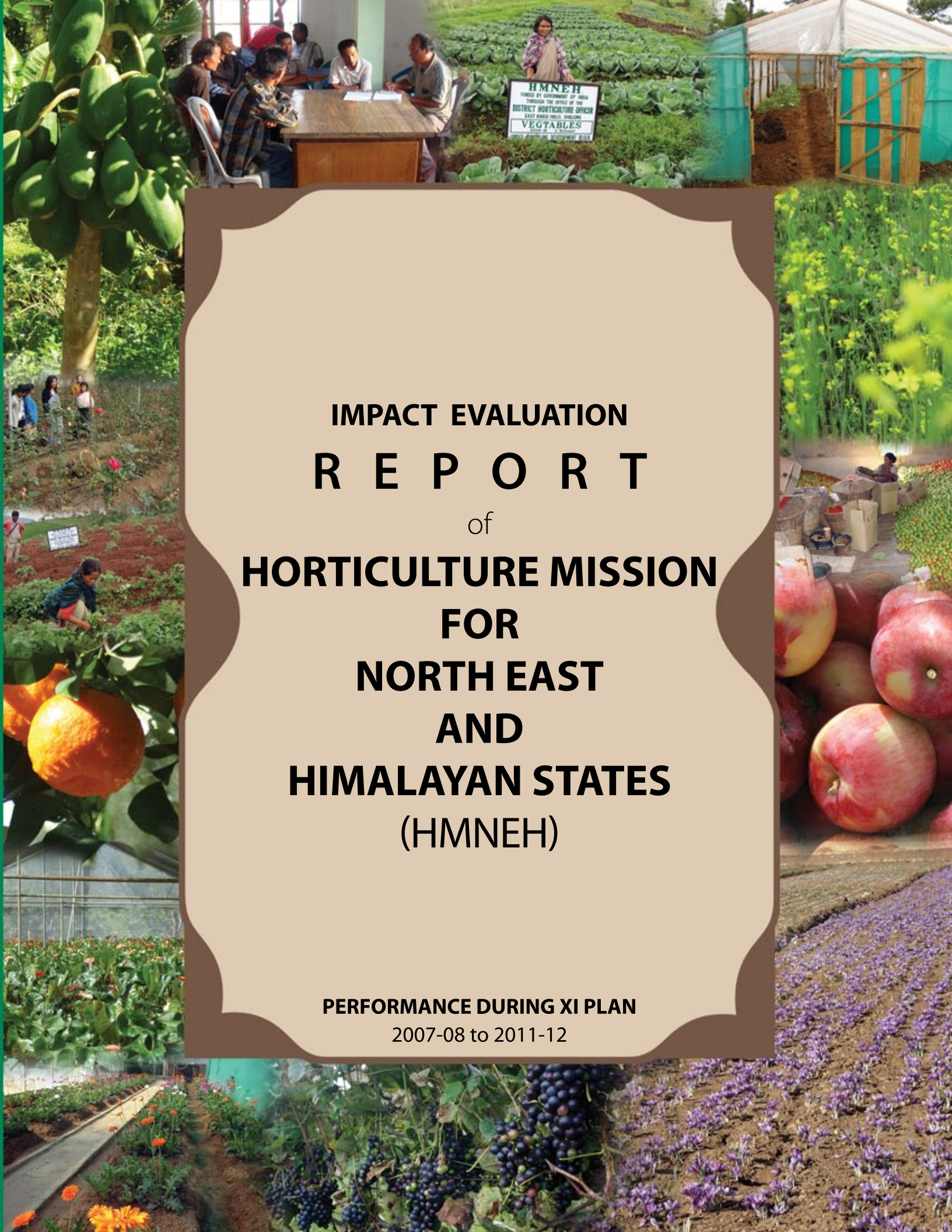

IMPACT EVALUATION

R E P O R T

of

HORTICULTURE MISSION FOR NORTH EAST AND HIMALAYAN STATES

(HMNEH)

PERFORMANCE DURING XI PLAN

2007-08 to 2011-12

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HORTICULTURE MISSION FOR NORTH EAST AND HIMALYAN STATES (HMNEH)

PERFORMANCE DURING XI PLAN

2007-08 to 2011-12

YEAR of HORTICULTURE 2012

Prepared by:

Agricultural Finance Corporation Ltd.

Submitted to:

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Acronyms

AFCL	Agricultural Finance Corporation Ltd
AMIS	Agriculture Marketing Information System
ATMA	Agriculture Technology Management Agency
BCL	Bio Control Laboratory
CoE	Centre of Excellence
DAC	Department of Agriculture and Cooperation
DCs	District Committees
DFU	Disease Forecasting Unit
DRDA	District Rural Development Agency
FIG	Farmers Interest Groups
FPO	Farmer Producers Organization
GoI	Government of India
HMNEH	Horticulture Mission for North East and Himalayan States
HRD	Human Resource Development
HSR	Himalayan States Region
IA	Implementing Agency
IGA	Income Generating Activities
INM	Integrated Nutrient Management
IPM	Integrated Pest Management
IT	Information Technology
J&K	Jammu & Kashmir
KVK	Krishi Vigyan Kendra
MAP	Medicinal and Aromatic Plants
MF	Marginal Farmers
MIS	Management Information System
MM	Mini Mission
MoA	Ministry of Agriculture
NEH	North East and Himalayan States
NER	North East Region
NGO	Non Government Organization
NHM	National Horticulture Mission
NHRDF	National Horticulture Research & Development Foundation
OBO	Other Backward Classes
OF	Other Farmers
PACS	Primary Agriculture Cooperative Societies
PHC	Plant Health Clinic
PPC	Plant Protection Chemicals
PRI	Panchayati Raj Institution
PTC	Plant Tissue Culture
SAMETI	State Agriculture Management and Extension Training Institute
SAU	State Agriculture University
SC	Scheduled Castes
SF	Small Farmers
SFAC	Small Farmers Agri-business Consortium
SHG	Self Help Group
ST	Scheduled Tribes
TCU	Tissue Culture Unit

Preface

The Technology Mission for Integrated Development of Horticulture in North Eastern States including Sikkim was launched by the Government of India during 2001-02 with the objective of improving the production and productivity of horticultural crops by harnessing the potential of the region. The scheme was subsequently extended to the States of Jammu & Kashmir, Himachal Pradesh and Uttaranchal during the year 2003-04. The scheme has since been renamed as Horticulture Mission for North East and Himalayan States (HMNEH).

The Mission has since completed a period of almost one decade. Small Farmers' Agribusiness Consortium (SFAC), as the Nodal agency for implementation of the scheme, commissioned a comprehensive exercise aimed at creating a data-base of beneficiaries covered under the programme during the XI Plan period (2007-08 to 2010-11) and also designing a suitable framework for Management Information System (MIS) at the District and State levels so as to assess the outcome and overall impact of the programme on the target beneficiaries. This evaluation was conducted by Agricultural Finance Corporation Ltd. (AFC) on behalf of SFAC.

A study team of experts in the field surveyed nearly ten thousand beneficiaries of different components of the programme of the Mission. The study team also used the secondary data/information available with the State Horticulture/Agriculture Directorate, analyzed the same and drew inferences there on.

This report is unique in many ways. It combined building a comprehensive database of HMNEH from the district upwards for each of the programme States, creating a highly user-friendly online Management Information System (MIS), followed by the subsequent detailed analysis of the data and a large sample of beneficiary level impact assessment. SFAC and AFC pooled their energies and resources to address a range of challenges in building the database from the ground up, developing and testing the MIS, training manpower in each district and State level offices besides crunching the wealth of statistics and information thrown up by the farmer level questionnaires.

The result is a report rich in statistical detail as well as analytical insights. It will provide valuable feedback to all stakeholders at various levels in the programme and set the stage for further deepening and strengthening of the Mission during the XII Plan.

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EXECUTIVE SUMMARY

The Technology Mission for North East States has been launched since 2001-02, initially in North East Region [NER] and later on from the year 2003-04, extended to Himalayan States Region [HSR] to promote holistic growth of the horticulture sector through an area based regionally differentiated strategies for ensuring an end-to-end approach covering production, post-harvest management, processing and marketing to assure appropriate returns to growers/producers and promoting R&D technologies for production, post-harvest management and processing.

The Mission has since completed almost one decade since its launching. The need has been felt to evaluate the programme to watch its impact at the ground level and to pinpoint grey areas requiring further attention. The present study has accordingly been entrusted to the Agricultural Finance Corporation Limited [AFCL] by the Small Farmers' Agri-Business Consortium [SFAC] which is implementing Horticulture Mission for North East and Himalayan States [HMNEH] on behalf of the Ministry of Agriculture, Department of Agriculture & Cooperation, Government of India. The Consortium has been set up since 1994, to support various types of agri-businesses.

The AFCL Study team interviewed as many as 9828 beneficiary farmers of the programme from 8 North East Region [NER] and 3 Himalayan State Region [HSR] using a carefully designed observation schedule containing a set of questions logically related to the issue under study. The Study Team further had interaction with various officials of the Implementing Agency to collect primary and secondary data from them. The data collected have been analyzed by using an Excel Package and an Executive Summary of the findings of the study, based on both the primary and secondary data as also other inputs relevant to the horticulture sub sector, is furnished below.

There has been a substantial increase in the coverage of beneficiaries, area, production & productivity of various horticulture crops since the launching of the Mission in 2001-02 till 2009 -10, a brief account of which is given as under:

Coverage of Beneficiaries

The HMNEH has covered a total of about 11.70 lakh beneficiaries including 2.41 lakh women [21%] between the period 2006-07 to 2010-11 alone under its different components. The maximum number of the beneficiaries is covered under Area Expansion [44%] followed by Productivity improvement [and Technology Transfer [10%] components. The farmers were participating in more than one component. A predominant majority of more than three fourth had taken part in the Area Expansion related activities.

As found during the survey, the programme has covered an adequate number of women, SC, ST and OBC farmers as per the societal structure prevailing in the concerned States as also marginal and small horti-farmers. A good number of well educated farmers were undertaking horticulture activity which will facilitate technology transfer not only to them but also to fellow farmers through them to harness the fruit of the research. Better per unit of land and water returns are prompting the farmers in Hilly Regions where agriculture is normally practiced on subsistence level for shifting towards cultivation of horticultural crops.

Financial Assistance Extended

All the participating States had been allocated a total budget of Rs.1749.67 crore till 2009-10, out of which funds of Rs.1088.14 crore i.e. 62.19% were actually released. The State of Mizoram with share of 11% in the total allocation and 67.18% in release of funds was at the top and J&K with the corresponding figures of 8.21% and 54.70%, at the bottom in regard to the allocation and release of the funds. The utilization of the funds released was of the order of Rs. 1075.76 crore i.e. 98.86%, which is fairly good. The States of Assam and J&K, had however, not been able to utilize the amount to the extent of 5.49% and 7.44% respectively during the XI Plan period.

A total of 11,71,480 farmers were covered between the period 2006-07 to 2009-10 out of whom 2,41,138 were women constituting about one-fifth of the total beneficiaries of the programme. The programme has helped beneficiaries cultivate different horticulture crops on an area of 5.69 lakh ha.

Achievements under HMNEH

Area Expansion

The main thrust of the programme of the HMNEH was both vertical and horizontal expansion of horticulture crops. The Mission has made great strides to achieve its objectives. An additional area of 5.69 lakh ha - 4.44 lakh ha in NER and 1.25 lakh ha in HSR in respect of various horticulture crops including rejuvenation/replacement of plantation, has been brought under various horticulture crops since its inception in 2001-02 till 2009-10. The major expansion in the acreage has been in the case of Fruit crops - 50% and Vegetables- 18%. Spices with increase of 13% in area mainly in NER, were the next important crops in that order.

Region wise, Fruit crops [47%], Vegetables [19%] and Spices [15%] occupied about 81% of the total expanded areas, in NER, Fruit Crops [63%] and Vegetables [16%] dominated the scene with about 79% share in the total additional area in HSR.

The new area added to the two minor crops of Plantation and Medicinal & Aromatic Plants mostly in NER constituted about 3% each in the total additional acreage brought under Area Expansion component.

States Leading in Horticulture Crops

The five States of Mizoram [14%], Arunachal Pradesh & Uttarakhand [each with 13%], Assam [12%] and Nagaland [10%] accounted for about two thirds of the additional area of 2.86 lakh ha brought under Fruit Crops under the programme of the Mission.

Like-wise the five States of Tripura [18%], Meghalaya [15%], Uttarakhand [14%], Sikkim [12%] and Mizoram 11%] shared as much as 70% of the total additional area of 1.04 lakh ha put under vegetable crops under the Mission.

An additional area of 28153 ha was brought under Floriculture under the Mission since inception to 2009-10. The States of Mizoram [17%], Nagaland & Sikkim [14% each], Assam [12%] and Uttarakhand [11%\ were the major beneficiaries of the Programme and their combined share in the total programme was of the order of 68%.

Further in the total area of 74317 ha of Spices, the State of Sikkim had the maximum share of 22%, followed by Assam -16%, Nagaland -15%, Arunachal Pradesh-12% and Mizoram -11%. These five States occupied as much as 76% of the total area in the targeted 11 States. J&K was the only State where saffron, which is the most expensive spice of the world, was grown on an additional area of 37 ha.

Assam had the maximum share of 43% in the total area expansion of the programme of 14111 ha under Plantation Crops that took place during the period 2001-02 to 2009-10. The States of Meghalaya with 23% share and Nagaland with 20% share in the total acreage were the next in order. These three states together shared about 86% of the total additional area covered under plantation.

In the total acreage of 6664 ha under Medicinal Plants, the State of Mizoram and Nagaland with 29% share of each, had the top position followed by Arunachal Pradesh with 22% and Assam with 10% share. These four States together occupied as much as 90% of the additional area brought under Medicinal Plants.

Under Aromatic Plants, Arunachal Pradesh occupied the top position with 63% share. With the 13% and 12% share of Assam and Nagaland respectively, these three States occupied 88% of the additional area of Aromatic Plants in the total programme.

Status of Area Expansion in Respect of the Sampled Beneficiary Farmers included in the Study/Survey

Fruit Crops Production

The number of fruit growers' area under fruit crops and production all showed impressive growth. The number of farmers increased from 2292 to 5766 [152%], Area from 1742 ha to 2975 ha [172%] and from production 98245 qtl to 256282 [1581%] as a result of the implementation of HMNEH in all the 11 participating States.

Rejuvenation Status of Senile Orchards

The number of farmers availing of Rejuvenation of Senile Orchards component of the Mission was limited as per survey findings. Orange and Apple were the two major crops involving a total number of 435 [64%] farmers and 552 ha [67%] area. Orange [415 ha] was the major crop in NER and Apple [125 ha] in Himalayan States under Rejuvenation programme.

Vegetable Crops Production

The number of Vegetable Growers, Area under vegetable crops and production increased moderately from the launching of the HMNEH since 2001-02 to 2009-10. The number of farmers increased from 2411 to 3625 [1214 No. - 50%] from Area 1015 ha to 1793 ha [778 ha -77%] and production from 93183 qtl to 183159 [84976 qtl – 91%] as a result of the implementation of HMNEH in all the 11 participating States.

Tuber Crops

The Tuber Crop sub sector witnessed moderate increase in the number of respondent farmers from 222 to 421 [199 No. - 90%], area from 91 ha to 173 ha [82 ha - 90%] and good production from 4446 qtl to 17677 qtl [11231 qtl - 253%].

Floriculture

The number of the beneficiary floriculture farmers increased from 148 to 349 [136%] adding up 201 new farmers. The area under floriculture like-wise increased from 101 ha to 187 ha [95%] in 2009 -10 with the addition of 96 ha area. The production rose from 3568 lakh/qtl to 12925 lakh/qtl registering an increase of 252% during the same period.

The Floriculture cultivation has been picking up gradually in the States in view of the support available to the activity under the Mission.

Spices

The spice sub sector witnessed an impressive increase in the number of the beneficiary farmers from 601 to 998 [397 No – 66%], in area from 303 ha to 998 ha [695 ha- 229%] and in production from 12015 qtl to 30131 qtl [18116 qtl – 151%]] since the launch of the mission in 2001-02 to 2009-10.

Plantation Crops

In all the 11 participating States taken together, the Plantation sub sector witnessed increase in the number of beneficiary farmers from 81 to 192 [111 No -137%], area from 54 ha to 203 ha [149 ha -276%] and production from 3755 qtl/kg to 7974 qtl/kg [4219/kg - 112%] since the launching of the Mission in 2001-02 till 2009-10.

Medicinal Plants

The number of farmers cultivating medicinal crops increased from 21 in the pre project period to 44 in the post project period showing an increase of about 110%. The acreage increased by about 95% from 19 ha to 37 ha during the same period. Aloe Vera was the major crop being grown. Aloe vera and Prickly winged [Xanthozyllum] were the two main crops in NER and Aloe vera was the main crop of HSR.

Aromatic Plants

Lemon Grass was the main crop which registered a good growth rate. The number of the beneficiary farmers growing Lemon Grass increased from 4 in the pre project period to 24 [500%] in post project stage, and acreage increased from 4 ha to 29 ha [628%]. Similarly, production of this crop rose from 280 qtl/ha to 1804 qtl/ha showing an increase of 544 percent. Damask Rose was the next important aromatic plant.

The varied agro climatic zones of the region are suitable for the cultivation of a host of essential oil bearing plants to meet increasing demand for aromatic plants.

Rate of Survival of Fruit Crops

The plant survival rate at the threshold limit of 75 percent or more in the 2nd year and 90 percent or more in the 3rd year in respect of the plants grown under HMNEH, had not sustained. The stipulated norm covered only about one-third of the total plants grown under the programme – NER one fourth and Himalayan States half. The rate of actual survival reported by the remaining about 65-66% of the beneficiary farmers, was in the range of 'above 50%' in the majority of two-thirds of the cases [42% of total sample]; '26 to 50%' in about one-fourth of the cases [17% of total sample] and between '10 to 25%' range in about 10% of the cases [7% of total sample].

Model Floriculture Centres

Floriculture is the fastest growing agri biz segment of horticulture sub sector of Agriculture Sector. It has the potential to provide higher returns to the farmers. In all 27 Model Floriculture Units have been set up under the Mission. Meghalaya is the leading State having set up the maximum - 41% of the total Model Floriculture Centres established under the Mission followed by Nagaland with 11% such centres.

The floriculture activity is becoming popular on account of its low volume and high value. The number of the beneficiary floriculture farmers surveyed increased from 148 to 349 [136%] adding up 201 new farmers. The area under floriculture like-wise increased from 101 ha to 187 ha [95%] in 2009 -10 with the addition of 96 ha area. The production rose from 3568 lakh/qtl to 12925 lakh/qtl registering an increase of 252% during the same period. Rose and the Carnation were the two major crops under floriculture constituting fifty to sixty percent share in the number of farmers, area and production during 2009-10. The floriculture cultivation has been picking up gradually in the participating States in view of the support available under the program.

Setting up of Integrated Mushroom Units

Mushrooms are a good source of high nutrition and nourishing in nature besides being easily digestible food due to their low content of calories for human body. The activity is profitable for the marginal and small farmers. A total 27 Integrated Mushroom Units have been established by the different States, for supply of quality spawn and compost as well as training to the farmers desirous of undertaking Mushroom cultivation.

The Mushroom cultivation showed about twelve fold increases in the number of farmers included in the survey on account of the support extended under the HMNEH, There was also concomitant growth of over 400 percent in production and 88 percent in value. The activity appears to have gained substantial ground in Himachal Pradesh with around 93 percent share in the new units set up and to a lesser extent in J&K with 6 percent new units established under the programme.

Pollination Support - Bee Farming

Honey bees are the important external agents cross pollination crop plants. A total of 71350 No. of bee colonies have been set up to promote this activity for increase both in income of farmers and the productivity of horticulture crops in the area. The four States of Nagaland [18%], Uttarakhand [17%], Manipur [15%] and Himachal Pradesh [13] together accounted for as much as about two thirds share in the total of bee colonies established under the Mission. This apart, a total 12 units for development of Bee Breeders had been set in the two States of Mizoram [10 No.] and Nagaland [2 No.] under the programme.

The Bee Keeping activity was not found much popular amongst the respondent farmers in the survey conducted. An overwhelming number of over 90 percent of the new Bee Keepers consisting of less than 2 percent, were concentrated in the State of Himachal Pradesh only. There was no problem either in the procurement of the bee hives for which the main source was the State Agencies or marketing of the product. Success of bee keeping however depends upon some basic factors such as suitable climatic conditions, bee forage, bee management and bee breeding.

Expansion in Basic Infrastructure

Setting up of Modern Nurseries, Tissue Culture Units and Herbal Gardens

The non availability of critical inputs on time undermines potential yield and performance of crop production. A total of 230 new big Nurseries of up to 2 ha size -118 in Public & 112

in Private Sector and 779 Small Nurseries of up to 1 ha size - 600 in Private and 179 in Public Sector had also been set up under the Mission to enable the farmers to have an easy access to the seed and planting material of good quality. The State of Sikkim had taken lead in setting up the maximum No. of 44 big Nurseries and Meghalaya in establishing 24 No. of small Nurseries. A total of 48 new Herbal Gardens – 33 in Private and 15 in Public Sector, had also been set up under the programme. The States of Sikkim and Himachal Pradesh have set up maximum number of 33 and 73 Herbal Gardens under Private and Public sector respectively. Besides, 24 Tissue Culture Units - 14 in Private and 10 in Public Sector had been established. The State of Tripura and Uttarakhand had the maximum share of 21% and 30% in establishing Tissue Culture units in private and public sector respectively.

The total annual plants production in all the 1009 nurseries big and small both in Public and Private Sector at the stipulated rate of 50,000 plants for small nursery and assuming double this figure for big nursery, could be around 7 crore.

In addition to above in the private sector, as many as 525 farmers included in the sample had also set up Nurseries - 79 big and 446 small producing estimated number 175 lakh plants annually for their own use as well as for sale to the other farmers and agencies – both Govt. and private. The maximum nurseries -164 [31%] have been set up in the State of Assam alone. A majority of the Nurseries around 55 percent have been established under poly houses. About 20 No of Herbal Gardens have also been set up under HMNEH by this class of the beneficiaries.

Government Departments Nurseries/SAU/Research Institutes were the major source from which a majority of 9048 [92%] respondents included in the survey were obtaining quality seed/planting material. A large majority over 80% were getting seed/planting material of their choice and of good quality and on time. Poor germination was cited as the main reason by a few farmers not satisfied with the existing supply arrangement.

Plant Protection Lab Infrastructure

The availability of a good lab infrastructure to diagnose and control diseases will help the farmers to control various diseases of their horticulture crops and avoid losses. A total network of 22 Disease Forecasting Units, 15 Plant Health Clinics, 7 Leaf/Tissue Analysis Labs and 4 Bio-control Labs have been set up in even of the States under Public Sector. One Hail Control Unit has also been established in Himachal Pradesh.

The Plant protection lab infrastructure of Disease Forecasting Units [DFU], Plant Health Clinics [PHC] and Bio-Control Labs [BCL] was found to be quite inadequate in the survey. A very small number of the respondents was aware either of the existence of such facilities in the area and/or had actually availed any service. There is thus a need to create above facilities within the easy access of the horticulture farmers and they should also be made aware of the benefits of these facilities to avoid crop loss.

Creation of Water Resources

Irrigation is very vital for raising the production and productivity of agriculture. HMNEH envisages not only creation of the additional Water Resources but also the judicious use of water to raise the production and productivity of horticultural crops.

A total number of 11251 Community Tanks and 14913 Tube-wells were constructed under the programme of the Mission. The five States of Himachal Pradesh [14%], Nagaland & Tripura [13% each], Mizoram [12%] and Sikkim [11%] together constitutes 63% of the total programme of Community Tanks in all the States. Like-wise the three States of Mizoram 21%], Assam [18%[and J&K [15%] together had a share of more than half of the total Tube-Wells construction programme.

The majority of the farmers of about two thirds in the area are, however, dependent upon rainfed horticulture and creation of water resources were very important for them to raise the production and productivity of their horticulture crops. About three fourth of the existing irrigation structures on the cultivated land of the beneficiaries surveyed have been created under MM-II programme. The maximum number of the respondents [98%] from Sikkim reported creation of community tanks, followed by Nagaland [94%] and Arunachal Pradesh [90%], in NER. In HSR community tanks in Uttrakhand formed 80 and above part of the total irrigation facilities created, followed by Himachal Pradesh [77%]. The community tanks were meeting the irrigation needs of the concerned beneficiary adequately and also being managed properly in all the States excepting Manipur. Manipur was the only State where majority [55%] had indicated that its full irrigation needs were not being met by the community tanks.

On-farm Water Management

The proper harvesting and efficient utilization of water is of great implication The method, frequency and duration of irrigations have also significant effects on crop yield and farm productivity. The scarce water resources are required to be used efficiently.

Drip Irrigation

Drip irrigation with economical and judicious use of water not only saves scarce resource of water but also adds to the productivity of the crop. A total area of 16656 ha has been covered under Drip Irrigation system since the inception of the programme to 2009-10. The performance of the State of J&K with almost cent percent [99.62%] shortfall was the worst. The four States of Meghalaya [24%] Arunachal Pradesh & Mizoram [13% each] and Assam [12%] had as much as 62% share in the total acreage covered under the drip irrigation system.

Sprinkler Irrigation

Further another area of 3150 ha had been put under sprinkler irrigation system under the Programme. The State of Mizoram [29%] Himachal Pradesh [25%] and Nagaland [17%] were the main States using this micro irrigation to the extent of 71% of the total programme.

Drip and sprinkler have not become much popular among the surveyed farmers of the area as only a small number [6% - drip and 3%- sprinkler] have installed this micro irrigation system on their lands on an area of 2153 ha and 634 ha respectively. The State of Mizoram had the maximum share of 26 percent the total area covered under drip irrigation. Himachal Pradesh had about half of share in the total sprinkler irrigation system created under the Mission. The micro irrigation system has, however, been found useful by the beneficiaries to increase irrigation potential and crop yield.

Plastic Mulching

Plastic Mulching a technique to cover soil around the root zone of plant with a plastic film is an effective practice to restrict weed growth, conserve moisture and reduce the effect of soil borne diseases. Under the Mission a total area of 10240 ha was covered by Plastic Mulching. The States which have played a dominant part in implementing mulching activity in horticulture were Manipur[21%], Assam [20%], Uttarakhand [17%] Meghalaya [13%] and Nagaland [12%] with combined share of about 83% in the total programme of mulching.

Only a fraction of the beneficiaries less than 2%, included in the study, have availed of Plastic Mulching component of the programme covering small area of about 57 ha. Farmers were, however, not satisfied with the use of this technique. The Extension Agencies of the States need to fill up this gap to popularize a large scale adoption of the mulching technology.

Promotion of Green House Technology

Greenhouse technology is used to protect the plants from the adverse climatic conditions. It provides the optimum growth conditions of light, temperature; humidity etc for the best growth of plant to achieve maximum yield and best quality.

An area of 94.5 lakh sqm had been covered under different sub components of the Greenhouse Technology such as, Low Cost Tunnels [3.49 lakh sqm], Greenhouse of 500 sqm size [18.37 lakh sqm], Low Cost Greenhouse [16.71 lakh sqm], Shade Nets [50.69 lakh sqm], Anti Hail Nets [0.74 lakh sqm] and Poly sheet houses [4.50 lakh sqm]. Besides, one unit of Anti Hail Gun has been set up on pilot basis, in Himachal Pradesh. The Anti Bird Net has not been used by any of the participating States.

The Greenhouse Technology/Protected Cultivation of Horticulture crops have not taken off as yet as observed during interaction with the sample farmers during the study. Excepting Low Cost/Improved Greenhouse of 100 sqm where the availing level is of the order of 5%among the sample farmers the expansion under the other sub components such as Low cost Greenhouses of bigger sizes, High Tech Greenhouses of different sizes, Shade Nets and Anti Hail Nets, is below 1%. The use was also skewed The use of as much as 86 percent of shade nets and 64 percent of Anti Hail Nets was in Himachal Pradesh and J&K respectively. The technology has, however, been found to be beneficial by a large majority of the farmers using the same. This indicates that there is a good potential for wide scale adoption of the Greenhouse/Protective cultivation practices in the area. It may, however, be necessary to take into consideration the effect of the local climate while selecting the technology for different locations. The On-farm Management Material is being procured mainly through the Government Departments and to lesser extent through SAUs.

On-farm Handling Unit

The On-farm handling Units are being established to tackle the problem of proper storage and handling of fruit and vegetables at the farm level to avoid high post harvest losses of horticulture crops.

As many as 8334 on Farm Handling units have so far been established under the programme.The maximum on Farm Handling Units of 1520 [18%] have been established in the State of Nagaland, followed by 1447 [17%] units set up in Himachal Pradesh 1318 [16%] in Mizoram, 1284 [15%] in J&K and 900 [11%] in Arunachal Pradesh. These five States have set up more than three fourth of the total on farm handling units established under the programme up to 2009-10.

Organic Farming

The following programme have been undertaken to popularize the Integrated Pest Management [IPM] Technology during the period of the project till the year 2009-10:

Earth Worms Units set up

A total 18664 Earth Worms Units had actually been set up under the programme. The State of Himachal Pradesh had the largest share of 29% in the total programme and Arunachal Pradesh, Mizoram and J&K, minimum of 25% each.

Only 12% of the respondents [11% - NES & 14% - HSR] had set up earthworm units on their lands. Their number was the highest at 34% in Sikkim. The Earthworm producing activity has however been found beneficial by a large majority above 70% of the respondents undertaking organic farming, in all the State except Nagaland where such percentage was just 4%.

Adoption of Organic Farming/Incentive for Organic Farming

An area of 23120 ha had been covered under the programme in all the states. The State of Sikkim had the largest share of 25% in the total area covered under the programme. This was followed by Arunachal Pradesh with 20%, Mizoram with 14% and Uttarakhand with 10% share in the total area coverage. These four States together implemented about two thirds of the total programme.

Amongst the sample farmers**,** only a small number -18 percent of the beneficiary farmers had adopted IPM. The number of such farmers was, however, very low in the States of J&K- 1percent, Meghalaya – 3 percent and Tripura – 4 percent The Horticulture/ Agriculture Department is the main source of supply of critical inputs of IPM practice. The demonstration programme on IPM practices organized under the Mission, *were* proving useful to the farmers for reduction in number of the sprayings and the savings in the PP Chemicals being used. Majority of the farmers did not face any difficulty in procuring critical inputs for use in IPM.

Organic Farming Certification

The certification of the organic farming is as important as the organic produce. A producer of the organic commodity may not get a fair price for his produce in the absence of necessary certification. A total 83 Certification Units had been set up under the Mission. The State of Mizoram had lion's share of 43%, followed by Sikkim with 22% and Uttarakhand with 18% in the total certification agencies/units established under the Mission. These three States together had as much as 83% share in the total implementation of this sub component of the programme.

Majority of 68% of the surveyed farmers did not confirm the existence of certification agency/unit in their respective areas. Further a very small number of farmers have availed of such a facility where it existed. All the respondents from the States of Arunachal Pradesh and Tripura have reported non existence of any Certification Unit. An easy access to its certification facility will help in promoting safe food organic farming**.**

Promotion of Integrated Pest Management [IPM]

The Integrated Pest Management [IPM] Technology is being popularized for bringing improvement in the production of horticulture crops. A total area of 90883 ha has been covered under the Programme up to 2009-10.

The State of Mizoram had the largest share of 29% in IPM component. This was followed by Sikkim with 20% share, Nagaland with 12% and Assam with 11% share in the total programme. The combined share of thee four States was about three fourth of the total IPM component implemented up to the year 2009-10.

Only a small number -18 percent of the beneficiary farmers had adopted IPM. The number of such farmers was, however, very low in the States of J&K- 1%, Meghalaya – 3% and Tripura – 4%. The Horticulture/Agriculture Department is the main source of supply of critical inputs of IPM practice such as **-** bio-fertilizer/bio-pesticide/pheromone traps/ inter-cropping seed etc. to the interested farmers. The demonstrations on IPM practices organized under the Mission, *were* proving useful to the farmers for reduction in number of the Plant Protection Chemical sprayings and the savings in cost. Majority of the farmers did not face any difficulty in procuring critical IPM inputs. The adoption of IPM technology, which aims at minimizing the ill affect of the use of pesticides, needs to be further encouraged in the region.

Promotion of Integrated Nutrient Management [INM]

The approach of the Mission is to develop a viable horticulture farming systems that utilizes locally available organic and inorganic sources of nutrients to maintain soil health and its productivity in the region. A small area of 1605 ha only has been covered under INM and that too in the two States of Nagaland [81%] and Meghalaya [19%] The use of the INM technology needs to be propagated and popularized for its wide spread adoption in all the States.

Horticulture Mechanization

Availability of adequate farm power is very crucial for timely farm operations for increasing production and productivity and handling of the crop produce to reduce losses. The need is particularly great in hilly areas. A total of 366 Power drawn Agriculture Tools and Equipments, 66725 Manually Operated Agriculture Machines/Tools, 13093 Power Operated Agriculture Machine/Tools, and 5927 Power Tiller Units have been distributed among the farmers till 2009-10. Much of this programme has been implemented in the States of Mizoram and Nagaland in NER and Himachal Pradesh in HSR.

With a view to overcoming the problem of power shortage which is quite common in most of the participating States, the Mission has the provision of supply of Diesel Engines to assist

the farmers to continue farming operation uninterrupted. A total of 13362. Diesel Engine Sets had been supplied to the farmers under the programme and about half of which had been distributed in the State of Tripura alone.

Besides above, 120 number of weed cutter and 620 Horticulture Equipments for Canopy Management, Pruning, etc. were also distributed amongst the farmers. While all the weed cutters were used in the State of Nagaland, in the supply of the canopy management material, Manipur had the major share of about three fourth of the total programme. Further 85 number of Pit Hole Digger were also distributed in to the farmers in the State of Nagaland.

Then majority of the beneficiaries surveyed – 55 percent [60% NES & 60% HSR] have received Agricultural Equipments/Tools under the programme. Manual Equipments with 68% share in the total Agriculture Equipments/Tools etc distributed were the most popular. The Diesel Engines with 5% share in the total machinery received by the farmers was at the lowest. The Agriculture Equipments/Tools have helped the beneficiary farmers in increasing efficiency in their farming operations and reducing drudgery and consequent increase in their production.

Capacity Building and Transfer of Technology

The HMNEH lays emphasis on the HRD to make available qualified and trained workforce for establishing a strong horticulture base by bringing improvement in quality and use of appropriate techniques, processes and innovative designs to meet production and market demand. Capacity building programmes for all he stakeholders have been undertaken by the Mission. As a first steps about 31 training curriculum modules have been developed at the district level in Himachal Pradesh and Nagaland. Initiatives have been both in the capacity building of the trainers and setting of training infrastructure. About 2000 Trainers and 63 Facilitators have been covered under training/refresher courses. Besides, 68 Training Centres for Gardeners' Training and 41 Supervisors' Training Centres had been established under the Mission.

Farmers the important stakeholders in the programme, are imparted training for the adoption of high yielding varieties of various horticulture crops and other related issues. A total of 1,50,565 farmers had been trained within the State and as many as 40,783 of them were deputed on training outside the State to expose them with good horticulture practices in other states on the principle of "seeing is believing". These training programmes will facilitate extension from technology transfer mode to technology application.

A large number of the beneficiary farmers – 83% from the survey list had attended one or the other training programme of various durations ranging from 1 to 5 days under the Mission on different aspects of horticulture cultivation. Most of the programmes have been organized within the State and a few outside the State. More and more training programmes will facilitate extension from technology transfer mode to technology application. Farmers Training outside the State will expose them on different farming practices/technology as also on use of traditional knowledge.

Workshops/Seminars Organized

As many as 79 Workshop/Seminars had been organized under the Mission since its inception in 2001-02 to 2009-10. The direct interface between farmers and scientists minimizes the intermission losses and provides an effective method for transfer of technology. More than 50% of the total workshops/seminars held under the programme, had been conducted by the State of Assam alone.

Availability of Extension Services and Development of Horticulture Clusters

The availability of proper and timely extension service on cluster basis will facilitate technology transfer to the field. As per the study, about two thirds horticulture clusters consisted of only a small number of farmers ranging from 1 to 5. A substantial majority over 80% were satisfied with receiving support from the Extension Agencies in the clusters and were also contented with the service being given to them by the concerned agency The majority of the farmers from all the States, excepting the States of J&K, Meghalaya and Manipur, were receiving advice and technical support from the Extension Agencies in the installation and use of on farm management system, to their satisfaction. In J&K, Meghalaya and Manipur majority of the respondents had denied availability of such a service to them. The officials of Agriculture/Horticulture pay visits to the farmers' fields from time to time. In Mizoram, however, the visits of the extension officials to the farmers, were reported to be rare.

Women Empowerment

Mainstreaming gender is an important component of the policy framework for agricultural extension now. The Mission has the core strategy in empowering women through SHGs which will act as a network for channelizing the horticultural support to women farmers.

Training of Women

A total number of 79162 women have been trained under the Mission to provide them with critical skills and technologies. The States having major share in the achievement up to 2009-10 were: Assam [17%], Sikkim [16%], Mizoram & Tripura [13% each] and Uttarakhand [12%]. These five States together trained about three fourth of the total women included under the programme.

Women Self Help Groups

A total number of 9087 Women SHGs have been promoted under the Mission. The State of Nagaland had the maximum share of one fourth in women SHG promotion, followed by Meghalaya with 19%, Assam with 14%, Manipur and Tripura each with 12% share in the total programme. These five States together accounted for more than 80% share in the total programme implemented till the year 2009-10. Mobilization of self help groups and creation of learning environment will strengthen women empowerment process.

Of about 45 percent of the total 1439 women farmers included in the **sample,** as many, 649 [45%] were the members of the SHGs. The least response of 0.4% in this regard was from the State of Jammu & Kashmir. The large majority around 90 percent of the SHGs

were making regular saving and about two third of them also were linked with the Banks and doing the business of loaning amongst the members and also undertaking income generating activities. The SHGs promoted under the Mission had essential characteristics of the SHG concept and hence could be rated as good.

Distillation Unit for Aromatic Plants

A total of 45 Distillation Units for Aromatic Plants had been established under the programme. This activity had been undertaken mainly in the two States of Mizoram and Arunachal Pradesh with 51% and 44% share respectively and to some extent in Assam with a small share of 4% in the total Distillation Units set up. The NER and HSR have a large number of aromatic plant species which are traded in bulk. The setting of Distillation Units for extraction of oil within the easy reach of the Aromatic Plant will offer farmers an opportunity to get better returns for their produce.

Creating Marketing and Transport Infrastructure

In order to harness the potential of emerging consumer demand for horticulture commodities, efforts are being made under MM-III to create a network of various types of market infrastructure in the concerned States.

A network of 47, Whole sale Markets, 278 Rural Primary Markets and 66 Apni Mandies, has been created under the Mission from its inception in 2001-02 to 2009-10. Further 18 Grading Labs had also been set up in different States.

While the State of J&K has established the maximum number of 15 [32%] Whole sale Markets, in setting up of Rural Primary Markets, the State of Nagaland with share of 37% in the total programme, had taken the lead role. In establishing Apni Mandies, only two of the Stares of Nagaland [62 No.] and Sikkim [14 No.] with 79% and 21% share in the programme, have participated. In setting up of Grading Labs, Assam had the major share of 39%.

The marketing network established will serve the purpose only when it offers all the facilities/services of a modern market like grading opportunities and cold storage facilities. A more transparent price discovery through open auction will be necessary to make it an integral part of an efficient supply chain system. The lab facility with adequate machines and equipments infrastructure and manpower will surely help the farmers to get better price for their horticulture produce.

Only the State of Uttarakhand has taken advantage of the Ropeways sub component of the programme and has constructed as many as 31 ropeways facilitating connectivity between various places in its difficult hilly terrain.

The marketing networking was found to be the weakest point in the supply chain of horticulture produce in the area of the survey. The position in the HSR in this regard is somewhat better compared to that in the NER. Further the regulated markets where exist, do not have proper facilities such as Office Building, Auction Platforms. Drying Platforms, Godowns. Cleaning/Grading/Sorting/Packing. Water/Electricity Supply Sanitation etc.

A large majority of the beneficiary farmers depend upon the private/state transport to carry their produce to the market. Transport, however, is a big bottleneck in the hilly terrain

of the NER and HSR States. Farmers face transport problems such as non-availability of transport from a nearby point, uncertainty in its availability and costly transport. This discourages them to access to the proper regulated market. The transport difficulty is a related problem to the state of road infrastructure which is poor. A good network of the Markets and collection centres at nearby points will solve the problem to a great extent.

Vegetables and Fruit Processing Units

A lot of wastage occurs at every stage of the value chain in marketing of the horticulture produce in our country. It is imperative to develop food processing industry adequately to process and add value to various horticulture crops. The Mission encourages setting up of Vegetables and Fruit Processing Units by extending financial assistance to the F&V processing industry which is highly underdeveloped in India. A total of 63 Vegetable and Fruit [V&F] Processing Units have been set up under the MM-III. The major beneficiaries of this component had been the Himalayan States with 60% share in the total units established. The State of Mizoram has also availed of this sub component for upgradation of the two existing V&F processing units, under the HMNEH.

Status of Targets vs. Achievement

The participating States had been given annual targets in the programme under each of the component of the Mission. The overall status of achievement of all the crops under Area Expansion Component of the programme since inception till 2009-10, was of the order of 95% of the targets.

Economic Impact of the Programme

The outcome of the programme has been positive. A large majority above 80 percent of the beneficiary farmers has been able to increase their income level. The income of the two thirds of them has risen from up to 25 percent after participation in the HMNEH programme and of the rest above 25 percent. This is quite evident from the consumer durable like TV, Fridge,Two/Four Wheelers, Furniture and other assets like pucca house created by them in the post project stage. The maximum increase was observed in the ownership of TV [52%]. This is more visible in respect of the NER compared to the HSR An overwhelming majority of the beneficiary farmers are willing to bring additional area under horticulture crops.

Suggestions/Recommendations

The region has a vast untapped potential for exploitation. There, however, has to be a paradigm shift, from traditional system to knowledge-based and technology-driven systems having efficiency as a focal point, involving farmers in planning and execution. The following suggestions are made to widen the scope of development of horticulture sector in NRE and HS Region.

Increasing the Availability of Quality Seed/Planting Material

An adequate network of nurseries is required to be created both in the Public and Private sector for producing quality planting material in sufficient quantity and distribution among

the farmers. Many of the existing nurseries do not have modern infrastructure and these need to be upgraded.

Further some suitable mechanism for certification, registration and accretion of nurseries with a suitable agency should be put in place to ensure quality control. Standards for production of planting material need to be worked out. Nurseries should be located at a place convenient to the farmers.

Creating Better R&D Linkages

There is also need to evolve appropriate horticultural based cropping systems for different agro-climatic areas and the need for refinement of technology to suite specific needs of the area, locations, situations and socio-economic conditions of the farmers.

There is also a need for close cooperation and linkages between the agriculture R&D institutes, farmers and the private sector to develop varieties that are suitable for processing.

The States also need to identify the crops and good clusters/districts where they could be grown and undertake a mission mode approach to address all issues in a holistic manner. The level of satisfaction of the farmers is an important factor to influence their decision for adoption of good farming practices and the same should be kept in view.

The use of Geospatial technology - a computer system capable of capturing, storing, analyzing, and displaying geographically referenced information, will be of great help in crop planning, application of various inputs based on soil conditions, water resource availability and agro-climatic conditions of the hill States.

High Post Harvest Losses

Efficient post harvest technologies for different horticultural crops are still lacking resulting into a great constraint in exploiting the full potential of this sector.

There is a strong need for development of post harvest handling, promoting pack house concept, storage and processing system, product diversification and value addition. There is a need to encourage setting up of agro processing units at different levels with due regard to the product quality and safety measures. Not many processing units have been established under Mini Mission – III. The prevention of post-harvest losses will amount to surplus generated, without any additional cost.

Lack of Adequate Basic and Marketing Infrastructure

Lack of the basic infrastructure and market are an important impediment in the realizing of potential of high value horticulture crops in the region. Road network is poor in most of the participating States. The marketing structure for horticulture is very traditional.

It is imperative to bring radical reforms in marketing infrastructure including greater investment on road and transportation to make the supply chain efficient in order to improve system effectiveness and reducing costs. A good network of the Markets and collection centres at nearby points will solve the transportation problem to a great extent.

Horticulture farmers should be free to sell their produce to anyone and at any location of their choice. Private sector players should be encouraged to buy directly from the farmers. The

elimination of a long supply chain will ensure a better value for the farmer and reasonable price for consumer.

Lab infrastructure established so far in the form of Disease Forecasting Units [DFU], Plant Health Clinics [PHC] and Bio-Control Lab [BCL] is inadequate and it needs to be suitably augmented. Further farmers also need be made aware of such facilities to avoid crop loss.

Linking Farmers to Market

Linking farmers to the markets under cooperative arrangements help assure better return on farmers' investments and the supply of what the retailer or processor needs. The SAFAL Associations' Model promoted by Mother Dairy Fruit and Vegetables Ltd [MDFVL] as a mechanism for helping farmers to produce and supply effectively, can be emulated in the region, with suitable modifications. Vertical coordination of farmers with cooperatives, contract farming and retail chains would also facilitate them to deliver better output.

A direct procurement from the field by the modern retailing would be an added incentive to farmers. The horticulture growers in the region can be tied up with such entities.

The Hub and Spokes Model developed by the State of Meghalaya in terms of which ease of extension, supervision, collection and marketing are carried out in a clustered manner within easy reach of the hub, is worth emulating by other States.

Organizing Marginal and Small Farmers into Interest Groups

The small and marginal farmers could be organized into Self Help Groups [SHGs]/Farmers Interest Groups [FIGs]/Farmers Producers Groups [FPOs] to strengthen their bargaining power in selling of their produce as also to empower them to purchase various inputs jointly in bulk and solve their transport problems. Such a forum can also serve as an effective channel for both dissemination of technology and feedback to research and extension.

Some suitable agency can be identified and a Pilot Project in one location in each of all the participating States can be initiated to provide complete package of solution to all the problems of the farmer members, from production to the marketing in a holistic manner.

Creating Small Farmers Horticulture Estates

Organizations like Small Farmers' Horticulture Estates could be promoted to combine the advantages of decentralized production and centralized services, post harvest management, value addition and marketing, for leveraging institutional support and facilitate direct farmer-consumer linkage.

Setting up of Organic Farming Zones

The region has a natural advantage for organic farming and the same needs to be fully exploited Farmers are required to be made aware about the benefits of organic farming and given standardized technology for producing various inputs like vermi-compost, bio-fertilizers and bio-pesticides. A network of suitable market also needs to be developed for making available organic vegetable to the customers and realization of appropriate price by the farmers. A beginning in this regard has been made by Himachal Pradesh and other States may consider following H.P. Model with suitable modifications.

Increased Use of Green House Technology

The Greenhouse Technology/Protected horticulture cultivation has clear edge over the open field conditions as it protects the plants from the adverse climatic conditions. The off-season vegetables are in great demand in home market as well as in overseas market more particularly in the neighboring countries.

The Greenhouse Technology/Protected Cultivation of Horticulture crops have not taken off as yet as its use is at a very low level in the region. Scope, therefore, exists for large-scale expansion of nursery activity under favourable micro-climate created in cost-effective low cost structures. It may, however, be necessary to take into consideration the effect of the local climate while selecting the technology for different locations. The Extension Agencies of the States need to educate and guide farmers to fill up knowledge gap in this regard to popularize a large scale adoption of the Greenhouse technology.

Encouraging Use of Integrated Pest Management

The Implementing Agencies have to continue and strengthen their efforts to motivate farmers to switch over to bio-pesticides in growing of horticulture crops to the extent possible. A package based on the balanced use of inputs for optimum production, needs to be developed and popularized. The eco friendly Integrated Pest Management since worked out for a large number of horticulture crops needs further popularizing among farmers by providing them seeds of resistant varieties and IPM inputs.

Strengthening Extension Service

Extension service will have a key role in ensuring widespread adoption of modern technologies by motivating and educating farmers about the available technological and other inputs to improve farm productivity. A new extension framework that would cope with the new challenges and provide customized solutions to the farming community is required to be put in place. The NGO and private sector which had since forayed into agriculture extension and set new benchmarks, could also be roped in the new frame work of extension services.

The Horticulture Department should have adequate and professionally trained manpower to enable it to percolate down technological interventions to the grass root farming community. Every District office of the Horticulture/Agriculture Department should be supplied PCs and Internet facility, if not already done.

Farmers' Easy Access to Credit

Farmers' should have access to the credit at an appropriate time, in adequate quantity and at affordable rate of interest. The banking sector needs to develop innovative different credit products to respond to varied needs of the farmers to the extent of their repayment capacity and an efficient credit delivery system.

States should also create a favourable environment to support the banking system to enable the latter to expand and deepen financial services in the region and bring improvement in the credit absorption capacity of farmers.

Creating Irrigation Potential

The region has abundant rainfall but the same is not spread evenly throughout the year. More and more water harvesting structures of appropriate sizes need to be constructed to harness the runaway water. An appropriately simple designed low-cost micro irrigation system suited to the small plots would ensure its widespread use. The farmers also need to be well trained and acquainted with the maintenance of the system which has been posing some problem.

Encouraging Farm Mechanization

The different machines developed for effective cultivation, harvesting, grading, packaging and value-addition need to be popularized at farmers' level. The promotion of setting up farm machinery centres at different places to lease the farm equipments and machinery to the needy farmers on reasonable rent, could be one way to overcome the problem to encourage the use of farm machinery. The Agri-business Centres already opened in many districts could also be encouraged to undertake custom hiring of agriculture machinery.

Risk Management in Horticulture

Agriculture is a high-risk economic activity right from sowing to post-harvest operations. The weather based crop insurance will be a solution to provide financial security to the horticulture farmers in the event of failure of their crops. A national level approach for developing yield estimates for horticulture crops, which is a cumbersome process, may be initiated by the Union Ministry of Agriculture. The Small Farmers' Estate/Farmers Interest Groups where ever formed will further facilitate group insurance coverage of the members.

Development of Human Resource and Transfer of Technology

Human Resource Development is one of the key factors for successful implementation of other sub components of any programme. The capacity building programme at all levels - farmers, field level workers, technical officers and scientists and developing orientation skills of all the stake holders in the context of changing world scenario in horticulture, may be enhanced. The training programmes both within and outside the State will facilitate extension from technology transfer mode to technology application. The "Farm Schools" Model can be made as a core strategy in the training programme module in the region for transferring technology to the field.

Administering Subsidy/Unit Cost

The uniform pattern of subsidy and the unit cost decided on the principal "one size fits all" may not be realistic in case of some of the States. Some different norms may be required to be fixed on case to case basis. It may also be desirable to include some element of cost on fencing of orchards to prevent poaching and damage by wild animals.

A subsidy on transport to keep the transportation cost within reasonable limits will promote the horticulture growth in the area as connectivity in the hilly terrain is a big problem.

Exploiting Export Potential

The region offers a good scope for export of horticulture produce to world's fastest growing economies in South East Asia under the "Look East" Policy of the Government. These states should be targeted for enhancing the export potential of the country. The farmers need to understand the requirements of the importing countries to get a breakthrough in the market access.

Other Administrative/Procedural Issues

Constitution of District Committees [DCS]

The District Committees envisaged under the Mission, should be constituted in all the districts and associated with the preparation and implementation of projects/action plans as per the guidelines issued by the MoA. The PRIs should be involved with the selection of the beneficiaries to ensure transparency in the system.

Conduct of baseline survey

A base line survey is a method of mapping the potential of any activity in the area and forms a good base for an effective planning. It would be advantageous to conduct a base line survey before launching any new programme in future.

Involvement of NGOs/voluntary agencies

The NGO/Voluntary Sector has not been playing any important role in the implementation of the programme. The utilization of the services of NGOs for formation of SHGs, Training and capacity building, training to women farmers, would particularly be useful. Efforts should, therefore, be made to involve the voluntary sector in the implementation of the programme.

Fund flow mechanism in the district

All the districts should maintain separate Bank Accounts for the programme under the HMNEH and the funds parked in the Bank should also earn interest. The payment to the beneficiaries is also required to be made by cheques issued in the name of supplier of goods/inputs as far as possible.

Establishment of Centres of Excellence [COE]

The Mission had envisaged setting up a few Centres of Excellence in each State to serve as good demonstration points to give thrust to the horticulture activity. A total number of 28 such Centres of Excellence [CoE] covering 32 districts have so far been established. More such centres are required to be set up to achieve the objectives of the Mission.

Monitoring mechanism adopted by the state

Monitoring is an important aspect of the implementation of the programme and it should be put in place in all the districts. The inspection/monitoring may be conducted at least once in every quarter.

Accredition of nurseries to the prescribed agency

The ambit of the accreditation system needs to be further enlarged to cover more Nurseries being established under the Mission to ensure production of quality planting material.

Creating a Strong Data Base

The statistical data base of the Region for the benchmark analysis has been poor both quantitatively and qualitatively. There is, thus, a strong need for improving data base in the horticulture sector for better planning and administration of the programme.

Success Stories

A success story depicts the progress of the programme over time, its value and impact. Many unspoken success stories have come in all shapes and sizes. Things have changed for a few beneficiaries of HMNEH. Undertaking agriculture on small scale or on subsistence level and finding it difficult to make both ends meet, they are now turned into successful horticulturists, thanks to the support they got under Mission's programme. In their part time role, the achievers have become real game changers and stand out a source of employment in the area and motivators to others for adopting horticulture as a commercial activity in place of traditional farming. A regular collection of success stories can become a powerful instrument in spreading a word about the programme.

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Chapter

INTRODUCTION

Importance of Horticulture Sector

Horticulture in India has emerged as the fastest growing sector within agriculture during the last two decades, triggering agricultural development. Its growth makes a direct impact on employment generation and broader micro economic development of the country. Horticulture accounts for about 30% of India's agricultural GDP from 13% of cropped area and has maintained the growth rate of more than 5 percent during the last two decades. It also provides about 37% of the total exports of agricultural commodities. Horticulture

crops also help in achieving bio-diversity to maintain ecological balance for sustainable agriculture, and above all securing nutritional security. The horticulture is expected to play a dominant role in the overall development of agriculture in the country in the coming years.

The diverse soil and agro-climatic conditions and long growing season in different agro-ecological regions offer India a comparative advantageous position for growing a large number of horticultural crops round the year in one part of the country or the other. Horticulture can, thus, be harnessed in a holistic way as a means of agro-diversification for the second Green Revolution.

Horticulture crops are known as highly remunerative crops providing quick returns to the farmer with significantly higher growth per unit of area. Horticulture offers an alternative opportunity to the marginal and small farmers to shift from the traditional crops to vegetables to realizing higher returns which they are not finding under cereal crops.

Development of Horticulture Sector in India

A conducive policy environment in the country has been instrumental in creating ground for rapid development of horticulture sector. India's Five Year Plans have played a very important role by creating a favourable policy environment. Horticulture sector received its present momentum in growth in area and production from Eighth Five Year Plan onwards with higher outlays, after the country had attained the goal of near self sufficiency and food security in food grain production.

The country has created a large network of various research centres and other infrastructure both in the public and private sector. The Indian Council of Agriculture Research [ICAR] is the premier agency, which pioneered systematic research on agricultural crops in the country. Various Regional Stations, Project Directorate, National Research Centres, All India Coordinated Research Projects [AICRPS], State Agricultural Universities and Multi-Disciplinary Institutes of the ICAR provide necessary technological support to the expanding horticultural industry in the form of horticultural research, education and development.

The launching of the National Horticulture Mission [NHM] during the X Five Year Plan was a major initiative taken to promote holistic growth of the horticulture sector through an area based regionally differentiated strategies for ensuring an end-to-end approach covering production, post-harvest management, processing and marketing to assure appropriate returns to growers/producers and promoting R&D technologies for production, post-harvest management and processing.

As a result of the various initiatives taken in the country, a large number of fruits and vegetable varieties resistant to diseases & pests as also of short maturity period introduced have been adapted by the horticulture growers in the country. Judicious soil-water-fertilizer crop management techniques have been developed and propagation techniques standardized in several fruit and plantation crops. Integrated Nutrient Management Strategies [INM] are available and Integrated Pest Management [IPM] strategies in crops have been well standardized.

The efforts have been rewarding and the horticulture has witnessed tremendous growth in area and production. The area under horticulture increased from 12.77 million ha in 1991-92 to 20.88 million ha in 2009-10 and the production from 96.56 million tonnes to 223.09 million tonnes during the same period. Of this, area under vegetables increased from 5.59 million ha in 1991-92 to 7.99 million ha during 2009-10 and production from 58.53 million tonnes to 133.78 MT. In case of fruits, the area increased from 2.87 million ha to 6.33 million ha and production from 28.6 MT to 71.52 MT during the same period. In respect of the other horticulture crops of Spices, Medicinal & Aromatic Plants, Nuts, Plantation crops, Flowers etc., recorded an increase from 4.31 million ha in 1991-92 to 6.56 million ha during 2009-10 in area and 9.43 MT to 17.79 MT in production.

Fruits and vegetables production together constitute above 90 percent of the total horticultural production in the country. The thrust on research and policy intervention pushed productivity of horticultural crops from 7.5 MT/ha in 1991-92 to 10.7 MT/ha in 2009-10. The growth rate in this sub-sector is significantly higher than many agriculture crops.

The various initiatives taken in the country particularly during last two decades have resulted in considerable strengthening of the horticultural base of the country. India has now emerged as the second largest producer of fruit and vegetables and is next only to China in area and production. It is the second largest producer of flowers and the largest producer, consumer and exporter of spices and spice products in the world. With a stiff competition in the food industry for developing of new flavor systems to introduce new products in the market, the spices cultivation has large potential. With people becoming more health conscious, the use of herbal medicines and essential oils have been gradually increasing. The varied agro climatic zones of the region are suitable for the cultivation of a host of essential oil bearing plants. Floriculture is the latest addition to the commercial economy of the agriculture sector and is developing with all its potential.

The high yielding cultivars and FI hybrids and suitable production technologies have largely contributed to higher production and productivity. The Government's strategy during the XI Plan is to provide further dynamism to the sector by consolidating the gains made during earlier plans. The plan targets an annual growth rate of 5 percent in the horticulture sector. But as per mid-term appraisal of the Plan, the horticulture subsector may not realize more than 4% average annual growth rate. This notwithstanding, an average growth rate of 6.5% per annum has, however, been projected for Horticulture and Plantation Sector during XII plan period.

Narrowing Down Demand and Supply Gap

The impressive growth notwithstanding, there exists a large gap between the demand and supply of several horticultural commodities resulting primarily with fast rising urbanization and incomes levels and changing dietary habits in favour of horticulture crops. The low productivity owing to inadequate quality planting material, lack of varieties for value addition, slow rate of transfer of technologies has started posing a challenge to meet increase in demand both in the domestic and overseas market. The overall demand for horticultural produce is estimated at 300 million tonnes by 2011-12, by various estimates. This calls for appropriate approaches and strategies for raising both production and productivity of horticulture crops.

The average yield for various horticulture crops in India is low compared to many other countries of the world. Non-availability of quality seed, use of traditional local varieties, sub-optimal standards of cultivation limited irrigation facilities, diseases, pests and insect attacks and underdeveloped infrastructure support are the factors inhibiting the full growth of the horticulture sector in the country. Here comes the critical role of research to fill up gaps.

Given the limited land, water and other natural resources, ensuring sustainability and competitiveness of this sector is a big challenge. With the continuous shrinking of the available arable land, primarily there has to be a vertical growth in horticulture. The use of quality seed of improved varieties/hybrids and adoption of improved package of practices have potential to increase the productivity by 2-3 times from the present level.

Wastelands and hilly terrains are the potential future expansion areas with development of matching technologies. Special focus is called for in the planning process of the country in developing technologies for dry land to arid and semi-arid tracts as also for the horticultural crops which have lesser demands on water and other inputs.

India faces the problem of a very large number of small and fragmented land holdings with an average size of 1.23 ha. Farmers owning over 83 percent of the total such holdings find it difficult to realize sufficient returns from growing traditional staple crops. Horticulture offers an alternative opportunity for increased participation of small and marginal farmers to shift to horticulture cultivation to improve their economic lot.

The use of quality seed of improved cultivars/hybrids and adoption of improved packages of practices have potential to increase the productivity of horticulture crops by two-three times from the present level and to produce the same round the year in India's long growing-season, diverse soil and climatic conditions.

There has to be a paradigm shift from traditional system to knowledge-based and technology-driven systems having efficiency as a focal point, involving farmers in planning and execution. The large scale adoption of Greenhouse Technology for protected cultivation and micro irrigation system for its efficacy in saving water and improving yield are the critical factors to increase the production and productivity. The Extension service will have a key role in disseminating modern technology among the farmers and ensuring widespread adoption of the same.

Excessive use of insecticides to protect crop against insect pests and diseases has become a cause of concern not only from the point of view of health hazards but also from the outlook of crop failure due to development of resistance against insecticides/ fungicides. Efforts to promote Integrated Pest Management [IPM] and Integrated Nutrient Management [INM] need to be intensified. Adopting Chinese experience in spraying of pesticides through helicopter would be good for India as well to control the menace of excessive use of pesticides.

There is a need to develop organic farming for production of various horticulture crops. Farmers are required to be made aware about the benefits of organic farming and given standardized technology for producing various inputs like vermi-compost, bio-fertilizers and bio-pesticides. A network of suitable markets also needs to be developed for making available organic produce to the customers and realization of appropriate price by the farmers.

Post-harvest & Supply Chain Management

Post-harvest and handling losses in India are very high. It is estimated that around 35-40% of the total fruits & vegetables are lost or gets wasted in market chain, due to poor post harvesting management. This results into low productivity per unit area and high cost of production. The timely availability of inputs, development of organized input market & infrastructure for storage. Labeling, packaging and distribution of horticulture produce will add to the productivity of the sector.

The development of an integrated marketing of horticulture produce to safeguarding the interests of producer-sellers as well as the consumers is very important. Market information database, market intelligence marketing system and use of information technology, would be the integral components of the marketing chain. Public Private Participation will be a way out in meeting the huge cost of the needed infrastructure.

As fresh horticulture produce are highly perishable in nature, management of entire supply chain has special significance in enhancing shelf-life of horticulture produce and in retaining nutritive values. An efficient supply chain management would have a central role in keeping production costs at a minimum and profitability as high as possible. In the present traditional supply chain management of horticulture crops, there are a large number of intermediaries such as farmers, traders, transporters, processors, retailers etc. Redesigning the supply chain from seed bed to consumers' plate is the need of the hour.

SAFAL has brought about a change in the prevailing traditional market structure. The successful SAFAL associations' terminal market model promoted by MDFVL at Bangalore linking Farmers Associations and Collection Centers in the selected producing areas offers a solution to meet key needs of the stakeholders and is worth emulating. It is an effort to establish a direct link between growers and consumers aimed at reducing the vast difference between the farm and the retail price.

The horticulture processing sector is highly underdeveloped. Less than 2 percent of horticulture produce is currently processed in India as compared to 65 percent to 80 percent in the developed countries. There is a need to encourage setting up of horticulture based processing units at different levels with due regard to the product quality and safety measures. Similarly, value addition is only 7 percent in India as against 88 percent in countries like UK. In addition, processing may provide viable solution to the problem of glut in the market due to over-production and also to the problem of transport of fresh horticulture produce from remote production clusters to markets. China's export competitiveness arises from low costs and a growing processing industry.

Emerging Organized Retailing Trend

An organized retailing penetration/modern supply chain is very low in India as to other developing countries. The emergence of supermarket chains has opened new opportunities for such horticulture farmers as are able to meet requirements for quality and supply continuity. Large corporate houses are now entering into horticulture sector and are bringing in latest technologies.

The increasing cooperative and contract farming system will provide extension education and training to the small land holders towards improved yield and quality of horticulture

crops in the long run. The production programmes will, however, have to be planned in a manner that the horticulture crops leave a remunerative price to the producer and are made available to the consumer at a reasonable price throughout the year.

The high delivery cost impacts the competitiveness and takes away any comparative advantage of the farmer for producing cheap. The growth of the modem food retailing sector will likely induce extensive changes in the structure of production and product aggregation. Greater supply chain coordination will occur in parallel with more traditional supply chains involving multiple intermediaries and sales through wholesale markets.

Export Potential

Despite being one of the largest producers of fruits and vegetables in the world, India lacks export competitiveness. Our share in export sector is insignificant – hardly 1 percent, due to inadequate production and poor quality standards in comparison to international standards. The quality control and longer shelf life in respect of fresh horticulture products, is a crucial factor for export. In the era of globalization, it has to be ensured that the produce has to be of international quality as well as globally competitive. Farmers need to understand the requirements of the importing countries to get a breakthrough in the market access. Organic production of fresh fruits and vegetable is important to capture markets in Europe. It, however, needs to produce sufficient surplus to emerge as a major horticulture exporting nation.

Other Related Issues

A well planned strategy is, however, needed in the direction to take advantage of our strengths and remove constraints to meet the goal of moving towards a strong horticultural growth in India. This will not only improve the nutritional requirement for masses but can also meet the challenge of adequate food supply to the growing population in the country.

There has to be a paradigm shift from traditional system to knowledge-based and technology-driven systems having efficiency as a focal point, involving farmers in planning and execution. Timely availability of inputs, development of organized input market and infrastructure for its storage and distribution, will add to the productivity of the sector.

Farmers' easy access to affordable credit facility is another important area which needs serious attention for the rapid development of horticulture sector. The recent move of the Government of India to make credit available at a cheaper rate is aimed at boosting horticulture production in the country.

Development of human resources with domain knowledge is the most vital need of the horticulture industry. A sustained capacity building at all levels campaign would be necessary to address the inadequacy of service delivery mechanism in respect of scheme implementation and rendering horticulture extension services. In view of low productivity and poor quality, there is imperative need for effective transfer of technology which is one of the prime movers of horticulture productivity and growth, is important.

Horticulture Mission in North East and Himalayan States

The diverse topography and climatic conditions of the NER and Himalayan States make the region suitable for production of a large range of horticultural crops. The Region with over 27% of area has about 7- 8% share in horticulture production. The Horticulture Mission for North Eastern and Himalayan States [HMNEH] launched since 2001-02 with the objective of harnessing potential of horticulture in the region has done a significant work.

The area and production under horticultures crops in North East Region [NER] and Himalayan States Region [HSR] had shown an increasing trend after the Mission. The area increased from 6.30 Million ha in 1991-92 to 9.80 ha during 2009-10 in case of Fruit Crops and from 6.05 ha to 11.93 million ha in respect of vegetable crops during the same period thereby recording a growth rate of 56% and 97% respectively over the base year of 1991-92. Like-wise, production of fruit crops increased from 30.46 MT in 1991-92 to 60.45 in 2009-10 MT and of vegetable crops from 49.11 MT to 98.60 MT during the said period, the growth rate for the two crops works out to be 98% and 100% respectively.

There was marginal increase in area under spices from 1.25 million ha in NER & HSR in 2007-08 to 1.32 million ha and production from 3.22 MT to 3.47 MT during 2009-10 showing a nominal growth rate of 6% and 8% respectively. In case of floriculture, area under cut flowers had doubled from 0.02 million ha in 2007-08 to 0.04 million ha in 2009-10 and production from 2378 lakh to 7304 lakh number recording an increase of over 200%.

2

Chapter

APPROACH & METHODOLOGY OF THE STUDY

Background of the Present Study

Horticulture in the country has emerged as a core sector in agriculture and is the best option for diversification in agriculture for nutritional security and enhancing employment opportunities and farm income. As a result of adoption of improved technologies, the country has made impressive growth and the horticulture sector is poised to attain great heights. There has, however, been much disparity in horticulture development in different parts of the country. Such a gap in production is more discernible in the case of North Eastern [NE] States.

The diverse topography and favourable agro - climatic conditions of North Eastern States offer a high potential for cultivation of multiple horticultural produce in the region. But so far a limited area is only put under horticulture crops. The hilly terrain of the region with poor connectivity and accessibility, very small holdings, low productivity under traditional cultivation system, have worked against bringing a wide generic resource of the area available in the wild, to the commercial use.

The lack of infrastructure for organized and scientific post harvest handling, marketing and processing of this produce have been other inhibiting factors against production of a large range of horticultural crops. Under the scenario, there was an imminent need for a paradigm shift from traditional system to knowledge-based and technology-driven systems having efficiency as a central point to achieve an enhanced production and productivity in the horticulture sector in the hilly regions of the country.

It was in this backdrop that the Ministry of Agriculture [MoA] launched the Technology Mission for Integrated Development of Horticulture in the NE Region as a centrally sponsored scheme from February, 2001. The emphasis is on integrated of efforts through the four Mini Missions viz. those related to Research [MM-I], Production and Productivity improvement [MM-II], Post Harvest Management, Marketing and Export [MM-III] and Processing [MM-IV], The approach brings out convergence and synergy of all the development addressed to these four aspects of the programme. The Mission has been extended from the year 2003-04 to three Himalayan States viz. Himachal Pradesh, Jammu & Kashmir and Uttarakhand having almost similar terrain.

The Mission has since completed almost one decade since its launching. The need has been felt to evaluate the programme to watch its impact at the ground level and to pinpoint grey areas requiring further attention. The present study has accordingly been entrusted to the Agricultural Finance Corporation Limited [AFCL] by the Small Farmers' Agri-Business Consortium [SFAC] which is implementing Horticulture Mission for North East and Himalayan States [HMNEH] on behalf of the Ministry of Agriculture, Department of Agriculture & Cooperation, GoI. The Consortium has been set up to support various types of agri-businesses since 1994.

Broad Objectives of the Study

The broad aim of the impact assessment study is to assess the extent of success achieved in meeting the objectives of the scheme on the under mentioned norms/parameters:

- Analysis of the extent of coverage under Mini Mission II, III and State-wise & Scheme-wise including extent of fund utilization.
- Assessment of the physical and financial achievements vis-à-vis targets, if any or approved action plan, State-wise and Scheme-wise.
- Study of the prevailing system for identification of target beneficiaries including processes followed in implementation of the programme and suggesting improvements/modifications thereof for streamlining the operational mechanism.
- Examining the efficacy of existing monitoring mechanism and suggesting a suitable design and framework for Management Information System [MIS] at the District, State and National level.

- Study of the fund flow mechanism from the SFAC to grass root level, and suggesting a suitable framework.
- Collecting, collating and preparing a data-base of beneficiaries covered under the programme during the XI Plan period [2007-08 to 2010-11].
- Undertaking physical verification of 10000 beneficiaries covering all the 124 project districts across 11 States so as to validate the MIS.
- Assess the outcome and overall impact of the programme in terms of increase in income level of target beneficiaries, quality of life, reduction in migration, occupational diversification, adoption of new and/or sustainable technologies and value addition.
- Identifying qualitative and quantitative indicators for putting in place an effective monitoring and evaluation system.
- Making suitable suggestions/recommendations for improving implementation of the programme to make it result oriented keeping in view its avowed objectives.
- The AFCL will also bring out a suitable MIS for creating a reliable statistical data base for benchmark analysis of the implementation of the programme during the period of XI Five Year Plan.

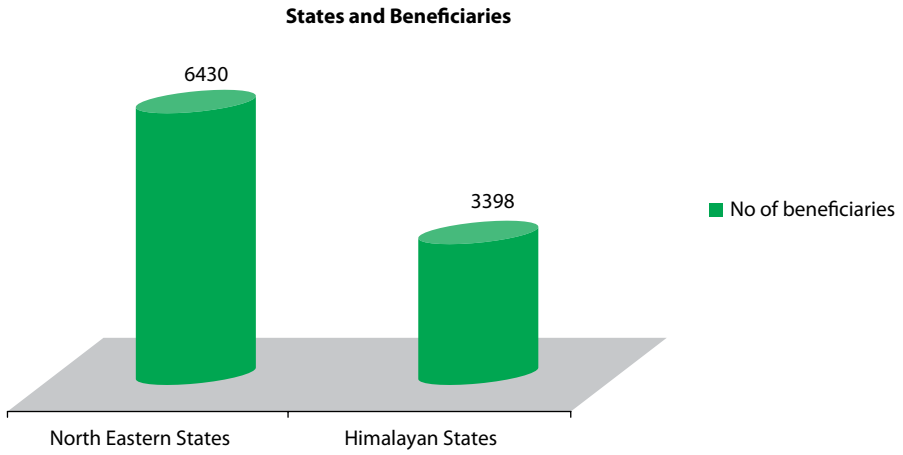
Coverage of Area and Sample Size

The details of the States and the beneficiaries to be covered in the study are furnished in Table 2.1.

Table 2.1 States and beneficiaries covered in the study

Sl. No	Name of the State	No. of beneficiaries
	North Eastern States	
1	Arunachal Pradesh	1238
2	Assam	1966
3	Manipur	675
4	Meghalaya	525
5	Mizoram	600
6	Nagaland	825
7	Sikkim	300
8	Tripura	301
	Sub Total	**6430**
	Himalayan States	
9	Himachal Pradesh	913
10	Jammu & Kashmir	1510
11	Uttarakhand	975
	Sub Total	**3398**
	Grand Total	**9828**

Figure 2.1 States and beneficiaries covered in the study



Criteria adopted for selection of beneficiaries

- All the eight North Eastern States and three Himalayan States, where the programme is launched, have been included in the study.
- A total number of 9828 beneficiaries of the programme - 6430 from NE States and 3398 from the Himalayan States as indicated in column No. 3 of Table 2.1, were included in the sample.
- The number of the beneficiaries in the sample is about 10 percent of the total beneficiaries.
- Out of the total sample of 9828, as many as 1439 [15%], 587 [6%], 5052 [51%], 1198 [12%] and 2991 [31%] were from Women, SC, ST, OBC and General Categories respectively. This gives a fair representation to different land owning social groups concentrated in different areas.
- A stratified random sampling technique to cover all the component of the programme has been adopted.
- The criteria adopted for determining the number of the sample from different States was in proportion to the total beneficiaries of the programme in the respective States.

Reference Period

The study has been conducted since the launching of the programme in the year 2001-02 to 2009-10.

Constitution of the Study Teams

A core team comprising of Horticulture Experts, Sociologists and Agricultural Economists supported by Research Associates and Field Investigators was constituted to take up the study. The Teams visited the State/District Offices of the State, Horticulture/Agriculture

Directorates, State SFAC offices and held discussions with the concerned Officers-in-Charge and other officials as also interacted with the farmer beneficiaries. The core team also had interaction with the State Agriculture Ministries and Central SFAC before taking up the study.

Study Tools

The following tools were designed to seek the required information on all aspects of the implementation of the programme, from State Implementing Agencies and the beneficiaries of the programme, to make a fair impact assessment, in consonance with the objectives and terms of reference of the evaluation study:

[1] **Farmer Schedule:** Check List to collect information on component/s of the programme in which the farmer had participated; extent of the impact of the programme on his production & productivity; problems, if any, faced by the beneficiary in undertaking the programme and adoption of the package of practices after existing the programme.

[2] **Format MIS-1:** Check List for District-wise/component-wise/year-wise details of Physical and Financial Targets and Achievement there against, during XI Plan period.

[3] **Format MIS-2:** Check List for obtaining information on the Programme Component/ Activity-wise Annual allocation and release of funds to the District Hort./Agri. office by the State SFAC during the XI Five year Plan.

[4] **MIS Format-3:** Check List for District-wise details of the beneficiaries covered under MM-II during XI Five Year Plan period.

[5] **District format:** Check List to collect information on the implementation of the programme - Staff, infrastructure, criteria adopted for selection of beneficiaries, details of the different committees functioning for supporting the programme Lab/Marketing/transport Infrastructure created under the programme, association of other agencies in the implementation of the programme and fund flow mechanism adopted.

[6] **Tables 1.1 to 1.3:** Check Lists to collect plan-wise information/details on the clusters formed for crop specific areas, since the inception of the scheme.

[7] **Tables 2.1, 2.2 & 2.3:** Check Lists for details of the additional area brought under horticulture crops during different plan periods.

[8] **Table 3:** Check List to collect information/details on the working status of the infrastructure created for Protected Cultivation, IPM. Organic Farming & Training since the launching of the Programme.

[9] **Table No. 4:** Check List to collect information on the progress on rejuvenated plants component over different periods.

[10] **Table No. 5:** Check List to collect information of the development of fruit crops with highest area during XI Five Year plan.

Sources of Information

- Primary data collected from the Beneficiaries
- Secondary data obtained from the Implementing Agencies
- Annual/Literature issued by the MoA/SFAC
- State Horticulture/Agriculture Departments
- Central/State SFACs
- Other Horticulture Experts
- Available literature on the Horticulture Development.

Structure of the Report

The report has been structured into following nine Chapters keeping in view the broad objectives and terms of reference of the study:

Chapter	Heading	Broad Contents
Chapter-I	Introduction	Importance and significance of horticulture in the national economy, its potential and some key issues in its proper development
Chapter -II	Approach & Methodology of the study	Systematic approach and methodologies are adopted in sample selection and conducting the study to make the report worth relevant to the client
Chapter -III	An overview of development of Horticulture sector in India	Potentials and prospects of horticulture in NE & Himalayan States and the role of different agencies
Chapter-IV	State Profile and Overview of Programme Implementation	Profile of the States in North Eastern Region and Himalayan States, institutional mechanism created and the infrastructure facilities put in place for effective implementation of programme
Chapter-V	Primary Research Analysis and Results	Analysis and results of the data collected during farmers' survey across different villages within the sample States and other aspects of various insights and factors influencing the decision of the farmers in growing horticulture crops under the programme
Chapter- VI	Performance evaluation of States	Critical evaluation of the performance of implementing States in the North Eastern Region and Himalayan States with reference to action plan and targets allocated under different components of the programme and achievements there against besides Plan period-wise comparative evaluation of the performance of States

Chapter	Heading	Broad Contents
Chapter-VII	Role of Management Information System [MIS] in Horticulture and Development of Database of Beneficiaries	Need for development of a suitable MIS for NE and Himalayan States for collection, collating information and utilizing the same in decision taking
Chapter- VIII	Findings and Conclusions of the Study	Survey Findings and the Conclusions/ inference drawn from the information collected and collated on the implementation of different components of the programme and their utility to the beneficiaries
Chapter- IX	Issues, Suggestions & Recommendations	An independent chapter entitled Summary and Recommendations has been included for a quick preview of the important points and recommendations, which could result into actionable programmes for accelerating the future growth of the Hort. sector.

It is expected that this study will provide valuable insights into various factors influencing the decision of the farmers on the economic feasibility of diversifying agriculture into vegetable crops as a viable proposition. This may help the policy planning authorities to consider making suitable changes in the development and implementation of policy on promotion of horticulture sector in general and vegetables in particular, in the country.

3

Chapter

AN OVERVIEW OF THE DEVELOPMENT OF HORTICULTURE IN INDIA

Definition

The horticulture sector encompasses a wide range of crops e.g., fruit crops, vegetable crops, potato & tuber crops, ornamental crops, medicinal and aromatic crops, floriculture crops, spices and plantation crops – such as tea, coffee and rubber, mushroom and bamboo. Bee keeping, a tool used to improve the productivity of horticultural crops, is also now a part of the horticulture sector. The Working Group on "Horticulture, Plantation and Organic Farming" set up by the Planning Commission for XI Five Year Plan, has redefined the

Horticulture as the "science of growing and management of fruits, vegetables including tubers, ornamental, medicinal and aromatic crops, spices, plantation crops, their processing, value addition and marketing". These crops form a significant part of total agricultural produce in the country.

Significance of Horticulture in Agriculture

After having passed through various phases over the years, horticulture has emerged as a core sector in agriculture in accelerating the overall growth of economy. Its growth makes a direct impact on employment generation and broader micro economic development of the country. It has, therefore, now become a key sector in country's planned economic development. Its role in the country's nutritional security, poverty alleviation and employment generation programmes as also for providing wide range of options to the farmers for crop diversification, is becoming increasingly important. It has now emerged as the fastest growing sector within agriculture triggering agricultural development.

Indian agriculture is characterized by the small size of farm holdings and the size has been further decreasing continuously. There are about 129 million operational farm holdings in India with an average size of 1.23 ha. About 83 percent of the farm holdings are less than 2 ha, with operated area of about 41%of the total agricultural land, which has an impact on crop productivity. The large holdings [10 ha and more] constitute just 0.85 percent of the total number but covered about 12 percent of the total cultivated area of holdings covering about 41 percent of area. The holdings are also fragmented.

The returns from the traditional food crops for such small holdings are not sufficient and the farmers look for alternative sources to supplement their income. It has gradually surfaced that growing of horticultural crops such as high valued vegetable crops, is an effective method of achieving sustainability of small holdings. Being high yield potential per unit land, time and water, growing of vegetable crops is also more profitable than any other seasonal crop particularly the food grain crop. Horticulture has, thus, brought the most important change in the process of diversification of Indian Agriculture. These crops also help achieving bio-diversity to maintain ecological balance for sustainable agriculture.

Food grain crops dominate the cropping pattern and account for about 64 percent of the gross cropped area. With its good range of climates and soils, India has a good potential for growing a wide range of horticultural crops. Horticulture can be promoted, in a holistic way, as a means of agro-diversification, increasing employment, improving environment, providing an enormous export potential and above all achieving nutritional security. Horticulture sector is set to assume a greater role and importance to provide the much needed impetus to the growth of agriculture for the second Green Revolution.

Horticulture in Historical Perspective

The planning process in the country has been instrumental in creating a favourable policy environment, through earmarking resources for different sectors to ensure the

overall economic development of the country. The first few Five Year Plans assigned priority to achieving self-sufficiency in food grain production. The Green Revolution of seventies, which triggered unprecedented high growth in agriculture sector, became the turning point in the India's food grain economy and the path to self-sufficiency. The country which was importing a large quantity of food grains during the first two decades after its independence made strides to increase its food grain production from just 50.8 MT in 1950-51 to an all time record of 241 MT in 2010-11. The period 1967 to 1978 witnessed revolutionary changes in agriculture that substantially pushed up productivity levels of crops. India has now established itself as one of the world's biggest agricultural producers.

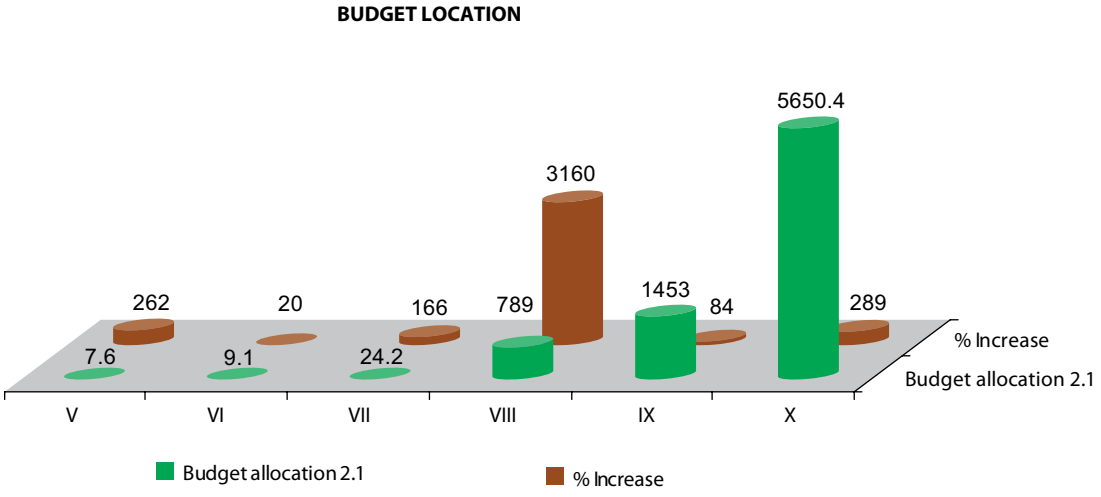
In the face of country's utmost priority to achieve food security, much planned efforts could not be made for horticultural development, except for giving some technical support and making development efforts for promotion of a few specific commodities like spices, coconut and potato, Recognizing the need for attaining nutrition security and for more profitable land use after attaining self sufficiency and a good measure of stability in food production, focused attention was paid to the development of horticulture sector. The other equally important reason, which weighed for the development of horticulture sector, was to secure sustainability in agriculture, creating increasing employment opportunities and bringing improvement in ecosystem. Besides, the sector offered enormous export potential and above all ensured nutritional security. From mid eighties Government of India, laid a lot of emphasis, on a planned process for the development of horticulture, as a means of diversification of agriculture for making it more profitable and sustainable. It was in the post-1993 period when horticulture growth received a sharp focus through an enhancement of plan allocations and development of knowledge based technology.

Horticulture development in the country received little attention till the 3rd Five Year Plan as the main concern of the country then was to ensure food security of the nation**.** The Horticulture sector started receiving increased plan resources from 7th Five Year Plans onwards. The plan budget allocation for the development of this sector under different Five Year Plans is as indicated in Table 3.1.

Table 3.1 Budget allocation for Horticulture Development in IV to X Five Year Plans [Rs. Crore]

S. No.	Five Year Plan	Budget allocation	% Increase
1	IV	2	-
2	V	8	262
3	VI	9	20
4	VII	24	166
5	VIII	789	3160
6	IX	1453	84
7	X	5650	289
8	XI	8809	56

Figure 3.1 Budget allocations for Horticulture Development in IV to X Five Year Plans



It may be perused from the table that the plan investment for horticulture development increased significantly from the VIII Five Year Plan onwards. Though during the VI and VII plan, allocation was enhanced impressively in percentage terms, the same still remained paltry in absolute term vis-à-vis the demand of the sector.

A real beginning to develop horticulture sector was made in the VIII plan period when the financial allocation was increased substantially to Rs.789 crore which was almost doubled to Rs.1453 crore in the IX plan period. During the X Plan period the resource allocation of Rs. 5650.40 crore was nearly 3 times compared to the allocation in IX plan period, in accordance with the national plans and priorities set for this sector. Like-wise, the modest separate plan allocation of Rs.3.5 crore made to Indian Council of Agricultural Research [ICAR] for research on horticulture crops during the IV plan was progressively raised during the subsequent plans and in X plan period, such an allocation stood at Rs.10000 crore. The plan investment has resulted in strengthening of the horticultural R&D programmes in the country, considerably. The strategy during the current XI Plan is to provide further dynamism to the sector by increasing allocation and consolidating the gains made during the X Plan period.

Development of R&D Infrastructure in Horticulture

A sound and responsive infrastructure plays a crucial role in the growth of any sector of the economy. The country has created a good network of research institutional facilities to provide necessary technological support to the expanding horticulture industry in the form of horticultural research, education and development. India now has a sound research infrastructure in horticulture to meet the growing needs and expectations of its fast developing horticulture industry.

The Union Ministry of Agriculture is responsible for the formulation and implementation of National Policies and Programmes aimed at achieving rapid agricultural growth including horticulture through optimum utilization of the country's land, water, soil and plant

resources. It implements its programs through the State Departments of Horticulture/ Agriculture and acts as a coordinator for various activities taking place at different levels in the country for promotion of horticulture.

The Indian Council of Agriculture Research [ICAR] is the premier agency which pioneered systematic research on agricultural crops in the country. It has the mandate to co-ordinate agricultural research and development programmes and to forge linkages at national and international level with interrelated organizations to enhance the quality of life of the farming community. About 10 percent of the total budget of Indian Council of Agricultural Research [ICAR] and 30 percent of the total budget of the Department of Agriculture & Cooperation [DAC] had been earmarked for the horticulture sector during the X Plan. In addition, the Ministry of Commerce has set up under its aegis an Agricultural Produce Export Development Authority [APEDA] for promotion and export of horticultural commodities - both fresh and value added. The coordinated projects for research and development, links between the Ministry of Agriculture & ICAR agencies and state and district-level initiatives have generated impressive outputs in the horticulture sector.

A vast network of various research centres and other infrastructure has been established in order to meet the agricultural research, technology intervention and education needs of the country. As at present, 8 ICAR institutes with 27 Regional Stations, 10 National Research Centres [on major crops], 1 Project Directorate on Vegetable crops, 10 National Research Centres, 16 All India Coordinated Research Projects [AICRPs] with 223 Research Stations located at various research Institutes/State Agricultural Universities, 1 full-fledged University of Horticulture, 25 State Agricultural Universities and 7 Multi-disciplinary Institutes of the ICAR, are engaged in horticulture research**.** In addition, a few R&D establishments of crop/ commodity boards and private sector are providing research support to Indian horticulture industry. The R&D work by the private sector has made significant contributions, more particularly in food industry followed by pesticide, seed and agricultural machinery. Besides above, a large number of CSIR Laboratories and Centres are also engaged in the basic and strategic research on horticultural crops. A few foreign-aided projects have also been in operation on specific problems of different horticulture crops.

The R&D sector in India is highly developed and contributing significantly to the horticulture industry development. A large number of vegetable and fruit varieties of vegetables have been released in the recent past both for table and processing purposes. Judicious soil-water-fertilizer-vegetable crop management techniques have been developed. Vegetative propagation techniques have been standardized in several fruit and plantation crops. Integrated Nutrient Management Strategies [INM] are available and Integrated Pest Management [IPM] strategies in crops have been well standardized.

India has been emerging as a leading player in the global scenario on account of new advances in technology made in this sector leading to an increase in horticulture production in the country. A Golden Revolution is well in the offing.

Launching of Horticulture Mission

Technology Mission for Integrated Development of Horticulture in North East Region and Himalayan States was launched in 2001-02 to achieve overall development of horticulture in

8 states to harness the potential that exists in these states. The scheme was further extended to three other hilly States namely Jammu & Kashmir, Himachal Pradesh and Uttaranchal during 2003-04. It has largely succeeded in its objective of sensitizing the farmers in harnessing the potential of horticulture in the region.

The launch of National Horticulture Mission in April 2005 was one of the important and major steps taken towards a planned approach for development of horticulture sector with focus on cluster approach in all the remaining states of the country. The mandate of the Mission envisages an end-to-end approach in covering production, post-harvest management and marketing, enhancing acreage, production and productivity in potential belts/clusters; adopting a coordinated approach and promoting partnership, convergence and synergy among R&D, processing and marketing agencies in public as well as private sectors and facilitating capacity building and Human Resource Development. It aimed to double the production of fruits and vegetables by 2010**.** The Mission seeks to promote, where appropriate and feasible, the National Dairy Development Board [NDDB] or Mother Dairy Model of cooperatives to ensure equitable involvement and returns to farmers. This will enable India to exploit its full potential of horticulture sector.

A scheme on Micro irrigation was launched during March 2006 to promote judicious use of water resources. The major components of the scheme are - coverage of area under drip and sprinkler irrigation, HRD of farmers and developmental staff, awareness and quality control measures.

Expanding Horticulture Production Base

The production base of horticultural crops has been expanding significantly since independence. From eighth plan onwards this sector has witnessed tremendous growth in area, production and productivity, as may be observed from the information presented in Table 3.2 [i to iii[.

Table 3.2.i Area, production and productivity of fruits and vegetables in India

Year	Area [Million ha]		Production [Million Tonnes]		Productivity [MT/ha]	
	Fruits	Vegetables	Fruits	Vegetables	Fruits	Vegetables
1991-92	2.87	5.59	28.6	58.53	10.0	10.5
2001-02	4.01	6.16	43.00	88.62	10.7	14.4
2002-03	3.79	6.09	45.20	84.82	11.9	13.9
2003-04	4.66	6.08	45.94	88.33	9.9	14.5
2004-05	5.05	6.74	50.87	101.25	10.1	15.0
2005-06	5.32	7.21	55.36	111.40	10.4	15.4
2006-07	5.55	7.58	59.56	114.99	10.7	15.2
2007-08	5.86	7.85	65.59	128.45	11.2	16.4
2008-09	6.10	7.98	68.47	129.07	11.2	16.2
2009-10	6.33	7.99	71.52	133.78	11.3	16.7

Source: NHB-Indian Horticulture Data Base-2010

Figure 3.2.1 Area, production and productivity of fruits and vegetables in India

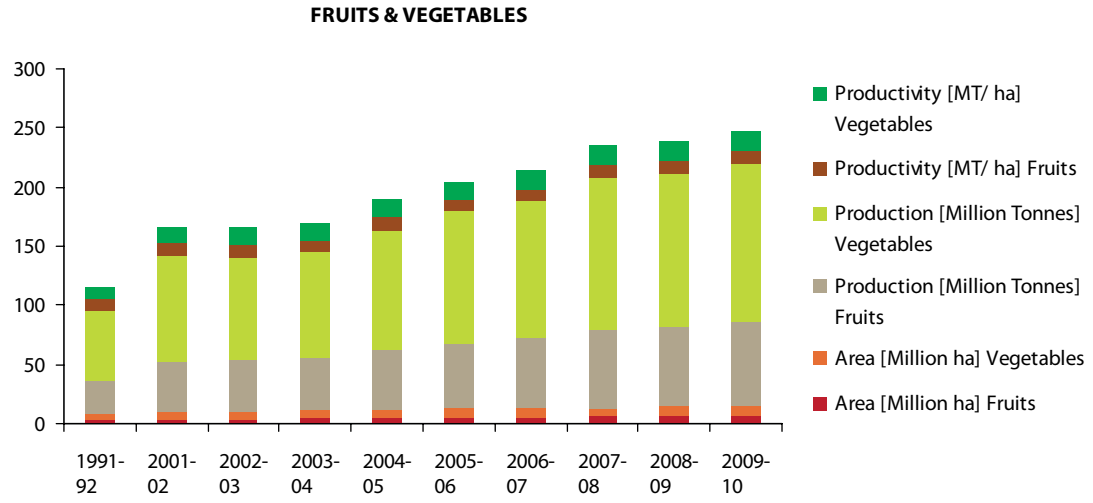


Table 3.2.ii Area and Production under other Horticulture Crops [Area [A] -000 ha, Production [P] - 000 Tonnes]

Year	Flowers [Loose]		Nuts		APM		Plantation	
	A	P	A	P	A	P	A	P
1991-92	NA	NA	NA	NA	NA	NA	2298	7498
2001-02	106	535	117	114	NA	NA	2934	9697
2002-03	70	735	117	114	NA	NA	2934	9697
2003-04	101	580	106	121	NA	NA	3102	13161
2004-05	118	659	106	121	131	159	3147	9835
2005-06	129	654	130	149	262	202	3283	11263
2006-07	144	880	132	150	324	178	3207	12007
2007-08	166	868	132	177	397	396	3190	11300
2008-09	167	987	136	173	430	430	3217	11336
2009-10	183	1021	142	193	509	573	3265	11928

Source: NHB-Indian Horticulture Data Base-2010.

The total area under different horticulture crops which was 12.77 million ha in 19991-92 increased to 20.88 million ha in 2009-10 showing an increase of 64 percent. Likewise, the production base of horticulture crops increased from 96.56 MT to 223.09 MT registering an increase of 131 percent during the said period. Both area expansion and production level have shown continuous increase except in the year 2002-03, when major horticulture crops registered negative growth. This, however, constitutes about 13 percent of the total net sown area of the country. Like-wise the production level of horticulture crops rose from 96.56 MT in 1991-92 to 223.09 MT in 2009-10. The growth rate at 131 percent has been impressive.

Fruits and vegetables are the two major horticulture crops in India. The performance of fruit sector has been impressive due to technological adoption. The area which was 2.87 million ha in 1991-92 increased to 6.33 million ha in 2009-10 under fruit crops, showing an

Table 3.2.iii Area and production under other Horticulture Crops

Year	Spices		Mushroom		Honey		Grand Total	
	A [000 ha]	P [000 MT]	A [000 ha]	P 000 MT	A 000 ha	P 000 MT	A [Million ha]	P [Million Tonnes]
1991-92	2005	1900	-	NA	-	NA	12.77	96.56
2001-02	3220	3765	-	40	-	10	16.59	145.78
2002-03	3220	3765	-	40	-	10	16.27	144.38
2003-04	5155	5113	-	40	-	10	19.21	153.30
2004-05	3150	4001	-	40	-	10	18.45	166.94
2005-06	2366	3705	-	35	-	52	18.71	182.82
2006-07	2448	3953	-	37	-	51	19.39	191.81
2007-08	2617	4357		37	-	65	20.21	211.24
2008-09	2629	4245	-	37	-	65	20.66	214.72
2009-10	2464	4016	-	41		65	20.88	223.09

Source: NHB-Indian Horticulture Data Base-2010.

increase of about 121 percent. The production level increased from 28.6 MT to 71.52 MT during the same period registering growth of 150 percent. Except the year 2002-03, the area under fruit crops has shown an increasing trend. In production, rising tendency was however, discernible during all these years. The productivity has moved around 10 -11 MT/ha all along with the increase of about 13% in 2009-10 over 1991-92.

The area under vegetable crops rose from 5.59 million ha in 1991-92 to 7.99 million ha in 2009-10 registering a moderate increase around 43 percent. The production of vegetable crops increased from 58.53 MT to 133.78 MT during the above period. The increase in production around 130 percent has been encouraging mainly because of rise in the productivity. The productivity level has increased from 10.5 MT/ha in 1991-92 to 16.7 MT/ha in 2009-10 with about 60 percent growth. Further except the year 2002-03 in respect of the area sown and 2002-03 & 2003-04 for production, there has been an increasing trend in the area as well as production of vegetable crops. Significant achievements have thus been made both in the area expansion and production of vegetable crops during the period 19991-92 to 2009-10. Given the fact that the production of vegetables in the country was just 15 million tonnes at the time of independence, the growth in the post independence era has been very impressive.

There has also been good performance in respect of other small horticulture crops during the said period. The area coverage and production of plantation crops increased from 2.30 million ha and 7.50 MT to 3.27 million ha and 11.93 MT showing an increase of 42 and 59 percent, respectively. The spices have shown a rise of 23 percent and 112 percent in area and production, respectively. The area increased from 2 million ha to 2.46 ha and production level from 1.90 MT to 4.02 MT. The flower [loose] area increased from 0.11 million ha in 2001-02 to 0.18 million ha in 2009-10 and production from 0.54 MT to 1.02 MT during the same period showing an increase of 64 and 89 percent, respectively. The area coverage and production of nuts increased from 0.12 million ha to 0.14 million ha & 0.11 MT to 0.19 MT registering a rise of 17 percent and 73 percent, respectively during the period 2001-02 to 2009-10.

Aromatic and Medicinal Plants [AMP] showed an increase of 292 percent and 256 percent in area sown and production. The area under these crops rose from 0.13 million ha in 2004-05 to 0.51 million ha in 2009-10 and production level from 0.16 MT to 0.57 MT.

Increasing Demand for Horticulture Produce

With the increase in purchasing power, changes in life style and food consumption habits of Indian population, there has been a decline in per capita cereal consumption and an overall increase in the consumer preferences for fruits and vegetables. Higher incomes and urbanization in India, changing lifestyles, international market integration and trade liberalization are expected to increase the demand for various horticulture commodities both in fresh and processed form even further.

However, there still exists existing unmet demand for vegetables and fruits. The per capita consumption of vegetables in India is only around 175 gm per day against a minimum of about 300 gm recommended by Indian Council of Medical Research and National Institute of Nutrition, Hyderabad. There is thus a much existing gap between the per capita demand and supply, which needs to be bridged.

Demand for both fruits and vegetables are expected to rise at the rate of 4-5 percent per annum in the next 15 years. The National Horticulture Mission had aimed to double the production of fruits and vegetables by 2010. The overall demand for horticultural produce is estimated at 300 million tonnes by 2011-12. The burgeoning population, shrinkage of arable land for agriculture due to urbanization and industrial growth and global competition has limited the possibilities for horizontal expansion. The answer, in horticulture expansion, therefore, lies in its vertical growth in terms of appropriate location specific high value crops with maximum productivity and cost effectiveness. Endowed with diverse agro-climatic conditions and abundant labour force, India can produce the required quantity of vegetables to meet the increasing demand. The only need is to provide a strong support of infrastructure and encouraging policy environment.

The rapidly growing demand for processed fruits and vegetables is expected to accelerate horticultural growth in the country. Consequently, horticulture is set to assume a greater role and importance within the agriculture sector and eventually in the national economy. Many cereal growing farmers are adding horticulture crops to their crop rotations in response to increased consumer demands. Large corporate houses are also entering into horticulture sector and bringing in latest technologies with them to give boost to the development of the sector.

Export Scenario

India has been exporting among others, fresh fruits, vegetables, processed products of fruits and vegetables. While the basket of India's fresh and processed horticultural export products is very diverse, only a few products account for a large share of the total foreign exchange earnings. Five commodities namely, fresh onions, mango pulp, processed gherkins, fresh grapes and fresh mangoes together account for about half of the total horticultural exports. The information on the export of fruit and vegetables during the period 2007-08 to 2008-09 and 2009-10 is presented in Table 3.8.

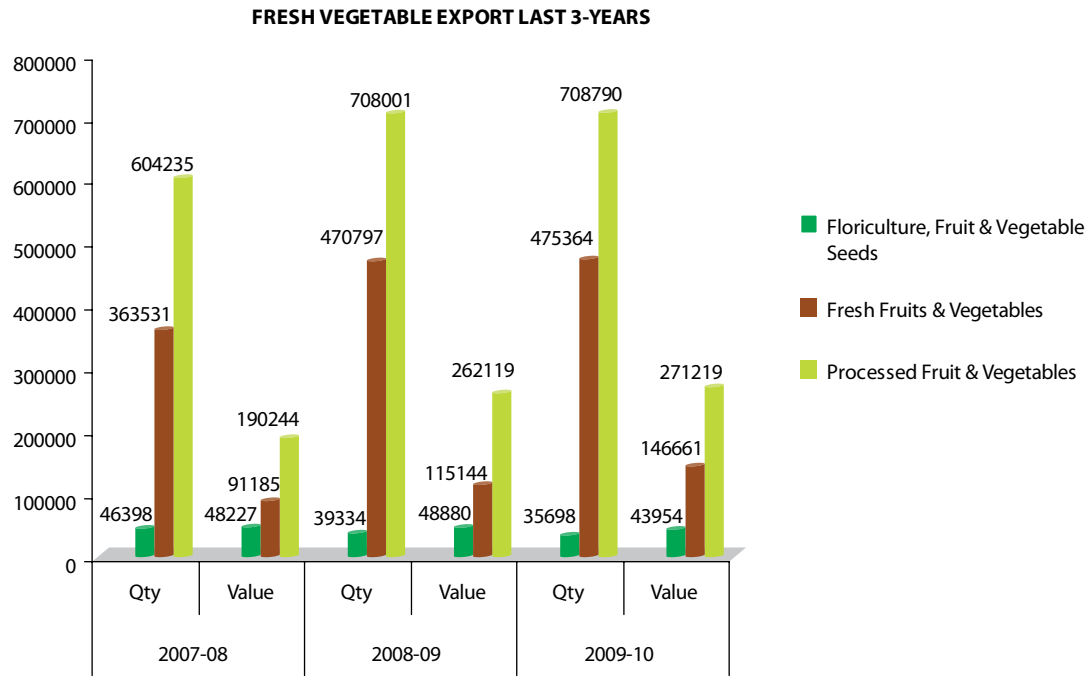
Table 3.8 Quantity and value of fresh vegetable export during the last three years

[Qty in MTs, Value in Rs. Lakh]

Hort. Produce Exported	YEAR					
	2007-08		2008-09		2009-10	
	Qty	Value	Qty	Value	Qty	Value
1. Floriculture	36241	34015	30798	36881	28815	29446
2. Fruit & Vegetable Seeds	10157	14212	8536	11999	8884	14508
Sub Total	**46398**	**48227**	**39334**	**48880**	**35698**	**43954**
2. Fresh Fruits & Vegetables						
[i] Fresh Onions	1008807	103578	1670186	182752	1664922	231943
[ii] Other Fresh Vegetables	350236	48949	505285	68020	419241	73186
[iii] Total [i] & [ii]	1359043	152527	2175471	250772	2084163	305129
[iv] Fruits	363531	91185	470797	115144	475364	146661
Sub Total [2]	**1724574**	**243712**	**2646268**	**365916**	**2559527**	**451790**
3. Processed Fruit & Vegetables	604235	190244	708001	262119	708790	271219
4. Grand Total	**2375206**	**482182**	**3393603**	**676915**	**3304015**	**766962**
5. % age of fresh veg. to the total horticulture produce [2[iii]/4]	57.22	31.63	64.11	37.05	63.08	39.78
6. % age of onion to the fresh veg export 2 [i]/Total [i] & [ii]	74.22	67.91	76.77	72.88	79.88	76.01

Source: NHB-Indian Agriculture Data Base-1910/APEDA Website March, 2011.

Figure 3.8 Quantity and value of fresh vegetable export during the last three years



It may be observed that the export of various horticulture products from the country has shown both an increasing and decreasing trend. The total horticulture export increased from 23.75 lakh MT in 2007-08 to 33.94 lakh MT in 2008-09 [43%] but declined 33.04 lakh MT in 2009-10 [- 3%]. The foreign exchange earned rose from Rs. 4821.82 crore in 2007-08 to Rs. 6769.15 crore [40%] in 2008-09 and to Rs. 7669.82 crore [13%] in 2009-10. The earning, however, depicted a rising graph.

The fresh vegetables and onions constituted 57, 63& 64 percent share in the total quantity of horticultural export and 32, 37 and 40 percent share in the total export earnings during the year 2007-08, 2008-09 and 2009-10, respectively. Further the share of fresh vegetable and fresh onion in the total export quantity constituted 15, 15 & 13% and 42, 49 and 50%, respectively. In terms of value, the respective share in the total export works out to be 10% in each year for fresh vegetables and 22, 27% & 30% for fresh onion during the year 2007-08, 2008-09 and 2009-10, respectively. The fresh vegetables and onion have, thus, a very significant content both in quantitative and value terms in the total export of horticulture products by the country. Further of the fresh vegetables export, onion contributes to 75 to 80% in quantitative terms and 68 to 76% in value. Other major export products were mushrooms, green peas, brinjal and okra. The fresh vegetable export represents insignificance portion of the total vegetable production in the country.

The export of fruit improved from 4.64 MT in 2007-08 to 4.71 MT in 2008-09 and to 4.75 MT in 2009-10 registering a growth rate of 29% and 0.85%, respectively over the previous year. The export value of the fruits which was 911.85 crore in 2007-08, increased to Rs. 1151.44 in 2008-09 and to Rs.1666.61 in 2009-10 showing growth rates of 26% and 1.06%, respectively. The export of fruit constituted 14, 15 and 14% of the total quantity of horticulture produce exported and 19, 17 and 19% in terms of value during the years 2007-08, 2008-09 and 2009-10, respectively.

The share of the processed vegetables and fruits in quantity and value constituted 25%, 21% & 21% and 39%, 39% & 35%, respectively of the total export during the years 2007-08, 2008-09 and 2009-10.

India's share in global horticulture trade is, however, less than 1 percent. The major markets for vegetables and fruits are Bangladesh, Sri Lanka, Malaysia, USA, UK and UAE besides other countries of the Middle East. It would be equally important to improve quality to retain existing market and also to diversify to other markets like Japan and Germany. The Agricultural and Processed Food Products Export Development Authority [APEDA] oversees market development for Indian exports.

Less than 2% of the total vegetables produced in the country are commercially processed as compared to 70% in Brazil and 65% in USA. Around 1.5 lakh MT of vegetables is sold as processed products. Lack of standards for quality produce also hinders the export prospects of these crops. In expanding export base, maintaining competitiveness, improving export market intelligence gathering to identify and meet opportunities, and meeting SPS and pesticide residues requirements are the key challenges. APEDA has developed HACCP certification and pesticide residue monitoring guidelines, and their effective implementation is critical for fresh and processed vegetable export development.

Emerging Issues for the Sector

The demand of horticulture produce is on the rise due to increasing population, changing food habits, realization of high nutritional value of horticultural crops and greater emphasis on value addition and export. This huge increase in the demand of fruits and vegetables for domestic consumption is a challenge to be met by the country. Along with this is the goal to produce horticultural products for exports, to earn much needed foreign exchange for an overall economic development of the country.

India aims to double its horticulture production to 300 million tonnes by 2012 and bring more cultivated area under different horticulture crops. The shrinking cultivable area has limited the possibilities for horizontal expansion and the answer lies in veridical growth of horticulture crops in terms of appropriate location specific high value crops with maximum productivity and cost effectiveness. Vegetables are known to give higher yields per unit area. Wastelands and hilly terrains which constitute a large area in the country are the potential future expansion areas, which can be tapped by developing matching technologies.

Though India is the second largest producer of most of the important vegetable crops at global level yet it lags behind in productivity in most of the crops. The productivity per unit area is low, resulting in high cost of production. The annual productivity of vegetable crops has increased marginally from 10.5 MT/ha in 1991-92 to 14.4 MT/ha in 2001- 02, to 16.1 MT/ha in 2007-08 and to 16.7 in 2009-10. Future increase in vegetable growth has mainly to be from the growth in productivity which will be possible by adopting improved technologies. Use of quality seed of improved cultivars/hybrids and adoption of improved package of practices has potential to increase the productivity by 2-3 times from the present level. Greenhouse technology and use of climatic variability further offer a good scope to increase productivity and production of vegetables round the year.

The post-harvest losses and handling continue to be high resulting in low productivity per unit area and high cost of production. Such losses in fruit and vegetables are estimated to account for 25 to 30 percent and occur at each and every step of the value chain such as different stages of grading, packing, storage, transport and finally marketing of both fresh and processed products. At micro level, these losses increase the marketing cost of the product and at macro level they also reduce the per capita availability. This has proved to be a great constraint in exploiting the full potential of this sector. Thus, there is a need to develop technologies, methods and mechanism to reduce these losses. High incidence of pests and diseases and low utilization in processing sector further add to the losses. There is the need to improve post harvest operations related to handling, storage and marketing of fresh and processed produce. The avoidance of post-harvest losses will amount to surpluses generated, without any additional cost.

The marketing structure for vegetables is very traditional consisting of a long chain of intermediaries. The farm-gate price available to the farmers is estimated to be only 25 percent of the retail price. A majority of the farmers sell their produce at the farm level in view of non-availability of proper transportation facilities, high transportation cost, malpractices in the market such as heavy deductions, free samples of the produce etc. Since most of these crops are grown by small and marginal farmers, and handled at the retail level by poor sections, the effect is all the more disturbing. Very often these commodities have to be sold through distress sales. The market intervention has thus been identified as one

of the important aspects for the growth of horticulture sector. The way out is to increase productivity of horticulture crops and remove the other supply constraints.

The multi layered market channel in supply chain is lacking in infrastructure which is affecting the growth potential of vegetables production. An efficient supply chain requires strengthening all the levels of infrastructure. The timely availability of inputs, development of organized input market and infrastructure for its storage and distribution will add to the productivity of the sector.

The emergence of SAFAL like models aimed at strengthening supply chain from producer to consumer is a welcome development. The SAFAL associations have been promoted by MDFVL as a mechanism for helping farmers to produce and supply produce more effectively. MDFVL fosters the development of associations of individual farmers, who can supply certain agreed quantity of fruit or vegetables a year, and deliver on a regular basis. MDFVL indicates its supply needs to SAFAL associations ahead of the season to allow association and individual farmers planning to meet agreed requirements. MDFVL also provides technical and input support for associations and the system is cited as a model of success.

Extension service will have a key role in ensuring widespread adoption of modern technologies. Horticulture extension is a weak area due to lack of extension professionalism as well as lack of manpower adequately trained in extension science. The recent initiative of the Government of India in the form of ATMA will go a long way in revitalizing the extension service and to make horticulture production knowledge based technology driven, farmer-centric as also demand driven.

The inadequate processing infrastructure has been one of the contributing factors for ineffective utilization of the raw materials resulting into huge post harvest losses. In India, less than 2 percent of fruits and vegetables produce is processed as against 65 percent in the US, 70 percent in Brazil, 78 percent in the Philippines, 80 percent in South Africa and 83 percent in Malaysia. The value addition is only 7 percent in India as against 23 percent in China and 88 percent in UK. This results into marked seasonal fluctuations in horticulture production leading to glut situation in one season and scarcity conditions in the other. With the growth of agro processing industry, surplus production in glut seasons could be well utilized in tiding over lean seasons. It will also reduce opportunities for exploitation especially of the small and marginal farmers by the traders and commission agents.

Efforts are, therefore, required in the direction to getting the most out of country's favourable agro climatic conditions by removing various constraints to meet the goal of moving towards a remarkable horticulture sector growth in India. A planned development in this regard will not only improve the nutritional requirement for masses but can also meet the challenge of adequate food supply for the growing population.

Future Outlook

India's long growing-season, diverse soil and climatic conditions comprising of several agro-ecological regions with a wide range of agro-climatic conditions enables it to produce horticulture crops particularly vegetables of different types throughout the year in one part of the country or the other and to maintain a continuous supply chain. The off season vegetables are in great demand in home market as well as in overseas market more

particularly in the neighbouring countries. India has, therefore, a great potential to become the largest producer and exporter of vegetable and other horticulture crops.

India is at the threshold of the retail revolution in the form of modern food retailing and super market chains, hyper market and cash and carry concepts. With the economy booming, retail is becoming India's one of the fastest growing industries. Modern retail in India could be worth US$ 175-200 billion by 2016. Reliance Fresh, Future Group**,** Wadhawan Group and Subhiksha are some of the important players in Food & Grocery Retailing and sourcing of bulk produce directly from the farmers, with big expansion plans. Direct sourcing of bulk produce from farmers eliminates middlemen and ensures a great opportunity for the producers of vegetables. This will further trigger the growth of horticulture sector.

The growing health consciousness among people all the world over and search for safe food has led to an increase in demand for organic foods. The global market for organically produced foods is said to be of the order of $26 billion and it is projected to increase to $102 billion by 2020. There is a strong need to promote organic farming in production of different horticultural crops to meet the vast demand both in the domestic and export market. India today produces a range of organic vegetables products. An appropriate market for the producers to sell his organic produce at remunerative price, assured regular source of supply of such produce by the seller and easy access to organic products by the consumer are proving bottlenecks in the development of this sector. The main bottlenecks of price, availability and development of markets in this regard are required to be addressed.

National Commission on Farmers views organic farming as a tool for second green revolution in the rain-fed and hilly areas of the country. The Commission has made a recommendation that 25,000 Organic Villages with niche commodities should be developed in the hills during the next five years, and the local farm graduates and youth be involved in it. It has recommended launching of a focused national movement for mainstreaming organic farming in the national agriculture economy. Organic production technologies need to be developed with scientific experimentation involving different disciplines to derive complete packages.

Technologies for producing vermi-compost, bio-fertilizer and bio pesticides for different crops have been standardized. In the years to come, India is likely to be able to convert a significant proportion of its agriculture into certified organic farming.

The State of Himachal Pradesh has since taken a policy decision for creation of an agency for scientific validation and certification of organic produce as the organic farming is being carried out traditionally in many landlocked pockets of the State. The SAUs will be creating a cadre of scientific manpower with a thorough knowledge of organic agriculture and carrying out research. An incentive based scheme of subsidy on inputs like seed, organic manure, bio-fertilizers and bio-pesticides, capacity building through trainings, exposure visits, trials on farmers' fields and support for adoption of technologies, has been introduced to strengthen the organic base. A Himachal Organic Farmers Forum has also been set up and the NGO/ Private Sector has been called upon to join hands to promote a State level Non Government body for organic sector. The other States may have to come out with similar schemes to promote organic farming in their respective areas.

Post-harvest management including pre-cooling, passive evaporative cooling for increasing the shelf life of fresh and processed horticulture produce has been standardized. The

production of frozen peas, garlic and ginger paste, tomato puree, mango pulp etc. has been taken up in a big way only recently in India. Integrated Nutrient Management [INM] for maintaining soil health and plant nutrient supply to an optimum level and Integrated Pest Management [IPM] to minimize the risk of pesticide residues in fresh and processed produce have been well developed and standardized.

India can look forward to emerge as a major player in global horticulture and secure reasonable market access for its agro exports. Indian horticulture industry has, however, to become more cost-effective to meet the growing challenges and opportunities arising out of WTO regime and the consequent globalization impacts. There are a number of collateral measures that have to be taken in order to take full advantage of modern technologies and for which the farmers must be made fully aware of. The XI Plan period seeks to address various constraints to further strengthen the sector and consolidate the advances made during the X Plan. The Plan envisages adoption of appropriate strategy for providing dynamism by retaining the gains already made and expanding its ambit to include new ones.

Horticulture Data for North Eastern and Himalayan States

Fruit Crops - Area, Production and Productivity in NER and HSR since 1991-92 to 2009-10

The NE and Himalayan States [NE & HS] together occupied about 21-, 22% of acreage of the total area of the country put under fruit crops during 1991-92 and 2001-02. In the year 2009-10, the share of this region decreased to about 15% in All India position. In the total production the combined share of these States in the country was 11% in 1991-92 which decreased to 10% in 2001-02 and further to about 9% in 2009-10. A detailed position in this regard has been presented in Table 3.9.

Table 3.9 Area, production and productivity of fruit crops in NE and Himalayan States during 1991-92 to 2009-10
[Area 000 ha, Production [Prod] 000 MT, Productivity [Pdty] MT/ha]

Name of the State	1991-92			2001-02			2009-10		
	Area	Prod	Pdty	Area	Prod	Pdty	Area	Prod	Pdty
Arunachal Pradesh	20.2	47.3	2.3	41.6	124.9	3.0	72.0	107.9	1.5
Assam	72.3	886.4	12.3	110.8	1335.1	12.0	117.3	1575.1	13.4
Manipur	19.8	43.0	2.2	26.1	134.0	5.1	38.4	281.9	7.3
Meghalaya	24.2	218.1	9.0	24.0	186.9	7.8	32.9	294.8	8.9
Mizoram	9.3	34.8	3.7	19.0	63.4	3.3	27.1	328.3	12.1
Nagaland	5.2	9.2	1.8	25.0	302.0	12.1	30.8	223.7	7.3
Tripura	44.9	319.1	7.1	28.3	452.1	16.0	36.9	573.8	15.6
Sikkim	7.7	18.8	2.4	12.3	10.3	0.8	12.2	18.5	1.5
Himachal Pradesh	157.2	339.9	2.2	223.0	284.4	1.2	208.4	382.7	1.8
Jammu & Kashmir	119.1	700.8	5.9	142.2	1000.9	7.0	209.8	1534.7	7.5
Uttarakhand	150.5	428.7	2.8	197.5	378.1	1.9	193.8	723.6	3.7
Total	**630.4**	**3046.1**	**-**	**849.8**	**4272.1**	**-**	**979.6**	**6045**	**-**
All India	**2874.0**	**28632.0**	**9.96**	**4010.0**	**43001.0**	**10.72**	**6329.0**	**71516.0**	**11.30**
% share of NER & HS	**21.93%**	**11%**	**-**	**21.19%**	**9.93%**	**-**	**15.43%**	**8.45%**	**-**

It may be observed from the Table that the area under Fruit Crops in NE & HS increased from 6.30 lakh ha in 1991-92 to 8.50 lakh ha in 2001-02 and to 9.80 lakh ha in 2009-10 showing an increase of 35% and 15% over 1991-92 and 2001-02 respectively. The total increase in the acreage in 2009-10 over 1991-92 works out to be 56%. As against this the increase at All India level was of the order of 120%. The Himalayan States with 4.27 lakh ha - Himachal Pradesh [1.57 lakh ha], Uttarakhand [1.51 lakh ha] and J&K [1.19 lakh ha] accounted for as much as 68% of the total acreage of 630 ha in NER & HS Region in 1991-92. The share of the NER States ranged from 1% in case of Sikkim to maximum of 11% for Assam during the same period. In the year 2009-10, the share of HS States constituted about 62% of the total acreage under fruit crops in NER & HS Region. The NER had improved its share from 32% in 1991-92 to 38% in the total acreage under fruit crops in all the States of NER and HS.

The total production of fruit crops which was 3.05 million MT in 1991-92, rose to 4.27 million MT in 2001-02 and further to 6.05 in 2009 -10 registering a growth rate of 40% and 42% during two decades. This works out to be about 98% over the year 1991-92. As against this the All India average is 149%. The Himalayan States with total production of 14.70 lakh MT– J&K [7.01 lakh MT], Uttarakhand [4.29 MT] and Himachal Pradesh [3.40 lakh MT], shared 48% of the total production of the States in both the regions and the remaining share going to NER States in 1991-92. The performance of Assam [8.86 lakh MT] and Tripura [3.19 lakh MT] was impressive and productivity better than that of the Himalayan States. In the year 2009-10, the share of the Himalayan States with total production of 26.42 lakh MT [J&K [15.35 lakh MT], Uttarakhand [7.24 lakh MT] and Himachal Pradesh [3.83 lakh MT] decreased to 44% and 56% went to the credit of NER States. The performance of Assam [15.75 lakh MT], Tripura [5.74 lakh MT] and Mizoram [3.28 lakh MT] was good and comparable with the Himalayan States in absolute terms and better in terms of productivity.

As regards productivity, it was 9.96 MT/ha at All India level in 1991-92, as against which the productivity in the State of Assam being 12.3 MT/ha was above this level and the productivity in the State of Meghalaya at 9.0 MT/ha was close to All India figure. In the year 2001-02, the States of Tripura, Nagaland and Assam had recorded productivity of 16.0, 12.1 and 12.0 MT/ha as against the average national figure of 10.72 MT/ha. In the year 2009-10, the productivity of Tripura with 15.6 MT/ha, Assam with 13.4 MT/ha and Mizoram with 12.1 MT/ha, was above the All India figure of 11.3 MT/ha. The productivity in the NER has all along higher compared to the Himalayan States.

The area under fruit crop has shown an increasing trend from moderate to substantial in respect of all the States in the two reasons since 1991-92 except Tripura where there has been decrease to the extent of 18%. Sikkim has showed a small decrease to the extent of 1.5% in production. Further in the States of Arunachal, Sikkim and Himachal Pradesh where the yield was already low between 2-3%, productivity has gone down further by 35%, 38% and 17% respectively in 2009-10 compared to 1991-92. There has also been a slight decrease of about 1% of the productivity in Meghalaya from 9 MT/ha in 1991 to 8.9 Mt/ha in 2009-10.

Vegetable Crops - Area, Production and Productivity of Vegetable Crops during 1991-92 to 2009-10

The NER and Himalayan States of Himachal Pradesh, J&K and Uttarakhand put together occupied in the year 1991-92, 2001-02 and 2009-10, 22%, 9% and 15% of the total area under

vegetables crops in all the States in the country. In production the share of this group of the States has been of the order of 8.39%, 7.33% and 7.37% respectively in the year 1991-92, 2001-02 and 2009-10. The State-wise details are given in Table 3.10

Table 3.10 Area, production and productivity of vegetable vrops in NE and Himalayan States during 1991-92 to 2009-10
[Area 000 ha, Production [Prod] 000 MT, Productivity [Pdty] MT/ha]

Name of the State	1991-92			2001-02			2009-10		
	Area	Prod	Pdty	Area	Prod	Pdty	Area	Prod	Pdty
Arunachal Pradesh	17.1	78.9	4.7	20.8	83.9	4.0	4.2	38.5	9.1
Assam	222.4	2132.3	9.8	237.4	2935.2	12.4	255.2	4569.9	17.9
Manipur	11.8	50.3	4.3	10.8	68.1	6.2	19.9	221.8	11.2
Meghalaya	25.9	219.2	8.5	35.7	265.9	7.4	44.3	415.8	9.4
Mizoram	6.0	31.8	5.3	6.8	44.1	6.6	10.6	179.1	16.9
Nagaland	8.2	86.9	8.2	26.3	286.0	10.8	10.4	78.3	7.5
Tripura	30.3	306.8	10.1	31.3	353.2	12.6	32.5	446.9	13.7
Sikkim	7.6	46.1	6.1	14.2	60.0	4.2	28.7	147.7	6.1
Himachal Pradesh	38.7	476.0	12.3	34.6	639.1	18.5	79.8	1390.7	7.4
Jammu & Kashmir	180.3	745.0	4.1	50.8	728.9	14.4	89.8	1374.2	19.7
Uttarakhand	57.1	737.3	10.8	93.8	1036.2	12.9	617.6	997.29	12.1
Total	**605.4**	**4910.6**	**-**	**562.5**	**6500.6**	**-**	**1193**	**9860.19**	
All India Position	**5593.0**	**58532.0**	**10.5**	**6156.0**	**88622.0**	**14.4**	**7984.8**	**133737.6**	**16.7**
% share of NER & HS	**21.93%**	**8.39%**	**-**	**9.14%**	**7.33%**	**-**	**14.94%**	**7.37%**	**-**

The area under vegetable crops, which, in the NER and Himalayan States of Himachal Pradesh, J&K and Uttarakhand put together, was 6.05 lakh ha in 1991-92, decreased to 5.63 lakh ha [-7%] in 2001-02 but again rose to 11.93 lakh ha in 2009-10 showing a growth of 97% over 1991-92. Amongst the States, Assam had the maximum area of about 37% [1.22 lakh ha] under vegetable in 1991-92, followed by J&K - 30% [1.80 lakh ha], and Uttarakhand – 9% [0.57.1 lakh ha]. These three States formed as much as 76% of the total area under vegetable crops in NER and HSR in 1991-92. In 2001-02 Assam and Uttarakhand raised their shares further to 42% [2.37 lakh ha] and 17% [0.94 lakh ha] respectively. The State of J&K showed considerable decline of about 72%. In 2009-10, the State of Uttarakhand had the maximum share of 6.18 ha [52%] followed by Assam with 2.55 ha [21%] these two States occupied about three fourth of the total area under vegetable crops in these two regions. All the States except Arunachal Pradesh and J&K had been showing increasing trend in the area under vegetable crops from moderate to substantial. There has, however been a considerable decline of vegetable acreage of the order of 75% and 50% respectively in the year 2009-10, in the case of Arunachal Pradesh and J&K compared to the period 1991-92.

The vegetable production rose from the level of 4.91 MT in 1991-92 to 6.50 MT in 2001-02 and further to 9.86 MT in 2009-19 showing a growth rate of 32% and 52% respectively. Compared to the base year 1991-92, the increase in the production in the year 2009- 10 was

of the order of more than 100%. In the State-wise comparison, Assam had the largest share of 2.13 million ha [43%] in the total production of all these 11 States in the years 1991-92. The other major States were J&K with 0.75 million MT [a little over 14%] and Uttarakhand, following closely with 0.74 MT [15%] and Himachal Pradesh - 0.48 MT [10%] These four States shared as much as 83% of the total productions in NER and HSR, In the year 2001-02 again these four States namely Assam [45%], Uttarakhand [16%], J&K [15% and Himachal Pradesh [10%] had the major share of 82% of the total production in these two regions.

In the year 2009-10, of the total production of 9.86 million of MT in the NER and HSR, the four States of Assam [4.47 MT-46%], Himachal Pradesh [1.39 MT -14%] J&K [1.37 MT -14%] and Uttarakhand [1.0 MT- 10%] had as much as 84% of share. These four States had been the leading States in the region since 1991-92 and their production trend has been more or less the same. Decline in the production pattern in the States of Arunachal Pradesh and Nagaland of the order of 51% and 10% respectively, has been noticed in 2009-10 compared to the year 1991-92. There is an increasing trend in case of all the other states.

In productivity, two of the States viz. Nagaland and Himachal Pradesh have shown declining trend of the extent of 9% and 40% respectively in 2009-10 as compared to the year 1991-91. Productivity in the States of J&K [19.7], Assam [17.9] and Mizoram [16.9] has been found to be above All India average [16.7].

Spice Crops - Area, Production and Productivity during 1991-92 to 2009-10

The NER and HSR have occupied about 5% of the total area and 7-9% of the production of the country since 2007-08 to 2009-10. The State-wise position of the area covered, production and productivity is indicated in Table 3.11

Table 3.11 Area, production and productivity of spice crops during 2007-08 to 2009-10
[Area 000 ha, Production [Prod] 000 MT, Productivity [pdty] MT/ha]
[3] SPECIES

Name of the State	2007-08			2008-09			2009-10		
	Area	Prod	Pdty	Area	Prod	Pdty	Area	Prod	Pdty
Arunachal Pradesh	9.20	53.10	5.77	7.63	43.34	5.68	7.63	43.34	5.68
Assam	28.63	18.76	0.66	27.37	18.55	0.68	27.37	18.56	0.68
Manipur	10.98	8.22	0.75	8.96	7.84	0.87	8.98	7.84	0.87
Meghalaya	16.64	71.25	4.28	16.60	69.91	4.21	17.41	72.01	4.14
Mizoram	9.0	38.30	4.26	22.67	80.62	3.56	22.67	80.63	3.56
Nagaland	4.50	26.20	5.82	7.22	38.62	5.35	7.22	38.62	5.35
Tripura	4.20	13.70	3.26	4.50	10.28	2.28	3.96	12.10	3.06
Sikkim	20.60	43.20	2.10	26.58	41.73	1.57	26.58	41.73	1.57
Himachal Pradesh	7.60	23.60	3.11	4.44	18.62	4.19	4.44	18.62	4.19
Jammu and Kashmir	4.39	1.31	0.30	3.89	0.91	0.23	3.89	0.91	0.23
Uttarakhand	9.26	24.42	2.64	1.94	13.06	6.73	1.94	13.06	6.72
Total	**125**	**322.06**		**131.8**	**343.48**		**132.09**	**347.42**	
All India position	**2617**	**4357**		**2629**	**4245**		**2664**	**4016**	
% share of NER & HS	**4.78%**	**7.39%**		**5.01%**	**8.09%**		**4.96%**	**8.65%**	

The area under Spice crops rose from 1.25 lakh ha in 2007-08 rose to 1.32 lakh ha in 2008-09 and remained at the same level in 2009-10 in the 11 States in the NER and HSR. The growth rate has been around 6% only. The four major States occupying about 62% of the total production of the spices in the region were: Assam [0.29 lakh ha- 23%], Sikkim [0.21 lakh ha - 17%], Meghalaya [0.17 lakh ha - 14%] and Manipur [0.10 lakh ha - 8%] in 2007-08. In the year 2008-09, Assam had the maximum area of 0.27 lakh ha [21%] under spice corps, followed by Sikkim with 0.27 lakh ha [20%], under spices, Mizoram with 0.23 [17%] and Meghalaya occupying 0.17 lakh ha [13%]. Together these four States occupied about 71% of the total area in 11 States. Manipur had been replaced by Mizoram. In the year 2009-10, there was no change and the inter states position remained more or less as in 2006-07.

The production in the all these 11 States increased from 3.22 lakh MT in 2007-08 rose to 3.43 lakh MT in 2008-09 and to 3.47 lakh MT in 2009-10 showing an increase of 7% and 1% respectively. The increase in 2009-10 over 2007-08 was 8%. The State of Meghalaya had the largest share of 0.71 lakh MT [22%] in the total production of the two regions, followed by Arunachal Pradesh with 0.53 lakh MT [16%], Sikkim with 0.43 lakh MT [13%] and Mizoram with 0.38 lakh MT [12%]. The combined production of these four States constituted about 63% o the total production o the 11 States in 2007-08. In 2008-09, Mizoram had the largest share of 0.81 lakh MT [24%] in the total share of these 11 States. States of Meghalaya with 0.70 lakh MT [20%], Arunachal with 0.43 lakh MT [13%], Sikkim with 0.42 lakh MT [12%] and Nagaland with 0.39 lakh MT production figure, were the next in order. The five sates contributed about 80% of the total production of spices in the area in 2008-09. In the year 2009-10, the same five states dominated the production scenario with their share of about 80% in the total production. There was slight change in the State-wise position in as much as the share of Arunachal Pradesh decreased from 13% to 12% and that of Mizoram from 24% to 23%. There was one percent increase in the share of Meghalaya from 20% to 21% in comparison with the previous year.

The productivity of spice crops remained low. In the year 2007-08, the highest productivity of 5.82 was in the State of Nagaland and lowest of 0.30 in J&K. In the following year of 2008-09 and 2009-10, the highest productivity of 5.68 was in the State of Arunachal and the lowest of 0.23 in J&K.

The States of Arunachal Pradesh, Assam, Manipur, Tripura, Himachal Pradesh, J&K and Uttarakhand had shown decreasing trends both in area and production and the State of Sikkim decline in production in the year 2009-10. The States of Arunachal, Meghalaya, Mizoram, Tripura, Sikkim, Nagaland and J&K also recorded decline in productivity.

Floriculure - Area and Production of Floriculture during 2007-08 to 2009-10

The area under Floriculture in the 7 of 11 States under study comprised 6.07%, 1.91% and 1.95% of the total area in the country under floriculture group in the year 2007-08, 2008-09 and 2009-10 respectively. In terms of the production, the share of these States was at 6.07%, 1.19% and 1.95% respectively. The State-wise status of the activity is presented in Table 3.12.

Table 3.12 Area and production floriculture during 2007-08 to 2009-10 [Area in 000 ha, Production: Loose in 000 MT Cut in Lakh]

Name of the State	2007-08			2008-09			2009-10		
	Area	Production		Area	Production		Area	Production	
		Loose	Cut		Loose	Cut		Loose	Cut
Arunachal Pradesh	NA	NA	NA	NA	NA	NA	1.22	NA	2860
Mizoram	0.05	0.00	76	0.22	0.00	168	0.04	0.00	142
Nagaland	0.02	0.00	17	0.02	0.00	17	0.02	0.00	17
Sikkim	0.1	0.00	45	0.15	0.00	66	0.18	0.00	200
Himachal Pradesh	0.6	3.4	566	0.6	3.4	566	0.68	0.6	605
Jammu and Kashmir	0.3	1.3	218	0.1	0.01	20	0.13	0.02	66
Uttarakhand	0.9	0.7	1456	0.9	0.6	2056	1.29	1.0	3414
Total	**1.97**	**5.4**	**2378**	**1.99**	**4.01**	**2893**	**3.56**	**1.62**	**7304**
All India position	**166**	**868**	**NA**	**167**	**987**	**NA**	**183**	**NA**	**1021**
% share of NER & HS	**1.19%**	**0.62%**	**-**	**1.19%**	**0.41%**	**-**	**1.95%**	**-**	**715%**

Source: NHB database 2010 – Status in 25 States/UT.

The seven States put together shared about 1.19%, 1.19% & 1.95% of cultivated area during the years 2007-08, 2008-09 and 2009 -10 respectively and 0.62% & 0.41% of production in the year 2007-08 and 2008-09 respectively of floriculture cultivation in all the States of the country.

In the year 2009-10, the production of cut flowers was 7304 lakh i.e. 715% of the All India average of 1021 lakh. The major States producing cut flowers were Uttarakhand [3424 lakh - 47%] and Arunachal Pradesh [2860 lakh-39%] sharing as much as 86% of the total production in these seven In terms of the area coverage, these two States occupied about 70% of the total acreage under flower cultivation in all the seven Stares – Uttarakhand -36% and Arunachal – 34%.

The States of Mizoram, J&K and Uttarakhand recorded decline in area of cultivation for flowers and States of Himachal Pradesh and J&K in production in 2009-10 compared to the year 2007-08.

The detailed Crop-wise and State-wise area and production of horticulture produce in North Eastern and Himalayan States are presented in Annexures 3.1 to 3.21.

4

Chapter

STATE PROFILE AND AN OVERVIEW OF PROGRAMME IMPLEMENTATION

Section I: State Profile

The North East Region [NER]

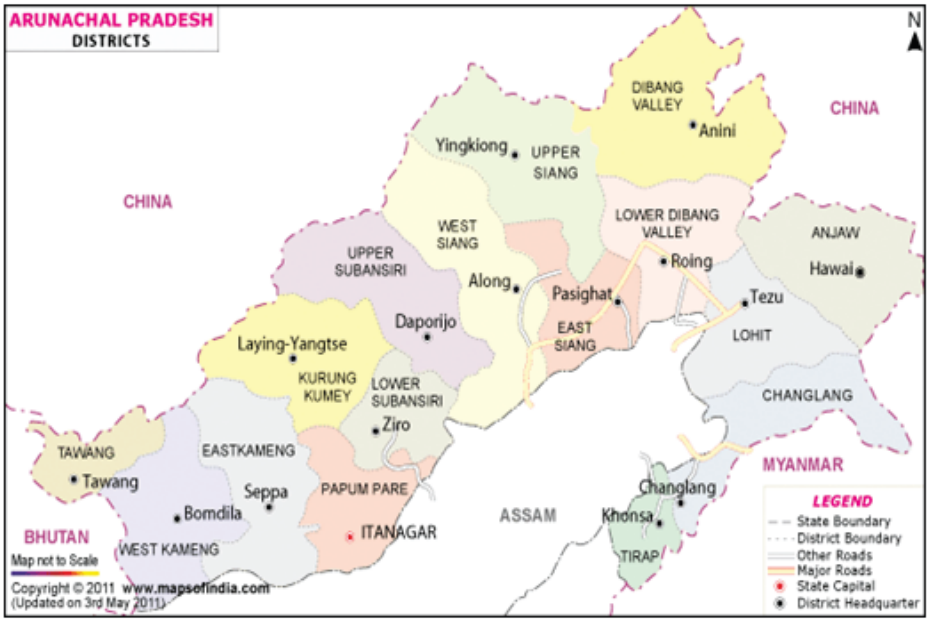
The North East Region [NER] comprises the seven sisters - Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura, along with Sikkim. The region has a long international boundary as about 96 per cent with China and Bhutan in the North, Myanmar in the East, Nepal in the West and Bangladesh in the South and West. The physiography of

the region is divided into three divisions viz. Meghalaya plateau, northeastern hills & basin, and Brahmaputra Valley. The region has more than 6o% of the total geographical area under forest cover. Most of the hill States in the region like Arunachal Pradesh, Meghalaya, Mizoram and Nagaland are predominantly inhabited by tribal people with a fairly high degree of diversity even within the tribal groups. The eight States cover an area of 2,62,179 sq. km. constituting 7.9 per cent of the country's total geographical area. Over 68 per cent of the population of the region lives in the State of Assam alone. The density of population varies from 13 per sq. km. in Arunachal Pradesh to 340 per sq. km. in Assam.

Richly endowed with natural resources, the region is identified as one of the world's biodiversity hotspots. The varied climatic conditions and topography in the region provides congenial background for the production of vegetables, tropical, sub-tropical and temperate fruits. A brief profile of each of the NER State is as under:

Arunachal Pradesh

Arunachal Pradesh is a sparsely populated mountainous area in the extreme Northeastern part of the subcontinent with Itanagar as capital. It is located in the North Eastern part of India, has 83,743 sq. km area and long international border with Bhutan to the West [160 km], China to the North and North-East [1,080 km] and Myanmar to the East [440 km]. The State is bordered on the south by Assam. It stretches from snow-capped mountains in the north to the plains of Brahmaputra Valley in the South. Area wise, it is the largest state in the North-Eastern Region. The population of the State as per 2011 census is 13.83 lakh.



Most of the State is mountainous, with lofty terrains, haphazardly aligned ridges that separate deep valleys and rise to the peaks of the Great Himalayas. It is a land of lush green forests, deep river valleys and beautiful plateaus. The State has five river valleys: the Kaman, the Subansiri, the Siang, the Lohit and the Tirap. All these rivers are fed by snows from the Himalayas and countless rivers and rivulets except Tirap which is fed by Patkai Range. The climate varies from hot and humid in the Shivalik range with heavy rainfall. It becomes progressively cold as one move northward to higher altitudes. The climate of the foothills is

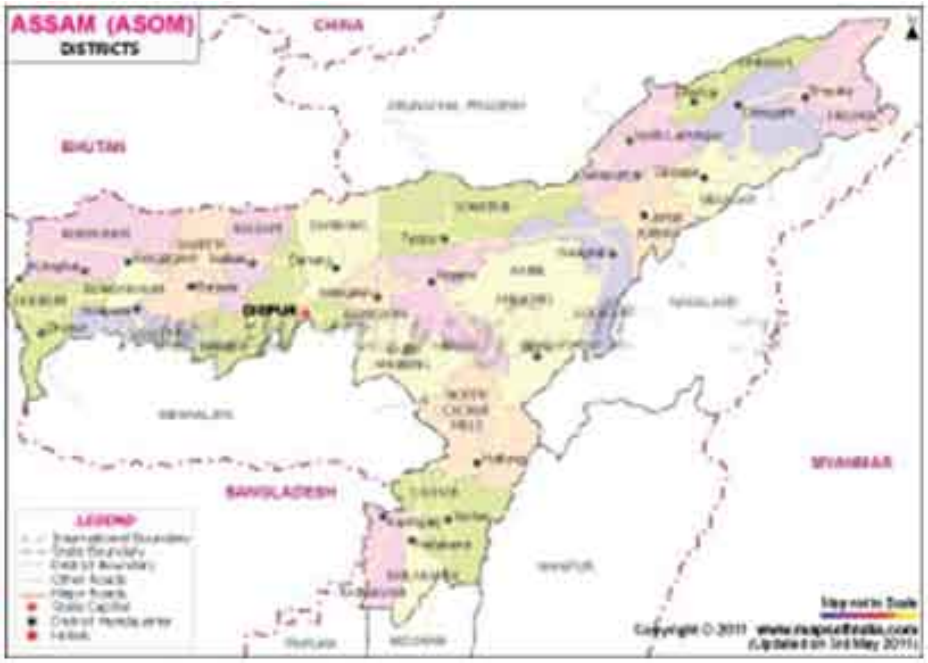
sub-tropical in the mountains, temperatures decrease rapidly with altitude. Rainfall averages between 2000 and 4000 mm in a year.

Jhoom [shifting cultivation] is the most important facet of agriculture profile of the State. A variety of vegetables like brinjal, sweet potato, chilly, ginger, cucumber, pumpkin and cowpea and fruit such as orange, pineapple, litchi, lemon, banana, peach and papaya are grown by this method. Arunachal Pradesh is considered as one of the 12 mega diversity [hotspots] in the world. The State has a number of species of fauna, flowering plants orchids etc. Given its diverse agro climatic potential, the State is suitable for cultivation of tropical sub tropical and temperate fruits, vegetables, spices, MAP and floriculture.

Assam

The biggest of states among the 'Seven Sisters' in the north-east India, Assam is located in the northeastern part of the country and spread over an area of about 78,523 square km. It is bounded to the North by the kingdom of Bhutan and the state of Arunachal Pradesh; to the East by the states of Nagaland and Manipur; to the South by the states of Mizoram and Tripura; and to the West by the state of Meghalaya, Bangladesh, and the state of West Bengal. The mighty Brahmaputra flows through the heart of state. Guwahati is the capital of the State. The State serves as the Gateway to the other seven North Eastern States. The Brahmaputra River Valley, the dominant physical feature of the State is surrounded on all sides except West by mountains.

As per 2001 census, the state has a total population of 2.67 crore out of which Males comprise 1.38 crore while Female population is 1.29 crore. Rural population predominates in the state comprising about 87% of the total population while the share of urban population is only 13%. The topography of the state is mainly composed of plains and river valleys. Geographically, the state is divided into three major regions as the Brahmaputra Valley in the north occupies most of the state running from north to the west, and exiting into Bangladesh; the Barak Valley in the South, and the Cachar Hills which divide both the valleys.



The State is on the foothills of the Eastern Himalayas or the Purvanchal. On the North lies the country of Bhutan while on East the State is bordered by the states of Arunachal, Nagaland and Manipur. To the West of Assam, lay Meghalaya and Mizoram and to the west is Tripura and Bangladesh. The state is surrounded by a ring of blue hills.

Agriculture is the main occupation of the people of the state. Rice is the dominant food crop in the State; the other main crops being jute, sugarcane and cotton. Horticulture has a good base in the State. Tea is the most important agrarian product and a main source of revenue for the State. About 15% of the world's tea production comes from Assam. Almost 75% of the tea gardens are in upper Assam districts of Darrang, Sibsagar and Lakhimpur. Fruits like oranges, bananas, guavas, and pineapples are grown in appreciable quantity. The rearing of silk work is a common activity in this hilly State. Forests are an important part of the economy. Timber and bamboo are the major products from these forests that bring income to the state. The State offers a good scope for setting up of Fruit, Vegetable Spice, MAP and other agro processing projects for commercial exploitation of horticulture base.

The State has a total network of 60,000 km of roads-both medaled and non-medaled. A 3816 km long railway track also serves as the Railways link for the North Eastern States. It has six civil airports at Guwahati, Tezpur, Dibrugarh, Lakhimpur, Silchar and Jorhat.

Manipur

Manipur state with a total area of 22,327 sq km is bounded by Nagaland in the North, Assam in the West and Mizoram in the South. It is one of the border States in the North-Eastern part of the country having an international boundary of about 352 km, long stretch of land with Myanmar in the South East.

The State is divided into two regions - the hill and the valley. The valley lies in the central part of the State and the hills surround the valley. Whereas the hill districts occupy about 90 percent [20,089 sq km] of the total area of the State, the valley has only about one tenth [2238 sq km]. Imphal is the capital city of Manipur. As per 2001 census, the population of State is 23.89 lakh.

The State is divided into three Eco-regions, viz. warm per humid agro-eco Zone with

[i] Thermic ecosystem, [ii] Hyper-thermic ecosystem and [iii] Thermic agro-eco zone. The average annual rainfall in the State is 967.2 mm. The net sown area in the State is about 2.00 lakh ha out of which 0.44 lakh area is under horticulture crops. Only 0.11 lakh ha area is sown more than once.

With suitable agro-climatic conditions, Manipur has a huge potential for growing various horticulture crops more particularly on the fertile soils on the hills. Pineapple, passion fruit and mushroom naturally grow in the area and are also being commercially cultivated. Among fruits, Banana, Pineapple and Citrus take a major share in area and production. The other fruits which are grown in sizeable area are Guava and Papaya.

The vegetable cultivation is much more promising. In Manipur, the valley land, after the harvest of paddy, is being successfully utilized for large scale cultivation of vegetables. Farmers have started using F1 hybrids and high yielding OP varieties. The main vegetables crops of the State are Pumpkin, Bottle gourd, Ridge gourd, Cucumber, Dolichos, Brinjal, Tomato, Chilies and Capsicum. The off season vegetables on the high altitudes during summer season and exotic vegetables, Brussels sprouts and broccoli also hold good promise due to favourable climatic conditions. These need to be popularized amongst the farmers. Further Mushroom, Root &Tuber Crops, AMP and Floriculture have good scope for exploitation in the State in view of favorable agro-climatic conditions. Among the Spices, Ginger, Turmeric and Large Cardamom are the important spice crops in the State. An area of 2.77 lakh ha has since been identified by the State as potential area for growing different horticulture crops like Fruit, Vegetable, Spices Root & Tuber crops, Aromatic & Medicinal plants etc.

Many agri-horticultural crops of the State, when processed, have promise of export. On this count, various preparations of pineapple, passion fruit, bamboo shoot, mushroom and ginger have attracted wide markets outside the State. Processing for extracts of spices, medicinal and herbal plants are another area of focus for agro-based industry.

Meghalaya

Meghalaya which literally means "Abode of Clouds" is a happy land of magnificent beauty, undulating hills, rolling grasslands, cascading waterfalls, snaking rivers, terraced slopes and thrilling wildlife. It is bounded on the South and Southwest by Bangladesh and on all other sides by the State of Assam. The State is spreads over an area of 22,429 sq km. It is one of the wettest regions in the world with Cherrapunji about 56 km from Shillong records annual rainfall average of 450 inches. Shillong is the capital of this hilly State which also serves as the district headquarters of East Khasi Hills District. The capital city has a bracing climate throughout the year. As per 2001 census, the State has a total population of 2.32 lakh.

The geo-climatic situation of Meghalaya offers an excellent scope for growing of different types of horticultural crops including fruits, vegetables, spices, and plantation crops, medicinal and aromatic plants of high economic value. A wide range of tropical, sub- tropical and temperate fruits such as Mandarin, Orange, Pineapple, Banana, Lemon, Guava, Pear, and Plum etc., are grown all over the State. A large variety of vegetables, both indigenous and exotic are grown across a wide range of agro climatic zones. The higher altitudes provide ecosystem conducive for the growth of traditional vegetables

like Potato and Cole crops during the rainy season. Tuber and root crops such as Sweet Potato and Tapioca, spices such as Turmeric, Ginger, Chilies, etc., are also grown abundantly. Plantation crops such as Tea, Cashew Nut, Coconut, Areca Nut and other spice crops like Black Pepper have been performing well and offer good scope for area expansion. In the long run, these crops can change the entire economic situation of the people of the State.

The State produces large amounts of Oranges, Peaches, Pineapples, Pears, Guavas, Plums, Lemon, and Bananas of superb variety. It also grows plenty of commercial crops like Cotton Jute, Potatoes, Tapioca, Bay Leaves, Ginger, Turmeric, Betel Leaf Black Pepper and Jackfruit. Plantation crops like Coffee, Rubber, and Areca Nut are attaining important place in the State. "Jhum" - the shifting system of cultivation is practiced in the State and the same is now being replaced with scientific methods, bringing land under permanent cultivation. Forest resources from pine and other timber products bring in the major chunk of state revenue.

The high value low volume crops like Strawberry Broccoli and coloured Capsicum etc. have been successfully introduced and marketed in the State. Meghalaya has abundant but untapped natural resources. There is a huge potential for promotion of horticulture and setting up of agro-based industries. The move of the State Government for creating "Horti Hubs" in each district of the State, which function on a hub and spoke model within an area of 10-15 kms radius, will create horticulture clusters having the potential of taking off horticulture in the State on a bigger scale. The State Government is also popularizing use of Greenhouse technology, poly-houses, drip and micro irrigation system, water harvesting structures, fertigation, soil less culture in its vision of transforming Meghalaya into a Fruit and Flower State of the country. This will go a long way in boosting the horticulture in Meghalaya.

The State is, however, poor in infrastructure. A national highway runs through the state from Guwahati in the North to Karimganj in the State of Assam in the South. There is no rail link in the State. Internal communications are poor, and many areas remain isolated. The only airport in the state is located at Umroi at a distance of about 30 km from Shillong.

Mizoram

Mizoram State is bordered by Myanmar to the East and South, Bangladesh to the West, and by the States of Manipur, Assam, and Tripura to the North. Mizoram means the "Land of the Highlanders". The State with Aizawal, as its capital, has a total area of 21,000 sq. km. As per 2011 Census, the total population of the State is 10.91 lakh.

The topography of the State is dominated by Mizo Hills. It has a pleasant temperate climate throughout the year. About three-quarters of the population of Mizoram earn their living from agriculture. Both terraced cultivation and Jhum tillage in which tracts are cleared by burning and sown with mixed crops are practiced.

Mizoram is famous for the fibreless Ginger. Paddy, Maize, Mustard, Sugarcane, Sesame and Potatoes are the other prominent crops grown in this area. Small-scale irrigation projects are being developed to increase the crop yield. About 12% of the North Eastern Fruits are sourced from Mizoram with an ever rising yield per hectare due to adoption of advanced production technologies. 'Vegetables', 'Spices', 'Cotton', Coffee', 'Tea', 'Birds eye Chili', 'Anthurium' and 'Rose' have immense potential in the State.

There are no major industries in the state. Small-scale industries set up in the State include sericulture, handloom and handicrafts industries, sawmills and furniture workshops, oil refining, grain milling, and ginger processing.

The state's poor transport and communication channels are a major obstacle to economic growth. Although a road system is being developed, a single road links the towns of Aizawal and Lunglei in Mizoram to Silchar in Assam. However, there are no railways.

Nagaland

Nagaland is a hill state located in the extreme North Eastern region of India with its capital at Kohima. It has a total area of 16,579 sq km The state shares common boundaries with Myanmar in the East, State of Assam in the West; Arunachal Pradesh and a part of Assam in the North with Manipur in the South. The state has a total geographical area of about 16,579 sq km As per the latest census, the State has a total population of 19.81 lakh.

The terrain is mountainous, thickly wooded, and cut by deep river valleys. Nagaland's climate which is pleasant throughout the year is more congenial for growing of various fruits and vegetables. There is a wide variety of plant and animal life. Though Nagaland has heavy rainfall, it lacks adequate water storage facilities. The average net area irrigated to total crop area is low at 43%. The State is bestowed with good monsoon rain, The Average annual rainfall in the State is 2000 mm-2500 mm.

The State is predominantly rural with more than four-fifths of the population living in small, isolated villages. The State is basically an agro-horticultural based economy. About 70% of its population depends upon agriculture for their livelihood. The main crops grown in the state include Rice, Millet, Maize and Pulses. Cash crops like Sugarcane and Potato are also grown in some parts. Coffee, Cardamom and Tea come under plantation crops which are grown in hilly areas. More than 80% of the gross cropped area is under rice cultivation. A sizeable population of the state grows oil seeds which includes Rapeseed, Mustard etc. The state also possesses natural oil reserves, with varied climatic conditions suitable for growing of various horticultural crops which have high commercial value.

Mainly two methods of cultivation - Jhuming [shifting cultivation] and Terrace are practiced in Nagaland. "Jhum" -Shifting cultivation is widely practiced in the State. The area under "Jhum" and Terraced cultivation is about 87,339 ha, 62,091 ha, respectively. The most important source of revenue of the State is forests which cover about 17 percent of its total area.

The State has poor transport and communication infrastructure. It depends mostly on roads for transportation. A national highway runs from Dimapur to Kohima and then on to Imphal in Manipur. Another main road links Mokokchung with Amguri in Assam. A short stretch of the Northeast Frontier Railway passing through Dimapur from Assam is the only rail link with the rest of India. Air service is available from Dimapur.

Nagaland offers an excellent scope for horticulture. The setting up of the Central Institute of Horticulture at Medziphema since January, 2006 with the objective of refinement/ demonstration of identified technologies specific for the region; and production and supply of quality seed and planting material of improved/high yielding varieties is expected to give boost to this sector.

Sikkim

Sikkim is the North Eastern State in India located on the Southern slopes of the Himalayas It is bounded on the North and North East by Tibet Autonomous Region of China, on the South East by Bhutan, on the South by West Bengal and on the West by Nepal. The geographical area of the State is 7,096 sq km Gangtok is the capital of the State. As per the 2011 Census, the total population of the State is 6.08 lakh. The population is mostly rural, living in scattered hamlets and villages.

The State is entirely mountainous, with one - third of the land

covered with dense forests of sal, sambal and bamboo, which are mostly inaccessible and unexploited. Kanchenjunga [8,598 m/28,209 ft], one of the highest peaks in the world is in Sikkim. The climate ranges from tropical to alpine. Generally the lowlands are hot and humid, the hills are temperate, and the mountains are permanently covered with snow. Annual rainfall varies from about 1300 to 5000 mm depending on the altitude and region of the state.

The economy of Sikkim is basically agrarian. Maize, Rice, Wheat, Pulses, Oil-Seeds, Potato, Mandarin, Orange, Tea, large Cardamom and Ginger are the principal crops of the State. The total area under agriculture is 1, 21,384 ha, out of which the net sown area is 62,043 ha. Ginger, Potato, Orange and off season vegetables are the other cash crops. The State accounts for about 85% production of the large cardamom in the country and is one of the world's main producers of this commodity. Sikkim has introduced bio-fertilizer demonstrating in over 3,000 hectares of tract in order to become a fully organic farming State by 2015. The traditional strengths of Sikkim are the cultivation of orchids and anthurium.

Roads, though not extensive, are the primary mode of travel. Ropeways have also been provided at many points. Baghdogra about 75 miles from Gangtok is the airport in the State.

Tripura

The State of Tripura is located in the North-Eastern part of the country and is bordered on the North, West, and South by Bangladesh, on the East by the State of Mizoram, and on the North-East by the state of Assam. Covering an area of only 10,486 sq km, it is India's third smallest state after Goa and Sikkim. Agartala is the capital of the State. The population of the State as per 2011 Census is 36.71 lakh.

Tripura is mainly a hilly territory with altitudes varying from 50 to 3080 ft above sea level, though the major population of the state lives in the plains. It has a moderate temperature and highly humid atmosphere. Agriculture is the mainstay of the economy with about 64% of the people engaged in this sector. Jhum- shifting cultivation is gradually being replaced by

modern farming methods. Important cash crops are: Tea, Jute, Cotton, Potato Ground nut, Pineapple, Oranges, Cashew nut, Jackfruit, Coconut, and Natural Rubber. Tripura is the second largest rubber producer in India after Kerala. Wheat, Rice and Sugarcane are also grown in the State. However, almost half of the land area is still covered by forest. The State has been making strides to develop Medicinal Plants. It houses at least 266 Medicinal Plants with 68 species of trees, 71 herbs, 39 shrubs and 88 climbers and has already tabled a 'Medicinal Plant Policy'.

Being the hilly terrain, the State has the problems of transport and communication infrastructure. With Bangladesh bordering the state on three sides, Tripura is mainly isolated from India. Agartala - Karimganj [Assam] road and a metre-gauge railway link from Dharmanagar to Kalkali Ghat, Assam links the State with other parts of the country. Boat traffic is also used for local transport. Agartala is linked by air to Kolkata in West Bengal and various towns in Assam.

Himalayan States

The Himalayan Region States comprises of three States of Himachal Pradesh, Jammu & Kashmir and Uttarakhand. The brief profiles of these States are given below:

Himachal Pradesh

Himachal Pradesh is bordered on the North by Jammu and Kashmir, on the West by Punjab, on the South by Haryana, on the Southeast by Uttar Pradesh, and on the East by Tibet. The State is enveloped by the Pir Panjal and Dhauladhar ranges in the North West, dominated by the great Himalayas in the north and East and marked with lower ridges of the Shivalik ranges in the South-East. The State has total geographical area of 55,673 sq km. Shimla is the capital of the State. As per 2011 census, the population of the State is 68.57 lakh.

State is divided into two regions: South west warm as plains and North where summers are temperate and winters are severe. Five mighty snow clad rivers namely Chenab, Ravi. Beas, Sutlej and Yamuna are flowing through it.

Himachal Pradesh is predominantly rural and its urban population comprises only 10 percent of total State population. State's economy is largely based on agriculture and horticulture land based activities with about 80% of the people depending upon farming, horticulture and livestock raising for their livelihood. Of the total State net sown area of 560,154 ha, only about 20% has the irrigation facilities. The main food crops of the State are: Wheat, Barley, maize, Rice and Potatoes.

The State has a large mountainous terrain which is rich in natural resources. A wide range of agro-climatic conditions makes the State ideal for growing different types of horticulture commodities like various kinds of fruit crops [from temperate to sub-tropical], flowers, vegetables, mushrooms, hops, tea, medicinal & aromatic plants etc. At present, about 38 types of fruit species are grown in the State both on big and small scale. Amongst fruit crops, apple, pear, cherry, peach, plum, apricot, almond, walnut, pecan nut, mandarin, sweet orange, kagzi lime, hill lemon, mango, litchi, guava, kiwi fruit, olive and strawberry are important ones. Fruit cultivation in the State is done mainly under rainfed conditions as there is a direct connection between the soil moisture and productivity of fruits.

Himachal Pradesh has emerged as an important vegetable growing state particularly for the production of Tomato, Capsicum, French bean and Cucumber during off season. Being near to the cities of Chandigarh and Delhi with big demand, the State has the comparative advantage in production of horticulture crops. The horticulture industry therefore, offers much scope in boosting the rural economy of the State.

Roads are communication lifelines of the State. Narrow railway gauge lines from Kalka to Shimla, and Pathankot to Jogindernagar through Kangra valley are serving as the only railway network in the state.

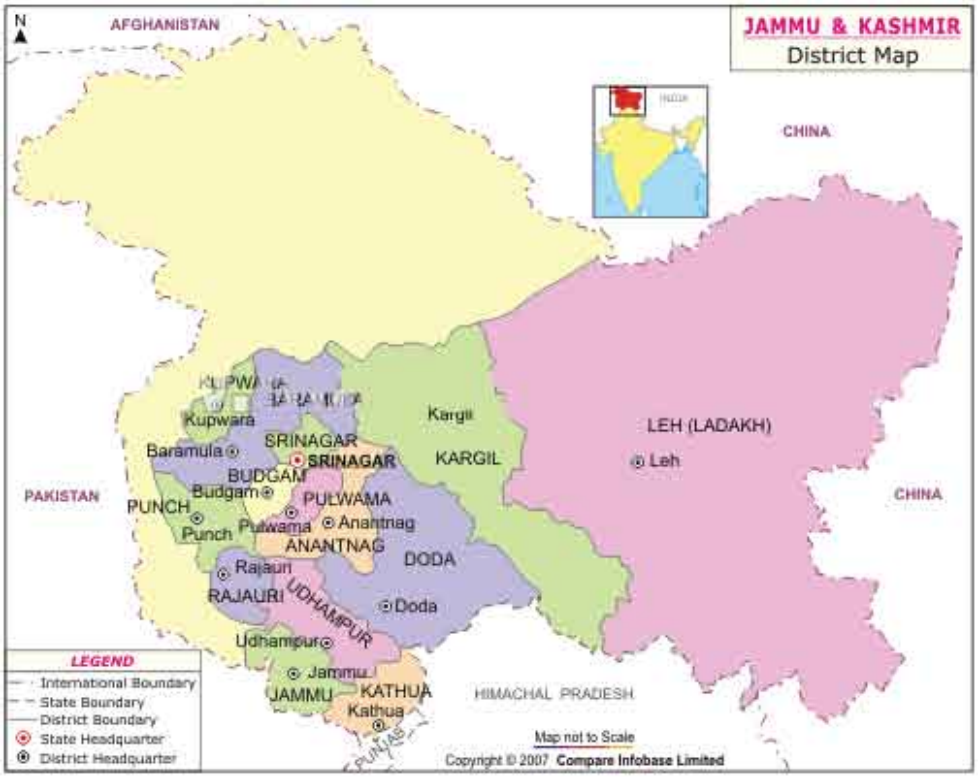
Jammu & Kashmir

Jammu & Kashmir is India's Northern-most state, lying between six mountain ranges and covering an area of 2,22,236 sq km The state is bounded on the North by Afghanistan and China, on the East by China, on the South by the State of Himachal Pradesh and the State of Punjab and on the West by the North-West Frontier Province and the Punjab Province of Pakistan. Srinagar in summer and Jammu in winter becomes the capital of Jammu & Kashmir. As per 2011 census, the population of the State is 125.49 lakh.

The State comprises of three regions: [i] the foothill plains of Jammu, [ii] the lakes and blue valleys of Kashmir rising to alpine passes, the high altitude plains and [iii] starkly beautiful mountains of Ladakh which lies beyond narrow passes. Kashmir region is called the living paradise on earth.

The Indus River flows through Kashmir and the Jhelum River rises in the North Eastern portion of the territory. Kashmir possess a more equitable climate than that of Southern and Central India and the beautiful vale of Kashmir is a noted resort region.

The majority of people are engaged in subsistence agriculture of diverse kinds on terraced slopes, each crop adapted to local conditions. Rice, Wheat, Barley, Corn [Maize], Millets, Pulses, Cotton and Tobacco are the main crops of the State.



Many temperate fruit and vegetables are grown in the area adjacent to urban markets or in well watered area rich in organic soils. Sericulture is also widespread. Large orchards in the value of Kashmir produce Apples, Peaches, Walnuts, Almonds and Cherries. In addition, Kashmir valley is the sole producer of Saffron in the whole Indian subcontinent.

Lake margins are particularly favourable for cultivation of vegetables and flowers are grown intensively in the reclaimed marsh lands or on artificial floating gardens. Cultivation in Ladakh is limited to such parts of the river valleys where it consists of small plots of Barley, Buckwheat, Turnips and Mustard.

Uttarakhand

The State is carved out of the Uttar Pradesh, which has the largest population in India. The state shares borders with Tibet in the North and Nepal in the East and inter-state boundaries with Himachal Pradesh in the West, Northwest and the Gangetic plains of Uttar Pradesh in the South. It occupies an area of 51,125 sq km It has a population of about 60 lakh as per 2001 census It borders Tibet, Nepal, Himachal Pradesh, and the UP plains districts. Dehra Dun, the state' capital is about 255 km away from India's capital, New Delhi. Uttarakhand has diverse geographical features ranging from snow-capped mountain peaks in the North to tropical forests in the South causing variation in its climate and vegetation.

It is divided into two broad regions – Garhwal and Kumaon. The State is endowed with rich natural resources but has not yet been able to tap them fully to its advantages. About 70% of hills population of the State is engaged in agriculture. More than 55% of the cultivated land in the State is rain fed. People in the hilly regions have been primarily engaged in subsistence agriculture, which in turn leads to a sizeable out-migration as there is hardly any

other major source of livelihood. In the plains, Sugarcane is the major crop of Uttarakhand. Other important crops are Wheat, Rice, Potato, Onion, Soybean and Groundnut.

Due to difficult terrains and fragile ecosystem, there has been inadequate infrastructure development in the area. State's total length of road network is reported to be 30,753.7 km as per records in 2008-09 besides 345 km of rail routes. The state has two domestic airports located at Jolly Grant in the Dehradun district and at Pant Nagar in the Udham Singh Nagar district.

The distinct geographical features of Uttarakhand with dominantly mountainous part, coupled with Bhabar and Terai regions makes it a unique region where it is possible to grow varieties of fruits, flowers vegetables and other horticultural crops. Nearly all types of fruits ranging from tropical to temperate fruits can be grown easily. Similarly in the irrigated land, cultivation of off-season vegetables, flowers and seed production of flowers is possible. This region also offers good potential for growing certain specialized crops as Mushroom, Olive, Asparagus, Spices, Ornamental flowers which not only hold high commercial value but also have export potential value as well. But the productivity of different horticulture crops is low in the State. The agro-climatic conditions also favour horticulture-based industries. The hill districts of Uttarakhand have tremendous potential for horticulture growth. Floriculture is a rapidly growing as a high income enterprise sector in the State.

The State has also a comparative advantage of its relative proximity to Delhi and other north Indian urban centres that have an increasing demand for fruits and vegetables.

Section II: An Overview of Programme Implementation

Implementing Agency [IA] of the Programme at the District Level

The success of the programme will largely depend upon the infrastructure created at the grass root level in the Distinct. Information has been gathered from the States on the set up created for the District level Agency engaged in the implementation of the HMNEH Programme in the States. The data received from 110 Districts from the participating States is consolidated in Table 1.

Table 1 Details of the implementing agencies in the states at the district level

Name of the State	Total No. of Districts	No. of Districts where Hort. Dept. is IA	No. of Districts where Agr. Deptt. is IA	Total [3 + 4]
[1]	[2]	[3]	[4]	[5]
North East Region				
Arunachal Pradesh	12	12	0	12
Assam	25	7	17	24
Manipur	9	9	0	9
Meghalaya	6	5	0	5
Mizoram	8	8	0	8
Nagaland	10	10	0	10
Sikkim	4	3	1	4
Tripura	4	4	0	4
Sub Total	**78**	**58**	**18**	**76**
Himalayan States				
Himachal Pradesh	11	11	0	11
J&K	10	9	1	10
Uttarakhand	11	11	0	11
Sub Total	**32**	**31**	**1**	**32**
Grand Total	**110**	**89**	**19**	**108**

It may be observed from the table that out of the total 110 Districts, in as many as 89 [81%] districts, the Implanting Agency of the programme is Horticulture Department of the State Government. In the remaining 19 Districts [17%] in the two States of Assam and Sikkim, the State Agriculture Department is implementing the programme along with its usual activities. In the State of Assam, in the majority of 17 [68%] of the Districts, State Agriculture Department is the Implementing Agency at the District level. Only in the remaining 7 Districts, Horticulture Department set up has been created at the District level. In Sikkim Agriculture Department is the Implementing Agency in one of the four Districts. There are 2 Districts, where no set up of the Agriculture/Horticulture Department has been created at the District level and the work of implementation is being done by drawing the staff from the other districts.

Historically, the Agriculture Department of the State Government had been looking after the work of horticulture activities as well. With the recognition of the importance of horticulture in the national economy, separate Horticulture Departments have been created to bestow focused attention to horticulture crops. It may be advantageous for the States to create a separate Horticulture Department to give needed push to the development of horticulture sub sector. The concerned States may further consider setting up a separate Horticulture Unit at such of the districts, where such an arrangement does not exist as at present, for an effective implementation of the programme.

It may be advantageous for the States to create a separate Horticulture Department to give needed push to the development of horticulture sub sector.

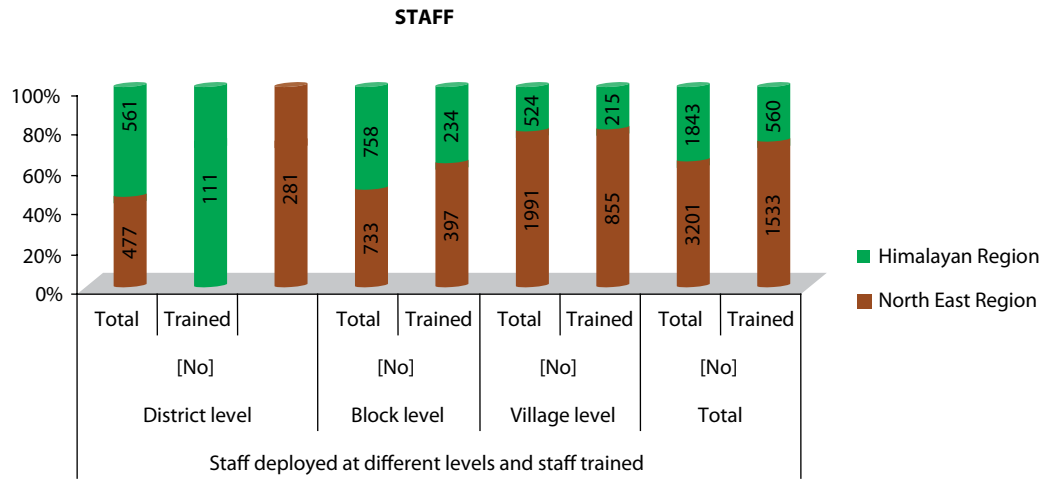
The Status of the Staff Deployed for Implementation of the Programme in Districts

The success of any programme also depends upon the deployment of an adequate and trained number of the staff. The information collated from the Districts on the number of the total staff deployed for implementation of the programme and how many of them have been imparted necessary training, is collated and presented in Table 4.1.

Table 4.1 No. of the staff deployed at different levels in the district and the staff trained

State	No. of Districts	Staff deployed at different levels and staff trained								Avg. No of staff per Distt.
		District level [No]		Block level [No]		Village level [No]		Total [No]		
		Total	Trained	Total	Trained	Total	Trained	Total	Trained	
North East Region										
Arunachal Pradesh	12	88	31	94	26	82	25	264	82	22
Assam	25	90	30	309	168	1489	699	1888	897	76
Manipur	9	65	60	38	34	42	38	145	132	16
Meghalaya	6	28	8	42	10	27	0	97	18	16
Mizoram	8	82	65	131	117	0	0	213	182	27
Nagaland	10	41	26	21	22	35	35	97	83	10
Sikkim	4	66	56	22	20	64	58	152	134	38
Tripura	4	17	5	76	0	252	0	345	5	86
Sub Total	**78**	**477**	**281**	**733**	**397**	**1991**	**855**	**3201**	**1533**	**41**
Himalayan Region										
Himachal Pradesh	11	41	14	104	23	94	49	239	86	22
J&K	10	79	3	105	5	177	20	361	28	36
Uttarakhand	11	441	94	549	206	253	146	1243	446	41
Sub Total	**32**	**561**	**111**	**758**	**234**	**524**	**215**	**1843**	**560**	**58**
Grand Total	**110**	**1038**	**392**	**1491**	**631**	**2515**	**1070**	**5044**	**2093**	**46**

Figure 4.1 No. of the Staff deployed at different levels in the district and the staff trained



The average number of the staff deployed for implementation of the programme at District, Block and Village level comes to 46 per district – 41 in NER and 58 in Himalayan States. The district wise position varies from 10 in Nagaland to 86 in Tripura depending upon the size and topography of the District. The staff appears to be adequate.

As for as the training part is concerned, out of total staff of 5044, associated with the implementation of the HMNEH, 2093 [41%] were reported to have undergone training. Since HRD has crucial role as the implementation of other components of the programme depends upon it, the capacity building of the Departmental staff is very important. Training may, therefore, be given to more members of the implementing staff at least to the extent of 50% their total strengths.

Status of PC and Internet in District Offices

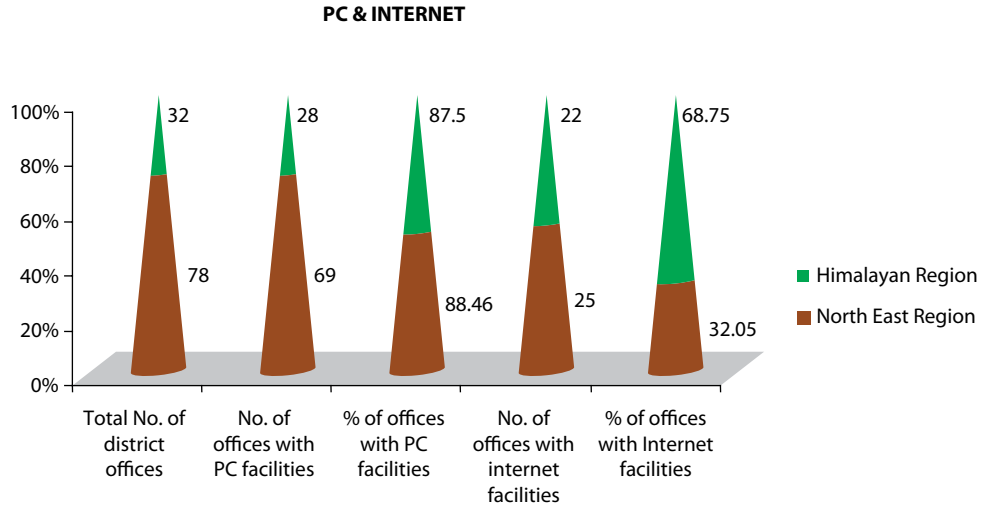
The HMNEH envisages linking of all the District Offices with Personal Computers and internet connections for faster communication and exchange of information. The position of the district offices in the State is exhibited in Table 4.2.

Table 4.2 Status of the PC and internet provided in district offices

Name of the State	Total No. of district offices	No. of offices with PC facilities	% of offices with PC facilities	No. of offices with internet facilities	% of offices with Internet facilities
North East Region					
Arunachal Pradesh	12	11	91.67	4	33.33
Assam	25	22	88.00	5	20.00
Manipur	9	8	88.89	4	44.44
Meghalaya	6	4	66.67	3	50.00
Mizoram	8	8	100.00	2	25.00
Nagaland	10	9	90.00	1	10.00
Sikkim	4	3	75.00	3	75.00
Tripura	4	4	100.00	3	75.00
Sub Total	**78**	**69**	**88.46**	**25**	**32.05**

Name of the State	Total No. of district offices	No. of offices with PC facilities	% of offices with PC facilities	No. of offices with internet facilities	% of offices with Internet facilities
Himalayan Region					
Himachal Pradesh	11	11	100.00	11	100.00
J&K	10	9	90.00	2	20.00
Uttarakhand	11	8	72.73	9	81.82
Sub Total	**32**	**28**	**87.50**	**22**	**68.75**
Grand Total	**110**	**97**	**88.18**	**47**	**42.73**

Figure 4.2 Status of the PC and internet provided in district offices



Of the 110 Districts for which data has been made available, as many as 97 (88%) had been extended PC facilities. The coverage is more or less similar in the two Regions of NER and HSR. All the District Offices in the States of Mizoram, Tripura and Himachal Pradesh have been provided PC facilities. In the remaining States, the PC coverage of the Districts Offices ranges from 67% in Meghalaya to 92% in Arunachal Pradesh. As regards Internet facility, only 47 of the 110 offices [43%] have been linked with the Internet as yet. Internet coverage of 32% offices in NER [25 Districts covered out of 78] was low compared to 69% in HSR [22 Districts covered out of 32]. The States with good coverage were Himachal Pradesh -100%, Uttarakhand - 82%, Sikkim & Tripura -75% each and Meghalaya -50%. In other States the net coverage ranged from 10% in case of Nagaland and 44% in respect of Manipur.

Since PC and Internet have become very important parts of the modern system of governance in regard to access to the fast flow of information, all the District Offices implementing the HMNEH are required to be provided with PCs and also linked with Internet connection. This would be absolutely necessary in introducing the proposed Management Information System [MIS].

Status of District Committees [DCs]

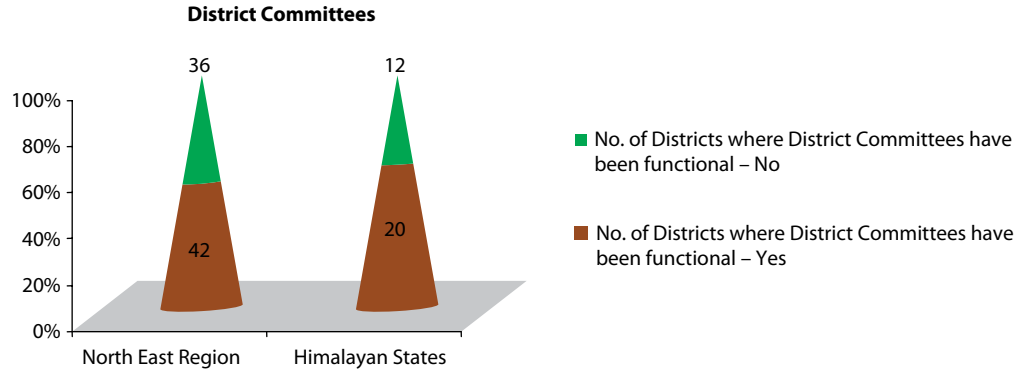
In the implementing structure created under the Mission, District Level Committees are required to be constituted in each District for preparation and implementation of

projects/action plans. The position of the existence of such committees in different districts of the participating States, is indicated in Table 4.3.

Table 4.3 Status of the district committees constituted under the Implementing structure of the Mission

Name of the State	Total No. of Districts	No. of Districts where District Committees have been functional	
		Yes	No
North East Region			
Arunachal Pradesh	12	7	5
Assam	25	14	11
Manipur	9	4	5
Meghalaya	6	5	1
Mizoram	8	2	6
Nagaland	10	4	6
Sikkim	4	3	1
Tripura	4	3	1
Sub Total	**78**	**42**	**36**
Himalayan States			
Himachal Pradesh	11	7	4
J&K	10	8	2
Uttarakhand	11	5	6
Sub Total	**32**	**20**	**12**
Grand Total	**110**	**62**	**48**

Figure 4.3 Status of the district committees constituted under the Implementing structure of the mission



It may be observed from the table that of the total 110 Districts, District Level Committees have been functional only in 62 Districts which constitute 56% of the total Districts - 53% in NER and 63% in HSR. In substantial number of 48 districts i.e. 44%, District Level Committees were not functional. The majority of the Districts - 75% in Mizoram, followed by 60% in Nagaland, 56% in Manipur and 55% Districts in Uttarakhand, Committees were not functional.

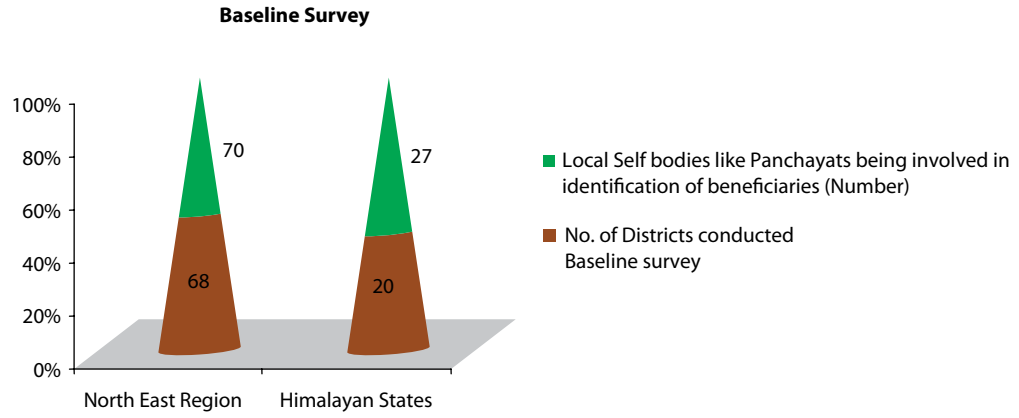
Conduct of Baseline Survey and Association of Local Self Bodies with the Programme

The details of the baseline survey conducted to identify Horticulture potential in different districts of the participating States are indicated in Table 4.4.

Table 4.4 Status of baseline survey conducted in districts of participating States

Name of the State	Total No. of Districts	No. of Districts which have conducted Baseline survey	Local Self bodies like Panchayats being involved in identification of beneficiaries [No.]
North Eastern Region			
Arunachal Pradesh	12	10	11
Assam	25	23	24
Manipur	9	9	8
Meghalaya	6	4	4
Mizoram	8	7	7
Nagaland	10	9	8
Sikkim	4	3	4
Tripura	4	3	4
Sub Total	**78**	**68**	**70**
Himalayan States			
Himachal Pradesh	11	5	11
J&K	10	8	7
Uttarakhand	11	7	9
Sub Total	**32**	**20**	**27**
Grand Total	**110**	**88**	**97**

Figure 4.4 Status of baseline survey conducted in districts of participating States



Baseline survey had been done in 88 [81%] of the 109 Districts before the launch of the programme. Of the remaining 19% Districts not conducting any baseline survey, 23% were

from NER and 38% from HSR. Further 97 Districts [89%] had been associating local self-bodies like Panchayats in the identification of beneficiaries. The Districts which were not involving local self-bodies with the beneficiary selection process constituted about 10% of total Districts in the participating States. The NER Region had 9% and HSR 16% share of such States.

A base line survey is a method of mapping the potential of any activity in the area and forms a good base for an effective planning. The involvement of Local Self Bodies makes the selection process more broad based and transparent. The non-compliant Districts should, follow these norms in future.

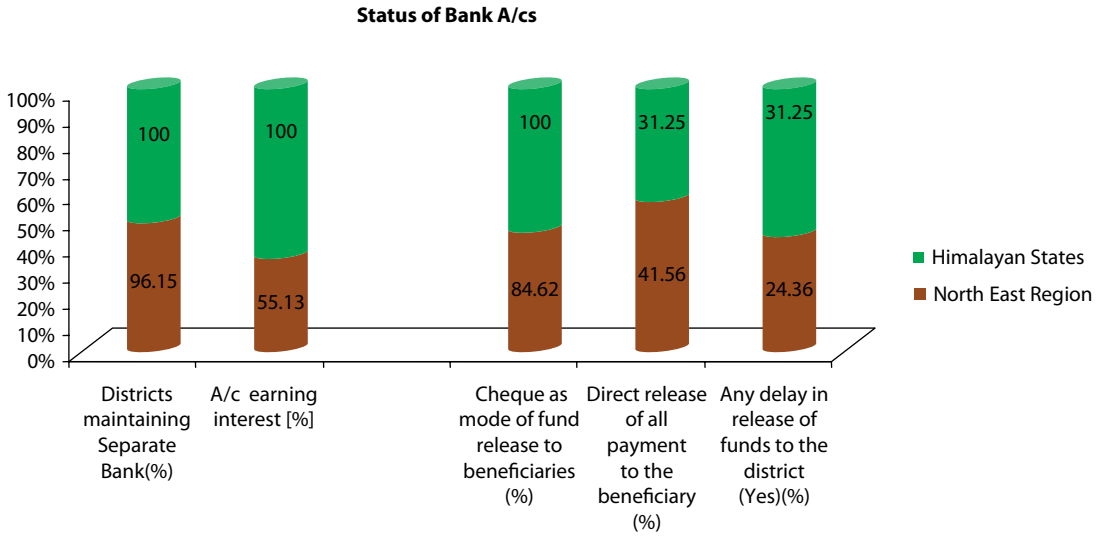
Fund Flow and Management of Funds

The Districts are required to maintain separate Bank Accounts for the programme under the HMNEH and the funds parked in the Bank should also earn interest. The payment to the beneficiaries is also required to be made by cheques issued in the name of supplier of goods/inputs as far as possible. The position of the districts in this regard in the participating States is exhibited in Table 4.5.

Table 4.5 Account maintenance, interest on deposits and mode of payment to the beneficiary

Name of the State	Total No. of Districts	Districts maintaining Separate Bank (%)	A/c earning interest [%]	Cheque as mode of fund release to beneficiaries (%)	Direct release of all payment to the beneficiary (%)	Any delay in release of funds to the district (Yes) (%)
North East Region						
Arunachal Pradesh	12	91.67	91.67	75.00	0.00	16.67
Assam	25	96.00	28.00	92.00	60.00	36.00
Manipur	9	100.00	0.00	66.67	55.56	11.11
Meghalaya	6	83.33	83.33	83.33	33.33	33.33
Mizoram	8	100.00	100.00	87.50	25.00	25.00
Nagaland	10	100.00	40.00	80.00	77.78	20.00
Sikkim	4	100.00	100.00	100.00	25.00	0.00
Tripura	4	100.00	100.00	100.00	0.00	25.00
Sub Total	**78**	**96.15**	**55.13**	**84.62**	**41.56**	**24.36**
Himalayan States						
Himachal Pradesh	11	100.00	100.00	100.00	54.55	18.18
J&K	10	100.00	100.00	100.00	20.00	20.00
Uttarakhand	11	100.00	100.00	100.00	18.18	54.55
Sub Total	**32**	**100.00**	**100.00**	**100.00**	**31.25**	**31.25**
Grand Total	**110**	**97.27**	**68.18**	**89.09**	**38.53**	**26.36**

Figure 4.5 Maintaining separate Bank A/cs, earning of interest on deposits and mode of payment to the beneficiary



An overwhelming majority of 97% of the Districts had been maintaining separate Bank Accounts in respect of the programmes under the Mission being implemented by them. Only a small number of about 3% at aggregate level, from the States of Meghalaya [16%], Arunachal [8%] and Assam [4%] had not done so. Regarding interest on deposits, 68% of the total Districts – 55% from NER and 100% from HSR had reported that their deposits kept with the banks were earning interest. About 32% of the districts - all from NER, had said that they had not got any interest on the funds of the Mission deposited with the banks. The number of the districts reporting non receipt of the interest from banks was: Manipur -100%, Assam -72%, Nagaland 60%, Meghalaya -17% and Arunachal -8%.

It is highly desirable that separate bank accounts under Mission should be maintained to avoid any confusion on the utilization of the money for the purpose for which it is meant. The States not complying with this condition of the Mission are required to open separate bank accounts immediately. The Districts not earning any interest on the funds parked with the banks are required to take up the matter with the concerned bank to find out as to why their deposits are not earning any interest when under similar circumstances, the banks in the other Districts/States are paying interest.

About 89% of the districts had been making payment to the beneficiaries by cheques. The districts following the practice of making payment in cash ranged from 8% in Assam to 33% in Manipur. On the point of release of payment to the beneficiaries direct, majority of 62% [58% - NER & 69%- HSR] of the districts had reported that all the payments to the beneficiaries were not being released direct and 38% [NER-42% & HSR -31%] had said that the payments were being made directly to the beneficiaries by them. In Arunachal Pradesh and Tripura, all the Districts had a system of not making direct payment to the beneficiaries. In the other States, the system of making payment to the beneficiaries direct, ranged from 18% in Uttarakhand to 78% in Nagaland. As far as possible, cheques should be issued to the supplier of the goods/inputs to the farmers, to avoid any

misuse of funds. The States making all the payments in cash need to revisit their policy in this regard.

On the question of delay in receipt of the funds, a large majority of the Districts had reported timely receipt of funds by them -76% in NER and 69% in HSR. Excepting the State of Sikkim, all the districts in other States had reported delay in routing of funds to them and the number of Districts with such reporting ranged from 11% in Manipur to 55% in Uttarakhand. The State SFACs are required to look into the matter and ensure that funds are promptly released to the concerned districts on receipt of the same from the central SFAC.

Status Establishment of Centre of Excellence [CoE] of Horticulture Mission in the Districts

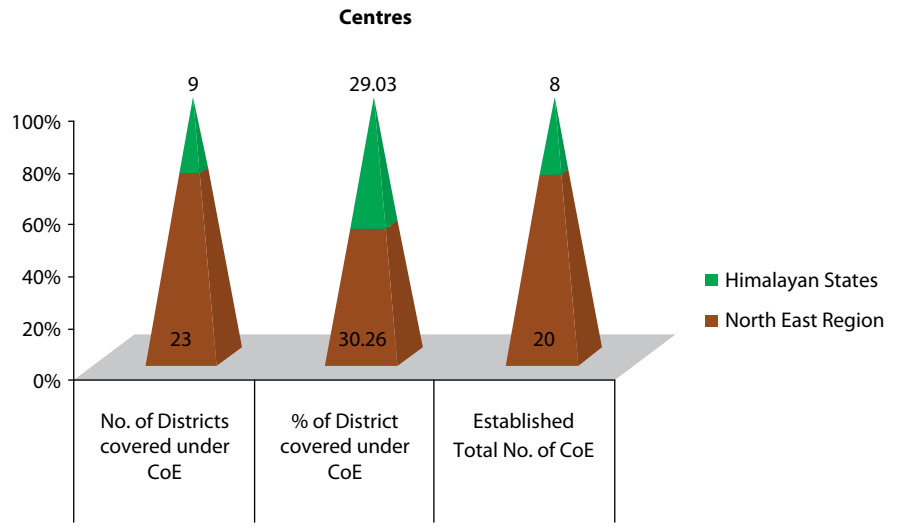
The Mission had envisaged setting up a few Centres of Excellence in each State to serve as good demonstration points to give thrust to the horticulture activity. The details of such centres established in the Districts are furnished in Table 4.6.

Table 4.6 Centres of excellence established in the districts

Name of the State	Total No. of Districts	No. of Districts covered under CoE	% of District covered under CoE	Total No. of CoE established
North East Region				
Arunachal Pradesh	12	4	36.36	2
Assam	25	4	16.67	2
Manipur	9	6	66.67	6
Meghalaya	6	4	66.67	4
Mizoram	8	2	25.00	3
Nagaland	10	2	20.00	2
Sikkim	4	1	25.00	1
Tripura	4	0	25.00	0
Sub Total	**78**	**23**	**30.26**	**20**
Himalayan States				
Himachal Pradesh	11	5	45.45	5
J&K	10	0	10.00	0
Uttarakhand	11	4	40.00	3
Sub Total	**32**	**9**	**29.03**	**8**
Grand Total	**110**	**32**	**29.91**	**28**

It may be observed from the table that 28 Centres of Excellence have been established in as many as 28 places covering Total 32 Districts. While NER share is 20 No [71%], the Himalayan States had 8 numbers [29%]. It is works out to about one centre for about 4 Districts. At least one centre in each District is required to be set up.

Figure 4.6 Centres of Excellence established in the districts



Monitoring Mechanism Adopted by the States

Monitoring is an important aspect of the implementation of the programme. The Monitoring mechanism developed by the Districts in the participating States is contained in Table 4.7.

Table 4.7 Monitoring mechanism developed under the programme

Name of the State	Total No. of Districts	No. of Districts conducting regular Monitoring.	% of Distts. condu -cting Reg. Ins	Periodicity of inspections				% of districts conducting Ins.			
				Monthly	Qtrly	Half yrly	Yly	Monthly	Qrly	Half yrly	Yearly
Arunachal Pradesh	12	9	90.00	6	4	0	0	60.00	40.00	0.00	0.00
Assam	25	21	95.45	12	8	4	1	54.55	36.36	18.18	4.55
Manipur	9	8	88.89	2	5	1	0	25.00	62.50	12.50	0.00
Meghalaya	6	5	83.33	4	1	0	1	66.67	16.67	0.00	16.67
Mizoram	8	7	87.50	2	6	0	0	25.00	75.00	0.00	0.00
Nagaland	10	10	100.00	3	6	1	0	30.00	60.00	10.00	0.00
Sikkim	4	4	100.00	4	0	0	0	100.00	0.00	0.00	0.00
Tripura	4	4	100.00	4	0	0	0	100.00	0.00	0.00	0.00
Sub Total	**78**	**68**	**93.15**	**37**	**30**	**6**	**2**	**51.39**	**41.67**	**8.33**	**2.78**
Himachal Pradesh	11	10	90.91	5	7	0	0	45.45	63.64	0.00	0.00
J&K	10	10	100.00	6	2	2	1	60.00	20.00	20.00	10.00
Uttarakhand	11	11	100.00	3	7	1	1	27.27	63.64	9.09	9.09
Sub Total	**32**	**31**	**96.88**	**14**	**16**	**3**	**2**	**43.75**	**50.00**	**9.38**	**6.25**
Grand Total	**110**	**99**	**94.29**	**51**	**46**	**9**	**4**	**49.04**	**44.23**	**8.65**	**3.85**

Of the total 110 districts from which reports have been received, as many as 99 No [94%-93% NER and 97% in HSR] had put in place regular Monitoring System. Six of the Districts – one each in the States of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram and Himachal Pradesh, had not established any regular monitoring mechanism. Further, about half of the

Districts where the regular monitoring system was in place, were conducting inspections on monthly basis, 44% of quarterly basis, 9% on half yearly basis and about 4% on annual basis. All the Districts in the States of Sikkim, Meghalaya, Tripura, J&K and Uttarakhand were conducting inspections/monitoring on monthly basis. All the Districts should put in place a strong monitoring system and inspections should be conducted at least once in a quarter in every district.

Status of Horticulture

The main agriculture and horticulture crops of the participating States are shown in Table 4.8.

Table 4.8 Main Horticulture crops of the NEH states

Region	Main Horticulture Crops of NEH States
North Eastern States	
Arunachal Pradesh	Apple, Kiwi, Walnut, Orange, Tomato, Large Cardamom, Brinjal, Orange, Pineapple, Citronella, Banana., Ginger, Vegetables, Pear Peach Plum, Turmeric
Assam	Banana, Assam Lemon, Black Pepper, Assam Lemon, Black Pepper, Cashew Nut, Assam Lemon, Black Pepper, Orange, Kharif & Rabi Vegetables, Turmeric, Ginger, Areca Nut, Pine Apple, Ginger, Turmeric etc., Hybrid Vegetables, Litchi, Rabi Vegetables, Chili, Potato, Colocasia, Paddy, Maize, Sugar Cane, Mustard, Black Gram, Colocasia, Brinjal, Winter Paddy, Maize, Sugarcane, Pineapple, Orange, Ginger, Turmeric, Rape And Mustard, Sesamum, Black Gram
Manipur	Banana, Citrus, Cabbage, Crops, Tomato, Rice, Paddy, Temperate Fruits, Passion Fruits, Vegetable, Ginger And Turmeric And Potato Vegetable & Spices
Meghalaya	Baby Corn, Okra, Cauliflower, Chilli, Citrus, Potato, Ginger, Vegetable, Apple, Banana, Floriculture, Orange, Cashew Nut, Pineapple, Mango, Coconut, Areca Nut, Strawberry, Strawberry, Flowers, Turmeric, Tomato, Cole Crops & Gerbera
Mizoram	Banana, M. Orange, Mango, Pine Apple, Chayote, Areca Nut, Anthurium, Fruits and Vegetables, Grapes, Passion Fruit,
Nagaland	Cardamom, Orange, Pine Apple, Chilli, Citrus, Banana, Fruits Large Cardamom, Orange, Banana, Vegetables, Maize, Palm, Vegetables, Passion Fruit, Betalvine, Turmeric, Cashew Nut
Sikkim	All Season Vegetable, Orange, Ginger, Cardamom, Flowers, Tomato, Ginger
Tripura	Banana, Pine Apple, Mango Orange, Raddish, Jackfruit
Himalayan States	
Himachal Pradesh	Apple, Apricot, Almond, Citrus, Walnut, Mango, Litchi, Plum, Hops, Peas, Potato, Kuth, Fruit Crops, Vegetables, Tomato, Capsicum, Peas, Ladyfinger, Exotic Vegetable, Potato, K.Lime, Kinnow, Pear, Gugul, Aonla, Carnation, Rose, Maize, Wheat, Strawberry, Plum, Walnut, Almond, Stone Fruits, Tomato, Gladiolus, Mushroom

Region	Main Horticulture Crops of NEH States
J&K	Apple, Pear, Walnut, Maize, Paddy, Wheat, Stone Fruit, Mango, Guava, Citrus, Aonla, Litchi, Ber,Orange, Cardamom, Pear, Peanut, Citrus Group, Fruit, Dome Fruit
Uttarakhand	Apple & Temperate Fruits, Malta, Mango, Litchi, Pear, Citrus Sp., Cabbage, Tomato, Fruit, Litchi, Vegetables, Pea, Cabbage, Guava, Chillies, Potato, Bean, Stone Fruits, Citrus, Capsicum, Cole Crops, Carnation, Gladiolus, Mushroom, Garlic, Chillies, Raddish, Vegetable, Cabbage, Pea

Criteria of Selection of Beneficiaries

The beneficiaries have normally been selected through the Regular/Extension/field staff of the Agriculture/Horticulture Department as well as through the existing beneficiaries, in the districts. In Himachal Pradesh 'the first come and first served' principle has also been applied in the selection. In Uttarakhand advertisement about the programme is issued. Only a few districts were consulting PRIs for selection of beneficiaries.

Some of the general criteria adopted by the districts for selection of beneficiaries are: Availability of land with the farmer:

- Irrigation facilities at the land of the farmer
- Suitability of the land for a particular crop,
- Farmer's interest in horticulture cultivation etc.
- Preference for Group of farmers

No. of Beneficiaries Assisted

The number of beneficiaries assisted, area covered and the financial assistance extended during the XI Plan period from 2007-08 upto 2010-11, is consolidated in Table 4.9.

A total of 11.71 lakh horti-farmers have been covered under the Mini Mission-II during XI Plan period from 2007-08 upto 2010-11, out of which 2.41 lakh were the women participants constituting about 20% of the total beneficiaries. An area of more than 7 lakh ha has been

Table 4.9 Component wise beneficiaries assisted and area covered (2007-08 upto 2010-11)

Component	No. of Farmers	Of which, No. of Women	Area Covered (ha)	Financial Assistance Provided (Rs. lakh)		
				Cash	Kind	Total
Area Expansion	520807	87324	411973	16535	24333	40771
Rejuvenation	81778	11131	31926	2056	2726	4782
Agri Implements/Tools	44363	3667	31794	761	974	1735
Awareness Campaign/Workshop/ Seminars/Publications/Mission Management	21248	1849	596	37	18	55
Bee Keeping	27751	4116	46545	45	174	220

Component	No. of Farmers	Of which, No. of Women	Area Covered (ha)	Financial Assistance Provided (Rs. lakh)		
				Cash	Kind	Total
Human Resource Development	71	0	0	12	0	12
Mushroom Unit	13	1	7	6	50	56
On-farm Handling Unit	2568	151	1694	915	135	1051
Production of Planting Material	402	29	336	756	492	1247
Productivity Improvement	302849	73186	6599091	7661	8935	16582
Special Intervention	500	175	8	5	18	22
Transfer of Technology	118865	24188	92509	579	882	1460
Women Empowerment	46991	46991	30751	238	263	501
Total	**1171480**	**241138**	**7250499**	**29623**	**39008**	**68518**

Source: Data compile from district level information

covered. Component-wise, the maximum participation about 45% of the farmers had been under Area Expansion, followed by Productivity Improvement by 26%, Transfer of Technology by 10% and Rejuvenation/replacement of senile orchards by 7%. Funds allocation too had been in the above order.

Involvement of NGOs/Voluntary Agencies under MM-II

The NGO/Voluntary Sector has not been playing any significant role in the implementation of the programme. The utilization of the services of NGOs for formation of SHGs, Training and capacity building, training to women farmers, have been reported by the some of the distracts in Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram and Sikkim in the NER. Voluntary sector also appears to have been associated in the District councils in some of the districts of Assam, Manipur, Meghalaya and Sikkim. There has not been any association of the NGO sector in the Himalayan States of Himachal Pradesh, Jammu & Kashmir and Uttarakhand.

Constitution and Functioning of MM-II Committees

The MM –II Committees have been constituted in the majority of the Districts. The Committees are headed by the Development Commissioner/Deputy Commissioner. All the concerned line Departments at District level, such as Agriculture Department, Horticulture Department, Animal Husbandry Department, Area Marketing Office have been given representation in the Committees Further, Deputy Registrar Cooperative Societies has also been made as a Member of the Committee. The Head of the Agriculture Department/Horticulture Department at the district level, is usually the Member Secretary of the Committee. In Assam, Zila Parishad KVK, Lead District Office and DRDA are also the members of the committee. The Community Development Officer in Uttarakhand and NGOs in Sikkim are included in the MM Committees.

The Committees are undertaking the work of preparation of Project/Action Plans and reviewing the progress in the implementation of the programmes at the field level. The different districts have fixed different periodicity of meetings of the Committee. Some

districts are holding such meetings at quarterly intervals, some on half yearly basis and a few of them once in a year. A very few districts have also reported regular follow up of the decisions taken in the committee.

Fund Utilization Status in NEH States since Inception of the Programme

The total funds of the order of Rs.1075.76 crore had been released to the participating States by the centre, for implementation of the programme since the inception of the Mission in 2006-07 to 2009-10. The status of the funds allocated released and utilized by different States as also the share of each State in the total budget, is indicted in Table 4.10 and 4.11,

Table 4.10 Fund utilization status under MM-II since inception [2001-02 to 2009-10]

[Rs lakh]

Sl. No.	State	Funds Allocated	State Share (%)	Funds Released	Funds Utilized	% Utilization
1	Arunachal Pradesh	15740.75	9.00	9098.30	9098.30	100.00
2	Assam	17760.27	10.15	10417.27	9845.27	94.51
3	Manipur	13888.03	7.94	9325.28	9325.28	100.00
4	Meghalaya	15997.31	9.14	9279.30	9279.30	100.00
5	Mizoram	19249.88	11.00	12998.98	12932.98	99.49
6	Nagaland	18467.70	10.55	12260.00	12260.00	100.00
7	Sikkim	17827.77	10.19	11180.97	11180.97	100.00
8	Tripura	13710.20	7.84	9208.70	9208.70	100.00
9	Jammu & Kashmir	13650.00	7.80	8066.00	7466.00	92.56
10	Himachal Pradesh	14370.00	8.21	8639.00	8639.00	100.00
11	Uttarakhand	14304.66	8.18	8339.72	8339.72	100.00
	Total	**174966.57**	**100.00**	**108813.52**	**107575.52**	**98.86**

From the year of launching of the Mission in NER in 2001-02 and its subsequent extension to the Himalayan States in 2003-04 to 2009-10, the GoI, MoA, have allotted a total sum of Rs.1749.67 crore to all the participating States. Amongst the States, Mizoram had the maximum share of 11% in the total allocation of funds under the programme and J&K the minimum of 7.80%. This has been followed by Nagaland – 10.55%, Sikkim – 10.19%, Assam – 10.15%, Meghalaya – 9.14% and Arunachal Pradesh - 9%. The share of the remaining States ranged from 7.84% in case of Tripura and 8.21% in respect of Himachal Pradesh.

As against the total allocation of Rs.1749.67 crore, the actual release of the funds to the States for spending, has been of the order of Rs.1088.14 crore i.e. 62.19%. The release of the allocated funds depends upon the actual utilization by the States. None the State has been able to utilize the entire fund allocated to it by the GoI under the HMNEH. The maximum release of the funds 67.18% vis-a-vis allocation, has been in the case of Mizoram. This has been followed by Tripura-

Table 4.11 Plan-wise fund utilization status under MM-II [2001-02 to 2009-10]

SN	State	2001-02	2002-03 to 2006- 07 [X Plan]	2007-08 to 2009-10 [XI Plan - ongoing]	Since inception [2001-02 to 2009-10]
1	Arunachal Pradesh	100.00	100.00	100.00	100.00
2	Assam	100.00	100.00	94.34	94.51
3	Manipur	100.00	100.00	100.00	100.00
4	Meghalaya	100.00	100.00	100.00	100.00
5	Mizoram	100.00	100.00	99.32	99.49
6	Nagaland	100.00	100.00	100.00	100.00
7	Sikkim	100.00	100.00	100.00	100.00
8	Tripura	100.00	100.00	100.00	100.00
9	Jammu & Kashmir	NA	100.00	89.12	92.56
10	Himachal Pradesh	NA	100.00	100.00	100.00
11	Uttarakhand	NA	100.00	100.00	100.00
	Total NEH	**100.00**	**100.00**	**98.53**	**98.86**

67.16%, Manipur - 67.15%, Nagaland - 66.38%, Sikkim -62.72%, Himachal Pradesh - 60.12%, Assam – 58.65%, Uttarakhand - 58.30%, Meghalaya - 58%; Arunachal Pradesh - 57.80% and J&K – 54.70%. The State of Mizoram was at the top and J&K at the bottom in regard to the allocation and release of the funds.

Against the release of funds of Rs 1088.14 crore by the MoA, the States have actually utilized an amount of Rs.1075.76 crore which works out to 62.19% of the allocation. The release of the funds which also depends upon the requisition of funds and the extent of utilization thereof, has a considerable gap of about 38%. With the exception of Assam, Mizoram and J&K, all the States have utilized the funds to the full extent. While Mizoram has nearly utilized [99.49%],the funds released to it, there has been a shortfall of the order of 5.49% in case of Assam and 7.44% in respect of J&K in the utilization of the fund released to them. The position of utilization against the actual release of funds was by and large satisfactory.

There was no mismatch between the release and utilization of funds during the X and X Plan period. The shortfall in the utilization of the funds vis- a -vis release, in respect of the three States, had occurred only during the XI plan [up to 2009-10]. The year wise and state wise details of fund allocation, release and utilization have been appended in Annexure 1.

States need to streamline their functioning to ensure that the funds allocated are released to them.

5

Chapter

PRIMARY RESEARCH ANALYSIS & RESULTS

The data has been collected from as many as 9823 beneficiary farmers; using an observation schedule named as "Beneficiary Schedule" containing a set of questions logically related to a problem under study. A wide array of information ranging from demographic profiles of the beneficiaries to their participation in the different components of the programmes, their views on the quality of the planting material and other critical inputs, availability of the extension support, impact on their income etc. has been sought from a large number of the respondents. The schedule had been carefully designed with closed ended, multiple choice, contingency questions - question requiring answer only in case of a particular response to

a previous question, and open ended questions to elicit without distortion, opinion of the respondents as to how the Mission bad best met their needs. The data collected as per details furnished in various tables that follow, have been analyzed by using an Excel Package.

Demographic Profile of Beneficiaries

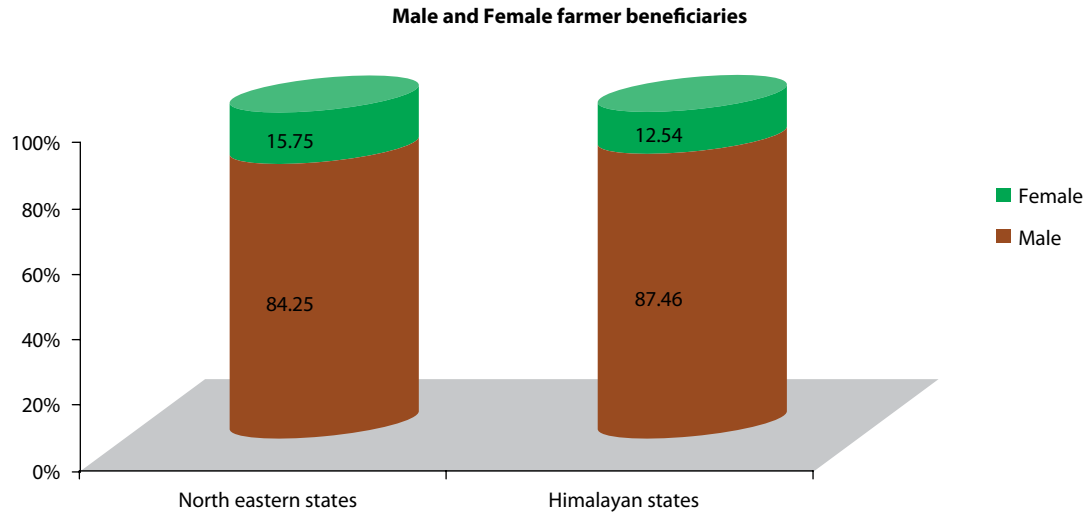
Gender-wise Sample Distribution

The Gender-wise details of the beneficiaries included in the sample are presented in Table 5.1.

Table 5.1 Gender-wise distribution of the sample

States	Total Sample	Male		Female	
		No.	%	No.	%
North Eastern States					
Arunachal Pradesh	1238	1043	84.25	195	15.75
Assam	1966	1822	92.68	144	7.32
Manipur	675	562	83.26	113	16.74
Meghalaya	525	232	44.19	293	55.81
Mizoram	600	523	87.17	77	12.83
Nagaland	825	710	86.06	115	13.94
Tripura	300	281	93.67	19	6.33
Sikkim	301	244	81.06	57	18.94
Sub Total	**6430**	**5417**	**84.25**	**1013**	**15.75**
Himalayan Statesl					
Himachal Pradesh	913	816	89.38	97	10.62
Jammu and Kashmir	1510	1299	86.03	211	13.97
Uttarakhand	975	857	87.9	118	12.10
Sub Total	**3398**	**2972**	**87.46**	**426**	**12.54**
Grand Total	**9828**	**8389**	**85.36**	**1439**	**14.64**

Figure 5.1 Gender-wise distribution of the sample



In the total sample of 9828 horticulture farmers included in the study, men and women constitute 85 percent and 15 percent, respectively both in the NE and Himalayan States. The lowest representation of 6 percent of the female farmers has been reported from the State of Tripura and the highest of 56 percent from the State of Meghalaya in the NE States. In the Himalayan States, there is not much variation in this ratio which ranges from 11 to 14 percent. Since the societal structure is predominantly patriarchal in the country, the land is usually in the name of male members of the households. In the State of Meghalaya, the societal formation being mainly matriarchal, the number of women farmers in the sample is naturally more. In the circumstance the sample is well representative.

Social Classification of Sample

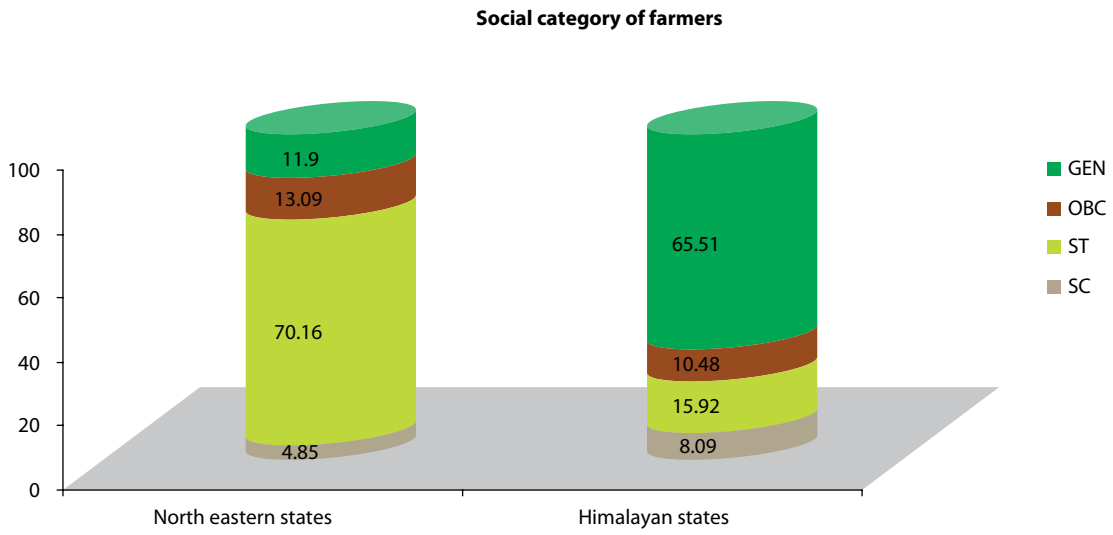
The social distribution of beneficiary farmers assisted under the programme is presented in Table 5.2.

Table 5.2 Social category-wise representation of farmers

States	Total Sample	SC		ST		OBC		GEN	
		No.	%	No.	%	No.	%	No.	%
North Eastern States									
Arunachal Pradesh	1238	27	2.18	1165	94.1	32	2.58	14	1.13
Assam	1966	183	9.31	799	40.64	535	27.21	449	22.84
Manipur	675	16	2.37	368	54.52	92	13.63	199	29.48
Meghalaya	525	7	1.33	517	98.48	1	0.19	0	0
Mizoram	600	2	0.33	597	99.5	1	0.17	0	0
Nagaland	825	11	1.33	811	98.3	3	0.36	0	0
Tripura	300	54	18	77	25.67	86	28.67	83	27.67
Sikkim	301	12	3.99	177	58.8	92	30.56	20	6.64
Sub Total	**6430**	**312**	**4.85**	**4511**	**70.16**	**842**	**13.09**	**765**	**11.9**
Himalayan States									
Himachal Pradesh	913	85	9.31	218	23.88	100	10.95	510	55.86
Jammu and Kashmir	1510	79	5.23	247	16.36	178	11.79	1006	66.62
Uttarakhand	975	111	11.38	76	7.79	78	8	710	72.82
Sub Total	**3398**	**275**	**8.09**	**541**	**15.92**	**356**	**10.48**	**2226**	**65.51**
Grand Total	**9828**	**587**	**5.97**	**5052**	**51.4**	**1198**	**12.19**	**2991**	**30.43**

The sample constituted 51% ST, 31% General Category, 12% OBC and 6% SC category farmers of the total sample of 9828 farmers on an average basis. In the NE States, where the ST population is fairly substantial, the share of the ST farmers was as high as 51% followed by OBC at 13%, General Category - 12% and SC farmers - 5%. While in the States of Arunachal Pradesh, Meghalaya, Mizoram and Nagaland, the ST farmers comprised of 94 to 99% of the sample, in the remaining NE States, their number was significant ranging between

Figure 5.2 Social category-wise representation of farmers



26% in Tripura to 59% in Sikkim. The minimum percentage of SC in the NE States was 1% each in Meghalaya and Nagaland and maximum 18% in Tripura. Similarly OBC coverage in Meghalaya, Mizoram and Nagaland is found to be less than 1% and maximum of 31% in Sikkim. There were no general category farmers in the States of Meghalaya, Mizoram and Nagaland. Manipur with about 30% of general category farmers had the maximum representation in the NE States in the sample.

In the Himalayan States, the General category farmers comprise majority ranging from 56% in Himachal Pradesh to 73% in Uttarakhand. The number of the OBC, SC and ST ranged from 8% to 12%, 5% to 11% and 8% to 24%, respectively. The sample is a fair representative of the composition of the land owning communities in the concerned NE and Himalayan states.

Educational Profile

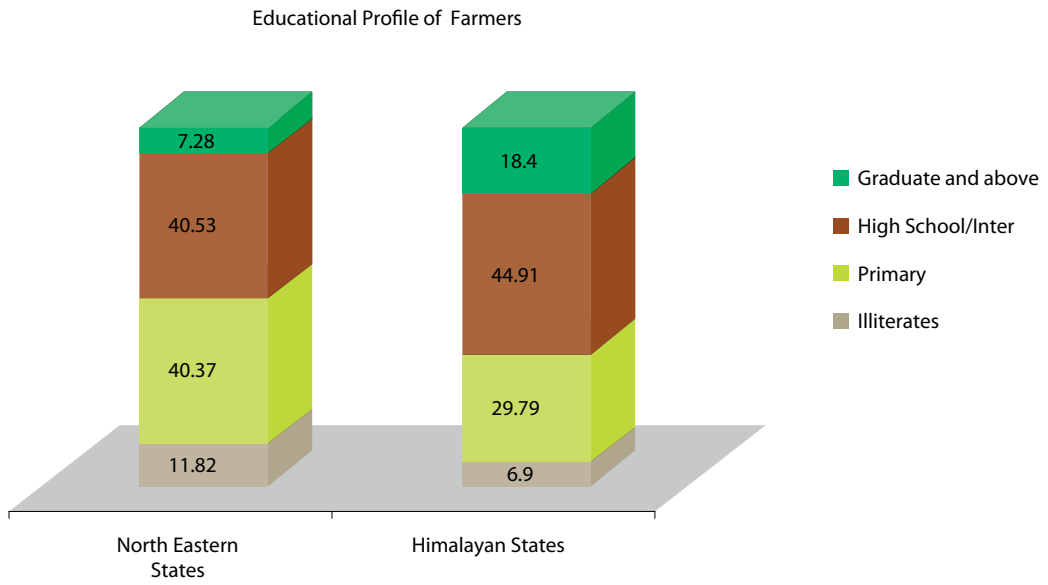
The education level of the farmers plays an important role in understanding and adopting modern technology and good agriculture practices to increase their returns. The technology transfer becomes comparatively easy to harness the fruit of the research. The information collected on the educational profiles of the respondents is consolidated and shown in Table 5.3.

Table 5.3 Educational profile of sample farmers

States	Total Sample	Illiterates		Primary		High School/ Inter		Graduate and above	
		No.	%	No.	%	No.	%	No.	%
North Eastern States									
Arunachal Pradesh	1238	275	22.21	469	37.88	370	29.89	124	10.02
Assam	1966	154	7.83	837	42.57	868	44.15	107	5.44
Manipur	675	85	12.59	157	23.26	313	46.37	120	17.78
Meghalaya	525	50	9.52	238	45.33	216	41.14	21	4

States	Total Sample	Illiterates		Primary		High School/ Inter		Graduate and above	
		No.	%	No.	%	No.	%	No.	%
Mizoram	600	22	3.67	185	30.83	354	59	39	6.5
Nagaland	825	120	14.55	400	48.48	280	33.94	25	3.03
Tripura	300	44	14.67	140	46.67	96	32	20	6.67
Sikkim	301	10	3.32	170	56.48	109	36.21	12	3.99
Sub Total	**6430**	**760**	**11.82**	**2596**	**40.37**	**2606**	**40.53**	**468**	**7.28**
Himalayan States									
Himachal Pradesh	913	63	6.9	272	29.79	410	44.91	168	18.4
Jammu and Kashmir	1510	281	18.61	557	36.89	512	33.91	160	10.6
Uttarakhand	975	121	12.41	290	29.74	395	40.51	169	17.33
Sub Total	**3398**	**465**	**13.68**	**1119**	**32.93**	**1317**	**38.76**	**497**	**14.63**
Grand Total	**9828**	**1225**	**12.46**	**3715**	**37.8**	**3923**	**39.92**	**965**	**9.82**

Figure 5.3 Educational profile of sample farmers



At the average of the figure of all the sampled States, the highest number of the horticulture farmers - 40%, possess High School pass educational qualifications, closely followed by farmers with primary level education - 39%. The number of illiterate and Graduate/Post Graduate being 12% and 10%, respectively. In all the NE States, the average percentage was almost at the same level except in the case of Graduate/Post Graduate where the variation was to the extent of 3%. In the Himalayan States, the average proportion of Graduate/Post Graduate – 15% & Illiterate -14% was comparatively more but less - 33% in case of Primary School pass. The percentage of High/Inter pass was almost at the same level as in the NE States sample.

There were, however, State-wise considerable variations in the educational status of the respondents. The minimum number of the illiterate farmers - 3%, was from the State of Sikkim

and the highest – 22% from Arunachal Pradesh. In the next category of Primary School Pass, the percentage ranged from 23% in Manipur to about 57% in Sikkim. Similarly percentage of respondents with High School/Inter qualifications was 30% in Arunachal Pradesh and 59% in Mizoram at the minimum and maximum level. While the lowest number - 3% of the Graduate/Post Graduate sampled farmers was from Nagaland and the highest of about 18% each from Himachal Pradesh and Manipur.

Majority of the respondents - 52% in NE States and a substantial number - 47% in Himalayan States, fell in the illiterate and/or Primary School pass category. This indicates that the primary sector employment still remains the first/easy choice of the persons with no or very little educational background. There is also a trend noticed that with the passage of time, people with better qualifications are also adopting agriculture as their occupation. It may be comparatively easy for the Extension Agencies to transfer modern farming technology to the field through this class of educated people.

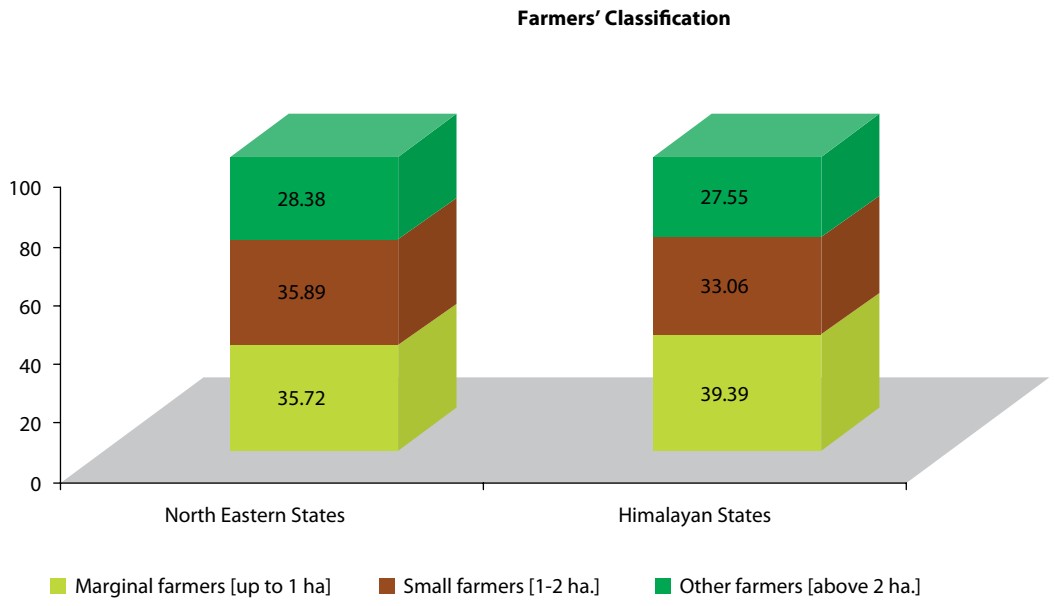
Land Ownership Pattern

Land is the basic means of production in an agrarian society. An understanding of the pattern of ownership and operational holdings of land is, therefore, important for analysis of the issues and problems and developing of necessary tools and techniques which can be integrated in a planning support system to improve land utilization systems for sustainable agricultural production. Information on the ownership pattern of the land was collected from the respondents and the same is contained in Table 5.4.

Table 5.4 Farmers' classification as per land holding

Name of the State	Total No. of Respondents	Marginal farmers [up to 1 ha]		Small farmers [1-2 ha.]		Other farmers [above 2 ha.]	
		No.	%	No.	%	No.	%
North Eastern States							
Arunachal Pradesh	1238	211	17.04	355	28.68	672	54.28
Assam	1966	690	35.1	977	49.69	299	15.21
Manipur	675	201	29.78	241	35.7	233	34.52
Meghalaya	525	295	56.19	98	18.67	132	25.14
Mizoram	600	181	30.17	238	39.67	181	30.17
Nagaland	825	454	55.03	171	20.73	200	24.24
Tripura	300	161	53.67	107	35.67	32	10.67
Sikkim	301	104	34.55	121	40.2	76	25.25
Sub Total	**6430**	**2297**	**35.72**	**2308**	**35.89**	**1825**	**28.38**
Himalayan States							
Himachal Pradesh	913	402	44.03	273	29.9	238	26.07
Jammu and Kashmir	1510	649	42.98	408	27.02	453	30
Uttarakhand	975	523	53.64	260	26.67	192	19.69
Sub Total	**3398**	**1574**	**46.32**	**941**	**27.69**	**883**	**25.99**
Grand Total	**9828**	**3871**	**39.39**	**3249**	**33.06**	**2708**	**27.55**

Figure 5.4 Farmers' classification as per land holding



The sample had a fair mix of all type of farmers- Marginal [MF], Small [SF] and Others [OF] having land up to 1 ha, between 1-2 ha and above 2 ha, respectively. Of the total sample of 9828 farmers, as many as 3871 [39%], were MF, followed by SF – 3248 [33%] and OF -2708 [28%]. Whereas in NER, MF, SM & OF formed 36%, 36% & 28% of the sample, In HSR, their corresponding percentage was 46%, 28% and 26% respectively. In HSR, the number of SF was more by about 10% and less by 8% and 2% respectively of the SF and OF compared to the NER farmers, in the land ownership pattern. There were State-wise variations in the composition of farmers' categories. It varied from 17% in Arunachal Pradesh to 56% in Meghalaya in NER Region in the MF category. In HSR, it ranged from 43% in J&K to 54% in Uttarakhand. The number of SF varied from 19% in Meghalaya to 50% in Assam in NER and of from 11% in Tripura to 54% in Arunachal Pradesh. In the HSR, the difference between the SF & OF category ranged between 2% to 7%.

Acreage of the Sample Farmers under Horticulture

With a view to ascertain the extent of the horticulture crops being grown by the respondents, necessary data was collected from them. Information received on land holding pattern and the land put to horticulture vs. other crops use, is consolidated in Table 5.5.

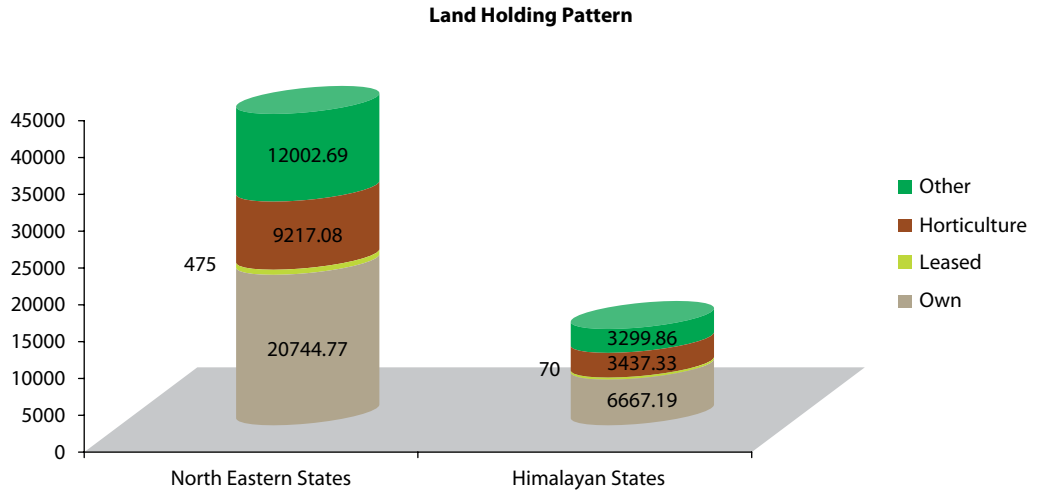
All the 9828 farmers included in the survey, were undertaking cultivation activities on a total land of about 27957 ha which works out to 2.84 ha per capita on an average. A small portion of the total land i.e. 545 ha [2%] was the land taken on lease by some of the farmers. In the State of Assam, the land taken on lease constituted the maximum of 6% of the total land of the sampled farmers in the State. In the remaining States, the portion of the leased land was insignificant.

Of the total acreage of 27,957 ha put under agriculture use, as much as, 12654 ha area [45%] was being used for horticulture cultivation and the rest 55% for growing other agricultural crops, on an average basis. The ratio between the horticulture and agriculture land use

Table 5.5 Land holding pattern and land under horticulture

Name of the State	Land holding [ha.]			Crops grown [ha.]		
	Own	Leased in	Total	Horticulture	Others	Total
North Eastern States						
Arunachal Pradesh	10405.8	19	10424.8	2820.53	7604.22	10424.8
Assam	3778.74	220	3998.74	2261.13	1737.61	3998.74
Manipur	1533.73	118	1651.73	944.21	707.52	1651.73
Meghalaya	708.95	18	726.95	348.24	378.71	726.95
Mizoram	1373.6	17	1390.6	962.97	427.63	1390.6
Nagaland	1783.5	68	1851.5	1087.85	763.65	1851.5
Tripura	445.47	8	453.47	301.08	152.39	453.47
Sikkim	715.03	7	722.03	491.07	230.96	722.03
Sub Total	**20744.8**	**475**	**21219.8**	**9217.08**	**12002.7**	**21219.8**
Himalayan States						
Himachal Pradesh	1737.83	11	1748.83	940.94	807.89	1748.83
Jammu and Kashmir	3261.99	40	3301.99	1579.31	1722.68	3301.99
Uttarakhand	1667.37	19	1686.37	917.08	769.29	1686.37
Sub Total	**6667.19**	**70**	**6737.19**	**3437.33**	**3299.86**	**6737.19**
Grand Total	**27412**	**545**	**27957**	**12654.4**	**15302.6**	**27957**

Figure 5.5 Land holding pattern and land under horticulture



was 41: 59 in NER and 51:49 in HSR. The respondent farmers in the States of Mizoram [69%], Sikkim [68%], Tripura [66%], Nagaland [59%] Assam and Manipur [each 57%], had more than half of their land under horticulture crops cultivation in NER. In Himalayan States, except the State of Jammu and Kashmir, area of the respondent farmers under horticulture was more than 50%. The topography of the region and the profitability of the activity are the two primary reasons of land use for different purposes. The Hilly terrain of all the 11 States are more suitable for growing horticulture crops and the agriculture is practiced mostly on

the foothills on subsistence basis in view of various constraints to promote agriculture on commercial scale. The farmers in these reasons are finding horticulture more rewarding and that is why more acreage is shifting towards cultivation of horticultural crops.

There is a good potential to increase the horticulture area in the States where more land is being used for other crops as at present more particularly in the hilly pockets where agriculture is normally practiced on subsistence level. The other States too leave potential for further expansion of horticulture base more so in the plain regions. Horticulture crops with higher returns per unit of land are more suitable for the small and marginal farmers.

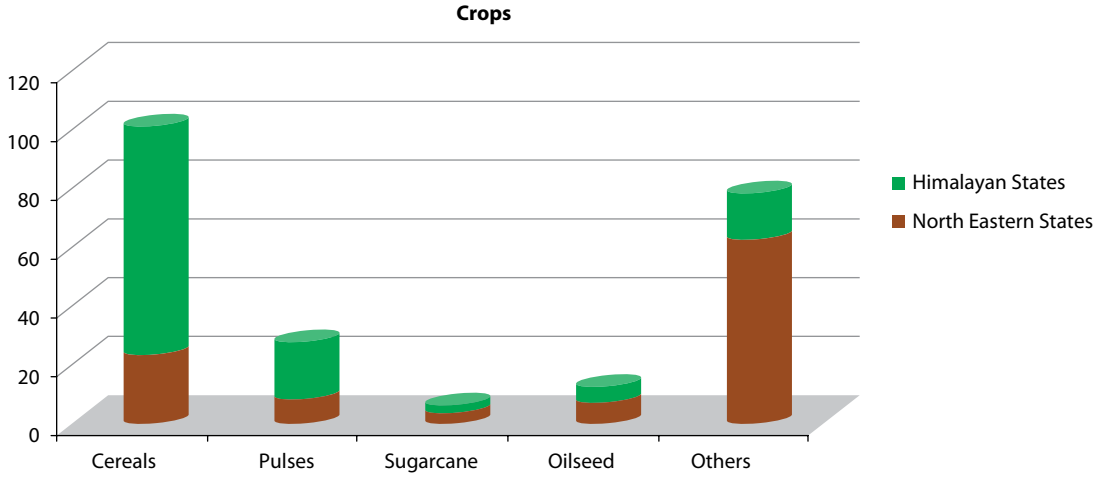
Diversification to Horticulture Crops

Agricultural diversification is an important instrument for economic growth. Diversification largely depends upon the opportunities and responsiveness of farmers to technological breakthrough, consumer demand, government policy, trade arrangements and development of irrigation, roads and other infrastructure. With the thrust being given on horticulture crops, farmers in the participating States have been switching over from the traditional food grain crops to more remunerative horticulture crops. Respondents undertaking horticulture activity were, therefore, asked to indicate the names of the crops from where they had switched over to horticulture crops. Replies received from them are collated in Table 5.6.

Table 5.6 Crops from which farmers switched over to horticulture

State	Total Sample	Response on Increase [yes] No increase [No] in the area under Hort. as compared to previous year/s		Crops from which the area has been diverted				
		Yes	No	Cereals	Pulses	Sugarcane	Oilseed	Others
North Eastern States								
Arunachal Pradesh	1238	100	0	17.54	3.91	1.56	2.35	76.31
Assam	1966	99.78	0.22	3.15	1.42	4.47	12.31	79.08
Manipur	675	100	0	37.11	21.76	6.03	6.95	32.36
Meghalaya	525	100	0	15.33	9.58	0.38	6.13	73.56
Mizoram	600	100	0	4.94	12.13	2.7	2.7	78.88
Nagaland	825	100	0	87.11	4.12	0	0	15.46
Tripura	300	100	0	36.63	18.11	6.17	11.93	35.39
Sikkim	301	100	0	67.73	7.97	3.59	8.37	35.06
Sub Total	**6430**	**99.95**	**0.05**	**23.4**	**8.47**	**3.33**	**6.66**	**62.15**
Himalayan States								
Himachal Pradesh	913	100	0	74.6	5.43	1.03	0.44	18.5
Jammu and Kashmir	1510	100	0	71.88	34.64	1.52	12.27	17.26
Uttarakhand	975	100	0	89.06	12.2	4.12	0.95	9.19
Sub Total	**3398**	**100**	**0**	**77.56**	**19.39**	**2.1**	**5.46**	**15.36**
Grand Total	**9828**	**99.97**	**0.03**	**43.6**	**12.54**	**2.87**	**6.21**	**44.7**

Figure 5.6 Crops from which farmers switched over to horticulture



Almost all the respondents with negligible exception, had indicated increase in acreage of the crops grown by them under horticulture compared to the pre-project stage. As many as 44% [23% from NER & 78% from HSR], had switched from food crops to horticulture, 13% [8% in NER & 19% in HSR] from pulses, 3% from sugarcane and 6% from oilseed [4% in NER & 2% in HSR]. A substantial portion of the respondents of 45% [62% in NER & 15% in HSR], had shifted from other non-horticulture crops to horticulture crops. A large majority from the States of Uttarakhand [89%] followed by Nagaland [87%], Himachal Pradesh [74%], J&K [72%] and Sikkim [68%], had shifted from food crops. In respect of other crops the number of the farmers was not much. Better per unit of land and better returns are prompting the farmers to adopt horticulture cultivation.

Sources of Irrigation

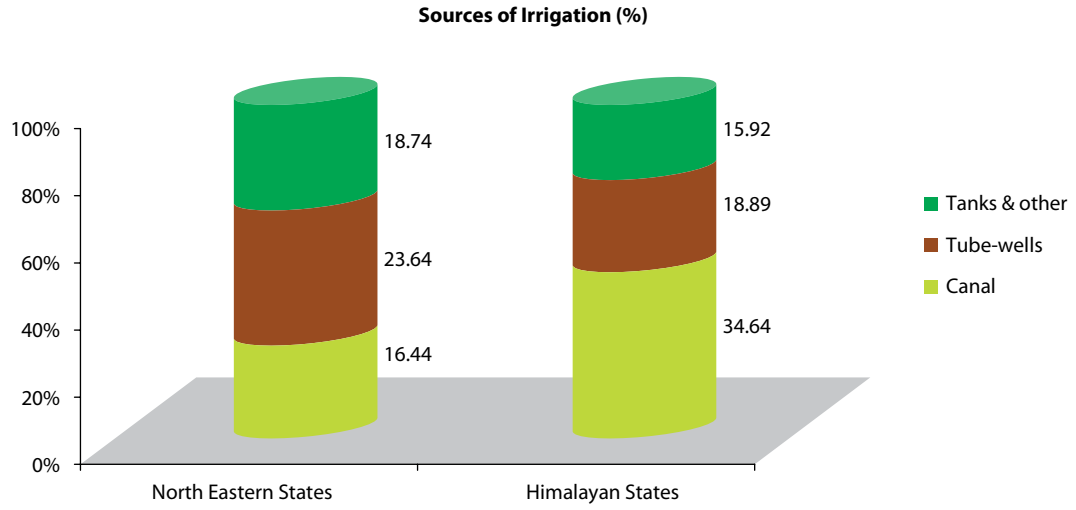
Irrigational facilities are very important for any kind of agricultural practice including horticulture. Irrigation had played a very important role in bringing green revolution to the country. The position of the different sources of irrigation the respondents had been using in raising horticultural crops is shown in Table 5.7.

Table 5.7 Sources of irrigation

State	Total No. of Respondents	Sources of Irrigation (%)		
		Canal	Tube-wells	Tanks & other
North Eastern States				
Arunachal Pradesh	1238	13.49	6.79	3.63
Assam	1966	22.58	51.98	9.16
Manipur	675	17.93	8.30	27.11
Meghalaya	525	23.62	31.81	17.90
Mizoram	600	12.83	18.50	39.67
Nagaland	825	8.00	2.30	26.30

State	Total No. of Respondents	Sources of Irrigation (%)		
		Canal	Tube-wells	Tanks & other
Tripura	300	17.67	20.00	21.67
Sikkim	301	1.66	0.33	60.80
Sub Total	**6430**	**16.44**	**23.64**	**18.74**
Himalayan States				
Himachal Pradesh	913	18.95	19.61	17.96
Jammu and Kashmir	1510	43.77	15.56	10.26
Uttarakhand	975	35.18	23.38	22.77
Sub Total	**3398**	**34.64**	**18.89**	**15.92**
Grand Total	**9828**	**22.73**	**22.00**	**17.77**

Figure 5.7 Sources of irrigation



At the aggregate level, about 63% of the respondents had irrigation facilities on their land – 58% in NER and 70% in HSR. The conventional irrigation sources like canal, tube-wells are limited in hilly areas and are confined to the plain parts of the States.

The respondents using canal and Tube-wells constitute 23% and 22%, respectively of the total sample. About 18% of them have reported use of water tanks and other sources like kuhls, farm pond etc. to meet their irrigation needs. In the use of canal irrigation the maximum number of 44% was from the State of J&K and minimum 2% from Sikkim. A majority of 52% of the respondents from Assam was using tube-wells as their main source of irrigation. In Sikkim the number of respondents reporting use of tube-wells was less than 1%. The majority of the respondents over 60% from this State had, however, reported use of tanks and other like sources for meeting their irrigation requirements. The respondents of other States using tanks and Kuhls, farm ponds etc. in a good measure in other States were: Mizoram [40%], Manipur [27%], Tripura [21%], and Meghalaya [18%] in NER. In the HSR, respondents using these methods of irrigation in good numbers were from the State of Uttarakhand [23%] and Himachal Pradesh [18%].

A substantial number of about 40% of the respondents were dependent on rainfed cultivation. Irrigation affects total factor productivity beyond the input value of the water. Rainwater harvesting by creating reservoirs of the appropriate structures and sizes, for collection of runway water to use the same for irrigation purpose particularly in the rainfed areas, along with increased popularization of micro irrigation system, needs focused attention of the States.

Farmers' Level of Awareness about HMNEH

Publicity of any programmed amongst all the stakeholders is as important as its launching. Use of standard marketing strategy will improve the coverage and the delivery of the service. Information has been collected from the respondents to ascertain the level of their awareness about HMNEH as also the different sources of their knowledge in this regard and the same is presented in Table 5.8.

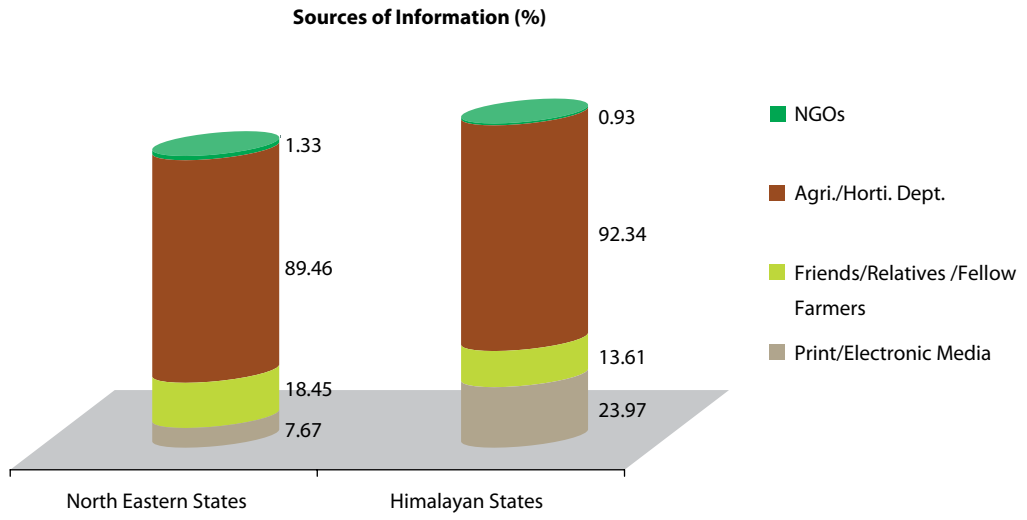
Table 5.8 Awareness and information source of the programme

States	Sources of information about the programme (Multiple Responses - %)			
	Print/Electronic Media	Friends/Relatives/ Fellow Farmers	Agri./Horti. Dept.	NGOs
North Eastern States				
Arunachal Pradesh	4.89	17.35	96.91	0.57
Assam	1.53	13.45	96.43	1.02
Manipur	32.74	12.89	79.11	2.81
Meghalaya	2.5	42.97	67.44	2.89
Mizoram	9.33	14.33	87.5	0.33
Nagaland	9.58	29.58	80.48	1.45
Tripura	6	11.67	94.67	2
Sikkim	4.98	10.3	98.01	1.33
Sub Total	**7.67**	**18.45**	**89.46**	**1.33**
Himalayan States				
Himachal Pradesh	36.66	12.95	92.86	0.77
Jammu and Kashmir	17.41	7.31	94.27	1.06
Uttarakhand	21.05	22.79	89.22	0.92
Sub Total	**23.97**	**13.61**	**92.34**	**0.93**
Grand Total	**13.11**	**16.83**	**90.42**	**1.2**

It may be observed that the awareness level of the beneficiaries about the programme is fairly high and the respondents have given multi answers utilizing more than one source of information.

The major source of the information was the Agricultures/Horticulture Department both in the NE & Himalayan States where around 90% of the respondents have reported to have known about the launching of the programme from these Departments. The State-wise variation was found lowest of 67% in Meghalaya and highest at 98% in Sikkim in NE

Figure 5.8 Awareness and information source of the programme



States. In Himalayan States, it ranged between 89% in Uttarakhand and 93% in Himachal Pradesh. The variation in these States was not much. The next important source was the information obtained from the friends/relatives/fellow farmers by around 18% both in the NE & HS States. The lowest number of the respondents at 7% was in the State of J&K and the highest of 43% percent being in the State of Meghalaya. The overall role of the Print and Electronic Media in imparting information about the programme has been 13% only - 27% in HS and 8% in NE States. The State variations were 2% as the lowest in Assam, to 33% in Manipur in NE States. In HS, the highest number of the respondent getting information from the Print and Electronic media – 37%, was in Himachal Pradesh and the lowest – 17% in J&K. The NGOs have played an insignificant part in this regard. The average reporting of this source is around 1% only in all the States. Much variation amongst the States is not noticed. This also indicates that all these States are highly deficit in the NGO sector presence in their respective areas.

The overall position in this regard appears to be satisfactory. However some more efforts especially of more use of print and electronic media, are required to be made to spread awareness amongst a large number of horticulture crops growers.

Programme Components Availed

There are more than one dozen different main components of Mini Mission-II intended to meet various needs of growers of horticultural crops. Details on these components availed of by individual beneficiaries have been collected. The information received is collated and presented in Table No. 5.9.1 and 5.9.2.

The respondents have participated in more than one component. A predominant majority of them - 7615 [78%] has taken part in the Area Expansion related activities [production of fruit, vegetables etc], followed by Agr./Farm Equipments, availed of by as many as 1901 [19%] respondents, On-farm Management by 1706 [17%], Organic Farming by 1638 [17%], Transfer of Technology [Exposure visits] by 1590 [16%] and Creation of Water Resources

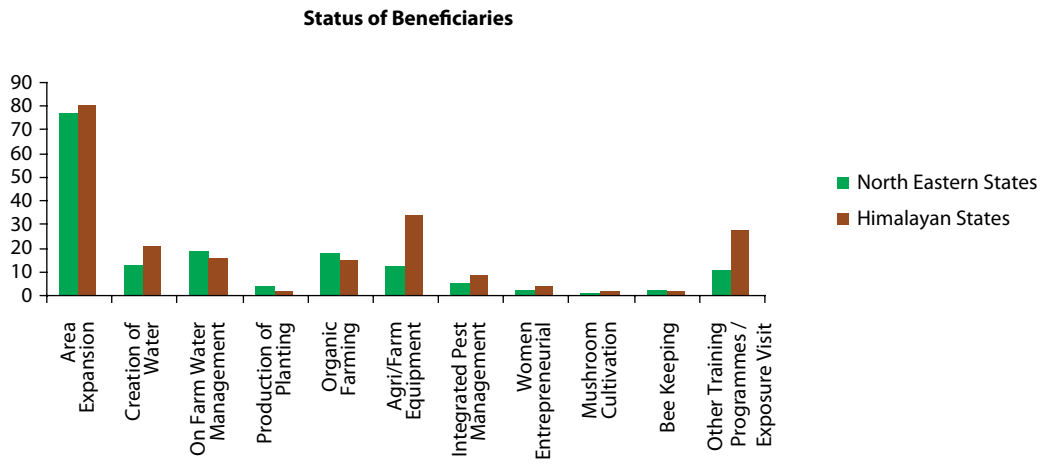
Table 5.9.1 Participation Status of Beneficiaries

States	Main component of the programme in which participated (%)										
	Area Expansion Programme [Fruit, Vegetable Production]	Creation of Water Resources	On-farm Water Management	Production of Planting Material	Organic Farming	Agri/Farm Equipments	Integrated Pest Management (IPM)	Women Entrepreneurial Development programme	Mushroom Cultivation	Bee Keeping	Other Training Programmes/Exposure Visit
North Eastern States											
Arunachal Pradesh	87.16	9.21	11.3	1.62	8.97	3.31	7.11	2.67	0.4	0.48	0.97
Assam	72	1.07	19	1.53	30.86	5.35	0.2	0.92	0.05	0.05	0.05
Manipur	74.81	3.56	24.7	3.41	4	11.85	4.89	0.44	0.44	15.41	6.81
Meghalaya	44.66	19.5	29.4	11.1	2.29	2.1	4.96	2.1	1.53	0.95	5.34
Mizoram	71.17	36.3	29.7	11.5	9.17	28.83	7.5	2.17	1.33	0.67	10
Nagaland	93.58	28.4	10.8	0.85	35.52	36.24	12.97	3.88	1.82	2.91	59.39
Tripura	75.33	21	4.33	6	8.67	16.67	7	1	0.67	0	6.33
Sikkim	83.72	15.3	21.9	0.66	2.33	0	0.33	0	0	0	2.99
Sub Total	**76.38**	**12.8**	**18.4**	**3.53**	**17.69**	**11.81**	**5.06**	**1.76**	**0.65**	**2.24**	**10.35**
Himalayan states											
Himachal Pradesh	66.92	22.6	20.8	0.88	27.27	26.4	2.3	1.97	0.99	0.11	9.86
Jammu and Kashmir	80.4	17.2	6.58	1.81	2.89	31.95	1.07	0.6	0.67	3.22	39.66
Uttarakhand	92	22.7	24.3	1.64	21.44	43.59	24.31	8.31	3.08	0.72	25.03
Sub Total	**80.11**	**20.2**	**15.5**	**1.51**	**14.83**	**33.81**	**8.11**	**3.2**	**1.45**	**1.66**	**27.38**
Grand Total	**77.66**	**15.4**	**17.4**	**2.84**	**16.71**	**19.39**	**6.11**	**2.25**	**0.93**	**2.04**	**16.22**

by 1505 [15%]. The number of the beneficiaries in respect of the remaining components was not significant.

There is, however, a wide variation in the availment of this component among NE States from 45% in case of Meghalaya to 94% in Nagaland. In respect of Himalayan States, the gap is comparatively narrow as it ranges between 67% in HP to 92% in Uttarakhand. In component-wise programme, there are wide variations amongst the States. Except Mizoram [29%] and Nagaland [36%], the percentage of the other States in NE Region ranges from 0% in Sikkim to 17% in Tripura as against the range of 26% in Himachal Pradesh to 44% in Uttarakhand under Agri/Farm Equipment sub component of the programme. For "On-farm

Figure 5.9.1 Participation Status of Beneficiaries



Management" component, coverage of 44% in Tripura is the lowest in all the States. In the other States in NER, availment level ranges from 11% in Nagaland to 30% in Mizoram. In Himalayan States, J&K had the lowest coverage of 6% and the other States' performance ranged between 21 to 24%.

Very few respondents in the States of J&K [3%], Meghalaya [2%], Sikkim [2%] Manipur [4%] have reported adoption of Organic Farming. In the other states, the position ranges from 8% in Tripura to 36% in Nagaland. Under the sub component of Exposure Visits, maximum reporting [59%] was from the respondents of Nagaland. In the remaining NE States participation under this sub head varied from less than 1% in Assam to the highest of 10% in Mizoram. The Himalayan States have fared better on an average basis. The respondents sent to Exposure Visits ranged from 10% in Himachal Pradesh to the highest 40% in J&K. In creation of Water Resources, the State of Mizoram was at the top and Assam at the bottom with 36% and 1% respondents, respectively undertaking this programme. In the other sub components of the programme, viz. adoption of IPM, Women Development Programme, Mushroom cultivation and Bee keeping very few sampled respondents had participated.

Year of Participation by the Beneficiaries in the Programme

The details of the period when the respondents had participated in the HMNEH programme were collected from them and the information received is contained in Table 5.9.2.

It may be observed that the programme has been gradually picking up from the year 2004-05 when about 7% of the respondents joined the same. Their number increased to 835 [9%] in 2005-06. During the years 2006-07 to 2007-08, the coverage increased substantially from 24% to 33%. By this time most of the respondents appeared to have availed of many of the components of the programme. The number of the beneficiaries showed declining trend during the subsequent period of 2009-10 and 2010-11 to 18% and 11%, respectively.

FEW COMPONENTS OF THE PROGRAMME UNDER MINI MISSION II & II

Area Expansion

Creation of Water Resources

Equipment

FEW COMPONENTS OF THE PROGRAMME UNDER MINI MISSION II & II

Training

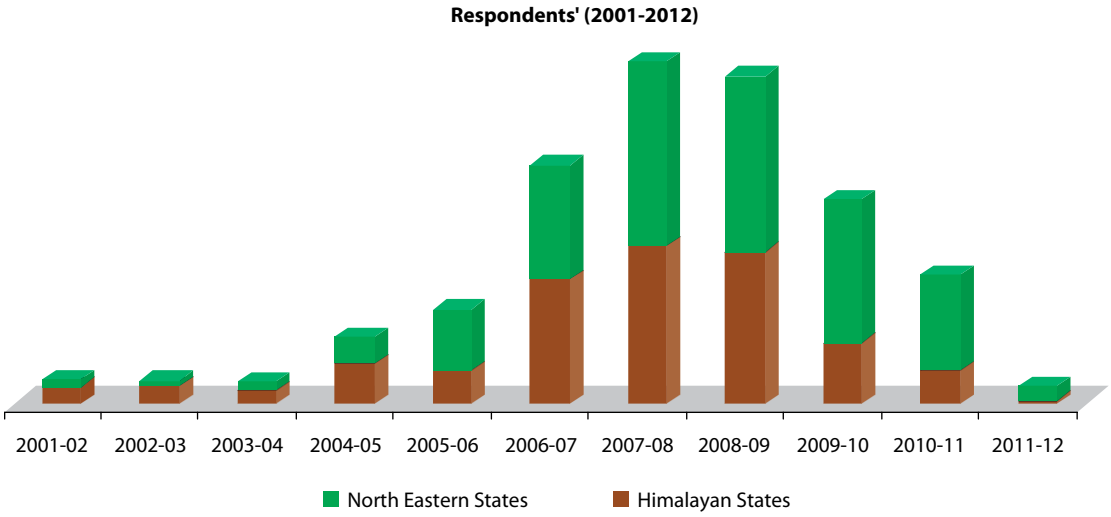
Bee Keeping

Sources of Irrigation

Table 5.9.2 Details of Respondents' participation in the programme during different years (%)

States	Year of participation										
	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
North Eastern States											
Arunachal Pradesh	5.17	12.68	10.02	16.8	12.2	11.15	17.69	18.66	15.35	21.49	1.78
Assam	2.39	0.05	0.61	12.47	8.55	18.64	19.45	35.69	9.01	0	0
Manipur	1.93	0.59	0.59	3.56	4.44	58.07	32	20.15	9.78	7.26	0.89
Meghalaya	0.57	0.76	1.15	2.1	4.2	9.35	23.09	34.73	19.27	11.83	1.34
Mizoram	0.83	1.33	1.33	0.83	2.5	68.67	41.67	16	8.33	3.5	0
Nagaland	8.85	6.18	1.58	1.09	3.52	14.55	65.7	47.76	18.06	0.61	0.73
Tripura	0.67	0	0	0.33	0.33	29.33	67	31.33	3.33	0	0
Sikkim	0	0.66	0.33	0	1.99	10.3	30.23	36.88	12.29	9.3	0.33
Sub Total	**3.22**	**3.53**	**2.61**	**7.83**	**6.57**	**24.83**	**31.46**	**30.26**	**12.14**	**6.71**	**0.65**
Himalayan States											
Himachal Pradesh	0.88	0.55	0.88	6.13	13.36	21.91	30.45	31.65	32.75	21.58	1.86
J&K	0.81	0.4	1.95	6.91	15.5	23.89	36.17	25.77	21.54	19.4	1.81
Uttarakhand	3.79	2.26	2.67	2.77	6.15	22.36	43.9	52.72	35.49	15.49	5.23
Sub Total	**1.69**	**0.98**	**1.87**	**5.51**	**12.23**	**22.91**	**36.86**	**35.14**	**28.6**	**18.86**	**2.81**
Grand Total	**2.69**	**2.65**	**2.36**	**7.03**	**8.52**	**24.17**	**33.32**	**31.94**	**17.81**	**10.89**	**1.4**

Figure 5.9.2 Details of Respondents' participation in the programme during different years (%)



Impact of Programme Components

Area Expansion

The area expansion was the major plank of the HMNEH. The details of the increase in the number of the Horticulture Crops Grower Respondents and the additional area brought under different horticulture crops by them are shown in Tables 5.10 to 5.18.

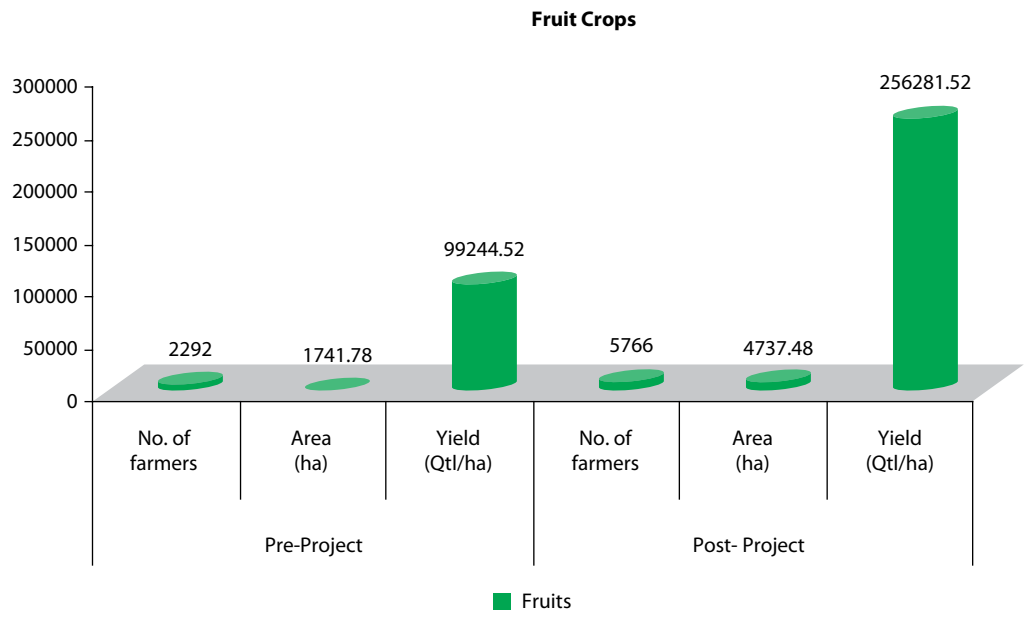
Fruit Crops

A variety of fruit crops is being grown in the North Eastern State Region [NER] and Himalayans States Region [HSR]. The information has been gathered from the respondents on the growing of fruit crops by them in the pre and post HMNEH project stage from both the regions and the same is consolidated and collated in Table 5.10.

Table 5.10 Increase in the no. of fruit growers and additional acreage brought under different fruit crops under HMNEH

	Pre-Project			Post–Project			% increase status over the pre project period			Increase/decrease during post project		
Crop	Number of Farmers Growing	Total Area (Ha)	Yield (Q/ha)	Number of Farmers Growing	Total Area (Ha)	Yield (Q/ha)	Number of Farmers Growing (%)	Total Area increased (%)	Yield (%)	Number of Farmers Growing	Total Area increased	Yield
Almond	38	36.15	1446	80	117.91	3158.4	110.53	226.17	118.42	42	81.76	1712.4
Aonla	21	24.09	1084.05	81	87.65	3728	285.71	263.84	243.90	60	63.56	2643.95
Apple	467	309.51	15433.9	1034	665.87	32117.95	121.41	115.14	108.10	567	356.36	16684.05
Apricot	48	20.05	631.85	185	85.2	2434.58	285.42	324.94	285.31	137	65.15	1802.73
Areca nut	5	4.2	193	10	7.1	227.5	100.00	69.05	17.88	5	2.9	34.5
Avocado	7	9.4	752	22	24.41	2272	214.29	159.68	202.13	15	15.01	1520
Banana	388	292.41	31555.18	697	604.86	65438.88	79.64	106.85	107.38	309	312.45	33883.7
Ber	4	2.48	136.4	11	5.28	290.4	175.00	112.90	112.90	7	2.8	154
Cherry	0	0	0	2	1	20	-	-	-	2	1	20
Chestnut	17	21.7	647	24	36.02	1076.6	41.18	65.99	66.40	7	14.32	429.6
Citrus	75	60.03	5576.8	134	93.66	9321.4	78.67	56.02	67.15	59	33.63	3744.6
Coconut	2	3.01	120.4	3	0.13	4.4	50.00	-95.68	-96.35	1	-2.88	-116
Corrumbula	2	1.3	285	3	0.32	42.2	50.00	-75.38	-85.19	1	-0.98	-242.8
Grapes	1	0.75	90	2	1.47	147.9	100.00	96.00	64.33	1	0.72	57.9
Guava	123	84.99	5111.7	218	158.91	9205.87	77.24	86.97	80.09	95	73.92	4094.17
Hatkora	2	0.75	35	8	5.95	170.6	300.00	693.33	387.43	6	5.2	135.6
Jackfruit	5	2.52	113.4	6	5.02	228.9	20.00	99.21	101.85	1	2.5	115.5
Jameer	0	0	0	1	2	80	-	-	-	1	2	80
Kiwi	21	7.64	229.2	226	138.57	4188.26	976.19	1713.74	1727.34	205	130.93	3959.06
Litchi	36	50.3	2137	171	151.78	5857.8	375.00	201.75	174.11	135	101.48	3720.8
Lime/Lemon	31	12.75	810	61	22.08	1276	96.77	73.18	57.53	30	9.33	466
Mango	175	164.98	6599.2	453	434.6	17138.95	158.86	163.43	159.71	278	269.62	10539.75
Orange	503	445.99	13755.94	1132	1332.06	39662.84	125.05	198.67	188.33	629	886.07	25906.9
Papaya	13	10.2	836.4	24	16.42	1344.54	84.62	60.98	60.75	11	6.22	508.14
Parsimon	2	2.5	73	4	7.3	227	100.00	192.00	210.96	2	4.8	154
Passion fruit	1	0.5	20	51	66.2	2648	5000.00	13140.00	13140.00	50	65.7	2628
Peach	58	21.27	700.5	130	44.84	1348.5	124.14	110.81	92.51	72	23.57	648
Pear	34	13.5	657	138	46.4	1528.75	305.88	243.70	132.69	104	32.9	871.75
Pecun nut	9	2	90	37	12.99	412.5	311.11	549.50	358.33	28	10.99	322.5
Persimon	0	0	0	9	5.35	111	-	-	-	9	5.35	111
Phalsa	0	0	0	0	0	0	-	-	-	0	0	0
Pineapple	123	93.08	7446.4	320	376.2	40356.2	160.16	304.17	441.96	197	283.12	32909.8
Plum	11	4.88	470	64	21.02	1260.5	481.82	330.74	168.19	53	16.14	790.5
Pomegranate	4	1.3	57	7	1.28	28	75.00	-1.54	-50.88	3	-0.02	-29
Pumelo	1	3	0.2	0	0	0	-100.00	-100.00	-100.00	-1	-3	-0.2
Strawberry	1	7.85	439.5	1	12.15	607.5	0.00	54.78	38.23	0	4.3	168
Walnut	64	26.7	1711.5	417	145.48	8319.6	551.56	444.87	386.10	353	118.78	6608.1
Total	**2292**	**1741.78**	**99244.52**	**5766**	**4737.48**	**256281.52**						
	61.95	**47.08**	**2682.28**	**155.84**	**128.04**	**6926.53**						

Figure 5.10 Increase in the no. of fruit growers and additional acreage brought under different fruit crops under HMNEH



Of the total sample of 9828, as many as 2292 [23%] farmers were engaged in fruit cultivation at the time of the launching of the Integrated Development of Horticulture Scheme in NER and HSR. Their number increased to 5766 [152%] and their acreage under fruit crops from 1742 ha to 2975 ha [172%] as a result of their participation in the HMNEH in all the 11 States. Like-wise the yield which stood at 98245 qtl at the time of launching of the Mission increased to 256281 qtl, recording 1581% growth as at the end of the year 2009-10. The Fruit Growers, acreage and production all showed impressive growth.

Orange, Apple, Banana, Kiwi, Mango, Walnut and Pineapple were the six main crops grown by majority of the 4482 [78%] respondent farmers out of the total sample of 5766 farmers engaged in fruit cultivation in all the 11 participating States Regarding crop-wise position, the maximum increase from 503 to 1132 [629 No] in the number of farmers, was observed in case of Orange, followed by Apple - 467 to 1034 [567 No], Banana - 388 to 697 [309 No], Kiwi - 21 to 229 [205 No], Mango – 175 to 453 [278 No], Walnut - 64 to 417 [353 No], and Pineapple - 123 to 320 [197 No]. In relative terms, however, the maximum increase in the number of farmers was observed in case of Kiwi - 976%, Walnut - 552%, Pineapple - 160%, Mango -159%, Orange - 125%, Apple - 121% and Banana - 80%.

In terms of acreage, the above six crops occupied as much as 2338 ha area [78%] of the additional 2995 ha brought under fruit cultivation. Orange recorded the maximum increase in area from 446 ha to 1332 ha [886 ha], followed by Apple - 310 ha to 666 ha [456 ha], Banana - 292 ha to 605 ha [312 ha]. Kiwi - 8 ha to 139 ha [131 ha], Mango – 165 ha to 435 ha [270 ha] and Pineapple - 93 ha to 376 ha [283]. In relative terms, the maximum increase in the area was observed in the case of Kiwi - 1715%, followed by Pineapple – 304%, Orange -199%, Mango -183%, Apple - 115% and Banana – 107%.

Out of as many as 37 fruit crops, listed in the table, the seven crops of Orange, Apple, Banana, Kiwi, Mango and accounted for as much as 209243 qtl [81%] of the total

production of the respondent farmers as at the end of 2009-10. The maximum increase in production was in the case of Banana from 31555 qtl to 65439 qtl [33864 qtl], followed by Pineapple - 7446 qtl to 40356 qtl [32910 qtl], Orange - 13756 qtl to 39663 qtl [25907 qtl], Apple - 15433 qtl to 32118 qtl [16684 qtl], Mango - 6599 qtl to 17139 qtl [10544 qtl], Walnut - 1712 qtl to 8320 qtl [6608 qtl], and Kiwi - 229 qtl– 4188 qtl [3859 qtl]

In the relative terms, Kiwi registered the maximum growth rate of 1727% and Banana the minimum of 107% among these seven major crops. The growth rate of the remaining four crops was noticed as; Pine apple – 44%, Walnut – 386%, Orange -189%, Mango – 160% and Apple – 108%.

Pumelo registered a negative growth rate of - 1, -3 & -0.2 in the No of farmers, area acreage and production respectively.

Region-wise Status

The Region-wise [NER & HSR] development has been as follows. The crop-wise and State-wise details of increase in acreage under different crops are contained in Annexures 5.1 to 5.9.

North Eastern Region

In the NER Region, the number of farmers increased from 1217 to 2853 [134%] and area from 1028 ha to 3023 ha [194%]. The yield which was 63148 qtl at the time of launching of the Mission increased to 114153 qtl recording 181% growth as at the end of the year 2009-10.

Kiwi, Pine apple, Orange and Banana were the major crops grown by the majority of 2201 [77%] respondent farmers out of the total sample of 2853 farmers, engaged in fruit cultivation in the NER. Regarding crop-wise position, the maximum increase from 21 to 226 [976%] in the number of farmers, was observed in case of Kiwi, followed by Pine Apple, from 119 to 306 [157%], Orange, from 479 t to 1017 [112%] and Banana from 363 to 652 [80%].

In terms of acreage, the above five crops occupied as much as 2450 ha [81%] of the additional 3023 ha brought under fruit cultivation. Orange recorded the maximum increase in area from 429 ha to 1245 ha [816 ha], followed by Banana - 278 ha to 577 ha [298 ha], Pine Apple – 92 ha to 361 ha [269 ha], Kiwi - 8 ha to 139 ha. [131 ha] and Apple - 22 ha to 128 ha [106]. In percentage terms, the maximum increase in the area was, however, observed in case of Kiwi [1637 %], followed by Apple [482%], Pine Apple [292%], Orange [190%] and Banana [107%].

Out of as many as 34 fruit crops, the five crops of Banana, Pine Apple, Orange, Apple and Kiwi accounted for as much as 84% [148752 qtl] of the total production of 177302 qtl in the year 2009-10. The maximum increase in production from 29985 qtl to 62514 qtl [32529 qtl] was observed in case of Banana, followed by Pine Apple - 7318 qtl to 38501 qtl [31183 qtl], Orange – 13276 qtl to 37251 qtl [23975 qtl], Apple – 1037 qtl to 6298 qtl [5261 qtl] and Kiwi - 229 qtl to 4188 qtl [3959 qtl]. In percentage terms, Kiwi had recorded the maximum growth of 1728% in 2009-10, followed by Apple - 507%, Pine Apple - 426%, Orange - 181% and Banana -108%, compared to pre-project stage.

The number of respondents growing Guava increased from 50 to 54 [208 %], but acreage decreased from 40 ha to 37 ha [- 8%] and production from 2385 qtl to 2140 qtl [- 10%].

Himalayan States Region

In the HSR Region, the number of farmers increased from 1076 to 2914 [171%] and area from 714 ha to 1000 ha [140%]. The yield which was 36096 qtl at the time of launching of the Mission increased to 78980 qtl recording 119% growth as at the end of the year 2009-10.

Apple, Walnut, Mango and Apricot were the major crops grown by the majority of 1829 [63%] respondent farmers out of the total sample of 2914 farmers, engaged in fruit cultivation in the HSR. Regarding crop-wise position, the maximum increase from 441 to 917 [476] in the number of farmers, was observed in case of Apple, followed by Walnut, from 57 to 375 [318],Mango from 158 to 378 [220] and Apricot from 38 to 159 [123]. In terms of percentage, the maximum increase was observed in respect of Walnut [558%], followed by Apricot [342%], Mango [139%] and Apple [108%].

In terms of acreage, the above for crops occupied as much as 586 ha [59%] of the additional 1000 ha brought under fruit cultivation. Apple recorded the maximum increase in area from 288 ha to 538 ha [250 ha], followed by Mango - 150 ha to 348 ha [198 ha], Walnut – 22ha to 116 ha [94 ha] and Apricot - 12 ha to 56 ha, [44 ha]. In percentage terms, the maximum increase in the area was, however observed in the case of Walnut [433%] followed by Apricot [372%], Mango [130%] and Apple [87%].

Out of as many as 30 fruit crops, listed in the table, the four crops of Apple, Mango, Walnut and Apricot formed as much as 60% [47578 qtl] share in the total production of 78980 qtl in the year 2009-10. The maximum increase in production from 14397 qtl to 25820 qtl [11423 qtl] was observed in case of Apple, followed by Mango - 6029 qtl to– 13804 qtl [7775 qtl], Walnut – 1369 qtl to 6450 qtl [4981 qtl], and Apricot – 391 qtl to 1604 qtl [1213] qtl]. In percentage terms, Walnut had recorded the maximum growth of 364% in 2009-10, followed by Apricot - 310%, Mango - 129% and Apple - 79%, compared to pre project period.

The cultivation of Areca nut, Chestnut, Corrumbula, Jackfruit, Pumelo Strawberry which had been taken up by one or two respondent farmers, however, showed negative growth.

Rejuvination Status of Senile Orchards

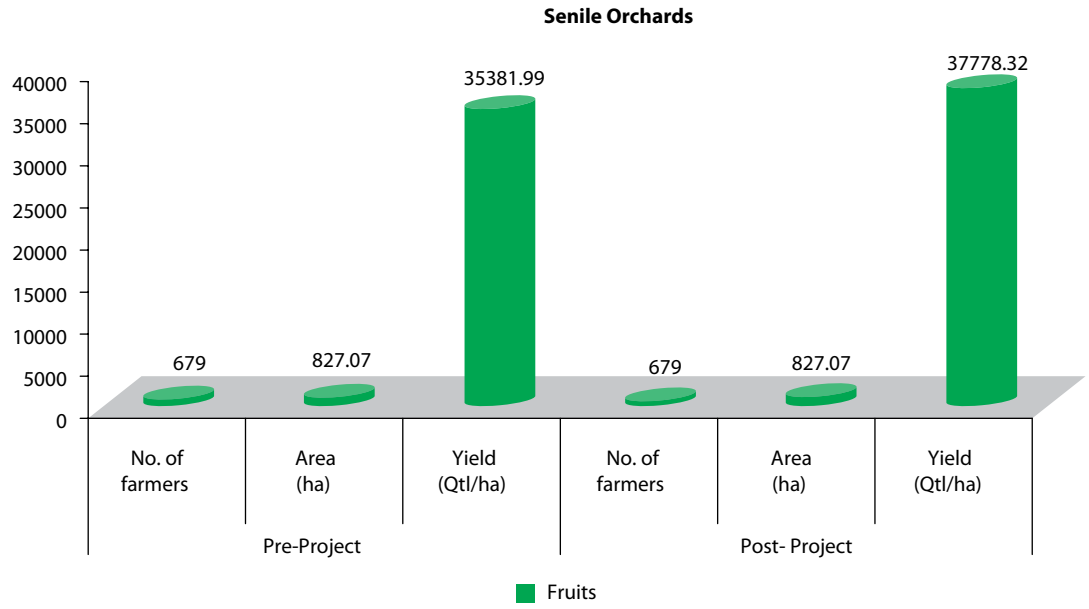
Low productivity of the fruit crops is often due to the old and senile trees and poor management of the orchards. Data on the replacement/rejuvenation of senile plantation has, been collected from the respondents. The position of the utilization of the component under Rejuvenation of Senile Orchards is given in Table 5.11.

Table 5.11 Increase in No. of Farmers and additional acreage brought under Rejuvenation of Senile Orchards under HMNEH

Crop	Pre-Project			Post-Project			% increase status over the pre project period			Increase/decrease during post project		
	No. of farmers	Area	Yield	No. of farmers	Area	Yield	No. of farmers	Area	Yield	No. of farmers	Area	Yield
Almond	15	18.4	699.2	15	18.4	736	0	0	5.26	0	0	36.8
Aonla	5	19.1	821.3	5	19.1	859.5	0	0	4.65	0	0	38.2
Apple	147	136.65	6422.55	147	136.65	6832.5	0	0	6.38	0	0	409.95
Apricot	2	0.5	12.5	2	0.5	14	0	0	12.00	0	0	1.5

Crop	Pre-Project			Post-Project			% increase status over the pre project period			Increase/decrease during post project		
	No. of farmers	Area	Yield	No. of farmers	Area	Yield	No. of farmers	Area	Yield	No. of farmers	Area	Yield
Areca nut	8	3	69	8	3	75	0	0	8.70	0	0	6
Avocado	6	2.3	135	6	2.3	144	0	0	6.67	0	0	9
Banana	53	48.75	5265	53	48.75	5362.5	0	0	1.85	0	0	97.5
Ber	1	3	153	1	3	165	0	0	7.84	0	0	12
Citrus	40	82.64	6465.92	40	82.64	6715.2	0	0	3.86	0	0	249.28
Guava	10	4.5	260.3	10	4.5	270	0	0	3.73	0	0	9.7
Hatkora	5	3.6	163.8	5	3.6	180	0	0	9.89	0	0	16.2
Jackfruit	3	11	459	3	11	495	0	0	7.84	0	0	36
Kiwi	6	4.07	111.89	6	4.07	122.1	0	0	9.13	0	0	10.21
Litchi	6	5.5	202.5	6	5.5	220	0	0	8.64	0	0	17.5
Lime/Lemon	3	2.2	105.6	3	2.2	110	0	0	4.17	0	0	4.4
Mango	37	31.28	1162.06	37	31.28	1251.2	0	0	7.67	0	0	89.14
Orange	288	415.29	10406.45	288	415.29	11628.12	0	0	11.74	0	0	1221.67
Papaya	1	1	79	1	1	82	0	0	3.80	0	0	3
Passion fruit	2	2	60	2	2	80	0	0	33.33	0	0	20
Peach	1	0.24	6.72	1	0.24	7.2	0	0	7.14	0	0	0.48
Pear	9	1.75	55.6	9	1.75	70	0	0	25.90	0	0	14.4
Pine apple	22	25.8	1986.6	22	25.8	2064	0	0	3.90	0	0	77.4
Strawberry	1	1	48	1	1	50	0	0	4.17	0	0	2
Walnut	8	3.5	231	8	3.5	245	0	0	6.06	0	0	14
Total	**679**	**827.07**	**35381.99**	**679**	**827.07**	**37778.32**						
Average			**1474.25**			**1574.10**						

Figure 5.11 Increase in no. of farmers and additional acreage brought under Rejuvenation of Senile Orchards under the HMNEH



In an overall position of all the 11 participating States, the number of the respondent farmers participating under the Rejuvenation Programme of the Mission was 679 and a total orchard area of 827 ha. The production which stood at 6423 qtl at the launch of the Mission rose to 6833 qtl [410 qtl] only as at the end of the year 2009-10 showing an increase of 6% only.

Orange and apple were the two major crops involving a total number of 435 [64%] respondent farmers and 552 ha [67%] area. The production of Apple increased from 6423 qtl to 6833 qtl [410 qtl] and of Citrus from 6466 qtl to 6715 qtl[249 qtl] showing a growth of 6% and 4% respectively. A few other crops included under the Mission such as Passion Fruit [33%], Pear [26%], Orange [12%] and Hatkora [10%] though not on any significant scale, showed good increase in their production.

The number of the farmers availing of Rejuvenation of Senile Orchards component of the Mission was limited. The State Department of Agriculture/Horticulture needs to popularize the programme amongst individual farmers, Farmers Cooperatives, SHGs, NGOs, and Growers Associations etc. to increase the productivity of the senile orchards in the area.

Region-wise Status

The Region-wise [NER & HSR] development has been as follows. The crop-wise and State-wise details are contained in Annexure 2.

North Eastern Region

In the NER Region, a total number of 431 farmers participated in the Rejuvenation of Orchards Programme of the Mission on an area of 624 ha. The yield in the region which stood at 25538 qtl at the launching of the Mission, increased to 27349 qtl [7%] as at the end of the year 2009-10.

Orange was the major crop covered under the programme with as many as 286 [86%] respondent farmers and 415 ha [76%] acreage. Banana with 77 [18%] respondent farmers & 42 ha [7%] area and Citrus with 27 [6%] respondent farmers and 71 ha [11%] were the next two important crops under rejuvenation programme. The production of Orange increased from 10387 qtl to 11606 qtl [1219 qtl] of Citrus from 5554 qtl to 5779 qtl [225 qtl] and of Banana from 4579 qtl to 4664 qtl [85 qtl] showing a growth of 12% 9% and 2% respectively. The rejuvenation of Passion Fruit though undertaken by only two of the respondents on an area of 2 ha, showed increase in production from 60 qtl to 80 qtl [3%]. Kiwi, Litchi and Ber grown by small number of respondents had shown increase of 9%, 9% and 8% respectively in production.

Himalayan States Region

In the Himalayan States, a total number of 248 numbers of respondent farmers had participated in the Rejuvenation programme with an area of 203 ha of land. The production which stood at 9844 qtl in the pre project area increased to 10429 qtl in 2009-10 registering a growth of 6% [585 qtl].

Apple was the major crop with 135 farmers [54%] and 125 ha of orchards [82%] covered under the Mission. Mango was the other significant crop covering 32 [13%] number of farmers and 28 ha of areas [14%]. The production of these two crops increased from 5873 qtl to 6248 qtl

[375 qtl] & 1049 qtl to 1131 [82 qtl], showing the growth of 6% and 8%, respectively. A few other fruit crops such as Pear [26%], Jackfruit [15%], Orange & Apricot [12% each], Areca nut [9%] Litchi & Mango - 8% each though covering only an insignificant number of farmer had shown good increase. Percent Increase in Yield of Pear - 26%, Jackfruit – 15% and Litchi [8%] has been reported by respondent farmers.

Vegetable Crops

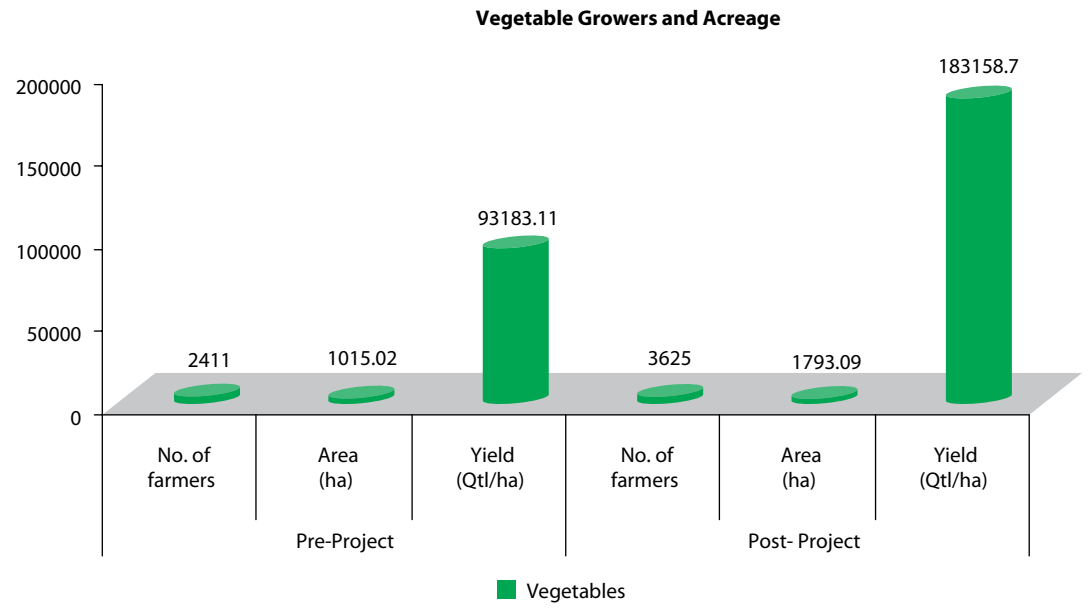
The production of large volumes of affordable vegetables is a thrust area for the country. The diverse soil and agro-climatic conditions and long growing season in the North East and Himalayan States offer a comparative advantageous position for growing a large number of vegetable crops round the year. Information on the type of the vegetables, being grown by the respondents as also the area covered under each of the crop during the pre project and the post project stage has been collected and the same is consolidated both crop-wise and State-wise in Table 5.12.

Table 5.12 Increase in the no. of vegetable growers and acreage under HMNEH

Crop	Pre-Project			Post- Project			% increase status over the pre project period			Increase/decrease during post project		
	No. of farmers	Area (ha)	Yield (qtl/ha)	No. of farmers	Area (ha)	Yield (qtl/ha)	No. of farmers	Area	Yield	No. of farmers	Area (ha)	Yield (qtl/ha)
Tomato	550	256.81	23112.9	794	354.51	41165.89	44.36	38.04	78.11	244	97.7	18052.99
Capsicum	130	48.34	5800.8	275	116.77	8762.1	111.54	141.56	51.05	145	68.43	2961.3
Chow Chow	35	17.82	2851.2	55	26.07	2205.5	57.14	46.30	-22.65	20	8.25	-645.7
Cabbage	774	320.48	40060	968	479.74	56098.72	25.06	49.69	40.04	194	159.26	16038.72
Cauliflower	287	112.07	11207	373	172.06	16393.7	29.97	53.53	46.28	86	59.99	5186.7
Peas	66	14.22	654.12	159	58.09	3451.04	140.91	308.51	427.59	93	43.87	2796.92
Cow pea	105	44.95	1798	284	221.45	30179.7	170.48	392.66	1578.52	179	176.5	28381.7
Leafy veg.	47	10.3	412	45	11.04	487.5	-4.26	7.18	18.33	-2	0.74	75.5
Root crops	3	3.6	180	10	6.5	482.4	233.33	80.56	168.00	7	2.9	302.4
Okra	22	5.45	360.75	32	13.33	794.85	45.45	144.59	120.33	10	7.88	434.1
Brinjal	48	16.71	1069.44	80	36.97	3221.14	66.67	121.24	201.20	32	20.26	2151.7
Cucumber	44	16.59	829.5	57	24.79	1591.5	29.55	49.43	91.86	13	8.2	762
French bean	53	11.24	224.8	73	19.05	459.75	37.74	69.48	104.52	20	7.81	234.95
Rice bean	5	4.56	91.2	8	1.27	43	60.00	-72.15	-52.85	3	-3.29	-48.2
Radish	73	20.23	404.6	68	22.74	590.3	-6.85	12.41	45.90	-5	2.51	185.7
Onion	31	15.74	1574	38	24.41	2441.5	22.58	55.08	55.11	7	8.67	867.5
Carrot	17	5.39	377.3	22	12.54	939.8	29.41	132.65	149.09	5	7.15	562.5
Bitter gourd	12	5	250	17	9.3	397.5	41.67	86.00	59.00	5	4.3	147.5
Bottle gourd	0	0	0	3	0.52	45.5	-	-	-	3	0.52	45.5
Ash gourd	0	0	0	2	1	260	-	-	-	2	1	260
Snake gourd	3	2	80	2	1.6	64	-33.33	-20.00	-20.00	-1	-0.4	-16
Coriander	4	3.2	160	11	4.75	237.5	175.00	48.44	48.44	7	1.55	77.5
Broccoli	30	6.04	362.4	38	11.04	632.25	26.67	82.78	74.46	8	5	269.85
B. Sprouts	0	47	0	1	45.1	5	-	-4.04	-	1	-1.9	5
Knol khol	9	3.05	91.5	11	1.54	68	22.22	-49.51	-25.68	2	-1.51	-23.5
Pumpkin	9	2.5	125	45	15	1067.46	400.00	500.00	753.97	36	12.5	942.46

Crop	Pre-Project			Post- Project			% increase status over the pre project period			Increase/decrease during post project		
	No. of farmers	Area (ha)	Yield (qtl/ha)	No. of farmers	Area (ha)	Yield (qtl/ha)	No. of farmers	Area	Yield	No. of farmers	Area (ha)	Yield (qtl/ha)
Samtak	0	0	0	22	18.8	2005	-	-	-	22	18.8	2005
French mustard	9	5.2	208	10	8.7	329.5	11.11	67.31	58.41	1	3.5	121.5
Fenugreek	18	11.65	699	102	67.13	8441	466.67	476.22	1107.58	84	55.48	7742
Spinach	26	3.88	174.6	17	4.58	248.6	-34.62	18.04	42.38	-9	0.7	74
Water melon	1	1	25	3	2.7	49	200.00	170.00	96.00	2	1.7	24
Total	**2411**	**1015.02**	**93183.11**	**3625**	**1793.09**	**183158.7**						
Average			**3005.91**			**5908.35**						

Figure 5.12 Increase in the no. of vegetable growers and acreage under HMNEH



At the macro level in all the 11 participating States, the number of participating farmers which stood at 2411 at the time of launching of the Mission in 2001-02, increased to 3625 and area from 1015 ha to 1793 ha showing an increase of 50% and 77% respectively, under vegetable cultivation. The production figure which was 98183 qtl in the pre project period, increased to 183159 qtl in 2009-10.during the same period.

The majority of the 2865 [79%] out of 3625 total respondent farmers were found growing Tomato [704 No - 44%], Capsicum [275 No.- 112%], Cabbage [968 No. 25%],Cauliflower 373 No.- 30%], Peas [159 No.142%], Cow pea [284 No-170%] and Fenugreek [102 No - 467%] during 2009-10. The maximum increase from 550 to 704 [244 No.] in the respondent farmers was noticed in the Tomato crop. It was followed by Cabbage - 774 to 968 [194 No] Cow pea - 105 to 284 [179 No], Capsicum -130 to 275 [145 No], Peas - 66 to 159 [93 No], Cauliflower - 287 to 373 [86 No] and Fenugreek - 18 to 102 [84 No]. In relative terms, the increase for these vegetables was maximum in case of Fenugreek [467%], followed by

Cow pea [170%], Peas [142%], Capsicum [112%], Tomato [44%], Cauliflower [30%] and Cabbage [25%].

So far area is concerned, the maximum acreage increase from 45 ha to 221 ha [177 ha] took place in case of Cow pea. This was followed by Cabbage - 320 ha to 480 ha [150 ha], Tomato - 257 ha to 355 ha [98 ha], Capsicum - 48 ha to 117 ha [68 ha], Capsicum - 48 ha to 117 ha [68 ha], Cauliflower – 112 ha to 172 ha [60 ha], Fenugreek – 12 ha to 67 ha [55 ha] and Peas -14 ha to 58 ha [44 ha]. In relative terms, the maximum growth of 476% was observed in the case of Fenugreek, followed by Cow pea [393%], Peas [309%], Capsicum [142%], Cabbage [50%], Tomato [38%] and Cauliflower [30%]. These seven crops together occupied an area of 1440 ha which constituted about 78% of the total area of 1793 ha under vegetables cultivation during 2009-10.

Cabbage [56099 qtl], Tomato [41166 qtl], Cow pea [30180 qtl], Cauliflower [16394 qtl], Capsicum [8762 qtl], Fenugreek [8441qtl] and Peas [3451 qtl] were the seven major vegetable crops being grown by the respondent farmers in all the 11 participating, with production level of 154493 qtl constituted about 90% share in the total production of 183159 qtl of more than 30 types of vegetables grown by all the Vegetable Grower respondents for the year 2009-10.

The maximum increase in the production from 1798 qtl to 30180 qtl [28382 qtl] was noticed in case of Cow pea, followed by Tomato - 23113 qtl to 41166 qtl [18053 qtl], Cabbage - 40060 qtl to 56099 qtl [16039 qtl], Fenugreek – 699 qtl to 8441 qtl [7742 qtl], Cauliflower- 11207qtl to 16394qtl [5187 qtl], Capsicum - 5801 qtl to 8762 qtl [2961 qtl] and Peas - 654 qtl to 3451 qtl [2797 qtl]. In relative terms, however, the maximum increase of 1579% was recorded in case of Cow pea, followed by Fenugreek [1108%], Peas [428%], Tomato [78%], Capsicum [51%], Cauliflower [46%] and Cabbage [40%].Chow Chow, Rice bean, Radish, Snake Guar, Brussel Sprouts and Knoll Khol: showed a some minor negative growth either in No. of farmers, acreage or production and/or in all,during 2008-10 compared to the pre pre-project period.

Region-wise Status

The Region-wise [NER & HSR] development has been as follows. The crop-wise and State-wise details are contained in Annexure 3.

North Eastern Region

The number of farmers increased from 1326 to 1718 [30%] and area from 704 ha to 1166 ha [40%] under Vegetable cultivation in NER since the launch of the Mission in 2001-02 to 2009 -10. The yield which Stood at 65039 qtl increased to 127918 qtl showing growth of 97% during the same period.

Tomato, Cabbage, Cauliflower and Cowpea were the four main vegetable crops grown by the majority of 1295 [75%] of the total 1718 respondents engaged in vegetables growing during the year 2009-10 in the region. The maximum increase in the number of respondent farmers from 194 to 302 [108 No] was observed in case of Tomato, followed by Cowpea - 84 to 179 [95 No], Cabbage - 531 to 614 [83] and Cauliflower-196 to 200 [4]. In relative terms, the maximum increase occurred in Cowpea - 113%, followed by Tomato - 56%, Cabbage - 16% and Cauliflower - 2%.

Regarding increase in area, Cowpea recorded the maximum increase of 41 ha to 179 ha [139 ha], followed by Cabbage – 272 ha to 391ha [118 ha, Tomato - 145 ha to 215 ha [69 ha] and Cauliflower - 85 ha to 118 ha [32 ha]. In percentage terms, the maximum increase was noticed in case of Cowpea [342%], followed by Tomato - 48%, Cabbage - 45% and Cauliflower - 38%.These four crops together occupied an area of 903 ha [53%] which was a little more than half of the total acreage of the respondents growing different vegetable crops.

Out of as many as 33 vegetable crops, included in the table, the four crops of Tomato, Cabbage, Cauliflower and Cow pea formed as much as 85% [10932 qtl] of the total production of 127918 qtl, in the year 2009-10. The maximum increase in production from 1622 qtl to 26756 qtl [25134 qtl] was noticed in the case of Cowpea, followed by Tomato - 13082 qtl to 25211 qtl [12129 qtl], Cabbage - 34028 qtl to 45462 qtl [11434 qtl] and Cauliflower - 8542 qtl to 11873 qtl [3331 qtl] In relative terms it works out to be 1549% in case of cowpea, 93% in respect of Tomato, 39% for Cauliflower and 33% in case of Cabbage.

Rice bean showed increase of one farmer but decrease in area of 4 ha and yield by 66 qtl. In case of Radish, decrease of 15 farmers while increase in 1.32 ha area and 26.4 qtl/ha yield was reported. Similarly number of farmers in respect of Spinach decreased by 9 number but area increased by 0.7 ha and production by 0.74 qtl, respectively.

Himalayan States Region

In all the three Himalayan States, the number of the respondent farmers increased from 1085 to 1907 and area from 311 ha to 627 ha during the operation of the Mission up to 2009-10 registering an increase of 76% and 102%, respectively. Like-wise, the production which was 28144 qtl at the commencement of the Mission increased nearly to double [55241 qtl] during the same period.

The majority of the 1346 [71%] out of 1907 total respondent farmers were growing Tomato [492 No.- 26%] Cabbage, [354 No.-19%], Capsicum [243 No.-13%] and Peas [152 No.- 8%] during the project period in 2009-10. In relative terms, the increase for the vegetables was maximum in case of Cow pea [400%], followed by Peas [153%] Capsicum [127%], Cabbage [47%] and Tomato [38%].

As far as area increased is concerned, the maximum acreage increase from 34 ha to 90 ha [56 ha] occurred in case of Capsicum. It was followed by, Cabbage - 48 ha to 89 ha [41 ha] Peas- 12 ha to 52 ha [40 ha], Cow pea – 4 ha to 42 ha [38 ha], and Tomato -111 ha to 141 ha [29 ha]. In percent terms, Peas recorded the maximum increase of 333%, followed by Capsicum -161%, Cabbage - 85%, Cow pea - 84% and Tomato - 26%. These five crops, including Fenugreek, occupied an area of 490 ha which constituted as much as 78% of the total area under vegetable crops in 2009-10.

Of the total 30 vegetable crops being grown by the respondent farmers in the region, six major crops viz. Tomato [15955 qtl], Cabbage [10637 qtl] Capsicum [6322 qtl], Peas [3115 qtl], Cow pea [342] and Fenugreek [5069 qtl] formed major share of 81% in the total production of 55241 qtl, in the year 2009-10. The maximum increase in the production from 10031 qtl to 15955 qtl [5924 qtl] was observed in the case of Tomato, followed by Fenugreek [5069 qtl-new crop], Cabbage – 6033 qtl to 10637 qtl [4604 qtl], Cow pea – 176 qtl to 3423 qtl [3248 qtl], Peas - 548 qtl to 3115 qtl [2567 qtl] and Capsicum - 4115 qtl to 6322 qtl [2207 qtl].

In relative terms it works out to be maximum of 1850% in case of Cow pea, followed by Peas - 468%, Cabbage - 76%, Tomato - 59% and Capsicum - 54%.

Leafy Vegetables, Chow Chow, Root Crops, Carrot, Snake Guard and Knoll Khol showed some minor negative growth either in number of Growers, area or production and/or in all.

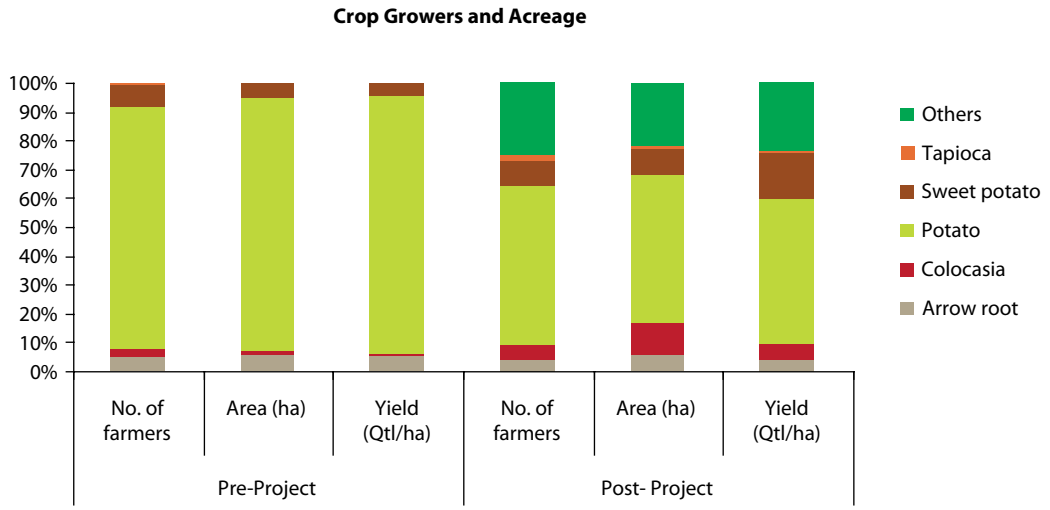
Tuber Crops

Root and tuber crops consist of root crops, such as beets and carrots, and tuber crops, such as potatoes and sweet potatoes, and the leaves of root crops, such as beet tops. The position of the growing of these crops by the respondents in the programme area, is indicated in Table 5.13.

Table 5.13 Increase in the no. of tuber crop growers and acreage under HMNEH

Crop	Pre-Project			Post- Project			% increase status over the pre project period			Increase/decrease during post project		
	No. of farmers	Area (ha)	Yield (qtl/ha)	No. of farmers	Area (ha)	Yield (qtl/ha)	No. of farmers	Area	Yield	No. of farmers	Area (ha)	Yield (qtl/ha)
Arrow root	11	5.38	215.2	17	9.92	622	54.55	84.39	189.03	6	4.54	406.8
Colocasia	6	0.85	38.25	20	18.93	924.85	233.33	2127.06	2317.91	14	18.08	886.6
Potato	186	79.86	3993	234	89.23	7775.5	25.81	11.73	94.73	48	9.37	3782.5
Sweet potato	17	4.26	191.7	38	14.99	2505.75	123.53	251.88	1207.12	21	10.73	2314.05
Tapioca	2	0.25	7.5	6	1.89	129.9	200.00	656.00	1632.00	4	1.64	122.4
Others	0	0	0	106	38.06	3718.8	-	-	-	106	38.06	3718.8
Total	**222**	**90.6**	**4445.65**	**421**	**173.02**	**15676.8**						
Avg	**37**	**15.10**	**740.94**	**70.17**	**27.84**	**2612.80**						

Figure 5.13 Increase in the no. of tuber crop growers and acreage under the HMNEH



In all the 11 participating States taken together, the Tuber Crop sub sector witnessed increase in the number of respondent farmers from 222 to 421 [199 No - 90%], area from 91 ha to 173 ha [82 ha - 90%] and production from 4446 qtl to 17677 qtl [11231 qtl - 253%].

The maximum increase in the respondent farmers, from 186 to 234 [48 No] was observed in the case of Potato, followed by Sweet Potato - 17 to 38 [21 No] and Colocasia - 6 to 20 [14 No.]. In relative terms, the highest increase of 283% in the number of respondent farmers was recorded by Colocasia. This was followed by Sweet Potato -124% and Potato - 26%. The number of the farmer respondents cultivating these three crops – 292, comprised about 69% of the total 421 respondents engaged in the activity of cultivating tuber crops during 2009-10.

The maximum increase in the area of Tuber Crops from 1 ha to 19 ha [18 ha] was observed in the case of Colocasia, followed by Sweet Potato - 4 ha to 15 ha [11 ha] and Potato - 80 ha to 89 ha [9 ha]. In the relative terms, the maximum increase was, however, in the case of Colocasia - 1800%, followed by Sweet Potato - 275% and Potato -12%.

Potato recorded the maximum increase in production from 3993 qtl to 7776 qtl [3783] followed by, Sweet Potato - 192 qtl to 2506 qtl [2314 qtl] and Colocasia - 38 qtl to 925 qtl [887 qtl]. In terms of percentage, the highest increase in production of 2318% was in respect of Colocasia, followed by Sweet Potato -1207% and Potato - 95%. The combined production of 11207 qtl of these three crops constituted as much as about 72% of the total production of 15677 qtl of all he Tuber Crops of the respondents.

Region-wise Status

The Region-wise [NER & HSR] development has been as follows. The crop-wise and State-wise details are contained in Annexure 4.

North Eastern Region

In the NER, the number of the respondents farmers growing tuber crops increased from 139 at the time of launching of the Mission to 264 as at the end of the 2009 -10 to and their acreage from 67 ha to 131 ha. The growth rate works out to 90% and 86% for the farmers and the area covered respectively. The production increased from 3320 qtl to 12783 qtl. [285%] during the same period.

Potatoes and sweet potatoes were the main tuber crops in the region. The number of farmers growing potatoes increased from 123 to 150 [27 No] and that cultivating sweet potato rose from 12 to 29 [17 No]. In percentage terms, sweet potato had more growth of 142% compared to 22% rise for potato. The area under Potato increased from 63 ha to 66 ha and under Sweet Potato from 3 ha to 13 ha. In percentage terms it works out to be 4% in case of Potato and 330% in case of Sweet Potato.

The production of Potato which stood at 3155 qtl at the time of launching of the Mission increased to 6368 qtl during 2009-10 showing an increase of 102%. As against this the production of Sweet Potato increased from 137 qtl to 2332 qtl registering a growth of 1599%. The total production of 8700 qtl of these two crops formed 68% of the total tuber crops production of 12783 qtl during 2009-10.

Tapioca, however, showed negative growth of 1, 0.12 ha, and 3.6 qtl in terms of number of farmers, area and production, respectively during the above period.

Himalayan States Region

At the time of launching the Mission in 2002-03 in the Himalayan States, 83 respondents were engaged in growing of root crops and their number increased to 84 [33%] in 2009 - 10. The area and production which were 24 ha and 1126 qtl increased to 42 ha [43%] and 2893 qtl [157%] respectively.

Potato was the main crop grown on an area of about three fourth by about the same percentage of respondents at the time of launching of the Mission. The number of the respondents and area under this crop showed about one third increase - farmers increased from 63 to 84 No [33%] and area 17 ha to 23 ha [35%] - in the project period. The production increased from 839 qtl to 1408 qtl [68%].

The other minor crops were the Arrowroot, Colocasia and sweet potato which had shown from moderate to good increase during the project. Tapioca cultivation was undertaken by the respondents under the Mission only in the region.

The root crops and tuber crops have very high yield potential although their protein, mineral and vitamin content are generally low compared to cereals. These are rich in carbohydrate and are commonly used as staple, livestock feed, or as raw materials for the production of industrial products such as starch and alcohol, or processed into various food products. The States need to popularize their cultivation in their respective areas.

Floriculture

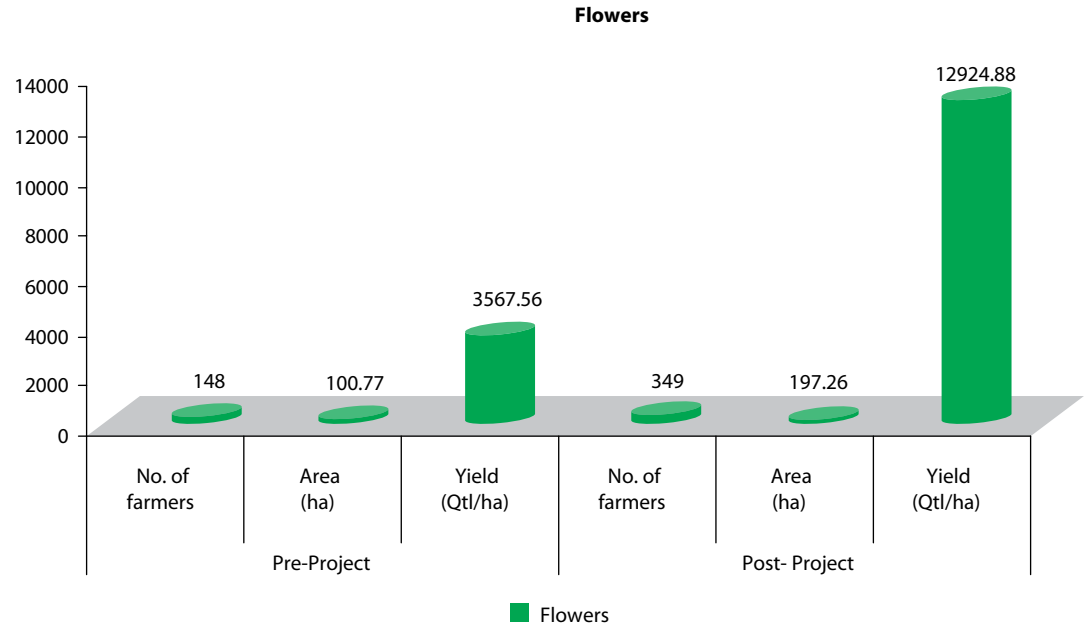
Floriculture is the fastest growing agri-biz segment of horticulture sub sector of Agriculture Sector. It has the potential to provide higher returns to the farmers. The NER and Himalayan States hold great promise for commercial floriculture. The information obtained from the respondents on the acreage put by them under foliage cultivation is presented in Table 5.14.

Table 5.14 Increase in no. of floriculture growers and additional acreage brought under different flowers under HMNEH

Crop	Pre-Project			Post- Project			% increase status over the pre project period			Increase/decrease during post project		
	No. of farmers	Area (ha)	Yield (lakh/ ha)	No. of farmers	Area (ha)	Yield (Lakh)	No. of farmers	Area (ha)	Yield	No. of farmers	Area (ha)	Yield (lakh)
Rose	52	34.4	1378	117	86.64	5615	125	152	307.58	65	52.2	4237
Anthurium	9	3.88	105	13	8.69	221.3	44.4	124	111.25	4	4.81	117
Orchid	1	0.1	2.7	11	1.8	330	1000	1700	12122	10	1.7	327
Cut foliage	0	0	0	2	4	7	-	-	-	2	4	7
Berbera	5	8.5	255	10	12.21	336.3	100	43.7	31.88	5	3.71	81.3
Tube rose	0	0	0	2	1.2	42	-	-	-	2	1.2	42
BOP	1	0.2	6	2	0.22	106	100	10	1666.7	1	0.02	100
Carnation	13	21.8	872	62	31.22	1321	377	43.2	51.47	49	9.42	449

Crop	Pre-Project			Post- Project			% increase status over the pre project period			Increase/decrease during post project		
	No. of farmers	Area (ha)	Yield (lakh/ ha)	No. of farmers	Area (ha)	Yield (Lakh)	No. of farmers	Area (ha)	Yield	No. of farmers	Area (ha)	Yield (lakh)
Lilium	0	0	0	21	4.52	2103	-	-	-	21	4.52	2103
Leather leaf	1	1	25	2	1.1	725	100	10	2800	1	0.1	700
Zantedeschia	0	0	0	1	0.2	100	-	-	-	1	0.2	100
Dry flower	1	0.6	17.4	1	0.6	18	0	0	3.45	0	0	0.6
Cymbidium	0	0	0	2	0.04	1	-	-	-	2	0.04	1
Gladiolus	13	9.55	334	22	13.37	468	69.2	40	40	9	3.82	134
Marigold	44	17.7	512	60	25.85	604.7	36.4	46.5	18.14	16	8.2	92.9
Geranium	0	0	0	1	0.3	0	-	-	-	1	0.3	0
Chrysanthemum	8	3.05	61	14	4.1	77	75	34.4	26.23	6	1.05	16
Lily	0	0	0	6	1.2	850	-	-	-	6	1.2	850
Total	**148**	**101**	**3568**	**349**	**197.3**	**12925**						
Avg			**198**			**718.1**						

Figure 5.14 Increase in no. of floriculture growers and additional acreage brought under different flowers under HMNEH



In all the 11 participating States from NER and HSR, the number of the respondent floriculture farmers which was 148 at the time of launch of the Mission, rose to 349 adding up 201 new farmers. The area under floriculture like-wise increased from 101 ha at the launch of the Mission to 187 ha in 2009 -10 with the addition of 96 ha area. The increase in the number of farmers and area under floriculture works out to 136% and 95% respectively. The production rose from 3568 lakh to 12925 lakh registering an increase of 252% during the same period.

Rose and the Carnation were the two major crops under floriculture. Under rose cultivation, the number of farmers which was 52 in 2001-02 increased to 117 adding up 65 new farmers and showing an increase of 125%. Under Carnation, the number of farmers rose from 13 in pre project period to 62 during 2009-10. It added 49 new farmers and indicated an increase of 377%. The total number of 179 farmers under these two crops constituted a little more than half of the total 349 farmers engaged in the floriculture activities in both the regions during 2009 -10. Similarly, these two crops – Rose [87 ha] and Carnation [31 ha] constituted about 60% of the total acreage of 197 ha under floriculture. The area under rose increased from 35 ha in pre project period to 87 ha in post project period showing an increase of 308%. The corresponding figures for carnation were; 22 ha to 31 ha and 43%.

The production of rose increased from 1378 lakh to 5615 lakh with growth of 308% and of Carnation from 872 lakh to 1021 lakh with increase of 51% in the pre project and post project period. The production of 6636 lakh of these two crops formed a little over half of the total production of 12925 lakh during 2009-10. Further Flowers like Lillium [Yield 2102 Lakh], Lily [Y 850 lakh], Zentedeschia [100 lakh] were taken up by the farmers after the launch of the Mission.

The floriculture cultivation has been picking up gradually in the participating States in view of the support available under the programme. Both domestic and international demand for non-traditional and traditional flowers has been on the rise. The NER and Himalayan States with varied biodiversity and congenial climate has a large growth potential for foliage cultivation and this is a good opportunity to farmers of the area to increase their income.

Region-wise Status

The Region-wise [NER & HSR] development has been as follows. The crop-wise and State-wise details are contained in Annexure 5.

North Eastern Region

A total of 194 respondent farmers were engaged in the floriculture by the year 2009-10, in the NER. Rose and Carnation with 47 ha and 9 ha [total 56 ha] occupied about 72% of the total 78 ha floriculture area of the respondents in the NER in the year 2009-10. While area under rose increased from 7 ha in the pre project period to 71 ha in the post project stage showing an increase of 571%, Carnation cultivation on an area of 9 ha was started by 47 respondents after the launch of the Mission in the NER.

The production of rose increased significantly from 285 lakh in the pre project period to 3885 lakh [1263%] in the post project period. The Lillium production which was taken up a new activity was of the order of 2000 lakh in 2009-10. This apart new varieties of Cut foliage, Tube Rose, Carnation, Lilium, Zantedeschia, Cymbidium, Lily, were undertaken, though on a modest scale, by a few farmers under the Mission.

Himalayan States Region

There were 155 respondents in all engaged in the floriculture activity in the Himalayan States Region during the year 2009-10 on an area of 120 ha as against 113 farmers

undertaking floriculture cultivation on an area of 88 ha before the launch of the Mission. This works out to 37% and 36% increase in the number of the farmers and area under floriculture, respectively, under the programme of the Mission. Similarly, the production level in the region increased from 3129 lakh to 4234 lakh registering a growth of 35% during the same period.

Out of the total 155 respondent floriculture farmers, maximum number of 60 [39%] of them were engaged in cultivation of marigold, followed by 9 [6%] producing Gladiolus. Whereas the number of farmers cultivating marigold increased from 44 in pre project period to 60 [36%] in post project period, the number of farmers growing glandulous increased from 13 to 22 [69%] during the same period.

Acreage-wise also, Rose occupied the maximum area of 39 ha [33%] of the total floriculture area of 120 ha as at the end of the year 2009-10, in the region. The area in respect of other individual floriculture crops was not any significant. Rose, Gladiolus and Marigold, the three major floriculture crops showed an increase of 58%, 40% and 15%, respectively.

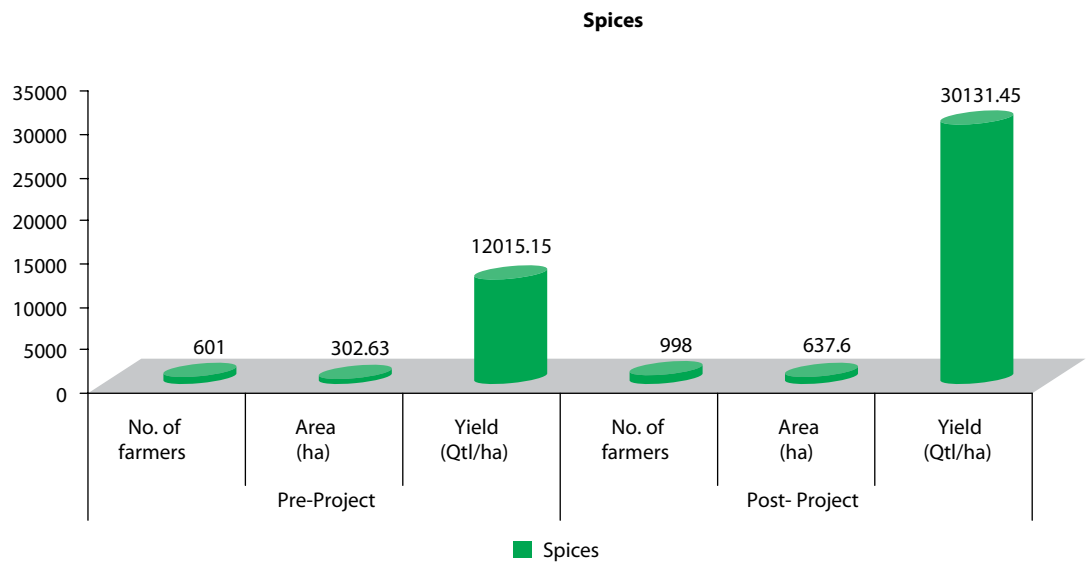
Spices

Spices have been an integral part of the Indian diet, and the demand for spices has been growing from time to time Spices are used for flavour and fragrance as well as colour, preservative and inherent medicinal qualities. The respondents were asked to indicate their status on the cultivation of spices by them during pre and post participation in the programme to ascertain popularity of spices amongst them. The replies received from them are consolidated in Table 5.15.

Table 5.15 Increase in the no. of spices growers and additional acreage brought under HMNEH

Crop	Pre-Project			Post- Project			% increase status over the pre project period			Increase/decrease during post project		
	No. of farmers	Area (ha)	Yield (q/ha)	No. of farmers	Area (ha)	Yield (q/ha	No. of farmers	Area	Yield	No. of farmers	Area (ha)	Yield (q/ha)
Bay leaf	21	20.89	622.6	15	12.9	211	-28.57	-38.25	-66.11	-6	-7.99	-411.6
Bird eye-chilli	22	6.37	350.35	31	20.52	1221.6	40.91	222.14	248.68	9	14.15	871.25
Black pepper	43	35.7	357	59	51.93	841	37.21	45.46	135.57	16	16.23	484
Cherry Pepper	15	10.27	102.7	36	44.48	391.3	140.00	333.11	281.01	21	34.21	288.6
Garlic	48	17.39	695.6	47	21.37	830.8	-2.08	22.89	19.44	-1	3.98	135.2
Ginger	287	126.32	5684.4	427	216.3	9252.35	48.78	71.23	62.77	140	89.98	3567.95
King chilli	34	15.71	785.5	75	54.9	2917.5	120.59	249.46	271.42	41	39.19	2132
Large Cardamom	14	15.4	693	51	64.6	1480.9	264.29	319.48	113.69	37	49.2	787.9
Tej patta	2	0.5	20	2	0.5	20	0.00	0.00	0.00	0	0	0
Turmeric	115	54.08	2704	223	116.88	11503	93.91	116.12	325.41	108	62.8	8799
Others	0	0	0	32	33.22	1462	-	-	-	32	33.22	1462
Total	**601**	**302.63**	**12015.15**	**998**	**637.6**	**30131.45**						
Average			**1092.29**			**2739.22**						

Figure 5.15 Increase in the No. of Spices Growers and additional acreage brought under different spices



in all the 11 participating States taken together, the spice sub sector witnessed increase in the number of respondent farmers from 601 to 998 [397 No], and area from 303 ha to 998 ha [695 ha] and production from 12015 qtl to 30131 qtl [18116 qtl] since the launch of the Mission in 2001-02 to 2009-10.

The maximum increase in the respondent farmers, from 287 to 427 [140 No] was noticed in the case of Ginger, followed by Turmeric-115 to 223 [108 No], King Chilli -34 to 75 [41 No], Large Cardamom 14 to 51 [37 No] and Cherry Pepper- 15 to 38 [21 No]. In relative terms, the highest increase of 264% was recorded by Large Cardamom. This was followed by Cherry Pepper- 145%, King Chilli - 121% Turmeric - 94% and Ginger - 49%.These five crops were cultivated by 814 [82%] of the total 998 respondent farmers.

The maximum increase in the area of spice cultivation, from 126 ha 216 ha [90 ha] was noticed in the case of Ginger, followed by Turmeric – 54 ha to 117 ha [63 ha], Large Cardamom - 15 ha to 65 ha [50 ha], King Chilli -16 ha 55 ha [39 ha] and Cherry Pepper- 10 ha to 44 ha [34 ha]. In the relative terms, the maximum increase was, however, in the case of Cherry pepper [333%]. It was followed by Large Cardamom [319%], King Chili [249%] Turmeric [116%] and Ginger [71%]. These 5 crops together occupied an area of 497 [78%] ha out of total area of 638 ha of the respondents under spice cultivation during 2009-10.

Ginger recorded maximum increase in production from 5684 qtl to 9252 qtl [3568 qtl] followed by, Turmeric- 2704 qtl to 11503 qtl [8799 qtl], King Chilli - 786 qtl to 2918 qtl [2132 qtl], Large Cardamom - 693 qtl to 1481 qtl [788 qtl] and Cherry Pepper-103 qtl to 391 qtl [289 qtl]. In relative terms, the highest increase of 325% was observed in the case of Turmeric, followed by Cherry pepper -281%, King Chili-271%, Large Cardamom -114% and Ginger- 63%. The production of 25545 qtl of these five main crops during 2009-10, formed 85% of the total production of 30131 qtl of spice crops of the respondent farmers.

Bay leaf had shown a negative growth of 6 No, 8 ha, and 412 qtl in terms of famers number, area and production, during 2009-10 compared to the earlier years.

India is the largest producer as well as the consumer of spices in the world. With a stiff competition in the food industry for developing of new flavor systems to introduce new products in the market the spices have large potential.

Region-wise Status

The Region-wise [NER & HSR] development has been as follows. The crop-wise and State-wise details are contained in Annexure 6.

North Eastern Region

The spice sub sector witnessed increase in the number of respondent farmers from 271 to 497 [83%], area from 214 ha to 507 ha [137% and production from 8396 qtl to 26214 qtl [212%] in NER since the launch of the mission in 2001-02 to 2009-10.

The maximum increase in the respondent farmers, 46 to 88 [42 No] was noticed in the case of Turmeric followed by Ginger – 112 to 152 [40 No], King Chilli - 26 to 64 [38 No], Large Cardamom - 14 to 51 [37 No] and Cherry pepper - 13 to 32 [19 No]. In terms of percentage, the highest increase of 264% was recorded by Large Cardamom. This was followed by Cherry pepper & King Chilli [146% each], Turmeric [91%] and Ginger [36%]. These five crops were cultivated by 387 [78%] of the total 497 respondent farmers.

The maximum increase in the area of spice cultivation, from 87 ha to 153 ha [66 ha.] was noticed in the case of Ginger, followed by Turmeric – 37 ha to 89 ha [52 ha], Large Cardamom – 15 ha to 65 ha [50 ha], King Chili - 14 ha to 52 ha [38 ha] and Cherry pepper - 8 ha to 42 ha [34 ha]. In percent terms, the maximum increase was, however, observed in the case of Cherry pepper [410%]. It was followed by Large Cardamom [319%], King Chili [266%] Turmeric [141%] and Ginger [76%]. These 5 crops occupied an area of 392 [77%] ha out of total area of 507 ha of the respondents under spice cultivation.

Turmeric recorded maximum increase in production from 1850 qtl to 10607 qtl [8757 qtl], followed by, Ginger-3917 qtl to 7278 qtl [3361 qtl], King Chili-710 qtl to 2849 qtl [2139 qtl], Large Cardamom - 693 qtl to 1481 qtl [788 qtl] and Cherry pepper - 83 qtl to 367 qtl [284 qtl]. In relative terms, the highest increase of 473% was observed in the case of Turmeric, followed by Cherry pepper-344%, King Chili-301%, Large Cardamom -114% and Ginger-86%. The production of 22582 qtl of these five main crops during 2009-10, formed 86% of the total production of 26214 qtl of spice crops of the respondent farmers.

Bay leaf had recorded a negative growth of 1 No, 8ha, and 340 qtl in number of farmers, area and production respectively, during the above period.

Himalayan States Region

The number of respondent farmers increased from 330 to 501 [171], Area from 88 ha to 131 ha [43 ha] and Yield from 3619 qtl to 3918 qtl [299 qtl] in HSR since the launch of the mission in 2001-02 to 2009-10. In terms of the percentage the increase was 52%, 49% and 8% in respect of number of farmers, area and production, respectively.

The maximum increase in the respondent farmers, from 175 to 275 [100 No] was noticed in the case of Ginger followed by Turmeric - 69 to135 [66 No]. In terms of percentage, the highest increase of 96% was recorded in case of Turmeric followed by Ginger with 57% increase. These two crops were cultivated by 410 [82%] of the total 501 respondent farmers engaged in spice cultivation.

The maximum increase in the area of spice cultivation, from 39 ha – 63 ha [24 ha] was noticed in the case of Ginger, The area under the next main crop of Turmeric increased from 17 ha to 28 ha [11, ha]. during 2009 -10. In relative terms, the increase [63%] was more in case of Turmeric than Ginger [60%]. The area of 91 ha covered under these two crops comprised 69% of the total 131 ha acreage under spice cultivation in the region during 2009-10.

Bay leaf, Chilli and Garlic had recorded a small negative growth either in the number of cultivators, area and/or production.

Turmeric recorded maximum increase in production from 854 qtl to 896 qtl [42 qtl] and Ginger came next with increase from 1767 qtl to 1974 qtl [207 qtl].In relative terms, the increase in production was more in case of Ginger [12%] than Turmeric [5%]. The production of 2870 qtl of these two crops formed about 73% of the total production of 3918 qtl of all the spice crops in the region in the year 2009-10.

Bay leaf had recorded negative growth of 6 No, 8 ha and 412 qtl in the number of farmers, area and production, respectively in the region.

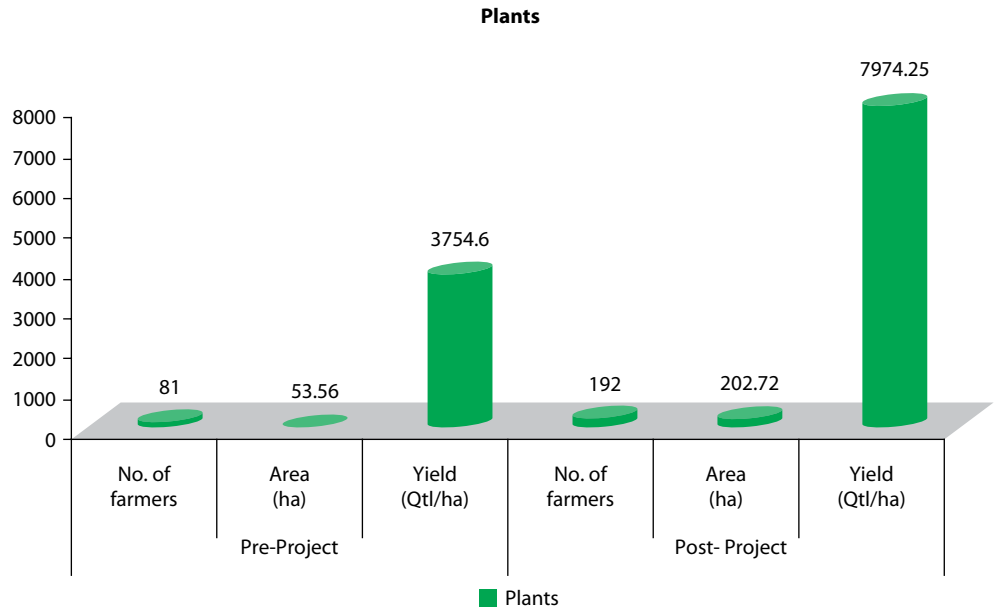
Plantation Crops

Plantation crops constitute a large group of crops. The major plantation crops include tea, coffee coconut, areca nut, oil palm, cashew nut and rubber plants which contribute a significant revenue to the national exchequer and country's exports by way of excise and export earnings. They also provide direct and indirect employment to a large number of people in the country. The information supplied by the respondents on the cultivation of plantation crops by them is appended in Table 5.16.

Table 5.16 Increase in the no. of plantation growers and additional area brought under different plantation crops under HMNEH

Crop	Pre-Project			Post- Project			% increase status over the pre project period			Increase/decrease during post project		
	No. of farmers	Area (ha)	Yield (q/ha)	No. of farmers	Area (ha)	Yield (q/ha)	No. of farmers	Area	Yield	No. of farmers	Area (ha)	Yield (q/ha)
Tea	28	16.55	1489.5	32	21.81	1803.4	14.29	31.78	21.07	4	5.26	313.9
Cashew nut	6	6.11	213.85	41	67.3	739.5	583.33	1001.47	245.80	35	61.19	525.65
Areca nut	1	0.5	12.5	2	0.04	4	100.00	-92.00	-68.00	1	-0.46	-8.5
Betel vine	1	0.5	15	5	6.5	285	400.00	1200.00	1800.00	4	6	270
Coconut	7	5.35	428	8	5.25	419	14.29	-1.87	-2.10	1	-0.1	-9
Tung	38	24.55	1595.75	64	63.7	3700.85	68.42	159.47	131.92	26	39.15	2105.1
Others	0	0	0	40	38.12	1022.5	-	-	-	40	38.12	1022.5
Total	**81**	**53.56**	**3754.6**	**192**	**202.72**	**7974.25**						
Average			**536.37**			**1139.18**						

Figure 5.16 Increase in the no. of plantation growers and additional area brought under different plantation crops under HMNEH



In all the 11 participating States taken together, the Plantation sub sector witnessed an increase in the number of respondent farmers from 81 to 192 [111 No -137%], area from 54 ha to 203 ha [149 ha -276%] and production from 3755 qtl/kg to 7974 qtl/kg [4219/kg - 112%] since the launching of the Mission in 2001-02 till 2009-10.

The maximum increase in the number of respondent farmers, from 6 to 41 [35 No] was observed in the case of Tung, followed by Cashew Nuts - 6 to 41 [35 No]. The increase in Tea from 28 to 32 [4 No] was insignificant. In relative terms, the highest increase of 583% in the number of respondent farmers was recorded by Cashew nuts. This was followed by Tung - 68% and Tea -14%.These three plantation crops were cultivated by 137 respondent farmers [75%] of their total number of 182.

The maximum increase in the area of plantation crops from 6 ha to 67 ha [61 ha] was observed in the case of Cashew nut, followed by Tung -25 ha to 64 ha [39 ha] and Tea - 17 ha to 22 ha [5 ha]. In the relative terms, the maximum increase was, however, in the case of Cashew nut - 1001%, followed by Tung - 159% and tea – 29%

Cashew nut recorded maximum increase in production from 214 to 740 qtl [526 qtl], followed by, Tea 1490 qtl to 1803 qtl [313 qtl] and Tung -1596 kg to 3701 kg [2105 kg]. In relative terms, the highest increase of 246% was observed in the case of Cashew nut, followed by Tung–32% and Tea - 21%. The production of 6244 qtl of these three crops during 2009-10, formed 79% of the total production of 7874 qtl of plantation crops of the respondent farmers.

Region-wise Status

The Region-wise [NER & HSR] development has been as follows. The crop-wise and State-wise details are contained in Annexure 7.

North Eastern Region

The number of respondent farmers increased from 56 to 148 l92] in respect of the Plantation, area from 42 ha to 188 ha [146] and production from 2888 qtl to 6793 qtl [3905 qtl] in NER since the launch of the Mission in 2001-02 to 2009-10.

Tea, Cashew nuts and Tung were the main crops being grown by the majority of the respondents. The maximum number of the respondents from 4 to 39 [35 No] increased in Cashew nut crop, followed by Tung – 27 to 40 [13 No] and Tea – 24 to 27 [3 No]. In percentage terms, the highest increase of 875% was in case of Cashew nut and the minimum in respect of Tea [13%]. Tung crop had recorded an increase of 48%. Out of total 148 respondent farmers engaged in growing of plantation crops, the majority of 106 [72%] was cultivating these three crops.

The maximum increase in the plantation area from 5 ha to 66 ha [61 ha] was noticed in the case of Cashew nut, followed by Tung- 23 ha to 60 ha [37 ha]. The increase in the area of Tea plantation from 13 ha to 15 ha [5 ha] was the minimum. These three crops occupied an area of 143 ha [76%] in the total area of 188 ha of the respondents under plantation crop during the year 2009-10.

Cashew Nuts recorded the maximum increase in production from 186 qtl to 795 qtl [519 qtl] followed by Tea – 1207 qtl to 1504 qtl [297 qtl[. Tung recorded increase in production from 1480 qtl 3471 qtl [1991 kg]. In relative terms, the highest increase of 279% was in the case of Cashew Nuts, followed by Tung – 134% and Tea – 25%.

Himalayan States Region

The number of respondent farmers increased from 25 to 44 [19 No] in respect of the Plantation crops, area from 12 ha to 15 ha [3 ha] and production from 867 qt/kg to 1181 qtl kg [313 qtl/kg] in HSR since the launch of the mission in 2001-02 to 2009-10. In percentage terms, the increase works out to 76%, 25% and 36% for number of farmers, area and production respectively.

Tung was the only major crop where number of the respondent farmers increased from 11 to 24 [13 No- 118%] area from 2 ha to 4 ha [100%] and production from 116 kg to 230 kg [114 kg-99%].

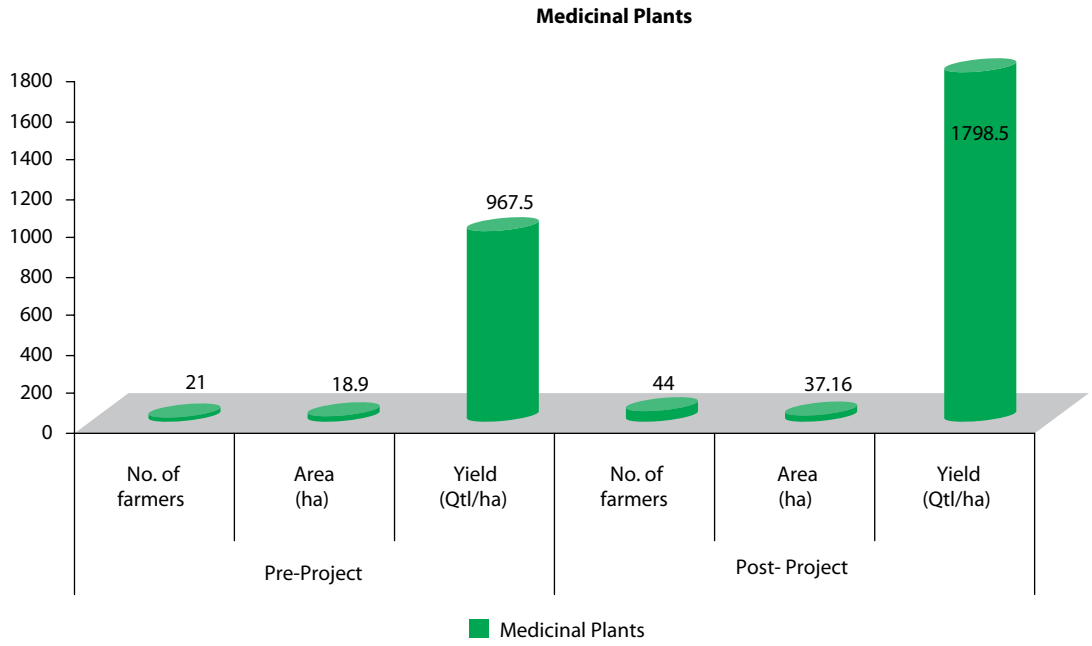
Medicinal Plants

Medicinal Plants have been used for human health form the time immemorial. It is believed that the herbal medicine can give good effect to body without causing side effects to human's life. Apart from it, the usage of medicinal plants has been increasing as an important role that can support the economic system. The status of the cultivation of Medicinal Plants by the respondents is shown in Table 5.17.

Table 5.17 Increase in the no. of medicinal plants growers and additional acreage brought under different medicinal plants under HMNEH

Crop	Pre-Project			Post- Project			% increase status over the pre project period			Increase/decrease during post project		
	No. of farmers	Area (ha)	Yield# (q/ha)	No. of farmers	Area (ha)	Yield# (q/ha	Area	Yield	No. of farmers	No. of farmers	Area (ha)	Yield# (q/ha
Aloe vera	11	9.4	470	18	20	677.5	63.6	108	44	7	10	208
Patchouli	1	0.5	18	1	0.5	17.5	0	0	0	0	0	0
Prickly winged [Xanthozyllum]	6	6	300	7	6.1	302.5	16.7	0.8	0.8	1	0.1	2.5
Saffron	3	3	180	13	9.7	799	333	222	344	10	6.7	619
Others	0	0	0	5	1.4	2	-	-	-	5	1.4	2
Total	**21**	**19**	**968**	**44**	**37**	**1799**						
Average			**194**			**359.7**						

Figure 5.17 Increase in the no. of medicinal plants growers and additional acreage brought under different medicinal plants under HMNEH



#: Aloe vera: Q/ha, Saffron: gram/ha, Patchouli: MT/ha

In all the number of farmers cultivating medicinal crops increased from 21 in the pre project period to 44 in the post project Stage showing an increase of about 110%. The acreage increased by about 95% from 19 ha to 37 ha during the same period. Aloe vera was the major crop being grown. The number of Aloe vera growing respondents which was 11 at the time of launching of the Mission, increased to 18 [64%] and their acreage from 9.4 ha to 19.55 ha [108%]. Like-wise the production increased from 470 qtl to 678 qtl showing a growth rate of [44%] during the same period.

With people becoming more health conscious, the use of herbal medicines has been increasing to avoid many possible side effects of allopathy. A focused approach to popularize the cultivation of Medicinal Plants is required.

Region-wise Status

The Region-wise [NER & HSR] development has been as follows. The crop-wise and State-wise details are contained in Annexure 8.

North Eastern Region

Aloe vera and Prickly winged [Xanthozyllum] were the two main crops being produced by 7 and 6 respondent farmers in the NER at the time launch of the Mission. While there was no change in the status of Prickly winged, the number of farmer growing Aloe vera increased from 7 in the pre project period to 12 [71%] in the post project stage. There was good increase of over 80% both in the area and production of the crop. While the area increased from 6 to 11 ha, production rose from 300 qtl to 555 qtl.

Himalayan Region

The number of the farmers increased from 8 to 18 [125%] and area from 7 ha to 11 ha [57%] in the post project period in the Himalayan States. The number of the farmers growing Aloe vera had increased from 4 in pre project period to 6 and acreage from 3 ha to 8 ha in post project period but the production level had declined by 47.5 qtl [28%]. There had not been much change in the other medicinal crops.

Aromatic Plants

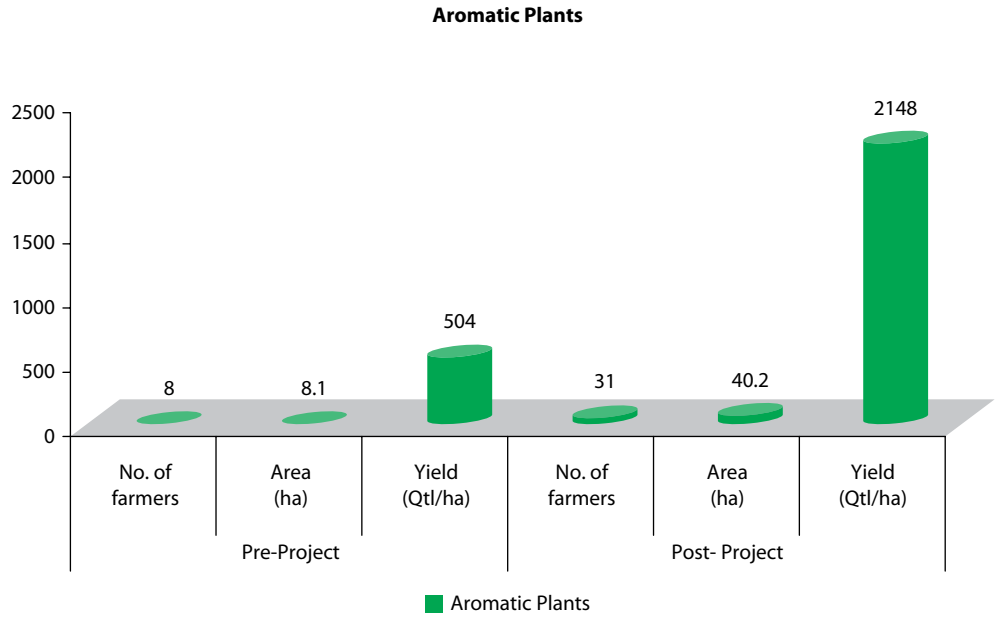
Aromatic plants produce a certain type of aroma due to the presence of some kind of essential oil used mainly in perfumery and flavorings material of the cosmetic industry. Production of essential oils is emerging as a potential agro based industry in India. The farmers' replies on the cultivation on Aromatic Plants are collated in Table 5.18.

There was a good increase in the number of respondents from 8 in the pre project stage to 31 [288%] in post project period growing aromatic plants at the macro level in all the 11 participating States. Like-wise there was a fairly good progress in the expansion of the

Table 5.18 Increase in no. of aromatic plants growers and additional acreage brought under different aromatic plants under HMNEH programme

Crop	Pre-Project			Post- Project			% increase status over the pre project period			Increase/decrease during post project		
	No. of farmers	Area (ha)	Yield# (q/ha)	No. of farmers	Area (ha)	Yield# (q/ha	Area	Yield	No. of farmers	No. of farmers	Area (ha)	Yield# (q/ha
Citronella	1	1	100	1	1	100	0.00	0.00	0.00	0	0	0
Damask Rose	3	3.1	124	5	8.1	244	66.67	161.29	96.77	2	5	120
Lemon grass	4	4	280	24	29.1	1804	500.00	627.50	544.29	20	25.1	1524
Others	0	0	0	1	2	0	-	-	-	1	2	0
	8	**8.1**	**504**	**31**	**40.2**	**2148**						

Figure 5.18 Increase in the no. of aromatic plants growers and additional acreage brought under different aromatic plants under HMNEH programme



#: Damsak Rose: MT/ha, Lemon grass, Citronella: q/ha

acreage from 8 ha to 40 ha [400%]. Lemon Grass was the main crop which registered a good growth rate. The number of the respondents growing Lemon Grass increased from 4 in the pre project period to 24 [500%] in post project stage, and acreage increased from 4 ha to 29 ha [625%]. Similarly, production of this crop rose from 280 qtl/ha to 1804 qtl/ha showing an increase of 544 %.

Damask Rose was the next aromatic plant grown by 3 of the respondents on an area of 3 ha with a production level of 124 MT at the time of launching of the Mission. By the year 2009-10, the number of the respondents, area and production of this crop increased to 5 No, 8 ha and 224 MT registering a growth of 67%, 161 and 97%, respectively.

On account of increased awareness of health hazards associated with synthetic chemicals coupled with the increase coast of petroleum products, the use of essential oils have been gradually increasing. The varied agro climatic zones of the region are suitable for the cultivation of a host of essential oil bearing plants.

On account of increased awareness of health hazards associated with synthetic chemicals coupled with the increase coast of petroleum products, the use of essential oils have been gradually increasing. The varied agro climatic zones of the region are suitable for the cultivation of a host of essential oil bearing plants.

Region-wise Status

The Region-wise [NER & HSR] development has been as follows. The crop-wise and State-wise details are contained in Annexure 9.

North Eastern Region

In all the number of farmers increased 2 to 24 and area from 2 ha 32 ha in the pre project and post project period. Lemon Grass was the main crop where the number of the respondents increased from 1 in the pre project period to 21 in the post project period and area increased from1 ha to 26 ha during the same period. There was also a substantial rise in the production which rose from 70 Q/ha at the time of launching of the programme to 1586 Q/ha in 2009-10. The other crop of Damask Rose recorded increase of one farmer, 5 ha acreage and 120 MT/ha production during the same period.

Himalayan States Region

There was an insignificant change in the increase of number of the respondents, acreage and production in the Himalayan States.

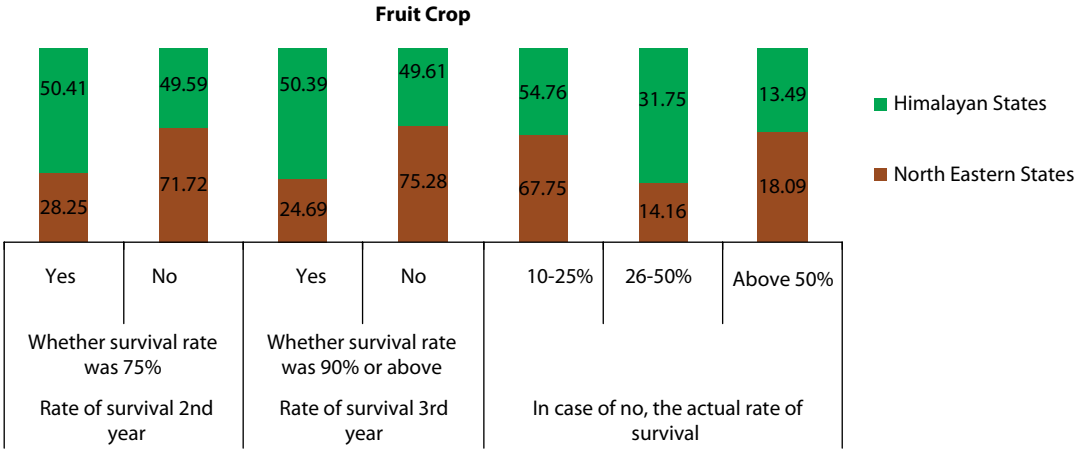
Rate of Survival of Fruit Crop

In the raising of the fruit trees, it is the rate of survival which is material for the success or failure of the venture. The respondents undertaking the activity of fruit cultivation were asked to indicate the rate of survival of plants in the 2nd and 3rd year which are crucial for the growth of the plants. The responses received from them are appended in Table 5.19.

Table 5.19 Rate of survival of fruit crop during 2nd and 3rd year

State	Total Respon-dents	Rate of survival 2nd year		Rate of survival 3rd year		In case of no, the actual rate of survival		
		Whether survival rate was 75%		Whether survival rate was 90% or above				
		Yes	No	Yes	No	10 -25%	26-50%	Above 50%
North Eastern States (NER)								
Arunachal Pradesh	1238	65.38	34.62	52.23	47.77	15.47	24.10	60.43
Assam	1966	2.2	97.8	1.73	98.27	10.52	31.18	58.30
Manipur	675	29.54	70.46	22.64	77.36	13.57	24.42	62.02
Meghalaya	525	5.71	94.29	5.52	94.48	10.48	25.40	64.11
Mizoram	600	46.34	53.48	45.3	54.53	7.03	16.93	76.04
Nagaland	825	43.45	56.43	44.05	55.83	8.70	21.30	70.00
Tripura	300	28.28	71.72	24.24	75.76	7.11	31.56	61.33
Sikkim	301	9.38	90.63	9.03	90.97	14.89	32.44	52.67
Sub Total	**6430**	**28.25**	**71.72**	**24.69**	**75.28**	**11.10**	**27.16**	**61.73**
Himalayan States (HSR)								
Himachal Pradesh	913	42.75	57.25	50.44	49.56	9.09	23.06	67.85
Jammu and Kashmir	1510	54.46	45.54	49.58	50.42	8.29	17.40	74.31
Uttarakhand	975	51.62	48.38	51.57	48.43	7.78	24.41	67.82
Sub Total	**3398**	**50.41**	**49.59**	**50.39**	**49.61**	**8.36**	**20.94**	**70.70**
Grand Total	**9828**	**35.91**	**64.07**	**33.58**	**66.4**	**10.40**	**25.56**	**64.05**

Figure 5.19 Rate of survival of fruit crop during 2nd and 3rd year



It may be observed from the table that on an average about 36% of the total respondents from the two Regions - 28% from NER & 50% from HSR, only have reported the rate of the plants survival in the second year at 75%. The maximum of such responses by about two thirds [65%] of the respondents was from the State of Arunachal Pradesh. Majority to an overwhelming number of the respondents from all the remaining seven NER States denied the existence of 75% of the survival of the plants in the 2nd year. The maximum number of the respondents from this "No" category was from the State of Assam [98%], followed by, Meghalaya - 94%, Sikkim – 91%, Tripura – 72%, Manipur – 70%,Nagaland – 56% and Mizoram – 54%.

In the HSR, majority of the respondents from the States of J&K [54%] and Uttarakhand [52%] had affirmed the survival rate of 75% in the second year for the plants grown by them. In Himachal Pradesh about 57% of the respondents denied that there was plant survival rate of 75% under the programme.

In the 3rd year, the average response on the survival rate of 90% of above decreased further to 25% [25% from NER & 50% from HSR]. In the NER, Arunachal Pradesh was the only State where the about 52% of the respondents affirmed the plant survival rate of 90% and more in the 3rd year. In the remaining seven NER Stares, from the simple majority of 55% in the State of Mizoram to an overwhelming number of 98% in Assam, did not endorse that there was survival rate of 90% or above in the 3rd year in case of the plants grown by them under the programme of the Mission. In the Himalayan State Region, the response on this issue was mixed. The majority or a little above that - 50% to 52% of the respondents, in Himalayan States Region only had, however, endorsed the survival rate of the plants as 90% or above in the 3rd year

Some of the respondents as had indicated survival rate below the threshold limit, were further asked to specify the extent of the survival of the plants. The majority of them - 64% [62% from NER and 71% from HSR] reported that the survival rate fell within the range of 'above 50%". The response in this regard ranged from minimum of 53% in Sikkim and maximum of 76% in case of the State of Mizoram in NER. In HSR, the corresponding number was 68% each in HP & Uttarakhand and 74% in J&K. This was followed by about 26% of the respondents [17% - NER & 21% - HSR] replying that the survival rate of the plants in 3rd year was between '26% to 50%'. The minimum of 17% of such a response was from Mizoram and the maximum of 32% from Sikkim in NER and 17% and 24% in case of J&K & Uttarakhand

respectively in HSR. In the last grouping of the respondents in survival rates of the plants between 1- to 25%, the overall response of 10% was the minimum. The State of Mizoram had the minimum number of about 7% and Arunachal Pradesh, the maximum of 15% in NER. In HSR, about 8% of the respondents each in J&K & Uttarakhand and 9% in Himachal Pradesh had reported survival rate of plants between 10 to 25% range in the 3rd year.

This means that about 6400 respondents of the total sample of 9828 had reported survival rate below the threshold limit prescribed both for 2nd and 3rd year. About 4096 of them i.e. 42% of the total sample specified survival rate above 50%, 1664 [17% of total sample] between 26 to 50% and 640 [7%] between 10 to 25%.

The issue of the low survival rates particularly reported from the State of Assam needs to be looked into by the concerned Department seriously as it is closely related with the impact of the programme.

Seed/planting Material Availability Status

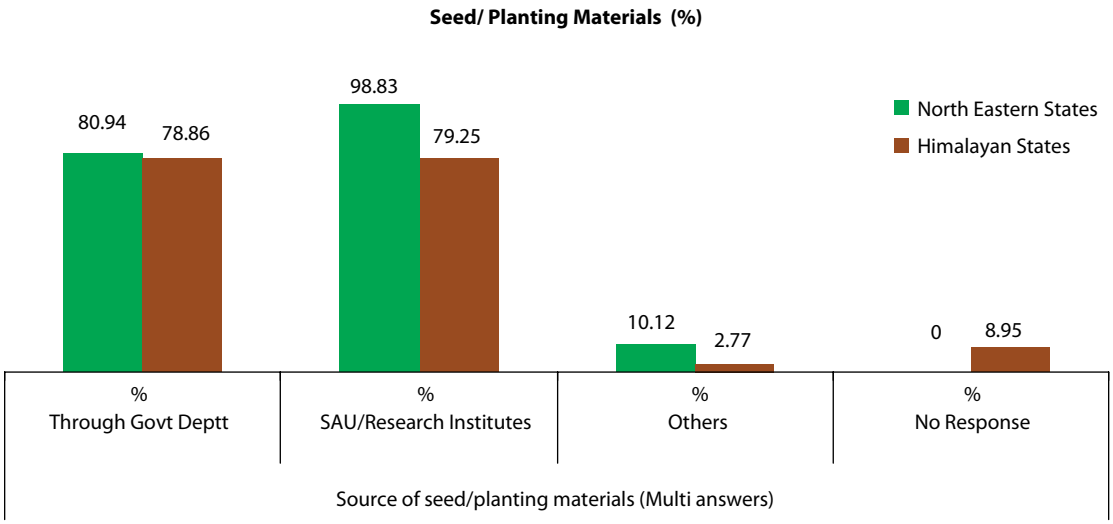
Source of Supply

Ensuring that farmers have timely access to seed and planting material of good quality is one of the most important elements of successful agricultural production and development. The non availability of these critical inputs on time undermines potential yield and performance of crop production. The respondents were, therefore asked to indicate the source of procurement of the good quality seed and planting material. Data in Table 5.20 provides details of the sources from where the respondents had actually met their requirements of quality seed/planting material for growing horticulture crops, under the programme.

Table 5.20 Source of supply of seed/planting materials to the farmers (%)

States	Through Govt Deptt	SAU/Research Institutes	Others	No Response
North Eastern States				
Arunachal Pradesh	92.17	98.71	2.10	0
Assam	67.9	100	20.45	0
Manipur	74.81	98.52	13.63	0
Meghalaya	67.81	96.57	3.81	0
Mizoram	86.67	98	9.17	0
Nagaland	94.91	97.7	6.30	0
Tripura	88.33	100	1.33	0
Sikkim	99.34	100	0.00	0
Sub Total	**80.94**	**98.83**	**10.12**	**0**
Himalayan States				
Himachal Pradesh	88.6	99.89	4.17	0
Jammu and Kashmir	65.96	54.9	2.19	20.13
Uttarakhand	89.74	97.64	2.36	0
Sub Total	**78.86**	**79.25**	**2.77**	**8.95**
Grand Total	**80.22**	**92.06**	**7.58**	**3.09**

Figure 5.20 Source of supply of seed/planting materials to the farmers



Information in the table reveals that respondents have given multi answers to this question. It would be observed that the Government Departments/Nurseries/SAUs/Research Institutes were the major source from which a majority of 9048 [92%] respondents had obtained quality seed/planting material. Further about 3% [304 No] of the interviews did not respond to the query in this regard, and around 5% of them had indicated tapping of other sources such as Cooperative societies, NGOs or even private parties to meet their requirements of the seed/ planting material. State-wise position is also more or less similar in this regard.

Satisfaction Level on Availability of Seed/Planting Material

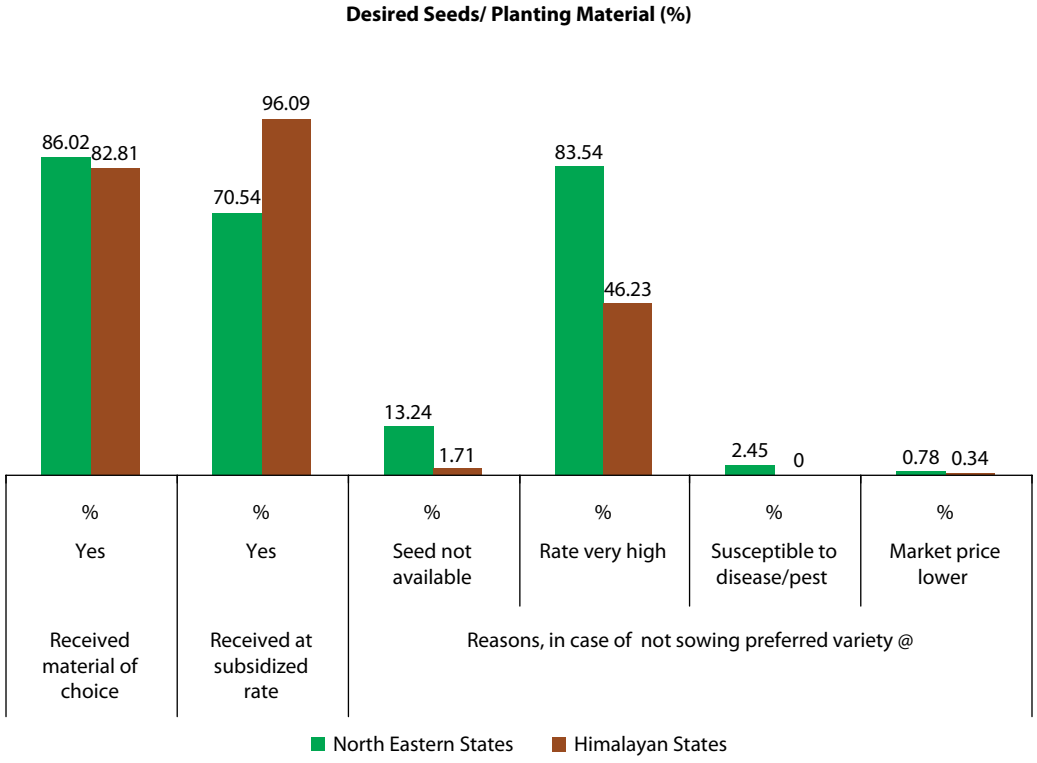
The level of satisfaction of the farmer is an important factor to influence his decision for adoption of good farming practices. The response of the farmers on their level of satisfaction in procuring good quality seeds/planting material is indicated in Table 5.21.

Table 5.21 Response to satisfaction on availability of desired seeds/planting material

States	Received material of choice	Received at subsidized rate	Reasons, in case of not sowing preferred variety @			
	Yes	Yes	Seed not available	Rate very high	Suscep-tible to dis-ease/pest	Market price lower
	%	%	%	%	%	%
North Eastern States						
Arunachal Pradesh	89.91	64.54	29.6	70.4	0	0
Assam	85.05	77.69	4.76	90.14	2.72	2.38
Manipur	84.74	44.58	2.91	96.12	0.97	0
Meghalaya	66.67	73.71	4.57	93.71	1.71	0
Mizoram	78.33	89.15	42.31	55.38	2.31	0

States	Received material of choice	Received at subsidized rate	Reasons, in case of not sowing preferred variety @			
	Yes	Yes	Seed not available	Rate very high	Suscep-tible to dis-ease/pest	Market price lower
	%	%	%	%	%	%
Nagaland	97.33	66.13	4.55	95.45	0	0
Tripura	84.33	57.31	2.13	82.98	14.89	0
Sikkim	99	92.62	0	100	0	0
Sub Total	**86.02**	**70.54**	**13.24**	**83.54**	**2.45**	**0.78**
Himalayan States						
Himachal Pradesh	93.97	96.97	5.45	94.55	0	0
Jammu and Kashmir	70.53	94.55	0.9	31.24	0	0
Uttarakhand	91.38	97.08	3.57	94.05	0	2.38
Sub Total	**82.81**	**96.09**	**1.71**	**46.23**	**0**	**0.34**
Grand Total	**84.91**	**79.15**	**8.7**	**68.85**	**1.48**	**0.61**

Figure 5.21 Response to satisfaction on availability of desired seeds/planting material



A large majority of the respondents [86% from NER and 83% from Himalayan States] have expressed their satisfaction for getting seed/planting material of their choice. The response in this regard ranges from minimum of 71% in the State of J&K to maximum of 99% in case

of Sikkim. Further around 79% respondents have reported availability of subsidy in the procurement of these inputs - 71% in NER and 96% in Himalayan States. The respondents from Himalayan States reporting availability of the seed/planting material is above 90%. In the NER States, such replies range from 45% in case of Manipur to 93% in respect of Sikkim.

Of the remaining about 1483 [14- 15%] respondents who had answered no to the availability of the seed/planting material of their choice, have given different reasons for their inability to sow the preferred variety. A majority of them - 1021 [69%], have reported price factor- price of the material being high 129 [9%] stated non availability of the seed/ planting material of their choice and one percent each said that the material was affected by disease or susceptible to disease/pest and market price for the substitute material was lower.

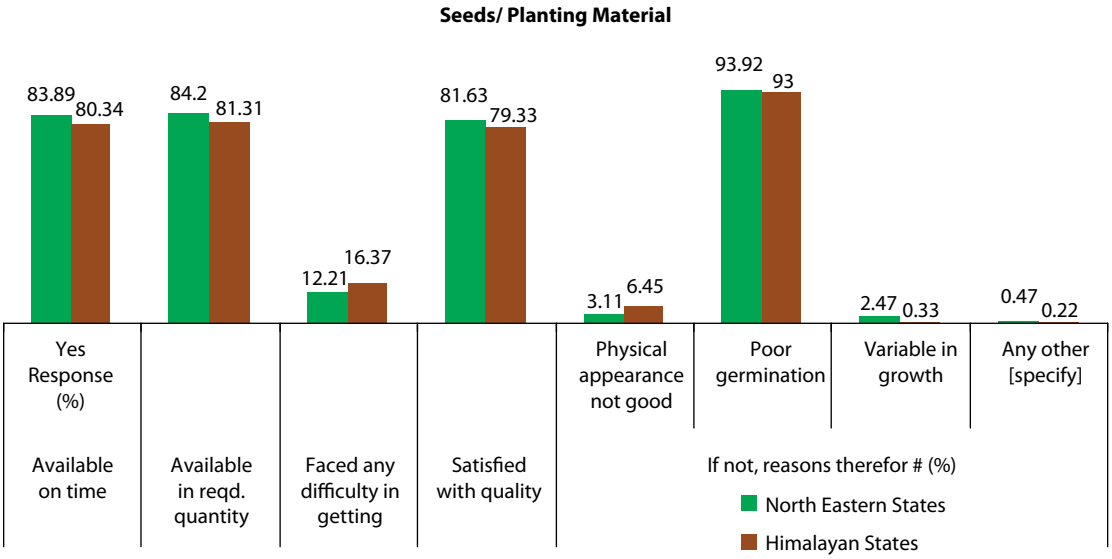
The respondents in this category indicating that the price of the material was high ranged from 31% in J&K and 94% in other Himalayan States. In the NER, the minimum number [55%] of the respondents who felt that the price was high, was from the State of Mizoram and the maximum [100%] from the State of Sikkim.

The respondents giving an affirmative answer on the availability of the material of their choice, were further asked whether the seed/planting material were available on time, in adequate quantity and quality and whether they had faced any difficulty in getting the same. The response obtained is presented in Table 5.22.

Table 5.22 Response on timeliness, adequacy and quality of the seeds/ planting material

States	Yes Response (%)				If not, reasons therefor # (%)			
	Available on time	Available in reqd. quantity	Faced any difficulty in getting reqd. input	Satisfied with quality	Physical appearance not good	Poor germination	Variable in growth	Any other [specify]
North Eastern States								
Arunachal Pradesh	87.81	87.09	12.27	86	1.78	90.07	6.46	1.69
Assam	83.32	83.57	13.12	73	5.14	93.54	1.32	0
Manipur	88.15	87.7	10.07	81	1.48	97.33	1.04	0.15
Meghalaya	63.62	64.19	14.48	84	3.24	95.43	0.38	0.95
Mizoram	73.17	73	14.67	79	2.5	91.5	5.83	0.17
Nagaland	92.48	94.18	9.33	88	2.06	97.33	0.36	0.12
Tripura	81.33	84.33	16.67	74	2.67	94.67	2	0.33
Sikkim	97.67	98.34	5.32	88	3.32	96.68	0	0
Sub Total	**83.89**	**84.2**	**12.21**	**81.63**	**3.11**	**93.92**	**2.47**	**0.47**
Himalayan States								
Himachal Pradesh	94.52	94.41	20.29	87	6.25	93.64	0.11	0
Jammu and Kashmir	64.7	67.15	8.87	79	7.98	90.71	0.95	0.36
Uttarakhand	91.28	90.97	24.31	72	5.33	94.36	0	0.31
Sub Total/Average	**80.34**	**81.31**	**16.37**	**79.33**	**6.45**	**93**	**0.33**	**0.22**
Grand Total	**82.66**	**83.2**	**13.64**	**80.42**	**4.11**	**93.64**	**1.83**	**0.39**

Figure 5.22 Response on timeliness, adequacy and quality of the seeds/ planting material



As many as 8124 respondents [83%] reported timely availability of the seed/planting material and an equal number stated that the material was also accessible in the quantity required by them. Except in the State of Meghalaya and Mizoram where such a response was 63% & 73%, the reply ranged above 80% [Maximum 98%] in the remaining NE States. In Himalayan States, while 65% of the respondents in J&K gave positive answers, the percentage of the respondents on timely availability was 98% in Uttarakhand and 94% in Himachal Pradesh. In all about 17-18% of the respondents had expressed their dissatisfaction with the timeliness and adequacy of the material.

The views of the respondents on whether they faced any difficulty in getting the required inputs and whether they were also satisfied with the quality aspect of the material were also taken during the study. As many as 1341 [14%] respondents, representing all the States, reported that they had faced such problems. On the question of availability of quality inputs, in all 80% of the respondents – 82% from NER and 79% from HSR – expressed their satisfaction. Of the minority of about 20% not satisfied with the quality of the available inputs, an overwhelming number constituting around 94% cited as poor germination as the main reason of their dissatisfaction. The response is more or less similar from all the states in this respect. The cause of complaint by the other 5 percent of the respondents was the packaging and variation in yield.

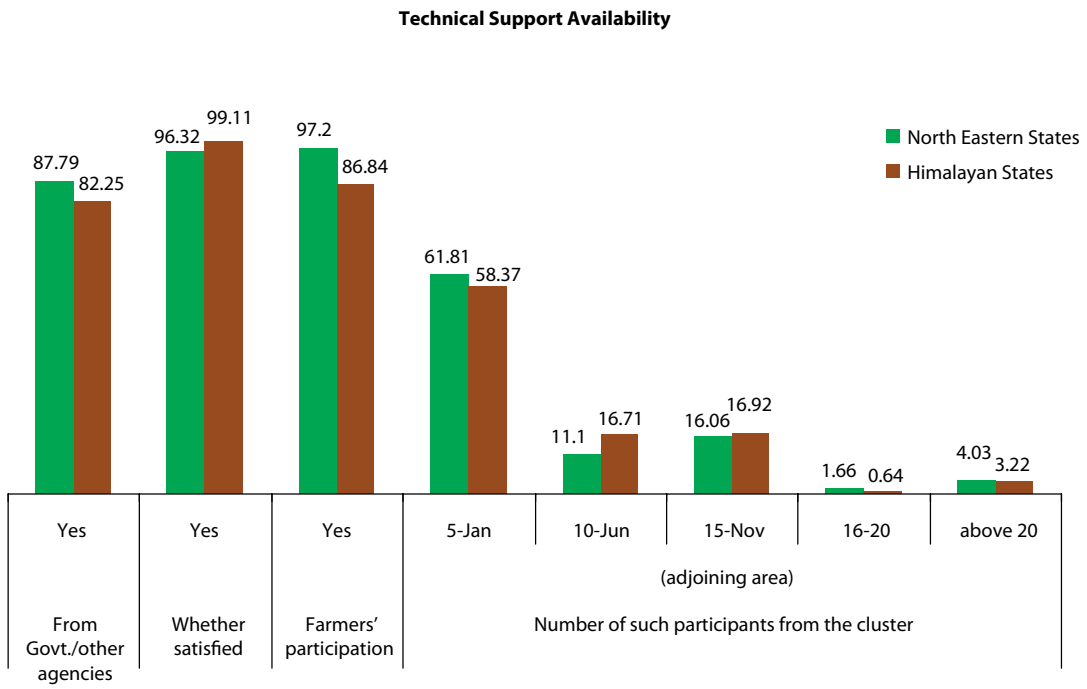
Availability of Extension Services and Development of Horticulture Clusters

The Extension Services have a key role in transfer of technology to the farmers. It continuously moves forward horticulture sector for adoption of newer methods of farming for raising product and productivity. The HMNEH lays much emphasis on development of horticulture on cluster basis for creating maximum impact of their programme. The response received from the respondents on these aspects are collated and Table 5.23.

Table 5.23 Technical support availability status- percent response

States	From Govt./ Other agen-cies	Whether satisfied with such support	Farmers' partici-pation from vill./ad-joining area	Number of such participants from the cluster (adjoining area)				
	Yes	Yes	Yes	1-5	6-10	11-15	16-20	above 20
North Eastern States								
Arunachal Pradesh	92.49	98.69	98.14	60.03	19.08	15.95	0.58	1.15
Assam	87.18	95.16	99.29	62.5	7.07	24.54	2.36	0.46
Manipur	89.19	99	96.3	66.15	7.38	8.31	1.23	9.85
Meghalaya	62.67	89.36	99.62	81.64	4.21	12.24	0	0.38
Mizoram	88.83	97	85.67	38.52	11.28	13.62	0.78	19.07
Nagaland	92.48	94.23	99.76	64.03	15.8	11.06	1.94	2.19
Tripura	88	99.62	100	69.67	12.33	12.67	0	3
Sikkim	98.01	97.29	90.7	45.05	10.62	5.13	8.42	13.92
Sub Total	**87.79**	**96.32**	**97.2**	**61.81**	**11.1**	**16.06**	**1.66**	**4.03**
Himalayan States								
Himachal Pradesh	94.63	99.65	99.89	64	14.6	19.1	0.11	0.88
Jammu and Kashmir	70.13	99.06	70.73	43.82	20.88	17.32	1.59	7.68
Uttarakhand	89.44	98.62	99.59	69.1	14.11	14.42	0.1	0.51
Sub Total	**82.25**	**99.11**	**86.84**	**58.37**	**16.71**	**16.92**	**0.64**	**3.22**
Grand Total	**85.88**	**97.24**	**93.62**	**60.71**	**12.9**	**16.34**	**1.34**	**3.77**

Figure 5.23 Technical support availability status- percent response



As many as 8440 [86%] of the respondents have reported that they were receiving support from the Extension Agencies and 8207 [97%] of them had also expressed their satisfaction on the service being given to them by the concerned agency. The affirmative answers to both the queries were given by an overwhelming majority from all the States. The response ranging from 63% in Meghalaya to 98% in Sikkim in NER and 70% in J&K to 95% in Himachal Pradesh in Himalayan States to issue [i] and 89% in Meghalaya to 99.62% in Tripura in NER and around 99% in all the Himalayan States to issue [ii]. About 94% of the respondents from the total sample reported that the other farmers from their respective villages were also participating in the programme. Except the State of J&K where 71% farmers confirmed the fact of participation by other farmers from the same villages, such a reporting from all the other States is by more than 90% of the respondents.

Clusterization has proved a more effective method to develop any sector. With a view to ascertain the extent of the clusterization in the programme, respondents were requested to indicate the number of the farmers participating in the programmes from their own villages as also from the adjoining villages simultaneously. Only 8746 farmers responded to the query. The information received is indicated in table 5.23 above. About 5586 [61%] of the respondents reported farmer beneficiaries of the programme from the same/ adjoining village/s falling within 1-5, farmers range, followed by 1503 [16%] stating within 11-15 farmers in the range, 1187[13%] reporting within 6 -10 farmers range, 347 [4%] above 20 farmers range and 123 [1%] within 16-20 range. Only farmers above 10 at one place may be considered as forming a cluster and less than this number may be good for making isolated efforts. Sustained efforts are, therefore, required to implement the programme in clusters to have the better and visible effect.

Mushroom Cultivation

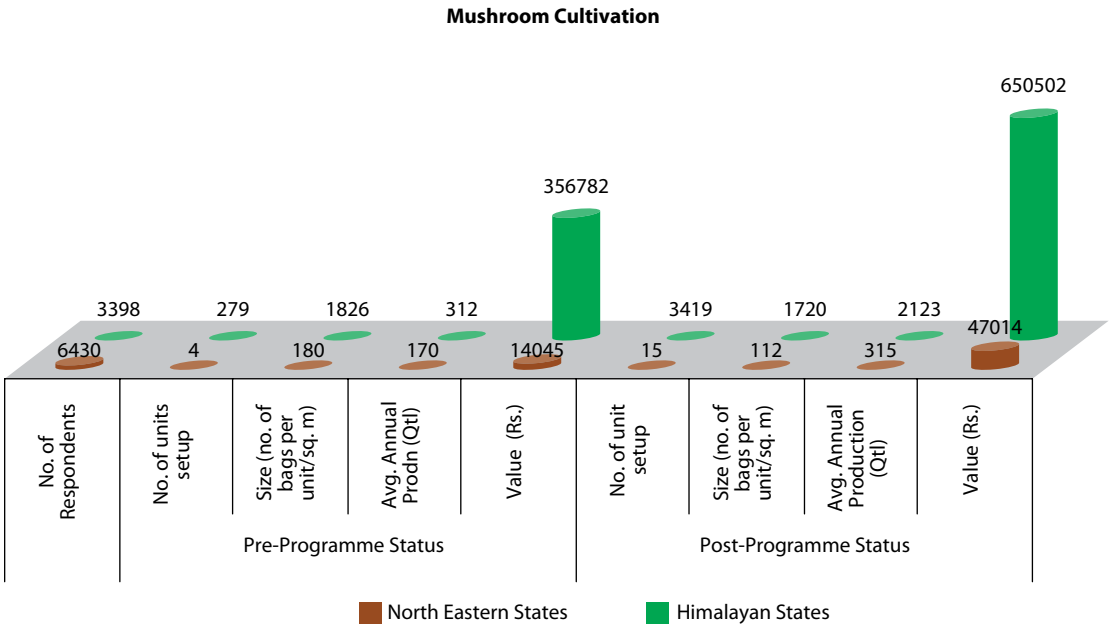
Mushrooms are a good source of high nutrition and nourishing in nature besides being easily digestible food due to their low content of calories for human body. In view of the increase in demand for Mushroom, the activity is profitable for the marginal and small farmers. The information gathered on the status of the Mushroom Cultivation under the programme is contained in Table 5.24.

Table 5.24 Pre and post programme status of Mushroom cultivation

NEH States	Pre-Programme Status					Post-Programme Status			
	No. of Respon-dents	No. of units setup	Size (no. of bags per unit/ sqm)	Avg. Annual Prodn (qtl)	Value (Rs.)	No. of unit setup	Size (no. of bags per unit/ sqm)	Avg. An-nual Pro-duction (qtl)	Value (Rs.)
North Eastern States									
Arunachal Pradesh	1238	0	0	0	0	0	0	0	0
Assam	1966	0	0	0	0	5	20	14	6000
Manipur	675	1	0	0	0	4	30	10	1200
Meghalaya	525	0	0	0	0	0	0	0	0
Mizoram	600	0	0	0	0	2	0	1	5000

NEH States	Pre-Programme Status					Post-Programme Status			
	No. of Respon-dents	No. of units setup	Size (no. of bags per unit/ sqm)	Avg. Annual Prodn (qtl)	Value (Rs.)	No. of unit setup	Size (no. of bags per unit/ sqm)	Avg. An-nual Pro-duction (qtl)	Value (Rs.)
Nagaland	825	0	0	0	0	0	0	0	0
Tripura	300	2	100	90	4045	3	15	180	21000
Sikkim	301	1	80	80	10000	1	80	120	15000
Sub Total	**6430**	**4**	**180**	**170**	**14045**	**15**	**112**	**315**	**47014**
Himalayan States									
Himachal Pradesh	913	9	680	54	300780	3203	1557	2056	257000
Jammu and Kashmir	1510	263	1042	176	55000	215	152	31	390000
Uttarakhand	975	7	104	82	1002	1	11	36	3502
Sub Total	**3398**	**279**	**1826**	**312**	**356782**	**3419**	**1720**	**2123**	**650502**
Grand Total	**9828**	**283**	**2008**	**482**	**370827**	**3434**	**1832**	**2438**	**697516**

Figure 5.24 Pre and post programme status of Mushroom cultivation



At the launch of the HMNEH, only a small number of respondents – 283 [3%] of the total sample of 9828, had been undertaking Mushroom cultivation activity mostly on a small scale. Over 90% of the respondents were from the State of J&K alone. In other States, the number of Mushroom cultivating farmers was negligible. The annual mushroom production was however, only of the order of 482 qtl worth Rs. 3.71 lakh.

As regards post programme status, in all 3434 units – 15 in NER and 3419 in HSR- mostly of small size were reported to have been set by the respondents from all the 11 States. Mushroom production increased from 482 qtl to 2438 qtl. The growth in the number of

units [1113%,] and production [406%] is good In relative terms but in absolute terms this is not much. The growth is, however, on account of the support extended under the HMNEH. There was not much increase in value [88%] which may be on account of fluctuation in prices at different points of time. The activity appears to have gained substantial ground in Himachal Pradesh and to a lesser extent in J&K. About 93% of the Mushroom Units have been reported from the single State of Himachal Pradesh and J&K is the next State with 6% of the units. In Himachal Pradesh, the per capita mushroom units come out to 3.5.In the remaining States the number of farmers cultivating Mushroom was negligible.

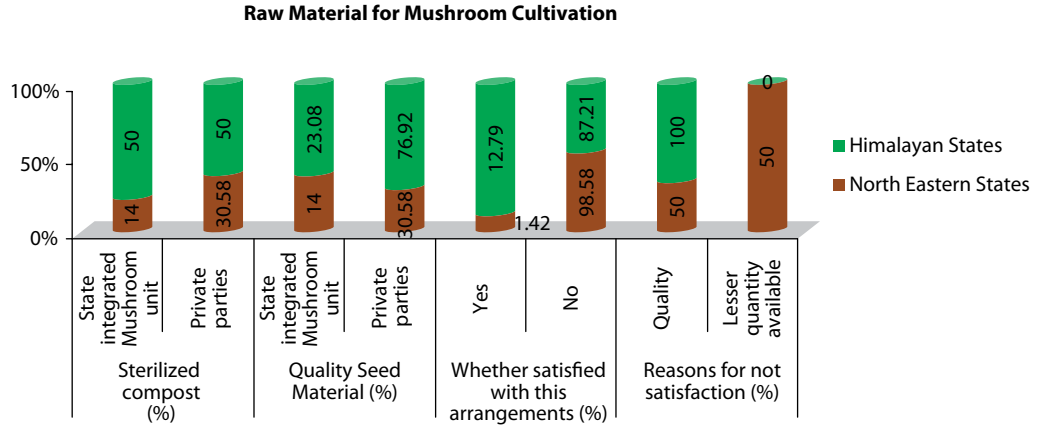
Source of Compost/Spawn Supply and Satisfaction Level

The infrastructure has a great role to play in the development of any activity. The respondents were asked to indicate the source of procurement of compost and quality seed material as also the level of satisfaction in respect of their mushroom cultivation activity. The information received is collated in Table 5.25.

Table 5.25 Source of raw material for Mushroom cultivation and satisfaction level

Name of the State	Total No. of Respondents	Sterilized compost (%)		Quality Seed Material (%)		Whether satisfied with this arrangements (%)		Reasons for not satisfaction (%)	
		State integrated Mushroom unit	Private parties	State integrated Mushroom unit	Private parties	Yes	No	Quality	Lesser quantity available
Arunachal Pradesh	1238	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00
Assam	1966	0.00	100.00	0.00	100.00	0.00	100.00	50.00	50.00
Manipur	675	0.00	0.00	0.00	0.00	0.44	99.56	0.00	0.00
Meghalaya	525	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00
Mizoram	600	100.00	0.00	100.00	0.00	14.29	85.71	0.00	0.00
Nagaland	825	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tripura	300	100.00	0.00	100.00	0.00	50.00	50.00	0.00	0.00
Sikkim	301	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00
Sub Total	**6430**	**14.00**	**30.58**	**14.00**	**30.58**	**1.42**	**98.58**	**50.00**	**50.00**
Himachal Pradesh	913	66.67	33.33	0.00	100.00	80.00	20.00	0.00	0.00
Jammu and Kashmir	1510	0.00	100.00	33.33	66.67	2.94	97.06	0.00	0.00
Uttarakhand	975	50.00	50.00	100.00	0.00	12.50	87.50	100.00	0.00
Sub Total	**3398**	**50.00**	**50.00**	**23.08**	**76.92**	**12.79**	**87.21**	**100.00**	**0.00**
Grand Total	**9828**	**60.00**	**40.00**	**31.25**	**68.75**	**4.09**	**95.91**	**66.67**	**33.33**

Figure 5.25 Source of raw material for Mushroom cultivation and satisfaction level



At the aggregate level, 50% of the respondents have indicted the source of sterilized compost as State's Mushroom Integrated Unit and the remaining 50% from the private parties. The farmers from Manipur and Sikkim have not responded to this query. Their number is however insignificant. The state-wise position varies. In the State of Assam and J&K, the response of procurement of compost from private parties was 100%. In the States of Mizoram and Tripura in NER, it was quite the opposite. All the respondents had indicted such a source as State Integrated mushroom unit. While in Himachal Pradesh the ratio between the State Integrated mushroom Unit and private parties as the supply source was two thirds and one third respectively, in Uttarakhand it was divided equally between the two sources.

In regard to the quality seed supply material, the response in the NER was same as in the case of compost. In Himachal Pradesh, all the respondents had indicted private parties as the main source of purchase of quality seed. In J&K, the response was divided in the ratio of one third and two third in favour of Government Agencies and Private sector respectively. The respondent/s from Uttarakhand had reported State Agency as the source of supply of seed.

On the satisfaction level, respondents from Assam and Uttarakhand had expressed their reservations on the quality of the seed and its availability to the extent of their full needs. The farmers from major mushroom Cultivation State like Himachal Pradesh did not report facing of any difficulty in existing arrangements for supply of compost and seed for mushroom.

Marketing of Mushroom

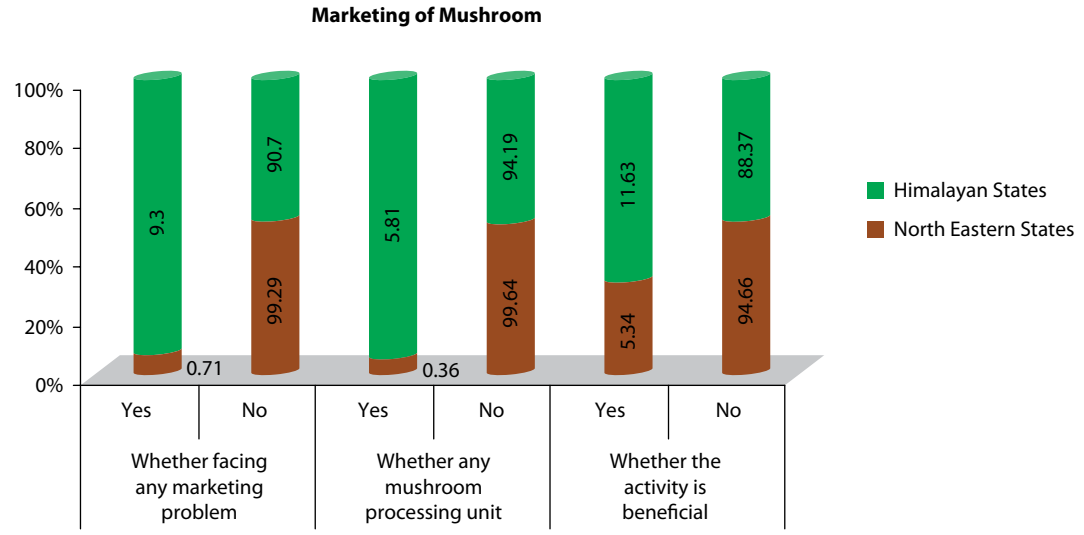
Marketing is the biggest constraint in the supply chain of horticulture produce in our country. The opinion of the respondent on this aspect is contained in Table 5.26.

A predominant majority of above 97% of the respondents had indicated that there was no marketing problem for sale of Mushroom produced by them. Only about 3% from the State of Manipur and Tripura in NER and from all HSR States had expressed some problem in this regard. In the individual States, where the number of such farmers was more were: Himachal Pradesh - 30%, Tripura and Uttarakhand each -25%. The farmers from these States had also stated existence of some processing units in their respective areas in the same

Table 5.26 Marketing of Mushroom

Name of the State	Total No. of Respon-dents	Whether facing any marketing problem		Whether any mushroom processing unit setup in your area		Whether the activity is beneficial		Average annual income from this activity (Rs.)
		Yes	No	Yes	No	Yes	No	
North Eastern States								
Arunachal Pradesh	1238	0.00	100.00	0.00	100.00	0.00	100.00	0
Assam	1966	0.00	100.00	0.00	100.00	0.00	100.00	0
Manipur	675	0.44	99.56	0.00	100.00	5.33	94.67	24400
Meghalaya	525	0.00	100.00	0.00	100.00	0.00	100.00	0
Mizoram	600	0.00	100.00	0.00	100.00	14.29	85.71	5000
Nagaland	825	0.00	0.00	0.00	0.00	0.00	0.00	0
Tripura	300	25.00	75.00	25.00	75.00	50.00	50.00	27000
Sikkim	301	0.00	100.00	0.00	100.00	0.00	100.00	0
Sub Total	**6430**	**0.71**	**99.29**	**0.36**	**99.64**	**5.34**	**94.66**	**56400**
Himalayan States								
Himachal Pradesh	913	30.00	70.00	30.00	70.00	60.00	40.00	672500
Jammu and Kashmir	1510	4.41	95.59	0.00	100.00	2.94	97.06	0
Uttarakhand	975	25.00	75.00	25.00	75.00	25.00	75.00	4500
Sub Total	**3398**	**9.30**	**90.70**	**5.81**	**94.19**	**11.63**	**88.37**	**677000**
Grand Total	**9828**	**2.72**	**97.28**	**1.63**	**98.37**	**6.81**	**93.19**	**733400**

Figure 5.26 Marketing of Mushroom



ratio as in the case of farmers facing marketing problems. About 98% of the respondents at aggregate level, had, however, reported non existence of any processing units in their respective areas.

On the question of whether the Mushroom cultivation activity was beneficial for them, only 7% of the respondents had given answers in affirmative and a large percent of 93% in negative manner at the all 11 States level which indicates the lack of technical knowhow in growing mushroom cultivation in scientific manner which otherwise had led to decreased yields and had proved to be a non-beneficial activity. There is a need to look into this aspect seriously by the State/district Horticulture officials to fill the technology gap by organizing suitable customized trainings and demonstrations. In the State-wise position, somewhat good to reasonable number, i.e. 60%, 50% and 25% respondents in the States of Himachal Pradesh, Tripura and Uttarakhand respectively, had expressed their satisfaction over the beneficial aspect of the activity. The annual income reported from the activity ranged from as low figure as Rs.0.05 lakh in Mizoram to as high as Rs.6.73 lakh in Himachal Pradesh depending on scale adopted for mushroom production.

The non availability of compost, quality seed and marketing are reported to be the major problems for this sector. Mushrooms with large number of applications such as tasty food, medicine, minerals, drugs etc., besides eco-friendly process of production, still remains an untapped source in the areas. There is much potential for promoting this activity in the participating States especially in the NER and Uttarakhand. The potential needs to be exploited after addressing the problems/constraints of the sector.

Bee Keeping

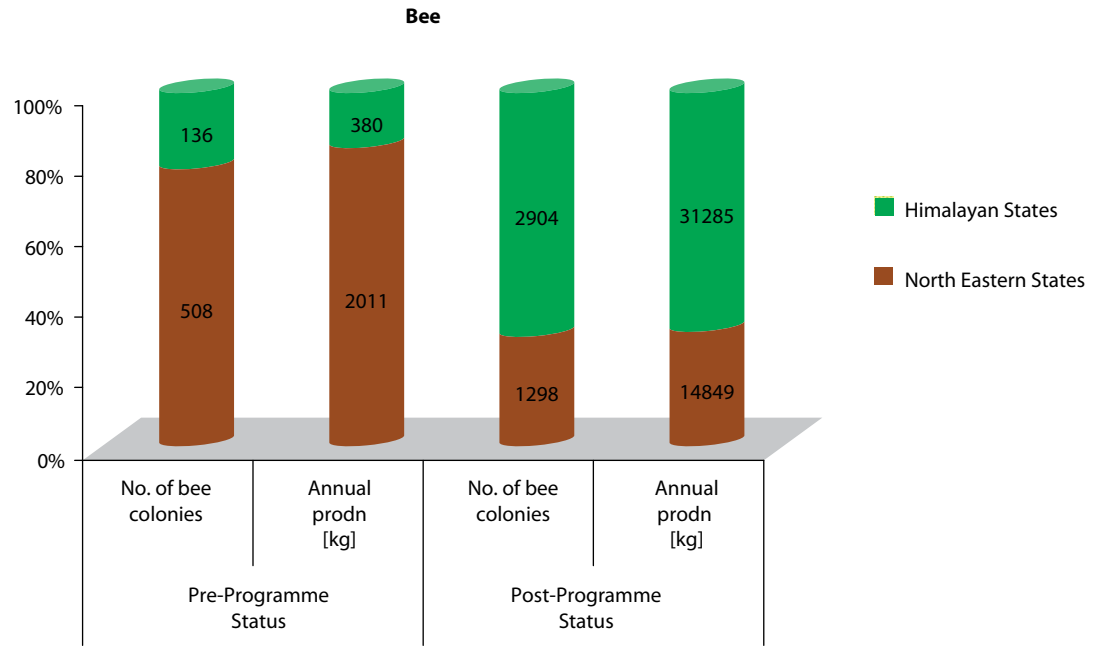
Honey bees are the important external agents cross pollination crop plants. Beekeeping is also a valuable source of income for small-holder farmers. Bee pollination gives better quality and quantity of horticulture crops. Inadequate pollination results in low yields of uneven and small fruits. The byproducts viz., honey and beeswax are a rich source of vitamins, minerals and anti-bacterial quality, and are a valuable source of income particularly for Marginal and Small farmers. Information collected from the respondents on these two important activities, is contained in Table 5.27 and Table 5.28.

Table 5.27 Pre and post programme status of Bee keeping in NEH States

States	Respon-dents	Pre-Programme Status			Post-Programme Status		
		No. of bee colonies	Annual prodn [kg]	Prod. of other By-products	No. of bee colonies	Annual prodn [kg]	Prodn of other By-products
North Eastern States							
Arunachal Pradesh	1238	10	50	No	36	180	Yes
Assam	1966	24	240	Yes	199	2587	Yes
Manipur	675	408	1428	Yes	896	10752	Yes
Meghalaya	525	46	230	Yes	91	774	Yes
Mizoram	600	9	54	No	27	378	Yes
Nagaland	825	0	0	No	0	0	No
Tripura	300	1	4	No	11	121	No
Sikkim	301	10	5	No	38	57	Yes
Sub Total	**6430**	**508**	**2011**		**1298**	**14849**	

States	Respon-dents	Pre-Programme Status			Post-Programme Status		
		No. of bee colonies	Annual prodn [kg]	Prod. of other By-products	No. of bee colonies	Annual prodn [kg]	Prodn of other By-products
Himalayan States							
H.P.	913	0	0	No	2500	30000	No
J&K	1510	120	300	Yes	354	885	Yes
Uttarakhand	975	16	80	Yes	50	400	Yes
Sub Total	**3398**	**136**	**380**	**Yes**	**2904**	**31285**	
Total	**9828**	**644**	**2391**	**Yes**	**4202**	**46134**	

Figure 5.27 Pre and post programme status of Bee keeping in NEH states



The number of the farmers undertaking bee keeping activity before the onset of programme was not much The number of the bee colonies reported was just about 644 i.e. 6% of the total population of the sample. About 63% of the bee colonies were reported from one State i.e. Manipur. The other State with comparatively good number of bee colonies [16%] was J&K. Beekeeping which is a forest and horti-agriculture based industry can play an important role in the development of hilly areas, as it increases economy without changing environmental balance.

Success of beekeeping depends upon some basic factors such as suitable climatic conditions, bee forage, bee management and bee breeding. The combinations of these factors lead to better honey and beeswax production. Besides better strains of bees and their appropriate management, production of honey also depends upon the bee floral resources available within the flight range of bees. Various climatic and ecological factors also affect the production and availability of nectar to the honeybees. Thus, abundance and richness of nectar and pollen resources around an apiary is quite important for the success of beekeeping in an area.

Depending on the availability of flora near apiary, the annual honey production generally varies between 3 to 20 kg per annum per bee hive/bee colony. In the North Eastern states, the highest honey production per hive or bee colony is reported to be in Mizoram [12 to 20 kg], followed by in Assam [8-10 kg], Meghalaya and Nagaland [4-5 kg], Manipur [3.5 kg] and Tripura [2 kg] as the least. In Himalayan States, the honey production varied from 4 to 5 kg per annum in J&K, 5 to 8 kg in Uttarakhand and Himachal Pradesh. The value is found to be between 6 to 8 kg per annum per hive.

As regards post programme status in Bee Keeping activity, a total of 4202 bee colonies have been reported out of which a majority of about 60% was in Himachal Pradesh. The other States with significant share in the bee colonies were: Assam [5%], J&K [8%] and Manipur [21%]. These combined share of these four States, was of the order of 96% of the total bee colonies set up by the respondents. The bee keeping which works out 1:27 in Himachal Pradesh seems to be well grounded in that State. In Manipur with 1:1 ratio is also quite reasonable. A total production of 16004 qtl of honey has been reported from all the 11 States except Himachal Pradesh. The State of Manipur had lion's share of around 71% in this total production. Taking into consideration 94% of the total bee hives/colonies set up in Himachal Pradesh, its honey production may be of the order of 15043 qtl. The total production of honey in the 11 States may therefore, be assumed about 31000 qtl.

A focused approach in respect of the States, where the Bee keeping activities have not yet taken ground is required.

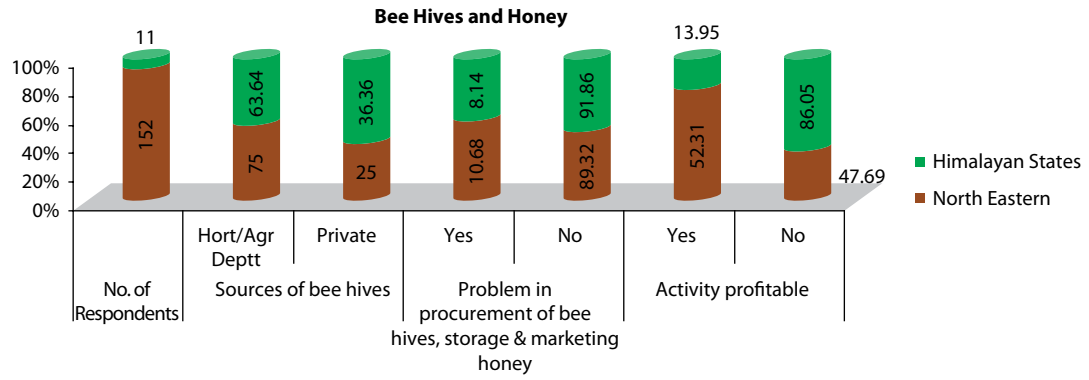
The responses of the farmers on the source of procurement of bee hives, problems, if any, faced by them in the marketing of the produce and profitability etc. are consolidated in Table 5.28.

Table 5.28 Procurement of bee hives and marketing of honey

Name of the State	No. of Respondents availing the component	Sources of bee hives		Problem in procurement of bee hives, storage & Marketing of honey		Activity profitable	
		Hort/Agr Deptt	Private parties	Yes	No	Yes	No
North Eastern States							
Arunachal Pradesh	11	100	0	16.67	83.33	66.67	33.33
Assam	4	0	100	0	100	33.33	66.67
Manipur	123	80.49	19.51	8.44	91.56	54.22	45.78
Meghalaya	6	0	100	50	50	60	40
Mizoram	5	40	60	57.14	42.86	42.86	57.14
Nagaland	0	0	0	0	0	0	0
Tripura	1	0	100	0	100	75	25.00
Sikkim	2	100	0	0	100	9.09	90.91
Sub Total	**152**	**75**	**25**	**10.68**	**89.32**	**52.31**	**47.69**

Name of the State	No. of Respondents availing the component	Sources of bee hives		Problem in procurement of bee hives, storage & Marketing of honey		Activity profitable	
		Hort/Agr Deptt	Private parties	Yes	No	Yes	No
Himalayan States							
Himachal Pradesh	2	100	0	10	90	50	50
Jammu and Kashmir	6	50	50	4.41	95.59	5.88	94.12
Uttarakhand	3	66.67	33.33	37.5	62.5	37.5	62.5
Sub Total	**11**	**63.64**	**36.36**	**8.14**	**91.86**	**13.95**	**86.05**
Grand Total	**163**	**74.23**	**25.77**	**10.08**	**89.92**	**43.32**	**56.68**

Figure 5.28 Procurement of Bee hives and marketing of honey



In all, 163 [1.66%] of the total 9828 respondents had only availed of Bee Keeping component of the programme. A large majority of 123 [75%] farmers is from one State of Manipur alone. As many as 74% of the respondents has reported State Horticulture/Agriculture Department as the source of supply of bee hives. The remaining about one fourth of them were meeting their requirements from the private parties. In the States of Arunachal Pradesh, Sikkim and Himachal Pradesh, all the respondents had indicated Govt. Hort./Agr. Department as the source of supply of bee hives, the case of farmers in the States of Assam, Meghalaya and Tripura was quite the opposite where 100% requirements of the farmers were being met by private sector. In the remaining States, farmers were obtaining bee hives partly from the Government Departments and partly from private parties. In his category, the respondents from Manipur [80%], Uttarakhand and J&K [59%] the majority or thereabout, was further relying on Govt. Hort/Agr. Departments for supply of bee hives. It all indicates that the State Government has been playing a very crucial role in the development of Bee keeping.

To the question of procurement of bee hives, storage & Marketing of honey, an overwhelming majority of about 90% has reported no problem either in the procurement of the bee hives or marketing of the product. Only a small minority of about 10% has reported facing of some problems in securing be hives and marketing of honey. In the State of Meghalaya and Mizoram, about half of the beneficiaries had indicated difficulties in smooth conduct of

the bee keeping activity. On the point of profitability, a majority [57%] of the respondents did not find the bee keeping activity as profitable. The maximum number/majority of the respondents indicating that the activity was not profitable was from the State of J&K [94%], followed by Sikkim [91%] Assam [67%], Uttarakhand [63%], Mizoram [57%] Meghalaya and Himachal Pradesh [each 50%].

Creation of Water Resources

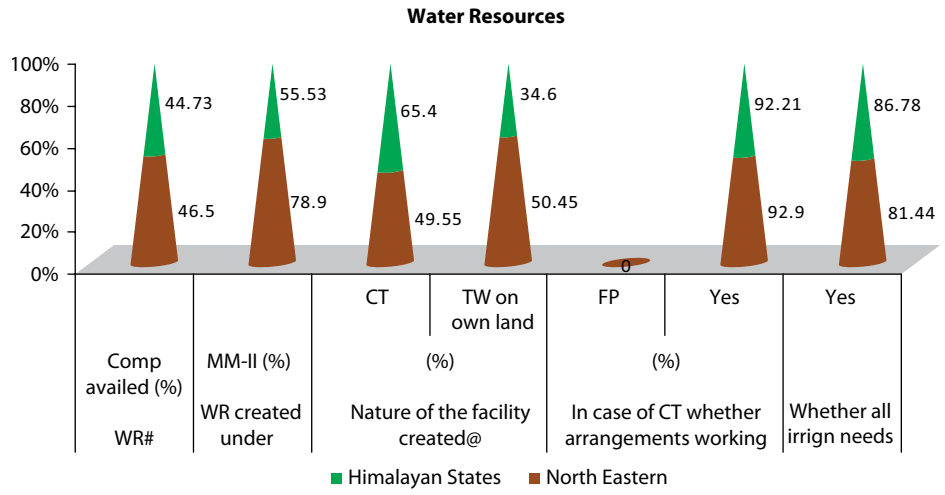
Irrigation is very vital for raising the production and productivity of agriculture. Information has therefore, been gathered to ascertain the extent of the water resourced created in the land of the respondents whether created under MM-II or otherwise. The replies received are consolidated in Table 5.29.

It is observed that only 4510 [46%] of the total respondents had irrigation facilities and majority of 5318 [54%] did not have any such facility. The ratio of the irrigated and non -irrigated area both in the NE States and Himalayan States is almost similar. The maximum number of the respondent farmers with irrigation facilities were from the States of Sikkim [81%], followed by Assam [73%], Mizoram [65%], Tripura [37%], Nagaland [34%.], Meghalaya [30%]. Arunachal Pradesh [21%] and Manipur [16%]. In Himalayan States, Uttarakhand farmers had the maximum share [50%] in irrigation facilities, followed by Himachal Pradesh [49%] and J&K 38%].

Table 5.29 Water resources created at the land of the respondents

States	WR# Comp availed (%)	WR created under MM-II (%)	Nature of the facility created@ (%)		In case of CT whether arrangements working satisfactorily (%)		Whether all irrign needs are being met from CT (%)
			CT	TW on own land	FP	Yes	Yes
North Eastern States							
Arunachal Pradesh	21.41	35.47	89.36	10.64	0	86.9	67.86
Assam	72.58	87.74	31.87	68.13	0	88.47	84.96
Manipur	16	62.96	80.88	19.12	0	90.91	45.45
Meghalaya	29.9	59.24	21.51	78.49	0	80	65
Mizoram	65.33	83.67	35.67	64.33	0	90.6	64.1
Nagaland	34.42	74.65	93.87	6.13	0	97.49	94.47
Tripura	37.33	61.61	82.61	17.39	0	98.25	84.21
Sikkim	81.4	99.18	97.94	2.06	0	100	86.97
Sub Total	**46.5**	**78.9**	**49.55**	**50.45**	**0**	**92.9**	**81.44**
Himalayan States							
Himachal Pradesh	49.51	60.4	76.56	23.44	0	89.95	91.39
J&K	38.34	54.4	43.17	56.83	0	94.12	80.88
Uttarakhand	50.15	52.35	80.86	19.14	0	93.24	85.99
Sub Total	**44.73**	**55.53**	**65.4**	**34.6**	**0**	**92.21**	**86.78**
Grand Total	**45.89**	**71.02**	**53.73**	**46.27**	**0**	**92.68**	**83.15**

Figure 5.29 Water resources created at the land of the respondents



#[WR: Water Resources created, CT: Community Tanks, TW: Tube Well, FP: Farm Ponds]

The respondents were further asked to indicate the extent and the types of the irrigation facilities created with the assistance availed by them under MM-II programme. As many as 3203 [71%] of the respondents with irrigation facilities, have reported the creation of the irrigation facilities on their land under MM-II. About 79% of these respondents were from the NE States and 56% from Himalayan States. In the State of Sikkim 99% farmers have availed assistance under this sub head followed by 88% in Assam [88%], Mizoram [84%], Nagaland 75%, Manipur 63%, Tripura 62%, Meghalaya [59%] and Arunachal [35%]. In Himalayan States, the highest number of the farmers creating irrigation facilities under the programme was from Himachal Pradesh [60%], J&K [54%] and Uttarakhand [52%] were next in order.

The types of the irrigation structures created comprised of community wells - 1721[54%] and Tube -wells/bore-wells 1482 [46%] in all the States. The maximum percentage of the respondents [98%] from Sikkim reported creation of community tanks. Respondents from the States of Nagaland [94%], Arunachal Pradesh [90%], Tripura [83%], and Manipur [80%] were next in order in creation of community tanks for irrigation under the programme from the NE States. In Himalayan States, 80% of the respondents in Uttarakhand have reported construction of community tanks The corresponding percentage in Himachal Pradesh and J&K of Himalayan Region being 77% and 43%, respectively. Of the total 1721 community tanks reported to have been created under the programme, 1169 [68%] were in NE States and 552 [32%] in Himalayan States.

As regards Tube-wells/Bore-wells, a total of 1482 such structures were reported in all the States - 1190 [80%] from NE States and 292 [20%] from Himalayan States. In the States of Meghalaya [79%], Assam [68%], Mizoram [64%] and J&K [57%] majority of the respondents had reported digging of tube-wells/Bore- wells. There was no reporting of the construction of farm ponds by the respondents from any of the 11 States.

A proper management of the community assets is often a problem. The respondents were, therefore, asked to indicate whether the community tanks constructed under the programme were being managed to their satisfaction. About 93% of them have replied in an affirmative

manner. The response is almost similar in both the NE States and Himalayan States. The positive response ranges from 80% in Meghalaya to 100% in Sikkim. The beneficiaries of the Community Tanks [1721] were further asked whether all their irrigation needs were being met from the water source structures created on community basis. As many as 1431 [83%] have replied that their irrigation requirements were being fully met from the community tanks. This forms a majority of the respondents [81% in NES & 87% in HS]. Manipur was the only State where majority [55%] had indicated that its full irrigation needs were not being met by the community tanks.

On-farm Management

Water though essential for human, animal and plant life, is becoming a scarce commodity. Its proper harvesting and efficient utilization is of great implication. The method, frequency and duration of irrigations have also significant effects on crop yield and farm productivity. The scarce water resources are required to be used efficiently. Drip irrigation supplies filtered water directly to the root zone of the plant through the network of pipes Sprinkler irrigation enables water to be sprinkled with the help of a network of pipes and sprinklers on the plant foliage. It is ideally suitable for close spaced crops like vegetables and floriculture in the horticulture sector.

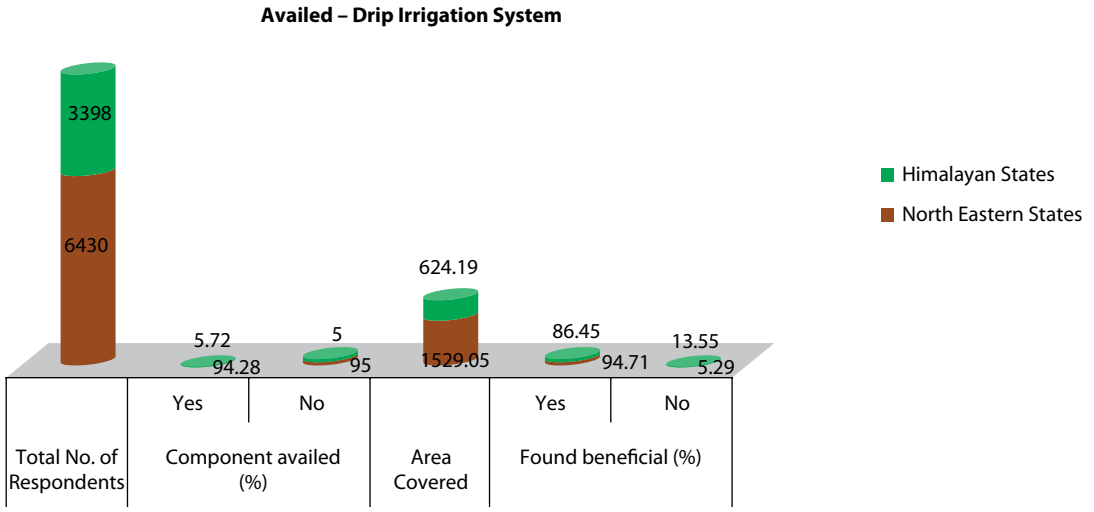
Drip Irrigation

The extent of the use of Drip Irrigation system, one of the two devices to control the water application closely, installed by the respondents at their fields, is indicated in Table 5.30.

Table 5.30 Details of the on farm component availed – drip irrigation system (%)

Name of the State	Total No. of Respon-dents	Component availed		Area Covered [ha]	Found beneficial (%)	
		Yes	No		Yes	No
North Eastern States						
Arunachal Pradesh	1238	4.52	95.48	254.0	75.00	25.00
Assam	1966	1.32	98.68	56.5	88.46	11.54
Manipur	675	8.74	91.26	54	84.75	15.25
Meghalaya	525	12.19	87.81	280.97	71.88	28.13
Mizoram	600	15.67	84.33	560.65	97.87	2.13
Nagaland	825	6.42	93.58	213.33	92.59	7.41
Tripura	300	3.00	97.00	9.2	100.00	0.00
Sikkim	301	2.33	97.67	100.4	100.00	0.00
Sub Total	**6430**	**5.72**	**94.28**	**1529.05**	**86.45**	**13.55**
Himalayan States						
Himachal Pradesh	913	9.31	90.69	262.49	94.12	5.88
Jammu and Kashmir	1510	1.13	98.87	217.20	94.12	5.88
Uttarakhand	975	6.97	93.03	144.50	95.59	4.41
Sub Total	**3398**	**5.00**	**95.00**	**624.19**	**94.71**	**5.29**
Grand Total	**9828**	**5.47**	**94.53**	**2153.24**	**89.05**	**10.95**

Figure 5.30 Details of the on farm component availed – drip irrigation system (%)



Only a small number (about 6%) of the respondents had availed of drip irrigation component of the programme. A very large majority of them accounting for about 95% has not shown any interest in drip irrigation adoption. Mizoram [16%], Meghalaya [12%] and Himachal Pradesh [9%] are the major states which have availed of this component.

The drip system installed by the respondents under the programme, has covered a total area of 2153 ha – 1529 ha [71%] in NER and 624 ha [29%] in HSR. The State of Mizoram had the maximum share of 26% in the total area covered under drip irrigation, followed by Meghalaya with 13%, Arunachal Pradesh & Himachal Pradesh – each with 12 and Nagaland and J&K each with 10% share. These six States together had more than 80% share in the total acreage coverage.

On the query of the usefulness of the system, about 89% of the respondents have reported that the drip irrigation had really been useful to them. Only about 10% of them had reported that they did not find the system much useful to them.

Sprinkler Irrigation

The extent of the use of Sprinkler Irrigation system, by the respondents is indicated in Table 5.31.

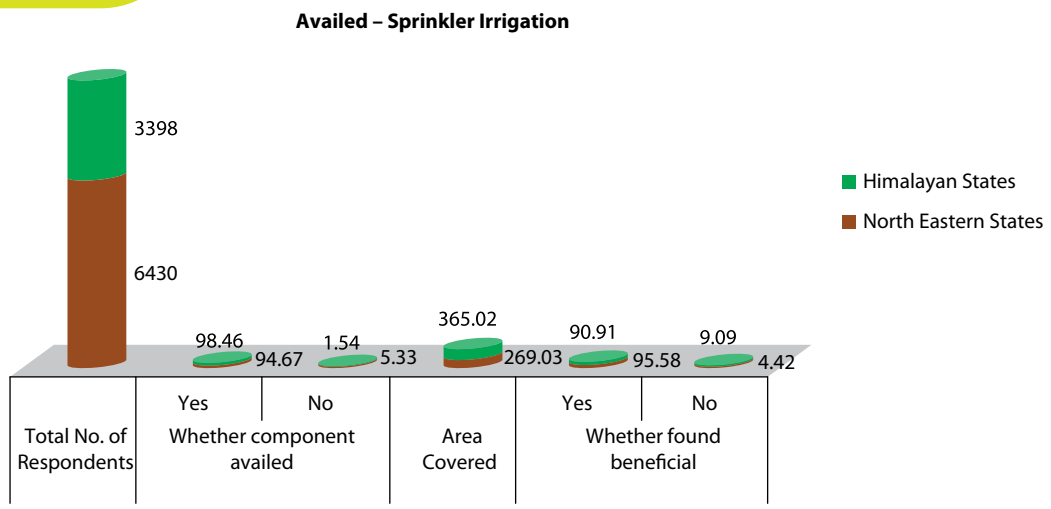
The number of the respondents - about 3% using sprinkler irrigation was still lower than the drip irrigation users. About 97% of the respondents had reported non use of this system. Himachal Pradesh is the only State from where somewhat reasonable number of the farmers – 17%, has reported having adopted sprinkler irrigation system. In the remaining States, the reporting is as low as less than 1% in the State of J&K and maximum as 6% in Mizoram. In the State of Sikkim, not even a single respondent has gone for sprinkler irrigation system.

A total area of about 634 ha of the respondents' lands, has been covered in all the eleven participating States - 365 ha [58%] in HSR & 269 ha [42%] in NER. The State of Himachal Pradesh had lion's share of about half [48%] of the total programme, followed by the State of Mizoram with 23% share and Meghalaya with 16% share. The combined share of three

Table 5.31 Details of the on farm component availed – sprinkler irrigation

Name of the State	Total No. of Respondents	Whether component availed		Area Covered [ha]	Whether found beneficial	
		Yes	No		Yes	No
North Eastern States						
Arunachal Pradesh	1238	0.16	99.84	6	0	100
Assam	1966	0.51	99.49	0	90	10
Manipur	675	1.04	98.96	3	100	0
Meghalaya	525	3.24	96.76	102.03	88.24	11.76
Mizoram	600	6	94	144	94.44	5.56
Nagaland	825	2.31	97.69	6	89.47	10.53
Tripura	300	2.67	97.33	8	100	0
Sikkim	301	0	100	0	-	-
Sub Total	**6430**	**1.54**	**98.46**	**269.03**	**90.91**	**9.09**
Himalayan States						
Himachal Pradesh	913	16.54	83.46	302.02	96.69	3.31
Jammu and Kashmir	1510	0.33	99.67	5	60	40
Uttarakhand	975	2.57	97.43	58	96	4
Sub Total	**3398**	**5.33**	**94.67**	**365.02**	**95.58**	**4.42**
Grand Total	**9828**	**2.85**	**97.15**	**634.05**	**93.93**	**6.07**

Figure 5.31 Details of the on farm component availed – sprinkler irrigation



States was of the order of 97% of the total sprinkler irrigation component availed of by all the respondents.

An overwhelming majority of 94% has, however, reported that the sprinkler irrigation system was found to be useful by them. While the entire lot of the farmers who had adopted sprinkler irrigation in Arunachal Pradesh had expressed their non satisfaction of the system, the number of such farmers not satisfied with the system in the State of Jammu and Kashmir [40%] was also significant.

Micro-irrigation technologies are increasingly seen as a means of addressing the growing competition for scarce water resources. The application of drip and sprinkler irrigation saves 30-35% water than the other conventional irrigation methods. The light and higher water application efficiency under the system creates ideal conditions for growth of horticulture crops. An appropriate low cost micro irrigation system can help poor farmers to improve water productivity and incomes. The system thus needs to be popularized for large scale adoption amongst the farmers.

Plastic Mulching

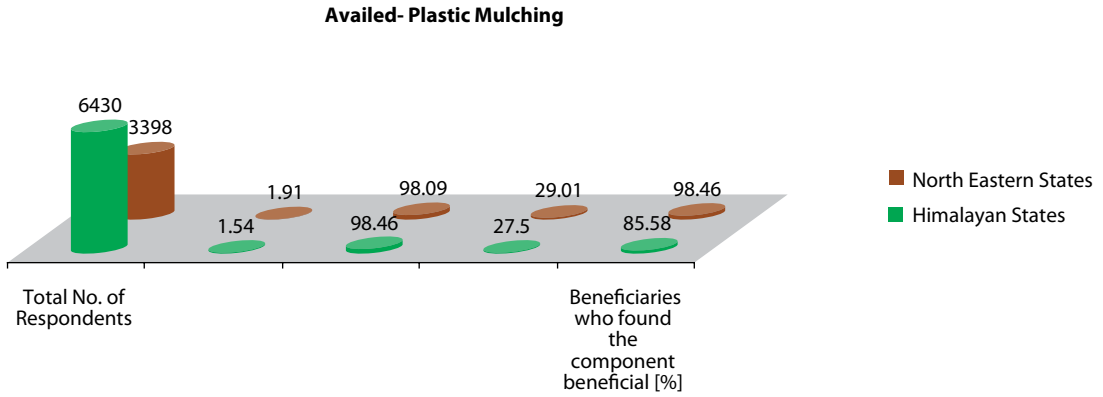
Plastic mulching is a technique to cover soil around the root zone of the plant with a plastic film It is an effective practice to restrict weed growth, conserve moisture and reduce the effect of soil borne diseases through soil solarization and one of the effective methods to modify soil temperature. Information has been collected to find out the use of plastic mulching under the programme and the same is consolidated in Table 5.32.

It may be observed from the table that only a fraction of the beneficiaries less than 2% has availed of Plastic Mulching component of the programme. A coverage of only small area of about 57 ha under Plastic Mulching had been reported. Some progress in this regard has been shown in the State of Manipur where the number of the respondents who chose use of Plastic Mulching was around 11% covering an area of about 30% of the total coverage by all the respondents.

Table 5.32 Details of the on farm component availed- plastic mulching

Name of the State	Total No. of Respondents	Component availed (%)		Area Covered [ha]	Beneficiaries who found the component beneficial [%]
		Yes	No		
North Eastern States					
Arunachal Pradesh	1238	0.08	99.92	6.00	0.00
Assam	1966	0.15	99.85	1.00	50.00
Manipur	675	10.52	89.48	17.00	90.14
Meghalaya	525	0.19	99.81	0.00	0.00
Mizoram	600	3.67	96.33	3.50	100.00
Nagaland	825	0.12	99.88	0.00	25.00
Tripura	300	0.00	100.00	0.00	NA
Sikkim	301	0.00	100.00	0.00	NA
Sub Total	**6430**	**1.54**	**98.46**	**27.50**	**85.58**
Himalayan States					
Himachal Pradesh	913	0.66	99.34	11.51	100.00
Jammu and Kashmir	1510	0.99	99.01	4.00	93.33
Uttarakhand	975	4.51	95.49	13.50	100.00
Sub Total	**3398**	**1.91**	**98.09**	**29.01**	**98.46**
Grand Total	**9828**	**1.67**	**98.33**	**56.51**	**90.53**

Figure 5.32 Details of the on farm component availed- plastic mulching



Uttarakhand and Mizoram are the other States with 5% and 4% of the sample farmers having availed of this component. In all the remaining States, the progress is still poorer. On the utility of this component, above 90% of the farmers availing this component from all the States taken together had indicated that the Plastic Mulching method was useful to them. However, a large to substantial majority of the farmers in the States of Arunachal Pradesh [100%], Meghalaya [100%] Nagaland [75%] and Assam [50%] do not see the Mulching component as beneficial to them.

Plastic Mulching is a useful method to regulate soil moisture conditions. It helps prevent soil water loss during dry period and sheds excessive water away from the crop root zone during periods of excessive rainfall and results into high productivity. It can also exert a distinct effect on weed control. Efforts are, therefore, required to popularize the use of Plastic Munching amongst the horticulture farmers. The farmers expressing dissatisfaction over the use of this component may not have proper training on the use of the Mulching Technology. The Extension Agencies of the States need to fill up this gap to popularize a large scale adoption of the mulching technology.

Greenhouse Technology

Greenhouse technology is used to protect the plants from the adverse climatic conditions. It provides the optimum growth conditions of light, temperature; humidity etc for the best growth of plant to achieve maximum yield and best quality. More and more need is felt to enlarge its scope in view of varied climatic conditions in the country. The following components under the Greenhouse/Protected technology have been availed of by the respondent farmers under the programme:

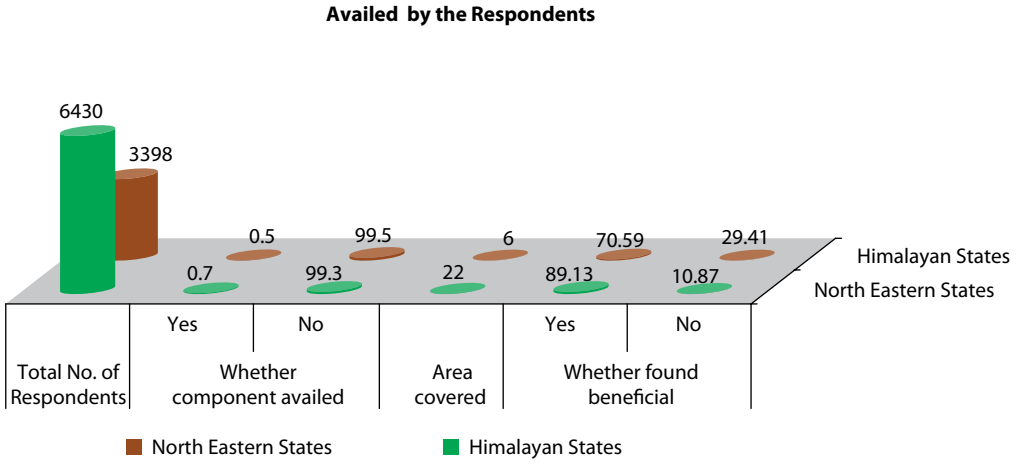
- Low Cost Tunnels
- Low Cost Greenhouse -100 sqm
- Low Cost Greenhouse - 500 sqm
- Low cost green house -1000 sqm
- Shade nets
- Anti hail nets

The detailed of the information collected from the respondents on the adoption and utility of the Greenhouse/Protected cultivation technology used by them under HMNEH are consolidated in Tables 5.33 to 5.40.

Table 5.33 Low cost tunnels component availed by the respondents

Name of the State	Total No. of Respon-dents	Whether component availed		Area covered [sqm]	Whether found beneficial	
		Yes	No		Yes	No
North Eastern States						
Arunachal Pradesh	1238	0.32	99.68	7	75.00	25.00
Assam	1966	0.00	100.00	0	-	-
Manipur	675	0.59	99.41	3	100.00	0.00
Meghalaya	525	0.38	99.62	1	50.00	50.00
Mizoram	600	3.83	96.17	10	91.30	8.70
Nagaland	825	1.09	98.91	1	90.00	10.00
Tripura	300	0.00	100.00	0	0.00	0.00
Sikkim	301	0.66	99.34	0	100.00	0.00
Sub Total	**6430**	**0.70**	**99.30**	**22**	**89.13**	**10.87**
Himalayan States						
Himachal Pradesh	913	0.00	100.00	0	0.00	0.00
Jammu and Kashmir	1510	0.20	99.80	1	33.33	66.67
Uttarakhand	975	1.44	98.56	5	78.57	21.43
Sub Total	**3398**	**0.50**	**99.50**	**6**	**70.59**	**29.41**
Grand Total	**9828**	**0.63**	**99.37**	**28**	**84.13**	**15.87**

Figure 5.33 Low cost tunnels component availed by the respondents



Of the total 9828 sample farmers, less than one percent [0.63%] of them have availed of Low Cost Tunnel component of the programme covering an area of 28 sq - 22 sqm in NER & 6 sqm in HSR. The highest number of farmers availing of Low Cost Tunnels component [3.83%] was in the State of Mizoram followed by Uttarakhand [1.44%] and Nagaland [1.09%] as per

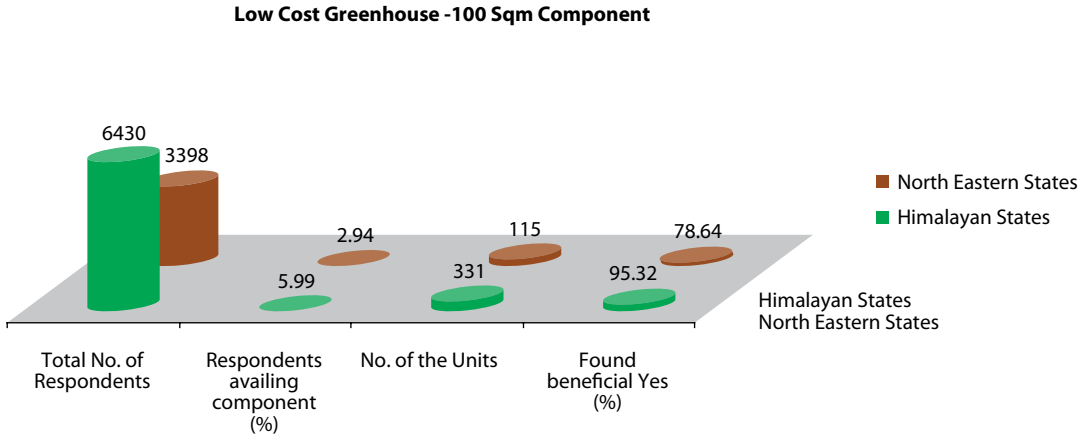
responses from the farmers. A vast majority of over 99% had not availed of this component. The State wise position is not much different. On the utility of the low cost tunnel technology, as many as 84% of the respondents availing of this component have stated that the technology was useful to them. Amongst the remaining 16% respondents not seeing any benefit from the technology, majority [67%] was from the State of J&K, followed by Meghalaya [50%], Arunachal Pradesh [25%], and Uttarakhand [21%].

Low tunnel is a small form of greenhouse to protect the plants from rains, winds, low temperature, frost and other vagaries of weather. It is a very simple structure requiring very limited skills to construct and maintain. A low tunnel helps in quick rising of the seedling. The low tunnel technology is suitable to the marginal and small farmers who may not be able to go for green houses. Its application, therefore, needs to be supported.

Table 5.34 Low cost greenhouse -100 sqm component availed by the respondents

Name of the State	Total no. of Respondents	Respondents availing component (%)	No. of the Units	Found beneficial Yes (%)
Arunachal Pradesh	1238	1.29	14	81.25
Assam	1966	0.0	0	50.00
Manipur	675	15.85	12	92.52
Meghalaya	525	18.10	106	98.95
Mizoram	600	6.33	52	92.11
Nagaland	825	0.24	2	100.00
Tripura	300	0.00	0	-
Sikkim	301	41.53	145	98.40
Sub Total	**6430**	**5.99**	**331**	**95.32**
Himachal Pradesh	913	1.10	1	70.00
Jammu and Kashmir	1510	4.37	64	87.88
Uttarakhand	975	2.46	50	59.26
Sub Total	**3398**	**2.94**	**115**	**78.64**
Grand Total	**9828**	**4.93**	**446**	**91.80**

Figure 5.34 Low cost greenhouse -100 sqm component availed by the respondents



About 5% of the total respondents only have availed of "Low cost/improved green house of size -100 sqm" component of the programme, setting up a total of 446 units. A good to reasonable number of the beneficiaries availing of this component was from the States of Sikkim [42%], Meghalaya [18%] and Manipur [16%]. The number of the farmers in the remaining States deriving benefit from this component, ranged from 0% in Tripura to 6% in Mizoram.

The State of Sikkim had the maximum share of about 33% followed by Meghalaya with 24% and J&K with 14% of the total programme of this component availed of by the respondents. The combined share of these three States was of the order of 71%. The other two states with around 11% share of each were Mizoram and Uttarakhand.

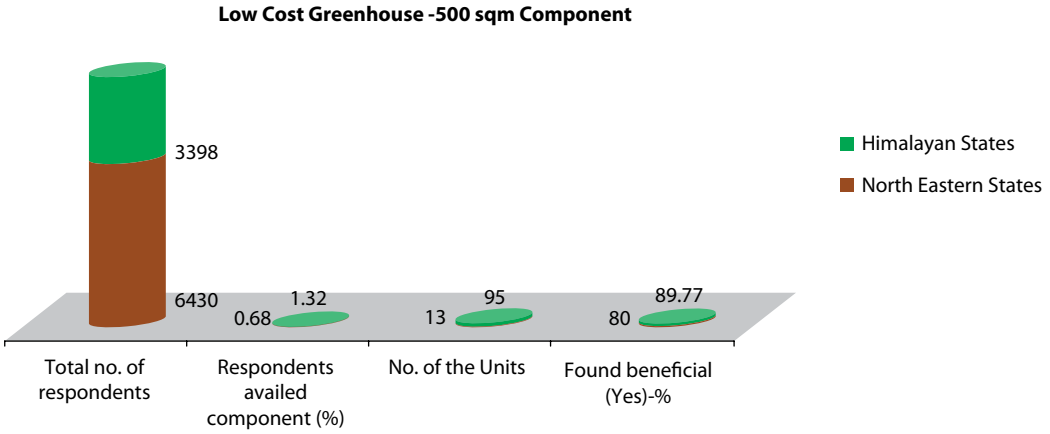
A very large majority of about 92% of the respondents availing of this component had found the technology as useful to them. Amongst the remaining 8% not satisfied with the utility of the green house technology, substantial number was from the States of Assam [50%], followed by Uttarakhand [41%], Himachal Pradesh [30%] and Arunachal Pradesh [19%].

In the "Low cost/improved green house of size - 500 sqm" category, only about 1% of the total sample farmers had availed of this component. The State-wise position was not much different. A total of 108 units had been set up by 1% beneficiaries of this component in all the States. The maximum 52 Units [30%] have been set up in the State of Manipur followed by 28 [26%] in Sikkim and 14 [13%] in Arunachal Pradesh. These three States had as much as 69% share in the total units set up by the respondents, Meghalaya and Mizoram were the other two States with share of 10% in this programme.

Table 5.35 Low cost greenhouse - 500 sqm component availed by the respondents

Name of the State	Total No. of respondents	Respondents availed component (%)	No. of the Units	Found beneficial (Yes)-%
North Eastern States				
Arunachal Pradesh	1238	1.13	14	92.86
Assam	1966	0.00	0	-
Manipur	675	4.44	32	100.00
Meghalaya	525	1.52	10	37.50
Mizoram	600	1.67	11	81.82
Nagaland	825	0.00	0	-
Tripura	300	0.00	0	-
Sikkim	301	7.64	28	100.00
Sub Total	**6430**	**1.32**	**95**	**89.77**
Himalayan States				
Himachal Pradesh	913	0.22	2	33.33
Jammu and Kashmir	1510	0.40	6	71.43
Uttarakhand	975	0.30	5	93.33
Sub Total	**3398**	**0.68**	**13**	**80.00**
Grand Total	**9828**	**1.10**	**108**	**87.61**

Figure 5.35 Low cost greenhouse - 500 sqm component availed by the respondents



Of the beneficiaries availing of this component, 88% had expressed their satisfaction over the use of the technology. Amongst the 12% of the beneficiaries reporting that the technology was not useful to them, majority to a substantial number were from the States of Himachal Pradesh [67%], Meghalaya [63%] and J&K [29%].

Table 5.36 Low cost greenhouse -1000 sqm component availed by the respondents

Name of the State	Total No. of respondents	Component availed (%)		No. of the Unit(s)	Found beneficial (%)	
		Yes	No		Yes	No
North Eastern States						
Arunachal Pradesh	1238	0.24	99.76	8	66.67	33.33
Assam	1966	0.05	99.95	1	0	100
Manipur	675	0.44	99.56	3	100	0
Meghalaya	525	0.38	99.62	2	100	0
Mizoram	600	0.67	99.33	5	100	0
Nagaland	825	0	100	0	0	0
Tripura	300	0	100	0	0	0
Sikkim	301	1	99	3	100	0
Sub Total	**6430**	**0.25**	**99.75**	**22**	**82.35**	**17.65**
Himalayan States						
Himachal Pradesh	913	0.88	99.12	8	75	25
Jammu and Kashmir	1510	0.07	99.93	1	0	100
Uttarakhand	975	0.51	99.49	5	66.67	33.33
Sub Total	**3398**	**0.41**	**99.59**	**14**	**66.67**	**33.33**
Grand Total	**9828**	**0.31**	**99.69**	**36**	**75**	**25**

Figure 5.36.1 Low cost greenhouse -1000 sqm component availed by the respondents

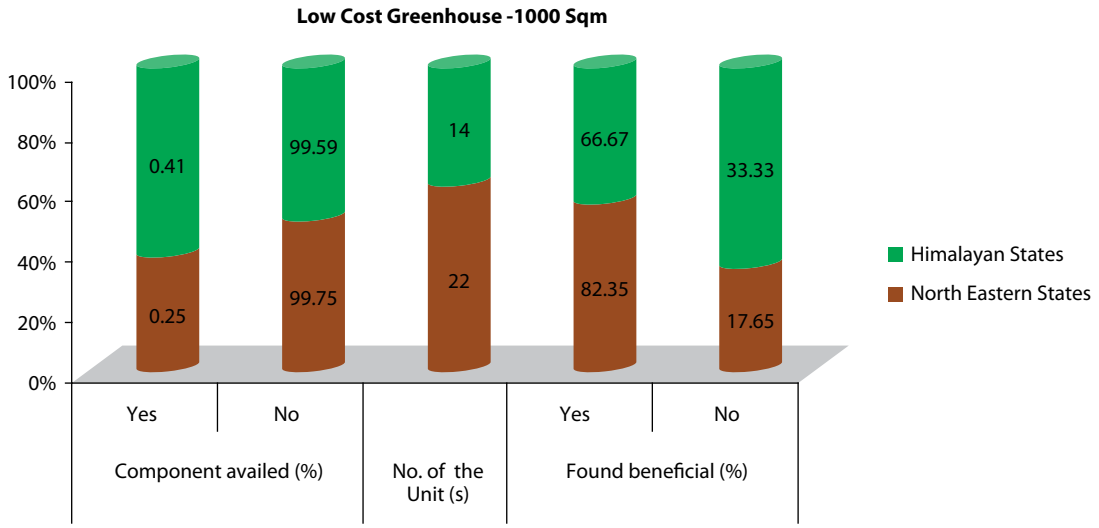
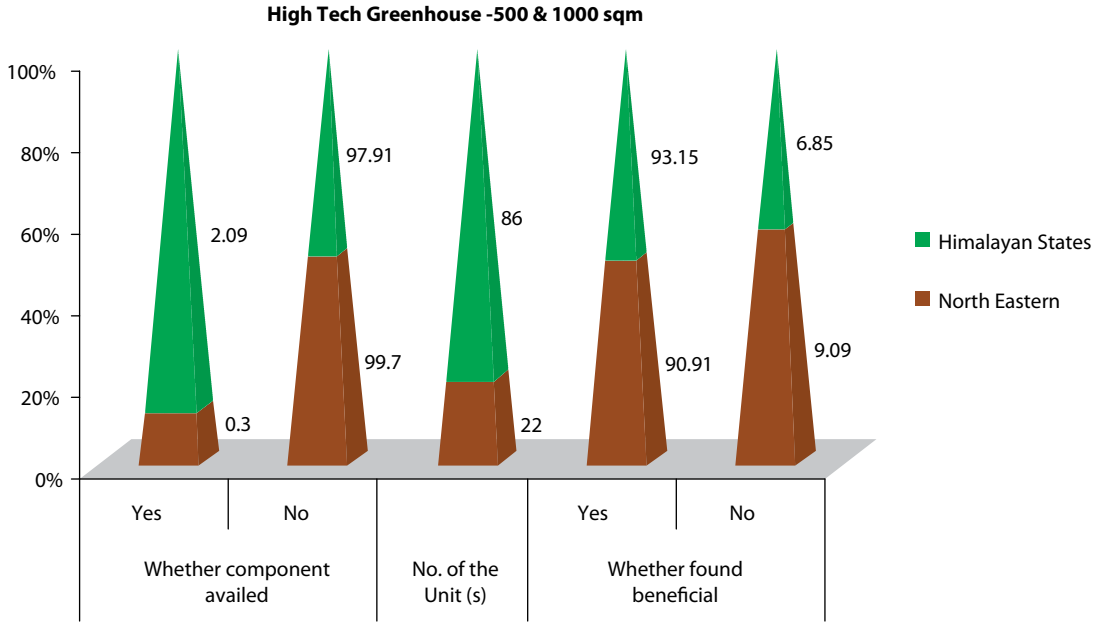


Figure 5.36.2 Low cost greenhouse -1000 sqm component availed by the respondents



In the category of "Low Cost/Improved Greenhouse of size-1000 sqm the beneficiaries were less than 1% [0.31%]; the State-wise position being more or less similar. A total of 36 units only had been set up in all the 11 States by the respondents availing this component. The major share of about 58% in setting up of improved green house of 1000 sqm was of Arunachal Pradesh and Himachal Pradesh [8 No. 22% each] and Mizoram [5 No. 14%].

A majority of 75% of the respondents availing of this component had found the technology beneficial to them. All the beneficiaries in the State of Assam and J&K, and a sizeable number of

33% of them each from the States of Arunachal & Uttarakhand and 25% from Himachal Pradesh fell in the second category of 25% indicating that the technology was not useful to them.

The position reported under this sub-head, "High Tech Greenhouses of size-1000 sqm" technology was the same as in the case of reported in 500 sqm green house to have been adopted by 0.92% of the respondents. The State of Himachal Pradesh had the largest share of setting up of 78 [72%] of such units. Manipur was the next State having set up 10 [9%] of High Tech Greenhouses of size-1000 sqm" The progress in this regard was slow in all the remaining States.

The technology had been found to be useful by as many as 93% of the respondents availing of this component of the programme. Of the 7% of the farmers indicting their non - satisfaction on the use of High Tech Greenhouses of size-500 and 1000 sqm., Nagaland with 67% response was at the top and J&K with 50% the next State in that order.

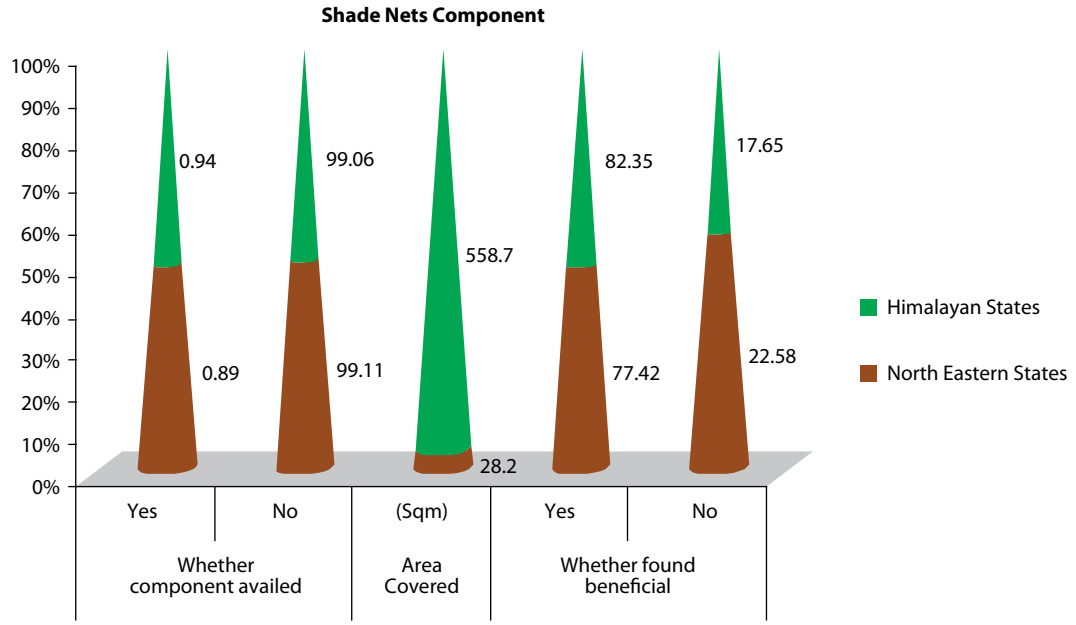
Shade nets are used to provide relief to the plants from the scorching sunlight, high winds, direct rainfall as well as from insects and pests. Shading nets are being used for various purposes such as raising nursery, indoor plants, hardening of tissue cultured platelets and growing of vegetables.

Only a fraction of less than 1% [0.91%], of the total respondents had reported use of Shade Nets on their farms. The inter State position being 0% in Assam & Meghalaya to the maximum of 4% in Mizoram. A total of 586 sqm area only had been covered under shade nets as reported by the beneficiaries of this sub component. Maximum area coverage of 502 sqm [86%] under shade nets, was in one State i.e., Himachal Pradesh. The State of Uttarakhand

Table 5.37 Shade nets component availed by the respondents

Name of the State	Total No. of Respon-dents	Whether component availed		Area Covered	Whether found beneficial	
		Yes	No	[sqm]	Yes	No
North Eastern States						
Arunachal Pradesh	1238	0	100	0	0	0
Assam	1966	0	100	0	0	0
Manipur	675	1.63	98.37	1	60	40
Meghalaya	525	0	100	0	0	0
Mizoram	600	4.33	95.67	23.2	100	0
Nagaland	825	0.85	99.15	4	37.5	62.5
Tripura	300	1	99	0	0	100
Sikkim	301	3.32	96.68	0	100	0
Sub Total	**6430**	**0.89**	**99.11**	**28.2**	**77.42**	**22.58**
Himalayan States						
Himachal Pradesh	913	1.2	98.8	501.7	75	25
Jammu and Kashmir	1510	0.26	99.74	10	75	25
Uttarakhand	975	1.74	98.26	47	88.89	11.11
Sub Total	**3398**	**0.94**	**99.06**	**558.7**	**82.35**	**17.65**
Grand Total	**9828**	**0.91**	**99.09**	**586.9**	**79.17**	**20.83**

Figure 5.37 Shade nets component availed by the respondents



and Mizoram had set up units covering 8% and 4% of the area. There was either no progress or a low progress in respect of the other States.

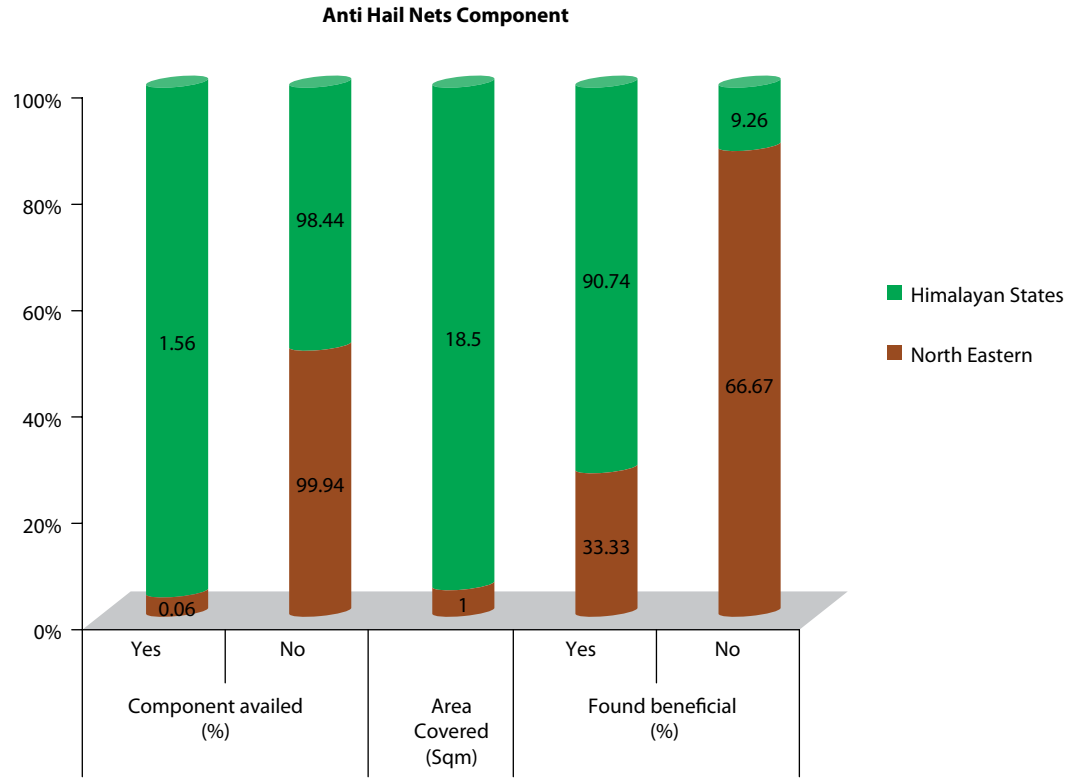
As many as 79% of the concerned beneficiaries had expressed their satisfaction on the use of shade net technology, while 21% did not find the technology useful to them. Majority to sizeable number of the beneficiaries using shade nets but not finding the same as useful was from the States of Tripura[100%], Nagaland [63%], Manipur [40%] and Himachal Pradesh & J&K [25% each].

Table 5.38 Anti hail nets component availed by the respondents

Name of the State	Total no. of respon-dents	Component availed (%)		Area Covered (sqm)	Found beneficial (%)	
		Yes	No		Yes	No
North Eastern States						
Arunachal Pradesh	1238	0	100	0	0	0
Assam	1966	0	100	0	0	0
Manipur	675	0	100	0	0	0
Meghalaya	525	0.19	99.81	1	100	0
Mizoram	600	0.17	99.83	0	100	0
Nagaland	825	0.12	99.88	0	0	100
Tripura	300	0	100	0	0	100
Sikkim	301	0.33	99.67	0	100	0
Sub Total	**6430**	**0.06**	**99.94**	**1**	**33.33**	**66.67**

Name of the State	Total no. of respon-dents	Component availed (%)		Area Covered (sqm)	Found beneficial (%)	
		Yes	No		Yes	No
Himalayan States						
Himachal Pradesh	913	0.77	99.23	6	100	0
Jammu and Kashmir	1510	0.2	99.8	0	100	0
Uttarakhand	975	4.41	95.59	12.5	88.64	11.36
Sub Total	**3398**	**1.56**	**98.44**	**18.5**	**90.74**	**9.26**
Grand Total	**9828**	**0.58**	**99.42**	**19.5**	**82.54**	**17.46**

Figure 5.38 Anti hail nets component availed by the respondents



Anti Hail Nets are very useful in the hail prone areas to protect the plants. This technology has been used by a very small number of the respondents [0.58%] covering a small area of about 20 sqm. In this the major share of 12.50 sqm [64%] was of the State of J&K followed by 6 sqm [31%] of the State of Himachal Pradesh. These two States occupy 95% of the total area covered by the respondents under Anti Hail Nets component of the programme. There is no reporting on the use of such technology from the four States of Arunachal Pradesh, Assam, Manipur and Tripura. In the remaining seven States, Uttarakhand had the maximum share of about 4% and Nagaland the minimum of 0.12%. About 83% of the beneficiaries of this component had reported the technology as useful to them. The remaining 17% - all from Nagaland and Tripura and 11% from Uttarakhand had stated that the use of anti hail net was not found beneficial by them.

In sum, the Greenhouse Technology/Protected Cultivation of Horticulture crops have not taken off as yet. Except Low Cost/Improved Greenhouse of 100 sqm where the availing

level is of the order of 5%, the expansion under the other sub components such as Low cost Greenhouses of bigger sizes, High Tech Greenhouses of different sizes, Shade Nets and Anti Hail Nets, is below 1%. The technology has, however, been found to be beneficial by a large majority of the farmers using the same. This indicates that there is a good potential for wide scale adoption of the Greenhouse/Protective cultivation practices in the area. It may, however, be necessary to take into consideration the effect of the local climate while selecting the technology for different locations.

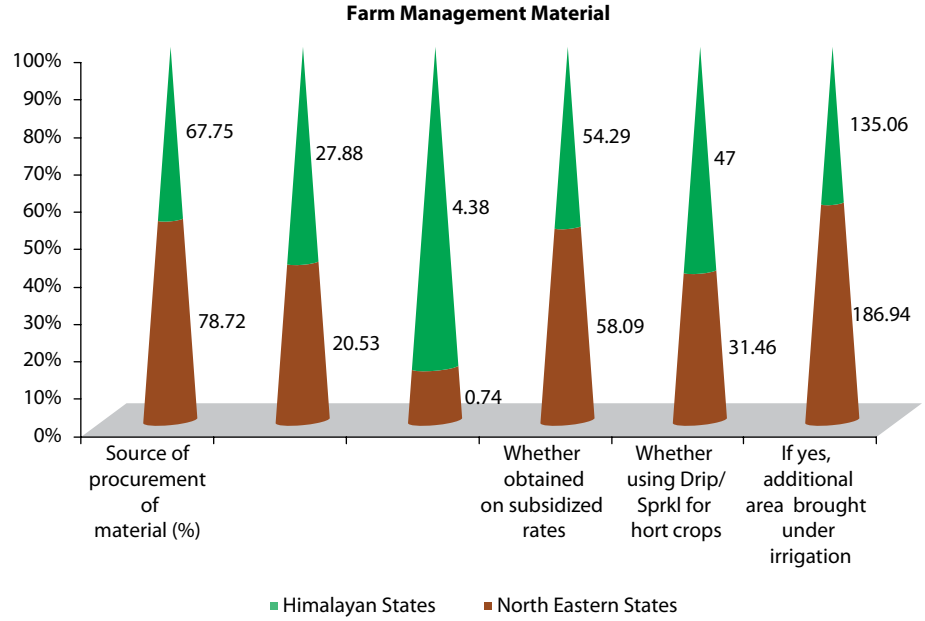
Procurement of Farm Management Material

The easy availability of the material and equipments at reasonable rates as the technical advice to the beneficiary farmers is a crucial factor to popularize On-Farm Management. The respondents were enquired of the source of procurement of material, whether obtained on subsidized rates and also the use of the drip and sprinkler irrigation system on their farms and the additional area brought under horticulture crop/s as a result of on farm management adoption. The information gathered is collated in Table 5.39.

Table 5.39 Procurement and utility of on farm management material

States	Actual no. of respondents availed farm management component	Source of procurement of material (%)			Whether obtained on subsidized rates	Whether using Drip/ Sprkl for hort crops	If yes, additional area brought under irrigation
		Govt. Deptt.	SAUs/Research Institutions	Others [Private/ coop]	Yes [%]	Yes [%]	[ha]
North Eastern States							
Arunachal Pradesh	89	94.38	5.62	0.00	64.04	38.2	5.46
Assam	41	63.41	29.27	7.32	70.73	19.51	2.39
Manipur	208	56.25	43.27	0.48	42.31	16.83	0.93
Meghalaya	164	94.51	4.88	0.61	40.24	62.2	48.58
Mizoram	182	86.81	12.19	1.10	86.26	50	26.18
Nagaland	76	90.79	9.21	0.00	31.58	7.79	1.67
Tripura	16	62.5	37.5	0.00	62.5	50	100
Sikkim	164	73.78	26.22	0.00	70.12	7.32	1.73
Sub Total	**940**	**78.72**	**20.53**	**0.74**	**58.09**	**31.46**	**186.94**
Himalayan States							
Himachal Pradesh	314	71.34	21.97	6.69	45.86	70.06	112.91
Jammu and Kashmir	98	37.76	56.12	6.12	37.76	5.1	3.00
Uttarakhand	205	76.59	23.41	0.00	75.12	31.71	19.15
Sub Total	**617**	**67.75**	**27.88**	**4.38**	**54.29**	**47**	**135.06**
Grand Total	**1557**	**74.37**	**23.44**	**2.18**	**56.58**	**37.61**	**322.00**

Figure 5.39 Procurement and utility of on farm management material



As many as 1557 [16%] of the total sample of 9828 farmers adopting 'on farm management' have responded. Of them 940 [60%] were from NE States and 617 [40%] from Himalayan States. There are two major sources for supply of material reported. About 74% of the respondents have reported the procurement of the material through Government Department and 23% from SAU and Research Institutes. About 2% have indicated other sources like private societies and private agencies.

In the NE States, the respondents indicating supply through the Government Departments constitute 79% and in Himalayan states, the corresponding figure is 68%. A majority of the respondents above 60% in all the States, except J&K have indicated the Government Departments as the primary and major source of obtaining the materials being used by them for "On-Farm Management" operations. In J&K, 56% of the respondents had indicated their primary source for procurement of such material as SAU and Research Institutes. The information obtained in this regard indicates that the interventions and support of the State Agencies including SAUs and Research Institutes have a great role in popularizing the concept of "On-Farm Management".

Taken all the 11 States together, majority of 57% [58% in NER and 54% in HSR] are reported to have obtained for on farm material on subsidized rates. As regards distribution of subsidy, in six of the States viz. Mizoram [86%], Uttarakhand [75%], Assam [71%] Sikkim [70%], and Arunachal [64%] a large majority has reported availability of the subsidy for purchase of the on farm management material and equipment. On the other hand the majority of the respondents in the remaining 5 States namely: Nagaland [68%], J&K [62.24%], Meghalaya [60%], Manipur [58%] and Himachal Pradesh [54%], have said that the material has not been obtained by them on any subsidized rate.

About 38% of 1557 respondents reporting adoption of farm management practice have indicated use of sprinkler/drip irrigation system for horticulture crops being grown by them

[32% in NER & 47% in HSR]. The highest percentage of such farmers was from Himachal Pradesh [70%], followed by Meghalaya [62%], Arunachal Pradesh [38%] and Uttarakhand 32%. In other States the number of the respondents following the on farm management practice was not significant.

With the use of Micro Irrigation System - Drip and Sprinkler, the beneficiaries of the programme had been able to bring additional acreage of about 322 ha – 187 ha [58%] in NER & 135 ha [42%] in HSR, under irrigation to increase production and productivity of horticulture crops. The maximum area of additional 113 ha [35%] acreage brought under irrigation was in the State of Himachal Pradesh, followed by 100 ha [31%] in Tripura and 49 ha [15%] in Meghalaya. These three States together shared 81% of the total programme of Micro Irrigation System undertaken by the respondents.

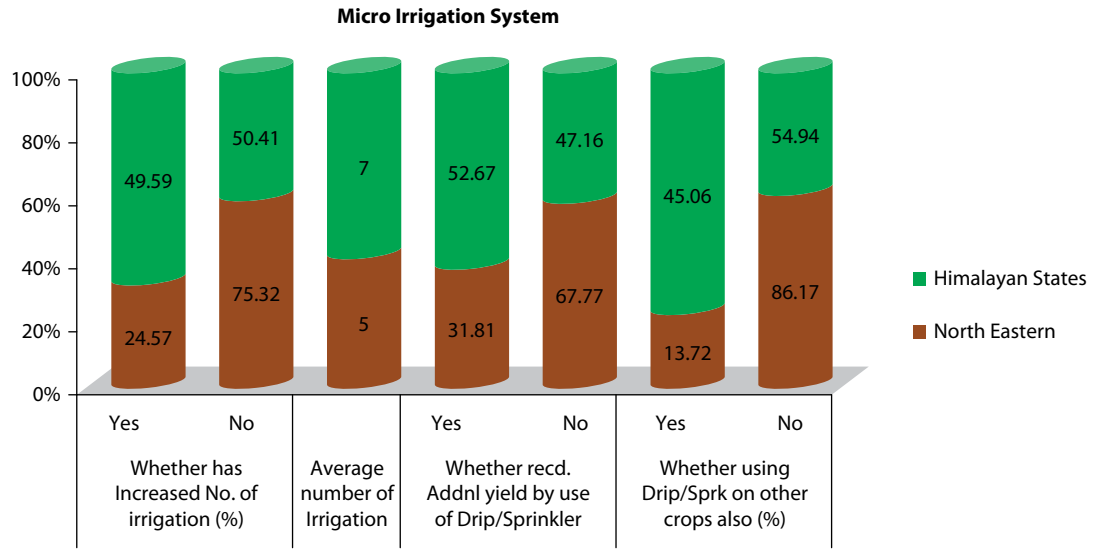
Utility of Micro Irrigation System

Availability of water is very critical to the agriculture production In the "On-Farm Management" practice, great stress is laid on the economical and judicious use of scarce water. The respondents were therefore, asked to indicate as to the additional number of irrigations increased by them on use of micro irrigation to ascertain as to how they were using the water judiciously and economically. The response received from the farmers on the utility of the Micro Irrigation System adopted by them, is shown in Table 5.40.

Table 5.40 Increase in irrigation on account of adoption of micro irrigation system

States	Total Sample	Whether has Increased No. of irrigation (%)		Average number of Irrigation increased	Whether recd. Addl yield by use of Drip/Sprinkler (%)		Whether using Drip/Sprk on other crops also (%)	
		Yes	No		Yes	No	Yes	No
North Eastern States								
Arunachal Pradesh	89	30.34	69.66	2	39.33	60.67	28.09	71.91
Assam	41	12.2	87.8	4	21.95	78.05	29.27	70.73
Manipur	208	9.62	89.9	3	30.29	69.71	10.1	89.42
Meghalaya	164	50	50	9	28.66	71.34	9.15	90.85
Mizoram	182	17.58	82.42	2	20.33	79.67	9.34	90.66
Nagaland	76	28.95	71.05	1	26.32	73.68	38.16	61.84
Tripura	16	50	50	1	56.25	43.75	50	50
Sikkim	164	21.34	78.66	2	48.17	49.39	1.22	98.78
Sub Total	**940**	**24.57**	**75.32**	**5**	**31.81**	**67.77**	**13.72**	**86.17**
Himalayan States								
Himachal Pradesh	314	72.61	27.39	8	72.61	27.07	63.38	36.62
Jammu & Kashmir	98	3.06	96.94	4	16.33	83.67	6.12	93.88
Uttarakhand	205	36.59	63.41	2	39.51	60.49	35.61	64.39
Sub Total	**617**	**49.59**	**50.41**	**7**	**52.67**	**47.16**	**45.06**	**54.94**
Grand Total	**1557**	**34.49**	**65.45**	**6**	**40.08**	**59.6**	**26.14**	**73.8**

Figure 5.40 Increase in irrigation on account of adoption of micro irrigation system



Of all the 1557 respondents who had installed sprinkler/drip irrigation system on their farms, only about 35% of them had answered increase in irrigation to the crops which worked out to 6 number on an average basis. The maximum number of increased irrigations of 9 after the use of micro irrigation system, has been reported from the State of Meghalaya closely followed by 8 in Himachal Pradesh. In other States, the increase in irrigation ranges from 1 time to 4 times.

A majority of 65% of the respondents, however, did not indicate any addition in the number of irrigations from the system. A very large majority in the latter category was from the State of Manipur [90%], Assam [88%], Mizoram [82%], Sikkim [79%] Nagaland [71%] and Arunachal Pradesh [70%] in NER. In HSR, about 96% of the farmers from J&K and 65% from Uttarakhand had reported no increase in irrigation with Sprinkler/drip irrigation system.

A majority of 60% of the respondent [68% from NER and 47% from HSR], also reported no additional yield with this irrigation system. A large majority of 74% of the respondents [86% in NER & 55% in HSR], were using sprinkler/drip system only for horticulture crops being grown by them. The remaining about 26%, have reported the use of this irrigation system also to other crops being grown by them. The State of Himachal Pradesh had the maximum of 63% of such responses, followed by Nagaland (38%) and Uttarakhand (36%).

Technical Support

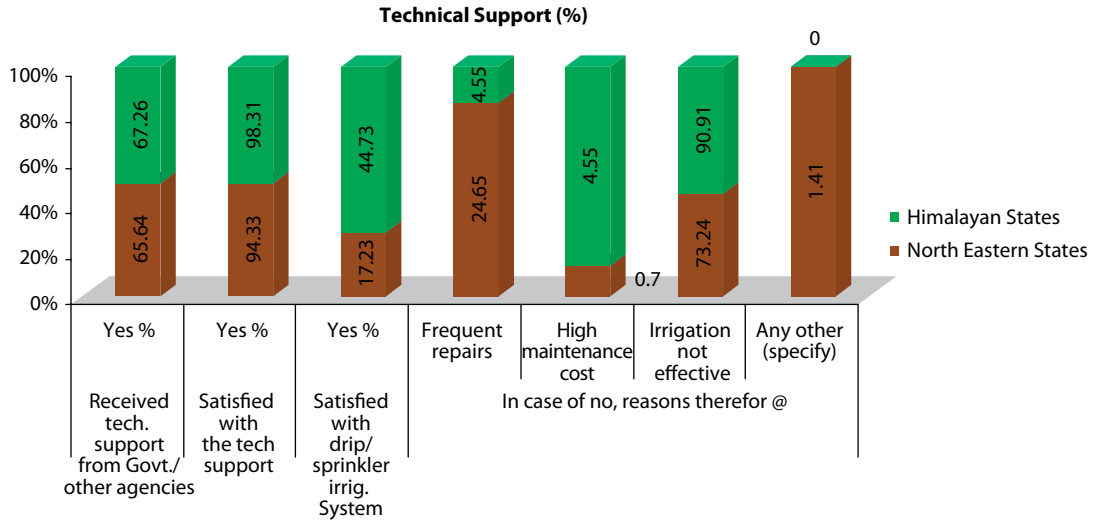
The extension has a key role to play in the transfer of technology from lab to land. The respondents were asked to indicate the type of the extension support they had been getting from different agencies. The replies received from them are consolidated in Table 5.41.

In regard to the support from the State/Extension Agencies on the "On-farm Management", as many as 1032 [66%] of the total respondents under this category, have given affirmative answers. A large majority ranging from 63% in Tripura to 89% in Nagaland, have reported

Table 5.41 Availability of technical support and satisfaction level (%)

State	Yes (%)			In case of no, reasons therefor @ (%)			
	Received tech. support from Govt./ Other agencies	Satisfied with the tech support received	Satisfied with drip/ sprinkler irrig. System for hort. Crops	Frequent repairs	High main-tenance cost	Irriga-tion not effective	Any other (specify)
North Eastern States							
Arunachal Pradesh	84.27	97.33	21.35	46.67	6.67	46.67	0
Assam	63.41	100	17.07	0	0	100	0
Manipur	46.63	93.81	13.94	0	0	100	0
Meghalaya	43.29	80.28	14.02	2.5	0	96.25	1.25
Mizoram	90.66	95.15	34.62	92.86	0	3.57	3.57
Nagaland	89.47	98.53	7.89	0	0	100	0
Tripura	62.5	100	50	0	0	0	0
Sikkim	64.02	96.19	4.27	0	0	100	0
Sub Total	**65.64**	**94.33**	**17.23**	**24.65**	**0.7**	**73.24**	**1.41**
Himalayan States							
Himachal Pradesh	78.66	99.19	67.83	14.29	0	85.71	0
Jammu & Kashmir	31.63	93.55	4.08	0	0	100	0
Uttarakhand	66.83	97.81	28.78	0	7.14	92.86	0
Sub Total	**67.26**	**98.31**	**44.73**	**4.55**	**4.55**	**90.91**	**0**
Grand Total	**66.28**	**95.93**	**28.13**	**21.95**	**1.22**	**75.61**	**1.22**

Figure 5.41 Availability of technical support and satisfaction level (%)



receipt of technical support from the State/other Extension Agencies, from all the States excepting J&K, Meghalaya and Manipur, where majority of the respondents [J&K - 68%, Meghalaya – 57% & Manipur - 53%], has denied availability of any such support and advice.

Of the respondents acknowledging the availability of technical support from the Extension Agencies, 96% have expressed their satisfaction on the support and only an insignificant minority of 4% has showed its dissatisfaction with the quality of the technical support. About 75% of the total 586 farmers [Table 5.41] responding to the use of sprinkler irrigation system, expressed their satisfaction for use of the system for horticulture crops. The remaining 25% of the respondents were dissatisfied with the use of the micro irrigation system by various reasons such as: system being costly, equipments need frequent repairs with high cost, irrigation not effective etc.

Production of Planting Material/Setting up of Nurseries

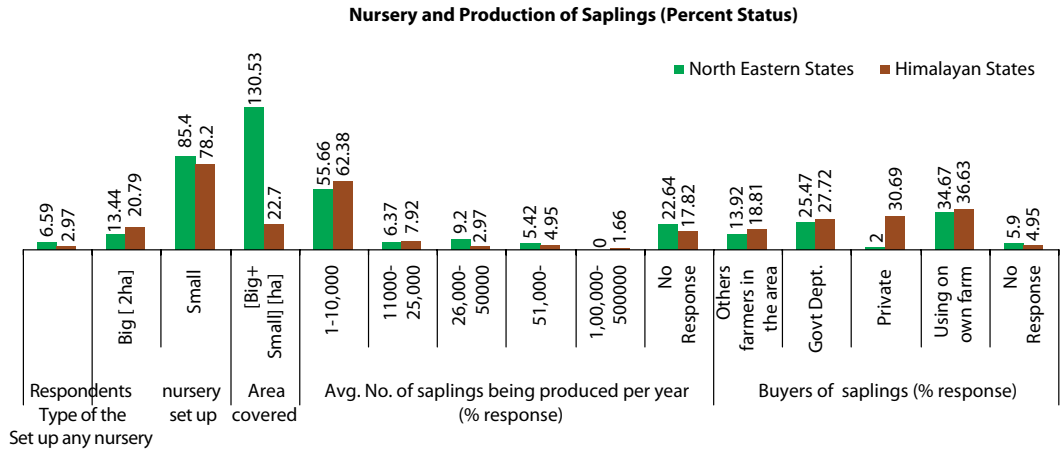
Supply of quality seed and planting material is very essential to ensure better production and productivity of horticulture crops. To ascertain the infrastructure of the planting material being produced at the level of the farmers themselves under the programme, information on the setting up of the nurseries and their production. The replies received from the respondents are consolidated in Tables 5.42.

In all, about 525 [5.34% of the total sample] respondents have reported setting of Nurseries by them. The Nurseries are scattered over different patches of all the States in small numbers. Out of the total 525 nurseries established, as many as 79 [15%] are big [above 1 ha] and the

Table 5.42 Information on setting up of nursery and production of saplings (percent status)

States	Respondents Set up any Nursery[%]	Type of the nursery set up [%]		Area covered [Big+ Small] [ha]
		Big [2ha]	Small [1 ha]	
North Eastern States				
Arunachal Pradesh	2.67	21.21	78.8	1.18
Assam	8.34	21.34	77.4	1.59
Manipur	7.41	10.00	84	31.03
Meghalaya	5.33	21.43	78.6	11.12
Mizoram	13.00	2.56	97.4	83.83
Nagaland	0.97	25.00	75	0.81
Tripura	5.33	0	100	0.37
Sikkim	15.61	0	100	0.60
Sub Total	**6.59**	**13.44**	**85.4**	**130.53**
Himalayan States				
Himachal Pradesh	5.91	14.81	85.2	46.00
Jammu & Kashmir	2.25	23.53	73.5	12.93
Uttarakhand	1.33	38.46	61.5	5.17
Sub Total	**2.97**	**20.79**	**78.2**	**22.7**
Grand Total	**5.34**	**14.86**	**84**	**194.63**

Figure 5.42 Information on setting up of nursery and production of saplings (percent status)



remaining 446 [85%] are small [up to 1 ha]. The maximum numbers of big Nurseries i.e. 35 have been set up in the State of Assam. No big nursery has been set up in the States of Tripura and Sikkim. In the remaining States, the number of such big nurseries ranges from 2 to 8. The highest number of small Nurseries – 129 [29%] again was found in Assam, followed by: Mizoram -76 [17%], Sikkim – 47 [11%] and Himachal Pradesh - 46 [10%]. These four States have about two third share in the total number of the small nurseries set up under the programme. In the remaining States the number of Nurseries set up is not much.

The total area covered by these nurseries is 195 ha. The maximum area coverage of 83 ha is in the State of Mizoram followed by Himachal Pradesh [46 ha]. In relative terms, the highest number of the sample respondents [16%] who had set up nurseries was from the State of Sikkim and the lowest about 1% from Uttarakhand.

The respondents were also asked to indicate the average no. of samplings being produced in the nurseries set up by them under the programme and the information supplied by them is collated in Table 5.43.

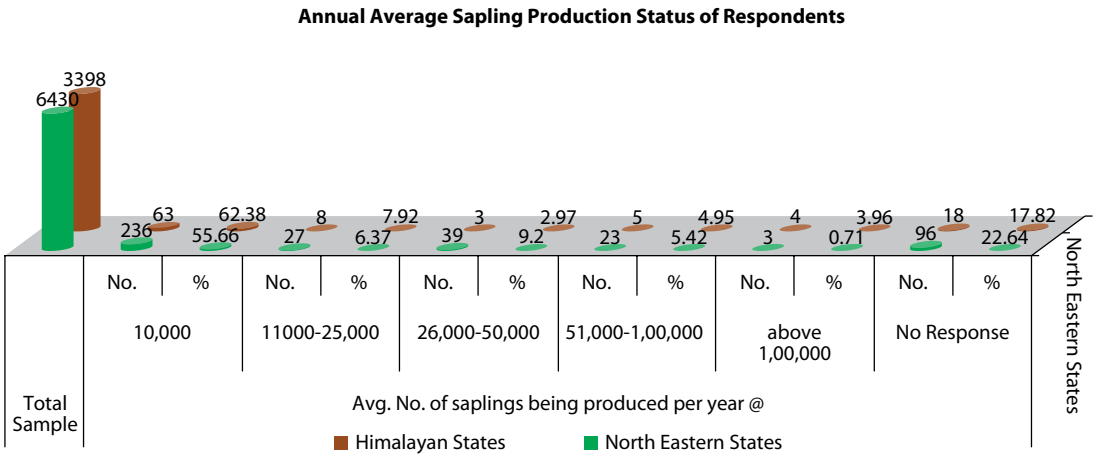
Table 5.43 Annual average sapling production status of respondents

States	Total Sample	Avg. No. of saplings being produced per year @											
		1		2		3		4		5		No Response	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
North Eastern States													
Arunachal Pradesh	1238	22	66.67	2	6.06	3	9.09	2	6.06	0	0	4	12.12
Assam	1966	87	53.05	5	3.05	3	1.83	1	0.61	1	0.61	67	40.85
Manipur	675	14	28	7	14	11	22	11	22	2	4	5	10
Meghalaya	525	16	57.14	1	3.57	1	3.57	0	0	0	0	10	35.71
Mizoram	600	53	67.95	10	12.82	6	7.69	0	0	0	0	9	11.54
Nagaland	825	4	50	0	0	2	25	2	25	0	0	0	0

States	Total Sam-ple	Avg. No. of saplings being produced per year @											
		1		2		3		4		5		No Response	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Tripura	300	9	56.25	1	6.25	1	6.25	5	31.25	0	0	0	0
Sikkim	301	31	65.96	1	2.13	12	25.53	2	4.26	0	0	1	2.13
Sub Total	**6430**	**236**	**55.66**	**27**	**6.37**	**39**	**9.2**	**23**	**5.42**	**3**	**0.71**	**96**	**22.64**
Himalayan States													
Himachal Pradesh	913	36	66.67	4	7.41	2	3.7	3	5.56	2	3.7	7	12.96
Jammu and Kashmir	1510	19	55.88	3	8.82	0	0	1	2.94	0	0	11	32.35
Uttarakhand	975	8	61.54	1	7.69	1	7.69	1	7.69	2	15.4	0	0
Sub Total	**3398**	**63**	**62.38**	**8**	**7.92**	**3**	**2.97**	**5**	**4.95**	**4**	**3.96**	**18**	**17.82**
Grand Total	**9828**	**299**	**56.95**	**35**	**6.67**	**42**	**8**	**28**	**5.33**	**7**	**1.33**	**114**	**21.71**

@ [Code 1-10,000-1, 11000-25,000-2, 26,000-50,000-3, 51,000-1, 00,000 -4 and above 1, 00,000- 5]

Figure 5.43 Annual average sapling production status of respondents



The majority of the Nurseries 299 [57%] were, on an average, producing saplings up to 10,000 per year, 35 [7%] - above 10,000 to 25000, 42 [8%] above 25, 000-50,000, 28 [5%] above 50,000- 1,00,000 and only 1 above 1 lakh. The total estimated average production of the saplings in all these Nurseries would be around 175 lakh taking mean figure in each production category.

With a view to knowing the contribution of the Nursery raising farmers, in the field of supply of quality planting material, information on the average number of the saplings being sold by them, along with information about the method of nursery growing and herbal garden, if any, has been collected and collated in Table 5.44.

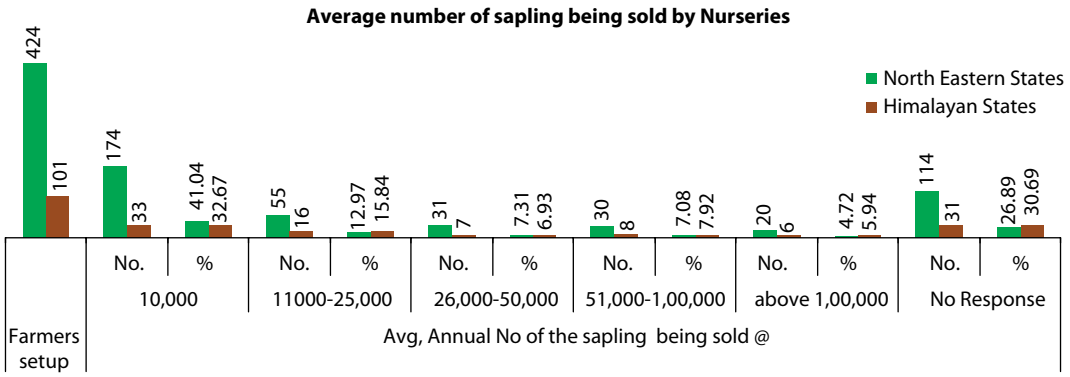
About 39% of the total 525 farmers who had established Nurseries, have reported annual sale of planting material produced by them in their Nurseries, up to 10,000, 14%- above

Table 5.44 Average number of saplings being sold by Nurseries

States	Farmers setup Nursery	Avg, Annual No. of the sapling being sold @											
		1		2		3		4		5		No Response	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
North Eastern States													
Arunachal Pradesh	33	2	6.06	0	0	1	3.03	3	9.09	3	9.09	24	72.73
Assam	164	66	40.24	27	16.46	1	0.61	5	3.05	9	5.49	56	34.15
Manipur	50	20	40	12	24	7	14	4	8	3	6	4	8
Meghalaya	28	16	57.14	2	7.14	1	3.57	0	0	2	7.14	7	25
Mizoram	78	33	42.31	12	15.38	10	12.82	1	1.28	0	0	22	28.21
Nagaland	8	3	37.5	0	0	0	0	3	37.5	1	12.5	1	12.5
Tripura	16	9	56.25	1	6.25	2	12.5	2	12.5	2	12.5	0	0
Sikkim	47	25	53.19	1	2.13	9	19.15	12	25.53	0	0	0	0
Sub Total	**424**	**174**	**41.04**	**55**	**12.97**	**31**	**7.31**	**30**	**7.08**	**20**	**4.72**	**114**	**26.89**
Himalayan States													
Himachal Pradesh	54	16	29.63	3	5.56	1	1.85	7	12.96	4	7.41	23	42.59
Jammu and Kashmir	34	13	38.24	7	20.59	5	14.71	1	2.94	1	2.94	7	20.59
Uttarakhand	13	4	30.77	6	46.15	1	7.69	0	0	1	7.69	1	7.69
Sub Total	**101**	**33**	**32.67**	**16**	**15.84**	**7**	**6.93**	**8**	**7.92**	**6**	**5.94**	**31**	**30.69**
Grand Total	**525**	**207**	**39.43**	**71**	**13.52**	**38**	**7.24**	**38**	**7.24**	**26**	**4.95**	**145**	**27.62**

@ [Code 1-10,000-1, 11000-25,000-2, 26,000-50,000-3, 51,000-1, 00,000-4 and above 1, 00,000-5]

Figure 5.44 Average number of saplings being sold by nurseries



10,000 to 25,000- 7% each above 25,000 to 50,0000 & 50000 to 1,00,000 and 5% above 1,00,000. About 28% of the farmers had not given any response in this regard. Calculating on the basis of mean figure, the total sale of the planting material works out to 135 lakh saplings per annum. Out of the total estimated production of 175 lakh saplings as indicated in table No 5.43, about 77% [135 lakh] were being produced for commercial purposes. This is a positive development of the programme as farmers' contribution in removing the supply gap of the planting material.

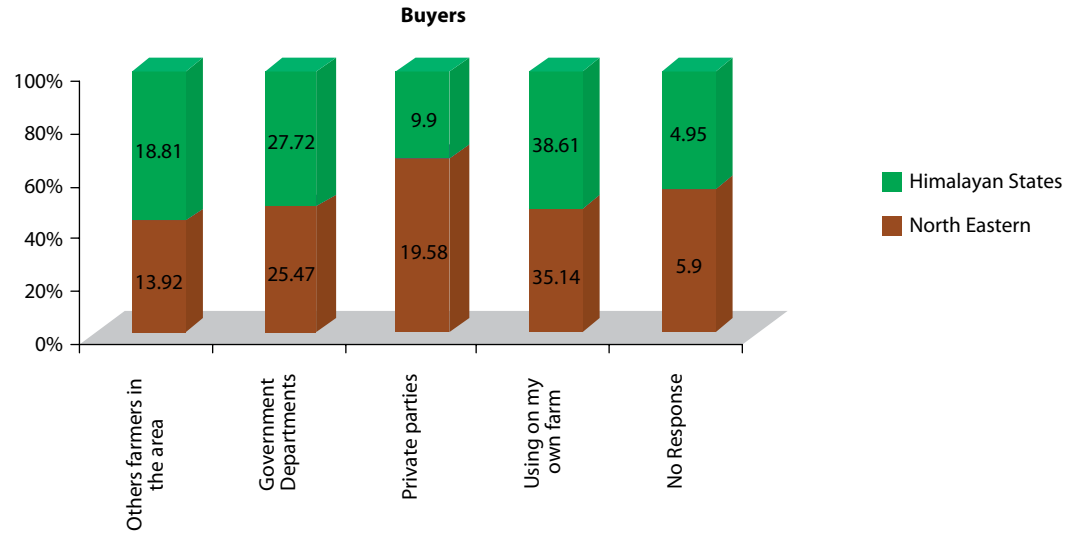
The respondent farmers, who had set up their nurseries under the Mission, were further asked as to how they had been disposing of the plants produced in their nurseries. The replies received from them are continued in Table 5.45.

Table 5.45 Buyers of the saplings of respondents

States	Total Sample	To whom the saplings are being sold #									
		1		2		3		4		No Response	
		No.	%	No.	%	No.	%	No.	%	No.	%
North Eastern States											
Arunachal Pradesh	1238	2	6.06	5	15.15	2	6.06	24	72.73	0	0
Assam	1966	23	14.02	12	7.32	32	19.51	85	51.83	12	7.32
Manipur	675	10	20	18	36	18	36	2	4	2	4
Meghalaya	525	16	57.14	3	10.71	4	14.29	1	3.57	4	14.29
Mizoram	600	7	8.97	17	21.79	22	28.21	26	33.33	6	7.69
Nagaland	825	1	12.5	3	37.5	1	12.5	2	25	1	12.5
Tripura	300	0	0	6	37.5	2	12.5	8	50	0	0
Sikkim	301	0	0	44	93.62	2	4.26	1	2.13	0	0
Sub Total	**6430**	**59**	**13.92**	**108**	**25.47**	**83**	**19.58**	**149**	**35.14**	**25**	**5.9**
Himalayan States											
Himachal Pradesh	913	4	7.41	10	18.52	6	11.11	33	61.11	1	1.85
Jammu and Kashmir	1510	13	38.24	11	32.35	2	5.88	5	14.71	3	8.82
Uttarakhand	975	2	15.38	7	53.85	2	15.38	1	7.69	1	7.69
Sub Total	**3398**	**19**	**18.81**	**28**	**27.72**	**10**	**9.9**	**39**	**38.61**	**5**	**4.95**
Grand Total	**9828**	**78**	**14.86**	**136**	**25.9**	**93**	**17.71**	**188**	**35.81**	**30**	**5.71**

[Code: Others farmers in the area -1, Government Departments-2, Private parties-3, Using on my own farm-4]

Figure 5.45 Buyers of the saplings of respondents



About 78 [15%] of the respondents who had set up nurseries under the Mission, had reported selling of the planting material produced in their nurseries to other framers in the area, 136 [26%] to Government Department, 93 [18%] to private parties and 188 [36%] said that they were using the planting saplings on their own farms. There were as many as 30 [6%] of the respondents, who did not give any response. The State of Meghalaya and J&K had the majority of 57% and a good number of 38% reporting selling of planting material to the other farmers in the area. Sikkim had the maximum percentage of 94% reporting selling of saplings to Govt Department and J&K substantial number of 54% in this category. In Arunachal Pradesh [73%], Assam [52%] and Himachal Pradesh [61%], the majority of the State respondents had been producing plants in nurseries for their own use.

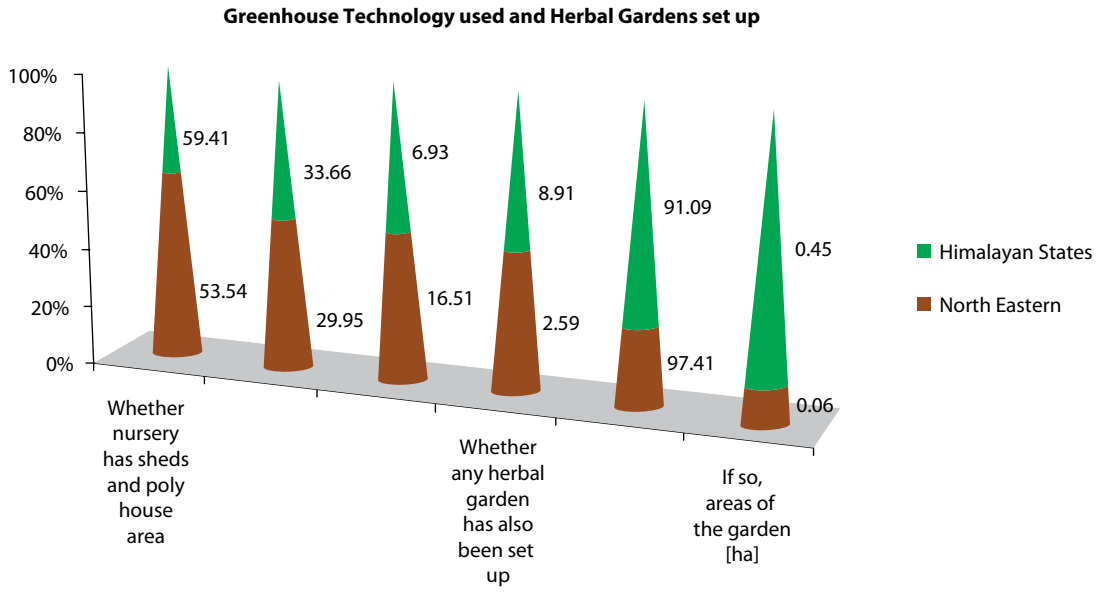
Protected horticulture cultivation has clear edge over the open field conditions. Information was collected from the respondents on the use of Greenhouse Technology as also setting up of any Herbal Garden by them and the same is consolidated in Table 5.46.

As many as 287 [55%] of the respondents had reported to be raising Nurseries under sheds and poly houses. A large majority to a good number of the respondents from the States of Sikkim [87%], Tripura [81%], Himachal Pradesh [81%], Uttarakhand [77%], Mizoram [49% and Assam [42%] were using Green/Poly House technology. In Meghalaya [68%], Arunachal Pradesh [55%] and J&K [70%] majority of the respondents did not use any ploy house

Table 5.46 Greenhouse technology used and herbal gardens set up

States	Farmers setup Nursery	Whether nursery has sheds and poly house area						Whether any herbal garden has also been set up				If so, areas of the garden [ha]
		Yes		No		No Response		Yes		No		
		No	%	No	%	No	%	No	%	No	%	
North Eastern States												
Arunachal Pradesh	33	14	42.42	18	54.55	1	3.03	0	0	33	100	0.5
Assam	164	69	42.07	38	23.17	57	34.76	7	4.27	157	95.73	0
Manipur	50	42	84	4	8	4	8	0	0	50	100	0.1
Meghalaya	28	9	32.14	19	67.86	0	0	1	3.57	27	96.43	0.06
Mizoram	78	38	48.72	33	42.31	7	8.97	2	2.56	76	97.44	0.12
Nagaland	8	1	12.5	6	75	1	12.5	0	0	8	100	0
Tripura	16	13	81.25	3	18.75	0	0	0	0	16	100	0.11
Sikkim	47	41	87.23	6	12.77	0	0	1	2.13	46	97.87	0.04
Sub Total	**424**	**227**	**53.54**	**127**	**29.95**	**70**	**16.51**	**11**	**2.59**	**413**	**97.41**	**0.06**
Himalayan States												
Himachal Pradesh	54	44	81.48	7	12.96	3	5.56	5	9.26	49	90.74	0.63
Jammu and Kashmir	34	6	17.65	24	70.59	4	11.76	2	5.88	32	94.12	0.31
Uttarakhand	13	10	76.92	3	23.08	0	0	2	15.38	11	84.62	0.25
Sub Total	**101**	**60**	**59.41**	**34**	**33.66**	**7**	**6.93**	**9**	**8.91**	**92**	**91.09**	**0.45**
Grand Total	**525**	**287**	**54.67**	**161**	**30.67**	**77**	**14.67**	**20**	**3.81**	**505**	**96.19**	**0.12**

Figure 5.46 Greenhouse technology used and herbal gardens set up



technology. About 15% of the respondents did not answer query in this regard. About 4% of the respondents had set up Herbal Gardens average size of which was 0.12 ha.

Adoption of Organic Farming

In their quest for higher yields, farmers are using heavy doses of chemical fertilizers which results into the high cost of production and adverse effect on environment and health of the people. In recent years, there has been emphasis on organic farming to obtain pesticide residue-free fruits, and vegetables and India is likely to convert a significant proportion of its agriculture into certified organic farming. Data has therefore, been collected from the respondents on the adoption of the organic farming and the Earthworm units set up by them. The information received is collated in Table 5.47.

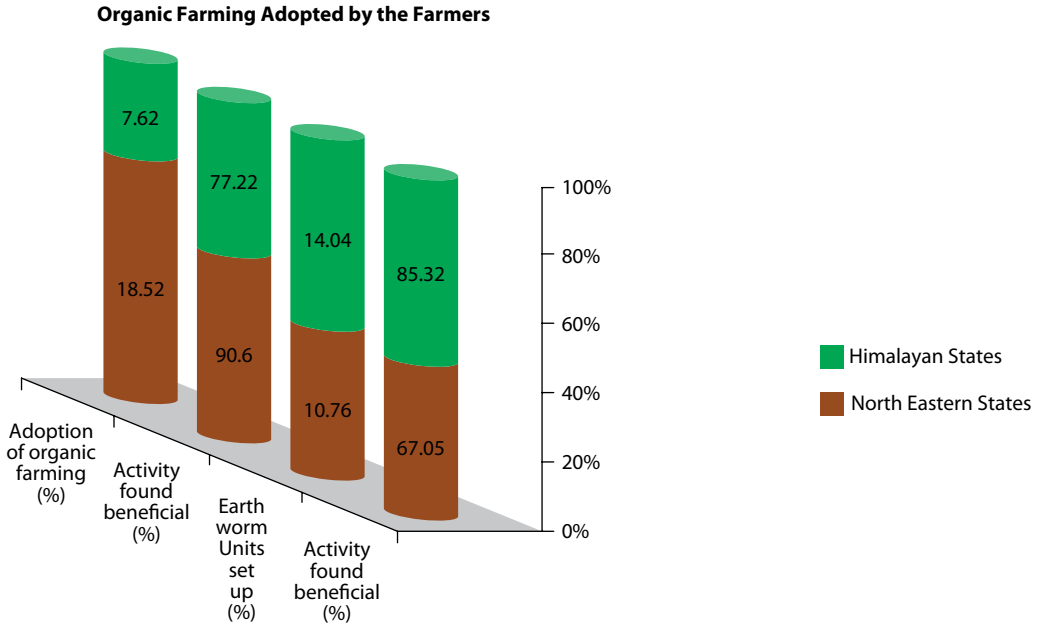
It is observed that about 15 respondents in all [19 % in NES and 8% in HS] have availed of organic farming sub component of the programme and a very large majority of 85% has not adopted this practice as yet. The inter State position varies greatly. Of the small number of the respondents adopting organic farming, the highest percentage of 69% is concentrated in Sikkim followed by Nagaland – 62%, Arunachal Pradesh - 27% and Himachal Pradesh – 19%. In other States, such percentage is insignificant. A large majority of the farmers - 88% [91% in NES & 77% in HSR] undertaking organic farming has found the activity as useful. This positive response ranges from 75% in Meghalaya & J&K to 99% in Sikkim.

The respondents were also requested to indicate the position of the Earthworm Units set up by them in pursuit of their organic farming activity. Only 12% of the respondents [11% NES & 14% HSR] replied that they had set up earthworm units Their number varies from State to State being lowest at 5% in Mizoram & J&K and highest at 34% in Sikkim. The Earthworm producing activity has however been found beneficial by a large majority above 70% of the respondents undertaking organic farming, in all the State except Nagaland where such percentage is just 4%.

Table 5.47 Organic farming adopted by the farmers

Name of State	Total Respn.	Adoption of organic farming (%)	Activity found beneficial(%)	Earthworm Units set up (%)	Activity found beneficial (%)
North Eastern States					
Arunachal Pradesh	1238	26.58	93.31	2.18	74.07
Assam	1966	2.85	62.5	13.43	80.68
Manipur	675	2.52	70.59	8	90.74
Meghalaya	525	1.52	75	3.43	88.89
Mizoram	600	7.83	87.23	5	96.67
Nagaland	825	61.94	89.82	19.88	3.66
Tripura	300	5.33	93.75	10.67	93.75
Sikkim	301	68.77	98.55	34.22	98.06
Sub Total	**6430**	**18.52**	**90.6**	**10.76**	**67.05**
Himalayan States					
Himachal Pradesh	913	19.17	76.57	27.82	81.89
Jammu and Kashmir	1510	4.24	75	4.5	72.06
Uttarakhand	975	2.05	90	15.9	96.77
Sub Total	**3398**	**7.62**	**77.22**	**14.04**	**85.32**
Grand Total	**9828**	**14.75**	**88.21**	**11.89**	**74.51**

Figure 5.47 Organic farming adopted by the farmers

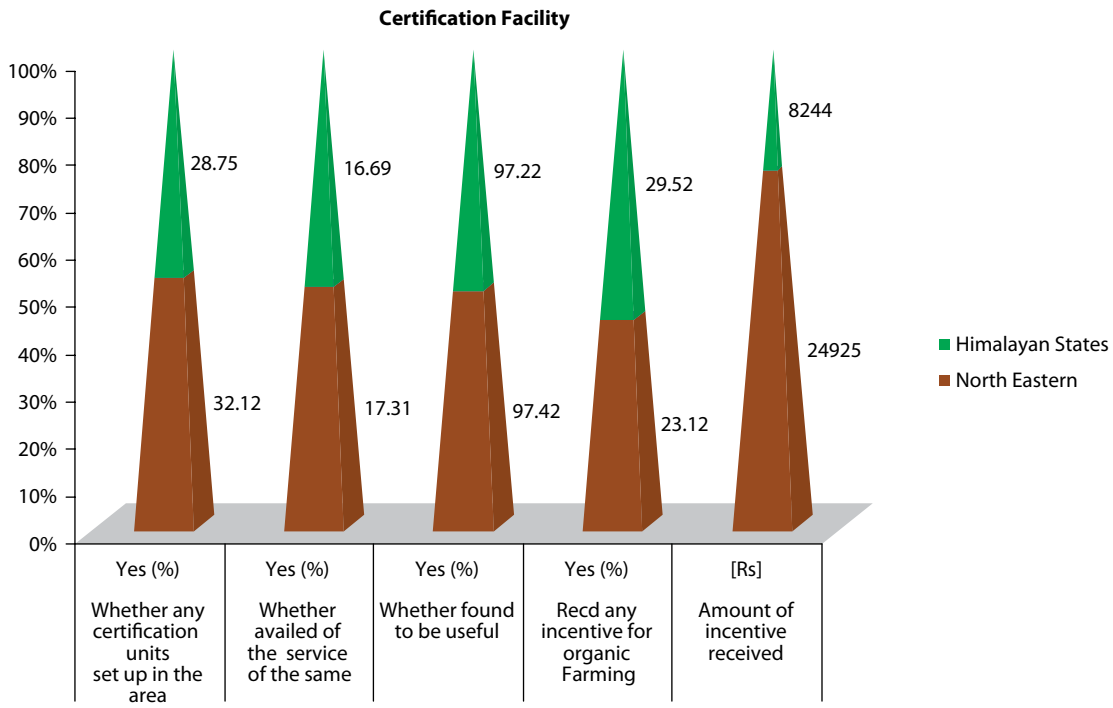


An easy access to its certification facility will help in promoting safe food organic farming. Information on the availability of facility of any certification of organic product facility in the area has been sought in the survey. The replies received are consolidated in Table 5. 48.

Table 5.48 Availability of organic produce certification facility and incentives obtained for adoption of organic farming

Name of the State	Total Respon-dents [No]	Whether any certifi-cation units set up in the area	Whether availed of the service of the same	Whether found to be useful	Recd any incentive for organic farming	Amount of incentive received
		Yes [%]	Yes [%]	Yes [%]	Yes [%]	[Rs]
North Eastern States						
Arunachal Pradesh	346	0	0.29	100	4.91	40000
Assam	267	61.05	62.55	96.41	64.79	17178
Manipur	61	14.75	24.59	100	26.23	24272
Meghalaya	20	35	35	100	55	50668
Mizoram	64	81.25	84.38	100	67.19	90050
Nagaland	514	49.61	0	0	9.92	717
Tripura	33	0	33.33	100	51.52	38500
Sikkim	261	6.51	6.13	93.75	13.03	3911
Sub Total	**1566**	**32.12**	**17.31**	**97.42**	**23.12**	**24925**
Himalayan States						
Himachal Pradesh	404	37.13	8.66	97.14	25.74	4913
Jammu and Kashmir	82	9.76	37.8	93.55	51.22	20396
Uttarakhand	161	17.39	26.09	100	27.95	4575
Sub Total	**647**	**28.75**	**16.69**	**97.22**	**29.52**	**8244**
Grand Total	**2213**	**31.13**	**17.13**	**97.36**	**24.99**	**20306**

Figure 5.48 Availability of organic produce certification facility and incentives obtained for adoption of organic farming



A total of 2213 [23%] beneficiary farmers had responded to the query on the availability of the certification unit in the area. About 30% [32 % NES & 29% HSR] of them reported existing of the Certification Units in their respective areas and majority of 68% of them did not make any such reporting. All the respondents from the States of Arunachal Pradesh and Tripura have reported non existence of any Certification Unit. The other States where a large majority of the respondents denied existence of certification units were from: Sikkim [94%], J&K [90%], Manipur [85%], Uttarakhand [83%], Meghalaya [65%], and Himachal Pradesh [63%].

About 50% of the respondents reporting the existence of the certification units in the area have further reported to have availed of the certification facility in respect of their organic produce. The highest percentage was from the State of Mizoram [84%] followed by Assam [63%], Meghalaya [35%], Tripura [33%] and Manipur [25%]. A very large majority around 97% of the respondents availing of the certification had expressed their satisfaction over the service.

As regards any assistance extended for adoption of organic farming, only 25% [23% NES & 30% HSR], reported having received incentive for undertaking this activity. The highest number of the respondents reporting availability of the incentive was from the State of Mizoram [67%], and Assam [65%], Tripura & J&K [51% each] were next in order. The amount of the incentive reported varied from the minimum of Rs.717 in Nagaland to maximum of Rs.90,050/- in Mizoram.

Adoption of Integrated Pest Management [IPM]

The eco-friendly Integrated Management of pests and diseases since worked out for a large number of vegetables, needs further popularizing among farmers by providing them seeds of resistant varieties and IPM inputs. Information has, therefore, been collected in this regard and presented in Table 5.49 to find out the position under the programme.

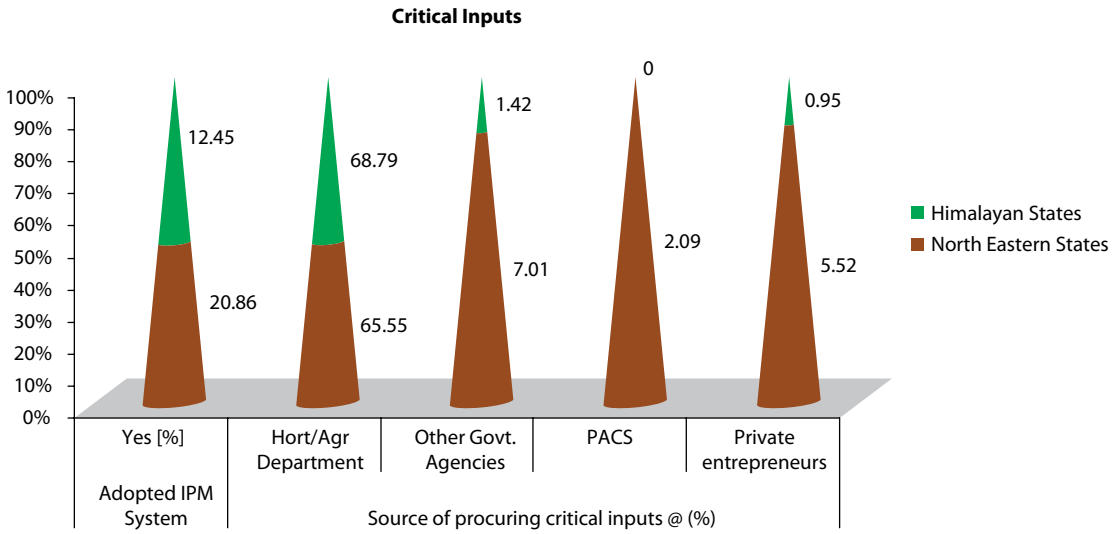
Table 5.49 Adoption of IPM by farmers and source of procurement of critical inputs

Name of State	Total Resp.	Adopted IPM System	Source of procuring critical inputs @ (%)			
		Yes [%]	1	2	3	4
North Eastern States						
Arunachal Pradesh	1238	24.39	95.7	0.66	0	0.66
Assam	1966	17.34	41.94	23.75	7.92	20.82
Manipur	675	13.63	83.7	1.09	0	0
Meghalaya	525	3.43	94.44	5.56	0	0
Mizoram	600	20.67	98.39	0.81	0	0.81
Nagaland	825	40.24	30.72	1.81	0.3	0
Tripura	300	3.67	81.82	9.09	0	0
Sikkim	301	40.2	99.17	0.83	0	0
Sub Total	**6430**	**20.86**	**65.55**	**7.01**	**2.09**	**5.52**

Name of State	Total Resp.	Adopted IPM System	Source of procuring critical inputs @ (%)			
		Yes [%]	1	2	3	4
Himalayan States						
Himachal Pradesh	913	14.68	16.42	0	0	0.75
Jammu and Kashmir	1510	0.99	93.33	0	0	0
Uttarakhand	975	28.1	93.07	2.19	0	1.09
Sub Total	**3398**	**12.45**	**68.79**	**1.42**	**0**	**0.95**
Grand Total	**9828**	**17.95**	**66.33**	**5.67**	**1.59**	**4.42**

@ [Hort/Agr Department -1, Other Govt. Agencies -2, PACS-3, Private Entrepreneurs-4, Critical Inputs - bio-fert/bio-pest/pheromone traps/inter-cropping seed etc.

Figure 5.49 Adoption of IPM by farmers and source of procurement of critical inputs



It may be observed from the table that only about 18% of the total 9828 respondents reported adoption of IPM by them and a large majority remained outside of its ambit. IPM adoption was the lowest [1%] in the State of J&K followed by Meghalaya [3%] and Tripura [4%]. It varied between 14% [Manipur] to 40% [Sikkim] in other States.

The main source of procuring critical inputs of IPM such as - bio-fert/bio-pest/pheromone traps/inter-cropping seed etc was reported to be the State's Hort/Agr Department by 66% of the respondents using IPM. The other sources being other Govt Agencies, PACS and Private Entrepreneurs meeting the demand of critical inputs in respect of about 15% of the respondents. About 20% of the farmers remained unresponsive on this issue. The maximum number of the respondents [24%] reporting supply of critical inputs from the sources other than Hort/Agr Department was from the State of Assam.

The demonstration and easy accessibility of critical inputs will facilitate wide spread adoption of any new practice. Information on the utility of demonstration on IPM and

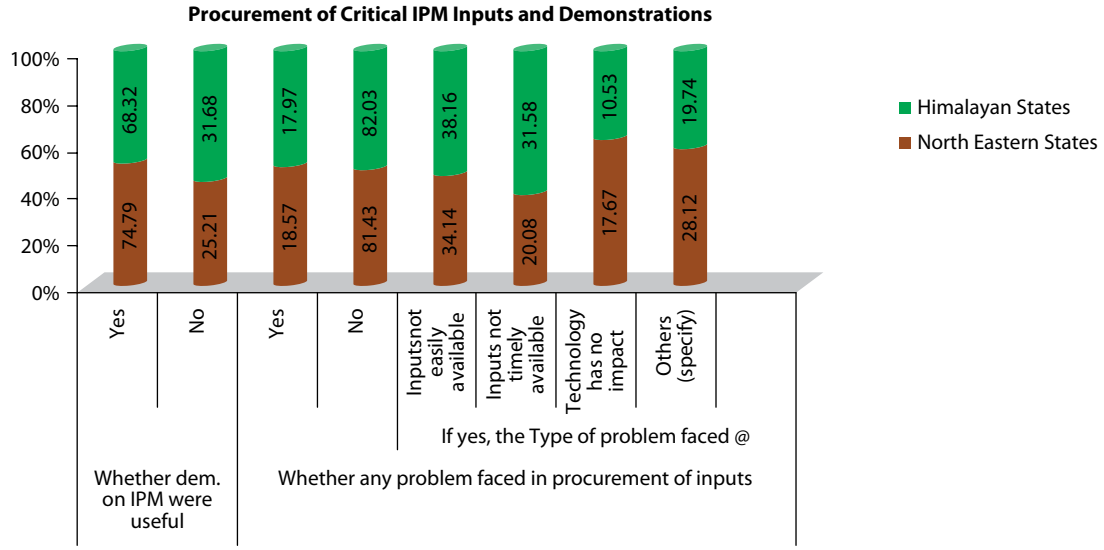
problems confronted by the respondents in the procurement of the critical inputs was obtained from the respondents and the same is contained in Table 5.50.

Table 5.50 Procurement of critical IPM inputs and demonstrations

Name of the State	Total Resp	Whether dem. on IPM were useful		Whether Any problem faced in procurement of inputs		If yes, the Type of problem faced @			
		Yes	No	Yes	No	1	2	3	4
North Eastern States									
Arunachal Pradesh	302	96.36	3.64	15.89	84.11	50.00	29.17	2.08	18.75
Assam	341	81.82	18.18	33.72	66.28	36.52	21.74	36.52	5.22
Manipur	92	78.26	21.74	19.57	80.43	77.78	5.56	0.00	16.67
Meghalaya	18	100.00	0.00	11.11	88.89	0.00	0.00	0.00	100.00
Mizoram	124	100.00	0.00	39.52	60.48	0.00	2.04	2.04	95.92
Nagaland	332	35.24	64.76	5.12	94.88	29.41	52.94	0.00	17.65
Tripura	11	90.91	9.09	0.00	100.00	0.00	0.00	0.00	0.00
Sikkim	121	76.03	23.97	0.00	100.00	0.00	0.00	0.00	0.00
Sub Total	**1341**	**74.79**	**25.21**	**18.57**	**81.43**	**34.14**	**20.08**	**17.67**	**28.12**
Himalayan States									
Himachal Pradesh	134	21.64	78.36	13.43	86.57	61.11	33.33	0.00	5.56
Jammu and Kashmir	15	80.00	20.00	40.00	60.00	50.00	0.00	0.00	50.00
Uttarakhand	274	90.51	9.49	18.98	81.02	28.85	34.62	15.38	21.15
Sub Total	**423**	**68.32**	**31.68**	**17.97**	**82.03**	**38.16**	**31.58**	**10.53**	**19.74**
Grand Total	**1764**	**73.24**	**26.76**	**18.42**	**81.58**	**35.08**	**22.77**	**16.00**	**25.92**

@ [Code: Inputs not easily available -1, Inputs not timely available -2 Technology has no impact -3, Others (specify)-4

Figure 5.50 Procurement of critical IPM inputs and demonstrations



A total of 1764 farmers responded to the query on the procurement of critical inputs and demonstration on IPM. An overwhelming majority of 73% of them [75% NES & 68% HS] had reported that the demonstrations of IPM practices, organized under the programme were found to be useful by them. Except the States of Nagaland and Himachal Pradesh, where such response was 35% and 22% respectively, the replies on the utility of the IPM were by a large majority of the respondents ranging from 76% percent in Sikkim to 100% in Meghalaya. The demonstrations organized were also reported to have successfully demonstrated the reduction in number of the sprayings and the savings in the PP Chemicals being used.

In all 82% in almost equal proportion both from the NES and HSR, the respondents have reported no difficulty in the procurement of the IPM inputs. The response from Tripura and Sikkim in this regard is 100%. Of the total respondents [18%] reporting problems in the procurement of the inputs from all the States, the maximum/substantial percentage was from the States of Mizoram & J&K - 40% each and Assam - 34%.

The respondents reporting difficulty in procurement of critical inputs have given different reasons in support of their contention. About 35% of them have reported that the inputs were not easily available. The States with 50% of more such response were; Manipur [77%], Manipur and J&K - 5% each. About 23% of them reported delay in supply of critical inputs. Such an argument was taken by the majority [52%] of the respondents in Nagaland. The remaining 26% of them have reported other problems in procuring critical inputs for their farming operations such as unsatisfactory quality/supply arrangement, and a great personal inconvenience involved in the procurement process.

Supply of Agricultural Equipment/Tools

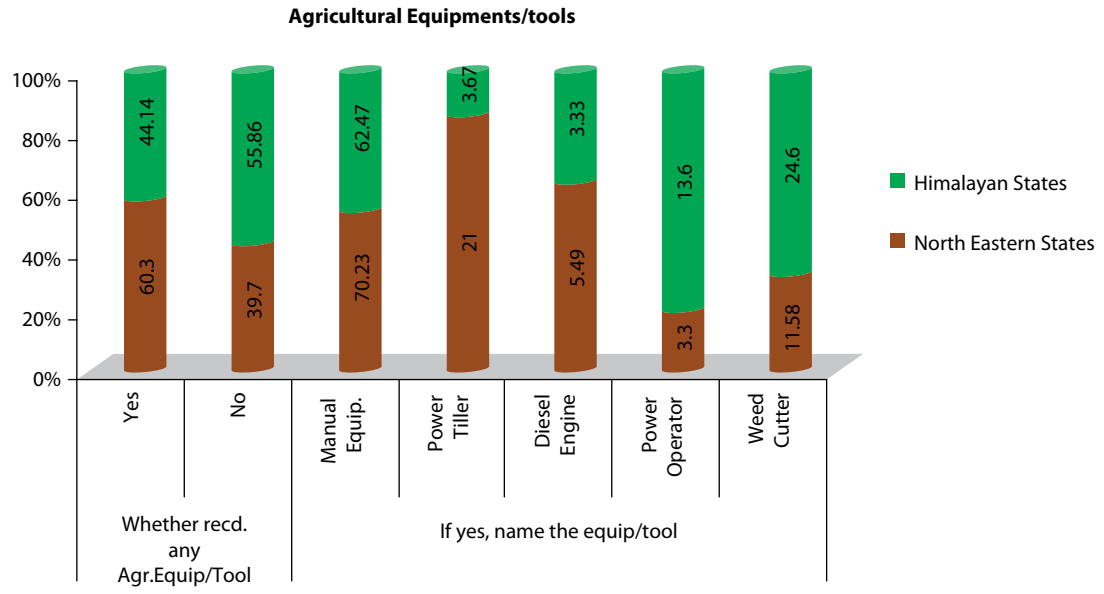
Agricultural Machinery makes the farming operations timely and efficient besides reducing the drudgery. The various types of the equipments/tools distributed among the respondents, under the Mission are shown in Table 5.51.

Table 5.51 Agricultural equipments/tools received by the farmers

Name of State	Total resp.	Whether recd. any Agr. Equip/Tool		If yes, name the equip/tool				
		Yes	No	Manual Equip.	Power Tiller	Diesel Engine	Power Operator	Weed Cutter
North Eastern States								
Arunachal Pradesh	1238	82.96	17.04	95.33	4.58	0.68	0	0.58
Assam	1966	81.23	18.77	49.15	43.27	10.96	4.32	13.34
Manipur	675	40.3	59.7	87.5	10.66	4.04	0.37	0.37
Meghalaya	525	28.38	71.62	83.89	6.04	6.04	23.49	3.36
Mizoram	600	66.33	33.67	55.53	1.51	1.26	0.5	50
Nagaland	825	25.21	74.79	99.52	1.92	0	0	4.33
Tripura	300	28.33	71.67	34.12	30.59	7.06	24.71	18.82
Sikkim	301	46.84	53.16	98.58	1.42	0	0	0
Sub Total	**6430**	**60.3**	**39.7**	**70.23**	**21**	**5.49**	**3.3**	**11.58**

Name of State	Total resp.	Whether recd. any Agr. Equip/Tool		If yes, name the equip/tool				
		Yes	No	Manual Equip.	Power Tiller	Diesel Engine	Power Operator	Weed Cutter
Himalayan States								
Himachal Pradesh	913	38.99	61.01	73.88	7.58	1.69	20.79	5.06
Jammu and Kashmir	1510	47.22	52.78	76.58	1.54	3.09	14.87	5.61
Uttarakhand	975	44.21	55.79	29.7	3.94	5.1	5.57	72.16
Sub Total	**3398**	**44.14**	**55.86**	**62.47**	**3.67**	**3.33**	**13.6**	**24.6**
Grand Total	**9828**	**54.71**	**45.29**	**68.07**	**16.16**	**4.89**	**6.17**	**15.21**

Figure 5.51 Agricultural equipments/tools received by the farmers



It may be seen that as many as 55% of the respondents [60% - NER & 60%- HSR] from all the States, had received Agricultural Equipments/Tools under the programme. A large majority of 83%, 81% and 66% reported having availed of this sub components from the States of Arunachal Pradesh, Assam and Mizoram, respectively. Further 47% of the respondents from each of the States of Sikkim and J&K reported availing this component. In the remaining States the response varied from 25% to 40%.

Use of Manual Equipments seems to be the most popular amongst the respondents. These machines had the major share of 68% [70% NER & 63% HSR], followed by Power Tiller [16%], Weed Cutter [15%], Power Operator [7%] and Diesel Engine [5%]. The percentage of the respondents availing of assistance under sub component Manual Operator was 56% in Mizoram, 49% in Assam, 345 in Tripura and 30% in Uttarakhand. In the remaining States, the percentage of the respondents varied from 74% in Himachal Pradesh to almost 100% in Nagaland.

Appreciable number of the respondents availing of assistance for Power Tillers was from Assam [43%] and Tripura [31%]. In the remaining States, the percentage utilization on this account ranged from 1% in Sikkim to 11% in Manipur In case of Power Operator tools,

the highest utilization was reported by the respondents from the States of Tripura [25%] followed by Meghalaya [24%],Himachal Pradesh – 21% and J&K – 15%. In the rest of the States, the utilization level ranged from 0% in Arunachal Pradesh, Nagaland & Sikkim to 6% in Uttarakhand. As many as 72% respondents from Uttarakhand reported utilization of assistance for Weed Cutter and Tripura & Assam with 18% and 13% utilization respectively were next in order. In the remaining States, the extent of utilization under this sub head ranged from 0% in Sikkim to 6% in J&K. As regards Diesel Engine, about 11% of the respondents from Assam had availed of assistance under this sub component and in the rest of the States, such a percentage varied from 0% in Nagaland & Sikkim to 7% in Tripura.

The respondents were further asked to indicate the actual utility of the Agricultural Machinery/Equipments/Tools for which they had obtained assistance under the programme. The replies given by them are consolidated in Table 5.52.

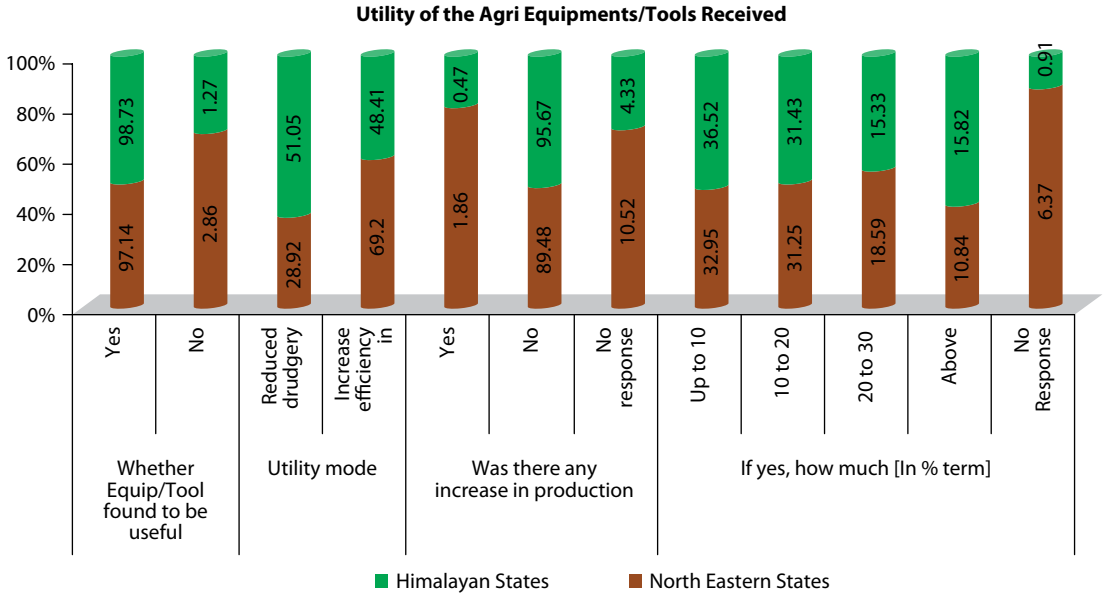
Of the total 5377 respondents who had availed of assistance under Agr/Equip/Tools, 98% [97% NER & 99% HSR] reported that the material was useful to them, There is not much variation amongst the different States as the percentage varies between 93% to 99%.

On the question as to how the Machinery has really helped them, the responses were: increase in efficiency in farming operations – 63% [NER- 69% & 66% HSR] and reduced drudgery – 35% [NER- 29% & 51% HSR]. The highest response in terms of the percentage of the respondents was from the State of Tripura [94%], followed by Sikkim [90%],

Table 5.52 Utility of the agri equipments/tools received

Name of State	Total resp.	Whether Equip/Tool found to be useful		Utility mode		Was there any increase in production			If yes, how much [In % term]				
		Yes	No	Reduced drudgery	Increase efficiency in operation	Yes	No	No response	Up to 10	10 to 20	20 to 30	Above 30%	No Response
North Eastern States													
Arunachal Pradesh	1027	98.05	1.95	13.41	84.51	1.99	79.26	20.74	34.28	29.12	23.71	11.92	0.98
Assam	1597	96.81	3.19	36.09	61.51	2.39	92.99	7.01	47.07	27	11.18	1.28	13.47
Manipur	272	97.06	2.94	23.86	74.62	1.52	93.38	6.62	10.63	42.13	35.04	10.63	1.57
Meghalaya	149	92.62	7.38	13.04	85.51	1.45	89.26	10.74	19.55	25.56	16.54	36.09	2.26
Mizoram	398	97.49	2.51	57.99	40.72	1.29	94.72	5.28	7.16	19.1	28.12	44.56	1.06
Nagaland	208	99.04	0.96	35.44	64.08	0.49	94.23	5.77	29.59	64.8	0.51	5.1	0
Tripura	85	97.65	2.35	6.02	93.98	0	97.65	2.35	8.43	31.33	51.81	7.23	1.2
Sikkim	141	95.04	4.96	8.96	90.3	0.75	90.07	9.93	15.75	62.99	19.69	0.79	0.79
Sub Total	**3877**	**97.14**	**2.86**	**28.92**	**69.2**	**1.86**	**89.48**	**10.52**	**32.95**	**31.25**	**18.59**	**10.84**	**6.37**
Himalayan States													
Himachal Pradesh	356	99.44	0.56	29.66	69.77	0.56	95.51	4.49	58.24	28.82	7.35	4.71	0.88
Jammu and Kashmir	713	98.88	1.12	72.06	27.38	0.57	96.35	3.65	19.51	29.84	22.71	27.07	0.87
Uttarakhand	431	97.91	2.09	33.89	65.64	0.24	94.66	5.34	47.06	36.27	9.56	6.13	0.98
Sub Total	**1500**	**98.73**	**1.27**	**51.05**	**48.41**	**0.47**	**95.67**	**4.33**	**36.52**	**31.43**	**15.33**	**15.82**	**0.91**
Grand Total	**5377**	**97.58**	**2.42**	**35.16**	**63.33**	**1.47**	**91.2**	**8.8**	**33.99**	**31.3**	**17.64**	**12.3**	**4.77**

Figure 5.52 Utility of the agri equipments/tools received



Meghalaya [86%], Arunachal [85%], Manipur [75%] Uttarakhand [66%],Nagaland [64%] and Assam [62%],. Mizoram [41%] and J&K [27%] were the only two States from where the percentage of the respondents was below 50 under this sub head. More respondents [Mizoram 58% & J&K 72%] from these two States have, however, reported reduction in drudgery as the main benefit compared to other States where the percentage ranges from 6% in Tripura to 36% in Assam in this regard.

The ultimate aim of providing assistance under Farm Machinery/Equipments/Tools is the increase in production and productivity. An overwhelming majority of the respondents over 90% have reported no increase in their production consequent upon use of farm machinery supplied to them under the programme. While about 9% of the respondents did not answer this query, an overwhelming majority of 91% indicated that there was no increase in their production consequent upon the use of agricultural implements. Only a microscopic minority of less than 2% [1.47%] had only indicated increase in their production level.

To the further question on the extent of the increase in production about 34%,reported increase in production up to 10%, 31% in the range of above 10 to 20%, 18% - above 21% to 30% and 12% above 30%. About 5% of the respondents from this category remained unresponsive in this regard.

Transfer of Technology

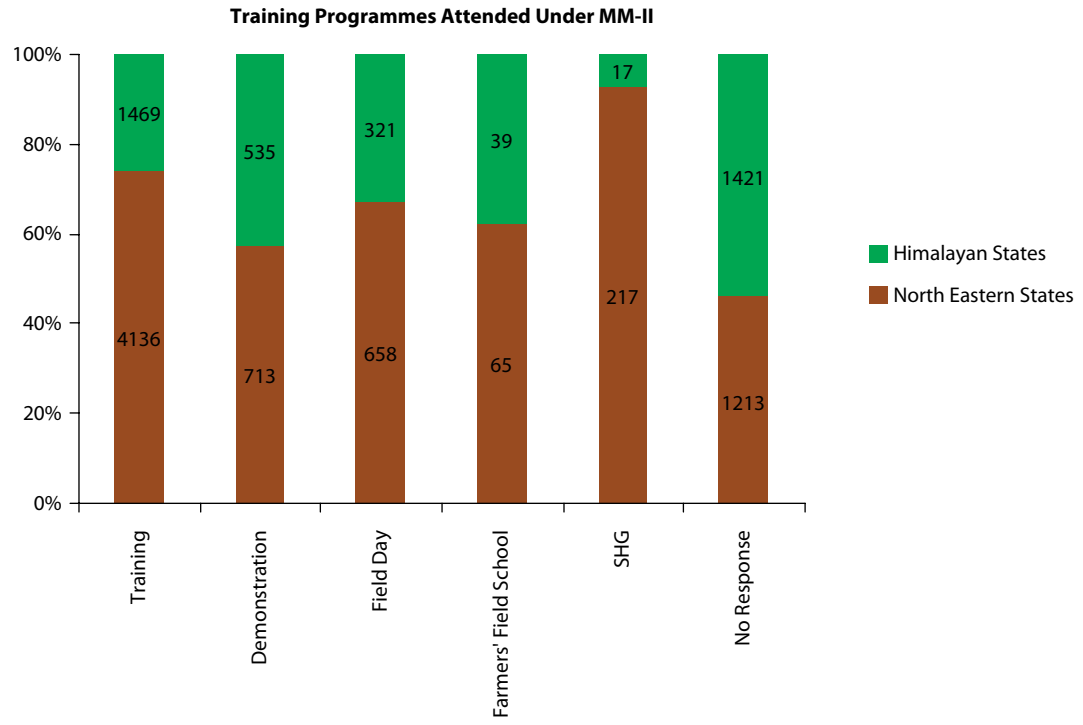
Human Resource Development is one of the key factors for successful implementation of other sub components of any programme. Acquisition of skill by farmers is a central part of the technology transfer process because of the new practices involved in production. The respondents were, asked to indicate the types of training programs undergone by them, the duration of such programmes, topics covered there under as also the venues of trainings programmes organized for them under the interventions of the Mission. Table 5.53 provides information on the training programs attended by the farmers under MM-II.

Table 5.53 Training programmes attended under MM-II

State	Total Sample	Prog. Attended under MM-II @ (Number of respondents)					
		1	2	3	4	5	No Response
North Eastern States							
Arunachal Pradesh	1238	712	78	23	6	2	490
Assam	1966	1005	47	477	32	194	221
Manipur	675	481	57	31	0	3	168
Meghalaya	525	262	28	77	2	0	178
Mizoram	600	499	79	24	4	11	70
Nagaland	825	649	335	17	0	4	64
Tripura	300	239	37	5	21	2	18
Sikkim	301	289	52	4	0	1	4
Sub Total	**6430**	**4136**	**713**	**658**	**65**	**217**	**1213**
Himalayan States							
Himachal Pradesh	913	479	14	9	30	3	393
Jammu and Kashmir	1510	550	475	284	5	7	553
Uttarakhand	975	440	46	28	4	7	475
Sub Total	**3398**	**1469**	**535**	**321**	**39**	**17**	**1421**
Grand Total	**9828**	**5605**	**1248**	**979**	**104**	**234**	**2634**

@ [Code: Training -1, Demonstration-2, Field day-3, Farmers Field school-4, SHG-5]

Figure 5.53 Training programmes attended under MM-II



At the aggregate level, about 83% [8170 No] of all the respondents have reported having attended one or the other training under the programme. Majority of 57% [5605 No] of them has reported its participation in the general training on different aspects of horticulture cultivation, followed by 13% [1248 No], having taken part in demonstrations, 10% [979 No] in field days, and 2% [234 No] and 1% [104 No] of them in Self Help Group and Farmers' Field Schools. The States from where the farmers had participated in the general training programme above all states average of 57%, were: Sikkim [96%], Mizoram [83%], Tripura [80%], Nagaland [79%], Manipur 71%, and Arunachal Pradesh [58%] in NER and Himachal Pradesh only in Himalayan States. In the demonstration type of programmes, the highest participation of about 38% [475 No] was from J&K followed by Nagaland – 27% [335 No]. The trainees from these two States together constituted as much as 65% of total farmers participants in the demonstration programmes. The share of the other States ranged from 1% in case of Himachal Pradesh and 6% in respect of Mizoram under Demonstration sub head. Under Field day the maximum participation of 24% was from Assam and lowest of 1% from Himachal Pradesh. While under Farmers Field School and SHG, the average participation at 1% and 2% remained insignificant. In Assam SHG training in which 10% of the respondents had participated was better amongst the States in both the regions.

Human Resource Development

HRD is an integral part of the HMNEH. The derails of various training programmes attended by the respondents are furnished in Tables 5.54 to 5. 55.

Table 5.54 Duration of the programme

States	1 day	Above 1 day and up to 5 days	Above 5 days	No Response
North Eastern States				
Arunachal Pradesh	184	373	155	1237
Assam	921	669	126	1965
Manipur	223	257	19	675
Meghalaya	262	61	22	521
Mizoram	327	183	17	596
Nagaland	422	311	24	824
Tripura	91	160	30	300
Sikkim	118	171	6	301
Sub Total	**2548**	**2185**	**399**	**6419**
Himalayan States				
Himachal Pradesh	339	79	98	909
Jammu and Kashmir	617	197	128	1508
Uttarakhand	267	133	95	970
Sub Total	**1223**	**409**	**321**	**3387**
Grand Total	**3771**	**2594**	**720**	**9806**

Figure 5.54 Duration of the programme

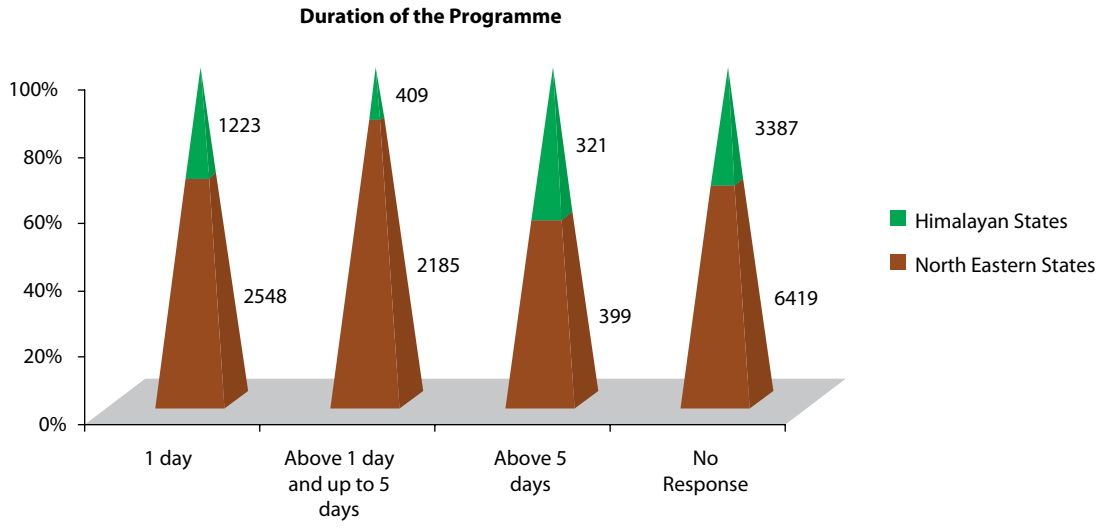


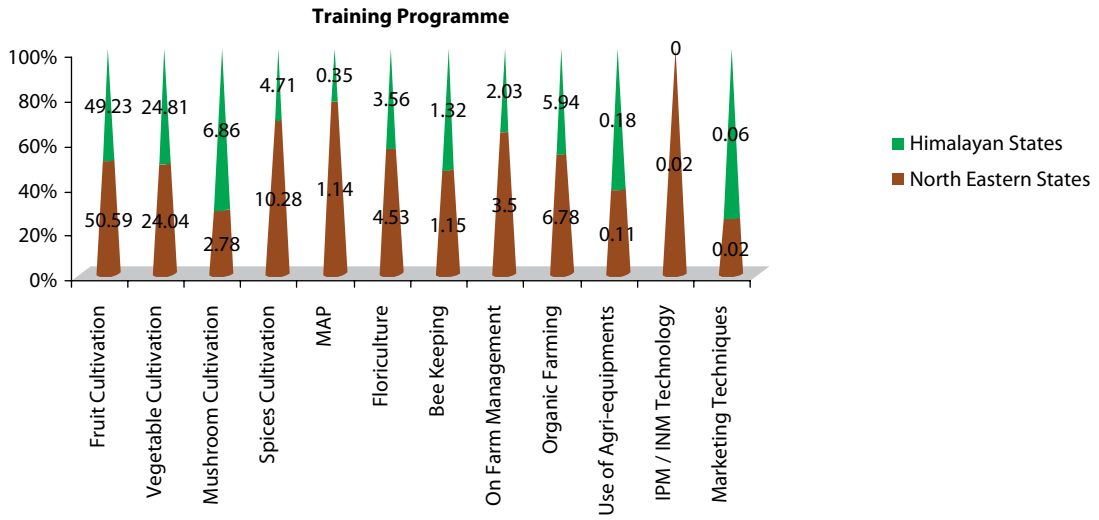
Table 5.55 Topics covered under the training programme

State	#Topics Covered (% Multiple Responses)											
	1	2	3	4	5	6	7	8	9	10	11	12
North Eastern States												
Arunachal Pradesh	51.86	15.40	4.30	11.51	4.30	0.83	0.28	2.36	9.57	0.97	0.14	0.14
Assam	53.10	11.24	3.41	13.12	0.15	0.00	0.51	3.66	1.32	0.00	0.00	0.00
Manipur	42.81	48.30	4.30	11.41	0.30	3.11	5.93	3.85	8.44	0.00	0.00	0.00
Meghalaya	20.00	43.81	1.33	1.33	1.52	27.62	0.19	1.33	3.05	0.00	0.00	0.00
Mizoram	54.83	33.17	0.83	6.00	1.50	6.00	1.17	5.83	10.50	0.00	0.00	0.00
Nagaland	67.76	11.03	3.52	9.58	2.06	0.73	0.00	3.88	10.30	0.00	0.00	0.00
Tripura	54.00	56.33	2.67	3.00	0.00	5.00	1.00	4.00	11.00	0.00	0.00	0.00
Sikkim	20.50	33.17	0.50	18.67	0.50	10.33	1.83	4.00	14.50	0.00	0.00	0.00
Sub Total	**50.59**	**24.04**	**2.78**	**10.28**	**1.14**	**4.53**	**1.15**	**3.50**	**6.78**	**0.11**	**0.02**	**0.02**
Himalayan States												
Himachal Pradesh	48.74	46.99	18.73	8.54	0.88	6.46	0.77	1.42	11.17	0.00	0.00	0.00
Jammu and Kashmir	57.28	10.73	2.12	3.11	0.00	1.66	1.66	2.78	3.11	0.40	0.00	0.13
Uttarakhand	37.23	25.85	3.08	3.59	0.41	3.79	1.33	1.44	5.44	0.00	0.00	0.00
Sub Total	**49.23**	**24.81**	**6.86**	**4.71**	**0.35**	**3.56**	**1.32**	**2.03**	**5.94**	**0.18**	**0.00**	**0.06**
Grand Total	**50.12**	**24.31**	**4.19**	**8.35**	**0.86**	**4.19**	**1.21**	**2.99**	**6.49**	**0.13**	**0.01**	**0.03**

 # (Code: Fruit Cultivation-1, Vegetable Cultivation-2, Mushroom Cultivation-3, Spices Cultivation-4, MAP-5, Floriculture-6, Bee Keeping-7, On-farm Management-8, Organic Farming-9, Use of Agri-equipments-10, IPM/INM Technology-11, Marketing Techniques-12)

The majority – 37% of the training programmes have been reported as organized for one day, followed by 29% for 2-5 and only 7% above 5 days duration. A large majority of the respondents – about 74% had attended training programmes on fruit [50%] and

Figure 5.55 Topics covered under the training programme

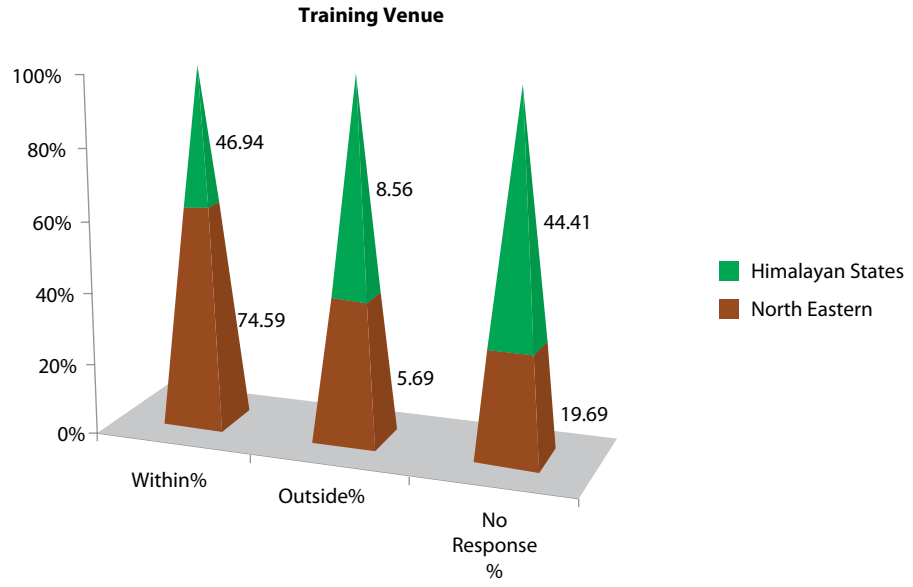


vegetable [24%] cultivation. The ratio of the participants in these two programmes at the aggregate level was also almost equal from these two regions. The maximum number of the respondents participating in the Fruit and vegetable programme was from the State of Nagaland [68%] & Sikkim [66%] and lowest from Meghalaya [20%] & Arunachal Pradesh [9%] respectively in NER. In Himalayan States, the highest number of farmers joining Fruit Vegetable training programmes was from the State of J&K [57%] & Himachal Pradesh [47%] and the lowest from Uttarakhand [37%] and J&K [11%], respectively.

Table 5.56 Location of the training venue

State	Within	%	Outside	%	No Response	%
North Eastern States						
Arunachal Pradesh	657	53.07	85	6.87	496	40.06
Assam	1688	85.86	46	2.34	230	11.70
Manipur	461	68.30	37	5.48	177	26.22
Meghalaya	312	59.43	32	6.10	181	34.48
Mizoram	463	77.17	62	10.33	75	12.50
Nagaland	703	85.21	39	4.73	83	10.06
Tripura	253	84.33	28	9.33	19	6.33
Sikkim	259	86.05	37	12.29	5	1.66
Sub Total	**4796**	**74.59**	**366**	**5.69**	**1266**	**19.69**
Himalayan States						
Himachal Pradesh	419	45.89	87	9.53	407	44.58
Jammu and Kashmir	796	52.72	99	6.56	613	40.60
Uttarakhand	380	38.97	105	10.77	489	50.15
Sub Total	**1595**	**46.94**	**291**	**8.56**	**1509**	**44.41**
Grand Total	**6391**	**65.03**	**657**	**6.68**	**2775**	**28.24**

Figure 5.56 Location of the training venue



The overall response to the training programmes on other sub components of the programme like, Mushroom, Spices, MAP, Floriculture, OFM, Organic Farming, Use of Agr. Machinery/Equipments, IPM and Marketing Techniques, remained insignificant ranging from 0.01% under IPM to 8% under Spices cultivation. However in some of the States, the response to a few of the activities was appreciable. About 19% of the respondents from Himachal Pradesh had attended training on Mushroom cultivation, 37% from Sikkim on Spices, 28% and 20% respectively, from Meghalaya & Sikkim on Floriculture 11% & 29% from Himachal Pradesh & Sikkim respectively on Organic Farming. The organizing of any particular training programme indicates the popularity of a particular activity in the area.

Most of the respondents - 65%, had attended training programmes organized within the State. About 7% also reported the venue of training outside the State. There was no response to this query by a good number of the respondents [28%].

The training programmes will facilitate extension from technology transfer mode to technology application. The direct Interface sessions between farmers and scientists would help in highlighting farming issues with the scientists and strengthen research-farmer linkages with minimum transmission losses. Farmers Training outside the State will expose farmers on different farming practices/technology as also use of traditional knowledge.

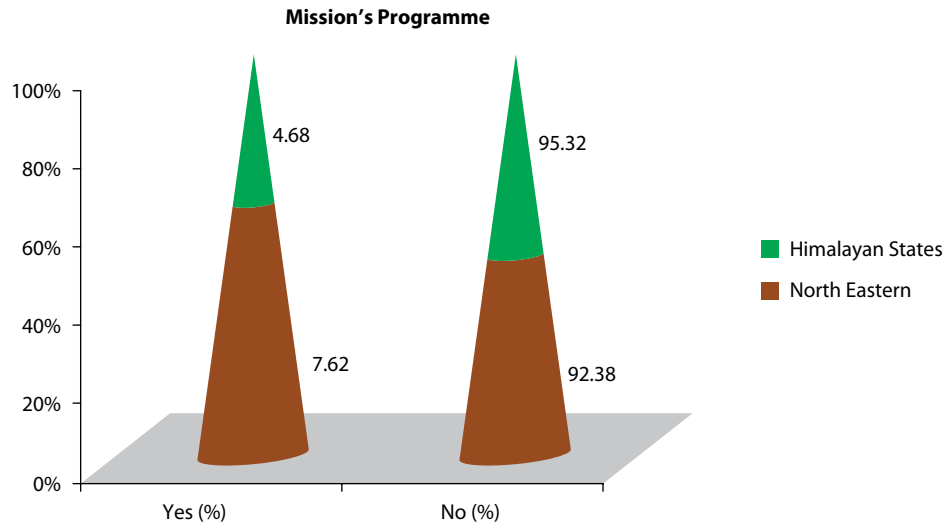
Women Empowerment

The HMNEH lays due emphasis on organizing women into Self Help Groups [SHGs] and empower them to implement the programme in a more effective way. Information was therefore, collected from the women respondents to know the status of their enrolment as the members of the SHGs and also the quality of the groups so formed. The data received is contained in Table 5.57.

Table 5.57 SHG status under mission's programme

State	Total Sample	Whether Member of any SHG	
		Yes (%)	No (%)
North Eastern States			
Arunachal Pradesh	1238	5.01	94.99
Assam	1966	6.26	93.74
Manipur	675	6.67	93.33
Meghalaya	525	16.95	83.05
Mizoram	600	6.17	93.83
Nagaland	825	8.48	91.52
Tripura	300	4	96
Sikkim	301	17.28	82.72
Sub Total	**6430**	**7.62**	**92.38**
Himalayan States			
Himachal Pradesh	913	5.26	94.74
Jammu and Kashmir	1510	0.73	99.27
Uttarakhand	975	10.26	89.74
Sub Total	**3398**	**4.68**	**95.32**
Grand Total	**9828**	**6.6**	**93.4**

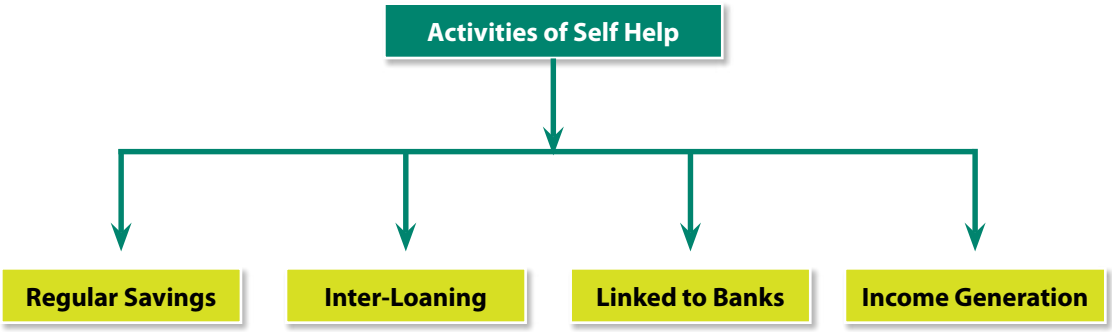
Figure 5.57 SHG status under mission's programme



Of the total 1439 women included in the sample, as many as 649 have said that they were the members of the SHGs. This forms about 45% of the total women and 7% of the total sample population. The maximum response was from the State of Sikkim (17%) closely followed by 16% in Meghalaya and the least 0.4% from the State of Jammu & Kashmir. Keeping in view the terrain of the States, the progress in organizing women into SHGs can be said to be somewhat satisfactory.

SHG Activities

Regular saving, inter-loaning amongst the members, linkage with any Bank and undertaking of Income Generating Activities [IGA] are the criteria of a successful SHG.



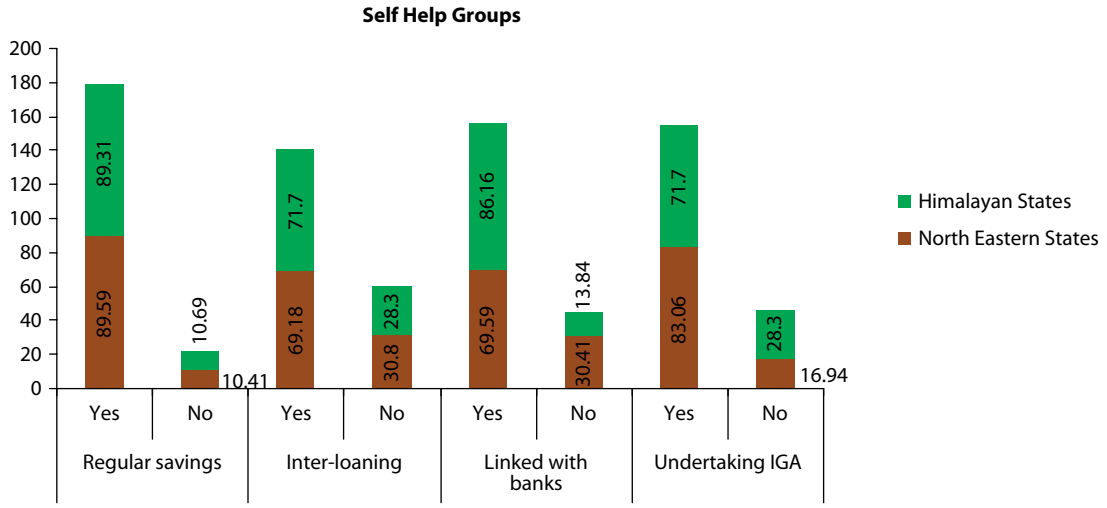
The information on the various characteristics of the SHGs formed is consolidated in Table 5.58.

Table 5.58 Activities of the Self Help Groups- percent status

State	Regular savings		Inter-loaning		Linked with banks		Undertaking IGA	
	Yes	No	Yes	No	Yes	No	Yes	No
North Eastern States								
Arunachal Pradesh	93.55	6.45	53.23	46.8	59.68	40.32	82.26	17.74
Assam	95.93	4.07	86.18	13.8	95.93	4.07	94.31	5.69
Manipur	44.44	55.56	35.56	64.4	40	60	42.22	57.78
Meghalaya	93.26	6.74	51.69	48.3	56.18	43.82	79.78	20.22
Mizoram	91.89	8.11	48.65	51.4	83.78	16.22	97.3	2.7
Nagaland	92.86	7.14	91.43	8.57	44.29	55.71	84.29	15.71
Tripura	91.67	8.33	91.67	8.33	91.67	8.33	91.67	8.33
Sikkim	96.15	3.85	86.54	13.5	86.54	13.46	84.62	15.38
Sub Total	**89.59**	**10.41**	**69.18**	**30.8**	**69.59**	**30.41**	**83.06**	**16.94**
Himalayan States								
Himachal Pradesh	100	0	62.5	37.5	91.67	8.33	68.75	31.25
Jammu and Kashmir	54.55	45.45	72.73	27.3	54.55	45.45	18.18	81.82
Uttarakhand	88	12	76	24	87	13	79	21
Sub Total	**89.31**	**10.69**	**71.7**	**28.3**	**86.16**	**13.84**	**71.7**	**28.3**
Grand Total	**89.52**	**10.48**	**69.8**	**30.2**	**73.65**	**26.35**	**80.28**	**19.72**

About 90% of the SHGs have reported regular saving and 70% doing the business of loaning amongst the members. While in the State of Himachal Pradesh, all the SHGs are making regular savings, in other States except J&K & Manipur, number of SHGs with regular savings is above 90%. In J&K and Manipur, the Groups with regular savings are reported to be 55% and 44% respectively. In Tripura and Manipur maximum [92%] and

Figure 5.58 Activities of the Self Help Groups- percent status



minimum [35%] number of SHGs have reported loaning activities amongst members, respectively. In other States such a percentage ranges from 49% in Mizoram to 91% in Nagaland.

About 74% of the SHGs are reported to have been linked with the Banks by opening Saving Bank Accounts and/or obtaining loans from the banks. With the average linkage of 72%, the position in the Himalayan States is better compared with that in NER where such an average is 69%. The bank linkage in the States of Assam [36%], Mizoram [49%], Meghalaya [51%] and Arunachal Pradesh [53%] is less than 60%. In other States, the bank linkage ranges from 63% in Himachal Pradesh to 92% in Tripura. Linkage with the banks is an important step towards the sustainability of any SHG. Concerted efforts need to be made to link more SHGs with banks.

About 80% of the SHGs are reported to have entered into the stage of IGA – 83% from NER and 72% from Himalayan States, which is encouraging. J&K [82%],and Manipur[58%] are the States where a large majority/majority of the SHGs are not undertaking any IGA. Efforts should therefore, be made to ensure that more SHGs undertake some IGA to improve the lot of their members and to sustain them. In the other States, the number of the Groups engaged in some economic activity ranges from 69% in Himachal Pradesh to 94% in Assam. The promotion and proper functioning of the groups also depends upon the existence of the good NGOs in the area.

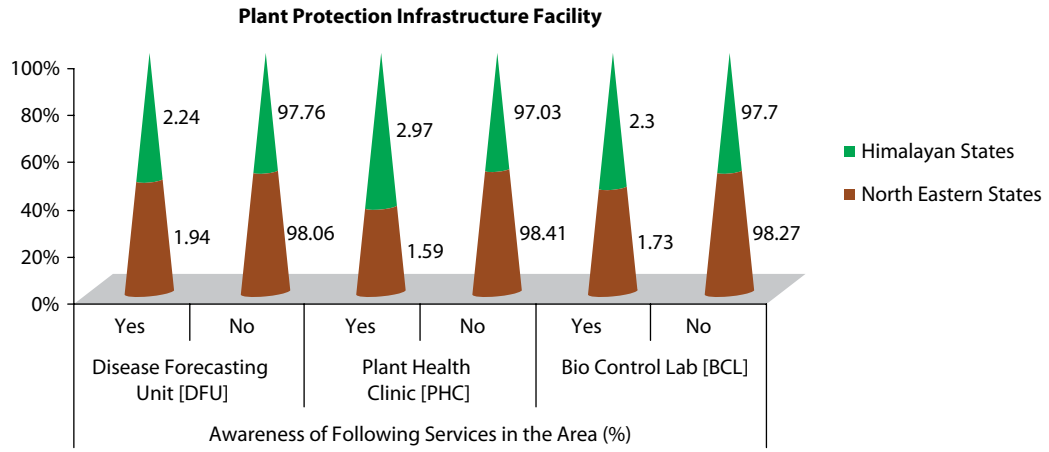
Availability of Extension Services & Plant Protection Infrastructure Facilities

Horticulture crops are frequent subject to the disease and pest attacks. The creation of necessary infrastructure in the form of Disease Forecasting Units [DFU], Plant Health Clinics [PHC] and Bio-Control Lab [BCL] is a prerequisite to fight this menace. The position of the existence of this infrastructure in the area of the respondents is presented in Table 5.59.

Table 5.59 Status of plant protection infrastructure facility in the areas of the respondents

State	Total Respondents	Awareness of Following Services in the Area (%)					
		Disease Forecasting Unit [DFU]		Plant Health Clinic [PHC]		Bio Control Lab [BCL]	
		Yes	No	Yes	No	Yes	No
North Eastern States							
Arunachal Pradesh	1238	3.07	96.93	1.78	98.22	1.78	98.22
Assam	1966	0.25	99.75	0.2	99.8	0.31	99.69
Manipur	675	1.93	98.07	0.59	99.41	0.59	99.41
Meghalaya	525	0	100	0	100	4	96
Mizoram	600	0.33	99.67	3.67	96.33	0	100
Nagaland	825	0	100	0	100	0	100
Tripura	300	0	100	3.33	96.67	4	96
Sikkim	301	22.26	77.74	13.29	86.71	15.28	84.72
Sub Total	**6430**	**1.94**	**98.06**	**1.59**	**98.41**	**1.73**	**98.27**
Himalayan States							
Himachal Pradesh	913	0.33	99.67	2.85	97.15	0.22	99.78
Jammu and Kashmir	1510	0.6	99.4	1.52	98.48	1.59	98.41
Uttarakhand	975	6.56	93.44	5.33	94.67	5.33	94.67
Sub Total	**3398**	**2.24**	**97.76**	**2.97**	**97.03**	**2.3**	**97.7**
Total	**9828**	**2.05**	**97.95**	**2.07**	**97.93**	**1.92**	**98.08**

Figure 5.59 Status of plant protection infrastructure facility in the areas of the respondents



An overwhelming majority of about 98% of the respondents has reported that they were not aware of the existence of any of the DFU, PHC and BCL facilities in their respective areas. About 22% of the respondents from the State of Sikkim only had reported that they were aware of DFU in their areas. In Meghalaya, Mizoram and Tripura States, 100% respondents stated that they were not aware of any DFU facility in their areas. In the remaining States,

the response on the non existence of the above facility ranged from 93% in Uttarakhand to 99.75% in Assam. In regard to PHC, response was almost similar as in the case of DFU. Around 13% of the respondents from Sikkim again showed their knowledge about the availability of PHC facility. In other States a predominant majority ranging from 95% in Uttarakhand to 100% in Mizoram and Meghalaya denied that they had any information about the facility in their respective regions. As far as BCL is concerned, a reasonable number of 15% of the State respondents from Sikkim only confirmed their knowledge about the facility. In other States, the response of the overwhelming majority from 95% in Uttarakhand to 100% in Meghalaya and Mizoram was that they were not aware of any BCL facility in their region.

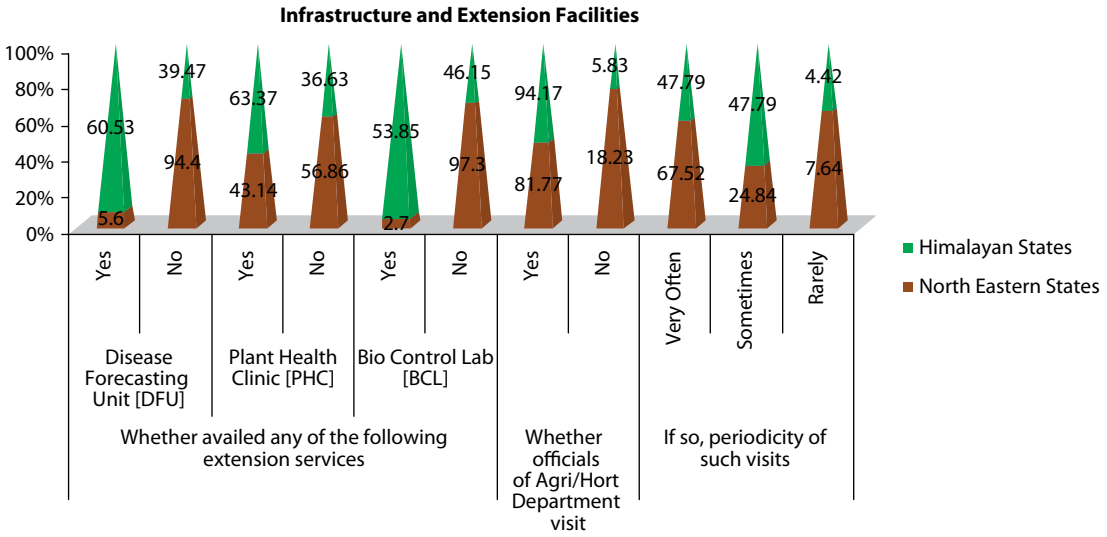
It indicates that either the DFU, PHC and BCL have not been set up in the area or the farmers by and large are simply not aware of the facility. There is thus a strong need to create above facilities within the easy access of the horticulture farmers and they should also be made aware and educated on the benefits of these facilities to avoid crop loss.

Further some of the respondents as had reported the existence of the DFU, PHC and BCL facilities in their locations, were further asked to indicate the extent of the services availed by them in this regard. Their answers were also sought on the visits of the staff of Extension Agencies to their fields and the frequency of such visits. The answers of the respondents are consolidated in Table 5.60.

Table 5.60 Infrastructure and extension facilities availed by the respondents

State	Total Sample	Whether availed any of the following extension services						Whether officials of Agri/Hort Department visit Farms of Beneficiaries		If so, periodicity of such visits		
		Disease Forecasting Unit [DFU]		Plant Health Clinic[PHC]		Bio Control Lab [BCL]						
		Yes	No	Yes	No	Yes	No	Yes	No	Very Often	Some-times	Rarely
North Eastern States												
Arunachal Pradesh	38	7.89	92.11	0	100	0	100	94.74	5.26	77.78	22.22	0
Assam	9	20	80	0	100	0	100	66.67	33.33	66.67	16.67	16.67
Manipur	13	23.08	76.92	75	25	75	25	61.54	38.46	12.5	62.5	25
Meghalaya	21	0	0	0	0	0	100	95.24	4.76	90	10	0
Mizoram	24	0	100	0	100	0	0	29.17	70.83	0	0	100
Tripura	13	0	0	20	80	0	100	84.62	15.38	72.73	9.09	18.18
Sikkim	74	0	100	97.5	2.5	0	100	93.24	6.76	68.12	31.88	0
Sub Total	**192**	**5.6**	**94.4**	**43.14**	**56.86**	**2.7**	**97.3**	**81.77**	**18.23**	**67.52**	**24.84**	**7.64**
Himalayan States												
Himachal Pradesh	28	0	100	76.92	23.08	50	50	100	0	7.14	89.29	3.57
Jammu and Kashmir	24	0	100	0	100	0	100	91.67	8.33	59.09	40.91	0
Uttarakhand	68	71.88	28.13	84.62	15.38	78.85	21.15	92.65	7.35	61.9	31.75	6.35
Sub Total	**120**	**60.53**	**39.47**	**63.37**	**36.63**	**53.85**	**46.15**	**94.17**	**5.83**	**47.79**	**47.79**	**4.42**
Total	**312**	**26.37**	**73.63**	**53.2**	**46.8**	**23.81**	**76.19**	**86.54**	**13.46**	**59.26**	**34.44**	**6.3**

Figure 5.60 Infrastructure and extension facilities availed by the respondents



Of the total about 300 respondents reporting the existence of the above Lab infrastructure in their locations, 26%, 53% and 24% of them have stated to have availed of DFU, PHC and BCL facility respectively. The actual use of the infrastructure wherever created or about which farmers were aware, was not adequate. The maximum/substantial number of the limited number of farmers actually availing of these services from this category, was from the State of Uttarakhand [72%], and Manipur [23%] in case of DFU facility, 98% from Sikkim, 85% from Uttarakhand, 77% from Himachal Pradesh, and 75% from Manipur in respect of the facility of PHC and 85% from Uttarakhand, 75% from Manipur and 50% from Himachal Pradesh for BCL facility.

Further, of the above farmers, large majority over 86% from Himalayan States and 82% from NER, have reported that the officials of Agriculture/Horticulture pay visits to their farms/fields, from time to time. Such reporting of 100% from Himachal Pradesh and 62% from Manipur to 95% from Meghalaya and all the other States is found except Mizoram where the number of such respondents is only 29%. As regards, the frequency of visits, majority of about 59% has reported "very often:" followed by 34% sometimes and rarely by 6%. The State-wise position varies from 7% in Himachal Pradesh to 79% in Arunachal Pradesh in "very often" category and from 9% in Tripura to 89% in Himachal Pradesh. All the respondents from the State of Mizoram have reported the visit of the Extension Officials only in "rarely" category.

Extension activities have a key role in the development of the horticulture Sector. A regular touch of the officials of the Agriculture/Horticulture Department and other Extension Agencies with the beneficiaries' help the latter to solve many of their farm level problems.

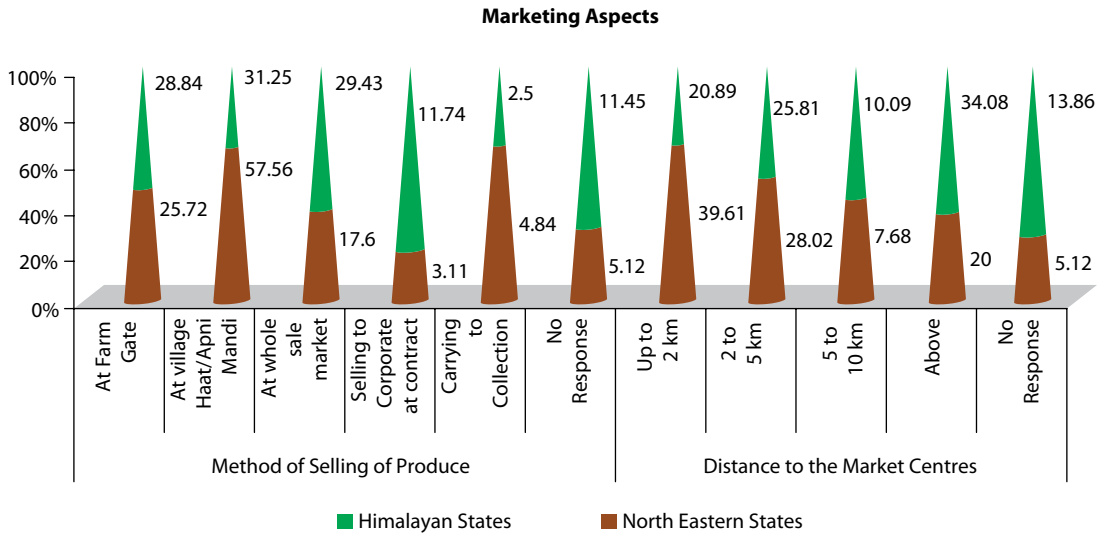
Marketing Aspects

Marketing is an important link in the supply chain of horticulture produce and often a weak point for the farmers. Information has been obtained from the respondents on the method of marketing of their produce and the distance between the farm gate and the market point and the same is presented in Table 5.61.

Table 5.61 Marketing aspects

State	Total Sample	Method of Selling of Produce						Distance to the Market Centres				
		At Farm Gate	At village Haat/ Apni Mandi	At whole sale market	Selling to Corporate at contract	Carrying to Collection Centre	No Response	Up to 2 km	2 to 5 km	5 to 10 km	Above	No Response
North Eastern States												
Arunachal Pradesh	1238	12.44	49.27	5.09	2.75	10.82	25.2	26.58	20.11	9.69	18.26	26.09
Assam	1966	27.01	74.16	17.04	0.86	1.02	0.05	52.29	19.84	6.61	21.21	0.05
Manipur	675	30.81	52.3	22.22	4.44	5.78	0	34.07	32.89	8.89	24.15	0
Meghalaya	525	37.14	48.38	14.48	0.57	4.76	0.95	29.14	39.05	3.05	27.81	0.95
Mizoram	600	27	26.17	41.83	10.67	8.67	0	45.83	25.67	14.33	16.33	0
Nagaland	825	25.09	61.21	24.61	0.97	2.42	1.33	37.45	46.42	2.79	14.06	0
Tripura	300	15.67	65.33	15	8	3.33	0	34.33	43.33	10	12.33	0
Sikkim	301	49.83	55.81	2.99	6.64	3.65	0	39.87	22.92	9.63	27.57	0
Sub Total	**6430**	**25.72**	**57.56**	**17.6**	**3.11**	**4.84**	**5.12**	**39.61**	**28.02**	**7.68**	**20**	**5.12**
Himalayan States												
Himachal Pradesh	913	33.52	20.81	49.73	2.63	0	0.22	32.86	34.5	12.6	23.44	0.22
Jammu and Kashmir	1510	18.54	23.25	16.03	15.36	4.97	25.56	7.95	19.6	7.75	33.77	30.99
Uttarakhand	975	40.41	53.44	31.18	14.67	1.03	0.1	29.74	27.28	11.38	44.51	0.1
Sub Total	**3398**	**28.84**	**31.25**	**29.43**	**11.74**	**2.5**	**11.45**	**20.89**	**25.81**	**10.09**	**34.08**	**13.86**
Total	**9828**	**26.8**	**48.46**	**21.69**	**6.09**	**4.03**	**7.31**	**33.14**	**27.26**	**8.52**	**24.87**	**8.14**

Figure 5.61 Marketing aspects



It may be observed from the table that the maximum number of the respondents- 4763 [48%] in NER and 31% in HSR] have reported sale of their horticulture produce through the channel of Village Haat/Apni Mandi, followed by 2634 [27%] selling their produce a the Farm gate, 2132 [22%] at the Wholesale Market, 599 [6%] to Corporates and 396 [4%] carrying their produce to Collection Centres. As many as 718 [7%] had not responded to the query.

The highest response for adopting Village Haat/Apni Mandi has been received from the State of Assam [74%], followed by Tripura [65%], Sikkim [56%], Nagaland [61%], Manipur [52%], Arunachal [49%], Meghalaya [48%] and Mizoram [28%] in NER and Uttarakhand[53%], J&K [23%] and Himachal Pradesh [21%]. The response of the farmers selling their produce at the farm gate from the States of Sikkim [50%], Meghalaya [37%], Manipur [31%] and Assam [27%] was above the all states average of 26% in the NER. In the Himalayan States, response of farmers using this farm gate sale channel was above both the all sate average of 36% and the Reg ion's average of 29% in Uttarakhand [40%] and Himachal Pradesh [34%]. The next important channel to dispose of the produce was the Whole Sale Market which had been used by 18% of the respondents on an average in NER and by 29% in HSR. In NER the response from the States of Mizoram [42%], Nagaland [25%] and Manipur [22%] was above the average figures for these States. In the HSR the States of Himachal Pradesh [50%] and Uttarakhand [31%] the response was above the Region's average of 29% of the farmers using the wholesale market channel.

A small number of farmers had also reported using sale to corporate [6%] and carrying produce to collection centers [4%] channel. As regards inter States comparison, farmers using "Sale to Corporate' channel comprised about 15% each in J&K & Uttarakhand, and 11% and 7% in Mizoram and Sikkim respectively. In the remaining States the number was negligible. In the sale through collection centres, the response from the States of Arunachal Pradesh and Mizoram was 11% and 9%, respectively and in respect of the remaining States, it was insignificant.

The Horticulture produce being perishable in nature, the distance between the marketing point and the farm gate is a major factor affecting the profitability of the farmers and hence an important factor in influencing their decision to utilize this channel. Information gathered from them reveals that at the aggregate level, the maximum respondents 3257 [33%[had indicated the distance between their farm gate and the sale point as up to 2 km, followed by 2679 [27%] reporting such distance between 2-5 km and 837 [9%] 5-10 km. However a substantial number of about 25% of the respondents had reported distance to the market above 10 km.

Within the 2 km category the maximum or substantial response had been from the States of Assam [52%], followed by Mizoram [46%], Sikkim [40%], Nagaland [37%], Tripura & Manipur each [34%] and Himachal Pradesh [33%]. In the next range of 2-5 km such a response, as in up to 2 km category, was from the States of Nagaland [46%], Tripura [43%], Meghalaya [39%], Himachal Pradesh [35%], and Manipur [33%]. Under 5-10 km category, minimum response of 3% each was from Nagaland & Meghalaya and maximum of 14%fom Mizoram.

As many as 45% of the respondents from the State of Uttarakhand had reported market distance above 15 km, followed by J&K [34%], Meghalaya & Sikkim [28% each] and Himachal Pradesh & Manipur [24% each]. There is large part of the States where the distance between the production and the sale point is considerable causing losses to the farmers in the form of more wastage of perishable produce and higher transport cost. Improvement in the supply chain management is necessary to ensure a reasonable price for the farmers and to encourage them towards cultivation of the horticulture crops.

Availability of Transport

Availability of transport at reasonable rates is equally important in carrying horticulture produce to the sale point by the farmers. Respondents were asked to indicate the mode of transport being used by them as also the frequency at which they send their produce to the market. The response received from them is consolidated and shown in Table 5.62.

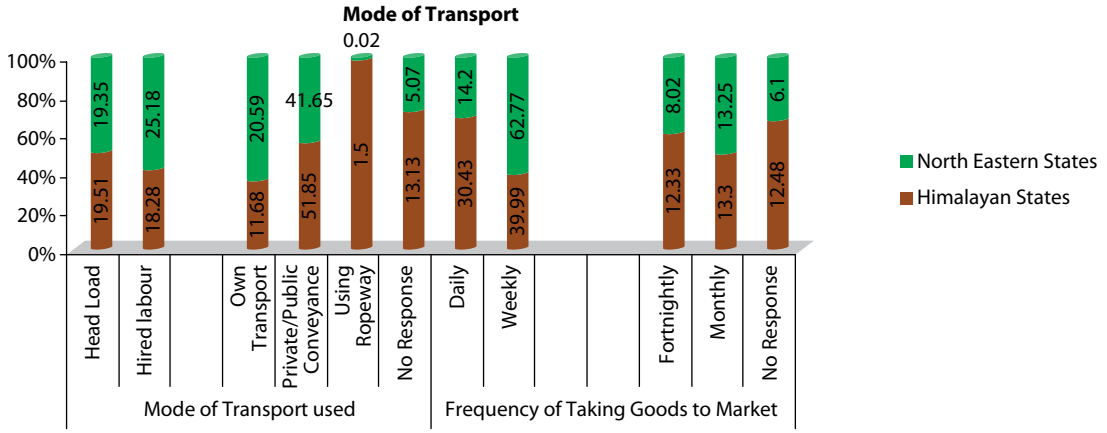
Transport is a big bottleneck and in the hilly terrain of the NER and HSR States which calls for serious attention. Majority of about 45% of the respondents - 1907 [42% in NER and 52% in HSR], reported the mode of transport being used by them in carrying their produce to market as the Private/Public transport. As many as 2240 [23% - 25% in NER & 18% in HSR], used hired labour, 1907 [19% almost in equal proportion from two regions], head load, and 1721 [18% - 21% in NER & 12% in HSR] had their own transport arrangements. While about 13% of the respondents had given multi-answers for use of more than one mode of transport, approximately 8% had not given any response in this regard. Less than 1% indicated use of ropeways also.

States where 50% or more respondents reported use of private/public transport were: Nagaland [62%], Sikkim [61%], Uttarakhand [59%], Tripura [58%], Manipur [55%] Mizoram [53%] and Himachal Pradesh [50%]. In the remaining States the number of the respondents using this mode of transport ranged from 25% in Arunachal to 48% in J&K. In respect of the hired labour sub head, the number ranged from 12% in J&K to 40% in

Table 5.62 Mode of transport and the frequency used by the respondents

State	Total Sample	Mode of Transport used						Frequency of taking Goods to Market				
		Head Load	Hired labour	Own Transport	Pvt./Public Conveyance	Using Ropeway	No Response	Daily	Weekly	Fortnightly	Monthly	No Response
North Eastern States												
Arunachal Pradesh	1238	20.68	22.46	9.53	25.04	0	25.85	8.08	45.96	8.32	7.75	31.1
Assam	1966	12.31	24.42	52.24	32.81	0.05	0.05	11.24	79.5	7.38	4.53	0.05
Manipur	675	21.93	24.15	5.04	54.81	0	0	16	58.96	10.81	14.37	0.15
Meghalaya	525	24.95	39.62	4	30.86	0	0.95	15.81	74.48	8.76	9.71	0.95
Mizoram	600	35.67	20.5	7.83	53.33	0	0	16	53.5	20.33	23.67	0
Nagaland	825	16.73	22.3	4.97	62.3	0	0	18.67	42.79	0.36	38.91	0
Tripura	300	15.67	33.67	6.33	57.67	0	0	27.33	75	4.67	7	0
Sikkim	301	22.59	27.24	5.65	61.13	0	0	22.92	71.76	3.32	11.63	0
Sub Total	**6430**	**19.35**	**25.18**	**20.59**	**41.65**	**0.02**	**5.07**	**14.2**	**62.77**	**8.02**	**13.25**	**6.1**
Himalayan States												
Himachal Pradesh	913	17.2	24.53	20.26	50.38	5.37	0.22	25.96	36.25	15.55	24.53	0.22
Jammu and Kashmir	1510	11.13	11.72	3.58	48.21	0	29.34	17.75	31.99	13.44	8.81	27.88
Uttarakhand	975	34.67	22.56	16.21	58.87	0.21	0.1	54.26	55.9	7.59	9.74	0.1
Sub Total	**3398**	**19.51**	**18.28**	**11.68**	**51.85**	**1.5**	**13.13**	**30.43**	**39.99**	**12.33**	**13.3**	**12.48**
Total	**9828**	**19.4**	**22.79**	**17.51**	**45.18**	**0.53**	**7.86**	**19.81**	**54.89**	**9.51**	**13.27**	**8.3**

Figure 5.62 Mode of transport and the frequency used by the respondents



Meghalaya. The hired labour mode is resorted where the distance is not much. Like-wise the produce is carried to the selling point where distance is not much. This practice seems to be more in Mizoram and Uttarakhand from where such reporting is around 35% in each State. In the remaining States, it ranged from 12% in Assam to 25% in Meghalaya. The highest response [52%] for making own transport arrangement for marketing of the produce was from the State of Assam, followed by Himachal Pradesh[20%] and Uttarakhand [16%]. It ranged from 4% in Meghalaya to 10% in Arunachal Pradesh in respect of other States. A limited use of ropeways has been reported from the States of Assam, Himachal Pradesh and Uttarakhand. Solutions lies in improving the transport system and streamlining the entire supply chain system of horticultures crops. The ropeway has also the potential to expand in these States.

As regards frequency in marketing the produce, majority of 55% of the respondents have reported weekly marketing of their produce in the season, 20% on daily basis, 13% on monthly basis and 10% on fortnightly basis. In NRE, the number of the responses on the marketing of produce on weekly basis, varied from 46% in Arunachal Pradesh to 80% in Assam. In HSR, the range on this account was 32% in J&K to 56% in Uttarakhand. On daily basis marketing, the response ranged from 8% in Arunachal to 27% in Tripura and from 18% in J&K to 54% in Uttarakhand. The highest number of the respondents – 39% was from the State of Nagaland and the lowest - 5% from Assam in NER taking horticulture produce to market on monthly basis. The corresponding figures in respect of HSR, were Himachal Pradesh - 25% and Uttarakhand- 10%. As regards sale on fortnightly basis, the response from the NER varied from less than 1% in Nagaland to 20% in Mizoram. In HSR, the minimum and maximum response for marketing of horticulture crop by the respondents at fortnightly intervals was from the State of Uttarakhand - 8% and Himachal Pradesh -16%. About 8% of the farmers had not responded to this question.

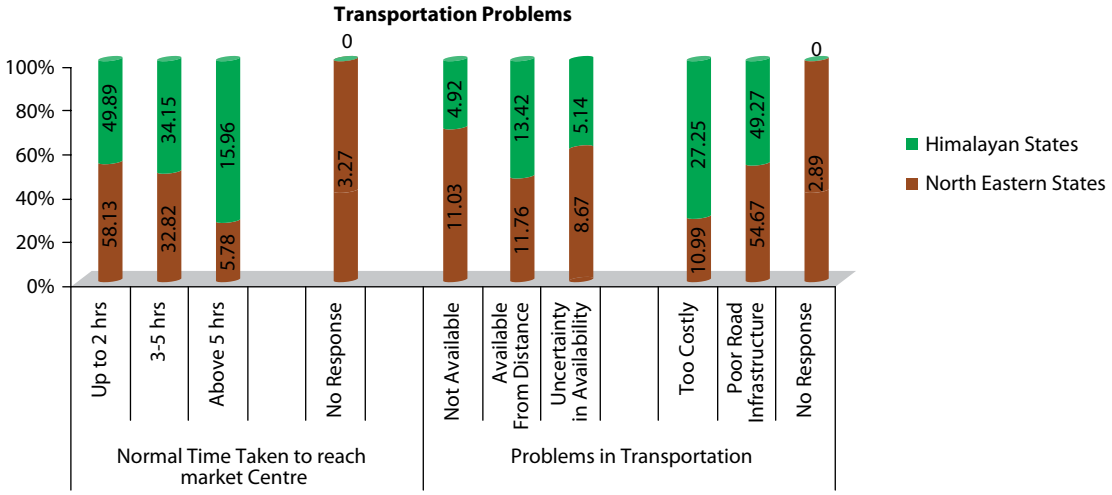
The important factors for deciding marketing are the production cycle, shelf life of the crop, availability of the transport, time taken in reaching market and market access.

Information has also been collected on the normal time taken to reach the market and the problems, if any, in the availability of the transport system in the area and is presented in Table 5.63.

Table 5.63 Transportation problems and time taken to reach market centre

State	Total Sample	Normal Time Taken to reach market Centre					Problems in Transportation				
		Up to 2 hrs	3-5 hrs	Above 5 hrs	No Response	Not Available	Available From Distance	Uncertainty in Availability	Too Costly	Poor Road Infrastructure	No response
North Eastern States											
Arunachal Pradesh	1238	32.71	27.95	13.15	26.19	10.26	8.97	7.6	5.01	45.07	23.09
Assam	1966	50.05	48.32	1.63	0	14.06	5.08	4.32	6.78	69.76	0
Manipur	675	72.15	26.22	1.63	0	6.19	4.59	5.04	16.48	67.7	0
Meghalaya	525	52.68	42.03	5.29	0	15.24	24.55	5.52	5.9	48.79	0
Mizoram	600	57.67	30	12.33	0	6	9.64	11.5	13.33	59.53	0
Nagaland	825	59.3	35.5	5.2	0	3.27	11.76	10.79	3.39	70.79	0
Tripura	300	72.67	20.33	7	0	18.33	18.33	8.34	36.33	18.67	0
Sikkim	301	67.77	32.23	0	0	14.9	11.12	16.28	0.66	57.04	0
Sub Total	**6430**	**58.13**	**32.82**	**5.78**	**3.27**	**11.03**	**11.76**	**8.67**	**10.99**	**54.67**	**2.89**
Himalayan States											
Himachal Pradesh	913	44.78	42.6	12.62	0	1.28	1.2	2.06	19.04	76.42	0
Jammu and Kashmir	1510	48.51	36.24	15.25	0	2.99	33.41	5.56	38.36	19.68	0
Uttarakhand	975	56.38	23.62	20	0	10.49	5.64	7.79	24.36	51.72	0
Sub Total	**3398**	**49.89**	**34.15**	**15.96**	**0.00**	**4.92**	**13.42**	**5.14**	**27.25**	**49.27**	**0**
Total	**9828**	**54.01**	**33.49**	**10.87**	**1.64**	**7.98**	**12.59**	**6.91**	**19.12**	**51.97**	**1.45**

Figure 5.63 Transportation problems and time taken to reach market centre



A little more than half of the respondents 54 percent [58% in NER & 50% in HSR] of the total 9828 respondents have indicated that the normal time taken by them to take their produce to market was up to two hours. Time of about 3-5 hours was reported by about 33% respondents [32% in NER & 34% in HSR] whereas 11 % of the total respondents [6% in NER and 6% in HSR] reported a time duration of more than 5 hours to reach the market to sell their produce.

Except Arunachal Pradesh, where 33% of the respondents have indicated time taken to reach market point as up to 2 hours, in all the States of NER, this response ranged from 50% in Assam to 73% in Tripura. In HSR, the corresponding range is 45% in Himachal Pradesh to 56% in Uttarakhand. In 3 to 5 hours category, the response range was 20% in Tripura to 48% in Assam in NER and from 24% in Uttarakhand to 43% in Himachal Pradesh. In the next category of above 5 hours, the range of response of the farmers i.e. 13% in Himachal Pradesh to 20% in Uttarakhand higher in the HSR compared to the range of 0% in Sikkim to 13% in Arunachal Pradesh in NER. Further the highest 13% response was only from two States of Arunachal Pradesh and Mizoram and the percentage in other States was much lower from 1% to 7%, in comparison to HSR.

The time taken to reach the market also depends upon availability of the transport and the road network. Majority of the respondents – 52% [55% in NER & 49% in HSR] has reported poor road network in their respective areas. Response in this regards ranges from 19% in Tripura to 71% in Nagaland in NER and from 20% in J&K to 76% in Himachal Pradesh in HSR.

About 8% of the respondents [11% in NER & 6% in HSR] have reported problem of non availability of transport. The State-wise position varies from 5% in Nagaland to 18% in Tripura in NER and from 1% in Himachal Pradesh to 16% in Uttarakhand, in HSR. Another problem reported by the respondents was the availability of the transport from a distance point from their farms. Such a reporting has come from 1%, 6% and 14% of the respondents in the States of Himachal Pradesh, Uttarakhand and J&K respectively in HSR. In the NER, this problem seems to be more acute. The distant factor in availability of the transport

problem ranges from 5% each in the State of Assam and Manipur to the highest of 26% in Nagaland. Besides, uncertainty in the availability of transport to carry horticulture produce to the market has been reported by about 7% of the respondents. State-wise position in this regard varied from 2% in Himachal Pradesh to 16% in Sikkim. Yet another constraint in transport is the cost factor reported by 15% of the respondents. With the average region figure of 26%, the HSR farmers have shown much concern on these problems as against 9% of the corresponding figure of NER. As regards, State-wise position, the response varies from less than 1% in Sikkim to 39% in Tripura in NER. In the case of HSR, the variation in response, which was 23% in Himachal Pradesh, 24% in Uttarakhand and 29% in J&K, was not much.

In the Hilly terrain of these States, the road network is required to be further developed. The transport difficulty is a related problem to the state of road infrastructure. The topography of the area, however, makes the development work many times costly. A good network of the Markets and collection centres at nearby points will solve the problem to a great extent.

In India, marketing of the agriculture produce, more so horticulture produce, with short shelf life is a big constraint. Views of the respondents were called on the status of the marketing infrastructure in their respective areas were sought and the replies received from them are consolidated in Table 5.64.

About 20% of the respondents only had reported existence of the Regulated Markets in their locations. A good number of the respondents of 63% just from one State viz. Himachal Pradesh had reported the availability of Regulated Markets in their areas. The response from other States in this regard ranges from 1% in Nagaland to 35% in Uttarakhand.

As regards creation of necessary facilities in the Markets, only 15% of them have reported existing of the office building in the Market. The highest number of the respondents - 63% in this regard was from the State of Himachal Pradesh The number of the farmers reporting existence of the Office building ranged from less than 1% in Nagaland to 38%nn Uttarakhand. About 15% - ranging from 0% in Nagaland to 32% in Uttarakhand, have reported availability of Auction Platforms. The position of the Drying Platforms is no better. Just 13% of the respondents have reported existence of these platforms in the markets in their respective areas. Their number varies from 0% in Nagaland to 43% in Himachal Pradesh. Like-wise a small number of 12% of the farmers – less than 1% in Tripura to 38% in Himachal Pradesh- has reported the availability of Godowns.

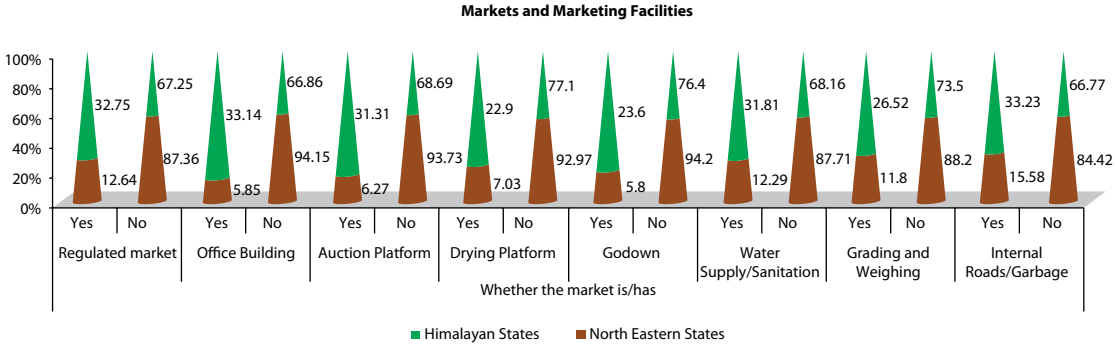
In regard to Water supply and sanitation, 19% of the respondents have reported this facility and their number being 0% in Nagaland and 33% in Uttarakhand in the inter State position. The facility of Grading and Weighing has been reported by 17% of the respondents – minimum of 2% being in Arunachal Pradesh and maximum 32% in Uttarakhand. Further in NER, as many as 21% respondents in Assam and 18% in Meghalaya, have also reported existence of this facility in markets in their area, which is much above the NER average of 12%. On the availability of Internal Roads and Garbage disposal, 22% o the total respondents have reported such a facility- 16% in NER and 33% in HSR. The positive response on his facility varies from 0% in Nagaland to 59% in Himachal Pradesh. In NER, the reporting from Assam [30%] and Mizoram [27%] is much above Region average of 16%.

The overall position emerges from the response is the sorry state of affairs of the marketing infrastructure in the area. Further the position in the HSR in this regard is slightly better

Table 5.64 Availability of the regulated markets and marketing facilities created in the area

State	Total Sample	Whether the market is/has															
		Regulated market		Office Building		Auction Platform		Drying Platform		Godown		Water Supply/ Sanitation Arrangements		Grading and Weighing arrangements		Internal Roads/ Garbage Arrangement	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
North Eastern States																	
Arunachal Pradesh	1238	7.59	92.41	0.97	99.03	4.36	95.64	6.7	93.3	1.86	98.14	3.47	96.53	2.02	98	2.58	97.42
Assam	1966	22.33	77.67	8.24	91.76	12	88	11.7	88.3	6.15	93.85	20.7	79.3	21.41	78.6	29.81	70.19
Manipur	675	2.67	97.33	1.93	98.07	1.93	98.07	1.93	98.07	2.22	97.78	4.3	95.7	4.59	95.4	14.22	85.78
Meghalaya	525	6.67	93.33	1.52	98.48	1.71	98.29	1.9	98.1	7.24	92.76	12.76	87.24	17.52	82.5	14.86	85.14
Mizoram	600	27.83	72.17	22.17	77.83	8.33	91.67	13.17	86.83	24.67	75.33	32.5	67.5	24.5	75.5	27.33	72.67
Nagaland	825	1.45	98.55	0.61	99.39	0	100	0	100	0.48	99.52	0	100	0.24	99.8	0.12	99.88
Tripura	300	8	92	6.67	93.33	6	94	3.67	96.33	0.33	99.67	8.67	91.33	6	94	7	93
Sikkim	301	7.97	92.03	7.64	92.36	7.64	92.36	8.64	91.36	7.64	92.36	7.64	92.36	7.64	92.4	7.97	92.03
Sub Total	**6430**	**12.64**	**87.36**	**5.85**	**94.15**	**6.27**	**93.73**	**7.03**	**92.97**	**5.8**	**94.2**	**12.29**	**87.71**	**11.8**	**88.2**	**15.58**	**84.42**
Himalayan States																	
Himachal Pradesh	913	63.09	36.91	62.65	37.35	59.8	40.2	42.72	57.28	38.12	61.88	56.3	43.7	48.3	51.6	59.15	40.85
Jammu and Kashmir	1510	13.25	86.75	12.05	87.95	13.58	86.42	6.29	93.71	7.55	92.45	16.09	83.84	10.07	89.9	15.76	84.24
Uttarakhand	975	34.56	65.44	38.15	61.85	32.1	67.9	30.05	69.95	34.87	65.13	33.23	66.77	31.59	68.4	36	64
Sub Total	**3398**	**32.75**	**67.25**	**33.14**	**66.86**	**31.31**	**68.69**	**22.9**	**77.1**	**23.6**	**76.4**	**31.81**	**68.16**	**26.52**	**73.5**	**33.23**	**66.77**
Total	**9828**	**19.6**	**80.4**	**15.28**	**84.72**	**14.93**	**85.07**	**12.52**	**87.48**	**11.96**	**88.04**	**19.04**	**80.95**	**16.89**	**83.1**	**21.68**	**78.32**

Figure 5.64 Availability of the regulated markets and marketing facilities created in the area



compared to that in the NER. The actual marketing conditions in the concerned States may not be that bad as depicted from the response as farmers may not be aware of various facilities. But it is well acknowledged that the marketing is the weakest point in the supply chain of horticulture produce and the system needs total restructuring. There may be difference of degree in the aforesaid marketing conditions but not in kind.

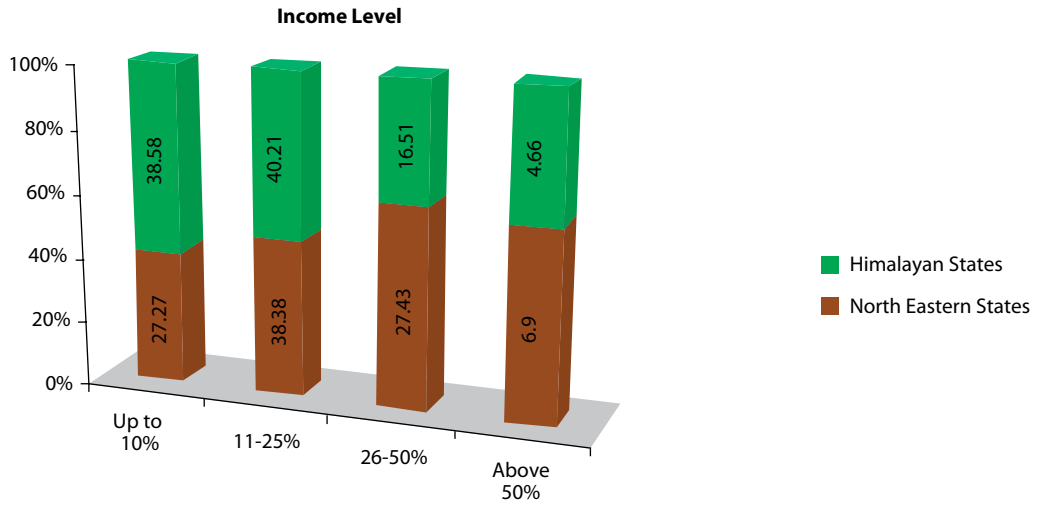
Economic Impact of the Programme

The ultimate objective of any economic development programme is to increase the income level of the beneficiaries. The respondents have furnished information on the effect of the Integrated Development of horticulture in NER and Himalayan states and the same is presented in Table 5.65.

Table 5.65 Effect of the programme on the income level of the beneficiaries

State	Total Sample	Increase in Income on a/c of MM-II (%)		Extent of Income Increase (% Response)			
		Yes	No	Up to 10%	11-25%	26-50%	Above 50%
North Eastern States							
Arunachal Pradesh	1238	63.65	36.35	27.92	32.49	37.94	1.65
Assam	1966	70.3	29.7	48.12	34.88	16.86	0.14
Manipur	675	87.11	12.89	25.85	35.71	23.3	15.14
Meghalaya	525	62.48	37.52	22.26	51.83	14.02	11.89
Mizoram	600	95.33	4.67	8.04	24.13	41.43	26.22
Nagaland	825	92.12	7.88	18.95	62.11	14.47	4.47
Tripura	300	97.33	2.67	11.99	33.56	52.05	2.4
Sikkim	301	97.01	2.99	9.93	32.19	54.11	3.77
Sub Total	**6430**	**77.79**	**22.21**	**27.27**	**38.38**	**27.43**	**6.9**
Himalayan States							
Himachal Pradesh	913	97.04	2.96	44.7	36.23	13.43	5.64
Jammu and Kashmir	1510	74.3	25.7	34.31	45.81	16.13	3.74
Uttarakhand	975	95.28	4.72	37.89	37.24	19.91	4.84
Sub Total	**3398**	**86.43**	**13.57**	**38.58**	**40.21**	**16.51**	**4.66**
Total	**9828**	**80.78**	**19.22**	**31.45**	**39.06**	**23.39**	**6.07**

Figure 5.65 Effect of the programme on the income level of the beneficiaries



Of the total 9828 farmers who answered this query, as many as 7939 [81% - 78% from NER and 86% from HSR] have indicated increase in their income level consequent upon their participation in the programme. In the inter State position, the response varies from 62% in Meghalaya to 97% in Tripura and Sikkim in NER. In the HSR, the position is still better compared with NER,as the response ranges from 74% in J&K to 97% in Himachal Pradesh.

Only a small minority of 19% [NER-22% & HSR -14%] has reported no change in their economic status. A good number of the respondents making such reporting are from three States viz. Meghalaya [37%], Arunachal Pradesh [36%] and J&K [26%]. More focus on the programme may therefore, be required in these States, in future.

A question was also put to the respondents to indicate increase in their income in four ranges i.e. [i] up to 10%, [ii] 11-25%, [iii] 26-50% and [iv] above 50%. Majority of 39% of them [38% -NER & 40% -HSR] have reported increase in their income in the 11-25% bracket, followed by 31% [27%-NER& 39%-HSR] showing increase up to 10%, 23% [27%-NER & 17%-HSR] between 26% to 50% and 6% [7%-NER & 5% HSR] reporting increase in their income by more than 50%.

In the income break up to 10% increase, the States with the minimum and maximum response were Meghalaya [8%], & Assam [48%] in NER and J&K [38%] & Himachal Pradesh [45%] in HSR. In the next category of income range of 11-25% the above position has been attained by Mizoram [24%] & Meghalaya [52%] in NER and Himachal Pradesh [36%] and J&K [46%] in HSR. The minimum and maximum response in the income bracket of 26-50% was from the States of Meghalaya [14%] & Sikkim [54%[in NER and Himachal Pradesh [13%] & Uttarakhand[20%] from HSR. Less than1% respondents reported income increase above 50% from Assam & 26% from Mizoram in NER and minimum of 4% by the respondents from the State of J&K & maximum of 6% from Himachal Pradesh.

In overall, it indicates a positive outcome of the programme in meeting its basic objective of increase in the income level of the beneficiaries. The views of the farmers were also ascertained as to whether they would like to sow additional area under horticulture crops. The replies received from them are collated and contained in Table 5.66.

Table 5.66 Beneficiaries reaction on sowing additional area under horticulture in future

State	Total Sample	Interest in additional area under Hort in future (%)		# Reason for Non-inclusion of additional area under Hort in future (% Response)						
		Yes	No	1	2	3	4	5	6	7
North Eastern States										
Arunachal Pradesh	1238	51.53	48.47	29.91	30.04	22.6	0	0	17.45	0
Assam	1966	55.09	44.91	16.42	28.42	26.78	14.84	9.08	4.28	0.18
Manipur	675	88.3	11.7	12.35	30.84	0	32.64	8.16	13.18	2.83
Meghalaya	525	49.33	50.67	23.17	34.38	6.38	33.3	2.38	0.39	0
Mizoram	600	89.33	10.67	22.19	19.75	14.68	32.04	6.82	4.52	0
Nagaland	825	88.36	11.64	14.82	28.14	4.64	36.48	5.82	3.14	6.96
Tripura	300	74.33	25.67	20.43	15.25	5.35	38.42	10.23	4.82	5.5
Sikkim	301	78.74	21.26	12.11	30.97	1.84	42.6	4.24	0	8.24
Sub Total	**6430**	**66.89**	**33.11**	**18.93**	**27.22**	**10.28**	**28.79**	**5.84**	**5.97**	**2.96**
Himalayan States										
Himachal Pradesh	913	92.88	7.12	4.74	22.64	3.28	38.42	12.4	4.04	14.48
Jammu and Kashmir	1510	64.04	35.96	6.12	19.45	8.62	45.37	8.83	6.34	5.27
Uttarakhand	975	83.28	16.72	4.31	32.25	2.36	44.58	2.02	8.06	6.42
Sub Total	**3398**	**77.31**	**22.69**	**5.06**	**24.78**	**4.75**	**42.79**	**7.75**	**6.15**	**8.72**
Total	**9828**	**70.49**	**29.51**	**11.99**	**26.00**	**7.52**	**35.79**	**6.80**	**6.06**	**5.84**

#[Crop not remunerative-1, High production cost-2, Area not productive-3, Crop susceptible to pests/ diseases-4, Certified seed of choice variety not available-5, Reqd. inputs not available-6, Others-7.

A large majority of 6928 [about 70% - 67% NER & 77% HSR] of the total sample farmers, has indicated their willingness to bring additional area under horticulture crops. The remaining 30% beneficiaries did not show any interest in bringing additional acreage under horticulture crops. This class of the beneficiaries formed majority in the State of Meghalaya [51%] and substantial to good number in Arunachal Pradesh [48%], Assam [45%], J&K [36%], Tripura [26%] and Sikkim [21%].

Among the total 2900 beneficiaries not showing any interest to increase their acreage under horticulture crops, have given different reasons for not expanding their horticulture crops base, such as: [i], Activity not remunerative [12%], [ii] High Production costs [26%]. [iii] Area not productive [8%], [iv] Crops susceptible to pests/diseased (36%), [v] quality seed of choice variety not available [7%], [vi] Required inputs not available [6%] and other reasons especially of marketing of this perishable produce [6%]. Amongst the States there is not much variation in the percentage of the beneficiaries covered under different sub heads of reasons.

The main reasons furnished by the farmers not interested in expanding their horticulture crop base were the pest and disease infestation, high production cost, marketing and input procurement constraints. Though such issues are being regularly addressed under various Govt. initiated programmes, yet Horticulture/Agriculture Department of the concerned States need to look into the matter to encourage this group of farmers to put more acreage under horticulture crops.

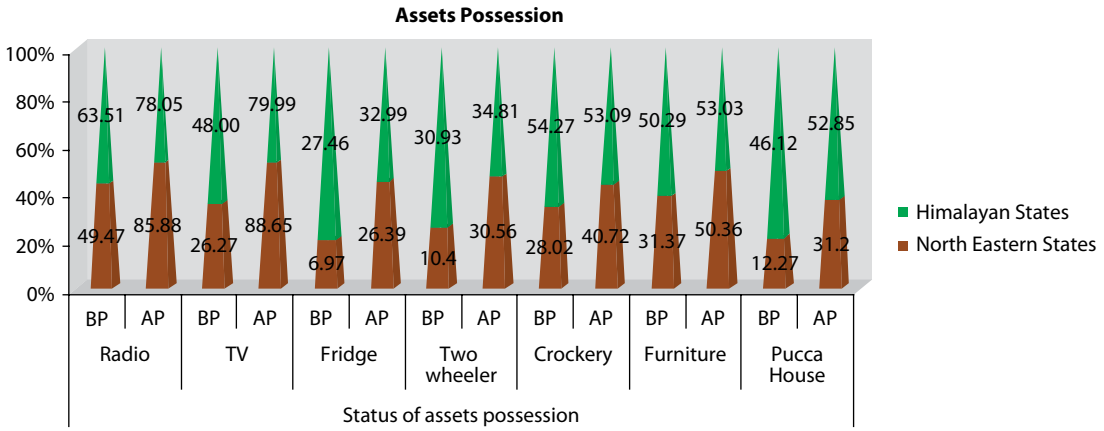
Standard of Living

With the increase in income level an individual has a natural tendency to improve his standard of living. A comparison of the possession of various assets in pre and post period of participation in the programme is another indicator to measure the impact of the programme on the income of the beneficiary. The information collected from the beneficiaries in this regard is shown in Table 5.67.

Table 5.67 Status of the assets possession by the respondents in pre and post programme period

State	Total Sample	Status of assets possession													
		Radio		TV		Fridge		Two wheeler		Crockery		Furniture		Pucca House	
		BP	AP	BP	AP	BP	AP	BP	AP	BP	AP	BP	AP	BP	AP
North Eastern States															
Arunachal Pradesh	1238	43.13	66.56	28.43	68.17	14.78	23.59	20.84	30.37	29.32	34.33	21.24	32.79	17.04	24.47
Assam	1966	32.04	95.07	22.08	96.19	2.19	8.55	8.85	18.92	9.46	21.16	31.54	40.03	4.07	16.94
Manipur	675	49.48	94.67	20.00	94.22	3.85	27.85	3.70	63.41	6.52	25.04	3.26	36.59	1.33	22.81
Meghalaya	525	50.10	96.00	21.14	97.71	3.62	13.90	5.52	10.29	23.24	35.24	29.71	50.29	16.00	46.10
Mizoram	600	50.50	61.33	43.67	92.50	16.33	76.67	14.83	47.17	50.00	66.33	57.50	82.17	30.50	63.67
Nagaland	825	88.24	92.24	33.58	81.58	7.39	25.45	7.52	18.55	71.15	83.39	51.76	75.03	10.91	31.39
Tripura	300	76.33	90.00	28.00	97.33	5.00	56.00	9.67	70.67	15.67	37.67	25.00	60.33	12.00	32.33
Sikkim	301	53.16	95.35	11.30	98.34	1.00	45.85	1.00	28.90	50.83	74.42	36.21	80.07	31.89	78.41
Sub Total	**6430**	**49.47**	**85.88**	**26.27**	**88.65**	**6.97**	**26.39**	**10.40**	**30.56**	**28.02**	**40.72**	**31.37**	**50.36**	**12.27**	**31.20**
Himalayan States															
Himachal Pradesh	913	83.35	89.38	34.83	98.69	25.74	14.24	37.35	16.87	27.27	21.25	34.06	23.99	27.27	26.18
Jammu and Kashmir	1510	65.10	60.13	41.85	57.68	18.87	36.89	16.56	36.69	58.48	61.32	44.57	57.22	38.61	50.46
Uttarakhand	975	42.46	95.18	69.85	97.03	42.36	44.51	47.18	48.72	73.03	70.15	74.36	73.74	75.38	81.54
Sub Total	**3398**	**63.51**	**78.05**	**48.00**	**79.99**	**27.46**	**32.99**	**30.93**	**34.81**	**54.27**	**53.09**	**50.29**	**53.03**	**46.12**	**52.85**
Total	**9828**	**54.32**	**83.17**	**33.78**	**85.65**	**14.05**	**28.67**	**17.50**	**32.03**	**37.10**	**44.99**	**37.91**	**51.28**	**23.97**	**38.69**

Figure 5.66 Status of the assets possession by the respondents in pre and post programme period



The respondents have given multi answers in holding possession of different types of assets. The possessions of assets under all the parameters have shown increase from moderate to substantial. In all, the status of the possession of consumer durables/ other assets of the beneficiaries has recorded increase in the form of ownership of: [i] Radio - 54% to 83%, [ii] TV - 34% to 86%, [iii] Fridge- 14% to 29%, [iv] Two/Four Wheeler - 18% to 32%, [v] Crockery -37% to 45%, [vi] Furniture - 38% to 51% and [vii] Pucca House - 24% to 39%.

The maximum increase in the ownership of TV [52%] followed by Radio [29%], Fridge, and Two Wheelers & Pucca House each at the rate of 15%, Furniture 13% and Crockery 8%. Region-wise, the maximum increase recorded in the NER was in case of TV [63%], followed by Radio [37%], Two Wheelers [21%], Fridge, Furniture, & Pucca House [19% each] and Crockery [13%], In respect of HSR, the maximum increase was in the possession of TV [32%], followed by Radio [14%], Pucca House [8%, Fridge [6%], Two Wheelers [4%] and Furniture [3%]. In case of Crockery, there was a decrease of one percent. The decrease in the asset possession is also observed in case of some of the States namely [i] J&K- one item [65% to 60% - Radio], [ii] Himachal Pradesh in respect of five items [26% to 14% - Fridge, 37% to 17%- Two Wheelers, 27% to 21% - Crockery, 34% to 24%- Furniture and 27% to 26%- Pucca House] and, Uttarakhand in case of two items [73% to 70% - Crockery, & 74% to 73%- Furniture].

Under all the parameters, increase is more visible in respect of the NER compared to the HSR. This disparity may be on account of existing level of satisfaction of the beneficiaries in a particular area in view of different developmental stages of the different region. Certain items are also discarded and new ones added in view of individual preference.

6

Chapter

PERFORMANCE EVALUATION OF STATES

The Technology Mission for Integrated Development of Horticulture in North Eastern States including Sikkim was launched by the Government of India during 2001-02, which was subsequently extended to the States of Jammu & Kashmir, Himachal Pradesh and Uttarakhand during the year 2003-04. The scheme has since been renamed as "Horticulture Mission for North East and Himalayan States [HMNEH]". The Mission aims at promoting holistic growth of the horticulture sector through an area based regionally differentiated strategies for ensuring an end-to-end approach covering production, post-harvest management, processing and marketing to assure appropriate returns to growers/producers and promoting R&D technologies for production, post-harvest management and processing.

The Mini Mission II and III have more than two dozen major components of the programme under which financial support is extended for integrated development of the horticulture in the North Eastern Region [NER] and Himalayan State Region [HSR]. The consolidated Component-wise physical achievements of States in the North Eastern Regional and Himalayan States is presented in Annexure 6.1. A brief analysis of the progress made by the States in the implementation of the programme under each Component together with Plan-wise tabulation of Physical Targets & Achievements is given below:

Area Expansion

With the growing demand and limit on the available arable land and other natural resources, primarily, there has to be a vertical growth in horticulture. Wastelands and hilly terrains are the potential future expansion areas for horticulture development. The diverse soil and agro-climatic conditions place the North East and Himalayan States in a comparative advantageous position for growing a large number of horticultural crops round the year and also triggering an overall economic growth in the region. The area expansion is thus the main plank of the strategy of the HMNEH for horticulture development in these States.

The technological driven Area Expansion component has covered the following Crops and other related activities:

- Fruit Crops
- Vegetable Crops
- Roots & Tuber Crops
- Floriculture
- Spices including saffron
- Plantation Crops
- Medicinal Crops
- Aromatic Plants
- Rejuvenation of Senile Orchards
- Model Floriculture Centres
- Integrated Mushroom Unit

The Main Crop-wise, Plan-wise and State-wise performance of the participating States in the implementation of the programme, Main Crop-wise, Plan-wise and State-wise achievement of targets and additional acreage brought under cultivation of horticulture crops since the inception of the Mission in 2001-02 in case of NER and 2003-04 for HSR, under Area Expansion, is discussed in the paragraphs [i] to [xi] hereunder.

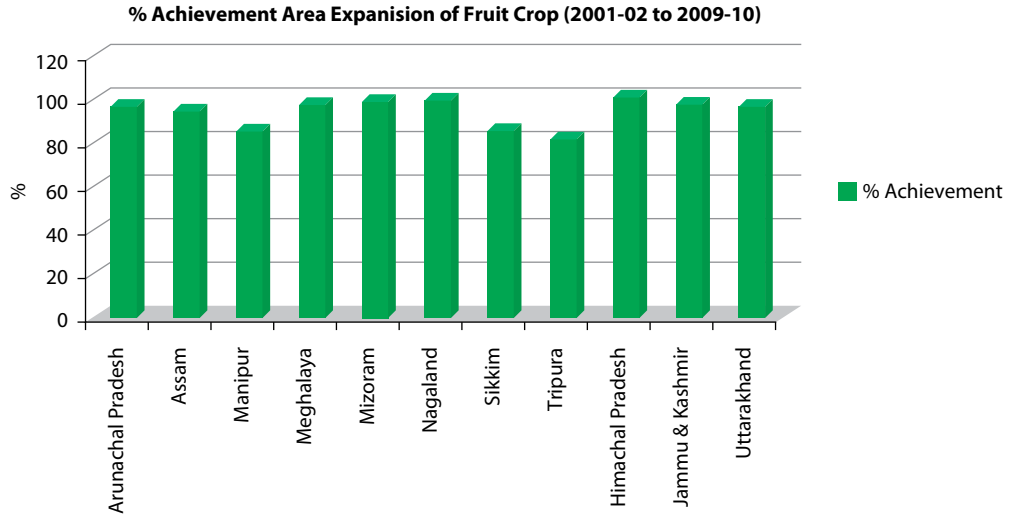
Fruit Crops

The Plan-wise and State-wise targets and achievement in the expansion of area under Fruit Crops cultivation component/sub component are presented in Table 6.1.

Table 6.1 Achievement vis-à-vis Target of the States in expansion area under Fruit Crops [ha]

States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achievement	% Achievement	% @ share
Arunachal Pradesh	1591	13368	23945	1551	13286	22835	38904	37672	97	13
Assam	350	10830	25240	250	9725	24580	36420	34555	95	12
Manipur	500	12103	18547	400	10850	15583	31150	26833	86	9
Meghalaya	900	5537	9714	950	5202	9714	16151	15866	98	6
Mizoram	600	19799	23724	623	19421	23424	44123	43468	99	15
Nagaland	600	9994	17765	600	9994	17765	28359	28359	100	10
Sikkim	420	5136	5500	260	4460	4795	11056	9515	86	3
Tripura	460	8050	5330	309	5690	5330	13840	11329	82	4
NES Total	**5421**	**84817**	**129765**	**4943**	**78628**	**124026**	**220003**	**207597**	**94**	**73**
Himachal Pradesh	N/A	13535	12699	N/A	14053	12536	26234	26589	101	9
Jammu & Kashmir	N/A	3441	10346	N/A	2924	10526	13787	13450	98	5
Uttarakhand	N/A	15284	24133	N/A	14862	23569	39417	38431	97	13
HS Total	**N/A**	**32260**	**47178**	**N/A**	**31839**	**46631**	**79438**	**78470**	**99**	**27**
Grand Total	**5421**	**117077**	**176943**	**4943**	**110466**	**170657**	**299441**	**286066**	**96**	**100**

Figure 6.1 Achievement vis-à-vis Target of the States in expansion of area under different Fruit Crops



At the time of launching of the programme in the year 2001-02 only a small target of 5421 ha for expansion of area under fruit crops, was fixed in respect of NER as the time left after doing the spade work, was not sufficient. With the extension of the programme to the Himalayan States, the target was increased substantially to 1.18 lakh ha during X five year Plan period. This sub sector was further strengthened in XI Five Year Plan when during the

first three years of the Plan from 2007- 08 to 2009-10, a target of 1.77 lakh ha had been fixed for all the States. A total target of 2.99 lakh ha for expansion of the area under fruit crops had thus been set up to the year 2009-10 in respect of all the States covered under the programme, against which the achievement was of the order of 2.86 lakh ha i.e. about 96% of the target. Keeping in view various constrains in the implementation of the programme in the mountainous terrain, the performance of the States at an aggregate level may be considered satisfactory.

The average shortfall in achievement during the IX Plan was of the order of 9% [ach 91%]. This was reduced to 4% [ach 96%] during X Plan. In the first three years of the XI Plan, the deficit of 4% continued.

Only two States of Nagaland and Himachal Pradesh have achieved their cumulative targets up to the year 2009-10, fully. The States of Mizoram, Meghalaya, J&K, Arunachal Pradesh and Uttarakhand had small deficit of 1% to 3%. In respect of the remaining States, Tripura had he maximum shortfall of 18% [ach.82%] in its achievement and Assam the minimum of 5%.

Keeping 2001-02 as the base year with an area of about 0.54 lakh ha, the area under fruit crops, expanded to 2.08 lakh ha in the NER, recording a fourfold increase. Like-wise in the Himalayan States the areas under fruit crops increased from 0.32 ha in 2003-04, the base year, to 0.78 lakh ha as at the end of 2009-10 showing an increase of two and half times.

In this expansion programme under fruit crops, the share of the two Regions viz. NER and HSR was of the order of 73% and 27% respectively. The highest share of 15% in the total area of 2.86 lakh ha was of the State of Mizoram, followed by Arunachal & Uttarakhand - each with 13%, share Assam with 12% and Nagaland with 10% share. These five States together had about two thirds share in the total area expansion that took place up to the year 2009-10. The share of the remaining six States ranged from 3% in case of Sikkim to 9% each in respect of Manipur and Himachal Pradesh.

In may be said in conclusion that the performance of all the States had by and large been satisfactory in the implementing of the Fruit Crops area expansion component. The shortfall in their achievement was marginal in most of the cases and the position in this regard had improved since the launching of the programme in 2001-02/2002-03. The Mission has been able to tap a vast potential of the fruit crops in the area more particularly in the NER.

Vegetable Crops

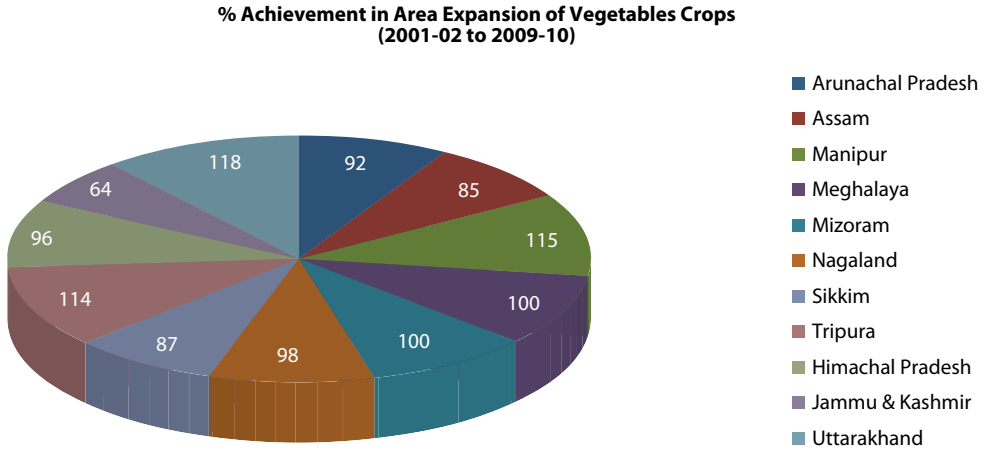
The Plan-wise and State-wise targets and achievement in the expansion of area under Vegetable Crops cultivation component/sub component are depicted in Table 6.2.

During the year 2001-01, only a small target of coverage of an area of 2000 ha had been allotted to the NER States under vegetable cultivation and the States had achieved the same with good margins. During the IX plan period and with the joining of 3 additional Himalayan States under the programme, the target of vegetable growing had been raised to 36688 ha in X Plan. The target of vegetable cultivation was further increased to 63601 ha during the XI Five Year Plan - up to 2009-10 alone. The States had been given a cumulative target of coverage of an area of 1.02 lakh ha under vegetable cultivation since the launching of the programme in the year 2001-02 to 2009 -10. Against this targets the achievement was of the order of 1.04 i.e. 102%. The performance of the States at the aggregate level was satisfactory.

Table 6.2 Achievement vis-à-vis Target in expansion of area under different Vegetable Crops

Vegetables [ha]										
States	Target			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achievement	% Achievement	% @ share
Arunachal Pradesh	110	3372	1813	110	3372	1375	5295	4857	92	5
Assam	250	2550	4875	250	1899	4385	7675	6534	85	6
Manipur	300	2711	10689	350	2859	12596	13700	15805	115	15
Meghalaya	250	3882	2895	300	3832	2895	7027	7027	100	7
Mizoram	200	4488	6342	200	4467	6342	11030	11009	100	11
Nagaland	200	2750	5780	200	2580	5780	8730	8560	98	8
Sikkim	340	5050	8765	775	4952	6520	14155	12247	87	12
Tripura	350	5085	10750	350	7403	10750	16185	18503	114	18
NES Total	**2000**	**29888**	**51909**	**2535**	**31364**	**50643**	**83797**	**84542**	**101**	**81**
Himachal Pradesh	N/A	2038	1846	N/A	2061	1670	3884	3731	96	4
Jammu & Kashmir	N/A	356	2020	N/A	210	1316	2376	1526	64	1
Uttarakhand	N/A	4406	7826	N/A	5073	9330	12232	14403	118	14
HS Total	**N/A**	**6800**	**11692**	**N/A**	**7344**	**12316**	**18492**	**19660**	**106**	**19**
Grand Total	**2000**	**36688**	**63601**	**2535**	**38708**	**62959**	**102289**	**104202**	**102**	**100**

Figure 6.2 Achievement vis-à-vis Target in expansion of area under different Vegetable Crops



The overall targets have been achieved during the X and X Plan with good to moderate margins of 27% [ach.127%] and 6% [ach.106%] respectively. During the XI Plan up to the year 2009-10, there has been a small shortfall of about 1% in the achievement.

Only five of the States of Manipur, Meghalaya, Mizoram, Tripura and Uttarakhand have achieved their targets fully. The shortfall in achievement of its target was maximum – 36% [ach. 64%] in the case of the State of J&K. In respect of the remaining States, the shortfall ranged from minimum of 4% in case of the State of Himachal Pradesh to a maximum of 15% in respect of Sikkim.

The State of Tripura had the maximum share of 18% in the total additional area brought under vegetable cultivation. This was followed by Manipur with 15%, Uttarakhand with 14%, Sikkim with 12% and Mizoram with 11%. These five States together accounted for about 70% of the total programme.

The area of vegetable cultivation under HMNEH increased substantially by about five thousand percent from just 2000 ha in at the start of the programme in 2001-02 to 1.04 lakh ha in the year 2009 -10. While there has been forty two times increase in the area under vegetable cultivation in NER, the corresponding figure for the HSR is three times. The overall progress in the area expansion under this component is rated as good both in relative and absolute terms.

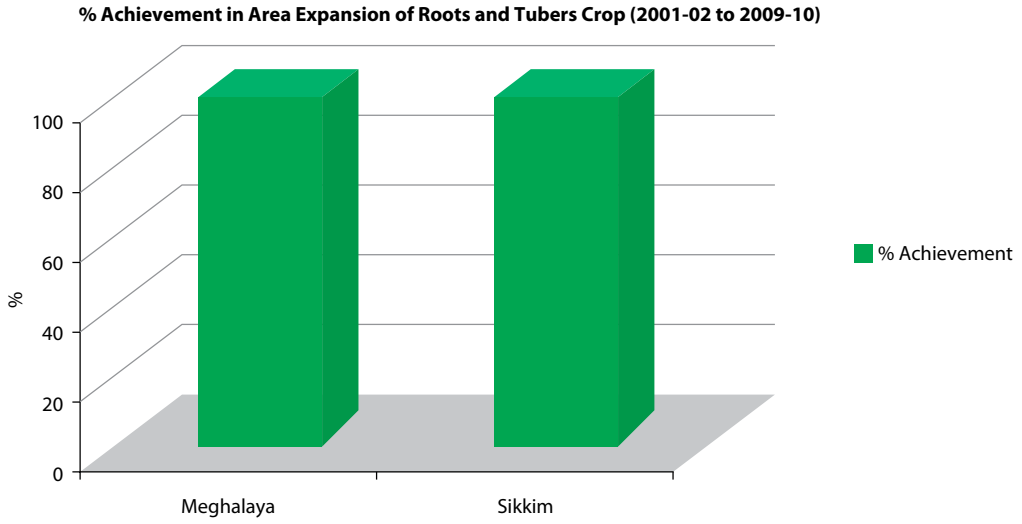
Roots and Tuber Crops

The Plan-wise and State-wise targets and achievements in the expansion of area under Roots and Tuber Crops cultivation component/sub component of the programme are shown in Table 6.3.

Table 6.3 Achievement vis-à-vis Target of the States in expansion of area under Roots and Tuber crops

Roots and Tubers [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achievement	% Achievement	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	120	399	0	120	399	519	519	100	39
Mizoram	0	0	0	0	0	0	0	0	N/A	0
Nagaland	0	0	0	0	0	0	0	0	N/A	0
Sikkim	0	0	800	0	0	800	800	800	100	61
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**120**	**1199**	**0**	**120**	**1199**	**1319**	**1319**	**100**	**100**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**0**	**N/A**	**0**	**0**	**0**	**0**	**N/A**	**0**
Grand Total	**0**	**120**	**1199**	**0**	**120**	**1199**	**1319**	**1319**	**100**	**100**

Figure 6.3 Achievement vis-à-vis Target of the States in expansion of area under Roots and Tuber crops



Only two of the States of Meghalaya and Sikkim have been participating in the production of Roots and Tuber Crops under the programme. Both the States have achieved their targets of 1318 ha given to them during the X and XI Plan - up to the year 2009-10. Whereas then State of Sikkim had the maximum share of 61%, coverage of Roots and Tuber Crops in Meghalaya was 39% of the total programme.

Floriculture

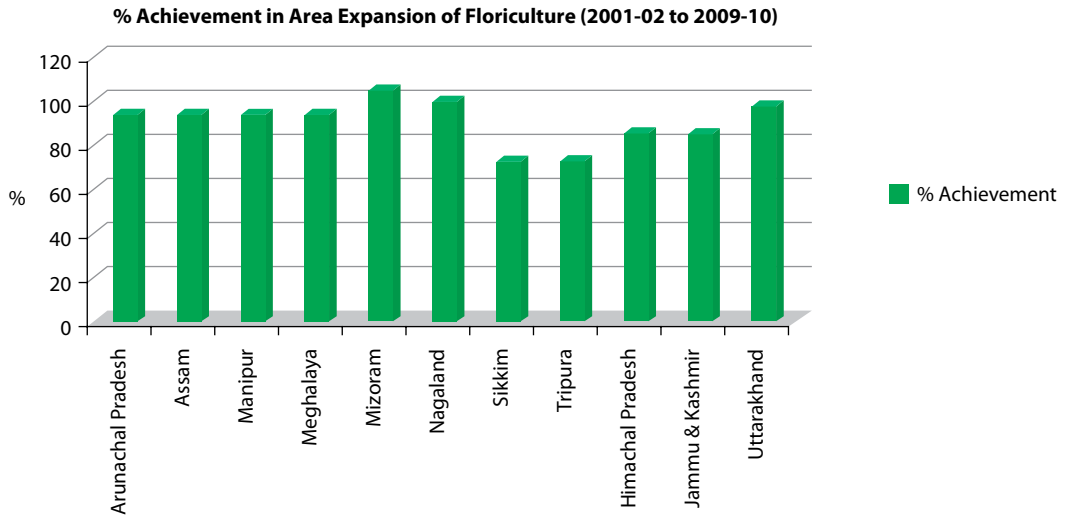
The Plan-wise and State-wise targets and achievement in the expansion of area under Floriculture component/sub component of the programme are contained in Table 6.4.

Table 6.4 Achievement vis-à-vis Target of the States in expansion of area under Floriculture

Floriculture [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achievement	% Achievement	% @ share
Arunachal Pradesh	0	780	900	0	780	816	1680	1596	95	6
Assam	0	908	2657	0	708	2657	3565	3365	94	12
Manipur	0	495	1296	0	393	1296	1791	1689	94	6
Meghalaya	0	1113	1583	0	1113	1583	2696	2696	100	10
Mizoram	0	3199	1280	0	3630	1060	4479	4690	105	17
Nagaland	0	1515	2466	0	1515	2466	3981	3981	100	14
Sikkim	0	2322	3205	0	1712	2342	5527	4054	73	14
Tripura	0	594	754	0	564	424	1348	988	73	4
NES Total	**0**	**10926**	**14141**	**0**	**10414**	**12645**	**25067**	**23059**	**92**	**82**

Floriculture [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achievement	% Achievement	% @ share
Himachal Pradesh	N/A	617	820	N/A	617	613	1437	1230	86	4
Jammu & Kashmir	N/A	76	850	N/A	58	734	926	792	86	3
Uttarakhand	N/A	970	2178	N/A	935	2137	3148	3072	98	11
HS Total	**N/A**	**1663**	**3848**	**N/A**	**1610**	**3484**	**5511**	**5094**	**92**	**18**
Grand Total	**0**	**12589**	**17989**	**0**	**12024**	**16129**	**30578**	**28153**	**92**	**100**

Figure 6.4 Achievement vis-à-vis Target of the States in expansion of area under Floriculture



The participating States had been given targets only from the X Plan onwards. Between the period 2003 - 04 to 2009-10, all the 11 States had been allotted a combined target to cover an additional area of 30578 ha under floriculture, against which the actual achievement had been of the order of 28153 ha i.e. 92% of the total targets. The average performance of the States in both the regions works out to be the same i.e. 92% of the targets. In view of the innovative nature of the activity the overall achievement may be considered as satisfactory.

The overall achievement in X Plan was of the order of 76% - 95% in NES & 97% and 90% - 89% NER & 91% in HSR, during the first three years of the XI Plan. The average performance of both the regions was more or less the similar.

Regarding state-wise position, only three of the States viz. Meghalaya, Mizoram and Nagaland had been able to achieve their full targets. The State of Uttarakhand had a small shortfall of 2% only. The achievement of the States of Sikkim and Tripura [73% each] has been poor and that of Himachal Pradesh & J&K, at 86% of targets, though comparatively

better, remained below the State average figure of 92%. The shortfall in the performance of the remaining States of Arunachal Pradesh, Assam and Manipur which ranged from 5% to 6% was also not much.

The State of Mizoram had the largest share of 17% in the total component, followed by Meghalaya and Sikkim each with 14% share, Assam with 12%, Uttarakhand with 11% and Assam with 10%.share. These five States together had about three fourth share in the total programme under this component implemented by all, the participating States.

Spices

The Plan-wise and State-wise targets and achievement in the expansion of area under Spices cultivation component/sub component of the programme are presented in Table 6.5.

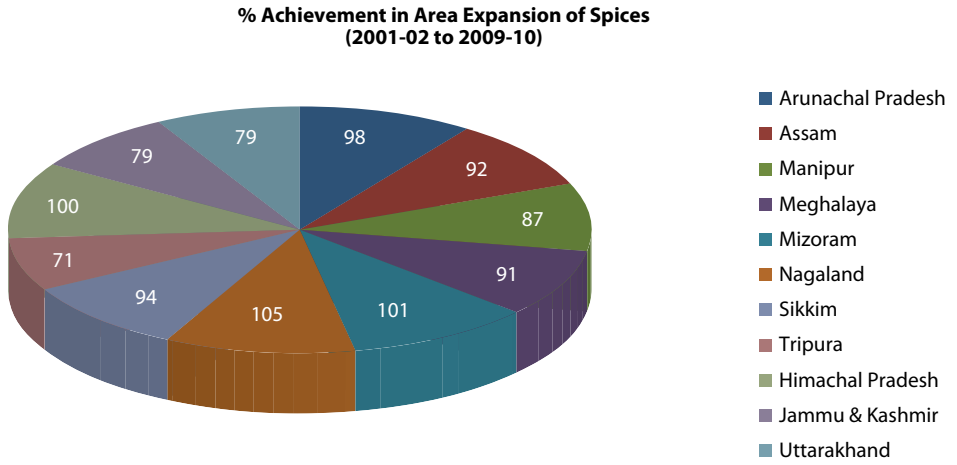
A modest target of 2750 ha, on the launching of the programme in the year 2001-02 was fixed for the States in North East Region. During the X Plan the target was raised to 0.37 lakh ha for all the 11 States including three Himalayan States. In the next XI plan period a total target of 0.38 lakh ha was set for the all the State during the first three years of the Plan. The States had thus been allotted a total target of 0.80 lakh ha area to be covered under spice crops. The actual coverage of the area was however of 0.74 ha [93%] leaving a shortfall of 7% in the achievement of targets.

The shortfall in the achievement which was 3% in the IX Plan increased to 7% in the X Plan and continued at the same level even during the first three years of the XI Plan.

Table 6.5 Achievement vis-à-vis Target in expansion of area under Spices

Spices [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% share in total achieve-ments
Arunachal Pradesh	560	5810	2985	560	5810	2759	9355	9129	98	12
Assam	250	4605	8420	250	3838	8081	13275	12169	92	16
Manipur	400	3280	1305	245	2888	1183	4985	4316	87	6
Meghalaya	250	2055	1850	200	2025	1550	4155	3775	91	5
Mizoram	300	1955	5825	335	2031	5825	8080	8191	101	11
Nagaland	190	4827	5683	190	5450	5583	10700	11223	105	15
Sikkim	600	9028	7490	935	8198	7040	17118	16173	94	22
Tripura	200	2625	2110	171	1594	1750	4935	3515	71	5
NES Total	**2750**	**34185**	**35668**	**2886**	**31834**	**33771**	**72603**	**68491**	**94**	**92**
H.P.	N/A	577	722	N/A	578	722	1299	1300	100	2
J&K	N/A	531	750	N/A	507	508	1281	1015	79	1
Uttarakhand	N/A	1810	2618	N/A	1701	1810	4428	3511	79	5
HS Total	**N/A**	**2918**	**4090**	**N/A**	**2785**	**3040**	**7008**	**5825**	**83**	**8**
Grand Total	**2750**	**37103**	**39758**	**2886**	**34620**	**36811**	**79611**	**74317**	**93**	**100**

Figure 6.5 Achievement vis-à-vis Target in expansion of area under Spices



Only three of the States viz., Mizoram, Nagaland and Himachal Pradesh had achieved the cumulative targets set for them up to the year 2009 -10.

The State of Tripura had the maximum shortfall of 29% [ach.71%] and Arunachal Pradesh the minimum of 2% [ach. 98%]. The shortfall in achievement ranged from 6% [ach 94%] in case of Sikkim to 13% [ach. 87%] for the State of Manipur in the NER. In the HSR, the gap in achievement was of the order of 21% [ach 79%] in case of both the States of J&K and Uttarakhand.

Further in the total area of 74317 ha covered under the programme, the State of Sikkim had the maximum share of 22%, followed by Assam with -16% share, Nagaland -15%, Arunachal Pradesh -12% and Mizoram -11%. These five States accounted for as much as 76% of the total area in the targeted 11 States. The share of the remaining States ranged from 1% in case of J&K to 6% in respect of Manipur. In view of the nature of the activity of the spice cultivation, the overall progress in the implementation of the programme is satisfactory.

Saffron

The Plan-wise and State-wise targets and achievement in the expansion of area under Saffron cultivation component/sub component of the programme are shown in Table 6.6.

Jammu and Kashmir is the only State in India producing saffron. The State had been given a target of cultivation of saffron on 455 ha during XI Plan, against which the achievement level was only of the order of 168 ha i.e. just 37%. The performance of the State is not up to the mark.

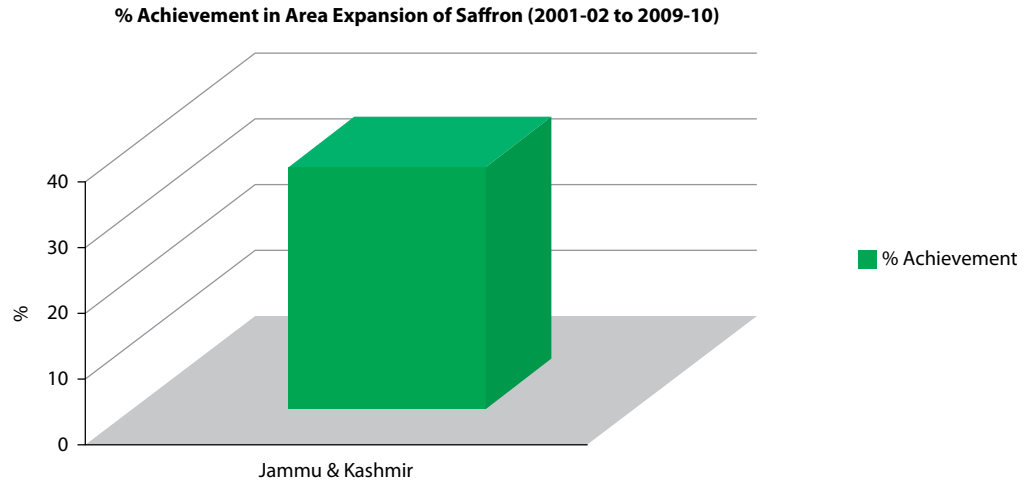
Saffron, the yellow-orange stigmas from a small purple saffron crocus is the world's most expensive spice by weight. It is used mainly in various cuisines as a seasoning and colouring agent and a very small quantity of it is sufficient to lend colour and aroma to any dish. It is also used to alleviate fatigue and exhaustion.

The other countries producing saffron are Iran, Spain, Egypt, Morocco and Turkey. Iran and Spain are recognized as producing the best quality saffron. The climatic conditions of Kashmir Valley are conducive for cultivation of saffron. A focused approach is required to encourage saffron, which is the most expensive spice of the world.

Table 6.6 Achievement vis-à-vis Target of the States in expansion of area under Saffron

Saffron [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	0	0	0	0	0	0	0	0	N/A	0
Nagaland	0	0	0	0	0	0	0	0	N/A	0
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**N/A**	**0**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	455	N/A	0	168	455	168	37	100
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**455**	**N/A**	**0**	**168**	**455**	**168**	**37**	**100**
Grand Total	**0**	**0**	**455**	**0**	**0**	**168**	**455**	**168**	**a**	**100**

Figure 6.6 Achievement vis-à-vis Target of the States in expansion of area under Saffron



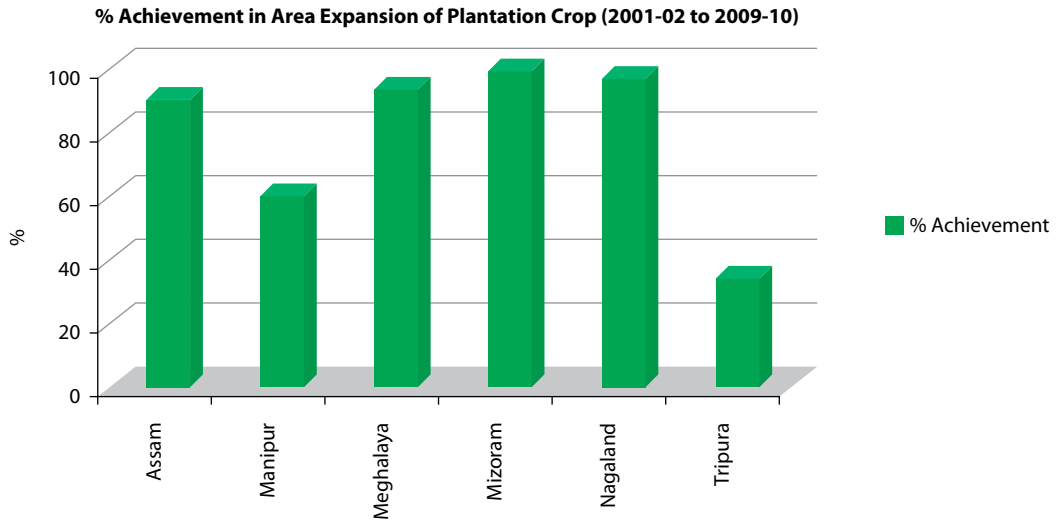
Plantation Crops

The Plan-wise and State-wise targets and achievement in the expansion of area under Plantation Crops cultivation component/sub component of the programme are consolidated in Table 6.7.

Table 6.7 Achievement vis-à-vis Target of the States in expansion of area under Plantation Crops

Plantation Crops [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	2250	4355	0	1940	4073	6605	6013	91	43
Manipur	350	265	50	300	55	50	665	405	61	3
Meghalaya	150	1200	2070	150	1000	2070	3420	3220	94	23
Mizoram	50	620	0	50	620	0	670	670	100	5
Nagaland	250	1345	1332	200	1345	1332	2927	2877	98	20
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	150	2190	320	125	631	170	2660	926	35	7
NES Total	**950**	**7870**	**8127**	**825**	**5591**	**7695**	**16947**	**14111**	**83**	**100**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**0**	**N/A**	**0**	**0**	**0**	**0**	**N/A**	**0**
Grand Total	**950**	**7870**	**8127**	**825**	**5591**	**7695**	**16947**	**14111**	**83**	**100**

Figure 6.7 Achievement vis-à-vis Target of the States in expansion of area under Plantation Crops



Only six of the States in the NER have been participating in the area expansion of Plantation Crops. At the time of launching of the Mission, a small target of 950 ha was allotted to five of the States in the region. This was raised to 7870 ha during X Plan and further to 8127 ha in

XI Plan up to 2009- 10. The cumulative target of the Plantation Crops set for six of the States up to the year 2009 – 10 was 16947 ha against which the actual coverage was to the extent of 14111 ha i.e. 83% of the target.

The overall performance during the IX Plan which was 87% went down to71% in X Plan but showed improvement with 94% achievement during the first three years of the XI Plan.

While the State of Mizoram had achieved its targets fully there was a small shortfall of 2% [ach.98%] in case of Nagaland. The shortfall in the achievement of Meghalaya [6%] and Assam [9%] was within reasonable limits. The deficit in case of 65% [ach 35%] in case of Tripura and 39% [ach.61%] in the achievement of Manipur was on the high side. The overall performance under this component is not good.

Assam had the maximum share of 43% in the total area expansion of the programme of 30419 ha under Plantation Crops that took place during the period 2001-02 to 2009-10. The States of Meghalaya with 23% share and Nagaland with 20% share in the total acreage were the next in order. The combined share of these three States was 86% of the total programme.

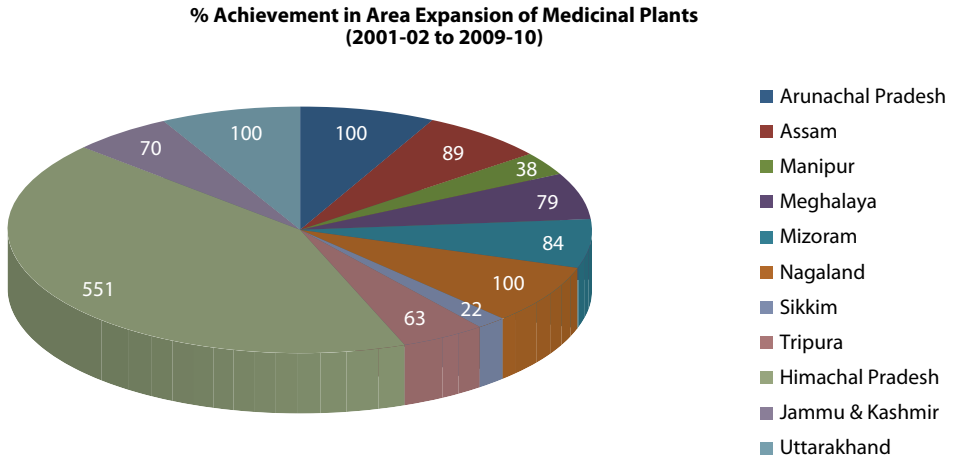
Medicinal Plants

The Plan-wise and State-wise targets and achievement in the expansion of area under Medicinal Plants cultivation component/sub component of the programme are shown in Table 6.8.

Table 6.8 Achievement vis-à-vis Targets in expansion of area under Medicinal Plants

Medicinal Plants [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	107	995	300	100	995	300	1402	1395	100	22
Assam	50	160	500	40	90	500	710	630	89	10
Manipur	150	50	0	60	15	0	200	75	38	1
Meghalaya	75	278	0	50	228	0	353	278	79	4
Mizoram	100	265	1900	50	265	1578	2265	1893	84	29
Nagaland	90	1083	710	90	1083	710	1883	1883	100	29
Sikkim	150	10	0	0	35	0	160	35	22	1
Tripura	50	0	0	14	18	0	50	32	63	0
NES Total	**772**	**2841**	**3410**	**404**	**2729**	**3088**	**7023**	**6221**	**89**	**96**
Himachal Pradesh	N/A	25	0	N/A	139	0	25	139	551	2
Jammu & Kashmir	N/A	0	79	N/A	0	55	79	55	70	1
Uttarakhand	N/A	50	0	N/A	50	0	50	50	100	1
HS Total	**N/A**	**75**	**79**	**N/A**	**189**	**55**	**154**	**244**	**158**	**4**
Grand Total	**772**	**2916**	**3489**	**404**	**2917**	**3143**	**7177**	**6464**	**90**	**100**

Figure 6.8 Achievement vis-à-vis Targets in expansion of area under Medicinal Plants



A target of plantation of Medicinal Plants on an area of 772 ha in the NER was fixed during the year 2001-02. With the extension of the Mission to three Himalayan States, targets were raised to 2916 ha during the X Plan and further to 3489 ha in XI Plan up to the year 2009-10. All the eleven participating States were thus given a total target of covering an additional area of 7177 ha since the inception of the programme in 2001 – 02 to 2009 – 10. Against this the actual coverage of area under Medicinal Plants was of the order of 6464 ha which works out to 90% of the targets. This may be considered reasonable at the macro level in view of the nature of the activity.

While the overall achievement during IX Plan remained 52%, the targets were achieved fully in X Plan at the aggregate level. During the first three years of the XI Plan, a shortfall of 10% in achievement was again noticed.

Only four of the States of Arunachal Pradesh, Nagaland, Himachal Pradesh and Uttarakhand had achieved their targets fully and all the other States lagged behind. Himachal Pradesh with 551% achievement level had shown an impressive performance. The States of Sikkim and Manipur had a very high shortfall of 78% [ach 22%] and 62% [ach 38%] respectively. The other States which had fared badly were Tripura with 63% and J&K with 70% achievement level. The shortfall in respect of the remaining States ranged from 11% in case of Assam [ach.89%] to 21% [ach 79%] for Meghalaya.

In the total acreage of 6464 ha, the States of Mizoram and Nagaland with 29% share of each, had the top position followed by Arunachal Pradesh with as much share as 22% and Assam with10% share. These four States had a combined share of 90% in the whole programme. The Himalayan States had an insignificant share of 1% to 2% in the cultivation of the Medicinal Plants.

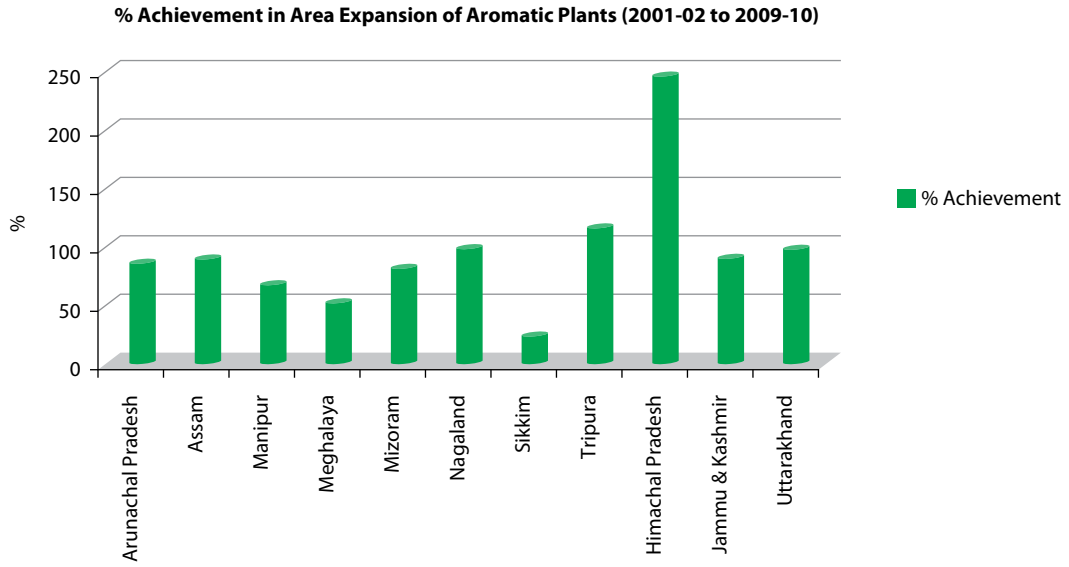
Aromatic Plants

The Plan-wise and State-wise targets and achievement in the expansion of area under Aromatic Plants cultivation component/sub component of the programme are depicted in Table 6.9.

Table 6.9 Achievement vis-à-vis Target of the States in expansion of area under Aromatic Plants

Aromatic Plants [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	358	2374	4510	358	3650	2374	7242	6382	88	63
Assam	100	196	1200	20	1200	146	1496	1366	91	13
Manipur	100	60	0	101	0	9	160	110	69	1
Meghalaya	40	25	0	20	0	15	65	35	54	0
Mizoram	100	401	468	74	468	260	969	802	83	8
Nagaland	200	375	600	200	600	375	1175	1175	100	12
Sikkim	100	10	0	0	0	28	110	28	25	0
Tripura	50	0	0	50	0	9	50	59	118	1
NES Total	**1048**	**3441**	**6778**	**823**	**5918**	**3216**	**11267**	**9957**	**88**	**98**
H.P.	N/A	50	11	N/A	7	145	61	152	248	1
J&K	N/A	0	54	N/A	49	0	54	49	91	0
Uttarakhand	N/A	25	0	N/A	0	25	25	25	100	0
HS Total	**N/A**	**75**	**65**	**N/A**	**56**	**170**	**140**	**226**	**161**	**2**
Grand Total	**1048**	**3516**	**6843**	**823**	**5974**	**3386**	**11407**	**10183**	**89**	**100**

Figure 6.9 Achievement vis-à-vis Target of the States in expansion of area under Aromatic Plants



The NER States had set a target of 1048 ha for cultivation of Aromatic Plants during the year 2001-02. During the X Plan a total target of bringing additional area of 3516 ha under Aromatic Plants was set for all the eleven participating States. The target was raised to

6843 ha in the XI Plan up to the year 2009 - 10. Against the cumulative target of 11407 ha set for the States since the inception of the Mission in 2001- 02 to 2009 -10, an area of 10183 ha was actually covered under Aromatic Plants. Keeping in view the nature of the activity, the overall performance of the programme at 89 of targets may be considered as satisfactory.

While during the IX Plan, 79% of the targets were achieved, the position improved considerably during the X Plan with achievement level of 170%. In the XI Plan there was again deceleration in progress and the achievement slipped down to about half of the targeted figure.

Only four States viz. Nagaland, Tripura, Himachal Pradesh and Uttarakhand had achieved their targets fully. Himachal Pradesh had recorded an impressive performance with 248% achievement against its targets. The States of Sikkim and Meghalaya showed a high shortfall of 75% [ach 25%] and 46% [ach 54%] in the achievement of their respective targets. In the remaining States, the level of shortfall ranged from minimum of 9% in case of Assam & J&K [ach 91%] to the maximum of 31% [ach 69%] in case of Manipur.

In total area coverage of 10183 ha under Aromatic Plants, Arunachal Pradesh occupied the top position with 63% share. The States of Assam and Nagaland with 13% and 12% share in the total acreage respectively under this sub head, came next in that order. While the State of Mizoram had 8% share in the total, the share of other States ranging between less than 1% to maximum 2% was insignificant. The Aromatic Plant activity with around 1% share in total programme was at the lowest level in the Himalayan States.

Replacement/Rejuvenation of senile plantation

The preponderance of the old and senile trees and poor management of orchards in the region has been resulting low productivity of fruit/plantation crops. The HMNEH supports productivity improvement programmes through rejuvenation of senile plantation/top working/re-planting with fresh stock supported with grafting, uniform cultural practices and plant protection measures.

The Plan-wise and State-wise targets and achievement under **Replacement/Rejuvenation** of senile Plantation component/sub component of the programme are contained in Table 6.10.

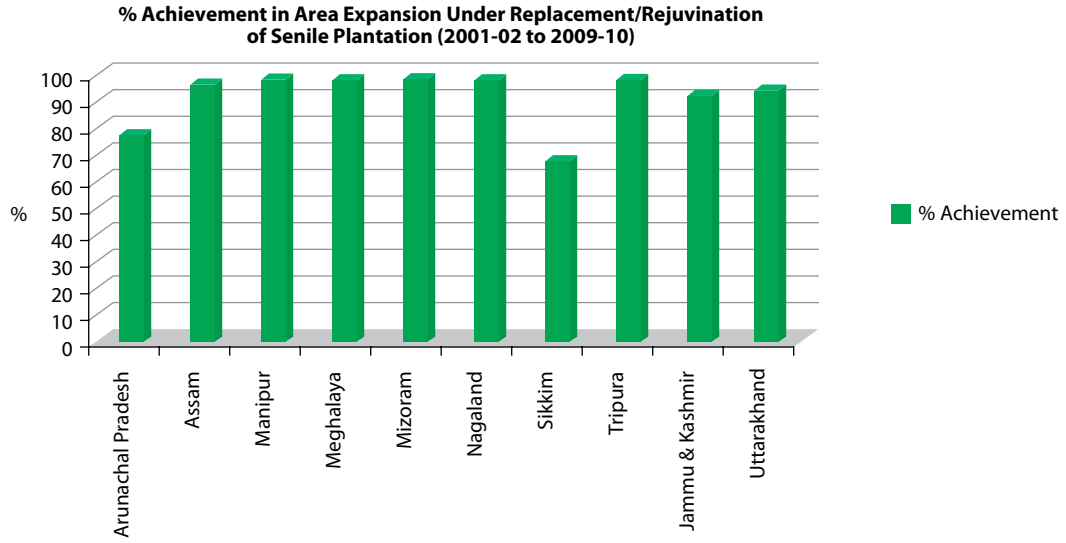
The targets for Replacement/Rejuvenation of senile Plantation were allocated under the programme from X Plan onwards. A Moderate target of coverage of an area of 4435 ha was assigned to six States - Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Sikkim, in NER and one State-Uttarakhand in HSR against which the achievement of the order of 4385 ha i.e. 99%.of the target was fairly good. During the XI Plan up to the year 2009-10, all the States in both the Regions excepting J&K had been assigned a total target of 42505 ha. The States, however, covered an area of 39207 ha under rejuvenation programme. This works out to 92% - 91% in NER & 95% HSR.

The State of Himachal Pradesh has not participated in this programme. All the other States had been allocated a cumulative target of coverage of an area of 46940 ha under Rejuvenation/Replacement of Senile plantation during the entire period of the Mission from 2001-02 to 2009-10. Against this an area of 63592 ha could only be covered i.e. 93%-92%

Table 6.10 Achievement vis-à-vis Target of the States in expansion of area under Replacement/Rejuvenation of senile Planatation component/ sub component of the programme

Replacement/Rejuvenation of senile Planatation [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Ach.	% Ach.	% @ share
Arunachal Pradesh	0	300	4108	0	300	3180	4408	3480	79	8
Assam	0	250	11100	0	250	10865	11350	11115	98	25
Manipur	0	300	1450	0	300	1444	1750	1744	100	4
Meghalaya	0	300	700	0	300	700	1000	1000	100	2
Mizoram	0	400	4260	0	400	4260	4660	4660	100	11
Nagaland	0	0	1000	0	0	1000	1000	1000	100	2
Sikkim	0	500	4190	0	450	2790	4690	3240	69	7
Tripura	0	0	2375	0	0	2375	2375	2375	100	5
NES Total	**0**	**2050**	**29183**	**0**	**2000**	**26614**	**31233**	**28614**	**92**	**66**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	6210	N/A	0	5818	6210	5818	94	13
Uttarakhand	N/A	2385	7112	N/A	2385	6775	9497	9160	96	21
HS Total	**N/A**	**2385**	**13322**	**N/A**	**2385**	**12593**	**15707**	**14978**	**95**	**34**
Grand Total	**0**	**4435**	**42505**	**0**	**4385**	**39207**	**46940**	**43592**	**93**	**100**

Figure 6.10 Achievement vis-à-vis Target of the States in expansion of area under Replacement/Rejuvenation of senile Planatation component/ sub component of the programme



in NER and 95% in HSR. The overall position of the implementation of the programme is reasonable. The inter region disparities were small.

Five of the States of Manipur, Meghalaya, Mizoram, Nagaland and Tripura had achieved their targets to the full extent. Three of the States viz. Assam [2%], Uttarakhand [4%] and J&K [6%] has a small shortfall in their achievement of targets. The performance of two States of Arunachal Pradesh and Sikkim with shortfall of 21% [ach.79%] and 31% [ach.69%] was not up to the mark.

The State of Manipur has the largest share of 25% in the total programme, followed by Uttarakhand with 21% J&K with 13% and Mizoram with 11% share. These four States accounted for about three fourth part of the total component of Replacement/Rejuvenation of old and senile plantation implemented up to the year 2009-10.

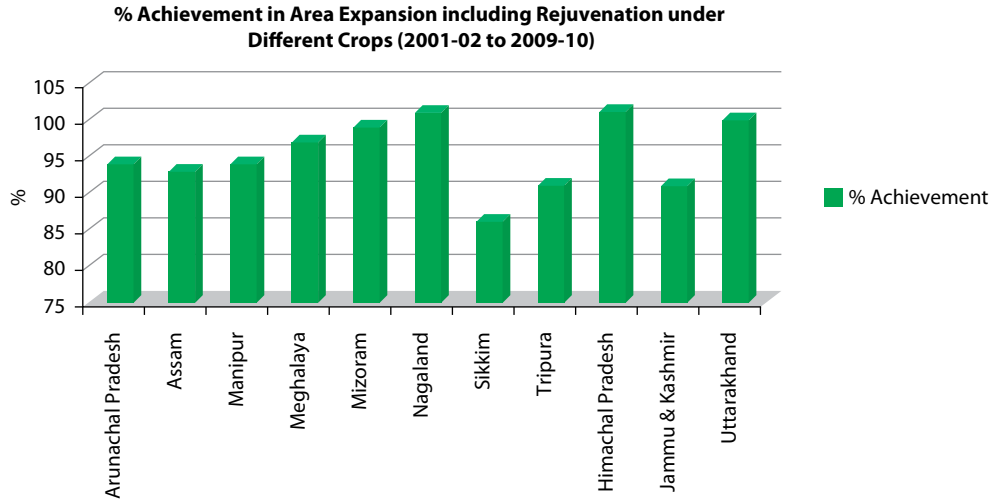
Total Progress Made under Area Expansion Component of the Programme

State-wise and Plan-wise consolidated position of the progress of the targets vs. achievement by the States in the implementation of HMNEH in regard to the additional acreage brought under cultivation of different horticulture crops including rejuvenation [Sr. No. i to x] since the inception of the Mission in 2001-02 in case of NER and 2003-04 for HSR, under Area Expansion Programme, is presented in Table 6.11.

Table 6.11 Achievement vis-à-vis Target of the States in respect of total additional area brought under horticulture crops since the inception of HMNEH to 2009-10 under area expansion component/ sub component of the programme

Area Expansion including Rejuvenation under different crops [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Ach.	% Ach	% @ share
Arunachal Pradesh	2726	26999	38561	2679	26917	34915	68286	64511	94	11
Assam	1350	21749	58347	1110	18597	56341	81446	76048	93	13
Manipur	1450	19264	33337	1156	17369	32152	54051	50677	94	9
Meghalaya	1665	14510	19211	1670	13835	18911	35386	34416	97	6
Mizoram	1350	31127	43799	1332	31094	42957	76276	75383	99	13
Nagaland	1530	21889	35336	1480	22342	35236	58755	59058	101	10
Sikkim	1610	22056	29950	1970	19834	24288	53616	46092	86	8
Tripura	1260	18544	21639	1019	15908	20799	41443	37726	91	7
NES Total	**12941**	**176138**	**280180**	**12416**	**165895**	**265599**	**469260**	**443910**	**95**	**78**
Himachal Pradesh	N/A	16842	16098	N/A	17592	15548	32940	33140	101	6
Jammu & Kashmir	N/A	4404	20764	N/A	3699	19174	25168	22873	91	4
Uttarakhand	N/A	24930	43867	N/A	25031	43621	68797	68652	100	12
HS Total	**N/A**	**46176**	**80729**	**N/A**	**46322**	**78343**	**126905**	**124665**	**98**	**22**
Grand Total	**12941**	**222314**	**360909**	**12416**	**212217**	**343942**	**596165**	**568575**	**95**	**100**

Figure- 6.11 Achievement vis-à-vis Target of the States in respect of total additional area brought under horticulture crops since the inception of HMNEH to 2009-10 under Area Expansion Component/ sub component of the programme



At the time of the commencement of the Mission in 2001-02, the eight of the States in NER had been given a total target of covering of an area of 12941 ha under different horticulture crops. Against this an area of 12416 ha i.e. 96% could be actually brought under horticulture crops. The targets were increased to 2.22 lakh ha during the X Plan when three additional States from HSR were also brought within the ambit of the Scheme. The States achieved targets of 2.12 lakh ha only [95%] leaving a shortfall of 5%. In the next XI Plan a total target of 3.61 lakh ha was set for all the eleven participating States against which the achievement was of the order of 3.44 lakh ha [95%]. There was almost uniformity in the achievement of targets by the States in all the Plans.

Since the inception of the Mission in 2001-02 to the year 2009-10, the States had been give a cumulative target of coverage of an area of 5.96 lakh ha under various horticulture crops. The area actually brought under horticulture was 5.69 lakh ha. This works out to 95% of the total targets – 95% in NER and 98% in HSR. The average performance of the HSR was slightly better that of the NER in the Area Expansion component. The overall performance of the States under Area Expansion head may be taken as satisfactory.

Only three of the States of Nagaland, Himachal Pradesh and Uttarakhand had achieved their targets fully. The States of Mizoram with 99% achievement had also nearly reached its target. Whereas the achievement [97%] of only one State viz. Meghalaya was above the average achievement figure of 96%, the achievement of the States of Arunachal Pradesh & Manipur [94% each], J&K & Tripura [91% each] Assam [93%] though apparently good was below the all State average achievement of 95%. The shortfall in their achievement ranged from 6% to 9%. The State of Sikkim [ach 86%] was at the lowest in performance with maximum shortfall of 14% in achievement'.

The States of Assam & Mizoram had the maximum share of 13% each in the total programme. This was followed by Uttarakhand with 12% share, Arunachal Pradesh with 11% and Nagaland with 10% share. These four States claimed as much as 59% share in

the total horticulture acreage brought under the Mission. The share of the remaining States ranged from the lowest of 4% in case of J&K to the highest of 9% in respect of Manipur.

Model Floriculture Centres

Floriculture has been identified as a sunrise industry with a high growth potential per unit area than most of the field crops. Model Floriculture Units are being set up under HMNEH for the propagation of planting material of commercially important floriculture crops by integrating research, production, technology and extension. The center would serve as the focal unit for the development of Floriculture in this state.

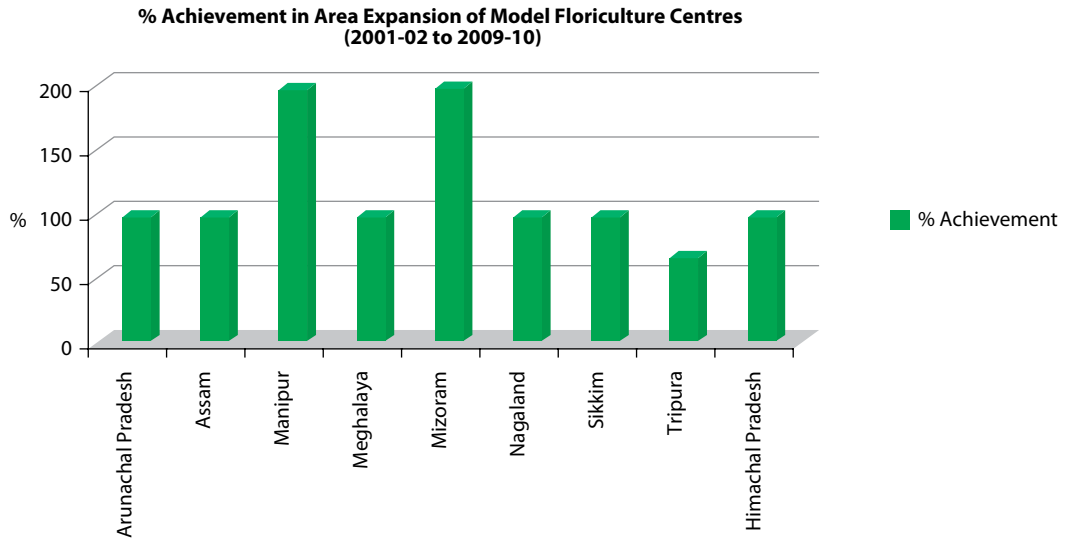
The Plan-wise and State-wise targets and achievement under setting up of Model Floriculture Unit component/sub component of the programme are shown in Table 6.12.

A target of setting up of 5 Model Floriculture Centres in the NER States at the launch of the programme in the year 2001-02 had been set up. In the X and XI Plan 5 and 16 units were targeted in the NER as well in one State of Himachal Pradesh in the HSR. A total target of 26 Model Floriculture Units had been allotted to all the participating States, excepting J&K and Uttarakhand which did not take up any such target, since the inception of the Mission up to

Table 6.12 Achievement vis-à-vis Target of the States in setting up Model Floriculture Centres

Model Floriculture Centres [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	1	1	0	1	1	0	2	2	100	7
Assam	1	0	1	1	0	1	2	2	100	7
Manipur	0	1	0	0	2	0	1	2	200	7
Meghalaya	1	0	10	1	0	10	11	11	100	41
Mizoram	1	0	0	1	1	0	1	2	200	7
Nagaland	0	2	1	0	2	1	3	3	100	11
Sikkim	0	0	1	0	0	1	1	1	100	4
Tripura	1	0	2	1	0	1	3	2	67	7
NES Total	**5**	**4**	**15**	**5**	**6**	**14**	**24**	**25**	**104**	**93**
Himachal Pradesh	N/A	1	1	N/A	1	1	2	2	100	7
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**1**	**1**	**N/A**	**1**	**1**	**2**	**2**	**100**	**7**
Grand Total	**5**	**5**	**16**	**5**	**7**	**15**	**26**	**27**	**104**	**100**

Figure 6.12 Achievement vis-à-vis Target of the States in setting up Model Floriculture Centres



the year 2009-10. As against this a total number of 27 units had actually been established. All the States were able to achieve their targets fully and one with some margin. The progress in this regard is, thus, satisfactory.

The Plan-wise targets set were achieved during the IX and X Plan period. In the X Plan up to the year 2009-10, as against the target of 16 Model Floriculture Units, 15 were actually established. The two units set up beyond the targeted figure in X Plan had compensated this deficit.

No targets were given to the States of J&K and Uttarakhand. All the other States except Tripura, had achieved their targets fully and two of them viz. Manipur and Mizoram with 100 margins. In case of Tripura the achievement was only of 67% of its target leaving a shortfall of as high as 33% in achievement.

The maximum number of 11 [41%] Floriculture Units had been set up in the State of Mizoram. This has been followed by Nagaland with the establishing of 3 units [11%]. The combined share of these two States constituted nearly half of total programme. All the other States have set up units at the rate of 2 each except Sikkim where only one unit was established.

Integrated Mushroom Unit for Mushroom Production

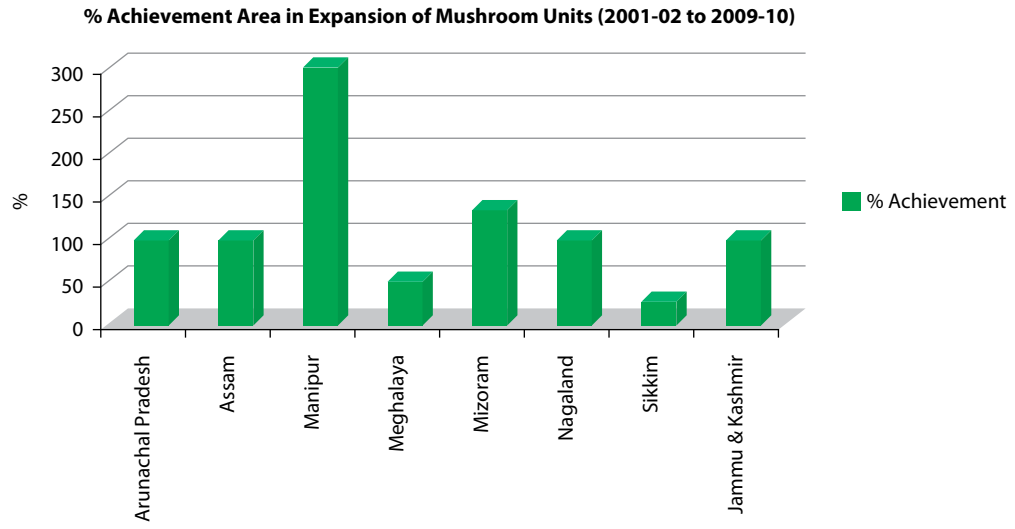
The Integrated Mushroom Units are being established in the public sector with the objective of making compost and spawn available to the Mushroom Growers at their door step and also to collect produce from the farmers, to be brought to the mother unit for processing and marketing.

The Plan-wise and State-wise targets and achievement under setting up of Integrated Mushroom Unit component/sub component of the programme are presented in Table 6.13.

Table 6.13 Achievement vis-à-vis Target of the States for setting up of Integrated Mushroom Units

Mushroom Units [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	1	3	0	1	3	0	4	4	100	15
Assam	1	1	0	1	1	0	2	2	100	7
Manipur	0	2	0	0	6	0	2	6	300	22
Meghalaya	1	1	0	0	1	0	2	1	50	4
Mizoram	1	4	1	1	6	1	6	8	133	30
Nagaland	0	3	1	0	3	1	4	4	100	15
Sikkim	2	0	2	0	0	1	4	1	25	4
Tripura	1	0	0	0	0	0	1	0	0	0
NES Total	**7**	**14**	**4**	**3**	**20**	**3**	**25**	**26**	**104**	**96**
H.P.	N/A	0	0	N/A	0	0	0	0	N/A	0
J&K	N/A	1	0	N/A	1	0	1	1	100	4
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**1**	**0**	**N/A**	**1**	**0**	**1**	**1**	**100**	**4**
Grand Total	**7**	**15**	**4**	**3**	**21**	**3**	**26**	**27**	**104**	**100**

Figure 6.13 Achievement vis-à-vis Target of the States for setting up of Integrated Mushroom Units



Most of the targets for setting up of Mushroom Units had been allotted to the NER States – 7 in 2001-02, 14 during X Plan and 3 in XI plan period. A target of establishing one unit was also allocated to the State of J&K in HSR during X Plan. As against the total target

of these 26, units during the entire period of the Mission up to the year 2009-10, as many as 27 Mushroom Units were actually established in different States. The overall progress under this component is fairly good.

The achievement vis-a-vis target remained poor at 43% in the IX Plan but improved to 140% in X Plan. During the first three years of the XI Plan the achievement again slipped to 75% of the targets.

The targets were achieved by all the States except Sikkim and Tripura. The State of Manipur has shown an impressive progress of 300% achievement, The State of Mizoram had also shown achievement with good margin of 33% [ach. 133%]. While, Tripura State had not set up any unit against the target of one given to it, Sikkim had the shortfall as high as 75% [ach.25%].

Out of the total 27 Mushroom Units set up under the programme during the period 2001-02 to 2009-10, a lion's share -30% of the total Programme, has gone to the State of Mizoram, followed by Manipur with 22% share, Arunachal Pradesh and Nagaland with 15% share of each. The combined share of these four States constituted as much as 82% of the total programme.

Pollination Support – Bee Farming

Honey bees are the important external agents of pollination to a large number of agriculture crops which helps in early setting of seeds resulting in early and more uniform crop yield. The yield of various crops due to the pollination by honey bees is estimated to be ranging from 20% to 100% by various studies. Further bee keeping can also become a good source of income to the small farmers by sale of honey and its by-products. Mission, therefore, supports bee farming with the objective of promoting the role of honey bee as agents of pollination for increasing crop productivity and developing newer strains of bees for evolving disease resistant types as well as for higher production of honey.

The Scheme has the following two components:

- Development of Bee Breeders
- Setting up of bee colonies/hives

Development of Bee Breeders

Breeding is the process of selection of queen rearing and its progeny of correct specifications. A quality stock of honeybees with specific traits of productivity and disease resistance is important for high honey production in bee farming.

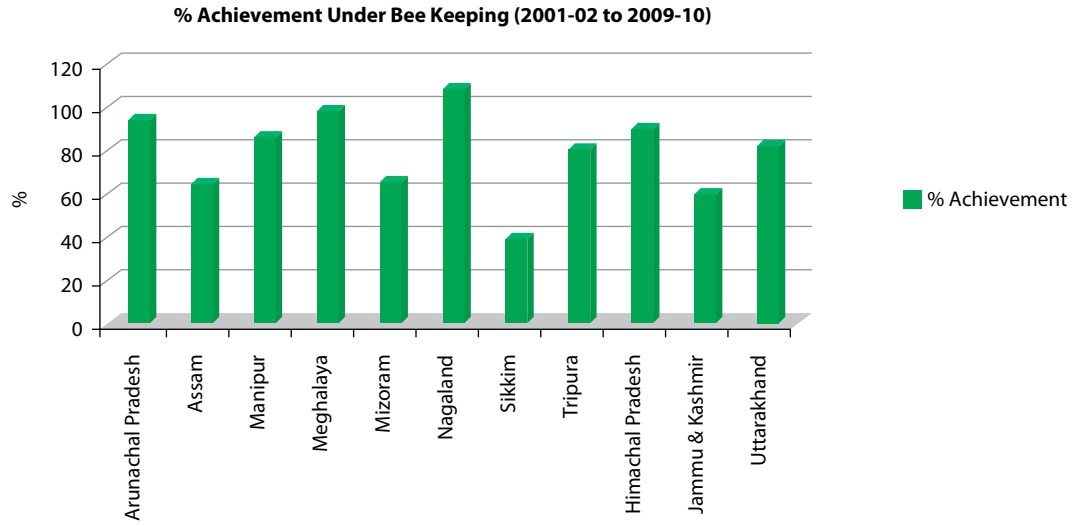
Setting up of Bee Colonies/Hives

The Plan-wise and State-wise targets and achievement under Pollination Support - Bee Keeping since the launch of the programme in the year 2001-02 [IX Plan] in the NER and from 2002-03 [X Plan] in respect of the Himalayan States are shown in Table 6.14.

Table 6.14 Achievement vis-à-vis Target of the States under Bee Keeping

Bee Keeping/bee colonies/hives [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Ach.	Ach %	% @ share
Arunachal Pradesh	0	1000	320	0	1000	272	1320	1272	96	2
Assam	0	535	6000	0	505	3800	6535	4305	66	6
Manipur	0	2000	10100	0	500	10100	12100	10600	88	15
Meghalaya	0	400	2550	0	400	2550	2950	2950	100	4
Mizoram	0	5975	0	0	3975	0	5975	3975	67	6
Nagaland	1600	6553	3500	400	8965	3500	11653	12865	110	18
Sikkim	4000	1120	8300	0	0	5500	13420	5500	41	8
Tripura	0	500	2300	0	0	2300	2800	2300	82	3
NES Total	**5600**	**18083**	**33070**	**400**	**15345**	**28022**	**56753**	**43767**	**77**	**61**
Himachal Pradesh	N/A	6790	3142	N/A	6000	3142	9932	9142	92	13
Jammu & Kashmir	N/A	4497	5437	N/A	3679	2462	9934	6141	62	9
Uttarakhand	N/A	10700	4000	N/A	10300	2000	14700	12300	84	17
HS Total	**N/A**	**21987**	**12579**	**N/A**	**19979**	**7604**	**34566**	**27583**	**80**	**39**
Grand Total	**5600**	**40070**	**45649**	**400**	**35324**	**35626**	**91319**	**71350**	**78**	**100**

Figure 6.14 Achievement vis-à-vis Target of the States under Bee Keeping



At the launch of the Mission in 2001-02 in the NER two States of Nagaland [1600 No.] and Sikkim [4000 No.] had been given a total target of setting of 5600 No. of bee colonies/ hives. The State of Nagaland could only meet one fourth of its target and set up 400

bee colonies/hives. The State of Sikkim had not recorded any progress in this regard. The performance with just 7% of the achievement of the total target during the IX Plan was poor. During the X Plan with the entry of Himalayan States, the target was raised to 40070 bee colonies/hives, against which 35324 units were established. With average 88% achievement - 85% NER & 96% HSR, the position stood considerably improved. In the XI Plan up to the year 2009 -10, a total target of 45649 units was set for all the States. The States, however, established only 35626 bee colonies/hives units. This works out to 78% of the targets – 85% NER & 60% HSR. The performance thus showed a declining trend in case of HSR in X Plan.

Since the inception of Mission in the year 2001-02 till the year 2009-10, all the participating States had been assigned a cumulative target of 91319 No. of bee colonies/hives. Against this target, the actual units set by all the States were 71350 No. thereby showing achievement of 78% - 77% in NER & 80% in HSR. With the average shortfall of 22%, the performance was not up to the mark.

Only two States of Meghalaya and Nagaland had achieved their full targets. The achievement of Arunachal Pradesh [96%],Himachal Pradesh [92%], Manipur [88%],Uttarakhand [84%] and Tripura[82%] was. however, above the average states' figure of 78% achievement. The performance of the four States of Mizoram, Assam, J&K and Sikkim at 67%, 66%, 62% and 41% of the target was below the all States average level. The State of Sikkim with as high as 59% shortfall in achievement, was at the lowest among all the States in achievement.

About two third part of this component was availed of by four States of Nagaland, Uttarakhand, Manipur and Himachal Pradesh with their share of 18%, 17%, 15% and 13% respectively up to the year 2009-10.

Under this component, a total target of development of 12 Bee Breeders was also set for the two States of Mizoram [10 No] and Nagaland [2 No] during the ongoing XI Plan and both the States had achieved this target. The progress is satisfactory so far as the meeting of the targets by the concerned States are concerned. Mizoram had the maximum share of 83% and Nagaland of 17% in the total programme implemented up to the year 2009-10.

There is a good potential of honey farming in other States. The activity is thus required to be propagated in all the States.

Production of Quality Planting Material

The use of the disease free and quality planting material is the key for improving production and productivity of horticulture plants. Farmers' timely access to good quality seed and planting material of elite cultivars and root stocks is one of the most important elements of successful horticulture production and development. Often the planting material available to farmers especially the small ones, is of poor quality which undermines potential yield and performance of crop production. The Mission provides this basic support for supply of quality planting material by extending financial support for setting up nurseries both in the Private and Public Sector.

The Production and Productivity Improvement Scheme has the following sub components of setting up of:

- Big Nurseries [above1ha]
- Small Nurseries [up to1ha]
- Herbal Gardens
- Tissue Culture Lab
- Both in the Private and Public Sector

The performance of the States in the implementation of the programme Plan-wise and State-wise in regard to the achievement of targets of setting up of Nurseries, Herbal Gardens, Tissue Culture Labs under the programme of the Mission both in the Private and Public Sector since the inception of the Mission in 2001-02 in case of NER and 2003-04 for HSR is depicted in Tables 6.15 to 6.22.

Private Sector

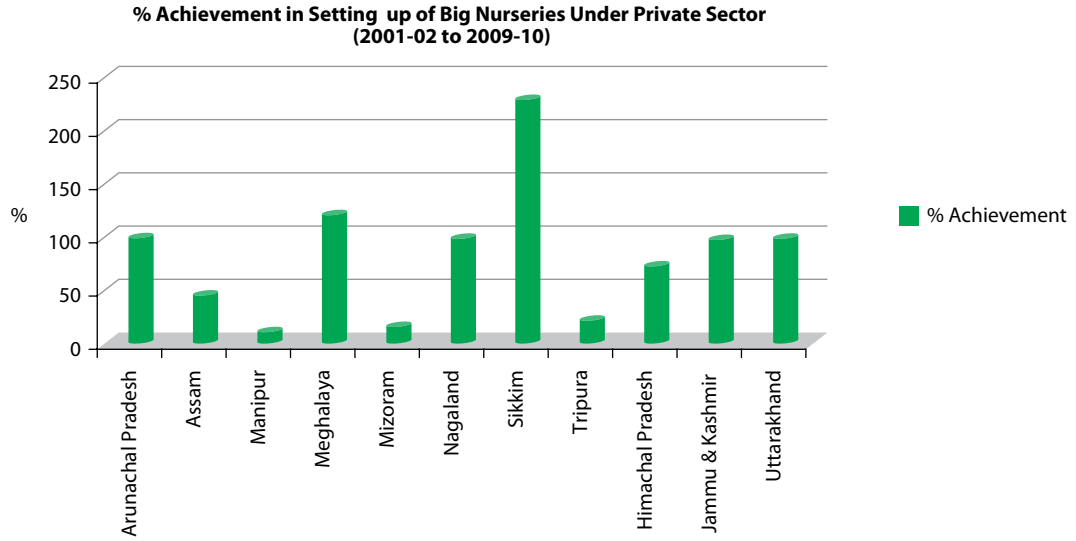
Setting up of Big Nurseries in Private Sector

The Plan-wise and State-wise targets and achievement under Setting up of Big Nurseries in Private Sector component/sub component of the programme are consolidated and collated in Table 6.15.

Table 6.15 Achievement vis-à-vis Target of the States in setting up of Big Nurseries in Private Sector

Setting up of Big Nurseries in Private Sector [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	2	9	0	2	9	0	11	11	100	10
Assam	1	18	0	1	8	0	19	9	47	8
Manipur	2	7	0	0	1	0	9	1	11	1
Meghalaya	0	3	6	0	5	6	9	11	122	10
Mizoram	0	5	1	0	0	1	6	1	17	1
Nagaland	0	12	0	0	12	0	12	12	100	11
Sikkim	0	19	0	0	44	0	19	44	232	39
Tripura	0	4	5	0	2	0	9	2	22	2
NES Total	**5**	**77**	**12**	**3**	**81**	**11**	**94**	**95**	**101**	**85**
Himachal Pradesh	N/A	6	6	N/A	6	3	12	9	75	8
Jammu & Kashmir	N/A	0	1	N/A	0	1	1	1	100	1
Uttarakhand	N/A	7	0	N/A	7	0	7	7	100	6
HS Total	**N/A**	**13**	**7**	**N/A**	**13**	**4**	**20**	**17**	**85**	**15**
Grand Total	**5**	**90**	**19**	**3**	**94**	**15**	**114**	**112**	**98**	**100**

Figure 6.15 Achievement vis-à-vis Target of the States in setting up of Big Nurseries in Private Sector



A total target of setting of 20 big Nurseries [2 ha and above] in the private sector, had been allotted to all the participating States to ensure quality planting material to the growers of horticulture crops. As against this, only 17 Nurseries have been established, which works out to be 85% of the targeted figure. The States of Sikkim with 232% achievement has shown an impressive performance. This has been followed by Meghalaya with achievement level of 122% of its targets. The States of Arunachal Pradesh, Nagaland, J&K and Uttarakhand had been able to achieve their targets. The performance of the States of Manipur [11%], Mizoram [17%], Tripura [22%] had been very poor. Himachal Pradesh and Assam had recorded a shortfall of 25% and 53% respectively in their achievement.

The overall achievement was 50% in NER during the IX Plan, 105% during X Plan in respect of all the States and 79% in the XI Plan up to the year 2009-10.

The State of Sikkim had set up the maximum number of 44 big Nurseries with 39% share in the total programme. Nagaland with 11% share and Meghalaya with 10% had also performed reasonably well. Assam, Mizoram and J&K had the least share of 1% each in the total 11 big nurseries set up under the programme.

Setting up of Small Nurseries in Private Sector

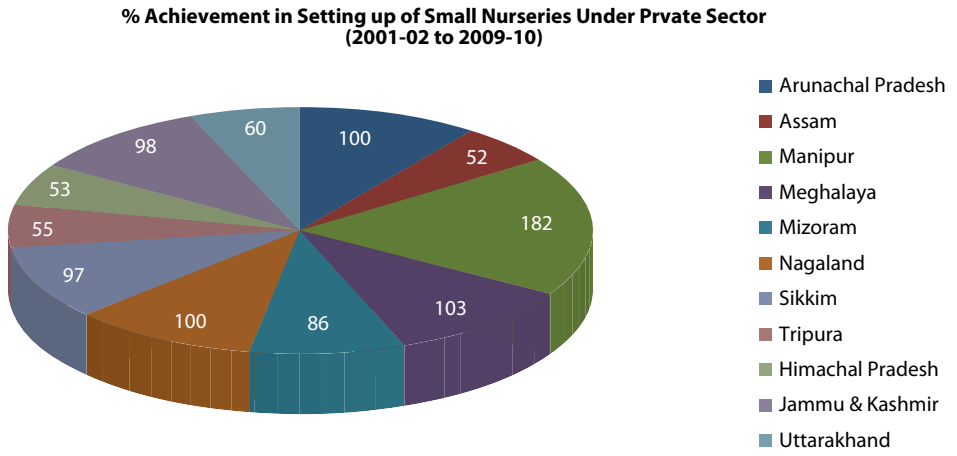
The Plan-wise and State-wise targets and achievement under Setting up of Small Nurseries in Private Sector component/sub component of the programme are consolidated and collated in Table 6.16.

All the eleven participating States had been given a total target of setting up of 701 small Nurseries [up to 1 ha] under private sector, since the launching of the HMNEH in 2001-02 to 2009-10 against which, 600 units [86%] could actually be established. Only four of the States of Manipur [182%], Meghalaya [103%], and Arunachal Pradesh & Nagaland [100% each] *had* achieved their targets fully. The performance of the State of Manipur with 182% was particularly good. The States of J&K [98%] and Sikkim [97%] had nearly achieved their

Table 6.16 Achievement vis-à-vis Target of the States in setting up of Small Nurseries in Private Sector

Setting up of Small Nurseries in Private Sector [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	4	30	0	4	30	0	34	34	100	6
Assam	2	75	0	2	38	0	77	40	52	7
Manipur	10	12	0	5	35	0	22	40	182	7
Meghalaya	0	25	35	0	27	35	60	62	103	10
Mizoram	0	6	8	0	4	8	14	12	86	2
Nagaland	0	63	37	0	63	37	100	100	100	17
Sikkim	0	41	35	0	45	29	76	74	97	12
Tripura	0	22	31	0	6	23	53	29	55	5
NES Total	**16**	**274**	**146**	**11**	**248**	**132**	**436**	**391**	**90**	**65**
Himachal Pradesh	N/A	23	41	N/A	23	11	64	34	53	6
Jammu & Kashmir	N/A	101	42	N/A	96	44	143	140	98	23
Uttarakhand	N/A	34	24	N/A	32	3	58	35	60	6
HS Total	**N/A**	**158**	**107**	**N/A**	**151**	**58**	**265**	**209**	**79**	**35**
Grand Total	**16**	**432**	**253**	**11**	**399**	**190**	**701**	**600**	**86**	**100**

Figure 6.16 Achievement vis-à-vis Target of the States in setting up of Small Nurseries in Private Sector



targets. The remaining States were not able to reach their targets and the shortfall in their achievement ranged from 47% [ach. 53%] in case of Himachal Pradesh to 14% [ach. 86%] in respect of Mizoram.

The overall achievement under this component was 69% in NER during the IX Plan, 92% during X Plan in respect of all the States and 75% in the XI Plan up to the year 2009-10.

The State of J&K had set up the maximum number of small nurseries in private sector – 140 [23%], followed by Nagaland - 100 [17%], Sikkim -74 [12%] and Meghalaya – 62 [10%]. These four States together had as much as 62% share in the total 600 units set up.

Setting up of Herbal Gardens in Private Sector

The Plan-wise and State-wise targets and achievement under Setting up of Herbal Gardens in Private Sector component/sub component of the programme are consolidated and collated in Table 6.17.

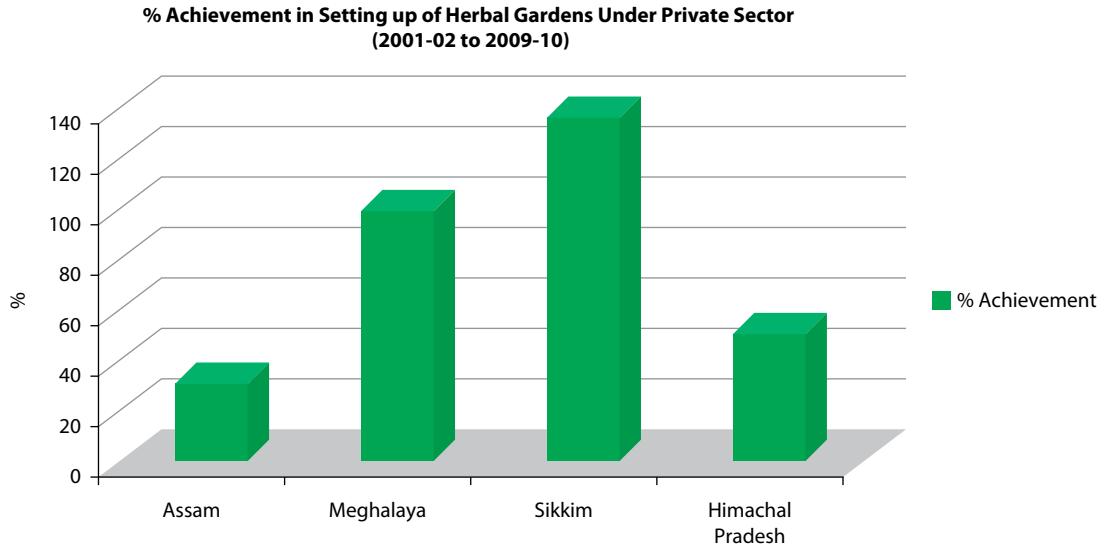
As against the total targets of 73 for all the 11 States, only 33 Herbal Gardens [45%] were set up. The achievement level is below 50% of targets and hence not up to the mark. Only six of the States viz. Assam, Meghalaya, Manipur, Sikkim, Himachal Pradesh and J&K, has participated in this activity. No information on the targets and achievement is available in respect of the remaining five States.

Only Meghalaya and Sikkim have been able to reach their target - Sikkim with 138%. Whereas the there has not been any progress in respect of the State of Manipur and J&K,

Table 6.17 Achievement vis-à-vis Target of the States in setting up of Herbal Gardens in Private Sector

Setting up of Herbal Gardens in Private Sector [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	19	0	0	6	0	19	6	32	18
Manipur	0	3	0	0	0	0	3	0	0	0
Meghalaya	0	2	0	0	2	0	2	2	100	6
Mizoram	0	0	0	0	1	0	0	1	N/A	3
Nagaland	0	0	0	0	0	0	0	0	N/A	0
Sikkim	0	1	7	0	4	7	8	11	138	33
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**25**	**7**	**0**	**13**	**7**	**32**	**20**	**63**	**61**
Himachal Pradesh	N/A	5	20	N/A	5	8	25	13	52	39
Jammu & Kashmir	N/A	0	16	N/A	0	0	16	0	0	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**5**	**36**	**N/A**	**5**	**8**	**41**	**13**	**32**	**39**
Grand Total	**0**	**30**	**43**	**0**	**18**	**15**	**73**	**33**	**45**	**100**

Figure– 6.17 Achievement vis-à-vis Target of the States in setting up of Herbal Gardens in Private Sector



the performance of the State of Assam and Himachal Pradesh fell short of 68% [ach 32%] and 42% [ach 52%] respectively.

Setting up of Tissue Culture Unit in Private Sector

Plant Tissue Culture [PTC] helps regenerating a whole plant from a small tissue or a cell. There are various fruits, flowers, medicinal plants and crops that can be propagated through PTC. It is useful in getting a large number of identical plants quickly, once its protocol is known. The HMNEH gives due importance on setting up Tissue Culture Units.

The Plan-wise and State-wise targets and achievement under Setting up of Tissue Culture Unit in Private Sector component/sub component of the programme are presented in Table 6.18.

The six of the States participating in the programme had been allotted a target of setting up of 22 Tissue Culture Units during the entire period of the project from 2001-02 to 2009-10. A total of 14 PTC units have however been set up which works out to 64% of the targets – NER 75% and HSR -57%. Three of the States of Meghalaya, Nagaland and Sikkim only had achieved their targets fully. In the remaining three States, while there is no progress in case of Manipur, the achievement level in respect of Himachal Pradesh and Uttarakhand has been of the order of 60% and 50% respectively.

The overall achievement which was 83% during the X plan showed a declining trend of 40% during the first three years of the XI Plan.

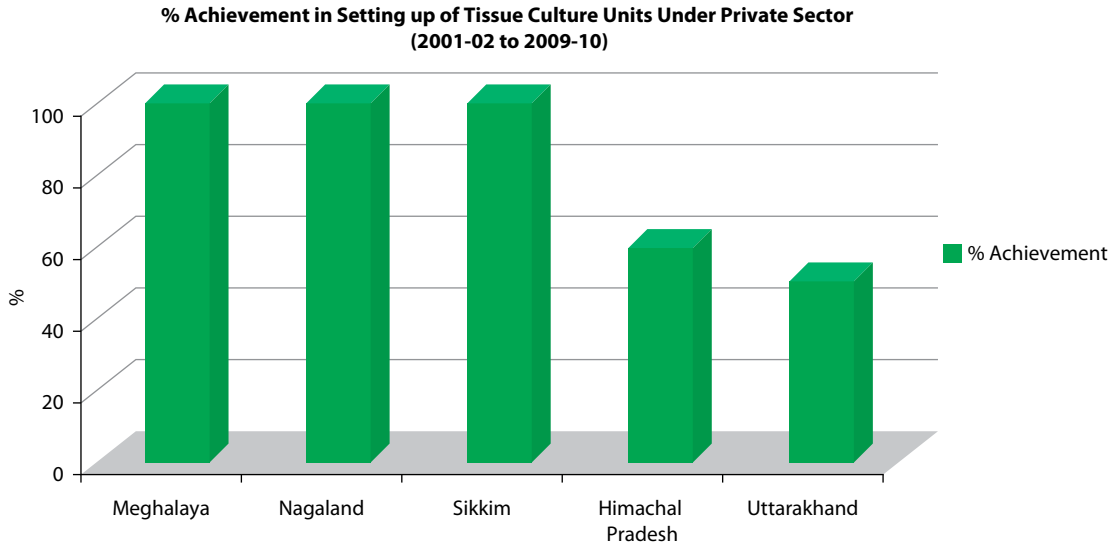
In terms of the share in the total programme implemented, Himachal Pradesh with 6 PTC Units [43%] tops the list. It has been followed by 3 [21%] and 2[14%] units set up each by Nagaland and Uttarakhand [14%]. The share of these four States constitutes as much as 92% of the total PTC units established up to 2009-10.

In view of the shortage of the quality planting material in the area, there is a need to set up more and more PTC Units in the region.

Table 6.18 Achievement vis-à-vis Target of the States under setting up of Tissue Culture Units in Private Sector

Setting up of Tissue Culture Units in Private Sector [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	2	0	0	0	0	2	0	0	0
Meghalaya	0	1	0	0	1	0	1	1	100	7
Mizoram	0	0	0	0	0	0	0	0	N/A	0
Nagaland	0	0	2	0	0	2	2	2	100	14
Sikkim	0	3	0	0	3	0	3	3	100	21
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**6**	**2**	**0**	**4**	**2**	**8**	**6**	**75**	**43**
Himachal Pradesh	N/A	4	6	N/A	4	2	10	6	60	43
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	2	2	N/A	2	0	4	2	50	14
HS Total	**N/A**	**6**	**8**	**N/A**	**6**	**2**	**14**	**8**	**57**	**57**
Grand Total	**0**	**12**	**10**	**0**	**10**	**4**	**22**	**14**	**64**	**100**

Figure 6.18 Achievement vis-à-vis Target of the States under setting up of Tissue Culture Units in Private Sector



Public Sector

The Private Sector alone may not be able to meet all the requirements of the planting material for horticulture crops in the area. The Public sector is playing an important role to produce planting material for being supplied to the farmers. The details of the Nurseries, Herbal Gardens and Plant Tissue Culture Units set up under the programme are furnished in Table 6.19 to 6.22 hereunder:

Setting up of Big Nurseries in Public Sector

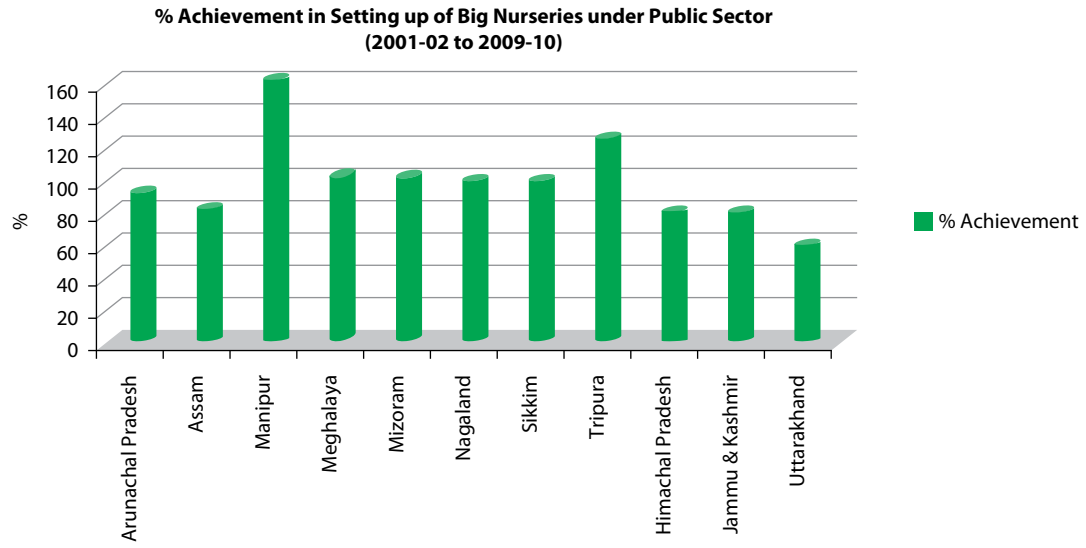
The Plan-wise and State-wise targets and achievement under Setting up of Big Nurseries in Public Sector component/sub component of the programme are consolidated and collated in Table 6.19.

The Public Sector had been given a total target of setting up of as many as 129 big [2 ha and above] Nurseries against which 118 units [91%] were actually established.- 105% in NER and 72% in HSR. The NER States fared better compared to HSR. All the NER States excepting Arunachal and Assam with shortfall of 9% and 20% respectively, have achieved their targets fully. Further the States of Manipur and Tripura had achieved their targets with good margins of 60% [ach.160%] and 25% [ach.125%] respectively. In the HSR, the shortfall ranged from 41% [ach.58%] in case of Uttarakhand to 22% [ach.78%] both in respect of Himachal Pradesh and J&K.

Table 6.19 Achievement vis-à-vis Target of the States under setting up of Big Nurseries in Public Sector

Setting up of Big Nurseries in Public Sector [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	2	5	4	2	5	3	11	10	91	8
Assam	2	3	0	2	2	0	5	4	80	3
Manipur	3	2	0	1	7	0	5	8	160	7
Meghalaya	0	9	18	3	10	15	27	28	104	24
Mizoram	1	2	0	1	2	0	3	3	100	3
Nagaland	1	4	3	1	4	3	8	8	100	7
Sikkim	2	7	0	2	7	0	9	9	100	8
Tripura	0	6	2	2	6	2	8	10	125	8
NES Total	**11**	**38**	**27**	**14**	**43**	**23**	**76**	**80**	**105**	**68**
Himachal Pradesh	N/A	5	4	N/A	5	2	9	7	78	6
Jammu & Kashmir	N/A	21	6	N/A	18	3	27	21	78	18
Uttarakhand	N/A	8	9	N/A	6	4	17	10	59	8
HS Total	**N/A**	**34**	**19**	**N/A**	**29**	**9**	**53**	**38**	**72**	**32**
Grand Total	**11**	**72**	**46**	**14**	**72**	**32**	**129**	**118**	**91**	**100**

Figure 6.19 Achievement vis-à-vis Target of the States under setting up of Big Nurseries in Public Sector



The NER States showed good overall performance of 127% during the year 2001-02. During the X Plan, the overall targets were achieved by taking all the States together. In the first three years of XI Plan, the overall performance of the States with 60% level of achievements has shown a declining trend.

The maximum number of big Nurseries – 28 [24%] have been set up in the State of Meghalaya followed by 21 [18%] such nurseries established in the State of J&K. These two States together had a share of more than half of the total nurseries' network created under the programme up to the year 2009-10.

Setting up of Small Nurseries in Public Sector

The Plan-wise and State-wise targets and achievement under Setting up of Small Nurseries in Public Sector component/sub component of the programme are consolidated and shown in Table 6.20.

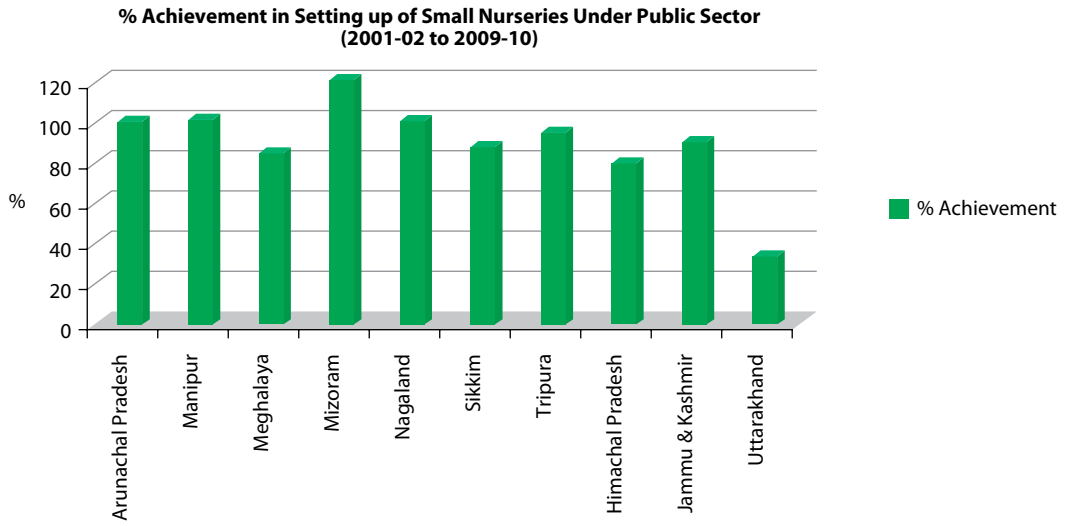
Against the target of 212 small Nurseries [up to 1ha] for the Public Sector, 179 units [84%] were actually set up – 92% in NER and 74% in HSR. The NER States have again fared better than the HSR in this regard. There is, however, no progress in the State of Assam in the NER. Four of the States viz. Arunachal Pradesh, Manipur Mizoram, and Nagaland only had achieved their targets fully – Mizoram also with 20% margins. In the NER, the shortfall in achievement in case of the remaining States ranges from 6% in Tripura [ach. 94%] to 16% in Meghalaya [ach. 84%]. In the HSR, the shortfall in performance is the maximum of 68% in Uttarakhand [ach. 32%] and minimum of 11% in case of J&K [ach. 89%].

During the launch year of the Mission, the NER States taken together had achieved all their targets fully. During the X plan, the overall achievement level was of the order of 97%. The average performance however came down to 60% during the XI Plan up to the year 2009-10.

Table 6.20 Achievement vis-à-vis Target of the States under setting up of Small Nurseries in Public Sector

Setting up of Small Nurseries in Public Sector [No].										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	7	9	1	7	9	1	17	17	100	9
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	7	2	0	5	4	0	9	9	100	5
Meghalaya	0	15	22	4	19	8	37	31	84	17
Mizoram	2	3	0	2	4	0	5	6	120	3
Nagaland	2	0	0	2	0	0	2	2	100	1
Sikkim	4	11	0	4	9	0	15	13	87	7
Tripura	0	18	16	2	16	14	34	32	94	18
NES Total	**22**	**58**	**39**	**26**	**61**	**23**	**119**	**110**	**92**	**61**
Himachal Pradesh	N/A	14	15	N/A	14	9	29	23	79	13
Jammu & Kashmir	N/A	22	23	N/A	19	21	45	40	89	22
Uttarakhand	N/A	7	12	N/A	4	2	19	6	32	3
HS Total	**N/A**	**43**	**50**	**N/A**	**37**	**32**	**93**	**69**	**74**	**39**
Grand Total	**22**	**101**	**89**	**26**	**98**	**55**	**212**	**179**	**84**	**100**

Figure 6.20 Achievement vis-à-vis Target of the States under setting up of Small Nurseries in Public Sector



The State of the J&K had set up the maximum number of small Nurseries - 44 [22%]. It was followed by Tripura with 32 Nurseries [18%], Meghalaya with 31 [17%] and Himachal Pradesh with 23 nurseries [13%]. The combined share of these four States constituted about three fourth of total small nurseries established under the public sector.

Setting up of Herbal Garden in Public Sector

The Plan-wise and State-wise targets and achievement under Setting up of Herbal Gardens in Public Sector component/sub component of the programme are consolidated and collated in Table 6.21.

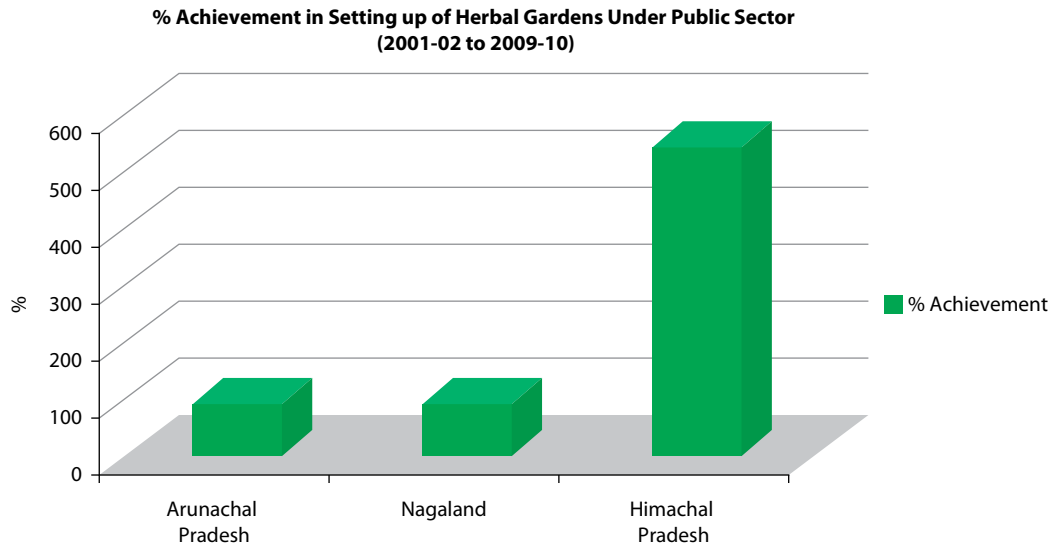
The performance of setting up of Herbal Garden by the Public Sector has been impressive. As against the total targets of 6, during the entire period of the project up to the year 2009-10, as many as 15 [250%] Herbal Gardens have actually been set up. Only four of the States of Manipur, Mizoram, Nagaland and Himachal Pradesh have participated in this activity and they have achieved all of their targets. The performance of Himachal Pradesh with 550% achievement level was impressive.

Himachal Pradesh has established the maximum number of 11 [73%] of the total Herbal Gardens as against its target of 2. The State of Manipur has not set up any unit against the target of 1 Herbal Garden. Mizoram set up one Herbal Garden though there was no target allotted to it. The overall targets have been achieved.

Table 6.21 Achievement vis-à-vis Target of the States under Herbal Gardens in Public Sector

Setting up of Herbal Gardens in Public Sector [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	1	0	0	1	0	1	1	100	7
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	1	0	0	0	0	1	0	0	0
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	0	0	0	0	1	0	0	1	N/A	7
Nagaland	0	2	0	0	2	0	2	2	100	13
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**4**	**0**	**0**	**4**	**0**	**4**	**4**	**100**	**27**
Himachal Pradesh	N/A	0	2	N/A	9	2	2	11	550	73
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**2**	**N/A**	**9**	**2**	**2**	**11**	**550**	**73**
Grand Total	**0**	**4**	**2**	**0**	**13**	**2**	**6**	**15**	**250**	**100**

Figure 6.21 Achievement vis-à-vis Target of the States under Herbal Gardens in Public Sector



Setting up of Tissue Culture Units in Public Sector

The HMNEH envisages setting of Tissue Culture Units by the Public sector also in each State for supply of in large quantities, quality planting material, which is free from diseases and viruses.

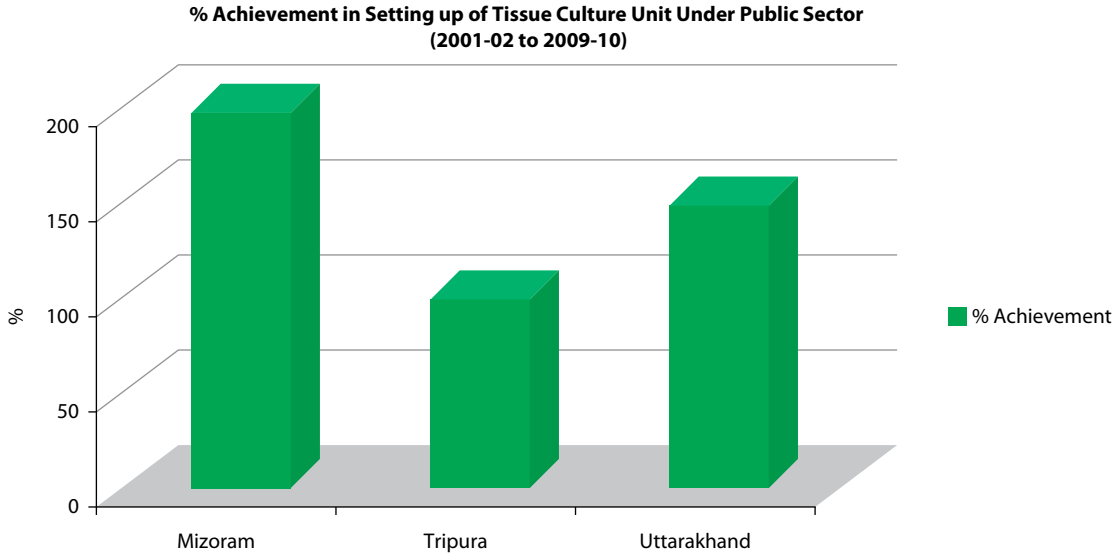
The Plan-wise and State-wise targets and achievement under Setting up of Tissue Culture Units in Public Sector component/sub component of the programme are consolidated and depicted in Table 6.22.

Table 6.22 Achievement vis-à-vis Target of the States under setting up of Tissue Culture Units in Public Sector

Setting up of Tissue Culture Unit [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	1	0	0	0	1	N/A	10
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	1	0	0	0	1	N/A	10
Mizoram	0	0	1	0	1	1	1	2	200	20
Nagaland	0	0	0	0	0	0	0	0	N/A	0
Sikkim	0	0	0	1	0	0	0	1	N/A	10
Tripura	0	2	0	1	1	0	2	2	100	20
NES Total	**0**	**2**	**1**	**4**	**2**	**1**	**3**	**7**	**233**	**70**

Setting up of Tissue Culture Unit [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Himachal Pradesh	N/A	0	2	N/A	0	0	2	0	0	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	2	N/A	2	1	2	3	150	30
HS Total	**N/A**	**0**	**4**	**N/A**	**2**	**1**	**4**	**3**	**75**	**30**
Grand Total	**0**	**2**	**5**	**4**	**4**	**2**	**7**	**10**	**143**	**100**

Figure 6.22 Achievement vis-à-vis Target of the States under setting up of Tissue Culture Units in Public Sector



The overall performance of the Public Sector in setting up of Tissue culture units has been good. As against the target of 7 units, 10 Tissue Culture Units were actually set up between the period 2001-02 to 2009-10. This works out to 243% of achievement - 233% in NER and 75% in HSR. The targets had been allotted to only three of the eleven participating States viz. Mizoram, Tripura and Himachal Pradesh. The States of Assam, Meghalaya and Sikkim though given no target, have set up one unit each. While Mizoram and Tripura have achieved their target, Himachal Pradesh did not set up any TCU against the target of two such units allotted to it. The good performance of other States has improved the all States position.

No target was allotted to any of the States in the year 2001-02 of the IX Plan. Whereas performance during the X Plan has been good by establishing the units exceeding the targeted figure, in the XI Plan only 2 TCU were established as against the target of 5.

The State of Uttarakhand had the largest share of 30% in establishing TCU units under the programme. This was followed by Mizoram and Tripura with 20% share of each. The combined share of these three States constituted more than two thirds of the total programme.

For supply of quality planting material in large quantities, which is free from diseases and viruses, more and more Nurseries, Herbal Gardens and Tissue Culture Units in each state needs to be set up. The Public Sector has a lead role in it.

Creation of Water Resources

Irrigation is very critical to agriculture. Shortage of water will cause drop in crop yields. The programme of the Mission lays great stress on creation of suitable water resources to ensure availability of irrigation for the horticulture development of these hilly regions, round the year.

The structures created under this programme are:

- Community Tanks
- Tube-wells

The performance of the States in the implementation of the programme Plan-wise and State-wise in regard to the achievement of targets of creation of Water Resources under the programme of the Mission since the inception of the Mission in 2001-02 in case of NER and 2003-04 for HSR is depicted in Tables 6.23 and 6.24.

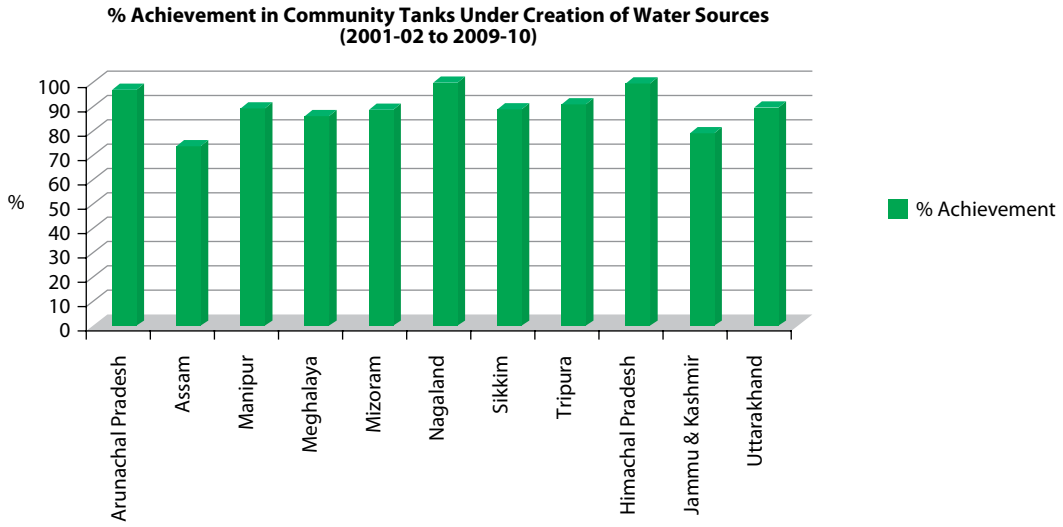
Community Tanks

The Plan-wise and State-wise targets and achievement under construction of Community Tanks component/sub component of the programme are contained in Table 6.23.

Table 6.23 Achievement vis-à-vis Target of the States under construction of Community Tanks

Community Tanks [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	Excess/ shortfall [-] in ach. [%]	% @ share
Arunachal Pradesh	30	775	214	30	775	182	1019	987	97	9
Assam	51	380	53	50	260	49	484	359	74	3
Manipur	22	717	160	23	627	160	899	810	90	7
Meghalaya	20	352	160	28	268	160	532	456	86	4
Mizoram	30	904	531	30	773	501	1465	1304	89	12
Nagaland	80	806	621	80	806	621	1507	1507	100	13
Sikkim	30	815	580	20	729	518	1425	1267	89	11
Tripura	20	920	728	10	930	575	1668	1515	91	13
NES Total	**283**	**5669**	**3047**	**271**	**5168**	**2766**	**8999**	**8205**	**91**	**73**
Himachal Pradesh	N/A	1019	521	N/A	1033	501	1540	1534	100	14
Jammu & Kashmir	N/A	421	529	N/A	366	386	950	752	79	7
Uttarakhand	N/A	475	374	N/A	479	281	849	760	90	7
HS Total	**N/A**	**1915**	**1424**	**N/A**	**1878**	**1168**	**3339**	**3046**	**91**	**27**
Grand Total	**283**	**7584**	**4471**	**271**	**7046**	**3934**	**12338**	**11251**	**91**	**100**

Figure 6.23 Achievement vis-à-vis Target of the States under construction of Community Tanks



At the time of launching of the programme, a small target of 283 community tanks was fixed for NER States ' With the joining of three Himalayan States, a total target of construction of 7584 Community Tanks was set for all the eleven States. During the first three years of the XI Plan, the States were given a total target of 4471 tanks. Since the beginning of the Mission in 2001-02 to 2009-10, the participating States were allocated a total target of construction of 12338 community Tanks. As against this, a total number of 11251 tanks were actually provided leaving a gap of 9% in the targeted figure.

The performance in achieving the targets at the aggregate level has shown a declining trend over the plan period. The achievement level which was 96% in the IX Plan decreased to 93% in X Plan and further to 88% in XI Plan till the year 2009-10.

Only two of the States of Nagaland and Himachal Pradesh had achieved their full targets and Meghalaya had a small shortfall of 3% in its achievement. The shortfall in achievement in respect of the remaining States ranged from 9% in case of Tripura [ach 91%] to 26% in respect of Assam [ach 74%]. Since water is a very critical in raising horticulture crops, the concerned States need to make all out efforts to achieve their targets.

The State of Himachal Pradesh had constructed the largest number of 1534 [14%] Community Tanks under the programme since its launching till 2009-10, followed by Tripura – 1515 [13%], Nagaland – 1507 [13%] Mizoram 1304 [12%] and Sikkim -1267 [11%]. These five States accounted for about two thirds share in the total programme. The share of the remaining States ranged from 3% in Assam to 9% in Arunachal Pradesh.

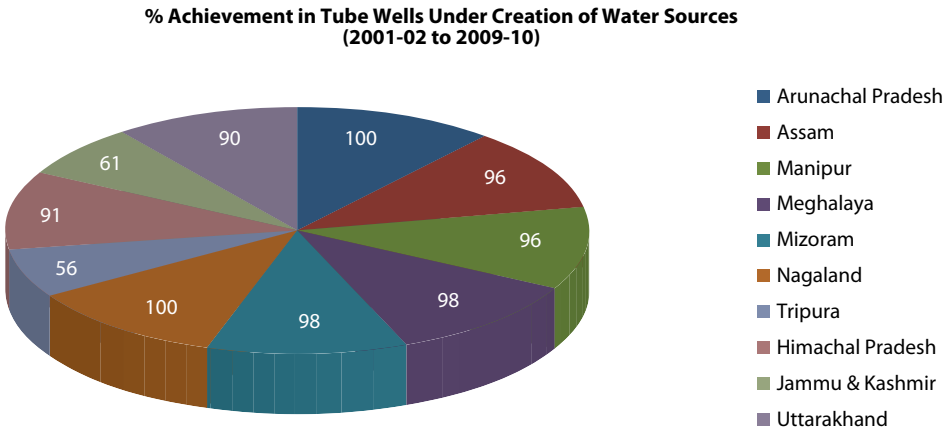
Tube-wells

The Plan-wise and State-wise targets and achievement under Tube wells component/sub component of the programme are shown in Table 6.24.

Table 6.24 Achievement vis-à-vis Target of the States under Tube-wells

Tube Wells [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	2	210	0	2	210	0	212	212	100	1
Assam	15	1035	1735	5	1035	1620	2785	2660	96	18
Manipur	10	190	885	14	141	885	1085	1040	96	7
Meghalaya	40	355	611	35	339	611	1006	985	98	7
Mizoram	40	850	2262	40	800	2262	3152	3102	98	21
Nagaland	30	734	320	30	734	320	1084	1084	100	7
Tripura	20	1070	1290	10	399	917	2380	1326	56	9
NES Total	**157**	**4444**	**7103**	**136**	**3658**	**6615**	**11704**	**10409**	**89**	**70**
H.P.	N/A	867	486	N/A	868	363	1353	1231	91	8
J&K	N/A	1287	2303	N/A	716	1461	3590	2177	61	15
Uttarakhand	N/A	570	650	N/A	572	524	1220	1096	90	7
HS Total	**N/A**	**2724**	**3439**	**N/A**	**2156**	**2348**	**6163**	**4504**	**73**	**30**
Grand Total	**157**	**7168**	**10542**	**136**	**5814**	**8963**	**17867**	**14913**	**83**	**100**

Figure 6.24 Achievement vis-à-vis Target of the States under Tube-wells



The participating States had been allocated a total target of sinking of 157 Tube-wells in 2001-02 [NER], 7178 in X Plan [all 11 States] and 10542 in XI Plan. As against cumulative target of 17867 for all the States since the inception of the Mission to the year 2009-10, the achievement was of the order of construction of 14913 tube-wells which works out to 83% of the targets. The progress with a shortfall of 17% in essential component as water resource is not satisfactory. The average achievement of 89% of the targets in the NER fared better compared to the73% achievement in the HSR.

The Plan-wise programme has shown both declining and increasing trend in achievement. The achievement which was 87% in the IX Plan declined to 81% in X Plan and again increased to 85% in the first three years of the XI Plan. Hopefully, the concerned States will continue maintaining this increasing trend in performance in respect of water resource so essential for enhancing production and productivity of horticulture crops.

Arunachal Pradesh and Nagaland were only the two States which were able to achieve their cumulative targets up to the year 2009-10. The shortfall in achievement by the remaining States in NER excepting Tripura, was, however, small ranging from 2% to 4%. In case of Tripura, the deficit of about 46% [ach. 54%] in achievement was considerable. In Himalayan Region States, two States of Himachal Pradesh and Uttarakhand had the shortfall in the range of 9% to 10%. But in case of J&K, it was 27% [ach. 73%].

Of the total number of 14913 tube-wells sunk since the launching of the programme in 2001-02 to 2009-10, under the Mission, the highest share of 21% had gone to Mizoram. The was followed by Assam with 18% and J&K with 15% share. The share of these three States taken together constitutes a little above half of the total structures created in all the participating States. Further, no progress in this regard has been reported from the State of Sikkim.

On-farm Water Management

The Programme has the following sub components of micro irrigation system:

- Drip Irrigation
- Sprinkler Irrigation
- Mulching

Drip and Sprinkler irrigation are the major components of farm management to improve the water use efficiency and to meet optimum water requirements of the horticulture crops. The water resources both existing and newly created under the Mission need to be linked with Micro Irrigation Techniques of drip and sprinkler irrigation system to the maximum extent.

The performance of the States in the implementation of the programme Plan-wise and State-wise in regard to the achievement of targets of On-farm Water Management under the programme of the Mission since the inception of the Mission in 2001-02 in case of NER and 2003-04 for HSR is shown in Tables 6.25 to 6.27.

Drip Irrigation System

Drip Irrigation system is an economical and judicious use of wager not only saves scarce source of water but also adds to the productivity of the crop by supplying filtered water directly to the root zone of the plant. The Mission therefore, emphasis much on use of micro irrigation system in the project area.

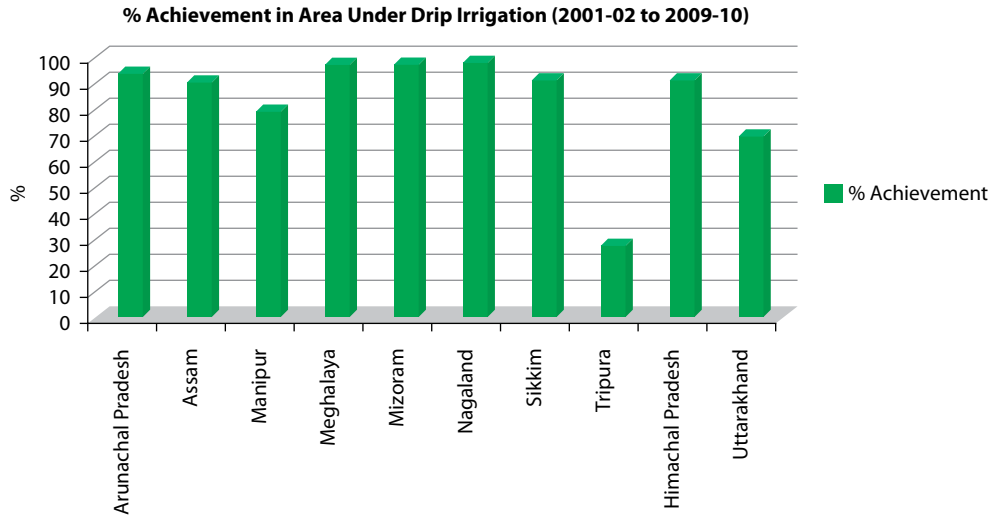
The Plan-wise and State-wise targets and achievement under Drip Irrigation System component/sub component of the programme are depicted in Table 6.25.

Against the target of coverage of 280 ha under drip irrigation system during the year 2009-10, the achievement by the NER States to which the programme had been allotted, was of the

Table 6.25 Achievement vis-à-vis Target of the States under Drip Irrigation

States	Drip Irrigation [ha]									
	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	110	1668	530	110	1670	446	2308	2226	96	13
Assam	20	538	1685	22	469	1582	2243	2073	92	12
Manipur	20	560	750	10	370	696	1330	1076	81	6
Meghalaya	20	1014	3058	28	984	3058	4092	4070	99	24
Mizoram	0	830	1420	0	810	1420	2250	2230	99	13
Nagaland	60	581	575	60	581	575	1216	1216	100	7
Sikkim	30	255	1194	30	260	1079	1479	1369	93	8
Tripura	20	320	355	0	14	185	695	199	29	1
NES Total	**280**	**5766**	**9567**	**260**	**5158**	**9041**	**15613**	**14459**	**93**	**87**
H.P.	N/A	532	284	N/A	551.7	208	816	759	93	5
J&K	N/A	0	108	N/A	0	0	108	0	0	0
Uttarakhand	N/A	1210	810	N/A	1010	427	2020	1437	71	9
HS Total	**N/A**	**1742**	**1202**	**N/A**	**1561.7**	**635**	**2944**	**2196**	**75**	**13**
Grand Total	**280**	**7508**	**10769**	**260**	**6720**	**9676**	**18557**	**16656**	**90**	**100**

Figure 6.25 Achievement vis-à-vis Target of the States under Drip Irrigation



order of 260 – 93%. Keeping in view the nature of the activity, which is yet not widely accepted, the performance may be taken as satisfactory. During the X Plan period, the States including Himalayan States were allocated a target of 7508 ha against which the achievement was coverage of 6720 ha which is about 90% - almost in the same proportion in the two regions. In the XI Plan, [up to 2009-10] a target of coverage of 10769 ha of land under drip irrigation system, was set for all the 11 states, against which the achievement level was to the extent of 9676 ha [90%: NER – 95%, HS-53%]. The performance of the NER States has been good throughout. The achievement of the HSR was poor during the initial three years of the XI Plan period.

During the entire period of the project since it launching in 2001-02 to 2009-10, a total area of 16656 ha has been covered under Drip Irrigation system against the targeted figure of 18557 ha which comes to 90% of the targets of all the States taken together.

Nagaland [100%], Meghalaya [99%] and Mizoram [99%] were the only two States which had fully or nearly achieved their targets and the other States were lagging behind in this respect. The State of Tripura had a very high shortfall of 71% [ach.29%] and Manipur a considerable one of 19% [ach 81%] in their achievement in NER. The shortfall in respect of the remaining States of the region ranged from 4% [ach.96%] in case of Arunachal Pradesh to 7% [ach.93%] for the State of Sikkim. In the HSR, J&K had not made any progress in installing drip irrigation and the shortfall in respect of Himachal Pradesh was 7% [ach.93%] and 29% [ach.71%] in case of Uttarakhand.

The State of Meghalaya had the largest share of 24% in the total acreage covered under the drip irrigation system in the 11 participating States. It was followed by Arunachal Pradesh & Mizoram each with share of 13% and Assam with 12% share. These five States had as much as about two thirds shares in the total area covered under drip irrigation under the programme of the Mission.

Sprinkler Irrigation

Sprinkler irrigation enables water to be sprinkled with the help of a network of pipes and sprinklers The system is ideally suitable for close spaced crops like vegetables and floriculture.

The Plan-wise and State-wise targets and achievement under Sprinkler Irrigation System component/sub component of the programme are shown in Table 6.26.

The seven of the participating States had been given a combined target of coverage of an area of 4015 ha between the period 2003-04 to 2009 -10, against which the achievement was of the order of 78%-89% in NER and 64% in HSR, only. Information about four of the States namely, Arunachal Pradesh, Assam, Sikkim and Tripura is not available. The achievement is not up to the mark. Only two of the States of Mizoram and Nagaland had achieved their targets fully. The performance of Himachal Pradesh [91%] and Meghalaya [79%] was comparatively good. The State of J&K had shown the poorest achievement of just 1% of its targets. The performance of the remaining two States of Uttarakhand [40%] and Manipur [33%] was also low.

The overall achievement during the X Plan was 84% of the total targets which was further reduced to 75% during the first three years of XI Plan.

The programme had evoked good response in the States of Mizoram, Himachal Pradesh, Meghalaya and Nagaland which had a share of 29%, 25%, 18% and 17% respectively in the total programme implemented. These four States had a total share of 89% of the total programme of supply of sprinkler irrigation. The programme needs to be further popularized in all the States to meet the challenge of the water scarcity.

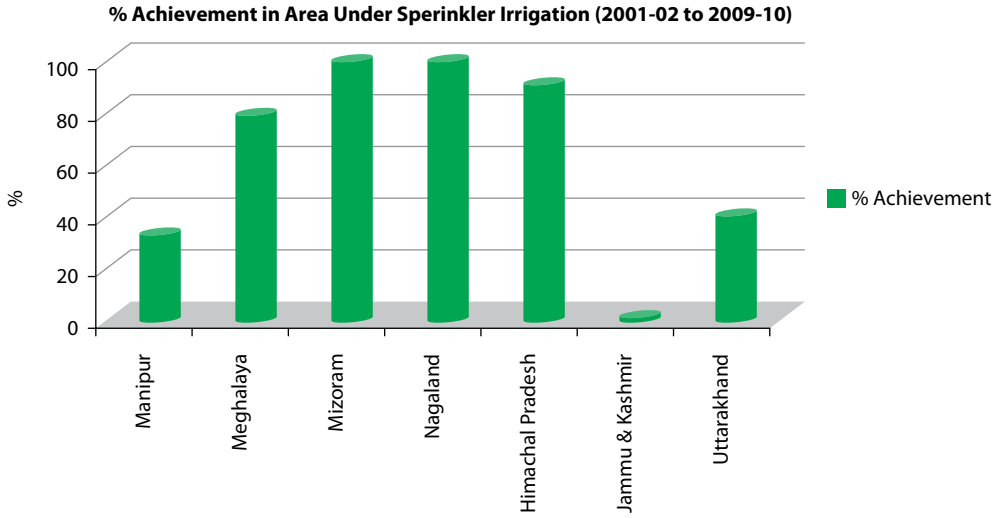
Mulching

In plastic Mulching the soil around the root zone of plant is covered with a plastic film called plastic mulching. It is an effective practice to restrict weed growth, conserve moisture and reduce the effect of soil borne diseases through soil solarization.

Table 6.26 Achievement vis-à-vis Target of the States under Sprinkler Irrigation system

Sprinkler irrigation [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	100	50	0	0	50	150	50	33	2
Meghalaya	0	316	410	0	163	410	726	573	79	18
Mizoram	0	500	400	0	500	400	900	900	100	29
Nagaland	0	150	400	0	150	400	550	550	100	17
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**1066**	**1260**	**0**	**813**	**1260**	**2326**	**2073**	**89**	**66**
Himachal Pradesh	N/A	476	383	N/A	492	290	859	782	91	25
Jammu & Kashmir	N/A	0	90	N/A	0	1	90	1	1	0
Uttarakhand	N/A	0	740	N/A	0	294	740	294	40	9
HS Total	**N/A**	**476**	**1213**	**N/A**	**492**	**585**	**1689**	**1077**	**64**	**34**
Grand Total	**0**	**1542**	**2473**	**0**	**1305**	**1845**	**4015**	**3150**	**78**	**100**

Figure 6.26 Achievement vis-à-vis Target of the States under Sprinkler Irrigation system

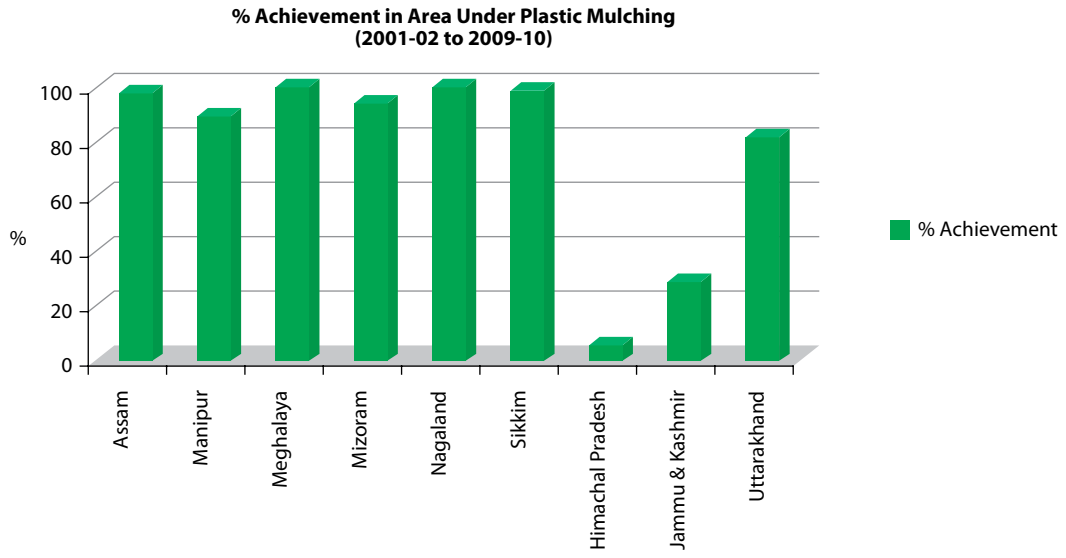


The Plan-wise and State-wise targets and achievement under Mulching component/sub component of the programme are contained in Table 6.27.

Table 6.27 Achievement vis-à-vis Target of the States under Plastic Munching

Mulching [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Assam	0	349	1890	0	337	1860	2239	2197	98	21
Manipur	0	595	1675	0	355	1675	2270	2030	89	20
Meghalaya	3	229	1090	2	229	1090	1322	1321	100	13
Mizoram	0	450	600	0	389	600	1050	989	94	10
Nagaland	15	100	1100	15	100	1100	1215	1215	100	12
Sikkim	0	620	0	0	615	0	620	615	99	6
NES Total	**18**	**2343**	**6355**	**17**	**2025**	**6325**	**8716**	**8367**	**96**	**82**
H.P.	N/A	142	810	N/A	48	0	952	48	5	0.5
J&K	N/A	112	279	N/A	100	11	391	111	28	1
Uttarakhand	N/A	830	1250	N/A	808.5	905	2080	1713	82	17
HS Total	**N/A**	**1084**	**2339**	**N/A**	**956.5**	**916**	**3423**	**1872**	**55**	**18**
Grand Total	**18**	**3427**	**8694**	**17**	**2982**	**7241**	**12139**	**10240**	**84**	**100**

Figure 6.27 Achievement vis-à-vis Target of the States under Plastic Munching



At the launch of the Mission in the NER, a small target of 18 ha area of mulching was given to the two States of Meghalaya [3 ha] and Nagaland [15 ha]. In the next X plan period, the target was increased to 3427 ha. During the XI Plan [up to 2009-10] a total target of 8694 ha was distributed among all the eleven States. A cumulative target of 12139 ha had thus been allocated to all the States since the launching of the Mission till the year 2009-10. As against this target, an area of 10240 ha only had been covered which formed 84% of the targets. The overall progress of this innovative activity is not bad.

In Plan-wise performance, a declining trend in the performance has been noticed. The achievement level which was 94% in the IX Plan declined to 87% in the X Plan and further to 83% in the XI Plan up to the year 2009-10.

Only two States of Meghalaya and Nagaland had been able to achieve their targets fully. The State of Sikkim and Assam had a small shortfall of 1% and 2% respectively. In the other NER Stares, the shortfall in achievement ranged from 6% [ach.94%] in Mizoram to 11% in case of Manipur [ach.89%]. The performance of the State of Himachal Pradesh and J&K with 5% and 28% achievement of their targets was low. The State of Uttarakhand with 82% achievement had done better.

The States which had played a major part in implementing mulching technology in horticulture were: Manipur, Assam. Meghalaya, Nagaland and Mizoram claiming a share of 21%, 20%.13%, 12%, and 10% respectively in the total programme. These five States together had about three fourth shares in the total area covered under mulching activity.

Use of Greenhouse Technology/Protected Cultivation Technology

The greenhouse technology is used to protect the plants from the adverse climatic conditions. The technology is used to provide the optimum growth conditions of light, temperature, humidity, CO_2 etc for the best growth of plant to achieve maximum yield and best quality.

The Greenhouse Technology/Protected cultivation has the following sub components:

- Low Cost Tunnels
- Greenhouse [500 sqm]
- Low Cost Greenhouse
- Shade Nets
- Anti Hail Net
- Anti Hail Gun
- Poly Sheet
- Anti Bird Nets

The performance of the States in the implementation of the programme Plan-wise and State-wise in regard to the achievement of targets under Greenhouse/Protected technology under the programme of the Mission since the inception of the Mission in 2001-02 in case of NER and 2003-04 for HSR is presented in Tables 6.28 to 6.35.

Low Cost Tunnel

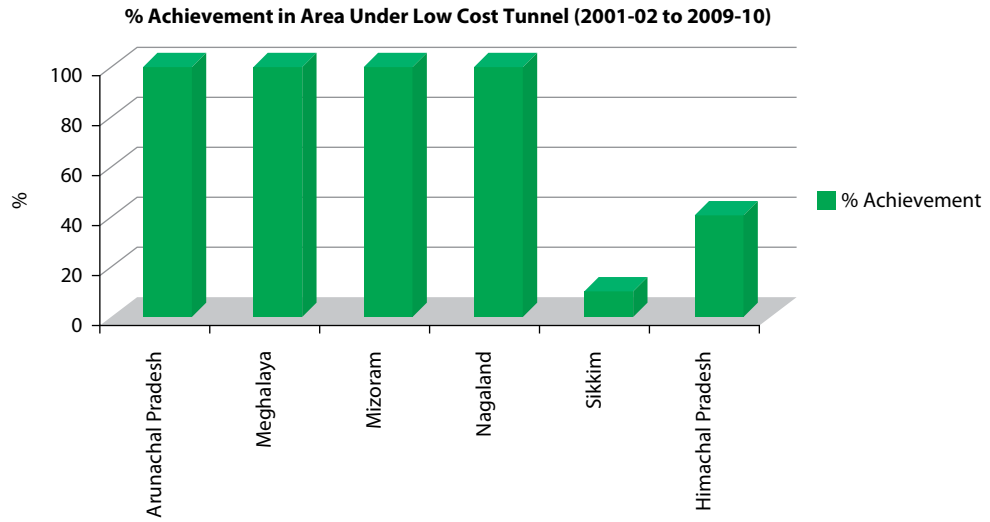
Low tunnels are simple structures used to protect plants from rains, winds, low temperature, frost and other vagaries of the weather. With these low tunnels seedling can be raised very quickly.

The Plan-wise and State-wise targets and achievement under Low Cost Tunnels component/sub component of the programme are shown in Table 6.28.

Table 6.28 Achievement vis-à-vis Target of the States under Low Cost Tunnels

Low Cost Tunnel [sqm]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	253100	0	0	253100	0	253100	253100	100	73
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	1680	0	0	0	0	1680	0	0	0
Meghalaya	0	22400	0	0	22400	0	22400	22400	100	6
Mizoram	0	500	0	0	500	0	500	500	100	0
Nagaland	0	0	50000	0	0	50000	50000	50000	100	14
Sikkim	0	4000	0	0	400	0	4000	400	10	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**281680**	**50000**	**0**	**276400**	**50000**	**331680**	**326400**	**98**	**94**
Himachal Pradesh	N/A	22400	32750	N/A	22400	0	55150	22400	41	6
Jammu & Kashmir	N/A	0	50020	N/A	0	0	50020	0	0	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**22400**	**82770**	**N/A**	**22400**	**0**	**105170**	**22400**	**21**	**6**
Grand Total	**0**	**304080**	**132770**	**0**	**298800**	**50000**	**436850**	**348800**	**80**	**100**

Figure 6.28 Achievement vis-à-vis Target of the States under Low Cost Tunnels



The eight States had been allotted a total target of coverage of 4.37 lakh sqm under low cost Tunnels. The achievement of 3.49 lakh sqm constitutes 80% of the targeted figure. Information in respect of three of the States viz. Assam, Tripura and Uttarakhand is not available. Four of the States of Arunachal Pradesh, Meghalaya, Mizoram and Nagaland

had achieved their targets in full. Whereas the State of Jammu & Kashmir did not show any progress in this regard, the performance of Manipur [33%] and Uttarakhand [40%] remained below the mark. The performance of Himachal Pradesh [91%], and Meghalaya [79%] was comparatively better.

The achievement in construction of low cost tunnels showed a declining trend from 85% in the X Plan period to 75% in the first three years of the XI Plan.

The State of Arunachal Pradesh, had the largest share of about three fourth in the total programme followed by Nagaland with about 14% share. These two States together had a share of 87% in the total low cost tunnel area of 3.49 lakh sqm covered.

In view of its low cost it is more suitable to the small and marginal farmers with small land holdings. Its application needs to be supported to attract them.

Greenhouse [500 sqm]

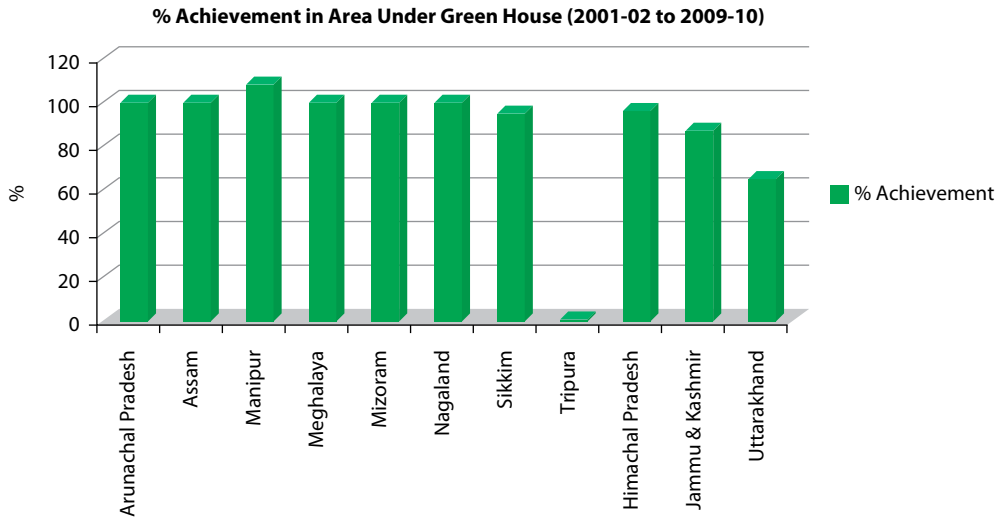
The Plan-wise and State-wise targets and achievement under Greenhouse [500 sqm] component/sub component of the programme are shown in Table 6.29.

During the year 2001-02, a target of setting up of 48 units of 500 sqm each in NER States was set up against which, the achievement was of 126 units [185%]. The

Table 6.29 Achievement vis-à-vis Target of the States under green house [500 sqm]

Greenhouse [500 sqm]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	10	40450	45000	10	40450	45000	85460	85460	100	5
Assam	0	290	20000	0	279	20000	20290	20279	100	1
Manipur	0	20387	96100	0	20349	105910	116487	126259	108	7
Meghalaya	20	559	138820	14	472	138820	139399	139306	100	8
Mizoram	0	198001	124700	0	198001	124700	322701	322701	100	18
Nagaland	0	74366	80000	0	74366	80000	154366	154366	100	8
Sikkim	12	44520	232911	102	44614	219600	277443	264316	95	14
Tripura	6	406	76023	0	309	23	76435	332	0.4	0.02
NES Total	**48**	**378979**	**813554**	**126**	**378840**	**734053**	**1192581**	**1113019**	**93**	**61**
Himachal Pradesh	N/A	201272	472000	N/A	201272	447000	673272	648272	96	35
J&K	N/A	0	9120	N/A	0	7894	9120	7894	87	0
Uttarakhand	N/A	37650	67500	N/A	37605	30468	105150	68073	65	4
HS Total	**N/A**	**238922**	**548620**	**N/A**	**238877**	**485362**	**787542**	**724239**	**92**	**39**
Grand Total	**48**	**617901**	**1362174**	**126**	**617717**	**1219415**	**1980123**	**1837258**	**93**	**100**

Figure 6.29 Achievement vis-à-vis Target of the States under green house [500 sqm]



achievement had been good rather impressive. In the next X Plan period, a target of 6.18 lakh sqm green houses each of 500 sqm was set for all the 11 States including 3 HSR States and the same was fully achieved. In the next three years period of XI Plan, as against the target of 13.62 lakh sqm the achievement was of the order of 12.19 sqm i.e. 90% of the targeted figure. The State had been allocated a cumulative target of covering 19.80 lakh sqm area by constructing Greenhouses of 500 sqm size against which the actual coverage was of the order of 18.37 lakh sqm. The achievement level of 93% of the targets can be considered fairly reasonable as the activity does not have a wide spread acceptance.

In the IX and X Plan. All the targets had been achieved, with impressive margins of 163% [ach.263%] in IX Plan. In the XI Plan up to 2009-10, the achievement was of 90% of the targets.

In NER all the States except Sikkim and Tripura had achieved their targets fully. While in case of Sikkim, the shortfall in achievement was only of 5%, with achievement level of less than 1%, there was hardly any progress in Tripura. In HSR, the State of Himachal Pradesh with small shortfall of 4% [ach. 96%] compared well with many NE States. While J&K had a moderate shortfall of 13% [ach. 87%], the achievement in respect of Uttarakhand at 65% was low.

In relative terms, the State of Himachal Pradesh had the highest share of 35% in the total programme. The States of Mizoram with 18% and Sikkim with 14% share came next. The three States had about two thirds share in the total implementation of this component of the programme.

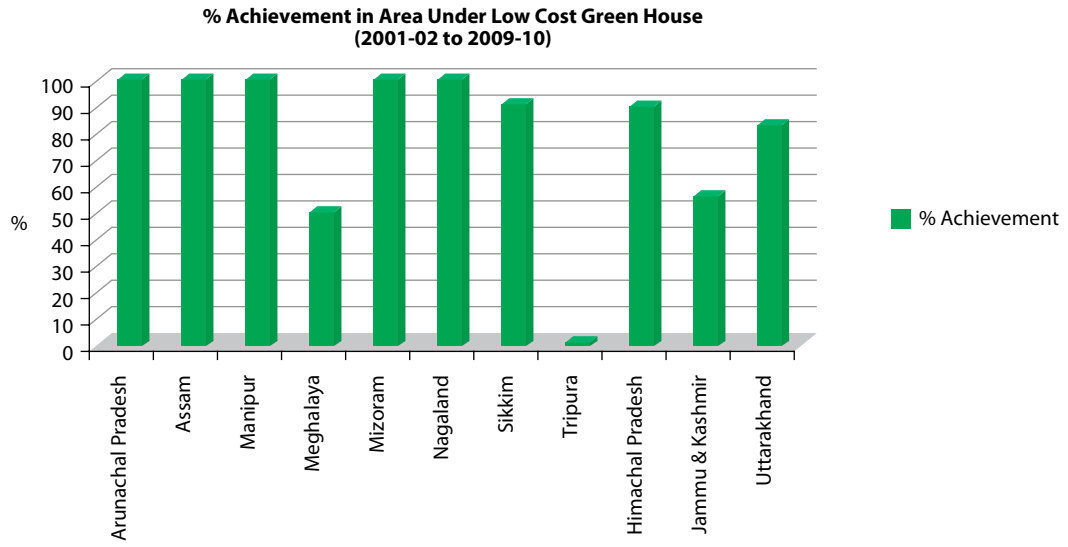
Low Cost Green House

The Plan-wise and State-wise targets and achievement under Low Cost Greenhouse component/sub component of the programme are shown in Table 6.30.

Table 6.30 Achievement vis-à-vis Target of the States under low cost green house

Low Cost Greenhouse										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	28000	0	0	28000	0	28000	28000	100	2
Assam	0	30100	140000	0	30000	140000	170100	170000	100	10
Manipur	0	30570	289000	35	30054	289000	319570	319089	100	19
Meghalaya	50	100208	100600	50	304	100600	200858	100954	50	6
Mizoram	0	44347	44000	148	44197	44000	88347	88345	100	5
Nagaland	40	10303	71000	40	10303	71000	81343	81343	100	5
Sikkim	0	10200	484304	0	10200	441600	494504	451800	91	27
Tripura	0	10010	353057	0	0	57	363067	57	0.02	0.003
NES Total	**90**	**263738**	**1481961**	**273**	**153058**	**1086257**	**1745789**	**1239588**	**71**	**74**
Himachal Pradesh	N/A	33494	118650	N/A	33011	104050	152144	137061	90	8
Jammu & Kashmir	N/A	265270	51824	N/A	167514	10078	317094	177592	56	11
Uttarakhand	N/A	50100	90400	N/A	50018	67060	140500	117078	83	7
HS Total	**N/A**	**348864**	**260874**	**N/A**	**250543**	**181188**	**609738**	**431731**	**71**	**26**
Grand Total	**90**	**612602**	**1742835**	**273**	**403601**	**1267445**	**2355527**	**1671319**	**71**	**100**

Figure 6.30 Achievement vis-à-vis Target of the States under low cost green house



Two States of Meghalaya and Nagaland in the NER had taken a target of construction of 90 Low Cost Greenhouses in 2001-01. As against this, as many as 273 [303%] Greenhouses had been constructed. In the X Plan, targets of 6.12 lakh sqm for construction of low cost green houses were set against which achievement was of 4.04 lakh sqm i.e. 66%. [NER - 58% & HSR - 72%]. In the XI Plan period of first three years, the target for the States was 17.43 lakh sqm and the achievement there against 12.67 lakh sqm. The States could achieve only 73% of their targets – NER 73% and HSR 74%. There was not much difference in achievement among NER and HSR.

Since the launching of the Mission in the year 2001-02, the participating States had been assigned a cumulative target of 23.56 lakh sqm for construction of low cost green houses. The overall achievement of 16.71 lakh sqm by them works out to 71% of the targets in the same proportion in both the regions. The overall performance in setting up low cost green houses during the X and XI Plan period remained low.

The States of Arunachal Pradesh, Assam, Manipur and Mizoram and Nagaland in NER had achieved their 100% targets. The shortfall of 9% [ach. 91%] in case of Sikkim was small; Meghalaya could reach only 50% of the targets set for it. There was virtually no progress in the State of Tripura with just less than 1% achievement. In the HSR, Himachal Pradesh had achieved 90% of its targets. The States of J&K and Uttarakhand had the shortfall of 17% [ach. 83%] and 46% [ach. 56%] in achievement of their respective targets Sikkim had the highest share of 27%, followed by Manipur with 19% J&K with 11% and Assam with 10% share in the total programme under low cost green house component.

Shade Nets

Shading nets are used to provide relief to the plants from the scorching sunlight, high winds, direct rainfall as well as insects and pests. Shading nets are being used for raising nursery, indoor plants, hardening of tissue cultured platelets and growing of vegetables also.

The Plan-wise and State-wise targets and achievement under Shade Net component/sub component of the programme are shown in Table 6.31.

No targets were allocated to any of the States in 2001-02. Still Sikkim provided some shade nets [14] to horticulture farmers. During X Plan, a target of 23.09 lakh sqm shade net was allocated amongst all the 11 States against which the achievement was of 21.48 lakh sqm i.e. 93%. Whereas the HSR had achieved all their targets, the achievement was 93% in case of NER. In the XI Plan [2007-08 to 2009-100] period the targets for all the States were of 46.47 lakh sqm of shade nets and achievement there against of 29.20 lakh sqm. i.e. 63% of the targets. The NER had 66% and HSR 8% achievement. The HSR which was ahead of the NER in X Plan lagged much behind NER in the XI plan.

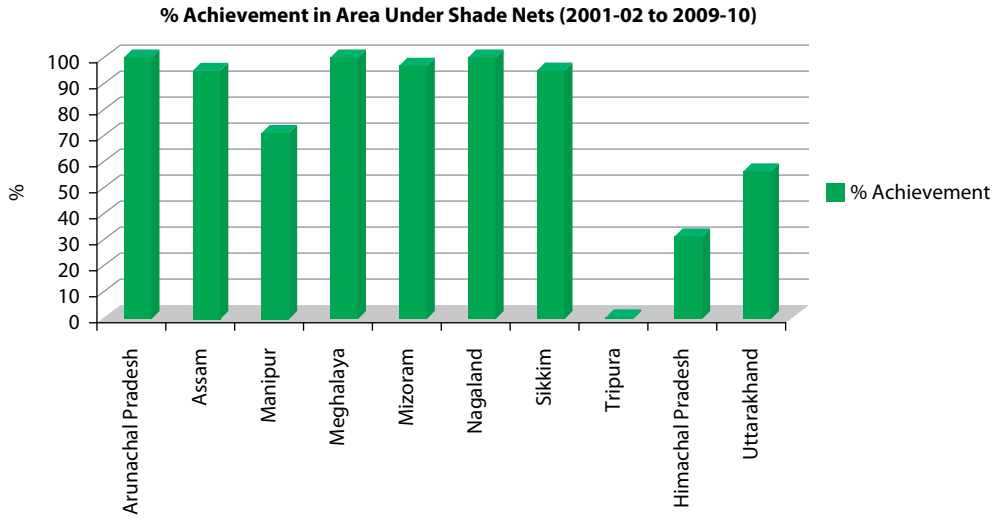
The participating States had been allocated a cumulative target of 69.57 lakh sqm of shade net since the inception of the programme till the year 2009-10, against which the achievement level was of the order of 50.69 lakh sqm i.e. 73% of the targets – 75% in NER and 34% in HSR. The performance of the NER was better compared to the HSR.

The States of Arunachal Pradesh, Meghalaya and Nagaland had only achieved their full targets amongst all the eleven States. While the State of J&K had made no progress, the achievement of the State of Tripura with less than 1% was not better. The States of Assam,

Table 6.31 Achievement vis-à-vis Target of the States in area expansion under shade nets

States	Shade nets [sqm]									
	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	10000	0	0	10000	0	10000	10000	100	0
Assam	0	112000	108500	0	102000	108500	220500	210500	95	4
Manipur	0	409430	782000	0	375000	474000	1191430	849000	71	17
Meghalaya	0	111929	252500	0	111929	252500	364429	364429	100	7
Mizoram	0	802000	970000	0	752000	970000	1772000	1722000	97	34
Nagaland	0	335120	675000	0	335120	675000	1010120	1010120	100	20
Sikkim	0	387914	414990	14	348914	414450	802904	763378	95	15
Tripura	0	27300	1150795	0	300	195	1178095	495	0.04	0.01
NES Total	**0**	**2195693**	**4353785**	**14**	**2035263**	**2894645**	**6549478**	**4929922**	**75**	**97**
Himachal Pradesh	N/A	95872	260500	N/A	96973	14500	356372	111473	31	2
Jammu & Kashmir	N/A	0	2000	N/A	0	0	2000	0	0	0
Uttarakhand	N/A	17650	31000	N/A	16250	11000	48650	27250	56	1
HS Total	**N/A**	**113522**	**293500**	**N/A**	**113223**	**25500**	**407022**	**138723**	**34**	**3**
Grand Total	**0**	**2309215**	**4647285**	**14**	**2148486**	**2920145**	**6956500**	**5068645**	**73**	**100**

Figure 6.31 Achievement vis-à-vis Target of the States in area expansion under shade nets



Mizoram and Sikkim in NER had, however, a small shortfall ranging from 3% to 5%. The shortfall in the achievement of target by the States of Manipur, Uttarakhand and Himachal Pradesh at 29%, 46% and 69% respectively was considerable to very high extent.

The State of Mizoram had the largest share of 34%, followed by Nagaland with 20%, Manipur with 17% and Sikkim with 15% in the total programme. These four States formed 86% share in the total implementation of the shade net technology.

Anti Hail Net

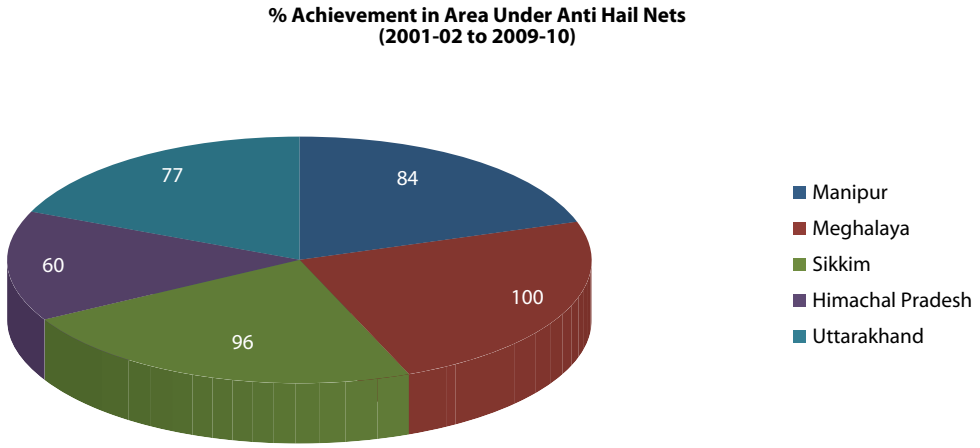
Anti Hail Nets are used to protect the crops from hails in hail prone areas. The anti hail nets are normally provided for each individual tree. The assistance would be provided only in hail prone areas.

The Plan-wise and State-wise targets and achievement under Anti Hail Net component/sub component of the programme are shown in Table 6.32.

Table 6.32 Achievement vis-à-vis Target of the States under anti-hail nets

Anti Hail Nets [sqm]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% @ share
Manipur	0	5340	0	0	4500	0	5340	4500	84	6
Meghalaya	0	7150	0	0	7144	0	7150	7144	100	10
Sikkim	500	8950	0	500	8550	0	9450	9050	96	12
Tripura	0	140	0	0	0	0	140	0	0	0
NES Total	**500**	**21580**	**0**	**500**	**20194**	**0**	**22080**	**20694**	**94**	**28**
Himachal Pradesh	N/A	20115	22198	N/A	20190	5340	42313	25530	60	34
Uttarakhand	N/A	12000	24500	N/A	12000	16190	36500	28190	77	38
HS Total	**N/A**	**32115**	**46698**	**N/A**	**32190**	**21530**	**78813**	**53720**	**68**	**72**
Grand Total	**500**	**53695**	**46698**	**500**	**52384**	**21530**	**100893**	**74414**	**74**	**100**

Figure 6.32 Achievement vis-à-vis Target of the States under anti-hail nets



The State of Sikkim only had been allotted a target of 500 sqm of anti hail net in 2001-02 and the State had achieved the same. During the X Plan, the target was raised to 0.54 lakh sqm against which achievement was to the extent of 0.52 lakh sqm which is

96%-94% NER & 100%. In the XI Plan, targets were 0.47 lakh sqm and achievement there against of 0.22 lakh sqm i.e. 47%. The States had been given a total cumulative target of 1.01 lakh sqm of hail net against which the achievement was of the order of 0.74 lakh sqm which comes to 74% of the targets -94% in NER and 68% in HSR.

Only six of the eleven States have participated in anti hail net programme of the Mission – 4 from NER and 2 from HSR. While during the year 2001-02, only NER States were covered under the programme, the targets under this sub component during the XI Plan up to the year 2009-10, had been given only to the two States in HSR.

Meghalaya was the only State to have achieved its targets fully and the remaining States lagged behind in this regard. The shortfall in the achievement of targets in respect of the States of Manipur, Uttarakhand and Himachal Pradesh was of the order of 16% [ach. 84%], 23% [ach. 77%] and 40% [ach. 60%] respectively. There was no progress in the case of Tripura in meeting the target of 140 sqm of shade net given to it.

The State of Uttarakhand had the largest share of 38% in the total programme, followed by Himachal Pradesh with 34% share, Sikkim with 12%, Meghalaya with 10% and Manipur with 6% share in the total programme implemented under this sub component.

Anti Hail Gun

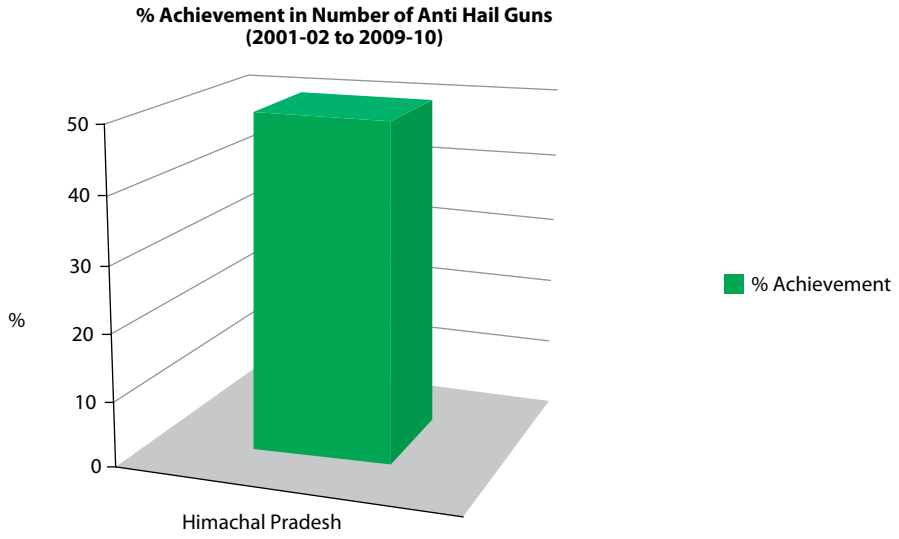
The principle behind anti-hail guns is to prevent the damage caused by hailstones by preventing their formation and growth by melting them all together.

The Plan-wise and State-wise targets and achievement under Anti Hail Gun component/sub component of the programme are shown in Table 6.33.

Table 6.33 Achievement vis-à-vis Target of the States under Anti Hail Gun

Anti Hail Gun [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	0	0	0	0	0	0	0	0	N/A	0
Nagaland	0	0	0	0	0	0	0	0	N/A	0
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**N/A**	**0**
Himachal Pradesh	N/A	0	2	N/A	0	1	2	1	50	100
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**2**	**N/A**	**0**	**1**	**2**	**1**	**50**	**100**
Grand Total	**0**	**0**	**2**	**0**	**0**	**1**	**2**	**1**	**50**	**100**

Figure 6.33 Achievement vis-à-vis Target of the States under Anti Hail Gun



A pilot project to install an anti-hail gun to protect the fruit crops especially apple crop, which suffers extensive damage due to frequent hailstorms, has been launched in the Jubbal-Kothkai belt of Himachal Pradesh. The State had been given a target of two Anti Hail Guns against which only one was installed. The programme is in the nascent stage and its expansion and demand from other States will depend upon its success rate.

Poly Sheet

The poly sheet technology used basically to prevent damage to the horticulture crops from weather aberrations and other natural agents without any environmental control. The shading nets are being used for raising nursery, indoor plants, hardening of tissue cultured platelets and growing of vegetables also.

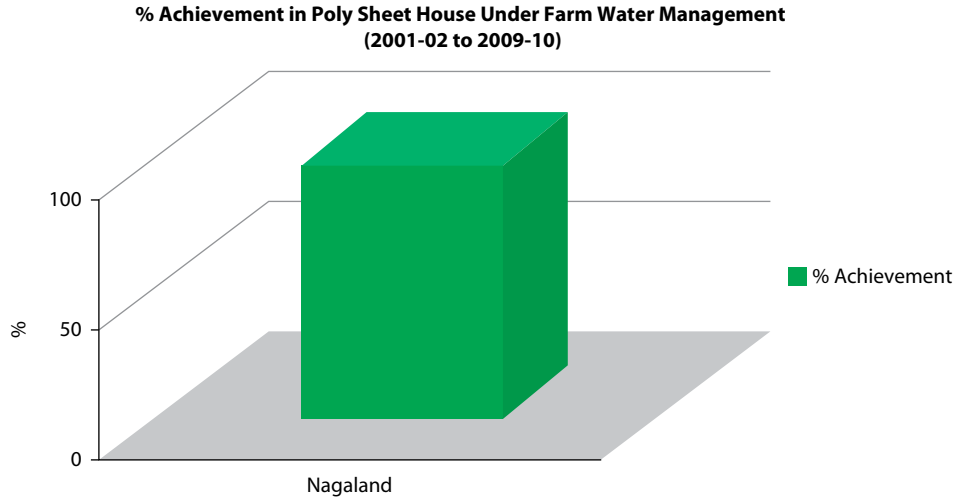
The Plan-wise and State-wise targets and achievement under Poly Sheet component/sub component of the programme are shown in Table 6.34.

Table 6.34 Achievement vis-à-vis Target of the States under Poly Sheet

Poly sheet House [sqm]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	0	0	0	0	0	0	0	0	N/A	0

Poly sheet House [sqm]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Nagaland	0	0	450000	0	0	450000	450000	450000	100	100
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**0**	**450000**	**0**	**0**	**450000**	**450000**	**450000**	**100**	**100**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**0**	**N/A**	**0**	**0**	**0**	**0**	**N/A**	**0**
Grand Total	**0**	**0**	**450000**	**0**	**0**	**450000**	**450000**	**450000**	**100**	**100**

Figure 6.34 Achievement vis-à-vis Target of the States under Poly Sheet



The supply of poly sheets has become popular in Nagaland only. The State had been allotted a target of coverage of 4.50 lakh sqm area by poly sheets houses during the XI Plan which it had fully achieved. No other participating State appears to have shown any interest in this technology.

Anti Bird Nets

Birds often cause huge losses to many of the horticulture crops. Sometimes the birds destroy the entire crop. The crops like grapes, guava, and pomegranate particularly attract parrots. To avoid such huge losses, the use of bird protection nets has been suggested.

The Plan-wise and State-wise targets and achievement under Anti Bird Net component/sub component of the programme are shown in Table 6.35.

Table 6.35 Achievement vis-à-vis Target of the States under Anti Birds Net

Anti Bird Net [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	N/A
Assam	0	0	0	0	0	0	0	0	N/A	N/A
Manipur	0	0	0	0	0	0	0	0	N/A	N/A
Meghalaya	0	0	0	0	0	0	0	0	N/A	N/A
Mizoram	0	0	0	0	0	0	0	0	N/A	N/A
Nagaland	0	0	0	0	0	0	0	0	N/A	N/A
Sikkim	0	0	0	0	0	0	0	0	N/A	N/A
Tripura	0	0	0	0	0	0	0	0	N/A	N/A
NES Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**N/A**	**N/A**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	N/A
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	N/A
Uttarakhand	N/A	0	75	N/A	0	0	75	0	0	N/A
HS Total	**N/A**	**0**	**75**	**N/A**	**0**	**0**	**75**	**0**	**0**	**N/A**
Grand Total	**0**	**0**	**75**	**0**	**0**	**0**	**75**	**0**	**0**	**N/A**

The anti bird net technology has not become popular under HMNEH as yet. Only the State of Uttarakhand had been allotted a target of coverage of 75 ha area of horticulture crops under anti bird nets. There has however, no progress in the State in this regard.

Presently greenhouse technology is practiced by very few in the country. Scope, therefore, exists for large-scale expansion of green house technology under favourable microclimate created in cost-effective low cost structures.

On-farm Handling Unit

On-farm handling units are being set up under HMNEH to tackle the problem of proper storage and handling of fruit and vegetables at the farm level to avoid high post harvest losses of these crops.

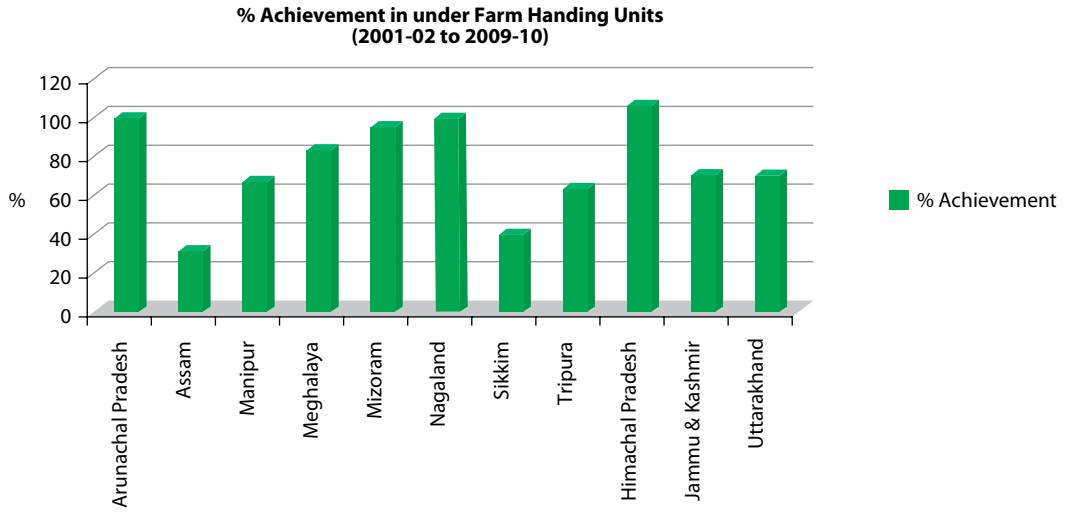
The Plan-wise and State-wise targets and achievement under On-farm Handling since the launch of the programme in the year 2001-02 [IX Plan] in the NER and from 2002-03 [X Plan] in respect of the Himalayan States are shown in Table 6.36.

The participating States had been allotted a total target of 9924 units against which the achievement was of the order of 8334 units. This works out to 84%-86% in NER and 82% in HSR. Only three of the States namely Arunachal Pradesh, Nagaland and Himachal Pradesh had achieved their targets fully and all the other states were lagging behind. The State of

Table 6.36 Achievement vis-à-vis Target of the States under On-farm Handling

On farm handling Units [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	600	300	0	600	300	900	900	100	11
Assam	0	300	35	0	69	35	335	104	31	1
Manipur	0	523	353	0	238	353	876	591	67	7
Meghalaya	0	54	166	0	54	129	220	183	83	2
Mizoram	0	292	1094	0	292	1026	1386	1318	95	16
Nagaland	0	671	849	0	671	849	1520	1520	100	18
Sikkim	0	61	35	0	37	0	96	37	39	0
Tripura	0	90	239	0	54	153	329	207	63	2
NES Total	**0**	**2591**	**3071**	**0**	**2015**	**2845**	**5662**	**4860**	**86**	**58**
Himachal Pradesh	N/A	450	920	N/A	600	847	1370	1447	106	17
Jammu & Kashmir	N/A	626	1200	N/A	388	896	1826	1284	70	15
Uttarakhand	N/A	600	466	N/A	518	225	1066	743	70	9
HS Total	**N/A**	**1676**	**2586**	**N/A**	**1506**	**1968**	**4262**	**3474**	**82**	**42**
Grand Total	**0**	**4267**	**5657**	**0**	**3521**	**4813**	**9924**	**8334**	**84**	**100**

Figure 6.35 Achievement vis-à-vis Target of the States under On Farm Handling



Mizoram had a small shortfall of 5%. In the remaining States the shortfall in achievement ranged from, 17% in case of Meghalaya [ach. 83%] to the highest of 69% in respect of Assam [ach. 31%].

The achievement vis–a-vis targets which was 82% during the X Plan rose to 87% the XI Plan up to the year 2009-10. No targets had been allotted during the year 2001-02 [IX Plan].

The maximum on Farm Handling Units of 1520 [18%] have been established in the State of Nagaland, followed by 1447 [17%] units set up in Himachal Pradesh 1318 [16%] in Mizoram, 1284 [15%] in J&K and 900 [11%] in Arunachal Pradesh. These five States had set up more than three fourth of the total on farm handling units established under the programme up to 2009-10.

Horticulture Mechanization

Availability of adequate farm power is very crucial for timely farm operations for increasing production and productivity and handling of the crop produce to reduce losses. The need is particularly great in hilly areas. The Mission, therefore, provides assistance for acquiring various agricultural implements to the beneficiaries for timely sowing, management of weeds and improved post harvest technology thereby reducing the cost of production and the drudgery associated with various agricultural operations. The following machinery and implements have been distributed amongst the farmers under the Farm Mechanization component:

- Manually Operated Agriculture Machines/Tools
- Power Operated Agriculture Machine/Tools
- Power Tiller
- Diesel Engine
- Weed Cutter
- Horticulture Equipments for Canopy Management, Pruning, etc
- Pit Hole Digger

The Plan-wise and State-wise targets and achievement under Horticulture Mechanization since the launch of the programme in the year 2001-02 [IX Plan] in the NER and from 2002-03 [X Plan] in respect of the Himalayan States are collated in Table 6.37 to 6.44.

Power Drawn Agriculture Tools and Equipments

The Plan-wise and State-wise targets and achievement under Power drawn Agriculture Tools and Equipments component/sub component of the programme are collated in Table 6.37.

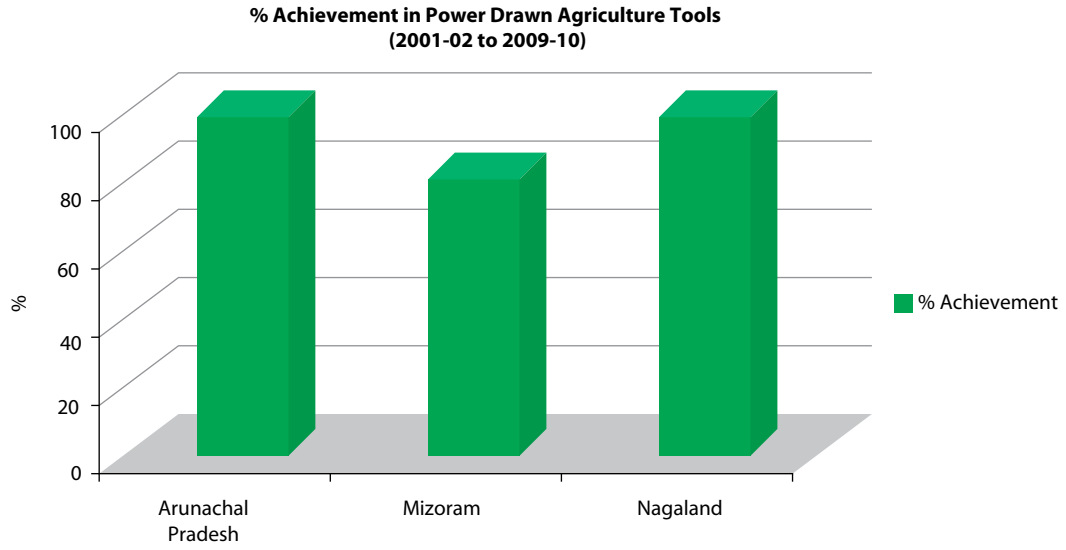
A total target of supply of 456 No. of Agriculture equipments had been set for four of the States viz. Arunachal Pradesh, Mizoram, Nagaland and Tripura, during the period 2001-02 to 2009-10. As against this, the achievement level was of the order of 366 i.e. 80% - all in NER. Only Arunachal Pradesh and Nagaland have achieved their full targets. Whereas the achievement level in case of Mizoram is 82%, there is no progress in respect of the State of Tripura. The overall position of the performance under this sub head was not up to the mark.

The shortfall in achievement occurred during 2001- 02 only. The targets set for the subsequent Plan had duly been achieved at the macro level. The initial shortfall has also resulted into lowering the overall performance to 84% as at the end of the year 2009-10. The programme has progressed only in two States of Mizoram and Nagaland where majority of the farm implements - 350 [96%] have been set up.

Table 6.37 Achievement vis-à-vis Target under Power Drawn Agriculture Tools and Equipments

Power Drawn Agriculture Tools & Equipments supplied										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	16	0	0	16	16	16	100	4
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	100	120	0	60	120	0	220	180	82	49
Nagaland	70	100	0	70	100	0	170	170	100	46
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	50	0	0	0	0	0	50	0	0	0
NES Total	**220**	**220**	**16**	**130**	**220**	**16**	**456**	**366**	**80**	**100**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**0**	**N/A**	**0**	**0**	**0**	**0**	**N/A**	**0**
Grand Total	**220**	**220**	**16**	**130**	**220**	**16**	**456**	**366**	**80**	**100**

Figure 6.36 Achievement vis-à-vis Target under Power Drawn Agriculture Tools and Equipments



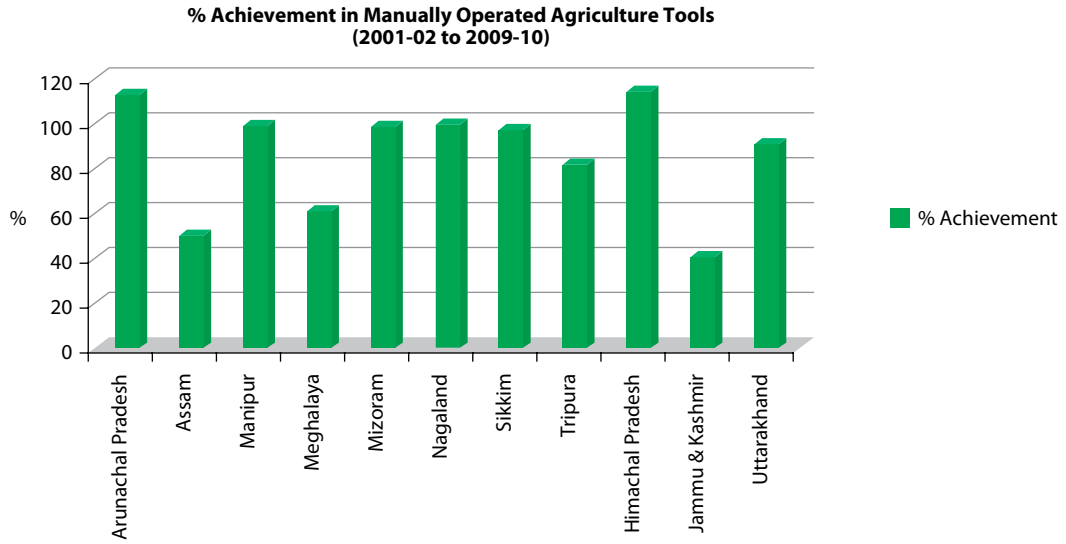
Manually Operated Agriculture Machines/Tools

The Plan-wise and State-wise targets and achievement under Manually Operated Agriculture Machines/Tools component/sub component of the programme are collated in Table 6.38.

Table 6.38 Achievement vis-à-vis Target under manually operated Agriculture Tools and Equipments

States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	400	3200	910	200	4200	754	4510	5154	114	8
Assam	1100	3657	5075	511	1307	3115	9832	4933	50	7
Manipur	300	2330	5000	300	2300	5000	7630	7600	100	11
Meghalaya	220	1591	2807	200	1354	1257	4618	2811	61	4
Mizoram	200	2970	6475	332	2720	6475	9645	9527	99	14
Nagaland	600	3030	4140	600	3030	4140	7770	7770	100	12
Sikkim	800	2610	5400	800	2580	5250	8810	8630	98	13
Tripura	200	650	4560	100	604	3720	5410	4424	82	7
NES Total	**3820**	**20038**	**34367**	**3043**	**18095**	**29711**	**58225**	**50849**	**87**	**76**
Himachal Pradesh	N/A	5700	4025	N/A	7200	4025	9725	11225	115	17
Jammu & Kashmir	N/A	2070	6550	N/A	1870	1700	8620	3570	41	5
Uttarakhand	N/A	690	500	N/A	726	355	1190	1081	91	2
HS Total	**N/A**	**8460**	**11075**	**N/A**	**9796**	**6080**	**19535**	**15876**	**81**	**24**
Grand Total	**3820**	**28498**	**45442**	**3043**	**27891**	**35791**	**77760**	**66725**	**86**	**100**

Figure 6.37 Achievement vis-à-vis Target under manually operated Agriculture Tools and Equipments



At the time of launching of the Mission in 2001-02, a target of 3820 No. of manually operated farms tool and equipments was fixed for NER States. In the X and XI Plan period targets of supply of 28498 and 45442 number of manually operated Agriculture tools and equipment respectively, were laid down for all the 11 States. Since the launching of the Mission in 2001-02 up to 2009-10,

a total cumulative target of 77760 number farm tools/equipments had been fixed for all the 11 States. As against this, the achievement was to the extent of 66725 number i.e. 86% - 87% in NER and 81% in HSR The overall achievement of NER was better than that of HSR.

The Plan-wise performance in achievement of the targets had shown both rising and declining trend. The achievement level which was 80% in IX Plan rose to 95% in the X Plan but again declined to 79% in the XI Plan.

Four of the States of Arunachal Pradesh, Manipur Nagaland and Himachal Pradesh had achieved their full targets. Mizoram and Sikkim with 99% and 98% achievement had nearly achieved targets set for them. The remaining three States of Tripura, Meghalaya and Assam in NER had showed a shortfall of 18% [ach82%], 39% [ach.61%] and 50% [ach. 50%] respectively. While J&K in HSR, had a high shortfall of 59% [ach. 41%], the shortfall of 9% in the achievement of targets in respect of the State of Uttarakhand was not much.

The State of Himachal Pradesh had the maximum share of 17% in the total tools/equipments supplied under the programme till 2009- 10. This was followed by Mizoram with 14% share, Sikkim with 13%, Nagaland with 12% and Manipur with 11% share in the total programme of this component. These five States implemented about two thirds of the total programme.

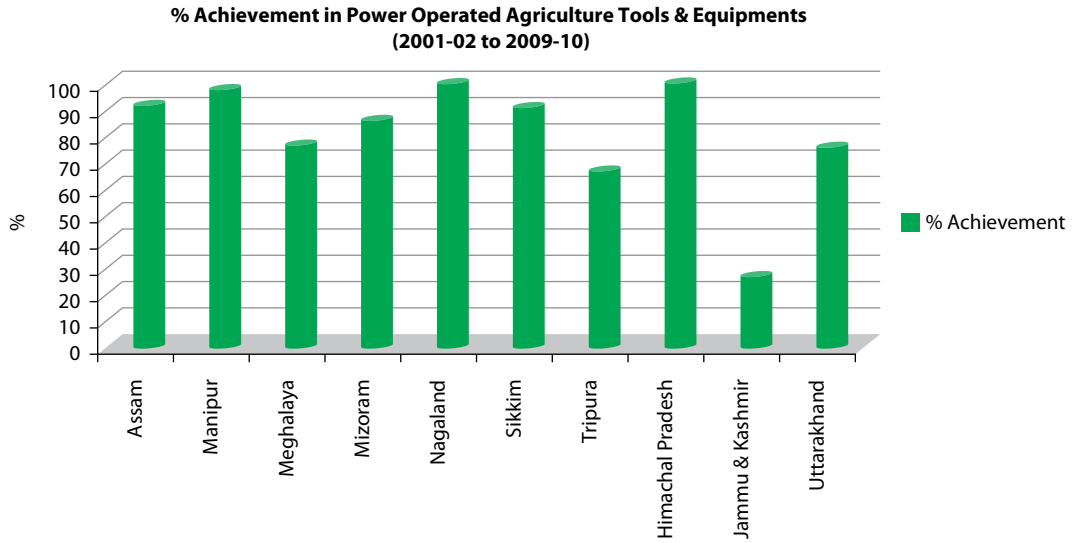
Power Operated Agriculture Machines/Tools

The Plan-wise and State-wise targets and achievement under Power Operated Agriculture Machines/Tools component/sub component of the programme are collated in Table 6.39.

Table 6.39 Achievement vis-à-vis Target under power operated tools and equipments

Power Operated [No.]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	100	0	0	0	0	0	100	0	0	0
Assam	0	825	0	0	757	0	825	757	92	6
Manipur	180	526	0	189	501	0	706	690	98	5
Meghalaya	0	400	128	0	280	128	528	408	77	3
Mizoram	0	625	1216	0	374	1216	1841	1590	86	12
Nagaland	0	100	0	0	100	0	100	100	100	1
Sikkim	200	425	1710	0	425	1709	2335	2134	91	16
Tripura	50	350	725	5	386	365	1125	756	67	6
NES Total	**530**	**3251**	**3779**	**194**	**2823**	**3418**	**7560**	**6435**	**85**	**49**
Himachal Pradesh	N/A	2700	3112	N/A	2699	3112	5812	5811	100	44
Jammu & Kashmir	N/A	0	1995	N/A	0	545	1995	545	27	4
Uttarakhand	N/A	225	170	N/A	215	87	395	302	76	2
HS Total	**N/A**	**2925**	**5277**	**N/A**	**2914**	**3744**	**8202**	**6658**	**81**	**51**
Grand Total	**530**	**6176**	**9056**	**194**	**5737**	**7162**	**15762**	**13093**	**83**	**100**

Figure 6.38 Achievement vis-à-vis Target under power operated tools and equipments



A modest target of supply of 530 No. of Agriculture Tools/Equipments to the horticulture crops growing farmers, had been allotted to four of the eight States in the NER at the time of the launch of the Mission in 2001-02. The States could meet only 37% of the target by supplying 194 No. Tools/Equipments and left a big gap of 57% in their achievement. In the X Plan, the target was for supply of 6176 No. of tools etc. set for all the States except Arunachal Pradesh and J&K, against which 5737 No. of tools were actually distributed. The achievement level at 93% - 87% in NER & 99% in HSR - was reasonably good. The HSR has shown good performance by nearly achieving all its targets. During the period of 2007-08 to 2009-10 of the XI Plan, a cumulative target of supply of 9056 number of tools/equipments for all the 11 States was fixed, against which 7162 No. of units were only supplied. The achievement works out to 79% of the targets in which the share of the NER States and HSR was 90% and 71% respectively. The average level of performance of NER in the XI Plan was better compared to that of the HSR.

During the entire period of the Mission from 2001-02 to 2009-10, the States had been assigned a total cumulative target of supply of 15762 No. of power operated Tools/Equipment amongst the producers of horticulture produce. Against this, all the States taken together, had distributed a total No. of 13093 units i.e. 83% of the targets leaving a shortfall of 17% in achievement. The share of the two regions being 85% for NER and 81% for HSR.

Only two of the States of Nagaland and Himachal Pradesh were able to achieve their full targets. The shortfall in the achievement ranging from 2%, 8% and 9% in case of Manipur, Assam and Sikkim respectively was not much. While there were no targets set for the State of Arunachal Pradesh, the States of Mizoram, Meghalaya and Tripura had shown a moderate to high shortfall of 14%, 23% and 37% respectively. In the remaining two States of HSR, Uttarakhand had a considerable shortfall of 24% and J&K a high deficit of 73% in achievement of their respective targets. There was no progress in this regard in the State of Arunachal Pradesh. Since agricultural implements and tools help in efficient farming, their use need be encouraged.

The State of Himachal Pradesh had the highest share of 44%, followed by Sikkim with 16% and Mizoram with 12% share in the total Tools/Equipments distributed. There three States together implemented about three fourth of the total programme.

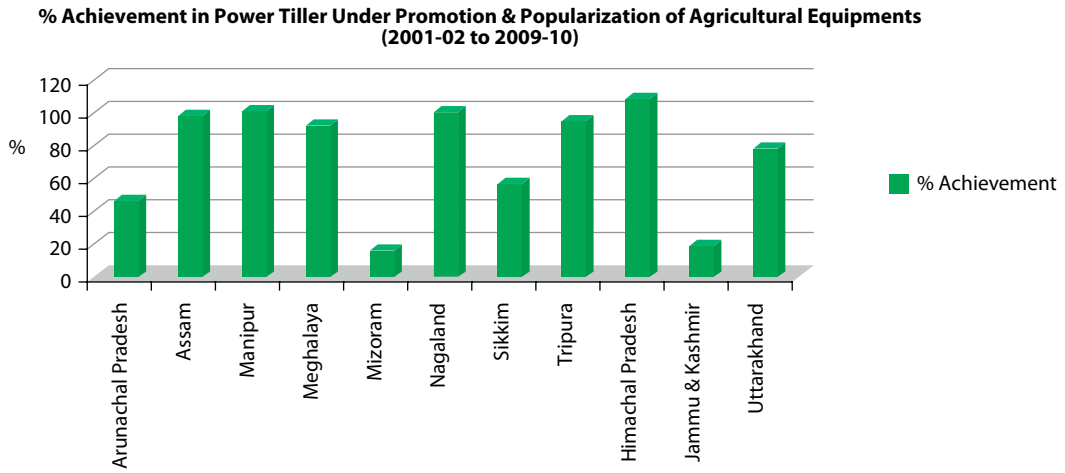
Power Tiller

The Plan-wise and State-wise targets and achievement under Power Tiller component/sub component of the programme are shown in Table 6.40.

Table 6.40 Achievement vis-à-vis Target of the States under Power Tiller [No]

States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	0	0
Assam	100	1221	82	121	1175	77	1403	1373	98	23
Manipur	20	372	142	19	377	142	534	538	101	9
Meghalaya	20	431	95	20	387	95	546	502	92	8
Mizoram	20	80	0	15	0	0	100	15	15	0
Nagaland	100	160	493	100	160	493	753	753	100	13
Sikkim	6	3	0	2	3	0	9	5	56	0.08
Tripura	30	1377	442	10	1348	391	1849	1749	95	30
NES Total	**311**	**3679**	**1254**	**297**	**3463**	**1198**	**5244**	**4958**	**95**	**84**
H.P.	N/A	500	162	N/A	550	162	662	712	108	12
J&K	N/A	50	146	N/A	20	16	196	36	18	1
Uttarakhand	N/A	225	60	N/A	215	6	285	221	78	4
HS Total	**N/A**	**775**	**368**	**N/A**	**785**	**184**	**1143**	**969**	**85**	**16**
Grand Total	**311**	**4454**	**1622**	**297**	**4248**	**1382**	**6387**	**5927**	**93**	**100**

Figure 6.39 Achievement vis-à-vis Target of the States under Power Tiller [No]



At the time of the launching of the Mission in the year 2001-02, a target of supply of 311 Power Tillers had been distributed amongst the States in NER. The States had supplied 297 Power Tillers achieving thereby 95% of the targeted figure. In the next X Plan the targets for supply of 4454 units were fixed for all the eleven States and achievement there against was of 4248 units of Power Tiller. The achievement being 95% was shared between the two Regions of NER and HSR in the ratio of 94 and 101. During the first three years of the XI Plan, all the 11 States were allocated a total target of supply of 1622 units and the States actually distributed 1382 No of Power Tillers and reached 85% - NER 96% & HSR -50% - of the target.

A total cumulative target for supply of 6387 No. of Power Tillers for all the States had been fixed since the inception of the Mission till 2009-10, against which the actual supply was of the order of 5927 units i.e. 93%. The position of average level of supply in the NER and HSR constituted 95% and 85% respectively. The NER States had performed slightly better than the HSR. The overall performance of this sub component of the programme can be taken as satisfactory.

Only the three States of Manipur, Nagaland and Himachal Pradesh had achieved their targets to the full extent. The States of Assam [2%], Tripura [5%] and Meghalaya [8%] had small shortfall in their achievement. The shortfall in respect of the States of Mizoram [85%] and J&K [82%] was very high. In case o the remaining States, the shortfall in achievement ranged from 22% in case of Uttarakhand to 54% in case of Arunachal Pradesh.

The maximum share in the supply of Power Tillers during the entire period of the project up to 2009-10 was of Tripura State –30%, followed by Assam -23%, Nagaland -13% and Himachal Pradesh -12.% These four States put together had the total share of around three fourth in the total achievement.

Diesel Engine

The Diesel Engines are being supplied to enable a farmer to continue his agricultural operation uninterrupted particularly the critical element of the timely water supply to the crops, in the event of power failure.

The Plan-wise and State-wise targets and achievement under Diesel Engine component/ sub component of the programme are collated in Table 6.41.

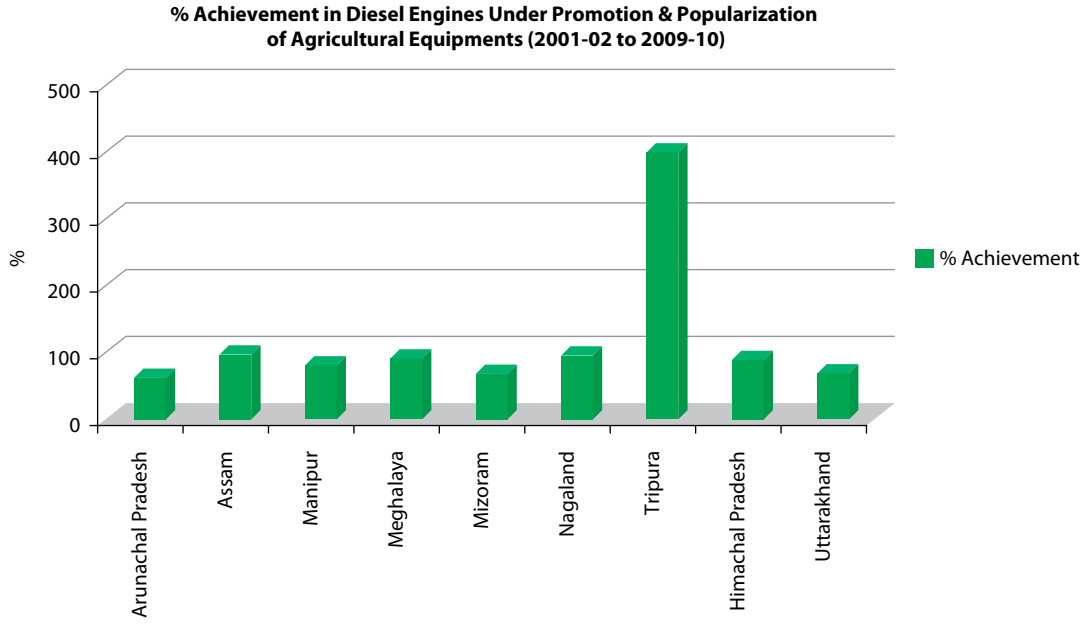
A target of supply of 280 Diesel Engines sets was allotted to the NER States in 2001-02 against which the achievement level was of 262 – 94%. In the X Plan period, the target was raised to 5326 sets. The actual achievement of supply of 9931 units i.e. was 186%-204% NER & 100% HSR- of the targeted figure and hence excellent. The performance of NER was impressive. In the X Plan period up to 2009-10, against the target of 3771 sets, 3169 Diesel Engines were actually supplied. This works out to 84% NER - 92% & HSR 57%. The performance of HSR was low.

A cumulative target of 9377 No. of Diesel Engines for the entire period from 2001-02 to 2009-10 had been fixed for all the States. Against this, the actual number of the Sets supported was 13362. The overall achievement of 142% - NER 158% & HSR 79% of the targets was good. The HSR lagged behind NER and also could not achieve its targets fully.

Table 6.41 Achievement vis-à-vis Target of the States under Diesel Engines

Diesel Engines [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	30	81	0	10	61	0	111	71	64	1
Assam	98	728	989	100	728	947	1815	1775	98	13
Manipur	22	570	360	22	450	360	952	832	87	6
Meghalaya	20	341	477	20	320	477	838	817	97	6
Mizoram	50	980	260	50	637	260	1290	947	73	7
Nagaland	60	480	390	60	480	390	930	930	100	7
Tripura	0	1240	395	0	6347	220	1635	6567	402	49
NES Total	**280**	**4420**	**2871**	**262**	**9023**	**2654**	**7571**	**11939**	**158**	**89**
H.P.	N/A	381	144	N/A	380	110	525	490	93	4
J&K	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	525	756	N/A	528	405	1281	933	73	7
HS Total	**N/A**	**906**	**900**	**N/A**	**908**	**515**	**1806**	**1423**	**79**	**11**
Grand Total	**280**	**5326**	**3771**	**262**	**9931**	**3169**	**9377**	**13362**	**142**	**100**

Figure 6.40 Achievement vis-à-vis Target of the States under Diesel Engines



Regarding State-wise position, only Nagaland and Tripura had achieved their targets fully – Tripura with an impressive margin [402%]. The State of J&K had not participated in this sub component. The shortfall in respect of Assam [2%], Meghalaya [3%] and Himachal Pradesh [7%] was small only. In respect of the remaining States, the shortfall in achievement ranged from 13% in Manipur to 34% in Arunachal Pradesh.

The State of Tripura had about half of share [49%] of the total achievement under Diesel Engines, sub component. followed by Assam with 13% share. These two States together formed around two thirds share in the total programme implemented up to the year 2009-10. The share of the remaining states, ranged between 1% to 7%.

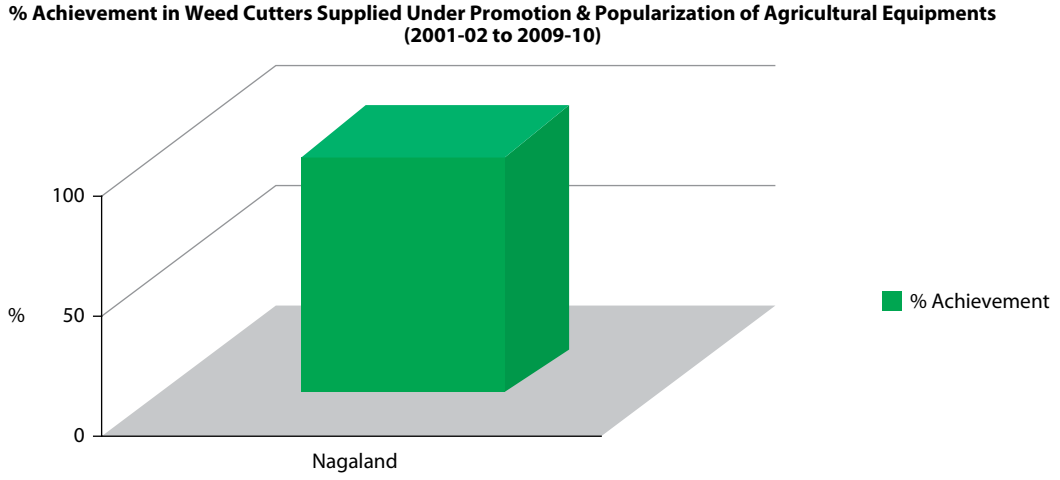
Weed Cutter

The Plan-wise and State-wise targets and achievement under Weed Cutter component/sub component of the programme are depicted in Table 6.42.

Table 6.42 Achievement vis-à-vis Target of the States under Weed Cutters

Weed Cutters supplied										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	0	0	0	0	0	0	0	0	N/A	0
Nagaland	0	0	120	0	0	120	120	120	100	100
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**0**	**120**	**0**	**0**	**120**	**120**	**120**	**100**	**100**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**0**	**N/A**	**0**	**0**	**0**	**0**	**N/A**	**0**
Grand Total	**0**	**0**	**120**	**0**	**0**	**120**	**120**	**120**	**100**	**100**

Figure 6.41 Achievement vis-à-vis Target of the States under Weed Cutters



The Weed Cutter sub component of the programme has been allotted only to one of the States i.e. Nagaland during the current XI Plan and the State has since achieved its target of supplying of 120 such tools.

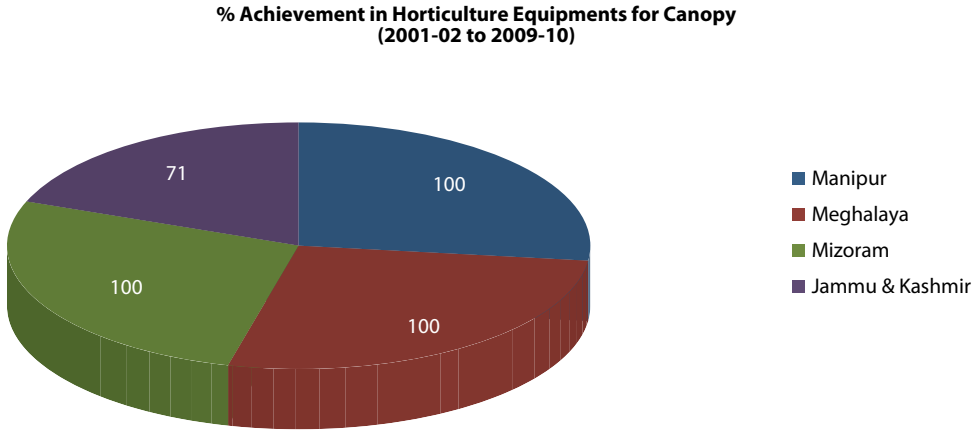
Horticulture Equipments for Canopy Management, Pruning, etc.

The Plan-wise and State-wise targets and achievement under are consolidated Horticulture Equipments for Canopy Management, Pruning, etc. component/sub component of the programme in Table 6.43.

Table 6.43 Achievement vis-à-vis Target of the States under Horticulture equipments for canopy management, pruning, etc.

Horticulture equipments for canopy management, pruning, etc.										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	465	0	0	465	465	465	100	75
Meghalaya	0	0	55	0	0	55	55	55	100	9
Mizoram	0	0	76	0	0	76	76	76	100	12
Nagaland	0	0	0	0	0	0	0	0	N/A	0
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**0**	**596**	**0**	**0**	**596**	**596**	**596**	**100**	**96**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	34	N/A	0	24	34	24	71	4
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**34**	**N/A**	**0**	**24**	**34**	**24**	**71**	**4**
Grand Total	**0**	**0**	**630**	**0**	**0**	**620**	**630**	**620**	**98**	**100**

Figure 6.42 Achievement vis-à-vis Target of the States under Horticulture equipments for canopy management, pruning, etc.



Four of the States of Manipur, Meghalaya, Mizoram and J&K have participated in the canopy management and pruning sub component of the programme. These States had been allocated a total target of supply of 630 No. of the canopy and pruning equipment against which 620 No. were actually provided. The 98% achievement level may be considered satisfactory. All the State participating in this sub component of the programme, excepting J&K, have achieved their targets. The State of J&K lagged behind in achieving its target and the shortfall in reaching its target was as much as 29% [ach.71%]. The targets were given only during the current XI Plan.

The State of Manipur has the major share of about three fourth in the total programme implemented in the four States.

Adoption of the latest technologies is of paramount importance in achieving higher productivity. Canopy Management is one of the most important factors to sustain the yield and quality of many fruit crops. Appropriate pruning practices keep the plant in such shape and condition as to enhance yield and quality of fruits. The practice needs to be encouraged and spread to the other States as well.

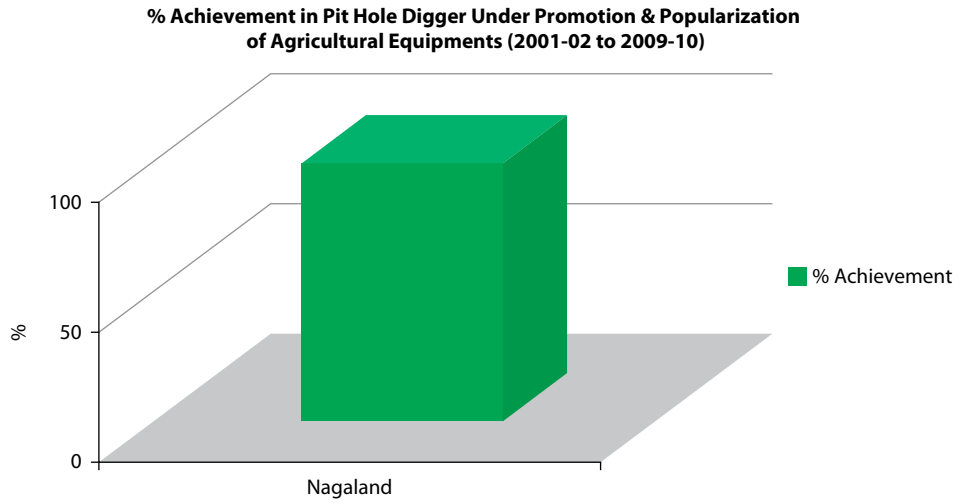
Pit Hole Digger

The Plan-wise and State-wise targets and achievement under Pit Hole Digger component/ sub component of the programme in are collated in Table 6.44.

Table 6.44 Achievement vis-à-vis Target of the States under Pit Hole Digger

Pit Hole Digger										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	0	0	0	0	0	0	0	0	N/A	0
Nagaland	0	0	85	0	0	85	85	85	100	100
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**0**	**85**	**0**	**0**	**85**	**85**	**85**	**100**	**100**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**0**	**N/A**	**0**	**0**	**0**	**0**	**N/A**	**0**
Grand Total	**0**	**0**	**85**	**0**	**0**	**85**	**85**	**85**	**100**	**100**

Figure 6.43 Achievement vis-à-vis Target of the States under Pit Hole Digger



The sub component of Pit Hole Digger had been taken only by one of the States i.e. Nagaland. The State has since achieved its target by supply of 85 No. equipments to the farmers.

Popularization of Organic Farming

The demand for the organically produced food items has been growing in the recent past worldwide. The strategy under the Mission is to promote organic farming through crop residue management and use of compost and other organic materials to exploit the natural advantage of the region in this regard as also to preserve the environment and soil health of the region.

The Sub Components of the Scheme are as under:

- Earth work Unit
- Adoption of Organic Farming/Incentive for Organic Farming
- Organic Farming Certification

The Plan-wise and State-wise targets and achievement under Popularization of Organic Farming since the launch of the programme in the year 2001-02 [IX Plan] in the NER and from 2002-03 [X Plan] in respect of the Himalayan States are presented in Table 6.45 to 6.47.

Earth Worm Unit

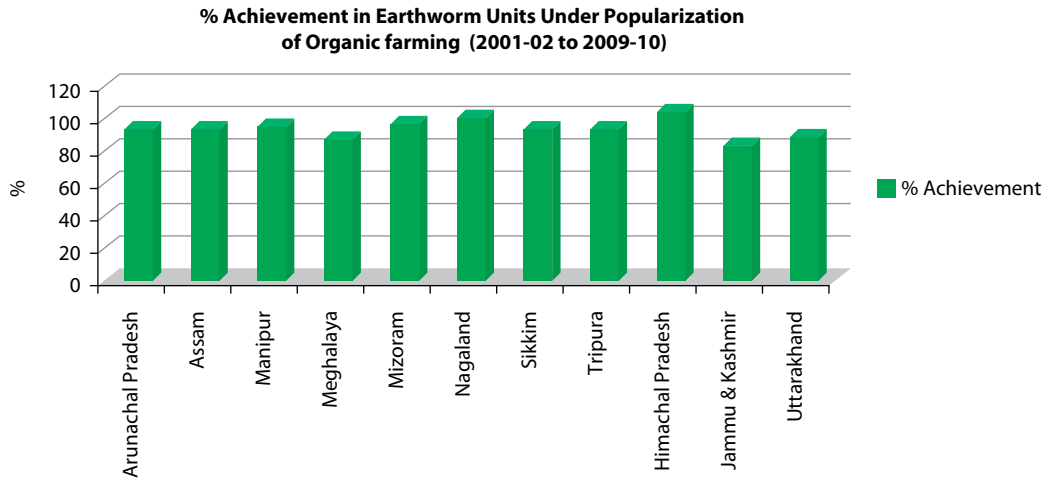
The Plan-wise and State-wise targets and achievement under Earth Worm Unit component/ sub component of the programme are depicted in Table 6.45.

As against the combined targets of 18713 Earthworm Units set for all the eleven States up to the end of 2009-10, 18694 [95%] units had been set up- 93% in NER and 97% in HSR. The progress on the micro level may be considered as satisfactory. Only one State of Nagaland and Himachal Pradesh in each region had achieved all the targets allotted to it. The State of J&K, Meghalaya and Uttarakhand had the shortfall of 17% [ach 83%], 13% [ach.87%] and 12% [ach.88%] respectively. In the remaining States, the shortfall in achievement which

Table 6.45 Achievement vis-à-vis Target of the States under Earthworm Units

Earthworm Units [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	5	159	140	5	155	122	304	282	93	2
Assam	10	716	1182	4	651	1147	1908	1802	94	10
Manipur	7	510	1463	5	263	1619	1980	1887	95	10
Meghalaya	4	2395	738	4	2373	338	3137	2715	87	15
Mizoram	12	290	150	6	280	150	452	436	96	2
Nagaland	5	693	489	5	693	489	1187	1187	100	6
Sikkim	15	335	720	32	355	610	1070	997	93	5
Tripura	10	440	1150	3	424	1080	1600	1507	94	8
NES Total	**68**	**5538**	**6032**	**64**	**5194**	**5555**	**11638**	**10813**	**93**	**58**
Himachal Pradesh	N/A	4146	1049	N/A	4294	1049	5195	5343	103	29
Jammu & Kashmir	N/A	171	369	N/A	145	301	540	446	83	2
Uttarakhand	N/A	1482	858	N/A	1471	591	2340	2062	88	11
HS Total	**N/A**	**5799**	**2276**	**N/A**	**5910**	**1941**	**8075**	**7851**	**97**	**42**
Grand Total	**68**	**11337**	**8308**	**64**	**11104**	**7496**	**19713**	**18664**	**95**	**100**

Figure 6.44 Achievement vis-à-vis Target of the States under Earthworm Units



ranged from 4% [ach. 96%] in Mizoram to 7% [ach. 93% each] in Arunachal Pradesh and Sikkim was not much.

The joint performance by all the States fluctuate between 94%, 98%, 90% during IX, X and XI Plan [up to 2009-10] respectively.

The States with 10 percent of more share in the setting up of total Earthworm Units up to 2009-10 were: Meghalaya – 2715 No. [15%], Uttarakhand – 2062 Nose] 11%], Assam – 1802 No. - [10%] and Manipur -1887 No. [10%].

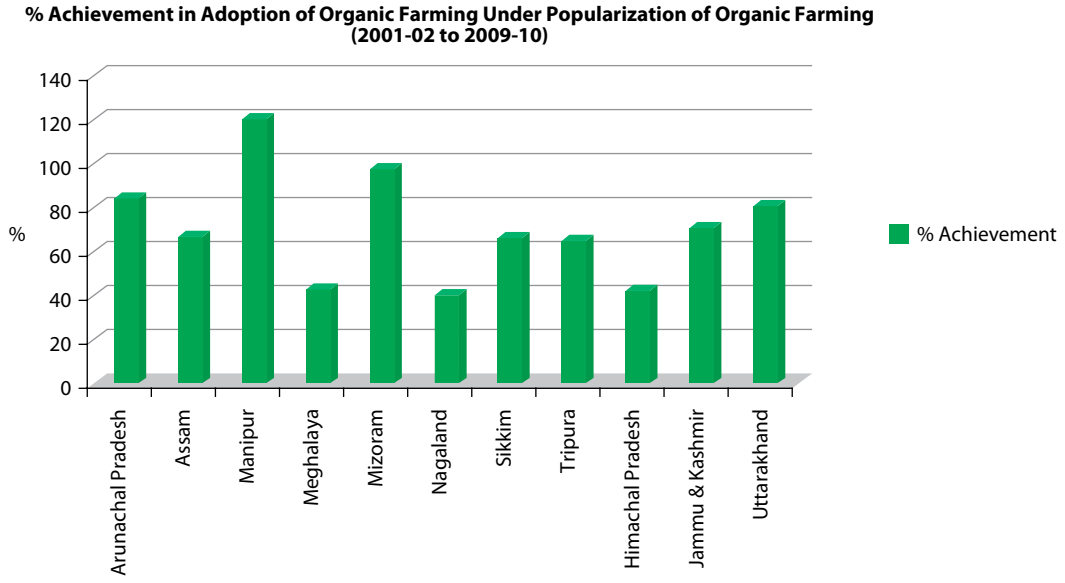
Adoption of Organic Farming/Incentive for Organic Farming

The Plan-wise and State-wise targets and achievement under Adoption of Organic Farming/ Incentive for Organic Farming component/sub component of the programme are shown in Table 6.46.

Table 6.46 Achievement vis-à-vis Target of the States for adoption of organic farming [ha]

States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	100	1098	4210	50	1098	3460	5408	4608	85	20
Assam	200	900	0	50	700	0	1100	750	68	3
Manipur	220	392	0	220	520	0	612	740	121	3
Meghalaya	230	899	827	200	539	127	1956	866	44	4
Mizoram	125	1536	1600	150	1493	1600	3261	3243	99	14
Nagaland	50	327	3750	50	327	1300	4127	1677	41	7
Sikkim	60	2220	6400	60	1898	3850	8680	5808	67	25
Tripura	180	940	1140	100	848	550	2260	1498	66	6
NES Total	1165	8312	17927	880	7423	10887	27404	19190	70	83
H.P.	N/A	476	1161	N/A	486	210	1637	696	43	3
J&K	N/A	434	855	N/A	345	577	1289	922	72	4
Uttarakhand	N/A	1278	1550	N/A	972	1340	2828	2312	82	10
HS Total	**N/A**	**2188**	**3566**	**N/A**	**1803**	**2127**	**5754**	**3930**	**68**	**17**
Grand Total	**1165**	**10500**	**21493**	**880**	**9226**	**13014**	**33158**	**23120**	**70**	**100**

Table 6.45 Achievement vis-à-vis Target of the States for adoption of organic farming [ha]



As against the target of 1165 ha allotted to the NER States at the time of launch of the Mission in 2001-02, the area actually covered under the incentive scheme was 880 ha. i.e. 76%. In the next plan period, targets had been raised to 10500 amongst various participant States. The achievement against this target was to the extent of 9226 ha which is 88% - NER 89% & HSR 82% - of the targets. The NER States as a group had done better than the Himalayan States. In the XI Plan period, a total target of coverage of an area of 21493 ha up to the third year of the Plan had been allocated among the States under organic farming. The area actually covered was of the order of 13014 i.e. 61% of the targets - 61% in NER and 60% in HSR. The performance of both the regions during XI Plan was more or less equal.

During the entire period of the Mission from 2001-02 to 2009-10, all the eleven participating States had been given a total cumulative target of coverage of 33158 ha of area under organic farming against which the actual coverage was of the order of 23120 ha [70%] leaving a shortfall of 30% in achievement. The position in achievement of targets at 70% and 68% in both the NER and HSR was not much different.

Only the two States of Manipur [121%] and Mizoram [99%] could achieve or nearly achieve their targets. The achievement of three of the States viz. Meghalaya [44%], Himachal Pradesh [43%] and Nagaland [41%] was below 50% of their targeted figure. The achievement in respect of the remaining six States ranged from 66% in respect of the State of Tripura to 85% in case of Arunachal Pradesh.

In view of the increasing demand for organic produce, States are required to upscale their efforts to bring more and more area under organic farming.

The State of Sikkim had the largest share of 25% in the total area covered under the programme. This was followed by Arunachal Pradesh with 20%, share Mizoram with 14% and Uttarakhand with 10% share in the total area coverage. There four States together implemented about two thirds of the total programme.

Organic Farming Certification

The certification of the organic farming that the produce has been genuinely raised organically is as important as the organic produce itself. A producer of the organic commodity may not get a fair price for his produce in the absence of necessary certification. A provision for extending assistance for setting up of certification agencies has been kept in the Mission for NER and Himalayan States.

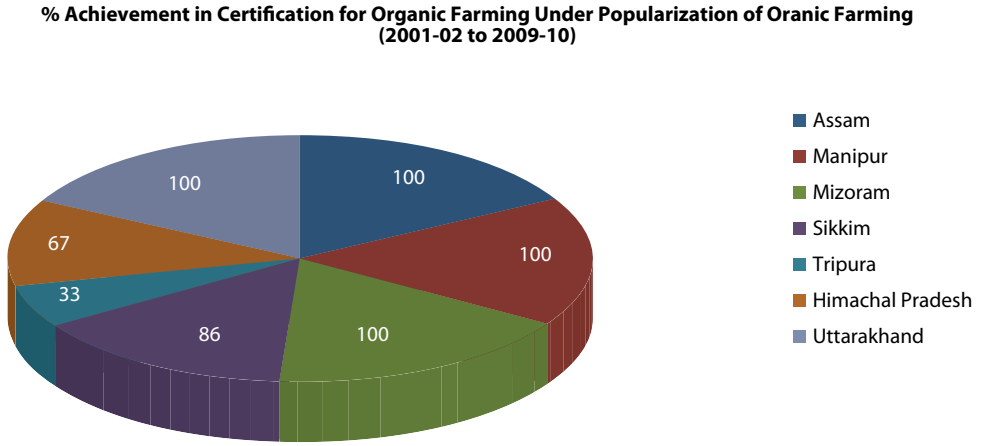
The Plan-wise and State-wise targets and achievement under Organic Farming Certification component/sub component of the programme are collated in Table 6.47.

The target of setting up one certification agency/unit allotted to Manipur in 2001-02 had been achieved. In the X Plan period, a target of 37 certification agencies/units had been set against which the actual achievement was of the order of setting up of 25 units i.e. 68% of the targets – 42% in NER & 94% in HSR. The performance of HSR was better during the X Plan, During the XI Plan [2007-08 to 2009-10], against the target of 64 – all for NER, 57 No [89%] of certification agencies/units were established. The shortfall in the achievement was of the order of 11% only.

Table 6.47 State-wise Achievement vis-à-vis Target in Certification for organic farming

Certification for Organic Farming										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% @ share
Assam	0	7	0	0	7	0	7	7	100	8
Manipur	1	0	0	1	0	0	1	1	100	1
Meghalaya	0	7	0	0	0	0	7	0	0	0
Mizoram	0	1	35	0	1	35	36	36	100	43
Sikkim	0	1	20	0	0	18	21	18	86	22
Tripura	0	3	9	0	0	4	12	4	33	5
NES Total	**1**	**19**	**64**	**1**	**8**	**57**	**84**	**66**	**79**	**80**
Himachal Pradesh	N/A	3	0	N/A	2	0	3	2	67	2
Uttarakhand	N/A	15	0	N/A	15	0	15	15	100	18
HS Total	**N/A**	**18**	**0**	**N/A**	**17**	**0**	**18**	**17**	**94**	**20**
Grand Total	**1**	**37**	**64**	**1**	**25**	**57**	**102**	**83**	**81**	**100**

Figure 6.46 State-wise Achievement vis-à-vis Target in Certification for organic farming



During the entire period of launching of the mission in 2001-02 to 2009-10, a total target of 102 Certification Agencies/Units had been allotted to different States. The achievement level of this target was of the order of 81% - 79% NER & 94% HSR.

No targets for setting up of certification units were allotted to the States of Arunachal Pradesh, Nagaland and J&K or there was no progress in these States. The State of Meghalaya also did not set up any certification unit against the target of 7 No. given to it since X Plan. Four of the States viz. Assam, Manipur, Mizoram and Uttarakhand had achieved

their targets fully. The remaining two States of Tripura and Himachal Pradesh had achieved 33% and 67% of their respective targets leaving a shortfall of 67% and 33% respectively in their achievement.

The State of Mizoram had lion's share of 43%, followed by Sikkim with 22% and Uttarakhand with 18% share in the total certification agencies/units established under the Mission. These three States together had as much as 83% share in the implementation of this sub component of the programme.

Promotion of Integrated Pest Management [IPM]

Horticultural crops are adversely affected by a variety of pests. Integrated Pest Management [IPM] is an eco-friendly approach which aims at keeping pests below the economic threshold level by employing all available pest control methods and techniques in place of the present day indiscriminate use of pesticide resulting into undesirable levels of residues in the produce.

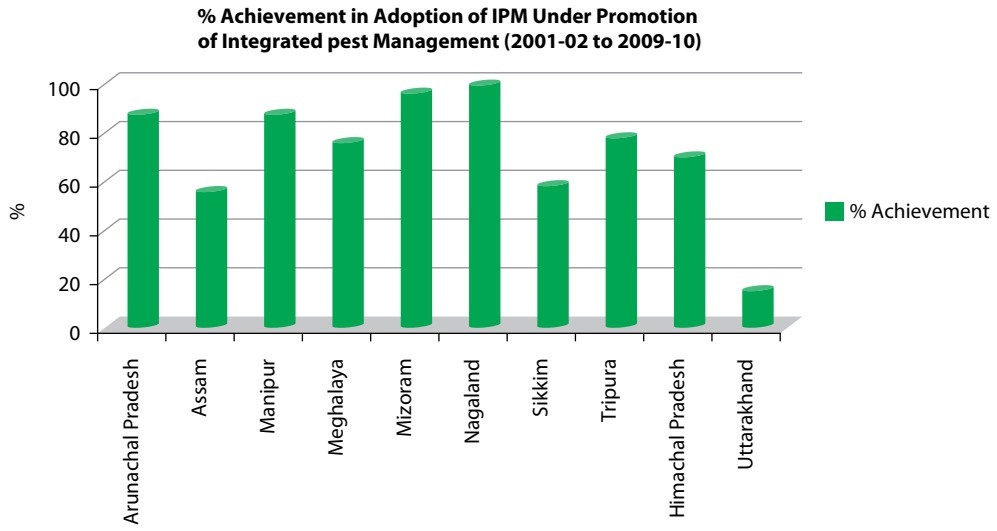
The Integrated Pest Management [IPM] Technology is being popularized for bringing improvement in the production of horticulture crops.

The Plan-wise and State-wise targets and achievement under adoption of IPM since the launch of the programme in the year 2001-02 [IX Plan] in the NER and from 2002-03 [X Plan] in respect of the Himalayan States are shown in Table 6.48.

Table 6.48 Achievement vis-à-vis Target of the States in Adoption of IPM

Adoption of IPM [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Ach.	% @ share
Arunachal Pradesh	300	2100	3000	100	2100	2550	5400	4750	88	5
Assam	502	2300	15000	1000	800	8104	17802	9904	56	11
Manipur	600	1860	7300	300	1036	7292	9760	8628	88	9
Meghalaya	2000	5447	577	1761	3722	577	8024	6060	76	7
Mizoram	385	11359	15425	500	10109	15425	27169	26034	96	29
Nagaland	800	2200	8353	800	2200	8353	11353	11353	100	12
Sikkim	202	6400	24525	400	3532	14000	31127	17932	58	20
Tripura	200	2330	2955	100	2424	1750	5485	4274	78	5
NES Total	**4989**	**33996**	**77135**	**4961**	**25923**	**58051**	**116120**	**88935**	**77**	**98**
H.P.	N/A	700	558	N/A	400	486	1258	886	70	1
J&K	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	1130	6184	N/A	1000	62	7314	1062	15	1
HS Total	**N/A**	**1830**	**6742**	**N/A**	**1400**	**548**	**8572**	**1948**	**23**	**2**
Grand Total	**4989**	**35826**	**83877**	**4961**	**27323**	**58599**	**124692**	**90883**	**73**	**100**

Figure 6.47 Achievement vis-à-vis Target of the States in Adoption of IPM



At the time of lunching of the Mission in 2001-02, all the eight States in NER were allocated a total target of coverage of 4989 ha area under Integrated Pest Management [IPM]. With the joining of three Himalayan States in 2003-04, the targets under this sub component were fixed for coverage of 35826 ha for all the eleven States during the X Plan. In the first three years of the current XI Plan the States had been assigned total targets of 83877 ha. In all, a total cumulative target of 124692 ha since the launching of the Mission in 2001-02 to 2009-10, had been assigned to the participating States. As against this the total area covered was of the order of 90883 ha i.e. 73% leaving a considerable shortfall of 27% at the aggregate level.

In the X Plan, the IPM targets had almost been achieved. The achievement level in the X Plan was76% -NER 76% & HSR -77%. During the XI Plan, the average achievement in respect of all the States was 76% of the targets -75% in NER & 8% in HSR. The performance of the HSR has been very low during XI plan up to the year 2009-10.

Nagaland was the only State to have achieved its cumulative targets and all the other States lagged behind in this regard. The shortfall in achievement of targets by Mizoram [4%], Arunachal and Manipur each with 12% [ach. 88%] was not much. While the State of J&K had no progress in targets or achievement, Uttarakhand has a very high shortfall of 85% [ach.15%]. In the rest of the States, the achievement level ranged between a little more than half to about three fourth and shortfall in achievement from one forth to a little less than half. The adoption of IPM technology, which aims at minimizing the ill affect of the use of pesticides, needs to be further encouraged in the region.

The State of Mizoram had the largest share of 29% in IMP component. This was followed by Sikkim with 20% share, Nagaland with 12% and Assam with 11% in the total programme. The combined share of thee four States was about three fourth of the total IMP component implemented up to the year 2009-10.

Promotion of Integrated Nutrient Management [INM]

The Integrated Nutrient Management [IPM] is a soil test-based judicious and balanced use of chemical fertilizers in conjunction with organic manures and bio-fertilizers. The combined

application of chemical fertilizers and organic manures increases crop productivity. The approach of the Mission is to develop a viable horticulture farming systems that utilizes locally available organic and inorganic sources of nutrients to maintain soil health and its productivity in the region.

The Government is promoting the soil test-based balanced and judicious use of chemical fertilizers, bio-fertilizers and locally available organic manures to maintain soil health and its productivity.

The Plan-wise and State-wise targets and achievement under adoption of INM since the launch of the programme in the year 2001-02 [IX Plan] in the NER and from 2002-03 [X Plan] in respect of the Himalayan States are shown in Table 6.49.

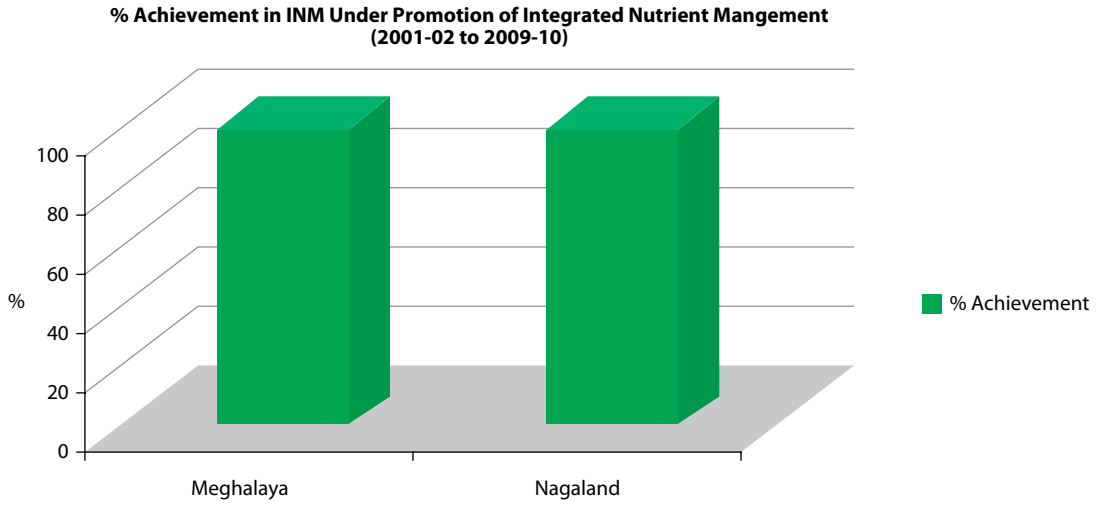
The States of Meghalaya and Nagaland had only been given a total target of coverage of 1605 ha of land under INM. Both the States had achieved their targets fully. The State of Nagaland with coverage of horticulture crop area of 1305 ha [81%] had the maximum share in the application of INM. In Meghalaya 300 ha [19%] were brought under INM technology.

The declining soil fertility and mismanagement of plant nutrients have caused a growing concern on the long term sustainability of agriculture production for meeting an increasing demand for food in the country. The overuse of fertilizer and the poor management of resources have also damaged the environment. The use of the INM technology needs to be propagated and popularized for its wide spread adoption in all the States.

Table 6.49 Targets vs. achievement under Integrated Nutrient Management [INM]

INM [ha]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	300	0	0	300	300	300	100	19
Mizoram	0	0	0	0	0	0	0	0	N/A	0
Nagaland	0	0	1305	0	0	1305	1305	1305	100	81
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**0**	**1605**	**0**	**0**	**1605**	**1605**	**1605**	**100**	**100**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**0**	**N/A**	**0**	**0**	**0**	**0**	**N/A**	**0**
Grand Total	**0**	**0**	**1605**	**0**	**0**	**1605**	**1605**	**1605**	**100**	**100**

Figure 6.48 Targets vs. achievement under Integrated Nutrient Management [INM]



Creating Plant Protection Lab Infrastructure

Horticulture crops are frequent subject to the disease and pest attacks. The availability of a good lab infrastructure to diagnose and control diseases will help the formers to manage various diseases of their horticulture crops and avoid losses. Necessary provision has, therefore, been made in the Mission to set up a network of the required labs to attend to the different aspects of the horticulture crop husbandry. The farmers can avail of the lab services by paying some charges/fee for sample/nutrient analysis.

The following Plant Protection Lab Infrastructure is included under this component:

- Disease Forecasting Unit [DFU]
- Plant Health Clinic
- Leaf Analysis Lab
- Bio Control Lab

The Plan-wise and State-wise targets and achievement under creating plant protection lab infrastructure since the launch of the programme in the year 2001-02 [IX Plan] in the NER and from 2002-03 [X Plan] in respect of the Himalayan States are contained in Table 6.50 to 6.53.

Disease Forecasting Unit [DFU]

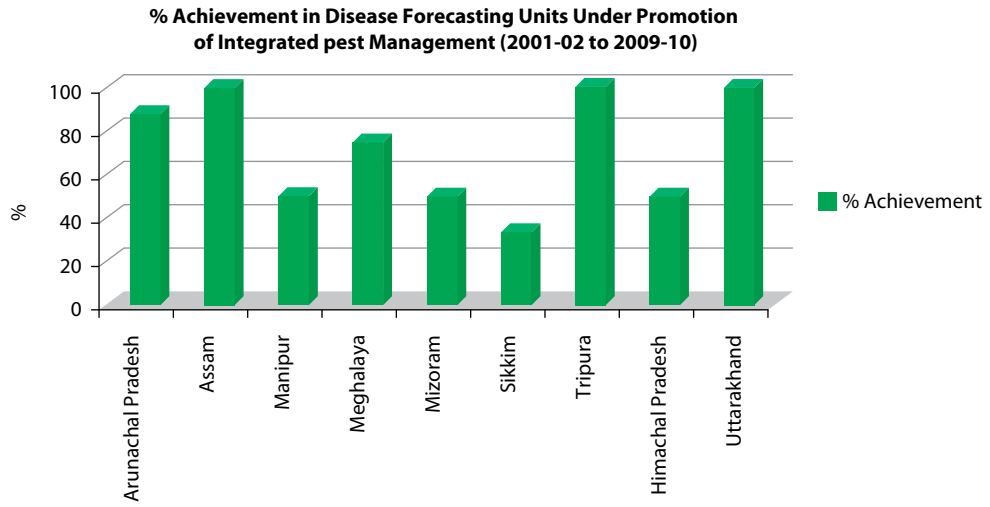
The Disease and Pest Forecasting units are envisaged under HMNEH in order to undertake forewarning of pests and diseases in horticultural crops. These units needs essentially be integrated with Plant Health Clinics.

The Plan-wise and State-wise targets and achievement under Disease Forecasting Unit [DFU] component/sub component of the programme are collated in Table 6.50.

Table 6.50 Achievement vis-à-vis Target of the States under Disease Forecasting Units [DFUs]

Disease Forecasting Units [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	2	6	0	1	6	0	8	7	88	32
Assam	2	0	0	2	0	0	2	2	100	9
Manipur	1	3	0	0	2	0	4	2	50	9
Meghalaya	2	2	0	1	2	0	4	3	75	14
Mizoram	1	1	0	1	0	0	2	1	50	5
Sikkim	2	7	0	1	2	0	9	3	33	14
Tripura	1	0	0	0	1	0	1	1	100	5
NES Total	**11**	**19**	**0**	**6**	**13**	**0**	**30**	**19**	**63**	**86**
H.P.	N/A	2	0	N/A	1	0	2	1	50	5
Uttarakhand	N/A	2	0	N/A	2	0	2	2	100	9
HS Total	**N/A**	**4**	**0**	**N/A**	**3**	**0**	**4**	**3**	**75**	**14**
Grand Total	**11**	**23**	**0**	**6**	**16**	**0**	**34**	**22**	**65**	**100**

Figure 6.49 Achievement vis-à-vis Target of the States under Disease Forecasting Units [DFUs]



In the initial year of 2001-02 of the Mission, the States in the NER were allotted a target of setting up of 11 No. of disease Forecasting Units [DFUs], In the next X Plan, the No of the units was increased to 23 with the inclusion of three more States from Himalayan Region in the programme. There were no targets fixed during the first three years of the current XI Plan. All the 11 participating States had been assigned a total target of 34 units during the entire period of the project from 2001-02 to 2009-10, against which only 22 DFUs were actually established in all the States. The overall performance of the State at 65% of the achievement -63% in NER and 75% in HSR is not up to the mark.

The achievement vis a vis targets which was 55% during IX was though improved to 70% in X Plan yet not to the level of 100%.

Only three of the States of Assam, Tripura and Uttarakhand had achieved their full targets. All the other States had the shortfall in their achievement ranging from as high as 67% in case of Sikkim [ach 33%] to a moderate extent of 12% [ach 88%] in respect of the State of Arunachal Pradesh. The States need to make good their shortfall now.

Arunachal Pradesh had the largest share of 32% in the total DFUs set up, followed by Meghalaya and Sikkim each with 14% share. The combined share of these three States accounted for 60% of the total programme implemented under this component.

Plant Health Clinic

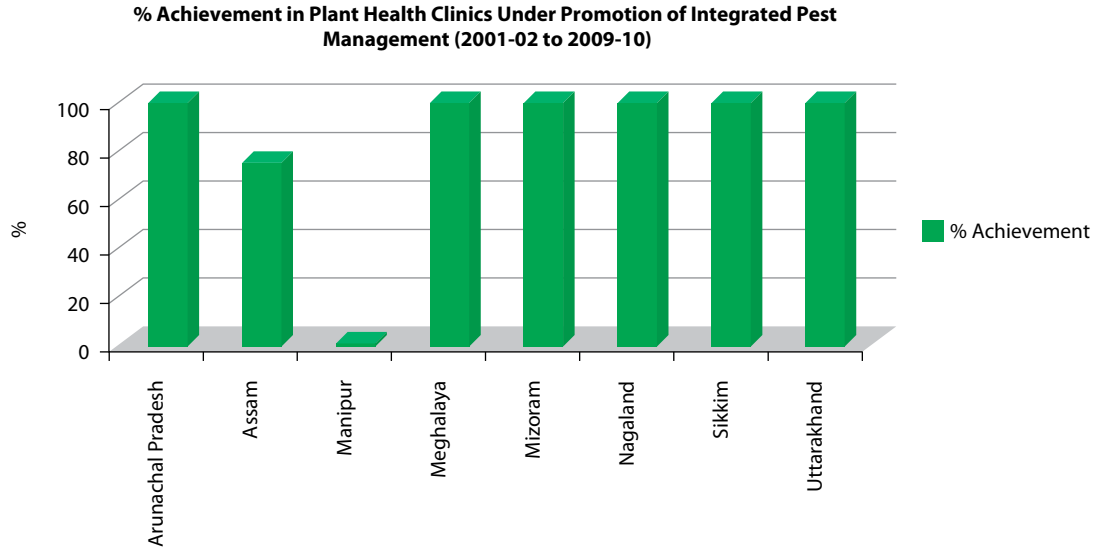
The Plant Health Clinics [PHC] provide horticulture crops pests mapping and Pest advisory services which could be accessed by the farmers for detection and diagnose of plant diseases. The PHC are being established under the programme to provide support for diagnosis of diseases and assist in quality management.

The Plan-wise and State-wise targets and achievement under Plant Health Clinics [PHC] component/sub component of the programme are consolidated in Table 6.51.

Table 6.51 Achievement vis-à-vis Target of the States under Plant Health Clinics [PHC]

Plant Health Clinics [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	Excess/ shortfall [-] in ach. [%]	% @ share
Arunachal Pradesh	1	2	0	1	2	0	3	3	100	20
Assam	2	2	0	2	1	0	4	3	75	20
Manipur	1	1	0	0	0	0	2	0	0	0
Meghalaya	1	0	0	1	0	0	1	1	100	7
Mizoram	1	0	0	1	0	0	1	1	100	7
Nagaland	0	1	0	0	1	0	1	1	100	7
Sikkim	1	0	0	1	0	0	1	1	100	7
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**7**	**6**	**0**	**6**	**4**	**0**	**13**	**10**	**77**	**67**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	5	0	N/A	5	0	5	5	100	33
HS Total	**N/A**	**5**	**0**	**N/A**	**5**	**0**	**5**	**5**	**100**	**33**
Grand Total	**7**	**11**	**0**	**6**	**9**	**0**	**18**	**15**	**83**	**100**

Figure 6.50 Achievement vis-à-vis Target of the States under Plant Health Clinics [PHC]



During the year 2001-02 at the time of the launch of the Mission, the NER States were assigned a total target of setting up of 7 Plant Health Clinics [PHC]. In the next X Plan five of the total 11 States from both the NER and HSR were assigned a total target of 11 PHCs. No targets were given for the current XI Plan. In all, a cumulative target of 18 No of PHC was allocated to all the States excepting Tripura, Himachal Pradesh and J&K, against which only 15 units were actually established. The achievement vis a vis targets works out to 83% - 77% NER and 100% HSR.

The Plan-wise achievement being 67% in IX Plan and 82% in X Plan. The three States of Tripura, Himachal Pradesh and J&K had no targets of achievement. In the remaining States except Manipur and Assam, all the States had achieved their cumulative targets up to the year 2009-10, fully. While the State of Manipur had not set up any PHC against the target of 2, Assam had set up only 3 PHC [75%] against the target of 4. These Stares need to set up units now.

The State of Uttarakhand had the largest share of 33% in setting of PHCs in the total programme. Next came the States of Arunachal Pradesh and Assam with 20% share of each. These three States had a combined share of about three fourth in the total programme implemented up to the year 2009-10.

Leaf Analysis Lab

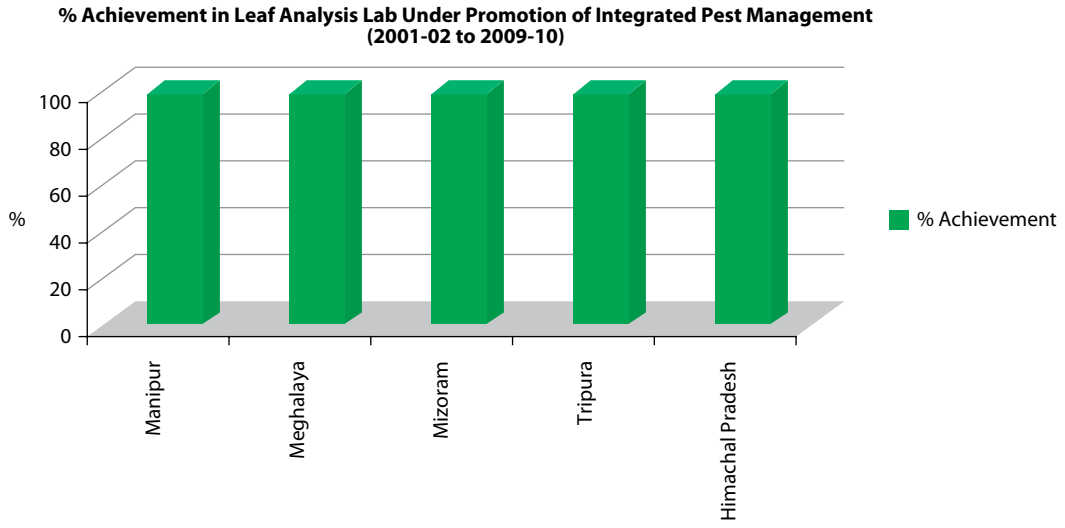
A leaf/tissue are very essential for determination of nutrient status and their availability. The Leaf analysis Labs are being established in the States to meet the above objective. The Leaf analysis is considered more reliable than soil analysis for nutrient management of orchards.

The Plan-wise and State-wise targets and achievement under Leaf Analysis Lab component/ sub component of the programme are collated in Table 6.52.

Table 6.52 Achievement vis-à-vis Target of the States under Leaf Analysis Lab

Leaf Analysis Lab										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	1	1	0	0	2	0	2	2	100	29
Meghalaya	1	0	0	1	0	0	1	1	100	14
Mizoram	1	0	0	1	0	0	1	1	100	14
Nagaland	0	0	0	0	0	0	0	0	N/A	0
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	1	0	0	1	0	0	1	1	100	14
NES Total	**4**	**1**	**0**	**3**	**2**	**0**	**5**	**5**	**100**	**71**
Himachal Pradesh	N/A	2	0	N/A	2	0	2	2	100	29
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**2**	**0**	**N/A**	**2**	**0**	**2**	**2**	**100**	**29**
Grand Total	**4**	**3**	**0**	**3**	**4**	**0**	**7**	**7**	**100**	**100**

Figure 6.51 Achievement vis-à-vis Target of the States under Leaf Analysis Lab



Since the launch of the programme in 2001-02 to 2009-10, a total target of setting up of 7 Leaf Analysis Labs was set for 5 of the States viz. Manipur [2 No], Meghalaya [1 No], Mizoram [1 No], Tripura [1 No] and Himachal Pradesh [2 No]. All these States have achieved their respective targets and established seven Leaf Analysis Labs.

Targets were allotted during the IX and X Plan. During the year 2001-02 there was a snowfall of one Lab which was made good during the X Plan. No further targets were given to the States.

More than half of the units of the Tissue/Leaf Analysis Lab created under the programme have been established in the two States of Assam and Himachal Pradesh each with 29% share in the total progress up to 2009-10

A tissue/leaf analysis is an important tool in determining nutrient requirements of a crop, an adequate number of Leaf Analysis labs within the easy reach of a farmer need to be set up in the area.

Bio Control Lab

Integrated Pest Management [IPM] has been adopted by the Government with a view to reducing the injudicious and indiscriminate use of chemical pesticides. Biological control for developing delivery mechanisms for various bio-control agents for being available to end-users is one of the major components of IPM.

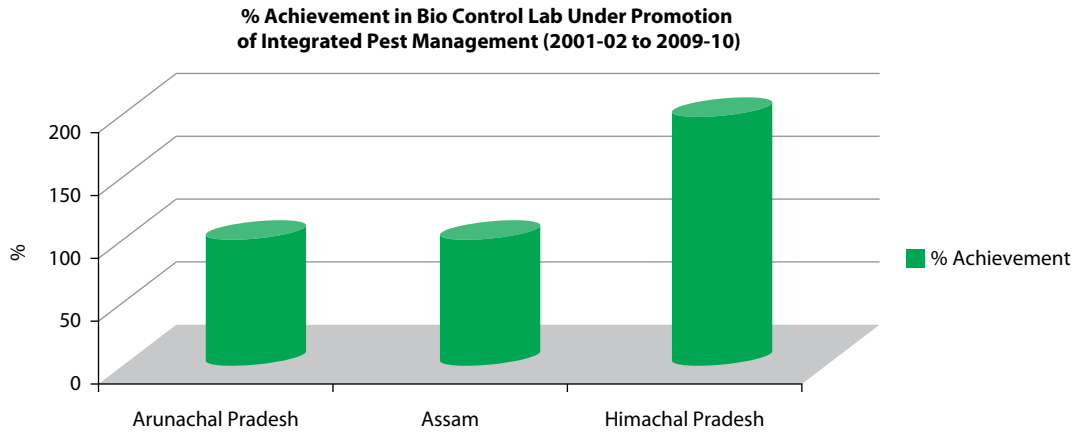
The Plan-wise and State-wise targets and achievement under Bio Control Lab component/ sub component of the programme are contained Table 6.53.

Six of the States viz. Arunachal Pradesh, Assam, Manipur, Meghalaya, Himachal Pradesh and Uttarakhand had been given a cumulative target of setting up of 6 bio control laboratories at the rate of one each. The labs have been established only by three States of Arunachal Pradesh, Assam and Himachal Pradesh. Himachal Pradesh has further set up 2 labs against

Table 6.53 Achievement vis-à-vis Target of the States under Bio Control Lab

Bio control Lab										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	1	0	0	1	0	1	1	100	25
Assam	0	1	0	0	1	0	1	1	100	25
Manipur	0	1	0	0	0	0	1	0	0	0
Meghalaya	0	1	0	0	0	0	1	0	0	0
Mizoram	0	0	0	0	0	0	0	0	N/A	0
Nagaland	0	0	0	0	0	0	0	0	N/A	0
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**4**	**0**	**0**	**2**	**0**	**4**	**2**	**50**	**50**
Himachal Pradesh	N/A	1	0	N/A	2	0	1	2	200	50
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	1	0	N/A	0	0	1	0	0	0
HS Total	**N/A**	**2**	**0**	**N/A**	**2**	**0**	**2**	**2**	**100**	**50**
Grand Total	**0**	**6**	**0**	**0**	**4**	**0**	**6**	**4**	**67**	**100**

Figure 6.52 Achievement vis-à-vis Target of the States under Bio Control Lab



its target of one. The State has thus claimed half of the total share of the programme. No bio control labs had been proposed to be established during XI Plan. The bio control labs were proposed to be established during X Plan only.

The IPM is found be an economical, effective, practical and protective system to ensure biological balance in the nature, apart from increasing the cost-benefit ratio by minimizing expenditure on the application of pesticides. The Bio Control Lab infrastructure being essential part of the system needs to be created sufficiently so as to be within the easy access of the farmers. Efforts are also required to create awareness and demand for eco-friendly and integrated pest management techniques amongst the farmers.

Women Empowerment

Women Empowerment which has emerged as an important issue refers to increasing the political, social or economic strength of Women. It often involves the empowered developing confidence in their own capacities. The Government of India has also formulated various training and development cum employment generations programs for the women to start their ventures. The Mission seeks to empower women of the region in the following two ways':

- Training of women
- Organizing women into SHGs

The Plan-wise and State-wise targets and achievement under Empowerment of Women since the launch of the programme in the year 2001-02 [IX Plan] in the NER and from 2002-03 [X Plan] in respect of the Himalayan States are pooled in Table 6.54 and 6.55.

Training of Women

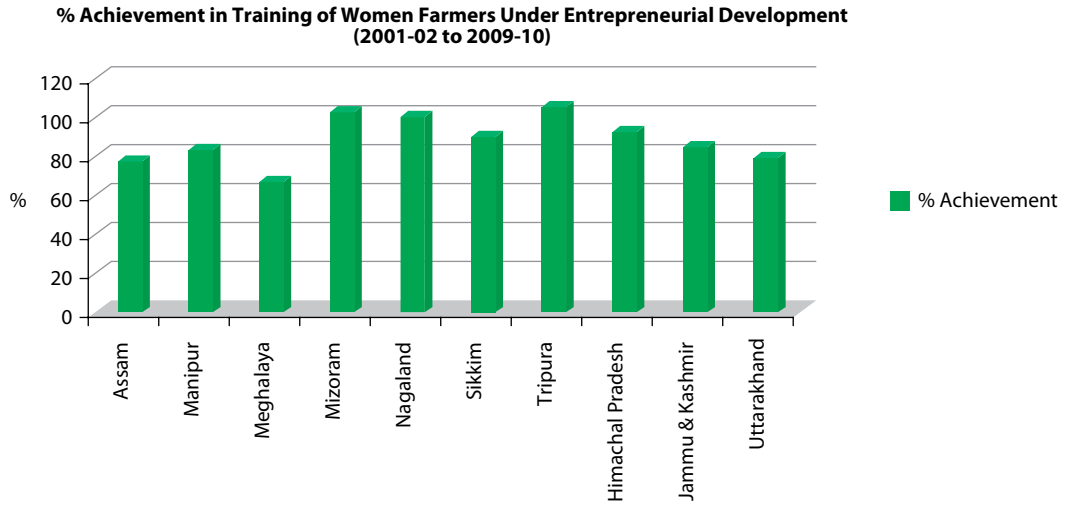
The women farmers are provided technical training on different aspects of horticulture and allied areas like production technology, methods to obtain credit loans for the farming purpose and to understand the marketing techniques of the produce. The scheme envisages making women farmers self-reliant by providing them opportunities for acquiring entrepreneurial and decision making skills so that they are able to share the benefits of the horticulture development taking place in the area.

The Plan-wise and State-wise targets and achievement under Training of Women component/sub component of the programme are collated Table 6.54.

Table 6.54 Achievement vis-à-vis Target of the States under Women Farmers' Training

Achievement vis-à-vis Target										
Training of Women Farmers										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	600	9870	7002	920	6120	6352	17472	13392	77	17
Manipur	0	5050	3850	0	3508	3875	8900	7383	83	9
Meghalaya	0	1071	7000	0	71	5250	8071	5321	66	7
Mizoram	1000	2708	6175	1000	2865	6175	9883	10040	102	13
Nagaland	1000	700	0	1000	700	0	1700	1700	100	2
Sikkim	0	6990	7170	0	6450	6100	14160	12550	89	16
Tripura	0	940	8850	0	1440	8850	9790	10290	105	13
NES Total	**2600**	**27329**	**40047**	**2920**	**21154**	**36602**	**69976**	**60676**	**87**	**77**
Himachal Pradesh	N/A	2876	2558	N/A	2941	2068	5434	5009	92	6
Jammu & Kashmir	N/A	1625	2869	N/A	1234	2523	4494	3757	84	5
Uttarakhand	N/A	7500	4797	N/A	6672	3048	12297	9720	79	12
HS Total	**N/A**	**12001**	**10224**	**N/A**	**10847**	**7639**	**22225**	**18486**	**83**	**23**
Grand Total	**2600**	**39330**	**50271**	**2920**	**32001**	**44241**	**92201**	**79162**	**86**	**100**

Figure 6.53 Achievement vis-à-vis Target of the States under Women Farmers' Training



During the first year of the launching of Mission, a target of training of 2600 women was fixed for the NER States. The States trained 2920 women with 112% achievement. In the X Plan period, a total target of training of 39330 women was given to different States including Himalayan States which had joined the programme by then. Only 32001 [81%] number of women were actually imparted training, leaving a shortfall of the order of 19%. In the XI Plan and up to 2009-10, 44241 women [88%] were imparted training against the target of 50271 No. During the total project period since the launch of the programme in 2001-02 to 2009-10, States had been allocated a total target of training of 92201 No of women. The number of the women actually imparted training was 79162 i.e. about 86%- 87% in NER & 83% in HSR. The shortfall was of the order 14% in totality. This does not include information in respect of the State of Arunachal Pradesh.

Only three of the States viz. Mizoram, Nagaland and Tripura had been able to achieve their targets to the full extent. The remaining States have failed to achieve their targets in this regard and the shortfall in their achievement ranges from 8% [Ach 92%] in case of Himachal Pradesh to 34% [ach.66%] in respect of the State of Meghalaya.

The States having major share in the achievement up to 2009-10 were: Assam [17%], Sikkim [16%], Mizoram & Tripura [13% each] and Uttarakhand [12%]. These five States together trained about three fourth of the total women included under the programme.

Women Self Help Groups [SHGs]

The Self Help Groups [SHGs] concept has emerged as an instrument of economic empowerment of women. The system of Micro-financing through SHGs creates empowerment promoting conditions for women to move from positions of marginalization to decision making process. The Mission has the core strategy in empowering women through SHGs which will act as a network for channelizing the horticultural support to women farmers.

The Plan-wise and State-wise targets and achievement under Women Self Help Groups [SHGs] component/sub component of the programme are consolidated in Table 6.55.

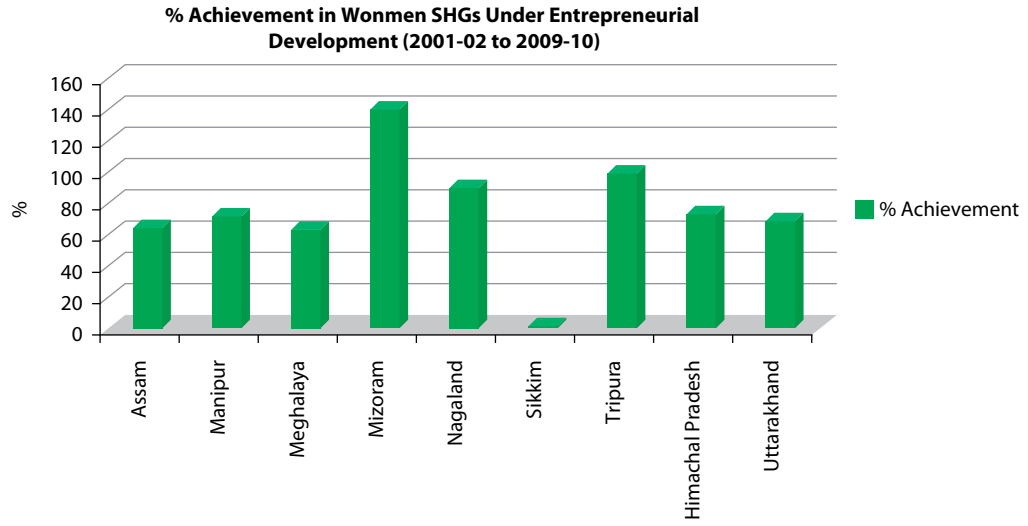
There was no target set in the first year 2001-02 of the launch of the Mission in the NER States. In the X Plan period, a target of promotion of 5756 No. of SHGs of women was fixed for NER as well Himalayan States. The actual achievement was only of 4422 Groups i.e. 77% of the targets – 74% in NER & 88% in HSR. During the XI Plan up to the year 2009-10, the States were allocated a total targets of 6017 No of women SHGs. A total of 4667 Groups were actually organized in all the States which works out to 78% of the targets - 82% in NER & 56% in HSR. During the entire period of the Mission from 2001-02 to 2009-10, the States had been given a total cumulative target of promoting of 11773 women SHGs against which 9087 Women SHGs were only formed. The progress with 77% achievement – 78% in NER & 73% in HSR, of the targets is not very encouraging.

The position of women SHG formation in respect of the States of Arunachal Pradesh, Sikkim and J&K is not available. Of the remaining States only Mizoram and Tripura had achieved their targets totally. The achievement of Tripura at 142% of the targets was good. The achievement in the remaining States ranged from 65% in Meghalaya to 92% in Nagaland. Since SHG route is a very effective method towards empowerment of women, it should be up-scaled in all the States.

Table 6.55 Achievement vis-à-vis Target of the States under formation of women SHGs

Women SHGs										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	1323	505	0	823	405	1828	1228	67	14
Manipur	0	750	770	0	350	770	1520	1120	74	12
Meghalaya	0	1610	1050	0	1375	350	2660	1725	65	19
Mizoram	0	120	0	0	170	0	120	170	142	2
Nagaland	0	639	1810	0	443	1810	2449	2253	92	25
Sikkim	0	26	0	0	0	0	26	0	0	0
Tripura	0	180	860	0	286	760	1040	1046	101	12
NES Total	**0**	**4648**	**4995**	**0**	**3447**	**4095**	**9643**	**7542**	**78**	**83**
Himachal Pradesh	N/A	318	311	N/A	308	166	629	474	75	5
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	790	711	N/A	667	404	1501	1071	71	12
HS Total	**N/A**	**1108**	**1022**	**N/A**	**975**	**570**	**2130**	**1545**	**73**	**17**
Grand Total	**0**	**5756**	**6017**	**0**	**4422**	**4665**	**11773**	**9087**	**77**	**100**

Figure 6.54 Achievement vis-à-vis Target of the States under Formation of Women SHGs



The State of Nagaland with 25% share had the maximum share in women SHG promotion, followed by Meghalaya with 19% share, Assam with 14%, Manipur and Tripura each with 12% in the total programme. These five States together had more than 80% share in the total programme implemented till the year 2009-10.

HRD and Transfer of Technology

The human resource development through training and demonstrations is an integral part of the mission. Training is organized for all the stakeholders such as farmers, officials implementing the programme and field level workers. The Mission had adopted the following strategy to achieve its objective of transfer of lab to land technology:

The Technology Transfer programme has the following sub components:

- Development of curriculum
- Training of Trainers
- Training of Farmers
  - Within the State
  - Outside the State
- Training Centres for Gardeners' Training
- Setting Up of Supervisors' Training Centre
- Refresher Training of Facilitators
- Workshops/Seminars organized

The Plan-wise and State-wise targets and achievement under HRD & Technology Transfer since the launch of the programme in the year 2001-02 [IX Plan] in the NER and from 2002-03 [X Plan] in respect of the Himalayan States are collated in Table 6.56 to 6.63.

Development of Curriculum

Development of an appropriate curriculum specifically tailored to meet the capacity building demand of different stakeholders is the first step and very essential for ensuring a better success rate of the training module.

The Plan-wise and State-wise targets and achievement under Development of curriculum component/sub component of the programme are presented in Table 6.56.

The programme has been implemented only by two of the States viz. Nagaland and Himachal Pradesh. Himachal Pradesh has achieved its target of 7 No. curriculum development Programmes fully as regards, Nagaland, the State had been given a target of preparing curriculum for 16 districts against which it has covered 24 districts thus recording an achievement level of 150% of its targets.

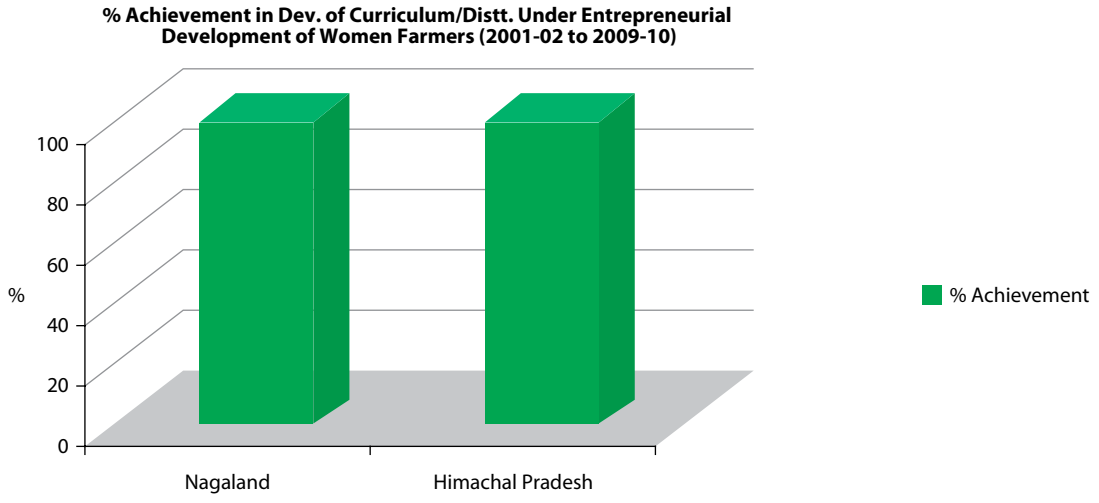
All the targets had been given to the States in the X plan and the same were achieved during that plan period. Since curriculum forms an important part of the EDP, the States may revisit the issue and revise the curriculum, if considered necessary, in the light of the present environment.

In the transfer of technology to the field, it is absolutely necessary that the Trainers keep themselves abreast of the latest development in the horticulture sector for which suitable infrastructure at various level is required to be created.

Table 6.56 Achievement vis-à-vis Target of the States under Development of curriculum

States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	0	0	0	0	8	0	0	8	N/A	26
Nagaland	0	16	0	0	16	0	16	16	100	52
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**16**	**0**	**0**	**24**	**0**	**16**	**24**	**150**	**77**
Himachal Pradesh	N/A	7	0	N/A	7	0	7	7	100	23
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**7**	**0**	**N/A**	**7**	**0**	**7**	**7**	**100**	**23**
Grand Total	**0**	**23**	**0**	**0**	**31**	**0**	**23**	**31**	**135**	**100**

Figure 6.55 Achievement vis-à-vis Target of the States under Development of curriculum



Training of Trainers

A trainer should not only be a knowledgeable person but should have also the ability to communicate effectively with the trainees and to create an appropriate rapport with them so that his ideas are well received by the latter. Training programmes for Trainers for their capacity building are, therefore being organized under the Mission, the progress of which is as under.

The Plan-wise and State-wise targets and achievement under Training of Trainers component/sub component of the programme are presented in Table 6.57.

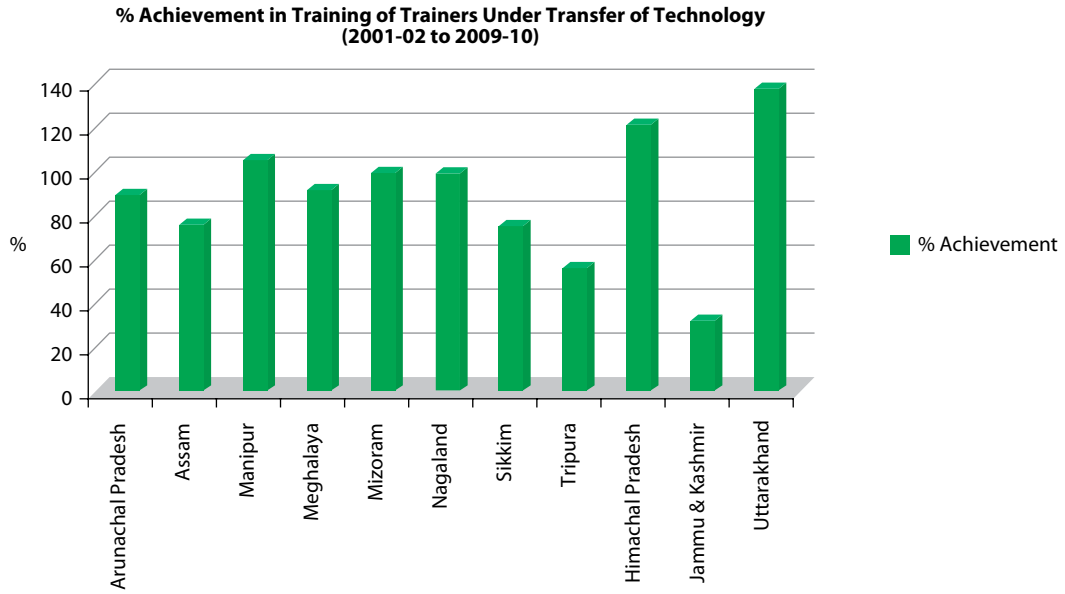
A target of training of 91 Trainers had been allocated to the NER States in 2001-02. The States actually trained 116 Trainers with an achievement of 127% of their targets. In the X plan period, the States trained 1133 No. of Trainers against the targeted figure of 1007 and the achievement was of the order of 113%. In the XI Plan up to the year 2009-10, the achievement was slowed down. As against the target of 874, only 714 [82%] Trainers could be imparted training. At the cumulative level during the entire period of the project from 2001-02 to 2009-10, the achievement of training of 1963 trainers was almost near the set targets of 1972. The overall performance of the States was satisfactory.

Five of the States of Assam. Mizoram, Nagaland, Himachal Pradesh and Uttarakhand had achieved their targets fully. Rather three of them with moderate to good margins to improve the overall position. The States of Meghalaya and Arunachal Pradesh had the shortfall of

Table 6.57 Achievement vis-à-vis Target of the States Training of Trainers

Training of trainers										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	10	80	34	10	80	22	124	112	90	6
Assam	10	97	0	25	57	0	107	82	77	4
Manipur	15	158	92	35	153	92	265	280	106	14
Meghalaya	16	32	100	16	30	90	148	136	92	7
Mizoram	10	89	142	10	89	142	241	241	100	12
Nagaland	10	95	100	10	95	100	205	205	100	10
Sikkim	10	72	80	10	83	30	162	123	76	6
Tripura	10	50	114	0	59	40	174	99	57	5
NES Total	**91**	**673**	**662**	**116**	**646**	**516**	**1426**	**1278**	**90**	**65**
H.P.	N/A	60	40	N/A	92	30	100	122	122	6
J&K	N/A	34	20	N/A	5	13	54	18	33	1
Uttarakhand	N/A	240	152	N/A	390	155	392	545	139	28
HS Total	**N/A**	**334**	**212**	**N/A**	**487**	**198**	**546**	**685**	**125**	**35**
Grand Total	**91**	**1007**	**874**	**116**	**1133**	**714**	**1972**	**1963**	**100**	**100**

Figure 6.56 Achievement vis-à-vis Target of the States Training of Trainers



8% [ach. 92%] and 10% [ach. 90%] respectively. The State of J&K had the highest shortfall of 67% [ach. 33%] in its achievement and Tripura with deficit of 43% [ach. 57%] was the next State in that order. The last two States of Assam and Sikkim had achieved about three fourth of their respective targets and left a shortfall of about one fourth in achievement.

Four States of Uttarakhand [28%], Assam [14%], Mizoram [12%] and Nagaland [10%], together shared about two third of the total achievement in this regard. The State of J&K with just 1% share in the total 11 States achievement was at the lowest.

Training of Farmers

Farmers are imparted training for the adoption of high yielding varieties of various horticulture crops and other related issues. The trainees are also provided resource material to acquaint them about various farming techniques through exhibitions and demonstrations. The training programmes are conducted both within and outside the State. The details of such programmes conducted since the inception of the Mission in 2001 to 2009-10 are given below:

Training of Farmers within the State

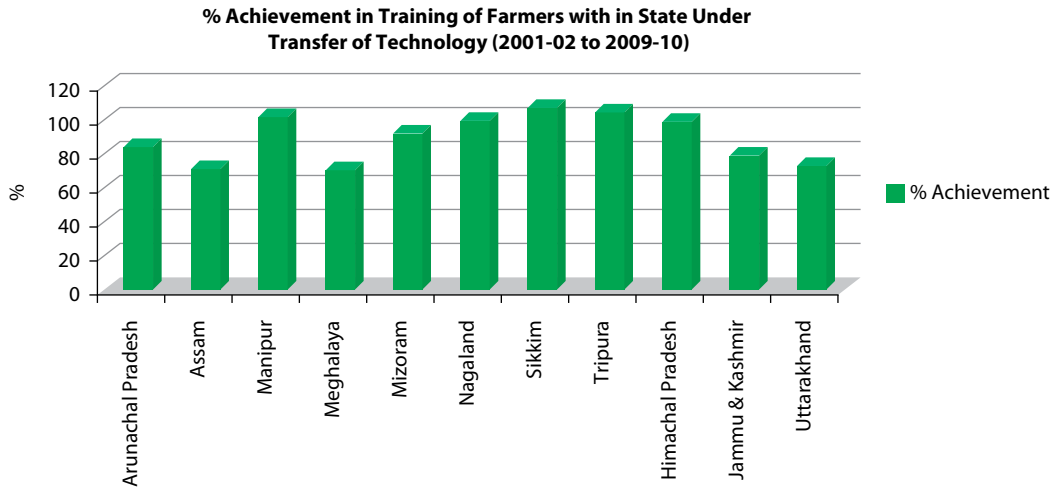
The Plan-wise and State-wise targets and achievement under Training of Farmers within the State component/sub component of the programme are presented in Table 6.58.

The NER States had been given a target of training of 8204 No of farmers at the time of launching of the programme in 2001-02 against which a total of 8647 farmers were trained. The target was fully achieved at macro level. In the X plan period, the target was increased to 75224 when three Himalayan States had also been brought within the ambit of the Mission. The States could however, achieve 92% of their targets by imparting training to 69448 farmers In the first three years of XI Plan period, a total target of training of 83287 farmers had been allocated to all the participating States. They, however, could organize

Table 6.58 Achievement vis-à-vis Target of the States under Training of Farmers within the State

Training of farmers with in State [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Ach.	% Ach.	% @ share
Arunachal Pradesh	704	5200	7000	704	5200	4900	12904	10804	84	7
Assam	1500	13480	10810	2380	7863	8162	25790	18405	71	12
Manipur	400	5230	9300	400	4112	10695	14930	15207	102	10
Meghalaya	600	2465	5750	530	2227	3450	8815	6207	70	4
Mizoram	400	3440	7400	333	2570	7400	11240	10303	92	7
Nagaland	800	4250	6000	800	4250	6000	11050	11050	100	7
Sikkim	3000	10600	8600	3000	13055	7750	22200	23805	107	16
Tripura	800	7700	13500	500	9097	13500	22000	23097	105	15
NES Total	**8204**	**52365**	**68360**	**8647**	**48374**	**61857**	**128929**	**118878**	**92**	**79**
Himachal Pradesh	N/A	9289	3601	N/A	9942	2881	12890	12823	99	9
Jammu & Kashmir	N/A	6070	5431	N/A	4310	4760	11501	9070	79	6
Uttarakhand	N/A	7500	5895	N/A	6822	2972	13395	9794	73	7
HS Total	**N/A**	**22859**	**14927**	**N/A**	**21074**	**10613**	**37786**	**31687**	**84**	**21**
Grand Total	**8204**	**75224**	**83287**	**8647**	**69448**	**72470**	**166715**	**150565**	**90**	**100**

Figure 6.57 Achievement vis-à-vis Target of the States under Training of Farmers within the State



training programmes only for 72470 farmers and fell short of their targets by 13%. During the entire period of the project from inception in 2001-02 to 2009-10, a total target of training of 166715 farmers was given to all the 11 States, against which the achievement

level was of the order of 90%-92% in NER & 84% in HSR, leaving an overall shortfall of 10% in achievement of the targets. A total of 150565 farmers have been imparted training up to the year 2009-10.

Cumulatively up to 2009-10, only five of the Stares, viz. Manipur, Nagaland Sikkim Tripura and Himachal Pradesh had achieved or nearly achieved their full targets. Himachal Pradesh [99.48%] had also nearly achieved its target. Mizoram had also recorded 92% achievement leaving a small shortfall of 8%. In the remaining States the shortfall in achievement ranged from 16% [ach. 84%] in case of Arunachal Pradesh to 30% [ach. 70%] for Meghalaya.

The State of Sikkim had the largest share of 16% in the total achievement, followed by Tripura with 15%, Assam12% and Manipur with 10%. Together these four States trained a little more than half of the total farmers included under the programme.

Training of Farmers Outside the State

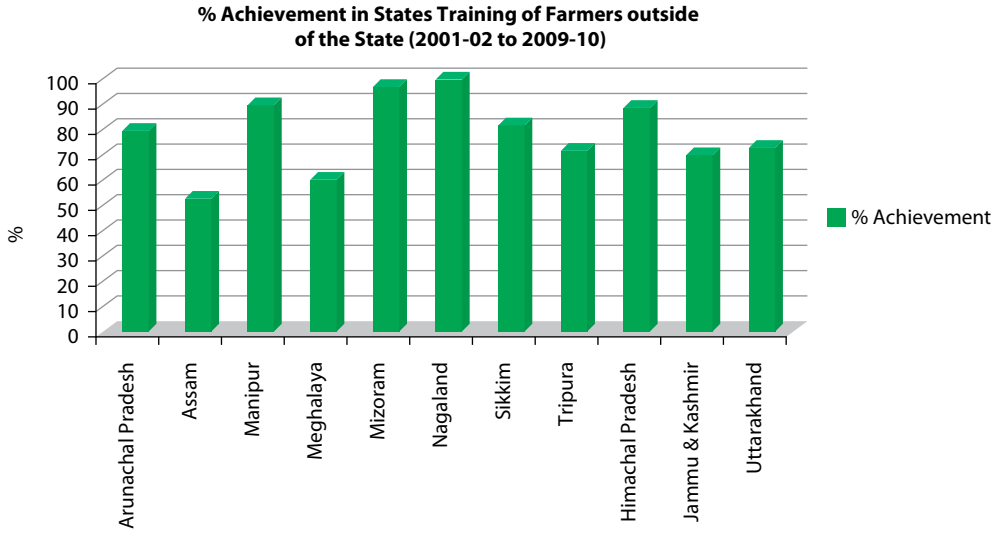
The Plan-wise and State-wise targets and achievement under Training of Farmers outside the State component/sub component of the programme are contained in Table 6.59.

In the year 2001-02, NER States had been given a total target of training of 1750 farmers outside the State. The targets were increased to 20902 No. in the X Plan when three more States from Himalayan Region had joined the Mission. The targets were still increased to 30287 during the first three years of the ongoing XI Plan. The States had thus been assigned a total cumulative target of imparting training to 52939 farmers outside the State. As against this a total number of 40783 farmers were deputed on training outside the State achieving

Table 6.59 Achievement vis-à-vis Target of the States Training of Farmers outside the State

States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Targets	Achieve-ment	% Ach.	% @ share
Arunachal Pradesh	200	1700	3450	200	1700	2400	5350	4300	80	11
Assam	250	4875	800	290	2875	0	5925	3165	53	8
Manipur	0	1030	1586	40	720	1586	2616	2346	90	6
Meghalaya	300	1065	4901	300	945	2501	6266	3746	60	9
Mizoram	300	1290	2400	200	1290	2400	3990	3890	97	10
Nagaland	200	1013	1800	200	1013	1800	3013	3013	100	7
Sikkim	300	1670	3670	300	1699	2650	5640	4649	82	11
Tripura	200	1250	2940	30	1331	1820	4390	3181	72	8
NES Total	**1750**	**13893**	**21547**	**1560**	**11573**	**15157**	**37190**	**28290**	**76**	**69**
H.P.	N/A	4214	2740	N/A	4144	2021	6954	6165	89	15
J&K	N/A	790	1500	N/A	663	940	2290	1603	70	4
Uttarakhand	N/A	2005	4500	N/A	2080	2645	6505	4725	73	12
HS Total	**N/A**	**7009**	**8740**	**N/A**	**6887**	**5606**	**15749**	**12493**	**79**	**31**
Grand Total	**1750**	**20902**	**30287**	**1560**	**18460**	**20763**	**52939**	**40783**	**77**	**100**

Figure 6.58 Achievement vis-à-vis Target of the States Training of Farmers outside the State



77% of the targeted figure – 76% in NER and 79% in HSR. There was a narrow difference in the percentage achievement of the two Regions.

The overall achievement has shown a declining trend in the subsequent Plans. The achievement which was 89% of the targets in IX Plan declined to 88% in the X Plan and further to 69% in the XI Plan. This needs to be reversed.

Nagaland was the only State to have achieved full targets. In the remaining States, five viz. Mizoram [97%], Manipur [90%], Himachal Pradesh [89%], Sikkim [82%] and Arunachal Pradesh [80%] had the achievement level above the all States average of 77%. On the other hand the States of Uttarakhand [73%], Tripura [72%], J&K [70%], Meghalaya [60%] and Assam [53%] had achievement below the all States level figure.

The State of Himachal Pradesh had the maximum share of 15% in the total farmers trained outside the State. This was followed by the State of Uttarakhand with 12% share, Arunachal & Sikkim with 11% of each and Mizoram with 10% share in the total programme under this component. These five States had more than two thirds of the share in the total programme implementation under training component.

These training programmes will facilitate extension from technology transfer mode to technology application.

Training Centres for Gardeners' Training

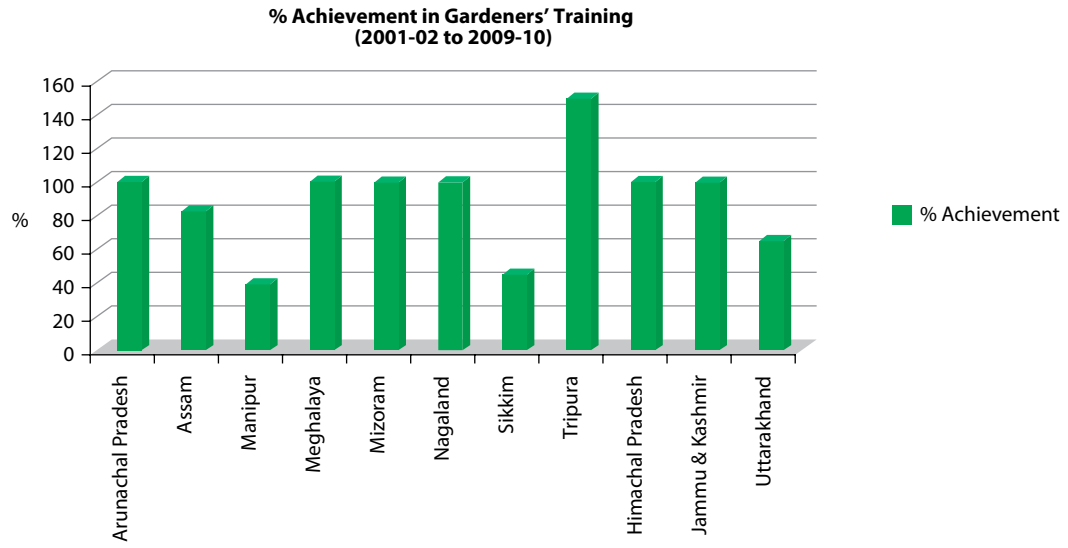
A few Training Centres for Gardeners' Training are also being established under the programme to create a trained force of Gardeners who may be available for being engaged in horticulture activity.

The Plan-wise and State-wise targets and achievement under Training Centres for Gardeners' Training component/sub component of the programme are presented in Table 6.60.

Table 6.60 Achievement vis-à-vis Target of the States under Training Centres for Gardeners' Training

States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	1	6	0	1	6	0	7	7	100	10
Assam	2	15	0	1	13	0	17	14	82	21
Manipur	0	8	0	0	3	0	8	3	38	4
Meghalaya	2	0	0	2	0	0	2	2	100	3
Mizoram	0	3	0	0	3	0	3	3	100	4
Nagaland	0	2	0	0	2	0	2	2	100	3
Sikkim	0	18	0	0	8	0	18	8	44	12
Tripura	0	6	0	0	9	0	6	9	150	13
NES Total	**5**	**58**	**0**	**4**	**44**	**0**	**63**	**48**	**76**	**70**
Himachal Pradesh	N/A	3	0	N/A	3	0	3	3	100	5
Jammu & Kashmir	N/A	0	2	N/A	0	2	2	2	100	3
Uttarakhand	N/A	12	11	N/A	10	5	23	15	65	22
HS Total	**N/A**	**15**	**11**	**N/A**	**13**	**5**	**28**	**20**	**71**	**30**
Grand Total	**5**	**73**	**13**	**4**	**57**	**7**	**91**	**68**	**75**	**100**

Figure 6.59 Achievement vis-à-vis Target of the States under Training Centres for Gardeners' Training



Out of the 5 Gardeners' Training Centre proposed to be set up in the year 2001-02 in NRE States, only 4 centers could be set up. The achievement of the targets was of the order of 80%. During the X Plan, a target of 73 such centres was given to all the 11 States including 3 Himalayan States, against which 57 centres were actually established. The achievement was thus 78% of the targets. In the next XI Plan till 2009-10, the targets were reduced to 13 against which 7 centres [54%] were actually set up by the States. During the entire project period up to the end of 2009-10, a total of 91 Gardeners' Training Centres were proposed to be set up. The actual progress was establishing of 68 such centres. The achievement was only 75%-76% in NER and 71% in HSR, of the targets. This left an overall shortfall of 25% in achievement.

Seven of the States of Arunachal Pradesh Meghalaya, Mizoram, Nagaland Tripura, Himachal Pradesh and J&K had achieved their targets fully. The State of Tripura had the maximum achievement of 150% of the targets among all the States. Whereas the achievement of the States of Manipur [38%] and Sikkim [44%] was below 50% of the targets, the performance of Assam [82%] and Uttarakhand [65%] though not so good was better than these two states.

More than two thirds of the total new Gardeners' Training Centres had been set up on the four States of Uttarakhand [22%], Assam [21%], Tripura [13%] and Sikkim [12%].

Setting up of Supervisors' Training Centre

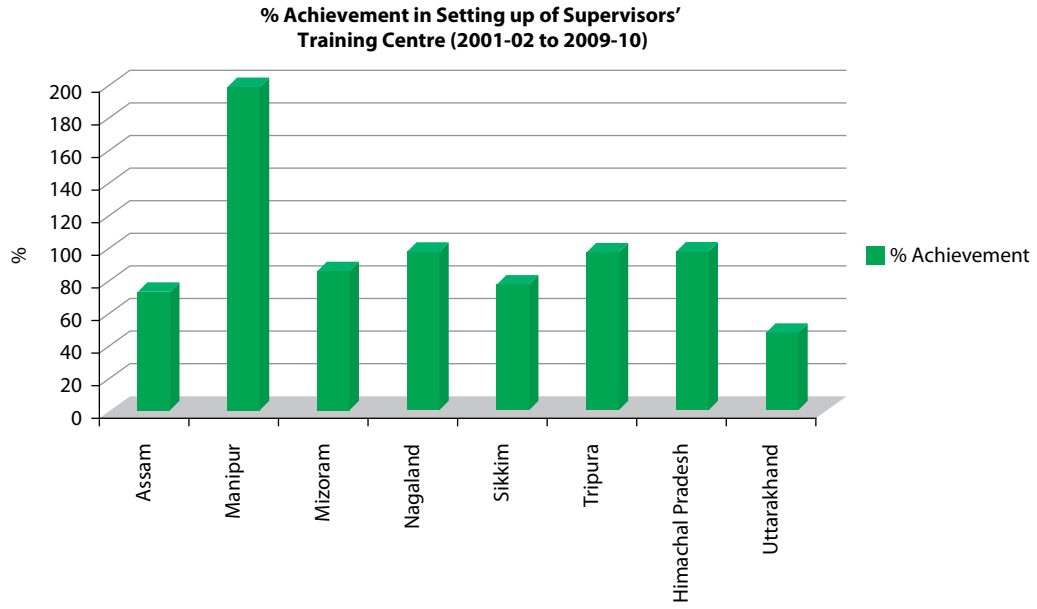
A few Supervisors' Training Centres are also envisaged under HMNEH to carry out the training programmes at supervisory level.

The Plan-wise and State-wise targets and achievement under setting up of Supervisors' Training component/sub component of the programme Centre are presented in Table 6.61.

Table 6.61 Achievement vis-à-vis Target of the States under Setting up of Supervisors' Training Centre

States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	0	0
Assam	0	16	4	0	13	2	20	15	75	37
Manipur	0	1	0	0	2	0	1	2	200	5
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	1	5	2	1	4	2	8	7	88	17
Nagaland	0	1	2	0	1	2	3	3	100	7
Sikkim	1	3	1	1	2	1	5	4	80	10
Tripura	0	4	2	0	5	1	6	6	100	15
NES Total	**2**	**30**	**11**	**2**	**27**	**8**	**43**	**37**	**86**	**90**
H.P.	N/A	2	0	N/A	2	0	2	2	100	5
J&K	N/A	1	0	N/A	0	0	1	0	0	0
Uttarakhand	N/A	1	3	N/A	1	1	4	2	50	5
HS Total	**N/A**	**4**	**3**	**N/A**	**3**	**1**	**7**	**4**	**57**	**10**
Grand Total	**2**	**34**	**14**	**2**	**30**	**9**	**50**	**41**	**82**	**100**

Figure 6.60 Achievement vis-à-vis Target of the States under Setting up of Supervisors' Training Centre



At the launch of the Mission in 2001-02, two Supervisors' Training Centres were proposed to be set up in the NER. The target was achieved the concerned States established two such centres. During the X Plan, all the 11 States were assigned a total target of 35 Supervisors' centres. Against this target the achievement was of the order of 88% and 30 centres were actually established. The targets set for various States during the first three years of the XI Plan were 14. The achievement was 64% as only 9 centres could be established. The progress during X and XI Plan showed a declining trend.

Only four States of Manipur, Nagaland, Tripura and Himachal Pradesh had achieved their full targets. Manipur set up two centres against the target of one. The States of Arunachal Pradesh and Meghalaya did not have any target or achievement. The State of J&K had not set up any centre against target of one centre given to it. The shortfall in the remaining four States of Assam, Mizoram, Sikkim and Uttarakhand ranged from 12% [ach. 88%] in case of Mizoram to 50% [ach. 50%] in respect of Uttarakhand.

The State of Assam had the largest share of 37% in the total Supervisors' Training Centre established under the Mission, followed by Mizoram with 17% and Tripura with 15% share. These three States together, had more than two thirds share in the total programme under this component.

Refresher Training of Facilitators

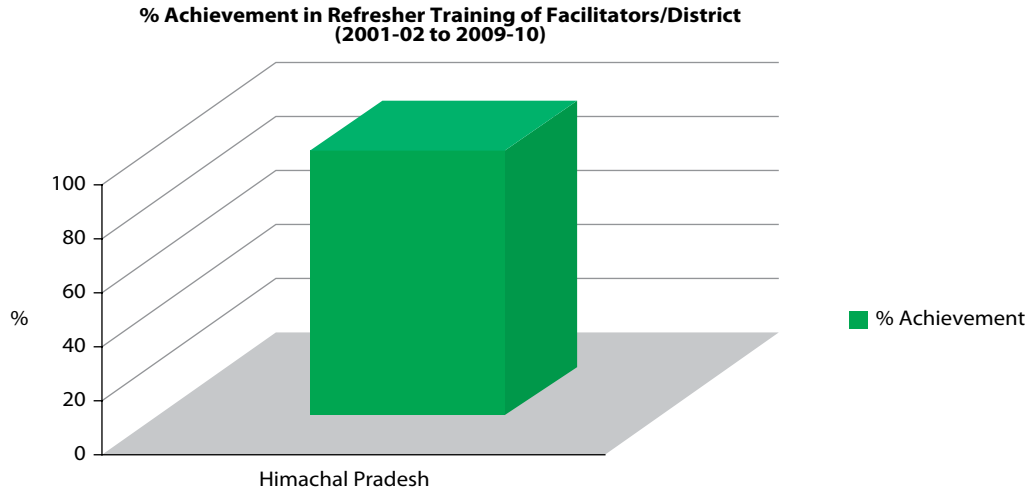
The Facilitators of the training programme would need to keep themselves abreast with the latest development in the horticulture sector. A refresher course for them from time to time would be very helpful to become update.

The Plan-wise and State-wise targets and achievement under Refresher Training of Facilitators component/sub component of the programme are depicted in Table 6.62.

Table 6.62 Achievement vis-à-vis Target of the States under Refresher Training of Facilitators

Refresher Training of facilitators/district										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	0	0	0	0	0	0	0	0	N/A	0
Nagaland	0	0	0	0	0	0	0	0	N/A	0
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**N/A**	**0**
Himachal Pradesh	N/A	12	0	N/A	12	0	12	12	100	19
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	51	0	0	51	N/A	81
HS Total	**N/A**	**12**	**0**	**N/A**	**63**	**0**	**12**	**63**	**525**	**100**
Grand Total	**0**	**12**	**0**	**0**	**63**	**0**	**12**	**63**	**525**	**100**

Figure 6.61 Achievement vis-à-vis Target of the States under Refresher Training of Facilitators



The Refresher Training for Facilitators sub component of the programme has, however, been undertaken by only one of the eleven participating Stares i.e. Himachal Pradesh. The State has taken a total target of 12 Refresher Training for Facilitators programme during the X Plan period and the same had been fulfilled by it. As Refresher courses for facilitators help the Extension Staff in updating their knowledge and learning various

new techniques in production and management of the crop, the States should give due importance to this aspect and conduct refresher courses for the concerned persons from time to time. This is necessary in the fast changing technology.

Workshops/Seminars Organized

Holding of any workshop/seminar for farmers and other stakeholders is a fine strategy for improving research-extension linkages with direct interface between farmers and scientists minimizing the intermission losses. It also helps in making extension from technology transfer mode to technology application.

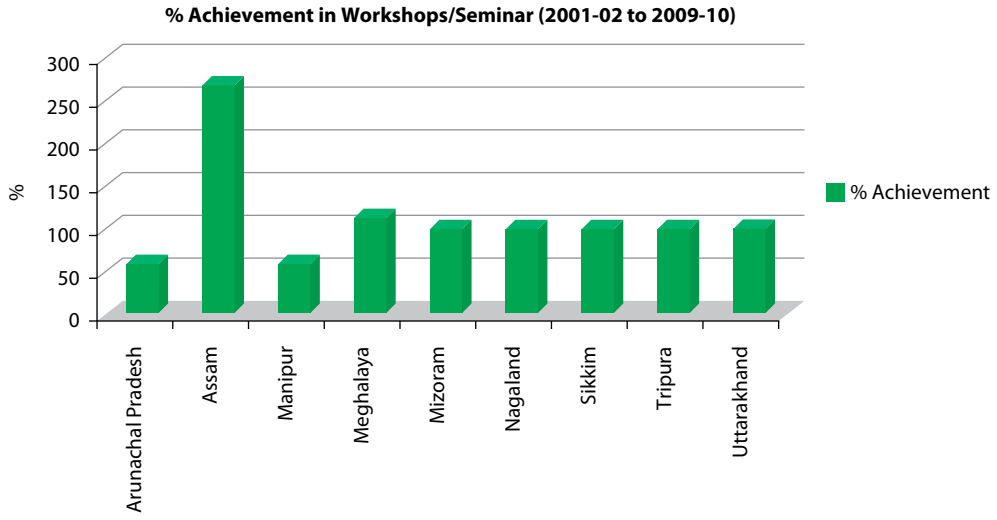
The Plan-wise and State-wise targets and achievement under Organizing Workshops/ Seminars component/sub component of the programme are presented in Table 6.63.

With the exception of J&K, all the States had been allotted a cumulative target for organizing 62 Workshops/Seminars during the period 2001-02 to 2009-10. As against this target, as many as 79 Workshops/seminars were held. The achievement level of 127% of the targets is good. Nevertheless, State-wise performance differs. The State of Assam, Meghalaya, Mizoram, Nagaland and Tripura in NER and Uttarakhand in HSR, had achieved their targets fully. Himachal Pradesh has not conducted any such programme against one target given

Table 6.63 Achievement vis-à-vis Target of the States under Organizing Workshops/Seminars

Workshops/Seminar [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	1	4	0	1	2	0	5	3	60	4
Assam	1	14	0	1	39	0	15	40	267	51
Manipur	0	15	0	0	9	0	15	9	60	11
Meghalaya	0	8	0	1	8	0	8	9	113	11
Mizoram	1	1	0	1	1	0	2	2	100	3
Nagaland	1	3	0	1	3	0	4	4	100	5
Sikkim	1	2	0	1	2	0	3	3	100	4
Tripura	1	7	0	1	7	0	8	8	100	10
NES Total	**6**	**54**	**0**	**7**	**71**	**0**	**60**	**78**	**130**	**99**
Himachal Pradesh	N/A	0	1	N/A	0	0	1	0	0	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	1	0	N/A	1	0	1	1	100	1
HS Total	**N/A**	**1**	**1**	**N/A**	**1**	**0**	**2**	**1**	**50**	**1**
Grand Total	**6**	**55**	**1**	**7**	**72**	**0**	**62**	**79**	**127**	**100**

Figure 6.62 Achievement vis-à-vis Target of the States under Organizing Workshops/Seminars



to it. The States of Arunachal Pradesh and Manipur lagged behind in reaching their targeted figure and the shortfall was of the order of 40% [ach. 60%] in each case. This has been compensated by other States with good performance.

The targets were given in the IX and X Plan and the same were achieved within the period of the respective plan.

The State of Assam has conducted maximum Workshops/Seminars of 40 against the target of 15 allotted to it. Its achievement at 267% of the targeted figure was impressive. The State shared nearly half of the total programme. The States of Manipur & Meghalaya each with 11% share and Tripura with 10% share in the total programme were next in order.

Distillation Unit for Aromatic Plants

The NER and HSR have a large number of aromatic plant species which are traded in bulk. The setting of Distillation Units for extraction of oil within the easy reach of the Aromatic Plant Farmers will offer them an opportunity for getting better returns for their produce.

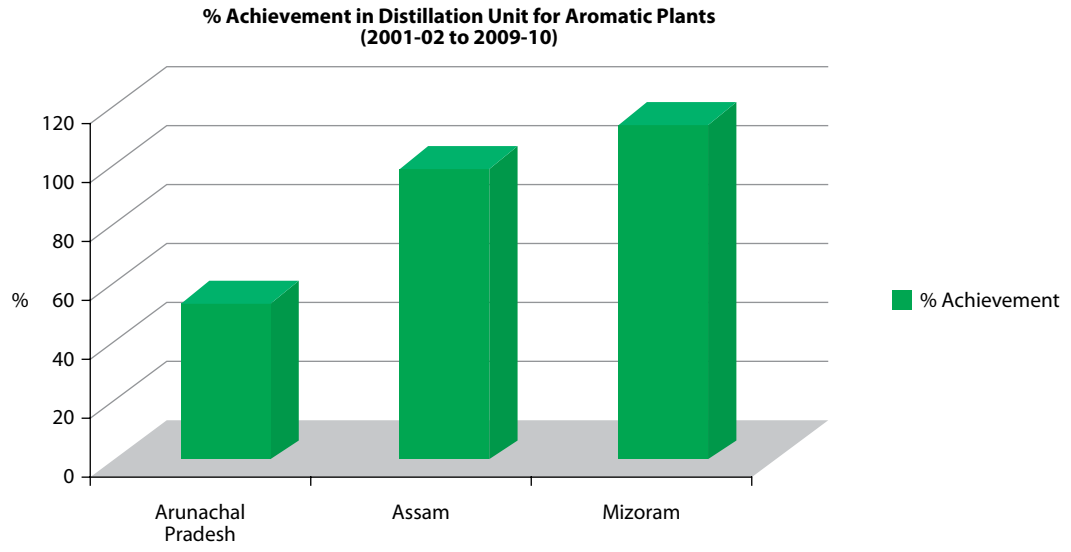
The Plan-wise and State-wise targets and achievement under setting up of Distillation Units for Aromatic Plants since the launch of the programme in the year 2001-02 [IX Plan] in the NER and from 2002-03 [X Plan] in respect of the Himalayan States are shown in Table 6.64.

Only the State of Arunachal Pradesh had been allotted a target of setting up of 4 No of Distillation Units in 2001-02, which it duly achieved. During X Plan, a target of 10 Distillation Units was given only to Arunachal Pradesh. The State had, however, established only one Unit leaving a shortfall of 90% in achievement. The overall shortfall was reduced to 40% by Mizoram by setting up of 3 units by it. In the XI Plan, the targets were increased to 45 by allotting 23 units to Arunachal Pradesh, 2 to Assam and 23 to Mizoram. While Assam and Mizoram achieved their targets to the full extent, the achievement of Arunachal was 65% only.

Table 6.64 Achievement vis-à-vis Target of the States under setting up of Distillation Units for Aromatic Plants

Distillation unit for Aromatic Plants [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	Excess/ shortfall [-] in ach. [%]	% @ share
Arunachal Pradesh	4	10	23	4	1	15	37	20	54	44
Assam	0	0	2	0	0	2	2	2	100	4
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	0	0	20	0	3	20	20	23	115	51
Nagaland	0	0	0	0	0	0	0	0	N/A	0
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**4**	**10**	**45**	**4**	**4**	**37**	**59**	**45**	**76**	**100**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**0**	**N/A**	**0**	**0**	**0**	**0**	**N/A**	**0**
Grand Total	**4**	**10**	**45**	**4**	**4**	**37**	**59**	**45**	**76**	**100**

Figure 6.63 Achievement vis-à-vis Target of the States under setting up of Distillation Units for Aromatic Plants



During the entire period of the Mission from 2001-02 to 2009-10, a cumulative target of setting up of 59 Distillation Units had been allocated to the three States in NER, against which 45 Units could only be established leaving an overall shortfall of 24% in achievement.

The achievement level which was cent percent in the IX Plan declined to 40% in X Plan but improved to 82% in the XI Plan up to the year 2009-10.

The programme had mainly been undertaken by the two States of Mizoram and Arunachal Pradesh with as much as 51% and 44% share and to some extent by Assam with small share of 4% in the total Distillation Units set up. The creation of value addition facility by setting up more Distillation Units near their areas will encourage the farmers to undertake Aromatic Plants cultivation on a larger scale.

Creating Marketing and Transport Infrastructure

Infrastructure has a significant bearing on the ability to attain desirable growth rates. Lack of the basic infrastructure and markets are affecting the growth potential of horticulture sector in the Region. An efficient supply chain requires strengthening of all the levels of infrastructure. Efforts have been made under the Mission to create a network of various types of market infrastructure in the concerned States in order to harness the potential of emerging consumer demand for horticulture commodities.

The sub components of the programmes are:

- Whole sale Market
- Rural Primary Market
- Apni Mandi
- State Grading Lab
- Ropeway

The Plan-wise and State-wise targets and achievement under Marketing and Transport infrastructure since the launch of the programme in the year 2001-02 [IX Plan] in the NER and from 2002-03 [X Plan] in respect of the Himalayan States are collated in Table 6.65 to 6.69

Whole Sale Markets

The Plan-wise and State-wise targets and achievement under Setting up of Whole Sale Market component/sub component of the programme are presented in Table 6.65.

No targets for setting up of Whole sale Markets for horticulture crops have been indicated against any State. Nevertheless, all the States excepting Himachal Pradesh taken together had established as many as 47 Whole Sale Markets – 32 in NER and 15 in HSR- in their respective areas. J&K had established the maximum number of 15 [32%] Whole sale Markets. This is followed by Mizoram with 10 wholesale markets [215] Nagaland by setting up 8 [17%] such markets and Arunachal Pradesh with 6 [13%]. These four States had as much as 83% share in the total programme. No new whole sale market has been set up in Himachal Pradesh.

Table 6.65 Achievement vis-à-vis Target of the States for setting up of Wholesale Markets

Wholesale Markets [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	6	0	0	0	6	N/A	13
Assam	0	0	0	0	2	0	0	2	N/A	4
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	2	0	0	2	N/A	4
Mizoram	0	0	0	4	6	0	0	10	N/A	21
Nagaland	0	0	0	5	3	0	0	8	N/A	17
Sikkim	0	0	0	1	0	0	0	1	N/A	2
Tripura	0	0	0	0	0	3	0	3	N/A	6
NES Total	**0**	**0**	**0**	**16**	**13**	**3**	**0**	**32**	**N/A**	**68**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	15	0	0	15	N/A	32
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**0**	**N/A**	**15**	**0**	**0**	**15**	**N/A**	**32**
Grand Total	**0**	**0**	**0**	**16**	**28**	**3**	**0**	**47**	**N/A**	**100**

Rural Primary Markets

The Plan-wise and State-wise targets and achievement under Setting up of Rural Primary Markets component/sub component of the programme are presented in Table 6.66.

Table 6.66 Achievement vis-à-vis Target of the States for setting up Rural Primary Markets

Rural Primary Markets [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	24	0	0	0	24	N/A	9
Assam	0	0	0	0	25	18	0	43	N/A	15
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	11	0	0	11	N/A	4
Mizoram	0	0	0	18	69	9	0	96	N/A	35

Rural Primary Markets [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Nagaland	0	0	0	0	94	9	0	103	N/A	37
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**0**	**0**	**42**	**199**	**36**	**0**	**277**	**N/A**	**100**
Himachal Pradesh	N/A	0	0	N/A	1	0	0	1	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**0**	**N/A**	**1**	**0**	**0**	**1**	**N/A**	**0**
Grand Total	**0**	**0**	**0**	**42**	**200**	**36**	**0**	**278**	**N/A**	**100**

Like-wise six of the States namely Nagaland [103 No], Mizoram [96 No], Assam [43 No], Arunachal Pradesh [24 No], Meghalaya [11 No] and Himachal Pradesh [1 No] have also set up a total of 278 Rural Primary Markets. The State of Nagaland had the maximum share of 37% in establishing Rural Primary Markets network in the State. This was followed by Mizoram with 35% share and Assam with 15% share. These three States together had as much as 87% share in the total market network set up under the programme.

Apni Mandies

The Plan-wise and State-wise targets and achievement under of setting up of Apni Mandies component/sub component of the programme are exhibited in Table 6.67.

Table 6.67 Achievement vis-à-vis Target of the States for setting up of Apni Mandies

Apni Mandies [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	0	0	0	0	0	0	0	0	N/A	0
Nagaland	0	0	0	0	50	2	0	52	N/A	79

Apni Mandies [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Sikkim	0	0	0	14	0	0	0	14	N/A	21
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**0**	**0**	**14**	**50**	**2**	**0**	**66**	**N/A**	**100**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**0**	**N/A**	**0**	**0**	**0**	**0**	**N/A**	**0**
Grand Total	**0**	**0**	**0**	**14**	**50**	**2**	**0**	**66**	**N/A**	**100**

Further two of the States, namely Nagaland [62 No] and Sikkim [14 No] have also set up a total of 66 Apni Mandies during the period 2001-02 to 2009 -10 with 79% and 21% share in the programme.

State Grading Lab

Under the existing agricultural marketing system, introduction of grading, standardization and quality certification of horticulture produce at the market level is of great importance to add to the marketability of the produce and thereby enabling the farmers to realize a better price.

The Plan-wise and State-wise targets and achievement under Setting up of State Grading Lab component/sub component of the programme are presented in Table 6.68.

Table 6.68 Achievement vis-à-vis Target of the States for setting up of State Grading Labs

State Grading Labs.										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	2	0	0	0	2	N/A	11
Assam	0	0	0	0	7	0	0	7	N/A	39
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	2	0	0	2	N/A	11
Mizoram	0	0	0	2	0	0	0	2	N/A	11

State Grading Labs.										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Nagaland	0	0	0	0	0	0	0	0	N/A	0
Sikkim	0	0	0	3	0	0	0	3	N/A	17
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**0**	**0**	**7**	**9**	**0**	**0**	**16**	**N/A**	**89**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A		0	N/A		0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	2	0	0	2	N/A	11
HS Total	**N/A**	**0**	**0**	**N/A**	**2**	**0**	**0**	**2**	**N/A**	**11**
Grand Total	**0**	**0**	**0**	**7**	**11**	**0**	**0**	**18**	**N/A**	**100**

Six of the eleven participating States, viz. Arunachal, Assam, Meghalaya, Mizoram, Sikkim and Uttarakhand have taken initiatives to set up a total of 18 Grading Labs in their respective areas. Out of these as many as 16 Labs are in the NER and 2 in the HSR. The Labs have been established during the IX and X Plan only. The largest number of 7 labs [39%] had been set up in the State of Assam, followed by 3 No. [17%] in Sikkim. The combined share of these two States constituted more than half of the total programme The established labs in the remaining States are at the rate of 2 each.

The lab facility with adequate machine and equipment infrastructure and manpower will surely help the farmers to get better price for their horticulture produce.

The traditional Indian markets have a non-existent infrastructure of packing, grading, sorting and cold storages. The commission agents and traders dominate the supply chain and are the major price setters. The marketing network established will serve the purpose only when they offer all the facilities/services of a modern markets like grading opportunities and cold storage facilities as well as more transparent price discovery through open auction necessary to make it an integral part of an efficient supply chain system.

Constructing Ropeways

The connectivity to the market/sale point with the farm gate of horticulture produce is as important as the sale point itself in the tricky hilly terrain, many a times it becomes very difficult to construct road network. As a consequence farmers face a lot of problems in transporting the perishable horticulture crops. Rope ways is one alternative to connect two points over steep vale. The information on the ropeways created under HMNEH, is contained in Table 36.

The Plan-wise and State-wise targets and achievement under Constructing Ropeways component/sub component of the programme, are presented in Table 6.69.

Table 6.69 Achievement vis-à-vis Target of the States in constructing Ropeways

Ropeways [No]										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	0	0	0	0	0	0	0	0	N/A	0
Nagaland	0	0	0	0	0	0	0	0	N/A	0
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**N/A**	**0**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	31	0	0	31	N/A	100
HS Total	**N/A**	**0**	**0**	**N/A**	**31**	**0**	**0**	**31**	**N/A**	**100**
Grand Total	**0**	**0**	**0**	**0**	**31**	**0**	**0**	**31**	**N/A**	**100**

Only the State of Uttarakhand has taken advantage of the Ropeways sub component of the programme and has constructed as many as 31 ropeways during the X Plan facilitating connectivity between various places in the difficult hilly terrain. The other States with similar topography need to emulate Uttarakhand in this regard.

Setting Up of Vegetables and Fruit Processing Units

India is the second largest producer of fruits and vegetables in the world. But its organized fruits and vegetable processing industry with just 2% processing of the total output, is highly underdeveloped. The Mission encourages setting up of Vegetables and Fruit Processing Units by extending financial assistance to the stakeholders.

The scheme consists of the following two components:

- Establishing new Vegetable and Fruit [V&F] Processing Units
- Upgradation of existing V&F Processing Units

The Plan-wise and State-wise targets and achievement under Setting up of Fruit and Vegetables Processing Units since the launch of the programme in the year 2001-02 [IX Plan] in the NER and from 2002-03 [X Plan] in respect of the Himalayan States are collated in Table 6.70 and 6.71.

Setting up New Vegetable and Fruit [V&F] Processing Units

The Plan-wise and State-wise targets and achievement under Establishing of Fruit and Vegetables Processing Units component/sub component of the programme are indicated in Table 6.70.

Table 6.70 Achievement vis-à-vis Target of the States in setting up of new V&F Processing Units

New units										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	1	0	1	N/A	2
Assam	0	0	0	0	4	2	0	6	N/A	10
Manipur	0	0	0	3	4	0	0	7	N/A	11
Meghalaya	0	0	0	3	0	2	0	5	N/A	8
Mizoram	0	0	0	0	0	0	0	0	N/A	0
Nagaland	0	0	0	0	1	4	0	5	N/A	8
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	1	0	0	1	N/A	2
NES Total	**0**	**0**	**0**	**6**	**10**	**9**	**0**	**25**	**N/A**	**40**
Himachal Pradesh	N/A	0	0	N/A	3	10	0	13	N/A	21
Jammu & Kashmir	N/A	0	0	N/A	1	7	0	8	N/A	13
Uttarakhand	N/A	0	0	N/A	6	11	0	17	N/A	27
HS Total	**N/A**	**0**	**0**	**N/A**	**10**	**28**	**0**	**38**	**N/A**	**60**
Grand Total	**0**	**0**	**0**	**6**	**20**	**37**	**0**	**63**	**N/A**	**100**

A total of 63 Vegetable and Fruit [V&F] Processing Units in all the States excepting Mizoram and Sikkim have been set up – 25 in NER and 38 in HSR- under the programme during the period 2001-02 to 2009-10. Sikkim and Mizoram had not established any Vegetable and Fruit Processing Unit.

The State of Uttarakhand had the maximum share in setting up of 17 V&F Units [27%], followed by Himachal Pradesh with 13 units [21%] and J&K with 8 units [13%]. These three Himalayan States formed as much as 60% share in the total units established. In NER States, Manipur with 7 units [11%] and Assam with 6 units [10%] claimed 21% share in the total 40% achievement of the region.

Upgradation of Existing V&F Processing Units

The Plan-wise and State-wise targets and achievement under Upgradation of Fruit and Vegetables Processing Units component/sub component of the programme are indicated in Table 6.71.

Table 6.71 Achievement vis-à-vis Target of the States in Upgradation of Existing Processing Units

Upgradation of Existing units										
States	Targets			Achievement			Total			
	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	2001-02	2002-03 to 2006-07 (X Plan)	2007-08 to 2009-10	Target	Achieve-ment	% Achieve-ment	% @ share
Arunachal Pradesh	0	0	0	0	0	0	0	0	N/A	0
Assam	0	0	0	0	0	0	0	0	N/A	0
Manipur	0	0	0	0	0	0	0	0	N/A	0
Meghalaya	0	0	0	0	0	0	0	0	N/A	0
Mizoram	0	0	0	2	0	0	0	2	N/A	100
Nagaland	0	0	0	0	0	0	0	0	N/A	0
Sikkim	0	0	0	0	0	0	0	0	N/A	0
Tripura	0	0	0	0	0	0	0	0	N/A	0
NES Total	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**N/A**	**100**
Himachal Pradesh	N/A	0	0	N/A	0	0	0	0	N/A	0
Jammu & Kashmir	N/A	0	0	N/A	0	0	0	0	N/A	0
Uttarakhand	N/A	0	0	N/A	0	0	0	0	N/A	0
HS Total	**N/A**	**0**	**0**	**N/A**	**0**	**0**	**0**	**0**	**N/A**	**0**
Grand Total	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**N/A**	**100**

The State of Mizoram has also availed of this sub component for upgradation of the two existing V&F processing units, under the HMNEH.

Marketing glut in one season and scarcity in another and great price variations are quite common in India in the absence of a well developed processing industry. The participating States need to set up more V&F Processing units to avoid wastage of a good percentage of the vegetables and fruit and to ensure a remunerative price to the producer.

FEW COMPONENTS OF THE PROGRAMME UNDER MINI MISSION II & II

Area Expansion of Crops

Popularization of Organic Farming – Vermi Compost

Production of Quality Planting Material – Setting up of Nurseries

FEW COMPONENTS OF THE PROGRAMME UNDER MINI MISSION II & II

Use of Greenhouse in Tomato Cultivation

Women Empowerment through Training and Organizing Women into SHGs

On-farm Handling Unit

7

Chapter

DEVELOPMENT OF MIS DATABASE

Management Information System [MIS]

Access to timely and reliable data and information is the key to a sound management system these days. A MIS is an organized approach to the study of the information needs of an organization's management at every level in making operational, tactical, and strategic decisions. It is a set of processes or a system designed by organizations to collect, store, tabulate and interpret data and information in an organized manner to provide a broad picture of the services a programme renders and to guide management to use knowledge

to arrive at informed decision making at all levels. Its objective is to design and implement procedures, processes, and routines that provide suitably detailed reports in an accurate, consistent and timely manner. Data collection involves the use of Information Technology [IT] comprising computers and telecommunications networks. MIS can deliver facts, data and trends in businesses with a great speed to enable the organizations to react more quickly to their situations and environment.

The major component of a Management Information System is the Decision Support System [DSS]. The primary objective of this system is to collect data, and analyze, package and deliver it in a format that management can use to make operational and strategic decisions. MIS systems provide a valuable function in that the Organizations can collate into coherent reports unmanageable volumes of data that would otherwise be broadly useless to decision makers. The studying of these reports built on data and information, the decision-makers can identify patterns and trends that would have remained unseen if the raw data were consulted manually. An effective MIS provides accurate, complete, and timely information to be used as tools necessary to make strategic decisions and intelligent choices that shape an organization's future vision and mission.

Need for Developing a Robust MIS

The Baseline data, indicators of performance & results and mechanisms or procedures are indispensable for putting in place an effective Monitoring and Evaluation mechanism. Baseline data and appropriate indicators of performance and results that may include actions such as field visits, stakeholder meetings, documentation of project activities, regular reporting, etc are required to be established.

The database in the Region, however, suffers from the following counts:

- Non-availability of reliable data base.
- Basic data on area, production productivity suffers from significant variations between different agencies.
- No standardized methodology or uniform parameter for yield assessment.
- Poor validation mechanism.
- Lack of sound and systematic Management Information System [MIS].

The Solution - Development of MIS

Building, operating and maintaining an appropriate Management Information System [MIS] are, therefore, challenges for the project. The effectiveness of management of the project is largely dependent on the existence of an equally effective Management Information System. An appropriate MIS is essential for monitoring implementation continuously to make necessary corrections. It keeps track of programmes and projects to be covered under evaluations as also the implementation status of recommendations emanating from evaluations.

There thus arose a felt need of putting in place an appropriate MIS. SFAC has, therefore, commissioned a comprehensive exercise for undertaking the task of creating database

as well as assessing the impact of the programme. The main purpose for developing MIS will be to establish a proper data collection system, dissemination and use of information about the project activities, resources and results to support decision making and control. MIS shall contain only such parameters as are relevant to the preferences and specific needs of the project programme.

Objectives of MIS

AFC has developed an MIS with the following objectives:

- To put in place a framework for monitoring and evaluation to ensure that goals of the programme remain always in sight.
- To bring in discipline in the project, transparency in processes, improve communication and increase efficiency of operations.
- To meet information needs of various stakeholders.
- To bring better accountability and transparency in the system.

Key Activities/Strategy

The MIS developed by AFC include the following Key Activities/Strategy:

- Development of input and output formats for Management Information System [MIS].
- Development of a simple user friendly MIS Software Package containing such parameters which are relevant to programme objectives.
- Creation of a database of beneficiaries who had availed assistance during the XI Plan period [2007-08 to 2011-12] - State-wise, Year-wise, Component-wise and Activity-wise covering all the 11 States spread over 134 project districts.
- Evaluation of Mission Programme in terms of increase in production & productivity of horticulture crops by adoption of improved production technologies as also Assessment of Impact on income and livelihood of target beneficiaries through Primary Research covering a representative sample of around 10000 farmers from 134 project districts across 11 States.

Development of MIS Output Formats

The following Output Formats have been developed:

i. Allocation and release of funds under Mini Mission-II during XI Five Year Plan.

ii. Programme component/activity-wise annual allocation and release of funds under MM-II by SFAC.

iii. Programme component/activity-wise annual allocation and release of funds under MM-II to District Horticulture/Agriculture Officer by the State SFAC.

iv. State–wise and quarter-wise/year-wise progress report under MM-II to be submitted by the State SFAC to Central SFAC.

v. District–wise and quarter/year-wise progress report to be submitted by the District Horticulture/Agriculture Officer to the State SFAC.

vi. Annual consolidated progress report on implementation of the programme to be submitted by the Central SFAC to DAC, MoA, GoI.

vii. District/State-wise number of beneficiaries covered under different components of the programme during XI plan period.

viii. District-wise particulars of beneficiaries covered under MM-II.

ix. Involvement of NGOs/voluntary agencies under MM-II.

x. Status of convergence and synergy under MM-II with other State/GoI/other agency funded schemes [information to be furnished by the State SFAC to Central SFAC on annual basis].

xi. Constitution and functioning of MM-II committees.

xii. Check List For Central/State SFAC.

All the above reports can also be pulled out from the MIS in any desired permutations/combinations of parameters or date range apart from the pre formatted reports mentioned above.

Operational Features of MIS

- The state's administrative machinery is divided into districts, subdivisions and blocks, which is the basic unit for the administration of the programme.
- Data collected at the block level need to be integrated at higher administrative levels to provide an integrated view at the district, state and central levels to support planning, monitoring, and decision making.
- An integrated database for the entire state may be supported by a mainframe/ minicomputer at the state headquarters.
- Suitable programmes for the analysis of data shall be designed to provide an interactive decision support system at the state level. The computers in the districts and subdivisions may have to be ultimately networked with the state computer.
- The local data may be stored and processed in the district/subdivision, and the shared data with appropriate level of aggregation may be transmitted to the state headquarters to update the integrated database.
- The districts and subdivisions would have direct access to the integrated database with proper authorizations assigned to them through their passwords.
- The key questions in designing an MIS that the systems should be as simple as possible while meeting the information & knowledge needs of all stakeholders' level, has been kept in view.

Key Advantages of the Proposed MIS

- MIS will make available the exact programme coverage [State-wise, District-wise, Component-wise, Activity-wise] to GoI [SFAC/MoA]) at a click of the mouse, which was not available till now.
- The use of an appropriate MIS will facilitate SFAC/MoA in planning and in making informed decisions.
- It will enable effective monitoring of operations at ground level and in taking necessary corrective measures.
- MIS can be successfully used for measuring and evaluating performance of each State/District - Will also enable SFAC to judge whether the GoI resources are being used correctly and judiciously.
- It will enable effective coordination among various departments and agencies in the process of implementation.
- System will complete audit trails of all transactions and any modifications made to any data in the system.
- Above all the MIS provide regular feedback to enhance the ongoing learning experience and to improve the planning process and effectiveness of interventions.
- MIS will facilitate a two-communication process in the programme - MoA, DAC to SFAC and from States to SFCA and MOA DOC to accomplish the entrusted task.

In conclusion, the proper utilization of the system by well trained personnel will transform the data collection exercise into a new automated phase where things are done without stress. It will relieve both the SFAC and the implementing States from the time wasting and energy consuming modes of operation.

Screen Shots

8

Chapter

FINDINGS & CONCLUSIONS

This Chapter envisages, important findings of the study described categorically in the present report under three Heads as: Status of Implementation of the Programme, Primary Research and Analysis, and Performance Evaluation of the Mission Components in terms of targets achieved by all the 11 NEH States since inception of the programme upto the period 2009-10.

Status of Implementation of HMNEH

Implementing Agency [IA] of the Programme

The Horticulture Department is normally the HMNEH Implementing Agency [IA] at the district level in the participating States. In the States, however, the programme in more than two thirds districts is being implemented by the Agriculture Department. Like-wise in Sikkim, in one of the four Districts, Agriculture Department is looking after the work of the Mission. In Himachal Pradesh, Assam and J&K, though there is a separate Horticulture Department, the vegetable cultivation is under Agriculture Department.

It may be advantageous for the States to create a separate Horticulture Department to give needed push to the development of horticulture sub sector.

Status of Staff Deployed for Implementation at District Level

The success of any programme also depends upon the deployment of an adequate and trained number of the staff. The average number of the staff deployed for implementation of the programme at District, Block and Village level comes to 46 per district – 41 in NER and 58 in Himalayan States. The district-wise position varies from 10 in Nagaland to 86 in Tripura depending upon the size and topography of the District. The staff appears to be adequate.

As far as the training part is concerned, out of a total staff of 5044 deployed for the implementation of the HMNEH, 2083 [41%] were reported to have undergone training. Since HRD has crucial role as the implementation of other components depends upon it, the capacity building of the Departmental staff is very important. Training may, therefore, be given to more members of the implementing staff at least to the extent of 50% of the total staff strength.

Status of PC and Internet in District Offices

HMNEH envisages linking of all the District Offices with Personal Computers and internet connections for faster communication and exchange of information.

Of the 110 Districts for which data has been made available, as many as 97 – 88% have been extended PC facilities. In the three States of Mizoram, Tripura and Himachal Pradesh, however, all the district offices have been provided PC facilities. In Meghalaya about one third, in Sikkim & Uttarakhand about one fourth districts in each State have not been provided PC facilities.

As regards Internet, only 47 of the 110 offices [43%] have been given Internet connections. Himachal Pradesh is the only State with 100% Internet coverage of District Horticulture Offices. The Internet coverage of District Offices in the States of Nagaland -10%, Assam & J&K - each 20%, Mizoram -25% and Arunachal Pradesh -33%, was low to very low.

Since PC and Internet have become very important parts of the modern system of governance for access to the fast flow of information, all the offices are required to be provided with PCs and linked with Internet connection. This would be absolutely necessary in introducing the proposed Management Information System [MIS].

Status of District Committees [DCs]

In the implementing structure created under the Mission, District Level Committees are required to be constituted in each District for preparation and implementation of projects/ action plans.

The District Level Committees exist only in 62 [56%] of the 110 districts from which the data has been received. A substantial number of 44% of the districts do not have DCs. The majority of the districts in the States of Mizoram [75%], Nagaland [60%], Manipur [56%] and Uttarakhand [55%] do not have DCs constituted. Further, in the districts where the DCs have been formed, about half of these committees are not being involved in the preparation and implementation of the projects/action plans.

Constitution and Functioning of MM-II Committees

The MM –II Committees have been constituted in the Districts. The Committees are headed by the Development Commissioner/Deputy Commissioner All the concerned District level line Departments, such as Agriculture, Horticulture Department, Animal Husbandry Department, Area Marketing Office have been given representation in the Committees Further Deputy Registrar Cooperative Societies has also been made as a Member of the Committee. The Head of the Agriculture Department/Horticulture Department at the district level is usually the Member Secretary of the Committee. In Assam, Zila Parishad, KVK, Lead District Office and DRDA are also the members of the committee. The Community Development Officer in Uttarakhand and NGOs in Sikkim are included in the MM Committees.

The Committees are undertaking the work of preparation of Project/Action Plans and reviewing the progress in the implementation of the programme at the field level. The different districts have fixed different periodicity of meetings of the Committee. Some districts are holding such meetings at quarterly intervals, some on half yearly basis and a few of them once in a year. A very few districts have also reported regular follow up of the decisions taken in the committee.

Selection of Beneficiaries

About 11% of the districts in all the States expect Mizoram, Sikkim, Tripura and Himachal Pradesh, are not involving local bodies like Panchayats, in the identification and selection of the beneficiaries of the HMNEH programme. The NER and HSR Region have 9% and 16% share of such States, respectively.

The Districts not involving PRIs are selecting the beneficiaries through the Regular/ Extension/field functionaries' staff of the Agriculture/Horticulture Department as well as through the existing beneficiaries. In Himachal Pradesh, the first come and first served principle is applied in the selection. In Uttarakhand, advertisement about the programme is issued. Some of the general criteria adopted by the districts for selection of beneficiaries are: availability of land with the farmer, irrigation facilities at the land, suitability of the land for a particular crop, farmer's interest in horticulture cultivation etc.

Conduct of Baseline Survey and Association of Local Self Bodies with the Programme

The baseline survey to find out potential of horticulture in the area has been done in about 81% of the Districts only before the launch of the programme. As many as 23% districts from NER and 38% from HSR have started implementing the programme without conducting any survey.

A base line survey is a method of mapping the potential of any activity in the area and forms a good base for an effective planning. The involvement of Local Self Bodies makes the selection process more broad based and transparent. The non-compliant Districts should, follow these norms in future.

Involvement of Voluntary Agencies under MM-II

The NGOs/Voluntary Sector has not been playing any significant role in the implementation of the programme. The utilization of the services of NGOs for formation of SHGs, Training and capacity building, training to women farmers, have been reported by the some of the districts in Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram and Sikkim in the NER. Voluntary sector also appears to have been associated in the District councils in some of the districts of Assam, Manipur, Meghalaya and Sikkim. There has not been any association of the NGO sector in the Himalayan States of Himachal Pradesh, Jammu & Kashmir and Uttarakhand.

Fund Flow Mechanism to the Districts

The Districts are required to maintain separate Bank Accounts for the programme under the MHNEH and the funds parked in the Bank should also earn interest. The payment to the beneficiaries is also required to be made by cheques issued in the name of supplier of goods/inputs as far as possible.

The majority of 97% of the Districts are maintaining separate Bank Accounts for HMNEH. Only a small percentage of about 3% at aggregate level from the States of Meghalaya [16%], Arunachal [8%] and Assam [4%] are not maintaining separate bank account for implementing the programme of the Mission.

About 32% of the districts - all from NER, were not earning any interest on the funds received under the programme of the Mission and parked with the banks. All the districts in Manipur, 72% in Assam, 60% in Nagaland, 17% in Meghalaya and 8% in Arunachal Pradesh fell in this category.

It is highly desirable that separate bank accounts under Mission should be maintained to avoid any confusion on the utilization of the money for the purpose for which it is meant. The States not complying with this condition of the Mission are required to open separate bank account immediately. The Districts not earning any interest on the funds parked with the banks are required to take up the matter with the concerned bank to find out as to why their deposits are not earning any interest when under similar circumstances, the banks in the other Districts/States are paying interest.

About 89% of the districts had been making payment to the beneficiaries through cheques with 100% in HSR and 85% in NER. The districts following the practice of making payment in cash ranged from 8% in Assam to 33% in Manipur.

Majority of about two thirds of the districts were not making any direct payment to the beneficiaries. In Arunachal Pradesh and Tripura, all the Districts had a system of not making direct payment to the beneficiaries. In the other States, the system of making direct payment to the beneficiaries ranged from 18% in Uttarakhand to 78% in Nagaland.

As far as possible, cheques should be issued to the supplier of the goods/inputs to the farmers, to avoid any misuse of the funds. The States making all the payments in cash need to revisit their policy in this regard.

About three fourth of the districts were receiving funds on time. The percentage of the remaining one fourth of the districts, reporting delay in receipt of funds, ranged from 11% in Manipur and 55% in Uttarakhand.

The State SFACs are required to look into the matter and ensure that funds are promptly released to the concerned districts on receipt from the central SFAC.

Availability of Irrigation and the Status of Nurseries

Mission lays stress on assured irrigation facilities and supply of quality planting material for raising of horticultural crops under the programme.

A little more than half of the Districts did not have assured irrigation facilities for the horticulture crops being raised under the programme of the Mission. The assured irrigation was not available in 25% Districts in the State of Sikkim and as high as 78% in the State of Manipur in NER. Like-wise in the HSR, the 36% of the Districts in Himachal Pradesh and 80% Districts in J&K were dependent mostly on rainfed irrigation. There is thus a great need to harness runaway rain water by creasing water harvesting structures of appropriate sizes and dimensions in these States.

The intention of the Mission was that with its initial financial support, Nurseries would become self sustained and supply quality planting material to the farmers. A large majority of the Nurseries - 83% set up under the programme had become self-sustained. There were still about 17% of the Nurseries numbering 1-7% in different Districts which needed further support.

With the exception of only 4 Districts, the Department of Horticulture/Agriculture had conducted regular checks and inspections of the nurseries to ensure quality control. Such regular action on the part of the Department will help in production and supply of quality planting material to the farmers.

Status of Source of Supply of Nucleus Seed and Planting Material in the District

The farmers should have an easy access to the basic seed and the planting material to enable them to carry on their horticulture activity smoothly.

The major source to meet the input demand of the farmers for cultivation of horticulture crops, to the extent of more than 80%, are the State Agencies. The rest of the demand is met by the Private Entrepreneurs to the larger extent and NGO/Voluntary sector to some extent. Voluntary Sector appears to be playing a good role in the States of Tripura, Meghalaya, Manipur and Assam. In the States of Assam, Manipur and Nagaland, private Sector is playing a significant supplementary role in supply of inputs to the farmers.

Status of Establishment of Centre of Excellence [CoE]

The Mission had envisaged setting up a few Centres of Excellence in each State to serve as good demonstration points to give thrust to the horticulture activity.

A total number of 28 (20 in NER and 8 in HSR), Centres of Excellence [CoE] have been established covering 32 Districts in all the participating States except Tripura and J&K where no such centre has been set up. Only about 30% of the districts have so far been covered under these centres. More such centres are required to be set up to achieve the objectives of the Mission.

Monitoring mechanism Adopted by the State

Monitoring is an important aspect of the implementation of the programme. A majority of the districts [94%] have put in place regular Monitoring System for the programme at different intervals e.g. monthly [49%], quarterly [44%], half yearly [9%] and annual [4%] basis.

Six of the Districts – one each in the States of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram and Himachal Pradesh, had not established any regular monitoring mechanism. All the Districts in the States of Sikkim, Meghalaya, Tripura, J&K and Uttarakhand were conducting inspections/monitoring on monthly basis. The remaining Districts too should put in place a strong monitoring system and inspections should be conducted at least once in a quarter in every district.

Status of the Horticulture Infrastructure Facilities Created at the District Level

An infrastructure in the form of Nurseries, Mushroom Units as also various test laboratories has been contemplated for optimum promotion of horticulture sub sector.

A total of 27 Tissue Culture Units, 434 Nurseries, 31 Model Floriculture Units, and 19 Integrated Mushroom Units have been set up in different Districts of the participating States to give boost to the horticulture industry. The States of Manipur, Meghalaya, Mizoram and J&K however had not set up any Tissue Culture Unit. The State of Sikkim had the maximum Tissue Culture Units of 11 No. Similarly four States of Manipur, Tripura, J&K and Uttarakhand had not established any model Floriculture Unit. The maximum Floriculture Units, 10 in number had been set up in the State of Meghalaya. Integrated Mushroom units have been established in all the States except Himachal Pradesh and Uttarakhand. Leaf Analysis Labs have been established in 5 States only viz. Assam, Nagaland, Sikkim and Himachal Pradesh. The maximum number of 6 such labs are in the State of Himachal Pradesh. Only three of the States of Arunachal Pradesh, Sikkim and Himachal Pradesh have so far introduced Disease Forecasting Labs. Setting up of the Bio Control Labs under the Mission had been reported from the Districts of five States of Meghalaya, Nagaland, Sikkim, Tripura and Himachal Pradesh only. The States deficient in basic infrastructure need to make efforts to create different type of labs in the Districts.

Accreditation of Nurseries to the Prescribed Agency

Accreditation of Nurseries with the prescribed Agencies ensures production of quality planting material, which helps in raising the production and productivity of the horticultural crops

and thereby raises the income of the farmers. A total of 76 Nurseries set up under the Mission in the different districts of the participating States, have been accredited to the prescribed agencies. The ambit of the accreditation system needs to be further enlarged to cover more Nurseries being established under the Mission to ensure quality planting material.

Setting up Ropeways

Connectivity is a very big problem in the mountainous terrain of the participating States. It is not possible to construct roads/rail everywhere. Ropeways are good alternative to connect different points of the deep valley. Only 4 Ropeways have been constructed – 2 each in the Districts of Mizoram and Sikkim. The progress is this regard is slow.

Marketing Network Created in the District

Marketing is a major constraint in the supply chain of agriculture produce in India. Not only a good marketing network is necessary but the markets should also be equipped with all the facilities like Office Building, Auction Platforms and other facilities.

In all, there are 69 Wholesale Mandies set up in the 110 districts of the participating States under HMNEH. The State of Manipur does not have any proper wholesale marketing facility. The NER States had also about 194 Rural Markets. Besides, there are 23 Apni Mandies in NER and 1 in HSR. There are only 5 Grading Labs set up on all the 11 States- 2 in Mizoram and 3 in the Districts of the State of Sikkim. The Marketing network is not sufficient in the States and the same needed to be augmented for the full development of horticulture potential in the area.

Marketing Infrastructure Developed in the Districts

There is lack of marketing infrastructure in the participating States. Further, there are no proper facilities created in the markets which have been established. The markets also lacked other basic facilities water supply/sanitation/electricity and internal roads & garbage disposal arrangement. There is a dire need to develop a proper marketing network with all the other modern facilities such as a good office, building, auction platform, Drying Platforms, Godowns, cleaning/packing facilities, grading labs, Electronic weighing Machines, Rest House for farmers, good network of internal roads, arrangements for disposal of garbage, electricity and sanitary arrangements etc.

Performance Evaluation of States – Analysis & Findings of Primary and Secondary Research

General Information about the Beneficiary Farmers Surveyed

The programme has covered an adequate number of women, SC, ST and OBC farmers as per the societal structure prevailing in the concerned States as also marginal and small horticulture farmers. A good number of well educated farmers were undertaking horticulture activity which will facilitate technology not only to them but also to fellow farmers through them to harness the fruit of the research.

Better per unit of land and water returns are prompting the farmers in Hilly Regions where agriculture is normally practiced on subsistence level, for shifting towards cultivation of

horticultural crops. Irrigation is very critical too in agriculture. The majority of the farmers of about two thirds are, however, dependent upon rainfed horticulture.

Publicity of any programme amongst all the stakeholders is as important as its implementation, for its spread amongst the largest number of beneficiaries. The major source of the information about the launching of HMNEH to the farmers is the Agricultures/ Horticulture Department.

The farmers were participating in more than one component. A predominant majority of more than three fourth had taken part in the Area Expansion related activities. This follows by Agriculture Equipments/Tools -19%, On-farm Management & Organic Farming - 17% each, Training/Exposure visits - 16% and Water Resources -15%.

Area Expansion Programme

The expansion of the horticulture base in the concerned States is the main objective of HMNEH.

Since inception of the Mission in 2001-02 upto the year 2009-10, the States had been assigned a cumulative target of coverage of an area of 5.96 lakh ha under various horticulture crops including replacement/rejuvenation of old senile plantation. The area actually brought under horticulture was 5.69 lakh ha. This works out to 95% of the total targets – 95% in NER and 98% in HSR. The average performance of the HSR was slightly better that that of the NER in the Area Expansion component. The overall performance of the States under Area Expansion component is satisfactory.

Only four of the States of Nagaland, Himachal Pradesh, Uttarakhand and Mizoram had fully or nearly achieved their targets. Whereas the achievement [97%] of only one State viz. Meghalaya was above the average achievement figure of 96%, the performance of the States of Arunachal Pradesh & Manipur [94% each], J&K & Tripura [91% each] Assam [93%] had below this all State average figure. The shortfall in their achievement ranged from 6% to 9%. The State of Sikkim [ach 86%] was at the lowest in performance with maximum shortfall of 14% in achievement.

The States of Assam & Mizoram had the maximum share of 13% in the total programme. This was followed by Uttarakhand with 12% share, Arunachal Pradesh 11% and Nagaland with 10% share. These four States claim as much as 59% share in the total additional acreage brought under horticulture under the Mission. The share of the remaining States ranged from the lowest of 4% in case of J&K to the highest of 9% in respect of Manipur.

The State-wise and main Crop-wise performance in the implementation of the programme is indicated below:

Fruits

A cumulative total target of 2.99 lakh ha for expansion of the area under fruit crops had been set since the launch of the Mission to 2009-10 in respect of all the States covered under the programme, against which the achievement was of the order of 2.86 lakh ha i.e. about 96%.

Only two States of Nagaland and Himachal Pradesh have achieved its cumulative targets up to the year 2009-10, fully. The States of Mizoram, Meghalaya, J&K, Arunachal Pradesh and

Uttarakhand had small deficit of 1% to 3%. In respect of the remaining States, Tripura had the maximum shortfall of 18% and Assam the minimum of 5%.

Keeping 2001-02 as the base year with an area of about 0.54 lakh ha, the area under the fruit crops, expanded to 2.08 lakh ha in the NER, recording about a fourfold increase. Like-wise in the Himalayan States, the area under fruit crops increased from 0.32 lakh ha in 2003-04, the base year, to 0.78 lakh ha as at the end of 2990-10 showing an increase of about two and half times. The Mission has been able to tap a vast potential of the fruit crops in the area.

In this expansion programme under fruit crops, the share of the two Regions viz. NER and HSR was of the order of 73% and 27% respectively. The highest share of 15% in the total area of 2.86 lakh ha was of the State of Mizoram, followed by Arunachal & Uttarakhand - each with 12%, share Assam with 12% and Nagaland with 10%. These five States together had about two thirds share in the total expansion that took place up to the year 2009-10. The share of the remaining six States ranged from 3% in case of Sikkim to 9% in respect of Manipur and Himachal Pradesh.

It may be said in conclusion that the performance of all the States had by and large been satisfactory in the implementation of the Fruit Crops area expansion component.

The primary research supports the above conclusion. As per the survey made, the number of fruit growers, area under fruit crops and production all showed impressive growth. The number of farmers increased from 2292 to 5766 [152%], Area 1742 ha to 2975 ha [172%] and production 98245 qtl to 256282 [1581%], as a result of the implementation of HMNEH in all the 11 participating States.

Orange, Apple, Banana, Kiwi, Mango, Walnut and Pineapple were the six main fruit crops grown by majority of the 4482 [78%] farmers, occupying as much as 2338 ha area [78%] of the additional 2995 ha brought under fruit cultivation. Orange recorded the maximum increase both in terms of number of farmers - from 503 to 1132 [629 No-125%] and acreage - from 446 ha to 1332 ha [886 ha -199%]. The maximum increase in production was in the case of Banana from 31555 qtl to 65439 qtl [33864 qtl-107%]. In relative terms, however, Kiwi recorded the maximum growth in the number of farmers [21 to 229 -976%], area [8 ha to 139 ha – 1638%] and production [229 qtl to 4888 qtl – 1727%].

Replacement/Rejuvenation of Senile Plantation

All the other States except Himachal Pradesh had been allocated a cumulative target of coverage of an area of 46940 ha under Rejuvenation/Replacement of Senile plantation. Against this, an area of 63592 ha could only be covered i.e. 93% of the target. The overall position of the implementation of the programme is satisfactory.

Five of the States of Manipur, Meghalaya, Mizoram, Nagaland and Tripura have achieved their targets to the full extent. Three of the States viz. Assam, Uttarakhand and J&K had a small shortfall ranging from 2% to 6% in their achievement of targets. The performance of two States of Arunachal Pradesh and Sikkim with shortfall of 21% and 31% was not up to the mark.

The State of Manipur has the largest share of 25% in the total programme, followed by Uttarakhand with 21%, J&K with 13% and Mizoram with 11% share. These four States accounted for about three fourth part of the total component of Replacement/Rejuvenation of old and senile plantation implemented up to the year 2009-10.

In the survey conducted, the number of farmers availing of Rejuvenation of Senile Orchards component of the Mission was limited. Orange and Apple were the two major fruit crops involving a total number of 435 [64%] farmers and 552 ha [67%] area. Orange [415 ha] was the major crop [125 ha] in NER and Apple in HRS under Rejuvenation programme. The overall increase in the yield was recorded around 7% compared to the pre-project position.

Vegetables

The participating States had the cumulative target of 1.02 lakh ha under different vegetable crops up to 2009-10, and the achievement was of the order of 1.04 ha i.e. 102%. The overall position was thus satisfactory. The additional area of 1.04 lakh ha brought under vegetable acreage was shared between the two Regions of NER and HSR in the ratio of 81:19.

Only five of the States viz. Manipur, Meghalaya, Mizoram, Tripura and Uttarakhand had achieved their targets fully. J&K had the maximum shortfall of 36% in the achievement of its target. In respect of the remaining States, the shortfall ranged from minimum of 4% in case of the State of Himachal Pradesh to the maximum of 15% in respect of Sikkim.

Five of the States viz. Tripura [18%], Manipur [15%], Uttarakhand [14%], Sikkim [12%], and Mizoram accounted for about three fourth of the total additional vegetable acreage brought under the Mission.

The number of Vegetable Growers, area under vegetable crops and production in respect of the sampled farmers increased significantly since the launching of the HMNEH from 2001-02 to 2009–10. The number of farmers increased from 2411 to 3625 [1214 No. - 50%]; Area from 1015 ha to 1793 ha [778 ha -77%] and Production from 93183 qtl to 183159 [84976 qtl–91%], as a result of the implementation of HMNEH in all the 11 participating States.

Tomato, Capsicum, Cabbage, Cauliflower, Peas, Cow peas and Fenugreek were the seven major crops grown by the majority of the 2955 [82%] of the beneficiary farmers and occupied an area of 1471 ha [82%] during the year 2009-10. Tomato recorded the maximum increase in the number of farmers from 550 to 794 [44%], Cow peas increased both in acreage from 45 ha to 221 ha [176 ha -391%] and production from 1798 qtl to 30180 [28382 qtl –1579%] in absolute terms. In the relative terms, however, Fenugreek had the maximum increase of 467% in the number of farmers and acreage - 458%. Cow pea had the maximum growth of 1579% in production both in absolute and relative terms. This was followed by Cow pea [170%], Peas [142%], Capsicum [112%], Tomato [44%], Cauliflower [30%] and Cabbage [25%].

Chow Chow, Rice bean, Radish, Snake Guar, Brussel Sprouts and Knol Khol showed some minor negative growth either in number of farmers, acreage or production or in all during 2008-10 compared to the pre pre-project period.

Roots and Tuber Crops

The States of Meghalaya and Sikkim had only availed of Roots and Tuber crops cultivation component of the Mission and achieved their target of 1319 ha [Meghalaya-39% and Sikkim-61% share in the total programme] fully.

In the survey for collection of primary data, the Tuber Crop sub sector witnessed significant increase in the number of respondent farmers from 222 to 421 [199 No - 90%], area from 91 ha to 173 ha [82 ha - 90%] and good production from 4446 qtl to 17677 qtl [11231 qtl - 253%].

The maximum increase in the number of farmers was from 186 to 234 [48 No – 26%] and production from 3993 qtl to 7776 qtl [3783 qtl 95%] in case of Potato. Area–wise maximum increase from 1 ha to 19 ha [18 ha 1800%] was recorded in respect of Colocasia. Whereas potatoes and sweet potatoes were the main tuber crops in the NER, potato dominated the scene in HSR.

Floriculture

Against the total target of 30578 ha area to be brought under floriculture, the actual achievement had been of the order of 28153 ha i.e. 92% shared by both the regions in the same proportion.

Only three of the States viz. Meghalaya, Mizoram and Nagaland had been able to achieve their full targets. The States of Sikkim and Tripura with 27% shortfall were at the bottom in performance and Himachal Pradesh and J&K with 14% shortfall were only next to them. The shortfall in the performance of the remaining States of Arunachal Pradesh, Assam and Manipur which ranged from 5% to 6%, was not much.

The State of Mizoram had the largest share of 17% and the State of J&K the lowest of 3% in the total area covered under floriculture in all the States. The three States of Mizoram [17%] and Nagaland & Sikkim [14% each] had as much as 45% share in the total programme.

In terms of the primary research, the number of the beneficiary floriculture farmers increased from 148 to 349 [136%] adding up 201 new farmers. The area under floriculture like-wise increased from 101 ha to 187 ha [95%] in 2009 -10 with the addition of 96 ha area. The production rose from 3568 lakh/qtl to 12925 lakh/qtl, registering an increase of 252% during the same period.

Rose and the Carnation were the two major crops under floriculture. The total number of 179 farmers under these two crops constituted a little more than half of the total 349 farmers engaged in the floriculture activities in both the regions during 2009 -10. Similarly, these two crops – Rose [87 ha] and Carnation [31 ha] constituted about 60% of the total acreage of 197 ha under floriculture. The production of 6636 lakh/qtl of these two crops formed a little over half of the total production of 12925 lakh qtl during 2009-10.

The floriculture cultivation has been picking up gradually in the participating States in view of the support available under the program.

Model Floriculture Centres

A total of 27 Model Floriculture Units have been established under the programme to serve as the focal points for the development of Floriculture. All the participating States with the exception of J&K had been allocated a target for setting up of 26 units up to the end of 2009-10. The maximum number of 11 [41%] Floriculture Units had been set up in the State of Mizoram. This has been followed by Nagaland with the establishment of 3 units [11%]. The combined share of these two States constituted nearly half of the share in the total programme.

The Model Floriculture Centres had played a significant role in promotion of floriculture activity in the implementing States.

Spices

As against the total targets of 0.80 lakh ha for all the Stares, the actual coverage of the area was of 0.74 ha [93%] leaving a shortfall of 7% in the achievement of targets. Only three of the States of Mizoram, Nagaland and Himachal Pradesh had achieved their cumulative targets. The State of Tripura had the maximum shortfall of 29% and Arunachal Pradesh, the minimum of 2%.

States of Sikkim [22%] Assam [16%], Nagaland [15%], Arunachal Pradesh [12%] and Mizoram [11%] accounted for about three fourth share in the total programme. The overall performance of the States was satisfactory.

As per the survey, the spice sub sector witnessed an impressive increase in the number of beneficiary farmers from 601 to 998 [397 No. – 66%], area from 303 ha to 998 ha [695 ha- 229%] and production from 12015 qtl to 30131 qtl [18116 qtl – 151%] since the launch of the mission in 2001-02 to 2009-10.

The maximum increase in the number of farmers from 287 to 427 [140 No.] was in the case of Ginger, followed by Turmeric-115 to 223 [108 No.], King Chilli-34 to 75 [41 No.], Large Cardamom 14 to 51 [37 No.] and Cherry Pepper- 15 to 38 [21 No.]. In relative terms, the highest increase of 264% was recorded by Large Cardamom.

The maximum increase in the area of spice cultivation from 126 ha 216 ha [90 ha] was in the case of Ginger, followed by Turmeric – 54 ha to 117 ha [63 ha], Large Cardamom - 15 ha to 65 ha [50 ha], In the relative terms, the maximum increase was, however, in the case of Cherry pepper [333%]. It was followed by Large Cardamom [319%], King Chili [249%], Turmeric [116%] and Ginger [71%]. These 5 crops together occupied an area of 497 [78%] ha out of total area of 638 ha of the respondents under spice cultivation during 2009-10.

Ginger recorded maximum increase in production from 5684 qtl to 9252 qtl [3568 qtl] followed by, Turmeric- 2704 qtl to 11503 qtl [8799 qtl] In relative terms, the highest increase of 325% was observed in the case of Turmeric, followed by Cherry pepper-281%, King Chili-271%, Large Cardamom -114% and Ginger- 63%. The production of 25545 qtl of these five main crops during 2009-10, formed 85% of the total production of 30131 qtl of spice crops of the respondent farmers.

Saffron

The performance of J&K, the only State in India producing saffron, with shortfall of 67% in its achievement of a target of 455 ha under saffron crop was poor calling for a revision in approach and strategy to enhance the production and productivity of the most expensive spice of the world.

Plantation Crops

Only all the NER States excepting Arunachal Pradesh and Sikkim have been participating in the area expansion of Plantation crops. These States covered an additional area of 14111 ha against the cumulative target of 16947 ha up to the year 2009 -10 i.e. 83% leaving a shortfall of 17% in achievement.

Only Mizoram had achieved its targets fully and other States lagged behind. The shortfall in case of Manipur - 39% and Tripura – 65% was on the high side. In other States, it ranged from a minimum of 2% in respect of the State of Nagaland to 6% in the case of Meghalaya.

Assam had the maximum share of 43% in the total programme of Plantation. The States of Meghalaya with 23% share and Nagaland with 20% share in the total acreage was the next in order. The combined share of these three States was 86% of the total programme.

As per primary research data, in all the 11 participating States taken together, the Plantation sub sector witnessed increase in the number of beneficiary farmers from 81 to 192 [111 No. - 137%], area from 54 ha to 203 ha [149 ha -276%] and production from 3755 qtl to 7974 qtl [4219 - 112%] since the launching of the Mission in 2001-02 till 2009 -10. The progress was fairly good.

The maximum increase in the number of farmers, from 6 to 41 [35 No] was in the case of Tung, The maximum increase in the area of plantation crops from 6 ha to 67 ha [61 ha] was in the case of Cashew Nuts. Cashew Nuts also recorded maximum increase in production from 214 qtl to 740 [526 qtl].

While Tea, Cashew Nuts and Tung were the main crops being grown by the majority of the beneficiary farmers in NER, Tung being the only major crop in HSR.

Medicinal Plants

All the eleven participating States were given a total target of covering an additional area 7177 ha under Medicinal Plants since the inception of the programme in 2001–02 to 2009–10. Against this, the actual coverage of area under Medicinal Plants was of the order of 6464 ha which works out to 90% of the targets. The overall performance may be considered reasonable at the macro level in view of the nature of the activity.

Only four of the States of Arunachal Pradesh, Nagaland, Himachal Pradesh and Uttarakhand had achieved their targets fully and all the other States lagged behind. Himachal Pradesh with 551% achievement level had shown an impressive performance. The States of Manipur and Sikkim had a very high shortfall of 62% and 78% respectively. The shortfall in respect of the remaining States ranged from moderate 11% in case of Assam to considerable 37% in case of Tripura.

The State of Mizoram and Nagaland with 29% share of each, had the top position in the programme implementation followed by Arunachal Pradesh with as much share as 22% and Assam with 10% share. These four States had a combined share of 90% in the whole programme. The Himalayan States had the nominal share of 1% to 2% in the cultivation of the Medicinal Plants.

The number of farmers cultivating medicinal crops increased from 21 in the pre project period to 44 in the post project period showing an increase of about 110%. The acreage increased by about 95% from 19 ha to 37 ha during the same period. Aloe Vera was major crop being grown. In absolute terms, the progress was low.

Aloe Vera and Prickly winged [Xanthozyllum] were the two main crops in NER and Aloe Vera was the main crop of HSR.

Aromatic Plants

Against the cumulative target of 11407 ha set for the States since the inception of the Mission, an area of 10183 ha [89%] was actually covered under Aromatic Plants. Only four States viz. Nagaland, Tripura, Himachal Pradesh and Uttarakhand had achieved their targets fully.

Himachal Pradesh had recorded an impressive performance with 248% of achievement against its targets. The States of Sikkim and Meghalaya showed a high shortfall of 75% and 46% respectively in the achievement of their targets. In the remaining States, the level of shortfall ranged from minimum of 9% in case of Assam & J&K to the maximum of 31% for Manipur.

Arunachal Pradesh occupied the top position with 63% share. The States of Assam and Nagaland with 13% and 12% share in the total acreage respectively under this sub head, came next in that order The Aromatic Plant activity was at the lowest level in the Himalayan States with below 1% share in the total programme.

Lemon Grass was the main crop which registered a good growth rate with the respondents from the sample. The number of beneficiary farmers growing Lemon Grass increased from 4 in the pre project period to 24 [500%] in post project stage, and acreage increased from 4 ha to 29 ha [628%]. Similarly, production of this crop rose from 280 qtl/ha to 1804 qtl/ha showing an increase of 544 percent. Damask Rose was the next aromatic plant.

The varied agro climatic zones of the region are suitable for the cultivation of most of essential oil bearing plants to meet increasing demand for aromatic plants of importance.

Rate of Survival of Fruit Crops

The information collected during the study from the beneficiary farmers revealed that the plant survival rate at the stipulated level of 75 percent or more in the 2nd year and 90 percent or more in the 3rd year in respect of the plants grown under HMNEH has not been sustained. The stipulated norm covered only about one-third of the total plants grown under the programme – NER one fourth and Himalayan States half. The rate of actual survival reported by the remaining about 65-66% of the beneficiary farmers, was in the range of 'above 50%' in the majority of two-thirds of the cases [42% of total sample]; ['26 to 50%'] in about one-fourth of the cases [17% of total sample] and between ['10 to 25%'] range in about 10% of the cases [7% of total sample].

Integrated Mushroom Unit for Mushroom Production

As many as 27 Mushroom Units were actually established in different States to give boost to mushroom cultivation. All the participating States excepting Himachal Pradesh and Uttarakhand, had been allotted a total target of 26 units. The State of Tripura did not set up any unit against the target of one given to it and Sikkim had the shortfall as high as 75% in its achievement. This had been compensated by the performance of Manipur and Mizoram with achievement of 300% and 133% respectively. A lion's share of 30% of the total programme had gone to the State of Mizoram, followed by Manipur with 22%, Arunachal Pradesh and Nagaland each with 15% % share. The combined share of these four States constituted as much as 82% of the total programme.

The Mushroom cultivation undertaken by the respondents showed about twelve fold increases in the number of farmers on account of the support extended under the HMNEH. There was also concomitant growth of over 400 percent in production and 88 percent in value. The activity appears to have gained substantial ground in Himachal Pradesh with around 93 percent share in the new units set up and to a lesser extent in J&K with 6 percent new units brought under the programme. Private agencies were the major source of supply

of compost and spawn in these two States while Govt. Mushroom Integrated units in other States. Demand for mushroom was good and marketing was not posing any problem.

The Integrated Mushroom Units set up under the programme were playing an important role in promoting mushroom cultivation activity.

Pollination Support – Bee Farming

Since the inception of Mission in the year 2001-02 till the year 2009-10, all the participating States had been assigned a cumulative target of 91319 No. of bee colonies/hives, against which 71350 units were set by all the States thereby showing achievement of 78% - 77% in NER & 80% in HSR. With the average shortfall of 22%, the performance was not up to the mark. Only the two States of Meghalaya and Nagaland had achieved their full targets. The State of Sikkim with shortfall in achievement as high as 59% was at the lowest in achievement among all the States. The shortfall in the achievement in respect of other States ranged from a small as 4% in the case of Arunachal Pradesh to a considerable extent of 38% in respect of J&K. About two thirds part of this component was availed of by four States of Nagaland, Uttarakhand, Manipur and Himachal Pradesh. Further, 12 Bee Breeders have also been developed in the State of Mizoram [10 No.] and Nagaland [2 No.] under HMNEH.

Bee Keeping

There was not much progress in bee keeping activity under the programme as per the information collected from respondents during the survey. An overwhelming number of over 90 percent of the new Bee Keepers consisting of less than 2 percent, were concentrated in Himachal Pradesh only. There was no problem either in the procurement of the bee hives for which the main source was the State Agencies or marketing of the product. Success of bee keeping, however, depends upon some basic factors such as suitable climatic conditions, bee forage, bee management and bee breeding.

Production of Quality Planting Material

Big Nurseries

The work of establishing Big Nurseries [above 1 ha], Small Nurseries [up to 1 ha], Herbal Gardens and Tissue Culture Labs both in the Private and Public Sector, had been undertaken for improving production and productivity of horticultural plants in the region.

A total target of setting of 20 big Nurseries in the private sector was given to all the participating States against which only 17 units [85%] were established. The four States of Arunachal Pradesh, Nagaland, J&K and Uttarakhand could only achieve their targets fully. The performance of the States of Manipur and Tripura with shortfall as high as 89% and 78% of their respective targets had been very poor. Himachal Pradesh and Assam had also recorded a considerable shortfall of 25% and 53% respectively in their achievement. The shortfall of these States was compensated to some extent with the good performance recorded in the States of Sikkim with 232% and Meghalaya with 122% achievement.

The State of Sikkim had set up the maximum number of 44 big Nurseries with 39% share in the total programme. Nagaland with 11% share and Meghalaya with 10% had also

performed reasonably well. Assam, Mizoram and J&K had the least share of 1% each in the total 11 big nurseries set up under the programme.

Under Public Sector, the States had been given a total target of 129 big Nurseries against which 118 units [91%] were actually established. All the NER States excepting Arunachal and Assam with a shortfall of 9% and 20% respectively, had achieved their targets fully - Manipur [160%] and Tripura [125%] with good margins. In the HSR, the shortfall ranged from 41% [ach.58%] in case of Uttarakhand to 22% [ach.78%] both in respect of Himachal Pradesh and J&K.

The maximum number of big Nurseries – 28 [24%] have been set up in the State of Meghalaya followed by 21 [18%] such nurseries established in the State of J&K. These two States together had a share of more than half of total nurseries' network created under the programme up to the year 2009-10 under Public Sector.

Small Nurseries

All the eleven participating States had been given a total target of setting up of 701 small Nurseries under Private Sector against which 600 units [86%] could actually be established. Only four of the States of Manipur, Meghalaya, Arunachal Pradesh and Nagaland had achieved their targets fully. The performance of the State of Manipur with 182% was particularly good. Shortfall in case of J&K was only small at 2%. The shortfall in the achievement of the remaining States ranged from 14% in case of Mizoram to 47% for Himachal Pradesh. The State of J&K had set up the maximum number of small nurseries in private sector – 140 [23%], followed Nagaland - 100 [17%], Sikkim -74 [12%] and Meghalaya – 62 [10%]. These four States together had as much as 62% share in the total 600 nursery units set up.

Under Public Sector, the States had been allocated a total target of 212 small Nurseries against which 179 units [84%] were actually set up. There was no progress in the State of Assam. Four of the NER States viz. Arunachal Pradesh, Manipur, Mizoram, and Nagaland only had achieved their targets fully and the shortfall in achievement in case of the remaining States ranges from 6% in Tripura to 16% in Meghalaya. In the HSR, the shortfall in performance is at the maximum of 68% in Uttarakhand and the minimum of 11% in case of J&K. The State of the J&K had set up maximum number of small Nurseries - 44 [22%]. It was followed by Tripura with 32 Nurseries [18%], Meghalaya - 31 [17%] and Himachal Pradesh with 23 nurseries [13%]. The combined share of these four States constitutes about three fourth of total small nurseries established under public sector.

Herbal Gardens

Only six of the States of Assam, Meghalaya, Manipur, Sikkim, Himachal Pradesh and J&K, had participated in this activity under Private Sector. The performance of the States in establishing of 35 No. Herbal Gardens [45%] against the target of 73 was low. Meghalaya and Sikkim had only been able to reach their target - Sikkim with 138%, fully. Whereas the there has not been any progress in respect of the State of Manipur and J&K, the performance of the State of Assam fell short of 68% and of Himachal Pradesh 42% of the target.

The Public Sector showed an impressive performance by setting up 15 Herbal Gardens as against the target of 6 and showing achievement of 259%. Only four of the States of Manipur, Mizoram, Nagaland and Himachal Pradesh have participated in this activity. Himachal Pradesh has established the maximum number of 11 [73%] of the total Herbal

Gardens as against its target of 2. The State of Manipur has not set up any unit against the target of 1 Herbal Garden. Mizoram set up one Herbal Garden though there was no target allotted to it.

Tissue Culture

Under Private Sector, a total target of 22 Tissue Culture units had been given to six of the States against which 14 units were set up which works out to 64% of the achievement. Three of the States of Meghalaya, Nagaland and Sikkim only had achieved their targets fully. In the remaining three States, while there is no progress in the case of Manipur, the achievement level in respect of Himachal Pradesh and Uttarakhand has been of the order of 60% and 50% respectively. In terms of the share in the total programme implemented, Himachal Pradesh with 6 TC Units [43%] tops the list followed by 3 [21%] and 2 units set up each by Nagaland and Uttarakhand [14%]. The share of these four States constitutes as much as 92% of the total TC units established up to 2009-10.

The overall performance of the Public Sector in setting up of Tissue culture units has been good. A total target of 7 PTC units had been allotted to three of the eleven participating States of Mizoram, Tripura and Himachal Pradesh, against which 10 units were actually established. While Mizoram and Tripura were about to achieve their target fully, Himachal Pradesh did not set up any TCU against the target of two such units allotted to it.

Seed/Planting Material Availability Status

Government Departments/Nurseries/SAU/Research Institutes were the major source from which a majority of the surveyed respondents had obtained quality seed/planting material. A large majority over 80% were getting seed/planting material of their choice, good quality and on time. Poor germination was cited as the main reason by a few farmers not satisfied with the existing supply arrangement.

As many as 525 farmers had set up Nurseries - 79 big [above 1 ha] and 446 small [up to 1 ha] producing estimated number of 175 lakh plants annually for their own use as well as for sale to the other farmers and agencies – both Govt. and private. The maximum nurseries -164 [31%] have been set up in the State of Assam alone. A majority of the Nurseries around 55 percent have been established under poly houses. About 20 Herbal Gardens have also been set up under HMNEH.

The infrastructure created under the Mission was serving the purpose of supply of quality material to the horticulture growers.

Creation of Water Resources

Construction of Community Tanks and Tube-wells had been undertaken under this component. The participating States were allocated a total target of construction of 12338 community Tanks, against which a total number of 11251 tanks were actually constructed leaving a gap of 9% in the targeted figure. Only two of the States of Nagaland and Himachal Pradesh have achieved their full targets and Meghalaya had a small shortfall of 3% in its achievement. The shortfall in achievement in respect of the remaining States ranged from 9% in case of Tripura to 26% in respect of Assam.

The State of Himachal Pradesh had constructed the largest number of 1534 [14%] Community Tanks followed by Tripura with 1515 [13%], Nagaland with 1507 [13%] Mizoram 1304 [12%] and Sikkim with 1267 [11%]. These five States accounted for about two thirds share in the total programme. The share of the remaining States ranged from 3% in Assam to 9% in Arunachal Pradesh.

As regards, Tube-wells, the States had been assigned a cumulative target of 17867 and the achievement was of the order of construction of 14913 tube-wells i.e. 83% of the targets. Arunachal Pradesh and Nagaland were only the two States which were able to achieve their cumulative targets. The shortfall in achievement by the remaining States in NER excepting Tripura was, however, small ranging from 2% to 4%. In case of Tripura, the deficit of about 46% in achievement was considerable. In Himalayan Region States, two States of Himachal Pradesh and Uttarakhand had the shortfall in the range of 9% to 10%. But in case of J&K, it was 27% [ach.73%.]

The highest share 21% in sinking of tube-wells under the programme had gone to Mizoram, followed by Assam - 18% and J&K-15%. The share of these three States taken together constitutes a little above half of the total structures created in all the participating States. Further, no progress in this regard has been reported from the State of Sikkim.

About three fourth of the existing irrigation structures on the cultivated land of the beneficiaries have been created under MM-II programme. In NER and Uttarakhand in HSR, community tanks formed 80 and above part of the total irrigation facilities created. The community tanks were meeting the irrigation needs of the concerned beneficiary adequately and these also were being managed properly.

On-farm Management

The programme had covered Drip Irrigation, Sprinkler Irrigation and Mulching under On -Farm Water Management.

Against the target of coverage of a total area of 18557 ha under Drip Irrigation system, an area of 16656 [90%] had actually been covered. The three States of Nagaland, Meghalaya and Mizoram had achieved their targets fully or nearly. The State of Tripura had a very high shortfall of 71% and Manipur a considerable one of 19% in their achievement in NER. The shortfall in respect of the remaining States of the region ranged from 4% in case of Arunachal Pradesh to 7% for the State of Sikkim. In the HSR, J&K had not made any progress in installing drip irrigation and the shortfall in respect of Himachal Pradesh was 7% and 29% in case of Uttarakhand.

The State of Meghalaya had the highest share of 24% in the total acreage covered under the drip irrigation system, followed by Arunachal Pradesh & Mizoram each with share of 13% and Assam with 12% share. These four States had as much as about two third share in the total area covered under drip irrigation under the programme of the Mission.

Seven of the participating States had been given a combined target of coverage of an area of 4015 ha under sprinkler irrigation system, against which the achievement was 78% Only two of the States of Mizoram and Nagaland had achieved their targets. The State of J&K had shown the poorest achievement of just 1% of its targets. The programme had evoked good

response in the States of Mizoram, Himachal Pradesh, Meghalaya and Nagaland which had a share of 29%, 25%, 18% and 17% respectively in the total programme implemented. These four States had a total share of 89% of the total programme of supply of sprinkler irrigation to the beneficiary farmers.

Under Mulching activity, seven States had been distributed a total target of coverage of 12139 ha against which actual achievement was of the order of coverage of 10240 ha, which formed 84% of the targets. Only two States of Meghalaya and Nagaland had been able to achieve their targets fully. The State of Sikkim and Assam had a small shortfall of 1% and 2% respectively. The achievement of Himachal Pradesh was just 5% and of J&K 28% of their respective targets. The States which had played a major part in implementing mulching activity in horticulture were: Manipur, Assam, Manipur, Meghalaya, Nagaland and Mizoram claiming a share about three fourth in the total area covered under mulching activity.

Drip and sprinkler have not become much popular among the sampled farmers of the area as only a small number [6% - drip and 3%- sprinkler] have installed this micro irrigation system on their lands on an area of 2153 ha and 634 ha, respectively. The State of Mizoram had the maximum share of 26 percent of the total area covered under drip irrigation. Himachal Pradesh had about half of share in the sprinkler irrigation system installed under the Mission. Mizoram and Meghalaya were the next two states with 23 percent and 16 percent share. The micro irrigation system has been found useful by the beneficiaries in increasing irrigation potential and crop yield.

Only a fraction of the beneficiaries i.e. less than 2% has availed of Plastic Mulching component of the programme covering a small area of about 57 ha. Farmers were, however, not satisfied with the use of this technique.

The 'On-farm Management', Material is being procured mainly through the Government Departments and a lesser extent through SAUs.

The majority of farmers were receiving advice and technical support, to their satisfaction, from the Extension Agencies in the installation and use of on farm management system excepting the States of J&K, Meghalaya and Manipur where majority has denied such a service. The officials of Agriculture/Horticulture pay visits to their farmers' fields from time to time. In Mizoram, however, the visits of the extension officials to the farmers were reported to be 'rare'.

Use of Greenhouse Technology/Protected Cultivation Technology

The Greenhouse Technology/Protected cultivation has Low Cost Tunnels, Greenhouse [500 sqm], Low Cost Greenhouse, Shade Nets, Anti Hail Net, Anti Hail Gun, Poly Sheet and Anti Bird Nets as its sub components.

Eight of the States excepting Assam, Tripura and Uttarakhand, had been allotted a total target of coverage of 4.37 lakh sqm under low cost Tunnels and the achievement of 3.49 lakh sqm there against constituted 80% of the targeted figure. Four of the States of Arunachal Pradesh, Meghalaya, Mizoram and Nagaland had achieved their targets fully. Whereas the State of Jammu & Kashmir did not show any progress in this regard, the performance of Manipur [33%] and Uttarakhand [40%] remained poor.

The States had been allocated a cumulative target of covering of 19.80 lakh sqm area by constructing Greenhouses of 500 sqm size against which the actual coverage was of the order of 18.37 lakh sqm. The achievement level of 93% of the targets can be considered fairly reasonable as the activity does not have yet a wide spread acceptance.

In NER, all the States except Sikkim and Tripura had achieved their targets fully. While in case of Sikkim, the shortfall in achievement was only of 5%, with achievement level of less than 1%, there was hardly any progress in Tripura. In HSR, while the State of Himachal Pradesh had a small shortfall of 4% and J&K a moderate of 13%, the achievement in respect of Uttarakhand with 35% shortfall was low. The State of Himachal Pradesh had the highest share of 35% in the total programme. The States of Mizoram with 18% and Sikkim with 14% share came next. The three States had about two third s share in the total implementation of this component of the programme.

Since the launching of the Mission, the participating States had been assigned a cumulative target of 23.56 lakh sqm for construction of low cost green houses. The overall achievement of 16.71 lakh sqm which works out to be 71% of the targets, was low.

The States of Arunachal Pradesh, Assam, Manipur and Mizoram and Nagaland in NER had achieved their 100% targets. The shortfall of 9% in case of Sikkim was small while Meghalaya could reach only 50% of the targets set for it. There was virtually no progress in the State of Tripura with just less than 1% achievement. In the HSR, Himachal Pradesh had achieved 90% of its targets. The States of J&K and Uttarakhand had the shortfall of 17% [ach. 83%] and 46% [ach. 56%] in achievement of their respective targets.

Sikkim had the highest share of 27%, followed by Manipur with 19% J&K with 11% and Assam with 10% share in the total programme implemented under low cost green house component. The participating States had been allocated a cumulative target of 69.57 lakh sqm of shade net, against which the achievement level was of the order of 50.69 lakh sqm i.e. 73% of the targets. The States of Arunachal Pradesh, Meghalaya and Nagaland had only achieved their full targets. While the State of J&K had made no progress, the achievement of the State of Tripura with less than 1% was not better. The States of Assam, Mizoram and Sikkim in NER had, however, a small shortfall ranging from 3% to 5%. The shortfall in the achievement of target by the States of Manipur, Uttarakhand and Himachal Pradesh at 29%, 46% and 69% respectively was considerable to very high.

The State of Mizoram had the largest share of 34%, followed by Nagaland with 20%, Manipur with 17% and Sikkim with 15% share in the total programme. These four States formed 86% share in the total implementation of the shade net technology component.

Only six of the eleven States have participated in anti hail net programme of the Mission – 4 from NER and 2 from HSR. Meghalaya was the only State to have achieved its targets fully. The shortfall in the achievement of targets in respect of the States of Manipur, Uttarakhand and Himachal Pradesh was of the order of 16%, 23% and 40% respectively. There was no progress in the case of Tripura in meeting the target of 140 sqm of shade net allotted to it.

In relative terms, the State of Uttarakhand had the largest share of 38% in the total programme, followed by Himachal Pradesh with 34%, Sikkim with 12%, Meghalaya with 10% and Manipur with 6% share in the total programme implemented under this sub component.

A pilot project to install an Anti-hail Gun to protect the fruit crops especially apple crop, which suffers extensive damage due to frequent hailstorms, has been launched in Himachal Pradesh. The State had been given a target of two Anti Hail Guns against which only one has been installed. The programme is in the nascent stage and its expansion and demand from other States will depend upon its success rate.

The supply of poly sheets has become popular in Nagaland only. The State had been allotted a target of coverage of 4.50 lakh sqm area by poly sheets during the XI Plan which it has fully achieved. No other participating State appears to have shown any interest in this technology.

Only the State of Uttarakhand had been allotted target of coverage of 75 ha area of horticulture crops under Anti Bird Nets. There has, however, no progress in the State in this regard.

Presently greenhouse technology is practiced by very few farmers in the country. Scope, therefore, exists for large-scale expansion of nursery activity under favorable microclimate created in cost-effective low cost structures.

The Protected Cultivation of Horticulture crops have not taken off as yet as observed from the primary data collected as also in the interaction with the farmers during the course of the study. Except Low Cost/Improved Greenhouse of 100 sqm where the availing level is of the order of 5%, the expansion under the other sub components such as Low cost Greenhouses of bigger sizes, High Tech Greenhouses of different sizes, Shade Nets and Anti Hail Nets, is below 1%. The use of as much as 86 percent of shade nets and 64 percent of Anti Hail Nets was in Himachal Pradesh and J&K, respectively. The technology has, however, been found to be beneficial by a large majority of the farmers using the same.

On-farm Handling Unit

The participating States had been allotted a total target of 9924 units against which the achievement was of the order of 8334 units [84%]. Only three of the States namely, Arunachal Pradesh, Nagaland and Himachal Pradesh had achieved their targets fully. The State of Mizoram had a small shortfall of 5%. In the remaining States, the shortfall in achievement ranged from 17% in case of Meghalaya [ach. 83%] to the highest of 69% in respect of Assam [ach. 31%].

The maximum On-Farm Handling Units of 1520 [18%] have been established in the State of Nagaland, followed by 1447 [17%] units set up in Himachal Pradesh; 1318 [16%] in Mizoram; 1284 [15%] in J&K and 900 [11%] in Arunachal Pradesh. These five States have set up more than three fourth of the total on farm handling units set up under the programme up to 2009-10.

Horticulture Mechanization

The agriculture machinery, tools and equipments help in ensuring timely farm operations and removing drudgery amongst the farmers.

The position of the implementation of the various sub-components of the programme is as under:

Power Drawn Agriculture Tools and Equipments

A total target of supply of 456 Agriculture equipments had been set for four of the States viz. Arunachal Pradesh, Mizoram, Nagaland and Tripura as against which, the achievement level was of the order of 366 i.e. 80%. Only Arunachal Pradesh and Nagaland have achieved their full targets. Whereas the achievement level in case of Mizoram is 82%, there is no progress in respect of the State of Tripura.

The programme has flourished only in two States of Mizoram and Nagaland where majority of the Units - 350 [96%] have been set up.

Manually Operated Agriculture Machines/Tools

Since the launching of the Mission in 2001-02 up to 2009-10, a total cumulative target of 77760 number farm tools/equipments had been fixed for all the 11 States. As against this, the achievement was to the extent of 66725 No. i.e. 86%. Four of the States of Arunachal Pradesh, Manipur Nagaland and Himachal Pradesh had achieved their full targets. Mizoram and Sikkim with 99% and 98% achievement had nearly achieved targets set for them. The remaining three States of Tripura, Meghalaya and Assam in NER had showed a shortfall of 18%, 39% and 50% respectively. While J&K in HSR, had a high shortfall of 59%, the shortfall of 9% in the achievement of targets in respect of the State of Uttarakhand was not much.

The State of Himachal Pradesh had the maximum share of 17% in the total tools/equipments supplied under the programme, followed by Mizoram with 14% share, Sikkim with 13%, Nagaland with 12% and Manipur with 11% share in the total programme of this component. These five States implemented about two thirds of the total programme.

Power Operated Agriculture Machines/Tools

During the entire period of the Mission from 2001-02 to 2009-10, the States had been assigned a total cumulative target of supply of 15762 No. of power operated Tools/ Equipment amongst the horticulture farmers. Against this, all the States taken together had distributed a total No. of 13093 units i.e. 83% of the targets leaving a shortfall of 17% in achievement.

Only two of the States of Nagaland and Himachal Pradesh were able to achieve their full targets. The shortfall of 2%, 8% and 9% in achievement in case of Manipur, Assam and Sikkim respectively was not much. While there were no targets set for the State of Arunachal Pradesh, the States of Mizoram, Meghalaya and Tripura had shown a moderate to high shortfall of 14%, 23% and 37% respectively. In the remaining two States of HSR, Uttarakhand had a considerable shortfall of 24% and J&K a high deficit of 73% in achievement of their respective targets. There was no progress in this regard in the State of Arunachal Pradesh. Since agriculture implements and tools help in efficient farming, their use need be encouraged.

The State of Himachal Pradesh had the highest share of 44%, followed by Sikkim with 16% and Mizoram with 12% share in the total Tools/Equipments distributed. There three States together implemented about three fourth of the programme.

Power Tiller

A total cumulative target for supply of 6387 No. of Power Tillers for all the States had been fixed since the inception of the Mission till 2009-10, against which the actual supply was of the order of 5927 units i.e. 93%. The NER States had performed slightly better than the HSR. Only the three States of Manipur, Nagaland and Himachal Pradesh had achieved their targets to the full extent. The States of Assam [2%], Tripura [5%] and Meghalaya [8%] had small shortfall in their achievement. The shortfall in respect of the States of Mizoram [85%] and J&K [82%] was very high. In case of the remaining States, the shortfall in achievement ranged from 22% in case of Uttarakhand to 54% in case of Arunachal Pradesh.

The maximum share in the supply of Power Tillers during the entire period of the project up to 2009-10 was of Tripura State –30%, followed by Assam -23%, Nagaland -13% and Himachal Pradesh -12.% These four States put together had the total share of around three fourth in the total achievement.

Diesel Engine

A cumulative target of 9377 Diesel Engines for the entire period from 2001-02 to 2009-10 had been fixed for all the States. Against this, the actual number of the Sets supported was 13362. The overall achievement of 142% of the targets was good. Only Nagaland and Tripura had achieved their targets fully – Tripura with an impressive margin [402%]. The State of J&K had not participated in this sub component. The shortfall in respect of Assam [2%], Meghalaya [3%] and Himachal Pradesh [7%] was small only. In respect of the remaining States, the shortfall in achievement ranged from 13% in Manipur to 34% in Arunachal Pradesh.

The State of Tripura had about half of share [49%] of the total achievement under Diesel Engines, sub component followed by Assam with 13% share. These two States together formed around two thirds share in the total programme implemented up to the year 2009-10. The share of the remaining states ranged from 1% to 7%.

Weed Cutter

The Weed Cutter sub component of the programme has been allotted only to one of the States i.e. Nagaland during the current XI Plan and the State has since achieved its target of supplies of 120 such tools.

Horticulture Equipments for Canopy Management, Pruning, etc.

Four of the States of Manipur, Meghalaya, Mizoram and J&K participating in the programme had been allocated a total target of supply of 630 No. of the canopy and pruning equipment against which 620 No. [98%] were actually provided. All the State participating in this sub component of the programme, excepting J&K, have achieved their targets. The State of J&K lagged behind in achieving its target and the shortfall in reaching its target was as much as 29%. The targets were given only during the current XI Plan.

The State of Manipur has the major share of about three fourth in the total programme implemented in the four States.

Pit Hole Digger

The sub component of Pit Hole Digger had been taken only by one of the States i.e. Nagaland. The State has since achieved its target by supply of 85 No. equipments to the farmers.

Majority of the beneficiaries – 55 percent [60% NES & 60% HSR] have received Agricultural Equipments/Tools under the programme. Manual Equipments with 68 percent share in the total Agriculture Equipments/tools etc. distributed were the most popular. The Diesel Engines with 5 percent share in the total machinery received by the farmers was at the lowest. The Agriculture Equipments/Tools have helped the beneficiary farmers in increasing efficiency in their farming operations and reducing drudgery and consequent increase in their production.

Popularization of Organic Farming

The Mission has supported the establishing of Earth worm Unit, Adoption of Organic farming/Incentive for Organic Farming and Organic Farming Certification to encourage Organic Farming cultivation for horticulture crops in the region. The status of implementation of these sub components by the States since the inception of the Mission till the year 2009-10 is as under:

Earth Worm Unit

As against the combined targets of 18713 Earthworm Units set for all the eleven States, 18694 [95%] units had been set up. Only two States of Nagaland and Himachal Pradesh have achieved all their targets. The State of J&K, Meghalaya and Uttarakhand had the shortfall of 17%, 13% and 12% respectively. In the remaining States, the shortfall in achievement which ranged from 4% in Mizoram to 7% in Arunachal Pradesh and Sikkim, was not much.

Adoption of Organic Farming/Incentive for Organic Farming

All the eleven participating States had been given a total cumulative target of coverage of 33158 ha of area under organic farming against which the actual coverage was of the order of 23120 ha [70%] leaving a shortfall of 30% in achievement. Only the two States of Manipur Mizoram could achieve or nearly achieve their targets. The achievement of three of the States viz. Meghalaya [44%], Himachal Pradesh [43%] and Nagaland [41%] was below 50% of their targeted figure. The achievement in respect of the remaining six States ranged from 85% in case of Arunachal Pradesh to 66% in respect of the State of Tripura.

The State of Sikkim had the largest share of 25% in the total area covered under the programme. This was followed by Arunachal Pradesh with 20%, Mizoram with 14% and Uttarakhand with 10% share in the total area coverage. There four States together implemented about two thirds of the total programme.

Organic Farming Certification

A total target of 102 Certification Agencies/Units had been allotted to different States and the achievement level of this target was of the order of 81%. No targets for setting up of certification units were allotted to the States of Arunachal Pradesh, Nagaland and J&K or there

was no progress in these States. The State of Meghalaya also did not set up any certification unit against the target of 7 No. given to it. Four of the States viz. Assam, Manipur, Mizoram and Uttarakhand had achieved their targets fully. The remaining two States of Tripura and Himachal Pradesh had achieved 33% and 67% of their respective targets leaving a shortfall of 67% and 33% respectively in their achievement.

The State of Mizoram had lion's share of 43%, followed by Sikkim with 22% and Uttarakhand with 18% in the total certification agencies/units established under the Mission. These three States together had as much as 83% share in the implementation of this sub component of the programme.

Adoption of Organic Farming

About 15 percent of the farmers surveyed -19 % in NES and 8% in HS have adopted organic farming under the Mission mainly in Sikkim and Nagaland. Further 12 percent of them - 11% NER & 14% in HSR, have also set up Earthworm units on their lands. Farmers have found the organic farming quite beneficial. But the certification facility was available in the area of about one fourth of them only. The States of Arunachal Pradesh and Tripura did not have any Certification agency/Unit. Further, about one fourth of the total farmers [23% NER & 30% HSR] adopting organic farming received incentive for undertaking this activity, the highest percentage [67%] being from Mizoram.

Promotion of INM/IPM

In all, a total cumulative target of 124692 ha had been assigned to the participating States. As against this the total area covered was of the order of 90883 ha i.e. 73% leaving a considerable shortfall of 27% at the aggregate level.

Nagaland was the only State to have achieved its cumulative targets. The shortfall in achievement of targets by Mizoram [4%], Arunachal and Manipur each with 12% was not much. While the State of J&K had no progress in targets or achievement, Uttarakhand had a very high shortfall of 85%. In the rest of the States, the achievement level ranged between a little more than half to about three fourth and shortfall in achievement from one forth to a little less than half.

The State of Mizoram had the largest share of 29% in IMP component. This was followed by Sikkim with 20% share, Nagaland with 12% and Assam with 11% in the total programme. The combined share of thee four States was about three fourth of the total IMP component implemented up to the year 2009-10.

Only 18 percent of the beneficiary farmers who were included in the survey, had adopted IPM. The number of such farmers was, however, very low in the States of J&K- 1 percent, Meghalaya – 3 percent and Tripura – 4 percent. The Horticulture/Agriculture Department is the main source of supply of critical inputs of IPM practice such as - bio-fertilizer/ bio-pesticide/pheromone traps/inter-cropping seed etc. to the interested farmers. The demonstration programmes on IPM practices organized under the Mission, were proving useful to the farmers for reduction in number of the sprays and the savings in the PP Chemicals being used. Majority of the farmers did not face any difficulty in procuring critical inputs for use in IPM.

Promotion of Integrated Nutrient Management [INM]

The States of Meghalaya and Nagaland had been given a combined target of coverage of 1605 ha of land under INM. Both the States have achieved their targets fully. The State of Nagaland with coverage of horticulture crop area of 1305 ha [81%] had the maximum share in the application of INM. In Meghalaya, 300 ha [19%] were brought under INM technology.

Creating Plant Protection Lab Infrastructure

Disease Forecasting Unit [DFU]

All the 11 participating States had been assigned a total target of 34 units against which only 22 DFUs were actually established in all the States. The overall performance of the State at 65% of the achievement was not up to the mark. Only three of the States of Assam, Tripura and Uttarakhand had achieved their full targets. All the other States had the shortfall in their achievement ranging from as high as 67% in case of Sikkim to a moderate extent of 12% in respect of the State of Arunachal Pradesh.

Arunachal Pradesh had the largest share of 32% in the total DFUs set up, followed by Meghalaya and Sikkim each with 14% share. The combined share of these three States accounted for 60% of the total programme implemented under this component.

Plant Health Clinic

A cumulative target of 18 No. of PHC was allocated to all the States excepting Tripura, Himachal Pradesh and J&K, against which only 15 units were actually established. The achievement vis-a-vis targets works out to 83%.

The three States of Tripura, Himachal Pradesh and J&K had no targets of achievement. In the remaining lot except Manipur and Assam, all the States had achieved their cumulative targets up to the year 2009-10, fully. While the State of Manipur had not set up any PHC against the target of 2, Assam had set up only 3 PHC [75%] against the target of 4.

The State of Uttarakhand had the largest share of 33% in setting of PHCs in the total programme. The States of Arunachal Pradesh and Assam had a share of 20% each. These three States had a combined share of about three fourth in the total programme implemented up to the year 2009-10.

Leaf Analysis Lab

Five of the States viz. Manipur [2 No.], Meghalaya [1 No.], Mizoram [1 No.], Tripura [1 No.] and Himachal Pradesh [2 Nos.] were given a total target of setting up of 7 Leaf Analysis labs, against which all of them had achieved their targets fully.

Bio-Control Lab

Out of the six of the States of Arunachal Pradesh, Assam, Manipur, Meghalaya, Himachal Pradesh and Uttarakhand which were assigned targets during X Plan, Bio Control labs have been established only by three - Arunachal Pradesh, Assam and Himachal Pradesh of them. Himachal Pradesh has further set up 2 labs against its target of one. No bio control lab had been proposed to be established during XI Plan.

The Plant protection lab infrastructure of Disease Forecasting Units [DFU], Plant Health Clinics [PHC] and Bio-Control Labs [BCL] was generally lacking in the participating States. Around one fourth of the 3 percent of the beneficiary farmers endorsing the existence of one of the other above facility in their respective areas, had actually availed of only some of these lab facilities. There is thus a need to create above facilities within the easy access of the horticulture farmers and they should also be made aware of the benefits of these facilities to avoid crop loss.

Development of Horticulture Clusters

About two thirds of horticulture clusters, consisted of only a small number of farmers ranging from 1-5 only, a good majority over 80% were satisfied the technical support they were receiving from the Extension Agencies as well as services rendered by other concerned agencies in the clusters.

Capacity Building and Transfer of Technology

The details of the achievement vs. targets in respect of the various training programmes conducted for capacity building of the different stakeholders to facilitate transfer of technology are furnished here under:

Development of Curriculum

The programme has been implemented only by two of the States viz. Nagaland and Himachal Pradesh. Himachal Pradesh has achieved its target of developing of 7 curricula, fully. The performance of Nagaland at 150% of its achievement was particularly good.

Training of Trainers

At the cumulative level, during the entire period of the project from 2001-02 to 2009-10, the achievement of training of 1963 No. of Trainers was almost near the set targets of 1972. Five of the States of Assam. Mizoram, Nagaland, Himachal Pradesh and Uttarakhand had achieved their targets fully. Rather three of them with moderate to good margins to improve the overall position. The States of Meghalaya and Arunachal Pradesh had the shortfall of 8% and 10% respectively. The State of J&K had the highest shortfall of 67% in its achievement and Tripura with deficit of 43% was the next State in that order. The last two States of Assam and Sikkim had achieved about three fourth of their respective targets and left a shortfall of about one fourth in achievement.

Four States of Uttarakhand [28%], Assam [14%], Mizoram [12%] and Nagaland [10%], together shared about two thirds of the total achievement in this regard. The State of J&K with just 1% share in the total 11 States' achievement was at the lowest.

Training of Farmers

Training of farmers within the State

The States had been assigned a total target of training of 166715 farmers against which 150565 No. had been trained up to the year 2009-10. The achievement level of 90% left an overall shortfall of 10% in achievement of the targets.

Only five of the Stares viz. Manipur, Nagaland Sikkim Tripura and Himachal Pradesh had achieved or nearly achieved their full targets. Mizoram had also recorded 92% achievement leaving a small shortfall of 8%. In the remaining States the shortfall in achievement ranged from 16% in case of Arunachal Pradesh to 30% for Meghalaya.

The State of Sikkim had the largest share of 16% in the total achievement, followed by Tripura with 15%, Assam with 12% and Manipur with 10%. Together these four States trained a little more than half of the total farmers included in the programme.

Training of farmers outside the State

The States had been assigned a total cumulative target of imparting training to 52939 farmers outside the State. As against this, a total number of 40783 farmers were deputed on training outside the State achieving 77% of the target.

Nagaland was the only State to have achieved full targets. The remaining five states viz. Mizoram [97%], Manipur [90%], Himachal Pradesh [89%], Sikkim [82%] and Arunachal Pradesh [80%] had the achievement level above the all states average of 77%. On the other hand, the States of Uttarakhand [73%], Tripura [72%], J&K [70%], Meghalaya [60%] and Assam [53%] had achievement below the all States level figure.

The State of Himachal Pradesh had the maximum share of 15% in the total farmers trained outside the State. This was followed by the State of Uttarakhand with 12% share, Arunachal & Sikkim with 11% of each and Mizoram with 10% share in the total programme under this component. These five States had more than two thirds of the share in the total programme implementation.

Training Centres for Gardeners' Training

A total of 91 Gardeners' Training Centres were proposed to be set up. The actual progress was establishing of 68 such centres. The achievement was only 75%.

Seven of the States of Arunachal Pradesh Meghalaya, Mizoram, Nagaland Tripura, Himachal Pradesh and J&K had achieved their targets fully. Tripura had the best achievement of 150% of its targets. Whereas the achievement of the States of Manipur [38%] and Sikkim [44%] was below 50% of the targets, the performance of Assam [82%] and Uttarakhand [65%] though not so good was better than these two states.

More than two thirds of the total new Gardeners' Training Centres had been set up by the four States of Uttarakhand [22%], Assam [21%], Tripura [13%] and Sikkim [12%].

Setting up of Supervisors' Training Centre

As against the total targets of 50 Supervisors" Training Centres proposed to be set up in all the States during the entire period of the Mission up to 2009-10, only 41 [82%] centres actually had been established.

Only four States of Manipur, Nagaland, Tripura and Himachal Pradesh had achieved their full targets. Manipur set up two centres against the target of one. The States of Arunachal Pradesh and Meghalaya did not have any target or achievement. The State of J&K had not set up any centre against target of one centre given to it. The shortfall in the remaining four

States of Assam, Mizoram, Sikkim and Uttarakhand ranged from 12% [ach. 88%] in case of Mizoram and 50% [ach 50%] in respect of Uttarakhand.

The State of Assam had the largest share of 37% in the total Supervisors' Training Centre established under the Mission, followed by Mizoram with 17% and Tripura with 15% share. These three States together, had more than two thirds share in the total programme under this component.

Refresher Training of Facilitators

The Refresher Training for Facilitators sub component of the programme has been undertaken only by the State of Himachal Pradesh with a total target of 12 No and the same had been fulfilled by it.

Workshops/Seminars Organized

With the exception of J&K, all the States had been allotted a cumulative target for organizing 62 Workshops/Seminars As against this target, as many as 79 Workshops/seminars were held. The achievement level of 150% of the targets is impressive. Nevertheless, State-wise performance differed. The State of Assam, Meghalaya, Mizoram, Nagaland and Tripura in NER and Uttarakhand in HSR, had achieved their targets fully. Himachal Pradesh has not conducted any such programme against one target given to it. The States of Arunachal Pradesh and Manipur lagged behind in reaching their targeted figure and the shortfall was of the order of 40% in each case which had been compensated by other States with good performance.

The State of Assam has conducted maximum Workshops/Seminars of 40 against the target of 15 allotted to it. Its achievement at 267% of the targeted figure is impressive. The State has about half of the share in the total programme.

A large number of the beneficiary farmers [83%] included in the survey had attended one or the other training programme under the Mission. Majority of such programmes of various durations ranging from 1 to 5 days, had been conducted on general/specific training on different aspects of horticulture cultivation. The other programmes organized were crop Demonstrations, Field Days/Farmers Field Schools and SHG. The programmes have been organized both within the State and outside the State but mostly within the State.

Women Empowerment

The Mission had adopted two pronged strategy in women empowerment i.e. women training and supporting their SHGs for a better impact.

Women Training

Since the launch of the programme in 2001-02 to 2009-10, States excepting Arunachal Pradesh had been allocated a total target of training of 92201 women. The number of the women actually imparted training was 79162 i.e. about 86% leaving a gap of the order of 14%.

Only three of the States viz. Mizoram, Nagaland and Tripura had been able to achieve their targets to the full extent. The shortfall in their achievement in respect of the remaining States ranges from 8% in case of Himachal Pradesh to 34% in respect of the State of Meghalaya.

The States having major share in the achievement up to 2009-10 were: Assam [17%], Sikkim [16%], Mizoram & Tripura [13% each] and Uttarakhand [12%]. These five States together trained about three fourth of the total women included in the programme.

Women Self Help Groups [SHGs]

All the States except Arunachal Pradesh, Sikkim and J&K had been given a total cumulative target of promotion of 11773 SHGs, against which 9087 Women SHGs were only formed. The progress with 77% achievement is not very encouraging. Two States of Mizoram and Tripura had achieved their targets. The achievement of Tripura at 142% of the targets was good. The achievement in the remaining States ranged from 65% in Meghalaya to 92% in Nagaland.

The State of Nagaland with 25% share had the maximum share in women SHG promotion, followed by Meghalaya with 19% share, Assam with 14%, Manipur and Tripura each with 12% share in the total programme. These five States together had more than 80% share in the total programme implemented till the year 2009-10.

Of the total 1439 women farmers included in the sample, as many, 649 [45%] were the members of the SHGs. The least response of 0.4% in this regard was from the State of Jammu & Kashmir. The large majority around 90 percent of the SHGs were making regular saving and about two thirds of them were also linked with the Banks, and doing the business of loaning amongst the members and also undertaking income generating activities. The SHGs with essential characteristics of the SHG concept can be rated as good.

Distillation Unit for Aromatic Plants

A cumulative target of 59 Distillation Units had been allocated to the three States in NER, against which 45 Units could only be established leaving an overall shortfall of 24% in achievement. The programme had mainly been undertaken by the two States of Mizoram and Arunachal Pradesh with as much as 51% and 44% share and to some extent by Assam with small share of 4% in the total Distillation Units set up.

Creating Marketing and Transport Infrastructure

The States have created the following marketing and transport infrastructure under Mini Mission III during the inception of the Mission in 2001-02 to 2009 -10. The targets against have not been mentioned.

Setting up of Wholesale Markets

All the States excepting Himachal Pradesh taken together have established as many as 47 Wholesale Markets in their respective areas. J&K has established the maximum number of 15 [32%] Wholesale Markets. This is followed by Mizoram with 10 wholesale markets [21%] Nagaland by setting up 8 [17%] such markets and Arunachal Pradesh with 6 [13%]. These four States had as much as 83% share in the total programme. No new wholesale market has been set up in Himachal Pradesh.

Setting up of Rural Primary Markets

Six of the States namely Nagaland [103 No], Mizoram [96 No.], Assam [43 No.], Arunachal Pradesh [24 No.], Meghalaya [11 No.] and Himachal Pradesh [1 No.] have also set up a total of 278 Rural Primary Markets. The State of Nagaland had the maximum share of 37% in establishing Rural Primary Markets network in the State. This is followed by Mizoram with 35% share, Assam with 15% and Arunachal Pradesh with 9% share. Meghalaya [4%] and Himachal Pradesh [less than 1%] had a very small share in the total programme.

Setting up of Apni Mandies

Further two of the States, namely Nagaland [62 No] and Sikkim [14 No] have also set up a total of 66 Apni Mandies during the period 2001-02 to 2009 -10 with 79% and 21% share in the programme.

Setting up of State Grading Lab

Six of the eleven participating States viz. Arunachal, Assam, Meghalaya, Mizoram, Sikkim and Uttarakhand have taken initiatives to set up a total of 18 Grading Labs in their respective areas. Out of these, as many as 16 Labs are in the NER and 2 in the HSR. The largest number of 7 labs [39%] has been set up in the State of Assam, followed by 3 No. [17%] in Sikkim. The labs established in the remaining States were at the rate of 2 each.

Constructing Ropeways

Only the State of Uttarakhand has taken advantage of the Ropeways sub component of the programme and provided connectivity between various places in the difficult hilly terrain.

The marketing was the weakest point in the supply chain of horticulture produce in the area. The position in the HSR in this regard is somewhat better compared to that in the NER. Further, the regulated markets where exist did not have proper facilities such as Office Building, Auction Platforms, Drying Platforms, Godowns, Cleaning/Grading/Sorting/Packing, Water/Electricity Supply, Sanitation etc.

The important factors for deciding marketing are the production cycle, shelf life of the crop, availability of the transport, time taken in reaching market and market access. Nearly half of the beneficiary farmers were selling their horticulture produce through the channel of Village Haat/Apni Mandi, about one fourth each at the Farm gates and Wholesale Market. The remaining one fourth farmers preferred other channels such as sale to corporates etc. As regards distance factor, about two thirds of the farmers have to cover 2- 5 km distance and the rest above 5 km.

The horticulture produce being of perishable nature needs to be taken to the selling points immediately. The time taken to reach the market also depends upon availability of the transport and the road network A large majority of the beneficiary farmers depend upon the private/state transport to carry their produce to the market. Transport, however, is a big bottleneck and in the hilly terrain of the NER and HSR States. Farmers face transport problems such as non-availability of transport from a nearby point, uncertainty in its

availability and costly transport. The transport difficulty is a related problem to the state of road infrastructure which is poor. A good network of the Markets and collection centres at nearby points will solve the problem to a great extent.

Setting Up of Vegetables and Fruit Processing Units

Setting up New Vegetable and Fruit [V&F] processing Units

A total of 63 Vegetable and Fruit [V&F] Processing Units in all the States excepting Mizoram and Sikkim have been set up – 25 in NER and 38 in HSR- under the programme during the period 2001-02 to 2009-10. Sikkim and Mizoram have not established any Vegetable and Fruit Processing Unit.

The State of Uttarakhand had the maximum share in setting up V&F 17 Units [27%] followed by Himachal Pradesh with 13 units [21%], J&K with 8 units [13%]. These three Himalayan States formed as much as 60% share in the total units established. In Himalayan States, Manipur with 7 units [11%] and Assam with 6 units [10%] claimed 21% share in the total 40% V&F units set up in the Region.

Upgradation of Existing V&F Processing Units

The State of Mizoram has also availed of this sub component for up-gradation of the two existing V&F processing units, under the HMNEH.

Economic Impact of the Programme

The outcome of the programme has been positive. A large majority above 80 percent of the sample beneficiary farmers has been able to increase their income level. The income of the two third of them has risen up to 25 percent after participation in the HMNEH programme and of the rest above 25 percent. This is quite evident from the consumer durable like TV, Fridge, Two/Four Wheelers, Furniture and other assets like pucca house created by them in the post project stage. The maximum increase in the ownership of TV [52%] is more visible in respect of the NER compared to the HSR. An overwhelming majority of the beneficiary farmers are willing to bring additional area under horticulture crops.

9

Chapter

ISSUES, SUGGESTIONS AND RECOMMENDATIONS

This chapter essentially focuses on some of the most challenging issues the North Eastern and Himalayas States are facing in the context to successful implementation of Horticulture Mission programme, and at the same time offers concrete policy suggestions that can help them in achieving rational outcomes in their endeavours.

The Horticulture Mission for North Eastern and Himalayan States [HMNEH] launched in 2001-02 with the objective of harnessing potential of horticulture in the region has done a significant work. The implementation of the Mission since the inception of the scheme

in 2001-02 to 2009-10, has helped in bringing an additional area of 5.25 lakh ha under various horticulture crops in the participating States. In addition, 43592 ha of senile and unproductive orchards have been rejuvenated to increase productivity. The scheme has created infrastructure in the region in the form of 1009 nurseries, 11251 Community Tanks and 14913 Tube-wells besides extending Drip Irrigation System to 16656 ha sprinkler irrigation to 4015 ha.

Apart from above, 27 Model Floriculture Centres, 48 Herbal Gardens 24 Tissue Culture Units 22 Disease Forecasting Units and 15 Plant Health Clinic units have been established at different places. Mission has given special thrust to high value crops like tomato, capsicum, strawberry and flowers to ensure production of quality produce. More than 9.45 million sqm of protected cultivation facilities have been created in the states. Agriculture Machinery/ Equipments/Tools - 5927 Power Tillers, 66725 Manually Machines, 13093 power operated implements and 13362. Diesel Engines have been distributed under the programme to make agriculture operations timely and efficient, For improving the supply chain system, 47 Wholesale Markets, 344 Rural Primary Markets/Apni Mandies, 65 Processing Units and 18 State Grading Laboratories have been set up.

The component-wise cumulative position of Targets [T] vs. Achievement [A] of crops under Area Expansion Component since 2001-02 to 2009-10, has been as under:

Crop	Target (lakh/ha)	Achievement (lakh/ha)	% achievement
Fruits	2.99	2.66	96
Vegetables	1.02	1.04	102
Roots & Tuber Crops	0.013	0.013	100
Floriculture	0.31	0.28	92
Spices	0.80	0.74	93
Plantation crops	0.17	0.14	83
Medicinal Plants	0.07	0.6	90
Aromatic Plants	0.11	0.10	89
Replacement/Rejuvenation of senile Planatation	0.47	0.44	93

Except vegetable crops, there has been shortage in the achievement ranging from 4% in case of Fruit crops to 17% in respect of Plantation crops, as some of the States could not meet their targets. These States need to ensure that their targets are duly achieved in future.

A positive spinoff of the programme of Mission is that it has created awareness amongst the farmers especially in the NER about the highly remunerative nature of horticulture produce. From the backyard activity sometime in the past, farmers have adopted horticulture as a commercial activity. This is quite evident from the area expansion and increase in the income of the farmers after the implementation of the Mission.

In the light of experience gained and encouraged by the rate of success, Mission has included in the scheme a few additional components like High Density Plantation, Seed Production for vegetables, Horticulture Mechanization, GAP certification, Integrated Control Atmosphere Chamber with pre-cooling and grading facility etc. from the year 2011-12. This will strengthen the programme further.

The above achievement notwithstanding, there still remains a vast un-tapped horticulture potential area for which Mission has to step up its efforts further. Apart from other horticulture crops, the varied agro climatic zones of the region have a large growth potential for cultivation of foliage and a host of essential oil bearing plants for which there is a great demand.

This apart, the momentum already gathered is required to be carried forward with more vigour. The North Eastern States and Himalayan States have many parallels. The economy of both the regions is primarily agrarian. The diverse topography, altitude and climate conditions offer ample potential for vertical and horizontal growth of horticulture crops in the region. The hilly terrains are the potential future expansion areas with development of matching technologies. There is vast potential of horticulture in the area which can be gainfully exploited with appropriate strategies.

Broad Horticulture Issues in NEH Region

During the primary survey to get an instinct of existing Horticulture scenario of the NEH states, it has been observed that that there is pre-existence of farmer interest/producer groups in states like Mizoram, Manipur, Arunachal Pradesh and Assam, but these groups have not been developed to the fullest due to inefficient value addition and supply chain systems to their produce. These groups lack inadequate market linkages and potential buyers to negotiate and receive the price they deserve for the produce. In addition to the lack of market linkages, the farmer groups are following traditional cultivation practices and due to lack of technical know how, non-availability of quality seeds/planting material etc., these groups are unable to produce high quality products. Besides this, poor grading, packaging and processing facilities, and poor transport systems in these hilly terrains and natural weather calamities, also discourage such farmer interest groups to develop further into big organizational structures like Farmer Producer Organizations. The factors inhibiting the full growth of the horticulture sector in the NE & HS Region can broadly be classified as under:

- Non-availability of elite seed/Planting Material within easy reach of farmers.
- Sub-optimal standards of cultivation resulting in low productivity of crops due to inferior genetic stocks and poor management.
- Large tracts of low and unproductive plantations needing replacement/ rejuvenation.
- Low technology application in rain fed areas and hence lack of crop specific, location specific and technology specific approach at all levels.
- Inadequacy of credit support and institutional support for transfer of technology.
- Limited irrigation facilities - Vast majority of holdings are small and un-irrigated.
- High incidence of pests and diseases.
- Limited private sector investment- Poor Market Network, Problem of market information and market access and high transport cost in carrying horticulture produce to market.

- Slow rate of Technology transfer - Lack of awareness on modern technologies relating to Good Agricultural Practices.
- Low Value addition- Heavy post-harvest losses and low utilization in processing sector due to Inadequate post-harvest infrastructure facilities like assembling centre with grading, washing, weighing, packaging, storage facilities etc. at strategic locations.
- Highly inefficient supply chain due to Dominance of middlemen in the marketing scenario.
- Lack of compact area [cluster] approach by growers and consequent problems of marketability.
- High post-harvest losses resulting into low productivity per unit area and high cost of production.

Way Forward

To overcome the above constraints, there has to be a paradigm shift, in the region, from traditional system to knowledge-based and technology-driven systems having efficiency as a focal point, involving farmers in planning and execution. The following suggestions are made to widen the scope of development of horticulture sector in NER and HS Region.

Increasing the Availability of Quality Seeds/Planting Material

The use of healthy and quality planting material is the key to improve production of horticultural plants. Among other factors, farmers' timely access to seed and planting material of good quality makes a critical difference to the growth in horticulture production. The inadequate availability of good quality seeds and disease free planting material of elite cultivars and root stocks is however, one of the important deterring factors in development of a sound horticulture industry. Farmers in the area often face problems in accessing certified disease free seed/planting material in sufficient quantity, which affects potential yield and crop production adversely. Production and distribution of the right kind of planting material, therefore becomes extremely important to make this Mission successful. An adequate network of nurseries is required to be created both in the Public and Private sector for producing quality planting material in sufficient quantity and distribution among the farmers. Many of the existing nurseries do not have modern infrastructure and these need to be upgraded. Further some suitable mechanism for certification, registration and accretion of nurseries with a suitable agency should be put in place to ensure quality control. Standards for production of planting material need to be worked out. Nurseries should be located at a place convenient to the farmers.

Creating Better R&D Linkages

There is also need to evolve appropriate horticultural based cropping systems for different agro-climatic areas and the need for refinement of technology to suite specific needs of the area, locations, situations and socio-economic conditions of the farmers. The country has created a good network of research institutional facilities to provide necessary technological support to the expanding horticulture industry in the form of horticultural research, education and development. There is also a need for close cooperation and

linkages between the agriculture R&D institutes, farmers and the private sector to develop varieties that are suitable for processing. The States also need to identify the crops and clusters/districts where they could be grown and undertake a mission mode approach to address all issues in a holistic manner. The level of satisfaction of the farmers is an important factor to influence his decision for adoption of good farming practices and the same should be kept in view.

The survival rate of the plants in the second and third year has been found to be low by many of the beneficiaries interviewed by the Study Team. The issue of the low survival rates particularly reported from the State of Assam needs to be looked into by the concerned Department seriously as it is closely related with the impact of the programme.

Clusterization has proved to be a more effective method of developing any sector. Presently many of the beneficiaries do not form clusters. A reasonable number of farmers say 10 or above in a neighbouring area may be considered as forming a cluster and less than this number may be good for making isolated efforts. Sustained efforts are, therefore, required to implement the programme in clusters to obtain a better and visible effect.

The use of Geospatial technology - a computer system capable of capturing, storing, analyzing, and displaying geographically referenced information, will be of great help in crop planning, application of various inputs based on soil conditions, water resource availability and agro-climatic conditions of the hill States. Geospatial technology for both increasing cultivation capacity as well as yield per hectare should be applied. It also lends a hand in crop acreage estimation, storage and logistics planning.

High Post Harvest Losses

Efficient post-harvest technologies for different horticultural crops are still lacking. The post-harvest losses and handling continue to be high resulting in low productivity per unit area and high cost of production. Such losses are estimated to account for 25 to 30 percent and occur at each and every step of the value chain such as different stages of grading, packing, storage, transport and finally marketing of both fresh and processed products. At micro level, these losses increase the marketing cost of the product and at macro level they also reduce the per capita availability. This has proved to be a great constraint in exploiting the full potential of this sector. Thus, there is a need to develop technologies, methods and mechanism to reduce these losses. High incidence of pests and diseases and low utilization in processing sector further add to the losses.

There is a strong need for development of post-harvest handling, promoting pack house concept, storage and processing system, product diversification and value addition. There is a need to encourage setting up of agro processing units at different levels with due regard to the product quality and safety measures. This will also help the processing industry to overcome the problem of erratic and inadequate supply of quality raw materials. Not many processing units have been established under Mini Mission – IV. The prevention of post-harvest losses will amount to surplus generated, without any additional cost.

Lack of Adequate Basic and Marketing Infrastructure

Infrastructure has a significant bearing on the ability to attain desirable growth rates. Lack of the basic infrastructure and market are an important impediment in the realizing of

potential of high value horticulture crops in the region. Road network is poor in most of the participating States. The marketing structure for horticulture is very traditional consisting of a long chain of intermediaries. The farm-gate price available to the farmers is estimated to be only 25 percent of the retail price. A majority of the farmers sell their produce at the farm level in view of non-availability of proper transportation facilities, high transportation cost etc. Since most of these crops are grown by small and marginal farmers, and handled at the retail level by poor sections, the effect is all the more disturbing. Very often these commodities have to be sold through distress sales. The market intervention has thus been identified as one of the important aspects for the growth of horticulture sector.

Most of the regulated markets in the area are poorly designed, congested and lack critical infrastructure, like auction platforms, Drying platforms, Electronic weighing machines, primary grading/collection centers etc. The Road network is poor in most of the States. It is imperative to bring radical reforms in marketing infrastructure including greater investment on road and transportation to make the supply chain efficient in order to improve system effectiveness and reducing costs. Since the horticulture produce is perishable in nature, the distance between the marketing point and the farm gate affects the profitability of the farmer and influences his decision to utilize this channel. A good network of the Markets and collection centres at nearby points will solve the problem to a great extent.

The archaic APMC Act is another major stumbling block in the development of horticulture sector and it needs reform to remove restrictions on the sale of horticulture produce in AMNC Mandies with a limited number of buyers with scope for collusion amongst buyers to force a farmer to sell produce at a low price. Horticulture farmers should be free to sell their produce to anyone and at any location of their choice. Private sector players should be encouraged to buy directly from the farmers. The elimination of a long supply chain will ensure a better value for the farmer and reasonable price for consumer.

Horticulture crops are frequently subject to the disease and pest attacks. The creation of necessary infrastructure in the form of Disease Forecasting Units [DFU], Plant Health Clinics [PHC] and Bio-Control Lab [BCL] is a prerequisite to fight this menace. A good network of different types of Labs has been envisaged in the Mission to provide support for diagnosis of diseases and assist in quality management of the programme. But the Lab infrastructure established so far is inadequate and it needs to be suitably augmented. At least one unit of each type of the above Lab/unit should be opened in each 133 districts of the eleven participating States so that the farmers can avail of the facility at the district level if not beyond. In the due course such facilities should be made available at the block level so as to place the same within the easy access of any horticulture farmers of the area. Further farmers also need be made aware of such facilities to avoid crop loss.

Linking Farmers to Market

Horticulture development depends not only on production but also on marketing system. Marketing is an important link in the supply chain of horticulture produce and often a weak point for farmers. The biggest challenge in the agriculture produce marketing is to break the long prevailing and the very strong link of the commission agents in the Indian Market system. Linking farmers to the markets under cooperative arrangements help assure better

return on farmers' investments and the supply of what the retailer or processor needs. The SAFAL Associations' Model promoted by Mother Dairy Fruit and Vegetables Ltd [MDFVL] as a mechanism for helping farmers to produce and supply effectively, is regarded as an example of cooperative marketing success. In terms of the said model, MDFVL indicates its supply needs to SAFAL Associations ahead of the season to allow the Associations' and the individual farmers' planning to meet agreed requirements. MDFVL also provides technical and input support for Associations and the system has been cited as a model of success, particularly for farmers with small holdings. The model is required to be replicated in the region with suitable modifications.

Vertical coordination of farmers with cooperatives, contract farming and retail chains would facilitate them to deliver better output due to lower market risk, better infrastructure, and public investment, acquired extension services, created awareness to prevailing and new technologies, better prices, stable income, etc. Its multiplier effect helps in increasing incomes, output and employment. Now a number of big corporate houses like the Reliance, ITC, Aditya Birla Group, Godrej and Bharti Airtel Group have entered into the retailing of fresh fruits and vegetables.

Some of the retail and wholesale stores are already in operation by the name of Reliance Fresh, Choupal Fresh, Namdhari's Fresh etc., ITC, Metro and Adani Fresh are also entering the wholesale market. Exports of fresh fruits and vegetables are being done with EUREPGAP certification by Namdhari's Fresh and Bharti Airtel. They have developed a supply chain with forward and backward linkages operating in an efficient manner with heavy investments in infrastructure and cold storage chain. A direct procurement from the field would be an added incentive to farmers. The horticulture growers in the region can be tied up with such entities.

The Hub and Spokes Model developed by the State of Meghalaya in terms of which ease of extension, supervision, collection and marketing are carried out in a clustered manner within easy reach of the hub, is worth emulating by other States.

Organizing Marginal and Small Farmers into Interest Groups

The small and marginal farmers have not been benefited primarily due to their poor competitiveness both at the production and post-harvest level. They are often unable to get remunerative price for their produce due to small marketable surplus and highly perishable nature of their produce. Linking farmers to market is the need of the hour. The small and marginal farmers could be organized into Self Help Groups [SHGs]/Farmers Interest Groups [FIGs]/Farmers Producers Groups [FPGs], a concept gradually picking up in the country. Organizing the small and marginal farmers in group will not only strengthen their bargaining power in selling of their produce, but also empower them to purchase various inputs jointly in bulk and solve their transport problems. The group action will confer on the small farmers the power of scale both at the production and post-harvest phases. Such a forum can also serve as an effective channel for both dissemination of technology to a large number of small and marginal farmers and feedback to research and extension, thereby facilitating the work of the Mission. It would be easier for other agencies to work with these associations in improving the quality of produce or inclusion of varieties required for processing.

Encouraging farmers to form producer associations and aggregating the produce of small and marginal farmers would go a long way in improving their bargaining power. This, however, is a complex task requiring a good support from the Government. There are a few voluntary organizations and private sector agencies that have forayed in the field and set a benchmark. Some suitable agency may be identified and a Pilot Project in one location in each of the eleven participating States be launched. The Agency could provide complete package of solution to all the problems of the farmer members, from production to the marketing in a holistic manner.

Creating Small Farmers Horticulture Estates

The National Commission on Farmers had recommended that the commodity-based farmers' organizations like Small Farmers' Horticulture Estates should be promoted to combine the advantages of decentralized production and centralized services, post-harvest management, value addition and marketing, for leveraging institutional support and facilitate direct farmer-consumer linkage. They should be duly empowered through enhanced access to modern technologies, formal credit and marketing. The participating States should promote such organizations of horticulture crops growers. Once the community based farmers/ organizations/groups are formed, they will facilitate implementation of Mission's objectives to a great extent. Department's extension services may be supplemented with Private Sector extension to improve the access of the small and marginal farmers to modern technologies and appropriate knowledge.

The number of the farmers availing of Rejuvenation of Senile Orchards component of the Mission has been limited. It would be easier for the State Department of Agriculture/ Horticulture to popularize the programme amongst, Farmers Cooperatives, SHGs, NGOs, and Growers Associations etc. to increase the productivity of the senile orchards in the area.

Setting up of Organic Farming Zones

With the present day organic movement and adoption of safe INM practices, vermi-compost offers a big potential for the vegetable growers. The demand for pesticide residue-free fruits, vegetables, spices and other horticultural commodities has been rising. There is, thus, a need to develop organic farming for production of various horticulture crops. Farmers are required to be made aware about the benefits of organic farming and given standardized technology for producing various inputs like vermi-compost, bio-fertilizers and bio-pesticides. A network of suitable market also needs to be developed for making available organic vegetable to the customers and realization of appropriate price by the farmers.

The region has a natural advantage for organic farming and the same needs to be fully exploited to meet the world wide growing demand as also for achieving a sustainable farming system. However, scientific technology with sound alternatives is not available. National Commission on Farmers views organic farming as a tool for second green revolution in the rainfed and hilly areas of the country. The Commission has made a recommendation that 25,000 Organic Villages with niche commodities should be developed in the hills where the use of chemical fertilizers is still low, during the next five years, and the local farm graduates and youth be involved in it. It has recommended launching of a focused national movement for mainstreaming organic farming in the national agriculture economy. The promotion of

the concept of organic villages with niche commodities may be given effect in the region. Organic production technologies need to be developed with scientific experimentation involving different disciplines to derive complete packages. A network of Certification Agencies at reasonable cost to the farmer needs to be created. Adequate institutional support in the areas of research, extension and marketing needs to be extended to give impetus to organic farming movement under the Mission.

Adoption of Organic Farming

The State of Himachal Pradesh has since taken a policy decision for creation of an agency for scientific validation and certification of organic produce as the organic farming is being carried out traditionally in many landlocked pockets of the State. A Himachal Organic Farmers Forum has also been set up and the NGO/Private Sector has been called upon to join hands to promote a State level Non-Government body for organic sector. The other States may have to come out with similar schemes to promote organic farming in their respective areas.

Increased Use of Green House Technology

The Greenhouse Technology/Protected horticulture cultivation has clear edge over the open field conditions as it protects the plants from the adverse climatic conditions such as wind, cold, precipitation, excessive radiation, extreme temperature, insects and diseases. It offers a good scope to increase productivity and production of horticulture crops in the region. The off-season vegetables are in great demand in home market as well as in overseas market more particularly in the neighboring countries. The Greenhouse Technology/Protected Cultivation of Horticulture crops have not taken off as yet in the region and is practiced by very few in the country, particularly under Low cost Greenhouses of bigger sizes, High Tech Greenhouses of different sizes, Shade Nets and Anti Hail Nets. The technology has, however, been found to be beneficial by a large majority of the farmers using the same. This indicates that there is a good potential for wide scale adoption of the Greenhouse/Protective cultivation practices in the area. It may, however, be necessary to take into consideration the effect of the local climate while selecting the technology for different locations.

Scope, therefore, exists for large-scale expansion of nursery activity under favourable micro-climate created in cost-effective low cost structures. Refined techniques for hardening of seedlings, including root pruning, have to be standardized. Greenhouse design, structure and technology for producing high quality planting material, need to be fine-tuned to suit conditions of the region.

Plastic Mulching is a useful method to regulate soil moisture conditions. It helps prevent soil water loss during dry period and sheds excessive water away from the crop root zone during periods of excessive rainfall and results into high productivity. It can also exert a distinct effect on weed control. Efforts are, therefore, required to popularize the use of Plastic Munching amongst the horticulture farmers. It, however, has been reported during the study, that the beneficiary farmers were not satisfied with the use of this component. They may not have proper training on the use of mulching. The Extension Agencies of the States need to fill up this gap to popularize a large scale adoption of the mulching technology.

Encouraging Use of Integrated Pest Management

The injudicious use of chemical pesticides, having harmful health effects need to be taken care of. The Chemical fertilizers also have a high input cost in horticulture crops production and its usage is imbalanced. Excessive use of insecticides to protect crop against insect pests and diseases has become a cause of concern not only from the point of view of health hazards but also from the outlook of crop failure due to development of resistance against insecticides/fungicides. This practice needs to be discouraged. Bio Fertilizers present a promising alternative to the use of chemical fertilizers. The Implementing Agencies have to continue and strengthen its efforts to motivate farmers to switch over to bio-pesticides in growing of horticulture crops to the extent possible. The adoption of IPM technology, which aims at minimizing the ill effects of the use of pesticides, needs to be further encouraged. A package based on the balanced use of inputs for optimum production, needs to be developed and popularized. The eco-friendly Integrated Pest Management since worked out for a large number of horticulture crops need further popularizing among farmers by providing them seeds of resistant varieties and IPM inputs.

Strengthening Extension Service

Extension service will have a key role in ensuring widespread adoption of modern technologies by motivating and educating farmers about the available technological and other inputs to improve farm productivity. Horticulture extension in most of the participating States is a weak area and the system needs restructuring. A new extension framework that would cope with the new challenges and provide customized solutions to the farming community is required to be put in place. In addition to the enhancement of productivity of the crops, the new arrangement should also help the farmers in marketing, value addition, packaging, processing, marketing/financial knowledge, natural resources management and issues related to climate change adaptation. The different extension departments/agencies of state and Central Government such as, SAMETIS, ATMAs, KVKs, NHRDF, SAUs state line departments, agriculture call centers and agribusiness centers need work in close coordination. Besides NGO and private sector which had since forayed into agriculture extension and set new benchmarks, could also be roped in the new frame work of extension services.

The public sector still has a major role to play in filling many remaining gaps in the lab to land transfer of technology. The Horticulture Department should, therefore have adequate and professionally trained manpower for undertaking extension service. It facilitates both the adoption of technology and the adaptation of technology to local conditions. Further, Horticulture Department of the State Government needs to be strengthened. It may be advantageous for the States to have an exclusive and separate Horticulture Department to give needed push to the development of horticulture sub sector.

It should be provided adequate manpower to enable it to percolate down technological interventions to the grass root farming community. The missionary zeal in the implementation of the programme of the Mission is found absent in the present efforts. Adoption of recommended practices is very crucial to increase the production and productivity of horticulture and extension services can ensure it at field level.

Horticulture Directorates have been established in all the 11 participating States to give thrust to horticulture. In the State of Assam, though there is Horticulture Directorate,

the work of the horticulture activities are being looked after by the District Agriculture Department. Likewise, in Himachal Pradesh, the vegetable part of horticulture is clubbed with Agriculture Department. In Sikkim and J&K too one of districts in each State Agriculture Department officials at the district level looks after Mission's work. It may be more appropriate to place all the horticulture activities under one umbrella of the Horticulture Department of the concerned State for their focused and undivided attention to this sector. The GoI may perhaps like to impress upon the Governments of Assam and Himachal Pradesh to transfer the entire work of horticulture to the Horticulture Department of the concerned State.

The Information Technology [IT] is a potent tool to implement and monitor any programme effectively. The HMNEH envisages linking of all the District Offices with Personal Computers and internet connections for faster communication and exchange of information. The Study Team found that about 12 percent of the districts had not been provided with the PC facility. The position of Internet connection was still bad as more than half of the districts were without Inherent facility. Further many of the Implementing Agencies officials though provided with PCs particularly in NER were found not using the same. Every District office of the Horticulture/Agriculture Department should be supplied PCs and Internet facility, if not already done. It should, however, be ensured that the concerned officials make full use of these facilities. This would be absolutely necessary in introducing the proposed Management Information System [MIS].

Farmers' Easy Access to Credit

Credit is a critical input for development of horticulture. Despite a multi-agency approach of the rural banking system in India resulting in to substantial increase in agriculture credit, the outreach of the formal credit institutions is low and further often the proportion of small and marginal farmers accessing formal credit is still lower than the farmers of large holdings. Farmers should have access to the credit at an appropriate time, in adequate quantity and at affordable rate of interest. The banking sector needs to develop innovative different credit products to respond to varied needs of the farmers to the extent of their repayment capacity and an efficient credit delivery system. This also calls for, bringing improvement in the credit absorption capacity of the farmers, on the part of the States, as the credit alone would not be sufficient to raise the horticulture to the higher threshold. States should also create a favourable environment to support the banking system to enable the latter to expand and deepen financial services in the region.

Creating Irrigation Potential

Irrigation is the lifeline of agriculture but the surface and canal irrigation has been declining due to the over-extraction of groundwater sources. The proper harvesting and efficient use of water is of great significance. Shortage of water will cause drop in crop yields. Measures for augmenting water supply through agricultural rainwater harvesting should be accorded high priority. Mainly Community Tanks and Tube-wells have been constructed under the Mission. The region has abundant rainfall but the same is not spread evenly throughout the year. More and more water harvesting structures of appropriate sizes need to be constructed to harness the runaway water. Further the traditional water intensive methods of irrigation should also be replaced by direct seeding and Micro irrigation for covering more area under irrigation.

Micro-irrigation technologies are increasingly seen as a means of addressing the growing competition for scarce water resources. Micro-irrigation has proved its efficacy in saving water and improving yield but its large-scale adoption under the Mission is limited. The system thus needs to be popularized for large scale adoption amongst the farmers.

The water resources both existing and newly created under the Mission need to be linked with Micro-Irrigation Techniques of drip and sprinkler irrigation system to the maximum extent. An appropriately simple designed low-cost micro-irrigation system suited to the small plots would ensure its widespread use amongst marginal and small farmers for increasing crop productivity and income. The farmers may have to be well trained and acquainted with the maintenance of the system which has been posing some problem.

Encouraging Farm Mechanization

Availability of adequate farm power is very crucial for timely farm operations for increasing production and productivity and handling the crop produce to reduce losses. Agricultural machinery makes the farming operations timely and efficient besides reducing the drudgery. Agricultural machines increase productivity of land and labour by meeting timeliness of farm operations and increase work out-put per unit time. The problems in the availability of labour also brings into focus role of mechanization and automation to sustain or improve productivity. The different machines developed for effective cultivation, harvesting, grading, packaging and value-addition need to be popularized at farmers' level, more so where labour access is limited. Mechanization can be used for efficient utilization of inputs such as seeds, fertilizers and irrigation water as well as for other related works like filling of pots, digging of soil, weeding, spraying of chemicals, training and pruning, protected cultivation, harvesting, washing, grading, sorting, packaging, processing, etc.

The high price limited usage during the sowing/harvesting season may, however, discourage farmers from purchasing and using farm equipments and machinery. The promotion of setting up farm machinery centres at different places to lease the farm equipments and machinery to the needy farmers on reasonable rent, could be one way to overcome this problem. The Agri-business Centres already opened in many districts could also be encouraged to undertake custom hiring of agriculture machinery. This will improve access of farmers on adopting modern technology and raising their crop productivity.

Risk Management in Horticulture

Agriculture is a high-risk economic activity right from sowing to post-harvest operations. While the perils related to pest attacks, diseases, weeds etc. in horticulture can be restricted with the use of technology and application of necessary inputs, there is no way of saving crops from the uncontrollable risks like excess/deficit rains, varying humidity, inclement weather and other natural calamities. This calls for risk management system to be put in place to save farmers from possible losses. The change in environment has been increasingly becoming a potential threat for agriculture production. There are the cases of crop failure/substantial damage to the crops. Farmers need user friendly insurance instruments covering their farming operations. Therefore, there is an urgent need to develop suitable insurance products that would take care of both production and price risks in horticulture crops. The weather based crop insurance will be a solution to provide financial security to the horticulture farmers in the event of failure of their crops. Necessary cost norms and premium rates for

the horticultural crops by the Insurance and Banking Sector for risk coverage are required to be evolved at the national level. A national level approach for developing yield estimates for horticulture crops, which is a cumbersome process, may be initiated by the Union Ministry of Agriculture. The Small Farmers' Estate/Farmers Interest Groups where ever formed will further facilitate group insurance coverage of the members.

Development of Human Resource

Human Resource Development is one of the key factors for successful implementation of other sub components of any programme. The capacity building at all levels - farmers, field level workers, technical officers and scientists and developing orientation skills of all the stake holders in the context of changing world scenario in horticulture, needs to be intensified. The NHM document recognizes the acquisition of skill by farmers as a central part of the technology transfer process because of the new practices involved in production processes. It is considered necessary not only to improve technical skills, logistics and good agricultural practices, but also towards developing critical human resource for ultimate success of the programme. Training and knowledge connectivity will bridge the growing gap between the scientific know-how and field level do-how and create a skilled manpower base for rapid development of horticulture sector. The study team found that about 40 percent of the staff of the Implementing Agency only had undergone training programmes. Since HRD has crucial role as the implementation of other components depends upon it, the capacity building of the Departmental staff is very important. Training may, therefore, be given to more members of the implementing staff.

Transfer of Technology

The training programmes will facilitate extension from technology transfer mode to technology application. Under the Mission, various training programmers on raising of horticulture crops for the farmers from the participating States are being held. The 'National Commission on Farmers' has observed that farmer to farmer learning is a very effective means to speed up the process of technological upgrading of crop husbandry. It, therefore, laid much emphasis on the need to promote this concept in addition to the retraining and retooling of existing extension personnel. To achieve this objective, the Commission has recommended establishment of "Farm Schools" in the fields of outstanding farmers, awardees of nationally recognized awards for farmers and eminent horticulturists including those who are raising organic vegetables and fruits and tissue culture propagated planting. There are already many success stories of horticulture in the participating States. The "Farm Schools" Model can be made as a core strategy in the training programme module in the region for transferring technology to the field. The number of the farmers imparted training constitutes about 10 percent of the total beneficiaries of the programme. In future more farmers should be considered for training programme to facilitate technology transfer mode to technology application mode amongst the larger number of farmers.

Farmers Training outside the State will expose farmers on different farming practices/ technology as also use of local traditional knowledge. Under the Mission, about one fourth farmers of the total farmers trained, were sent on exposure visits outside the state. The number of farmers for outside visits needs to be increased.

Administering Subsidy/Unit Cost

The topography conditions, the poverty level, supply of source of material, transport cost etc. differ from State to State particularly in the NER. The uniform pattern of subsidy and the unit cost decided on the principal "one size fits all" may not be realistic in case of some of the States. Some different norms may be required to be fixed on case to case basis. It may also be desirable to include some element of cost on fencing of orchards to prevent poaching and damage by wild animals.

Connectivity in the hilly terrain is a big problem as the road network is week. As a result the transport cost for carrying horticulture produce from one place to another becomes high and offset the advantage of the cheap product. A subsidy on transport to keep the transportation cost within reasonable limits will promote the horticulture growth in the area. The ropeway has also the potential to expand in these States.

Exploiting Export Potential

India's share in global horticulture export is minuscule. The region offers a good scope for export of horticulture produce. The NER is in the close proximity to one of world's fastest growing economies, South East Asia. Under the "Look East" Policy of the Government, the neighbouring South East countries particularly Myanmar and Bangladesh can become good importers of the various horticulture commodities from the bordering NER. These states should be targeted for enhancing the export potential of the country.

The exporters have to maintain international quality and globally competitive price. The quality control and longer shelf life in respect of fresh horticulture products, is a crucial factor for export. The farmers need to understand the requirements of the importing countries to get a breakthrough in the market access.

Other Administrative/Procedural Issues

Status of District Committees [DCs]

In the implementing structure created under the Mission, District Level Committees are required to be constituted in each District for preparation and implementation of projects/ action plans. A substantial number of Districts have not constituted such Committees. Further in the districts where the DCs have been formed, about half of these committees are not being involved in the preparation and implementation of the projects/action plans.

Selection of beneficiaries

About 11% of the districts in all the States are not involving local bodies like Panchayats, in the identification and selection of the beneficiaries of the HMNEH programme. The Districts not involving PRIs are selecting the beneficiaries through the Regular/Extension/ field functionaries' staff of the Agriculture/Horticulture Department as well as through the existing beneficiaries. Some States are following first come and first served principle applied in the selection. Some of the general criteria adopted by the districts for selection of beneficiaries are: availability of land with the farmer, irrigation facilities at the land, suitability of the land for a particular crop, farmer's interest in horticulture cultivation etc. These districts should also involve PRIs in the selection of beneficiaries to make the process more transparent. Publicity of any programme amongst all the stakeholders is as important

as its launching. Use of standard marketing strategy will improve the coverage and the delivery of the service. The States may use print and electronic media to create awareness among the farmers about the programme.

Conduct of baseline survey and association of local self bodies with the programme

About one fifth of the total districts had not conducted any base line survey. A base line survey is a method of mapping the potential of any activity in the area and forms a good base for an effective planning. The involvement of Local Self Bodies makes the selection process more broad based and transparent. The non-compliant Districts should, follow these norms in future.

Involvement of NGOs/voluntary agencies

The NGO/Voluntary Sector has not been playing any important role in the implementation of the programme. The utilization of the services of NGOs for formation of SHGs, training and capacity building, training to women farmers, would particularly be useful. Efforts should, therefore, be made to involve the voluntary sector in the implementation of the programme.

Fund flow mechanism

The Districts are required to maintain separate Bank Accounts for the programme under the HMNEH and the funds parked in the Bank should also earn interest. The payment to the beneficiaries is also required to be made by cheques issued in the name of supplier of goods/inputs, as far as possible.

A small number of about 3% of the Districts are not maintaining separate bank account for implementing the programme of the Mission. Further about one third districts were found not earning any interest on the funds of the Mission parked with the banks. It is highly desirable that separate bank accounts under Mission are maintained to avoid any confusion on the utilization of the money for the purpose for which it is meant. The Districts not complying with this condition of the Mission are required to open separate bank account immediately. Likewise, the Districts not earning any interest on the funds parked with the banks are required to take up the matter with the concerned bank to find out as to why their deposits are not earning any interest when under similar circumstances, the banks in the other Districts/States are paying interest.

About one third of the districts were found making payment of the support available under the Mission directly to the beneficiaries and a few districts were making payment through cash. As far as possible cheques mode of payment should be used to avoid any misuse of the funds. The States making all the payments in cash need to revisit their policy in this regard.

About one fourth districts reported to have been receiving funds late. The State SFACs are required to look into the matter and ensure that funds are promptly released to the concerned districts on receipt of the same from the central SFAC.

Establishment of Centres of Excellence [CoE]

The Mission had envisaged setting up a few Centres of Excellence in each State to serve as good demonstration points to give thrust to the horticulture activity. A total number of

28 such Centres of Excellence [CoE] covering 32 districts have so far been established. More such centres are required to be set up to achieve the objectives of the Mission.

Monitoring mechanism adopted by the state

Monitoring is an important aspect of the implementation of the programme. Except a small number of six, all the other districts had put in place monitoring mechanism of conducting inspections/monitoring on monthly/quarterly/half yearly/annual basis. The six remaining districts too should put in place a strong monitoring system and inspections should be conducted at least once in a quarter in every district.

Accreditation of nurseries to the prescribed agency

Accreditation of Nurseries with the prescribed Agencies ensures production of quality planting material, which helps in raising the production and productivity of the horticultural crops and thereby the income of the farmers. Only a few Nurseries set up under the Mission in the different districts of the participating States, have been accredited to the prescribed agencies. The ambit of the accreditation system needs to be further enlarged to cover more Nurseries being established under the Mission to ensure quality planting material.

Creating a strong data base

The statistical data base of the Region for the benchmark analysis has been poor both quantitatively and qualitatively. There is no reliable data available on area, production and productivity of various horticulture crops and input use in the participating States and more particularly in the NER. There is, thus, a strong need for improving data base in the horticulture sector for better planning and administration of the programme.

A Management Information System [MIS] has since been devised with the following objectives:

- To put in place a framework for monitoring and evaluation to ensure that its goals of the programme remain always in sight.
- To bring in discipline in the project, transparency in processes, improve communication and increase efficiency of operations.
- To meet information needs of various stakeholders.
- To bring better accountability and transparency in the system.
- The MIS should be put in place immediately and data captured on the implementation of the programme should be commenced. The system, it is hoped, would be fully stabilized at the commencement of XII Plan.

Need for an Out of Box Innovative Approach

Small and marginal farmers growing horticulture crops in NEH region in particular and the entire country in fact need a one stop Holistic Solution as Agricultural Marketing Information System [AMIS] to resolve all the issues and problems related to cultivation and marketing of their horticulture produce. An innovative approach to provide complete end-to end solutions to farmers in a holistic manner is called for. The approach should be focused on promotion of production, processing, storage, transportation, packaging and marketing of

Horticulture produce mainly, Fruits & Vegetables in the North East and Himalayan Region comprising of 11 States.

A suitable agency may be identified to prepare necessary modalities and implementation of the programme on pilot basis. The main objective of the proposed model should be to:

- Help in enhancing productivity of the farmers' produce
- Train the producers for adoption of Organic and Global GAP Certifications
- Provide agricultural extension services to producers including weather advisory & insurance services
- Create storage facilities for the farmers' produce
- Impart provision of grading, packing and processing facilities to farmer producers
- Provide market linkages - catering to domestic as well as international markets through the e- portal

The Model should have the Following Process Flow to Accomplish its Objectives:

- The model should run as pilot in one location each in all the eleven NEH states.
- The model should identify the farmers or existing farmer groups of 15-20 in number growing specific horticulture crop or group of crops falling under the same category like pome fruits which comprise of apple, pear, peach, plum and citrus fruits comprising of Kinnow, Orange, Mandarin, Lime etc. in Production Clusters in each of the eleven NEH states.
- These identified farmers should then be Federated into FPOs comprising of 1000 farmers at block/district level and for this, mobilization, training and capacity building of such farmers/farmer groups should be commenced so as to build entrepreneurship capabilities among them for sustainable livelihood.
- As innovative model, forward as well as backward linkages including weather forecast services should be provided through IT mode of Information Communication and Technology (ICT).
- It should provide horticultural marketing related information from a single window by facilitating dissemination over web, of the daily arrivals and prices of commodities in the horticultural produce markets spread across the country. The data transmitted from all the markets should be made available in a multilingual mode. It should display Commodity-wise, Variety-wise daily Prices and Arrivals information from all wholesale markets. Various types of reports could be viewed including Trend reports for Prices and Arrivals for important commodities.
- It should provide data flow of potential buyers for FPOs to sale their produce at the competitive prices.

  The above indicative innovative model indicates data inflow to farmers at each stage to facilitate high quality crop production, supply chain and insurance protection cover to their farm produce with access to forward market linkages of their own

choice. The innovative model should disseminate accurate and timely marketing information so as to support in marketing decision making and marketing efforts of entrepreneurs, farmers, government, development organizations, academicians, and researchers. It will help in ensuring that produce goes to markets where there is a demand for it. It will shorten marketing channels and cuts down on transport costs, and helps ensure that each marketing transaction is a fair one, and that all participants share the risks and benefits.

This model is thus, unique and is based on the "end-to-end approach" that seeks to take into account the entire gamut of horticultural development where farmer would not only have access to market information, he would be updated about the modern farm equipments, sources of their availability and be imparted customized IT based Good Agricultural Practices (GAP), thereby leading to timely and personalized significant returns on their investment with additional profits, and savings.

Annexures

Annexure 3.1 Crop wise summary of area & production of horticulture produce in north eastern and himalayan states

Crops	2006-07		2007-08		2008-09		2009-10	
	Area	Production	Area	Production	Area	Production	Area	Production
Fruits								
Mango	92.6	217.9	94.4	211.4	96.4	262.7	96.9	216.9
Apple	251.6	1623.7	263.9	2001.5	274.4	1985.1	282.9	1777.1
Banana	70.2	912.2	74.4	920.8	84.9	1224.4	93.9	1314.6
Citrus	136.5	518.3	142.4	512.4	84.9	1224.4	164.9	680.6
Guava	7.1	83.7	7.8	84.9	7.3	84.8	10.5	101.1
Grapes	0.8	4.8	1.7	11.1	1.9	10.7	1.8	19.2
Litichi	19.5	65.0	20.3	66.2	20.7	68.1	21.6	75.4
Papaya	9.8	128.0	10.2	140.6	10.9	163.2	11.0	171.2
Pineapple	51.0	539.1	48.6	518.1	52.0	609.3	63.2	671.6
Pomegranate	0.9	0.3	1.1	0.5	1.2	0.6	1.4	0.8
Sapota	0.1	1.4	0.1	1.5	0.2	1.0	0.2	1.1
Others	205.1	1006.6	239.9	1221.4	207.1	1020.8	231.4	1015.8
Total	**845**	**5101**	**905**	**5690**	**842**	**6655**	**980**	**6045**
Vegetables								
Potato	154.6	1546.2	164.0	1645.8	171.0	1860.3	1835.3	36577.3
Onion	14.6	123.9	13.6	114.0	15.7	153.7	756.2	12158.8
Tomato	22.7	521.1	24.1	499.4	41.9	869.2	634.4	12433.2
Brinjal	7.4	92.1	6.7	92.7	23.5	397.4	612.4	10563.0
Cabbage	14.6	276.1	17.4	296.6	51.6	966.9	331.0	7281.4
Cauliflower	9.9	159.1	11.9	173.3	33.0	491.5	347.9	6569.0
Okra	8.4	126.1	8.5	91.3	18.8	232.2	452.5	4803.3
Peas	33.1	406.1	35.8	341.0	57.0	394.1	364.9	3029.4
Tapioca	8.2	46.4	8.3	43.9	8.6	45.9	231.9	8059.8
Sweet Potato	13.6	48.2	14.1	50.2	14.3	51.1	118.9	1094.7
Others	378.8	5617.9	379.6	5778.7	183.6	2170.2	2299.5	31167.6
Total	**666**	**8963**	**684**	**9127**	**619**	**7633**	**7985**	**133738**
Aromatic	0.0	0.0	0.0	0.0	1.05	4.32	1.9	13.9
Almond/Walnut	132.0	150.0	132.3	176.5	136.49	172.62	141.8	193.0
Flowers Loose	1.7	5.4	1.9	5.4	1.90	4.02	3.6	1.9
Flowers Cut*		2055.0		2366.5		2892.94		7304.4
Plantation Crops	126.8	216.3	128.7	212.4	136.21	210.79	119.0	207.0
Mushroom		5.9		5.4		5.40		7.9
Honey		0.0		0.0		0.00		0.0
Spices	127.8	299.5	127.7	297.8	131.82	343.48	132.1	347.4
Total	**1900**	**16796**	**1979**	**17881**	**1868**	**17921**	**9363**	**147858**

A=Area in 000' Ha. **P**=Production in 000' MT
**** Lakh Numbers, not included in total***
Fruits, Vegetables, Flowers, Aromatic/Medicianal Plants and Mushroom, Spices - State Directorates of Horticulture
Plantation Crops:- Coconut (CDB), Arecanut (Directorate Arecanut & Spice Dev) and Cashew & Cocoa (Directorate of Cashew & Cocoa Development).
Spices: Directorate of Arecanut & Spices Development

Annexure 3.2 Area & production of horticulture produce in north eastern and himalayan states (2009-10)

States	Fruits		Veg.		Flowers			Aromatic		Almond/Walnut		Spices		Plantation Crops		M'room	Honey	Total	
	A	P	A	P	A	P		A	P	A	P	A	P	A	P	P	P	A	P
North Eastern States																			
Arunachal Pradesh	72.0	107.9	4.2	38.5	1.2		2860.0			4.8	0.6	7.6	43.3	0.0	0.0			89.8	190.3
Assam	117.3	1575.5	255.2	4569.9				0.0	0.0	0.0	0.0	27.4	18.6	88.8	163.7			488.7	6327.6
Manipur	38.4	281.9	19.9	221.8	0.0	0.0						9.0	7.8	0.0	0.0			67.3	511.5
Meghalaya	32.9	294.8	44.3	415.8								17.4	72.0	12.4	17.1			107.0	799.7
Mizoram	27.1	328.3	10.6	179.1	0.0	0.0	142.0	1.9	13.9			22.7	80.6	6.6	8.2			68.9	610.2
Nagaland	30.8	223.7	10.4	78.3	0.0	0.0	17.0					7.2	38.6	1.1	1.6			49.5	342.3
Tripura	36.9	573.8	32.5	446.9								4.0	12.1	10.2	16.4			83.6	1049.2
Sikkim	12.2	18.5	28.7	147.7	0.2		200.0					26.6	41.7	0.0	0.0			67.6	207.9
Sub Total	**367.7**	**3404.4**	**405.8**	**6097.9**	**1.5**	**0.0**	**3219.0**	**1.9**	**13.9**	**4.8**	**0.6**	**121.8**	**314.8**	**119.0**	**207.0**	**0.0**	**0.0**	**1022.5**	**10038.6**
Himalayan States																			
Himachal Pradesh	208.4	382.7	79.8	1390.7	0.7	0.6	605.0			11.0	3.3	4.4	18.6	0.0	0.0	7.4		304.4	1803.3
Jammu & Kashmir	209.8	1534.7	69.8	1374.2	0.1	0.2	66.3			106.8	168.4	3.9	0.9	0.0	0.0	0.5		390.3	3079.0
Uttranchal	193.8	723.6	82.6	997.3	1.3	1.0	3414.0			19.3	20.7	1.9	13.1	0.0	0.0			298.9	1755.7
Sub Total	**612.0**	**2641.0**	**232.2**	**3762.2**	**2.1**	**1.9**	**4085.4**	**0.0**	**0.0**	**137.1**	**192.4**	**10.3**	**32.6**	**0.0**	**0.0**	**7.9**	**0.0**	**993.6**	**6638.0**
Grand Total	**979.7**	**6045.5**	**638.0**	**9860.1**	**3.6**	**1.9**	**7304.4**	**1.9**	**13.9**	**141.8**	**193.0**	**132.1**	**347.4**	**119.0**	**207.0**	**7.9**	**0.0**	**2016.1**	**16676.7**

A=Area in 000' Ha. **P**=Production in 000' MT
Fruits, Vegetables, Flowers, Aromatic/Medicianal Plants and Mushroom, Spices - State Directorates of Horticulture
Plantation Crops: Coconut (CDB), Arecanut (Directorate Arecanut & Spice Dev) and Cashew & Cocoa (Directorate of Cashew & Cocoa Development).
Spices: Directorate of Arecanut & Spices Development

Annexure 3.3 Area & production of fruits in north eastern and himalayan states [2009-10]

States	Apple		Banana		Citrus		Grape		Guava		Litchi	
	A	P	A	P	A	P	A	P	A	P	A	P
North Eastern States												
Arunachal Pradesh	12.8	10.0	5.4	13.3	34.1	35.6						
Assam	0.0	0.0	53.4	805.2	24.2	225.9	0.0	0.0	4.7	88.2	5.1	39.2
Manipur	0.0		4.0	33.7	6.0	46.7			0.0	0.0		
Meghalaya	0.0	0.0	7.0	82.8	10.1	43.1	0.0	0.0	0.0	0.0	0.0	0.0
Mizoram	0.0	0.0	8.7	207.7	10.6	64.7	1.2	18.4				
Nagaland	0.0	0.0	6.3	62.7	5.4	43.7	0.2	0.1	0.3	1.5	0.2	0.2
Tripura	0.0		7.5	105.6	5.3	33.9			0.4	1.7	2.8	17.0
Sikkim	0.0	0.0	1.6	3.2	7.9	13.1			0.9	0.1	0.2	0.0
Sub Total	**12.9**	**10.1**	**93.8**	**1314.3**	**103.5**	**506.8**	**1.4**	**18.5**	**6.3**	**91.5**	**8.3**	**56.4**
Himalayan States												
Himachal Pradesh	99.6	280.1	0.1	0.3	22.1	28.1	0.1	0.2	2.2	2.3	4.3	3.4
Jammu & Kashmir	138.1	1373.0	0.0	0.0	12.8	19.1	0.3	0.5	2.0	7.2	0.0	0.0
Uttranchal	32.4	114.0	0.0	0.0	26.7	126.6					9.1	15.7
Sub Total	**270.1**	**1767.1**	**0.1**	**0.3**	**61.5**	**173.8**	**0.4**	**0.7**	**4.3**	**9.6**	**13.3**	**19.0**
Grand Total	**282.9**	**1777.1**	**93.9**	**1314.6**	**164.9**	**680.6**	**1.8**	**19.2**	**10.5**	**101.1**	**21.6**	**75.4**

A=Area in 000' Ha. **P**=Production in 000' MT

	Mango		Papaya		Pineapple		Pg		Sapota		Others		Total	
	A	P	A	P	A	P	A	P	A	P	A	P	A	P
					10.9	34.4					8.8	14.7	72.0	107.9
	4.6	46.5	7.2	119.1	14.2	223.0	0.0	0.0	0.0	0.0	3.9	28.3	117.3	1575.5
	0.0	0.0			12.1	103.5	0.0				16.4	98.0	38.4	281.9
	0.0	0.0	0.7	5.6	10.8	106.8	0.0	0.0	0.0	0.0	4.4	56.5	32.9	294.8
			0.8	20.3	0.4	6.3					5.4	10.9	27.1	328.3
	0.3	0.4	0.8	6.8	8.0	80.1	0.1	0.3			9.3	27.9	30.8	223.7
	4.3	13.2	1.3	18.5	6.8	117.5			0.1	1.1	8.6	265.3	36.9	573.8
											1.5	2.0	12.2	18.5
	9.1	**60.1**	**10.8**	**170.3**	**63.2**	**671.6**	**0.1**	**0.3**	**0.1**	**1.1**	**58.3**	**503.6**	**367.7**	**3404.4**
	38.7	24.0	0.2	1.0	0.0	0.0	1.3	0.5	0.1	0.0	39.9	42.9	208.4	382.7
	10.7	12.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.9	122.8	209.8	1534.7
	38.4	120.8									87.3	346.6	193.8	723.6
	87.8	**156.8**	**0.2**	**1.0**	**0.0**	**0.0**	**1.3**	**0.5**	**0.1**	**0.0**	**173.1**	**512.2**	**612.0**	**2641.0**
	96.9	**216.9**	**11.0**	**171.2**	**63.2**	**671.6**	**1.4**	**0.8**	**0.2**	**1.1**	**231.4**	**1015.8**	**979.7**	**6045.5**

Annexure 3.4 Area & production of vegetables in north eastern and himalayan states [2009-10]

States	Brinjal		Cabbage		C.Flower		Okra		Peas		Tomato	
	A	P	A	P	A	P	A	P	A	P	A	P
North Eastern States												
Arunachal Pradesh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Assam	15.9	253.0	29.8	614.2	20.5	351.3	10.9	149.7	21.2	13.2	16.3	379.5
Manipur	0.0	0.0	5.6	72.8	2.3	22.9	0.0	0.0	4.5	44.7	2.2	27.2
Meghalaya	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mizoram	0.0		2.4	44.4			1.3	8.4			0.6	6.7
Nagaland	0.1	2.2	0.3	3.0	0.1	0.2	0.1	0.2	0.1	1.0	0.7	4.0
Tripura	2.9	38.9	1.9	42.6	1.7	27.6	1.5	11.9			1.3	29.6
Sikkim	0.3	1.6	1.2	7.0	0.8	3.9	1.0	6.5	1.8	7.7	0.6	4.1
Sub Total	**19.2**	**295.8**	**41.1**	**783.9**	**25.3**	**405.9**	**14.8**	**176.7**	**27.6**	**66.6**	**21.7**	**451.1**
Himalayan States												
Himachal Pradesh	1.1	20.5	4.6	144.7	2.9	56.6	2.4	28.1	21.7	237.3	10.1	383.8
Jammu & Kashmir	2.5	40.6	2.9	66.7	3.8	111.9	2.1	42.5	7.6	69.9	8.3	122.1
Uttranchal	2.1	24.6	5.5	68.1	2.6	34.6	3.0	24.6	10.8	71.0	7.9	95.6
Sub Total	**5.6**	**85.7**	**13.0**	**279.4**	**9.3**	**203.2**	**7.5**	**95.3**	**40.1**	**378.2**	**26.3**	**601.6**
Grand Total	**612.4**	**10563.0**	**331.0**	**7281.4**	**347.9**	**6569.0**	**452.5**	**4803.3**	**364.9**	**3029.4**	**634.4**	**12433.2**

A=Area in 000' Ha. **P**=Production in 000' MT

	Onion		Potato		S.Potato		Tapioca		Others		Total	
	A	P	A	P	A	P	A	P	A	P	A	P
	0.0	0.0	4.0	31.7	0.0	0.0	0.0	0.0	0.2	6.8	4.2	38.5
	7.0	19.3	86.6	589.7	8.9	34.3	3.6	20.8	34.7	2144.8	255.2	4569.9
	0.0	0.0	1.7	15.2	0.0	0.0	0.0	0.0	3.7	39.0	19.9	221.8
	0.0	0.0	20.3	221.7	5.5	19.2	4.9	26.4	13.7	148.5	44.3	415.8
			1.5	20.9					4.7	98.7	10.6	179.1
	0.0	0.0	1.5	10.0	0.1	0.4	1.0	6.0	6.5	51.4	10.4	78.3
			5.8	99.4					17.4	197.0	32.5	446.9
	0.3	1.7	9.1	44.3					13.7	70.9	28.7	147.7
	7.3	**21.0**	**130.4**	**1032.8**	**14.5**	**53.9**	**9.4**	**53.2**	**94.5**	**2757.1**	**405.8**	**6097.9**
	2.0	33.9	16.0	184.4					19.1	301.3	79.8	1390.7
	2.6	64.8	7.5	110.6					32.3	745.1	69.8	1374.2
	3.6	40.5	24.3	432.2					22.8	206.0	82.6	997.3
	8.2	**139.2**	**47.8**	**727.2**	**0.0**	**0.0**	**0.0**	**0.0**	**74.2**	**1252.5**	**232.2**	**3762.2**
	756.2	**12158.8**	**1835.3**	**36577.3**	**118.9**	**1094.7**	**231.9**	**8059.8**	**2299.5**	**31167.6**	**7984.8**	**133737.6**

Annexure 3.5 Area & production of plantation crops in north eastern and himalayan states [2009-10]

States	Cashewnut		Arecanut		Cocoa		Coconut		Total	
	A	P	A	P	A	P	A	P	A	P
North Eastern States										
Arunachal Pradesh										
Assam			70.0	62.7			18.8	101.0	88.8	163.7
Manipur										
Meghalaya			12.4	17.1					12.4	17.1
Mizoram			6.6	8.2					6.6	8.2
Nagaland			0.2	1.3			0.9	0.3	1.1	1.6
Tripura			4.4	8.4			5.8	8.0	10.2	16.4
Sikkim										
Sub Total	**0.0**	**0.0**	**93.5**	**97.7**	**0.0**	**0.0**	**25.5**	**109.3**	**119.0**	**207.0**
Himalayan States										
Himachal Pradesh										
Jammu & Kashmir										
Uttranchal										
Sub Total										
Grand Total	**0.0**	**0.0**	**93.5**	**97.7**	**0.0**	**0.0**	**25.5**	**109.3**	**119.0**	**207.0**

A=Area in 000' Ha. **P**=Production in 000' MT

Annexure 3.6 Area & production of horticulture produce in north eastern and himalayan states [2008-09]

States	Fruits		Veg.		Flowers			Aromatic		Almond/Walnut		Spices		Plantation Crops		M'room	Honey	Total	
	A	P	A	P	A	P		A	P	A	P	A	P	A	P	A	P	A	P
North Eastern States																			
Arunachal Pradesh	57.60	108.00	23.80	110.00						3.8	0.1	7.6	43.3	0.000	0.000			92.8	261.4
Assam	105.20	1574.77	240.05	2916.69				0.0	0.0	0.0	0.0	27.4	18.6	106.970	169.299			479.6	4679.3
Manipur	42.40	341.91	16.62	174.26	0.000	0.000						9.0	7.8	0.000	0.000			68.001	524.0
Meghalaya	32.95	294.81	44.27	415.79								16.6	69.9	12.360	17.100			106.180	797.6
Mizoram	34.07	123.07	14.44	114.37	0.215	0.000	168	1.050	4.317			22.7	80.6	6.580	8.210			79.015	330.6
Nagaland	18.16	151.27	10.38	78.33	0.019	0.000	17					7.2	38.6	1.100	1.438			36.875	269.7
Tripura	36.52	477.18	25.59	294.71								4.5	10.3	9.200	14.746			75.8	796.9
Sikkim	10.50	15.67	21.49	98.04	0.151		66					26.6	41.7	0.000	0.000			58.715	155.4
Sub Total	**337.39**	**3086.68**	**396.63**	**4202.20**	**0.39**	**0.00**	**250.94**	**1.05**	**4.32**	**3.80**	**0.10**	**121.55**	**310.89**	**136.21**	**210.79**	**0.00**	**0.00**	**997.01**	**7814.98**
Himalayan States																			
Himachal Pradesh	193.27	624.66	74.73	1263.92	0.6	3.4	566			11.1	3.7	4.4	18.6	0.000	0.000	5.3		284.1	1919.6
Jammu & Kashmir	205.08	1538.13	60.66	1023.65	0.1	0.011	20			103.0	152.5	3.9	0.9	0.000	0.000	0.1		372.7	2715.3
Uttranchal	171.71	725.27	81.82	1077.55	0.9	0.6	2056			18.6	16.3	1.9	13.1	0.000	0.000			274.9	1832.8
Sub Total	**570.06**	**2888.06**	**217.21**	**3365.11**	**1.52**	**4.02**	**2642.00**	**0.00**	**0.00**	**132.69**	**172.52**	**10.27**	**32.59**	**0.00**	**0.00**	**5.40**	**0.00**	**931.75**	**6467.70**
Grand Total	**907.45**	**5974.73**	**613.84**	**7567.32**	**1.90**	**4.02**	**2892.94**	**1.05**	**4.32**	**136.49**	**172.62**	**131.82**	**343.48**	**136.21**	**210.79**	**5.40**	**0.00**	**1928.76**	**14282.68**

A=Area in 000' Ha. **P**=Production in 000' MT

Annexure 3.7 Area & production of fruits in north eastern and himalayan states [2008-09]

States	Apple		Banana		Citrus		Grape		Guava		Litchi	
	A	P	A	P	A	P	A	P	A	P	A	P
North Eastern States												
Arunachal Pradesh	10.8	9.8	5.3	15.3	25.0	28.4						
Assam			47.9	852.6	19.3	191.5			4.4	79.8	4.8	34.9
Manipur			5.6	71.7	7.2	54.9						
Meghalaya			7.0	82.8	10.1	43.1						
Mizoram			8.7	66.4	10.6	10.6	1.2	10.0				
Nagaland	0.035	0.050	2.700	59.000	5.650	17.030	0.180	0.100	0.278	1.400	0.160	0.170
Tripura			7.7	76.2	5.2	13.4			0.3	1.1	2.8	14.4
Sikkim					6.298	10.479						
Sub Total	**10.8**	**9.9**	**84.8**	**1224.1**	**89.3**	**369.4**	**1.4**	**10.1**	**5.1**	**82.3**	**7.8**	**49.4**
Himalayan States												
Himachal Pradesh	97.2	510.2	0.1	0.3	21.6	26.3	0.1	0.1	2.2	2.4	4.1	3.4
Jammu & Kashmir	133.7	1332.8			12.8	18.8	0.3	0.6				
Uttranchal	32.7	132.3			26.7	129.5					8.8	15.3
Sub Total	**263.6**	**1975.3**	**0.1**	**0.3**	**61.1**	**174.6**	**0.4**	**0.7**	**2.2**	**2.4**	**12.9**	**18.7**
Grand Total	**274.4**	**1985.1**	**84.9**	**1224.4**	**150.4**	**543.9**	**1.9**	**10.7**	**7.3**	**84.8**	**20.7**	**68.1**

A=Area in 000' Ha. **P**=Production in 000' MT

	Mango		Papaya		Pineapple		Pg		Sapota		Others		Total	
	A	P	A	P	A	P	A	P	A	P	A	P	A	P
					9.3	37.8					7.2	16.7	57.6	108.0
	4.8	42.5	7.1	128.5	12.9	225.1					4.0	20.0	105.2	1574.8
					8.6	78.5					21.0	136.7	42.4	341.9
			0.7	5.6	10.8	106.8					4.4	56.5	32.9	294.8
			1.0	4.5	0.4	2.4					12.2	29.2	34.1	123.1
	0.280	0.400	0.670	5.600	3.700	57.500	0.080	0.320			4.423	9.700	18.156	151.270
	4.5	15.9	1.3	18.4	6.3	101.2			0.1	1.0	8.3	235.6	36.5	477.2
											4.200	5.192	10.498	15.671
	9.6	**58.8**	**10.7**	**162.5**	**52.0**	**609.3**	**0.1**	**0.3**	**0.1**	**1.0**	**65.7**	**509.6**	**337.4**	**3086.7**
	38.4	38.8	0.2	0.7			1.1	0.3	0.1	0.0	28.0	42.2	193.3	624.7
	10.7	49.8									47.6	136.2	205.1	1538.1
	37.7	115.4									65.8	332.8	171.7	725.3
	86.8	**203.9**	**0.2**	**0.7**	**0.0**	**0.0**	**1.1**	**0.3**	**0.1**	**0.0**	**141.5**	**511.2**	**570.1**	**2888.1**
	96.4	**262.7**	**10.9**	**163.2**	**52.0**	**609.3**	**1.2**	**0.6**	**0.2**	**1.0**	**207.1**	**1020.8**	**907.4**	**5974.7**

Annexure 3.8 Area & production of vegetables in north eastern and himalayan states [2008-09]

States	Brinjal		Cabbage		C.Flower		Okra		Peas		Tomato	
	A	P	A	P	A	P	A	P	A	P	A	P
North Eastern States												
Arunachal Pradesh												
Assam	15.5	275.9	29.2	585.2	19.8	282.9	10.3	129.2	19.4	11.9	15.6	297.1
Manipur			4.0	43.8	1.9	19.2			3.5	34.0	1.8	23.1
Meghalaya												
Mizoram			2.985	23.880	0.330	3.300					0.6	4.960
Nagaland	0.135	2.200	0.250	3.000	0.100	0.150	0.065	0.150	0.135	1.000	0.680	4.000
Tripura	2.9	38.4	1.9	41.4	1.7	22.4	1.1	10.0			1.3	24.9
Sikkim											1.123	7.094
Sub Total	**18.5**	**316.5**	**38.3**	**697.3**	**23.9**	**328.0**	**11.5**	**139.3**	**23.1**	**46.9**	**21.2**	**361.2**
Himalayan States												
Himachal Pradesh	0.9	17.6	4.5	140.8	2.8	54.5	2.2	26.2	18.9	202.5	9.6	336.3
Jammu & Kashmir	2.3	41.3	3.6	63.5	3.8	72.6	2.1	42.5	4.4	73.5	3.5	79.3
Uttranchal	1.8	22.0	5.1	65.3	2.5	36.4	2.8	24.2	10.6	71.1	7.6	92.5
Sub Total	**5.0**	**80.9**	**13.2**	**269.6**	**9.1**	**163.5**	**7.2**	**92.9**	**33.9**	**347.1**	**20.7**	**508.1**
Grand Total	**23.5**	**397.4**	**51.6**	**966.9**	**33.0**	**491.5**	**18.8**	**232.2**	**57.0**	**394.1**	**41.9**	**869.2**

A=Area in 000' Ha. **P**=Production in 000' MT

	Onion		Potato		S.Potato		Tapioca		Others		Total	
	A	P	A	P	A	P	A	P	A	P	A	P
			4.0	31.7					19.8	78.3	23.8	110.0
	6.9	16.8	79.7	669.2	8.7	31.5	2.8	13.5	31.8	587.4	239.8	2900.6
			1.7	15.2					3.7	39.0	16.6	174.3
			20.3	221.7	5.5	19.2	4.9	26.4	13.7	148.5	44.3	415.8
			2.903	9.870					7.6	72.364	14.4	114.4
			1.500	10.000	0.100	0.400	0.950	6.000	6.465	51.430	10.4	78.3
			5.3	81.3					16.7	157.6	30.9	376.1
	0.235	1.075	8.071	35.689					12.057	54.181	21.5	98.0
	7.1	**17.9**	**123.4**	**1074.7**	**14.3**	**51.1**	**8.6**	**45.9**	**111.8**	**1188.8**	**401.7**	**4267.5**
	1.9	32.1	16.0	173.7					17.9	280.1	74.7	1263.9
	3.0	63.2	6.5	99.6					31.2	488.1	60.7	1023.6
	3.6	40.5	25.1	512.4					22.6	213.2	81.8	1077.6
	8.5	**135.9**	**47.6**	**785.7**	**0.0**	**0.0**	**0.0**	**0.0**	**71.8**	**981.4**	**217.2**	**3365.1**
	15.7	**153.7**	**171.0**	**1860.3**	**14.3**	**51.1**	**8.6**	**45.9**	**183.6**	**2170.2**	**618.9**	**7632.6**

Annexure 3.9 Area & production of plantation crops in north eastern and himalayan states [2008- 09]

States	Cashewnut		Arecanut		Cocoa		Coconut		Total	
	A	P	A	P	A	P	A	P	A	P
North Eastern States										
Arunachal Pradesh										
Assam	18.0	13.0	70.0	62.7			19.0	93.6	107.0	169.3
Manipur										
Meghalaya			12.360	17.100					12.360	17.100
Mizoram			6.580	8.210					6.580	8.210
Nagaland			0.200	1.300			0.900	0.138	1.100	1.438
Tripura			3.400	6.900			5.800	7.846	9.200	14.746
Sikkim										
Sub Total	**18.0**	**13.0**	**92.5**	**96.2**	**0.0**	**0.0**	**25.7**	**101.6**	**136.2**	**210.8**
Himalayan States										
Himachal Pradesh										
Jammu & Kashmir										
Uttranchal										
Sub Total										
Grand Total	**18.0**	**13.0**	**92.5**	**96.2**	**0.0**	**0.0**	**25.7**	**101.6**	**136.2**	**210.8**

A=Area in 000' Ha. **P**=Production in 000' MT

Annexure 3.10 Area & production of horticulture produce in north eastern and himalayan states [2007-08]

States	Fruits		Vegetables		Flowers			Aromatic		Almond/Walnut		Spices		Plantation Crops		Mush-room	Honey	Total	
	A	P	A	P	A	P		A	P	A	P	A	P	A	P	P	P	A	P
North Eastern States																			
Arunachal Pradesh	57.6	108.0	30.4	126.3						3.8	0.1	8.2	47.5	0.000	0.000			100.0	281.9
Assam	122.7	1410.7	328.9	4474.2				0.0	0.0	0.0	0.0	27.2	18.5	104.300	174.399			583.1	6077.8
Manipur	39.1	273.7	12.093	113.675	0.0	0.0						8.7	7.7	0.000	0.000			59.9	395.1
Meghalaya	28.5	235.3	42.5	352.5								18.4	80.9	12.100	16.500			101.5	685.2
Mizoram	33.3	203.4	2.965	51.860	0.0	0.0	76					9.0	38.3	2.000	5.300			47.2	298.9
Nagaland	11.8	53.0	10.415	63.500	0.0	0.0	17					4.5	26.2	1.100	1.438			27.8	144.1
Tripura	33.9	525.7	33.7	423.6								4.5	9.4	9.200	14.746			81.3	973.4
Sikkim	9.299	13.934	20.067	95.872	0.1	0.0	34					34.0	42.4	0.000	0.000			63.5	152.2
Sub Total	**336.1**	**2823.7**	**481.0**	**5701.5**	**0.1**	**0.0**	**126.5**	**0.0**	**0.0**	**3.8**	**0.1**	**114.5**	**270.9**	**128.7**	**212.4**	**0.0**	**0.0**	**1064.3**	**9008.6**
Himalayan States																			
Himachal Pradesh	202.4	713.0	63.8	1150.7	0.6	3.4	566			11.0	3.3	6.3	23.4	0.000	0.000	5.3		284.1	1899.1
Jammu & Kashmir	194.9	1435.8	58.6	1238.3	0.3	1.3	218			98.9	156.8	3.6	0.6	0.000	0.000	0.1		356.3	2832.9
Uttranchal	171.3	717.8	80.5	1036.2	0.9	0.7	1456			18.6	16.3	3.3	2.9	0.000	0.000			274.6	1773.9
Sub Total	**568.6**	**2866.6**	**202.9**	**3425.2**	**1.8**	**5.4**	**2240.0**	**0.0**	**0.0**	**128.5**	**176.4**	**13.2**	**26.9**	**0.0**	**0.0**	**5.4**	**0.0**	**915.0**	**6505.9**
Grand Total	**904.7**	**5690.3**	**683.9**	**9126.7**	**1.9**	**5.4**	**2366.5**	**0.0**	**0.0**	**132.3**	**176.5**	**127.7**	**297.8**	**128.7**	**212.4**	**5.4**	**0.0**	**1979.3**	**15514.5**

A=Area in 000' Ha. **P**=Production in 000' MT

Annexure 3.11 Area & production of fruits in north eastern and himalayan states [2007-08]

States	Apple		Banana		Citrus		Grape		Guava		Litchi	
	A	P	A	P	A	P	A	P	A	P	A	P
North Eastern States												
Arunachal Pradesh	10.8	9.8	5.3	15.3	25.0	28.4						
Assam			44.1	610.9	19.0	163.4			4.4	79.2	4.8	34.0
Manipur			4.7	35.0	6.3	45.3						
Meghalaya			5.6	66.5	8.3	34.9						
Mizoram			7.2	98.5	9.2	11.6	1.2	10.4				
Nagaland	0.035	0.050	1.300	16.000	3.700	17.030	0.180	0.100	0.278	1.400	0.160	0.170
Tripura			6.2	78.6	5.2	30.9			0.8	1.5	2.6	14.4
Sikkim					5.817	9.671						
Sub Total	**10.8**	**9.9**	**74.4**	**920.8**	**82.5**	**341.2**	**1.4**	**10.5**	**5.5**	**82.1**	**7.6**	**48.6**
Himalayan States												
Himachal Pradesh	94.5	592.6			21.4	24.7	0.1	0.1	2.3	2.8	3.9	2.5
Jammu & Kashmir	126.4	1268.5			11.7	19.1	0.2	0.5				
Uttranchal	32.2	130.5			26.8	127.4					8.8	15.1
Sub Total	**253.1**	**1991.6**	**0.0**	**0.0**	**59.9**	**171.2**	**0.3**	**0.6**	**2.3**	**2.8**	**12.7**	**17.6**
Grand Total	**263.9**	**2001.5**	**74.4**	**920.8**	**142.4**	**512.4**	**1.7**	**11.1**	**7.8**	**84.9**	**20.3**	**66.2**

A=Area in 000' Ha. **P**=Production in 000' MT

	Mango		Papaya		Pineapple		Pg		Sapota		Others		Total	
	A	P	A	P	A	P	A	P	A	P	A	P	A	P
					9.3	37.8					7.2	16.7	57.6	108.0
	4.5	39.6	7.0	107.1	12.7	195.7					26.2	180.8	122.7	1410.7
					8.5	72.4					19.6	121.0	39.1	273.7
			0.7	6.3	9.6	85.3					4.3	42.3	28.5	235.3
			0.6	15.5							15.1	67.4	33.3	203.4
	0.280	0.400	0.670	0.800	2.245	10.000	0.080	0.320			2.823	6.700	11.751	52.970
	3.7	11.6	1.0	10.0	6.3	116.9			0.1	1.5	8.0	260.3	33.9	525.7
											3.482	4.263	9.299	13.934
	8.5	**51.6**	**10.0**	**139.7**	**48.6**	**518.1**	**0.1**	**0.3**	**0.1**	**1.5**	**86.7**	**699.5**	**336.1**	**2823.7**
	39.1	29.3	0.2	0.9			1.0	0.2			39.9	59.9	202.4	713.0
	9.8	17.8									46.8	129.9	194.9	1435.8
	37.0	112.7									66.5	332.1	171.3	717.8
	85.9	**159.8**	**0.2**	**0.9**	**0.0**	**0.0**	**1.0**	**0.2**	**0.0**	**0.0**	**153.2**	**521.9**	**568.6**	**2866.6**
	94.4	**211.4**	**10.2**	**140.6**	**48.6**	**518.1**	**1.1**	**0.5**	**0.1**	**1.5**	**239.9**	**1221.4**	**904.7**	**5690.3**

Annexure 3.12 Area & production of vegetables in north eastern and himalayan states [2007-08]

States	Brinjal		Cabbage		C.Flower		Okra		Peas	
	A	P	A	P	A	P	A	P	A	P
North Eastern States										
Arunachal Pradesh										
Assam										
Manipur			2.581	27.445	1.599	14.186			2.496	24.362
Meghalaya										
Mizoram			0.200	5.000	0.030	0.438				
Nagaland	0.135	2.200	0.250	3.000	0.100	0.150	0.065	0.150	0.135	1.000
Tripura	2.8	35.9	2.1	41.3	1.9	24.7	1.5	11.5		
Sikkim	0.260	1.084	2.368	14.134	1.900	8.779	0.207	0.923	2.367	14.521
Sub Total	**3.20**	**39.18**	**7.50**	**90.88**	**5.53**	**48.25**	**1.77**	**12.57**	**5.00**	**39.88**
Himalayan States										
Himachal Pradesh	0.8	15.4	3.9	119.8	2.3	52.7	1.8	21.7	17.4	203.4
Jammu & Kashmir	1.0	16.9	1.1	24.2	1.6	34.6	2.1	35.8	2.3	25.2
Uttranchal	1.7	21.2	4.9	61.7	2.5	37.7	2.8	21.2	11.1	72.5
Sub Total	**3.5**	**53.5**	**9.9**	**205.7**	**6.4**	**125.0**	**6.7**	**78.7**	**30.8**	**301.1**
Grand Total	**6.7**	**92.7**	**17.4**	**296.6**	**11.9**	**173.3**	**8.5**	**91.3**	**35.8**	**341.0**

A=Area In 000' Ha. **P**=Production In 000' Mt

	Tomato		Onion		Potato		S.Potato		Tapioca		Others		Total	
	A	P	A	P	A	P	A	P	A	P	A	P	A	P
			6.6	16.3	4.0	31.7					19.8	78.3	30.4	126.3
					79.3	514.6	8.3	29.0	2.7	12.9	238.6	3917.7	328.9	4474.2
	1.550	15.144			1.690	13.796					2.177	18.742	12.093	113.675
					18.8	161.0	5.4	19.5	4.3	23.5	14.0	148.5	42.5	352.5
	0.017	0.297			1.688	15.960					1.030	30.165	2.965	51.860
	0.680	4.000			1.500	10.000	0.100	0.400	0.950	6.000	6.500	36.600	10.415	63.500
	1.3	28.7			5.9	115.3					18.2	166.2	33.7	423.6
	0.947	4.372	0.241	1.068	7.818	35.197	0.265	1.307	0.341	1.518	3.353	12.969	20.067	95.872
	4.49	**52.51**	**6.84**	**17.37**	**120.70**	**897.55**	**14.07**	**50.21**	**8.29**	**43.92**	**303.66**	**4409.18**	**481.04**	**5701.51**
	9.4	317.7	1.6	25.9	14.0	175.0					12.6	219.1	63.8	1150.7
	1.7	37.0	1.8	35.5	5.6	89.6					41.4	939.5	58.6	1238.3
	8.5	92.2	3.4	35.2	23.7	483.6					21.9	210.9	80.5	1036.2
	19.6	**446.9**	**6.8**	**96.6**	**43.3**	**748.2**	**0.0**	**0.0**	**0.0**	**0.0**	**75.9**	**1369.5**	**202.9**	**3425.2**
	24.1	**499.4**	**13.6**	**114.0**	**164.0**	**1645.8**	**14.1**	**50.2**	**8.3**	**43.9**	**379.6**	**5778.7**	**683.9**	**9126.7**

Annexure 3.13 Area & production of plantation crops in north eastern and himalayan states [2007-08]

States	Cashewnut		Arecanut		Cocoa		Coconut		Total	
	A	P	A	P	A	P	A	P	A	P
North Eastern States										
Arunachal Pradesh										
Assam	15.0	12.0	70.3	68.8			19.0	94	104.3	174.4
Manipur										
Meghalaya			12.100	16.500					12.100	16.500
Mizoram			2.000	5.300					2.000	5.300
Nagaland			0.200	1.300			0.900	0	1.100	1.438
Tripura			3.400	6.900			5.800	8	9.200	14.746
Sikkim										
Sub Total	**15.0**	**12.0**	**88.0**	**98.8**	**0.0**	**0.0**	**25.7**	**101.6**	**128.7**	**212.4**
Himalayan States										
Himachal Pradesh										
Jammu & Kashmir										
Uttranchal										
Sub Total										
Grand Total	**15.0**	**12.0**	**88.0**	**98.8**	**0.0**	**0.0**	**25.7**	**101.6**	**128.7**	**212.4**

A=Area in 000' Ha. **P**=Production in 000' MT

Annexure 3.14 Area & production of horticulture produce in north eastern and himalayan states [2006-07]

States	Fruits		Vegetables		Flowers			Aromatic		Almond/Walnut		Spices		Plantation Crops		Mush-room	Honey	Total	
	A	P	A	P	A	P		A	P	A	P	A	P	A	P	P	P	A	P
North Eastern States																			
Arunachal Pradesh	54.6	107.9	23.8	110.0						3.8	0.1	8.2	47.5	0.0	0.0			90.4	265.5
Assam	118.5	1392.3	331.4	4449.5				0.0	0.0			27.2	18.5	105.0	181.3			582.1	6041.6
Manipur	33.9	229.1	10.341	91.767	0.0	0.0						8.7	7.7	0.0	0.0			52.9	328.6
Meghalaya	28.5	234.3	42.0	345.4								18.5	83.1	12.000	16.600			101.0	679.4
Mizoram	20.5	179.8	1.684	31.254	0.0	0.0	31					9.0	38.3	2.000	5.300			33.2	254.7
Nagaland	10.332	31.910	9.379	44.593	0.0	0.0	0					4.5	26.2	1.100	1.438			25.3	104.1
Tripura	33.2	525.5	31.8	415.9								4.5	9.4	6.700	11.717			76.2	962.5
Sikkim	9.000	13.410	17.839	80.810	0.1	0.0	45					34.0	41.9	0.0	0.0			61.0	136.1
Sub Total	**308.5**	**2714.2**	**468.2**	**5569.2**	**0.1**	**0.0**	**76.0**	**0.0**	**0.0**	**3.8**	**0.1**	**114.6**	**272.6**	**126.8**	**216.3**	**0.0**	**0.0**	**1022.1**	**8772.5**
Himalayan States																			
Himachal Pradesh	197.4	369.1	63.8	1150.7	0.6	3.6	531			11.2	3.3	6.3	23.4	0.0	0.0	5.3		279.3	1555.4
Jammu & Kashmir	171.5	1321.5	56.8	1247.7	0.3	1.3	218			98.4	130.3	3.6	0.6	0.0	0.0	0.6		330.6	2702.0
Uttranchal	167.8	695.9	77.1	995.5	0.7	0.5	1230			18.6	16.3	3.3	2.9	0.0	0.0			267.5	1711.1
Sub Total	**536.7**	**2386.5**	**197.7**	**3393.9**	**1.6**	**5.4**	**1979.0**	**0.0**	**0.0**	**128.2**	**149.9**	**13.2**	**26.9**	**0.0**	**0.0**	**5.9**	**0.0**	**877.4**	**5968.5**
Grand Total	**845.2**	**5100.7**	**665.9**	**8963.1**	**1.7**	**5.4**	**2055.0**	**0.0**	**0.0**	**132.0**	**150.0**	**127.8**	**299.5**	**126.8**	**216.3**	**5.9**	**0.0**	**1899.5**	**14741.0**

A=Area in 000' Ha. **P**=Production in 000' MT

Annexure 3.15 Area & production of fruits in north eastern and himalayan states [2006-07]

States	Apple		Banana		Citrus		Grape		Guava		Litchi	
	A	P	A	P	A	P	A	P	A	P	A	P
North Eastern States												
Arunachal Pradesh	9.8	9.8	5.3	15.3	25.0	28.4						
Assam			43.3	598.9	17.9	176.0			4.3	77.9	4.7	33.3
Manipur			3.1	26.3	4.7	36.4						
Meghalaya			5.6	66.4	8.3	34.7						
Mizoram			5.6	119.7	7.8	34.4	0.5	4.2				
Nagaland	0.040	0.015	1.017	5.000	3.813	12.400	0.020	0.100	0.278	2.050	0.145	0.060
Tripura			6.2	80.2	4.9	30.6			0.3	1.5	2.5	14.4
Sikkim					5.550	9.250						
Sub Total	**9.8**	**9.8**	**70.1**	**911.8**	**78.0**	**362.2**	**0.5**	**4.3**	**4.9**	**81.5**	**7.3**	**47.8**
Himalayan States												
Himachal Pradesh	91.8	268.4	0.1	0.4	21.1	12.7	0.1	0.1	2.2	2.2	3.8	2.8
Jammu & Kashmir	119.4	1222.2			11.0	18.4	0.2	0.4				
Uttranchal	30.6	123.3			26.4	125.0					8.4	14.4
Sub Total	**241.8**	**1613.9**	**0.1**	**0.4**	**58.5**	**156.1**	**0.3**	**0.5**	**2.2**	**2.2**	**12.2**	**17.2**
Grand Total	**251.6**	**1623.7**	**70.2**	**912.2**	**136.5**	**518.3**	**0.8**	**4.8**	**7.1**	**83.7**	**19.5**	**65.0**

A=Area in 000' Ha. **P**=Production in 000' MT

	Mango		Papaya		Pineapple		Pg		Sapota		Others		Total	
	A	P	A	P	A	P	A	P	A	P	A	P	A	P
					8.3	37.8					6.2	16.6	54.6	107.9
	4.5	38.9	6.8	105.0	12.4	191.9					24.6	170.4	118.5	1392.3
					12.0	100.7					14.1	65.7	33.9	229.1
			0.7	6.1	9.6	85.0					4.3	42.1	28.5	234.3
			0.4	5.0	0.5	2.9					5.7	13.6	20.5	179.8
	0.285	0.050	0.680	0.680	2.045	5.000	0.080	0.050			1.929	6.505	10.332	31.910
	3.7	11.4	1.0	10.0	6.2	115.8			0.1	1.4	8.3	260.2	33.2	525.5
											3.450	4.160	9.000	13.410
	8.5	**50.4**	**9.6**	**126.8**	**51.0**	**539.1**	**0.1**	**0.1**	**0.1**	**1.4**	**68.6**	**579.3**	**308.5**	**2714.2**
	38.4	40.1	0.2	1.2			0.8	0.2			38.9	41.0	197.4	369.1
	9.3	17.6									31.6	62.9	171.5	1321.5
	36.4	109.8									66.0	323.4	167.8	695.9
	84.1	**167.5**	**0.2**	**1.2**	**0.0**	**0.0**	**0.8**	**0.2**	**0.0**	**0.0**	**136.5**	**427.3**	**536.7**	**2386.5**
	92.6	**217.9**	**9.8**	**128.0**	**51.0**	**539.1**	**0.9**	**0.3**	**0.1**	**1.4**	**205.1**	**1006.6**	**845.2**	**5100.7**

Annexure 3.16 Area & production of vegetables in north eastern and himalayan states [2006-07]

States	Brinjal		Cabbage		C.Flower		Okra		Peas	
	A	P	A	P	A	P	A	P	A	P
North Eastern States										
Arunachal Pradesh										
Assam										
Manipur			2.083	27.661	1.413	12.542			1.553	10.646
Meghalaya										
Mizoram	0.625	2.450	0.236	3.684	0.035	0.241				
Nagaland	0.125	0.160	0.100	0.160	0.095	0.110	0.050	0.059		
Tripura	2.8	35.7	1.7	39.6	1.6	23.1	1.5	11.4		
Sikkim	0.100	0.476	1.000	5.800	0.500	2.000	0.080	0.341	1.600	9.700
Sub Total	**3.7**	**38.8**	**5.1**	**76.9**	**3.6**	**38.0**	**1.6**	**11.8**	**3.2**	**20.3**
Himalayan States										
Himachal Pradesh	0.8	15.4	3.9	119.8	2.3	52.7	1.8	21.7	17.4	203.4
Jammu & Kashmir	1.2	16.9	1.2	24.2	1.7	34.6	2.2	71.5	2.5	116.9
Uttranchal	1.7	21.0	4.4	55.2	2.3	33.8	2.8	21.1	10.0	65.5
Sub Total	**3.7**	**53.3**	**9.5**	**199.2**	**6.3**	**121.1**	**6.8**	**114.3**	**29.9**	**385.8**
Grand Total	**7.4**	**92.1**	**14.6**	**276.1**	**9.9**	**159.1**	**8.4**	**126.1**	**33.1**	**406.1**

A=Area in 000' Ha. **P**=Production in 000' MT

	Tomato		Onion		Potato		S.Potato		Tapioca		Others		Total	
	A	P	A	P	A	P	A	P	A	P	A	P	A	P
					4.0	31.7					19.8	78.3	23.8	110.0
			6.9	16.8	77.7	504.6	8.1	28.4	2.7	12.6	236.0	3887.1	331.4	4449.5
	1.343	12.187			0.800	6.408					3.149	22.323	10.341	91.767
					18.8	157.6	5.3	19.0	4.2	23.3	13.7	145.5	42.0	345.4
	0.017	0.325									0.771	24.554	1.684	31.254
	0.764	1.398			1.035	1.765	0.100	0.186	0.930	8.850	6.180	31.905	9.379	44.593
	1.3	28.6			5.7	113.0					17.2	164.5	31.8	415.9
	0.100	0.400	0.080	0.371	7.600	33.300	0.113	0.592	0.366	1.630	6.300	26.200	17.839	80.810
	3.5	**42.9**	**7.0**	**17.2**	**115.6**	**848.4**	**13.6**	**48.2**	**8.2**	**46.4**	**303.1**	**4380.4**	**468.2**	**5569.2**
	9.4	317.7	1.6	25.9	14.0	175.0					12.6	219.1	63.8	1150.7
	1.8	73.6	2.6	46.0	1.9	51.7					41.7	812.3	56.8	1247.7
	8.0	86.9	3.4	34.8	23.1	471.1					21.4	206.1	77.1	995.5
	19.2	**478.2**	**7.6**	**106.7**	**39.0**	**697.8**	**0.0**	**0.0**	**0.0**	**0.0**	**75.7**	**1237.5**	**197.7**	**3393.9**
	22.7	**521.1**	**14.6**	**123.9**	**154.6**	**1546.2**	**13.6**	**48.2**	**8.2**	**46.4**	**378.8**	**5617.9**	**665.9**	**8963.1**

Annexure 3.17 Area & production of plantation crops in north eastern and himalayan states [2006-07]

States	Cashewnut		Arecanut		Cocoa		Coconut		Total	
	A	P	A	P	A		A	P	A	P
North Eastern States										
Arunachal Pradesh										
Assam	15.0	11.0	71.0	65.0			19.0	105.3	105.0	181.3
Manipur										
Meghalaya			12.0	16.6					12.000	16.600
Mizoram			2.0	5.3					2.000	5.300
Nagaland			0.2	1.3			0.9	0.1	1.100	1.438
Tripura			3.4	6.9			3.3	4.8	6.700	11.717
Sikkim										
Sub Total	**15.0**	**11.0**	**88.6**	**95.1**	**0.0**	**0.0**	**23.2**	**110.2**	**126.8**	**216.3**
Himalayan States										
Himachal Pradesh										
Jammu & Kashmir										
Uttranchal										
Sub Total										
Total	**15.0**	**11.0**	**88.6**	**95.1**	**0.0**	**0.0**	**23.2**	**110.2**	**126.8**	**216.3**

A=Area in 000' Ha. **P**=Production in 000' MT

Annexure 3.18 Area & production of horticulture produce in north eastern and himalayan states [2005-06]

States	Fruits		Veg.		Flowers			Aromatic		Almond/Walnut		Spices		Plantation Crops		M'room	Honey	Total	
	A	P	A	P	A	P	P	A	P	A	P	A	P	A	P	P	P	A	P
North Eastern States																			
Arunachal Pradesh	51.7	105.1	20.2	81.1						3.7	0.1			0.0	0.0			75.6	186.3
Assam	112.6	1352.1	319.0	4229.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0			104.3	217.8			536.9	5799.2
Manipur	31.2	189.1	8.4	67.3	0.0	0.0								0.0	0.0			39.5	256.4
Meghalaya	28.3	231.7	41.7	340.2		0.0								17.9	21.9			87.8	593.7
Mizoram	17.4	66.0	2.3	31.4	0.0	0.0	18.0							2.0	5.3			21.8	102.7
Nagaland	9.6	30.4	9.7	51.2	0.0	0.0	0.0							1.1	2.1			20.5	83.7
Tripura	33.0	525.1	31.5	365.1										6.7	11.7			71.2	901.9
Sikkim	8.9	13.2	17.6	79.1	0.1	0.1	16.8							0.0	0.0			26.6	92.4
Sub Total	**292.7**	**2512.6**	**450.4**	**5244.8**	**1.1**	**0.1**	**34.7**	**0.0**	**0.0**	**3.7**	**0.1**	**0.0**	**0.0**	**132.0**	**258.8**	**0.0**	**0.0**	**879.9**	**8016.4**
Himalayan States																			
Himachal Pradesh	182.7	692.4	62.6	1062.2	0.4	3.0	434.4			11.2	3.3			0.0	0.0	5.0		257.0	1765.9
Jammu & Kashmir	163.3	1289.3	54.9	1052.9	0.3	1.3	217.9			93.2	123.7			0.0	0.0	0.5		311.7	2467.8
Uttranchal	163.1	676.1	72.9	911.7	0.6	0.4	575.0			18.6	16.3			0.0	0.0			255.2	1604.4
Sub Total	**509.2**	**2657.8**	**190.4**	**3026.8**	**1.3**	**4.7**	**1227.3**	**0.0**	**0.0**	**123.0**	**143.3**	**0.0**	**0.0**	**0.0**	**0.0**	**5.5**	**0.0**	**823.9**	**5838.0**
Grand Total	**801.8**	**5170.4**	**640.8**	**8271.6**	**2.4**	**4.8**	**1262.0**	**0.0**	**0.0**	**126.7**	**143.4**	**0.0**	**0.0**	**132.0**	**258.8**	**5.5**	**0.0**	**1703.7**	**13854.5**

A=Area in 000' Ha. **P**=Production in 000' MT

Annexure 3.19 Area & production of fruits in north eastern and himalayan states [2005-06]

States	Apple		Banana		Citrus		Grape		Guava		Litchi	
North Eastern States												
Arunachal Pradesh	9.1	9.6	4.9	15.1	23.6	27.8						
Assam	0.0	0.0	42.0	577.7	16.1	138.8	0.0	0.0	4.3	78.7	4.7	34.9
Manipur			2.1	17.8	3.1	19.9			0.0	0.0		
Meghalaya			5.6	65.8	8.2	34.2						
Mizoram	0.0	0.0	3.1	29.0	7.4	17.7	1.4	3.0	0.0	0.0	0.0	0.0
Nagaland	0.0	0.0	1.0	5.0	3.1	12.4	0.0	0.1	0.3	0.1	0.1	0.1
Tripura			5.7	79.3	4.8	29.2			0.4	1.6	2.3	14.3
Sikkim					5.5	9.1						
Sub Total	**9.1**	**9.6**	**64.4**	**789.6**	**71.8**	**289.0**	**1.4**	**3.1**	**4.9**	**80.3**	**7.1**	**49.3**
Himalayan States												
Himachal Pradesh	88.6	540.4	0.1	0.4	20.7	29.2	2.2	0.1	2.2	2.8	3.5	3.7
Jammu & Kashmir	100.1	1151.7			10.9	18.2	0.2	0.3				
Uttranchal	28.8	112.3			26.1	122.9			0.0	0.0	7.9	13.6
Sub Total	**217.5**	**1804.4**	**0.1**	**0.4**	**57.7**	**170.4**	**2.4**	**0.5**	**2.2**	**2.8**	**11.4**	**17.3**
Grand Total	**226.6**	**1814.0**	**64.5**	**790.0**	**129.6**	**459.4**	**3.8**	**3.5**	**7.1**	**83.1**	**18.6**	**66.6**

A=Area in 000' Ha. **P**=Production in 000' MT

	Mango		Papaya		Pineapple		Pg		Sapota		Others		Total	
					7.9	37.0					6.2	15.6	51.7	105.1
	4.4	48.1	6.1	90.5	10.7	161.1	0.0	0.0	0.0	0.0	24.5	222.4	112.6	1352.1
	0.0	0.0	0.0	0.0	11.9	97.4					14.0	54.1	31.2	189.1
			0.7	5.8	9.5	83.7					4.2	42.2	28.3	231.7
	0.0	0.0	0.5	2.0	0.5	2.9					4.6	11.5	17.4	66.0
	0.3	0.1	0.7	0.7	2.0	5.0	0.1	0.1			1.9	6.9	9.6	30.4
	3.7	12.3	1.0	10.1	5.2	106.4			0.1	1.4	9.8	270.5	33.0	525.1
											3.4	4.1	8.9	13.2
	8.4	**60.5**	**9.0**	**109.0**	**47.8**	**493.5**	**0.1**	**0.1**	**0.1**	**1.4**	**68.6**	**627.2**	**292.7**	**2512.6**
	37.4	63.1	0.2	1.1			0.6	0.2	0.0	0.0	27.1	51.4	182.7	692.4
	8.9	14.9									43.2	104.1	163.3	1289.3
	36.0	106.6									64.3	320.6	163.1	676.1
	82.3	**184.6**	**0.2**	**1.1**	**0.0**	**0.0**	**0.6**	**0.2**	**0.0**	**0.0**	**134.5**	**476.1**	**509.2**	**2657.8**
	90.7	**245.1**	**9.2**	**110.1**	**47.8**	**493.5**	**0.7**	**0.3**	**0.2**	**1.5**	**203.1**	**1103.3**	**801.8**	**5170.4**

Annexure 3.20 Area & production of vegetables in north eastern and himalayan states [2005-06]

States	Brinjal		Cabbage		C.Flower		Okra		Peas	
	A	P	A	P	A	P	A	P	A	P
North Eastern States										
Arunachal Pradesh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Assam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manipur	0.0	0.0	1.8	23.1	1.2	10.3	0.0	0.0	1.3	8.8
Meghalaya										
Mizoram	0.4	1.5	0.3	4.3	0.1	0.3	0.2	0.7	0.1	0.2
Nagaland	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.0
Tripura										
Sikkim	0.1	0.5	0.9	5.5	0.5	2.0	0.1	0.3	1.6	9.7
Sub Total	**0.6**	**2.1**	**3.1**	**33.1**	**1.9**	**12.7**	**0.3**	**1.1**	**3.0**	**18.7**
Himalayan States										
Himachal Pradesh	0.8	14.3	3.7	115.9	2.3	53.1	1.7	19.7	16.3	177.0
Jammu & Kashmir	2.0	31.3	2.8	71.3	3.3	71.5	2.1	71.5	7.5	116.9
Uttranchal	1.6	20.6	4.0	50.2	2.0	30.8	2.7	18.5	9.6	60.9
Sub Total	**4.3**	**66.2**	**10.6**	**237.4**	**7.6**	**155.4**	**6.4**	**109.6**	**33.4**	**354.8**
Grand Total	**5.0**	**68.3**	**13.6**	**270.5**	**9.4**	**168.1**	**6.8**	**110.7**	**36.5**	**373.5**

A=Area in 000' Ha. **P**=Production in 000' MT

Annexure 3.21 Area & production of plantation crops in north eastern and himalayan states [2005-06]

States	Cashewnut		Arecanut		Cocoa		Coconut		Total	
	A	P	A	P	A	P	A	P	A	P
North Eastern States										
Arunachal Pradesh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Assam	14.0	10.0	71.2	66.8	0.0	0.0	19.1	141.0	104.3	217.8
Manipur	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Meghalaya	6.4	6.4	11.5	15.5	0.0	0.0	0.0	0.0	17.9	21.9
Mizoram	0.0	0.0	2.0	5.3	0.0	0.0	0.0	0.0	2.0	5.3
Nagaland	0.0	0.0	0.2	1.3	0.0	0.0	0.9	0.8	1.1	2.1
Tripura	0.0	0.0	3.4	6.9	0.0	0.0	3.3	4.8	6.7	11.7
Sikkim	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub Total	**20.4**	**16.4**	**88.3**	**95.8**	**0.0**	**0.0**	**23.3**	**146.6**	**132.0**	**258.8**
Himalayan States										
Himachal Pradesh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jammu & Kashmir	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uttranchal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Grand Total	**20.4**	**16.4**	**88.3**	**95.8**	**0.0**	**0.0**	**23.3**	**146.6**	**132.0**	**258.8**

A=Area in 000' Ha. **P**=Production in 000' MT

	Tomato		Onion		Potato		S.Potato		Tapioca		Others		Total	
	A	P	A	P	A	P	A	P	A	P	A	P	A	P
	0.0	0.0	0.0	0.0	4.0	29.8	0.0	0.0	0.0	0.0	16.2	51.3	20.2	81.1
	0.0	0.0	7.7	18.3	69.6	353.7	7.3	25.9	2.8	13.3	231.6	3818.2	319.0	4229.3
	0.6	5.3	0.0	0.0	0.6	5.0	0.0	0.0	0.0	0.0	2.8	14.9	8.4	67.3
					18.7	156.0	5.4	18.9	4.2	23.1	13.4	142.2	41.7	340.2
	0.0	0.3	0.1	0.2	0.2	0.9	0.2	0.9	0.1	0.5	0.6	21.7	2.3	31.4
	0.8	1.5	0.0	0.0	1.0	1.8	0.1	0.2	1.3	15.9	6.1	31.4	9.7	51.2
			0.0	0.0	5.4	75.9	0.0	0.0			26.1	289.2	31.5	365.1
	0.2	0.7	0.1	0.4	7.6	32.9	0.1	0.6	0.4	1.6	6.1	24.9	17.6	79.1
	1.5	**7.7**	**7.9**	**18.9**	**107.2**	**655.9**	**13.1**	**46.4**	**8.8**	**54.3**	**303.0**	**4393.8**	**450.4**	**5244.8**
	9.2	301.2	1.5	21.8	15.0	160.0					12.1	199.2	62.6	1062.2
	3.4	73.6	2.8	51.7	6.9	120.1					24.1	445.1	54.9	1052.9
	8.0	77.0	3.1	31.7	22.2	450.6					19.7	171.3	72.9	911.7
	20.5	**451.8**	**7.5**	**105.2**	**44.1**	**730.7**	**0.0**	**0.0**	**0.0**	**0.0**	**55.9**	**815.6**	**190.4**	**3026.8**
	22.1	**459.5**	**15.4**	**124.1**	**151.3**	**1386.7**	**13.1**	**46.4**	**8.8**	**54.3**	**358.8**	**5209.4**	**640.8**	**8271.6**

Annexure 4.1 Details of beneficiaries assisted under mm-ii of hmneh programme [2006-07 to 2010-11]

Name of Component	2006-07						2007-08						2008-09					
	No. of Farmers	Of which, No. of Women	Area Covered (ha)	Financial Assistance Provided (Rs.)			No. of Farmers	Of which, No. of Women	Area Covered (ha)	Financial Assistance Provided(Rs.)			No. of Farmers	Of which, No. of Women	Area Covered (ha)	Financial Assistance Provided(Rs.)		
				Cash	Kind	Total				Cash	Kind	Total				Cash	Kind	Total
Agri Implements/ Tools	7010	560	5515	202	221	423	14272	663	10756	166	265	432	10833	833	7555	95	168	263
Area Expansion	69159	12414	49914	3991	3532	7455	119472	18623	74406	3532	4208	7740	118581	17871	91053	2827	5496	8293
Awareness Campaign/ Workshop/ Seminars/ Publications/ Mission Management	2902	210	75	7	3	10	6174	423	243	7	2	9	9138	462	55	10	5	15
Bee Keeping	507	28	805	3	6	9	5677	304	9750	12	43	56	5052	483	7826	17	24	40
Human Resource Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mushroom Unit	6	1		6	0	6	0	0	0	0	0	0	0	0	0	0	0	0
On Farm Handling Unit	614	36	300	211	6	216	1039	41	570	438	47	484	351	15	306	122	6	128
Production of Planting Material	100	10	94	152	151	303	98	10	86	235	100	335	83	6	52	85	75	160
Productivity Improvement	37522	6679	772945	2103	1384	3487	52907	3410	832923	1816	2146	3963	112955	4525	1064924	1372	1598	2957
Rejuvenation	8285	1234	3615	201	259	459	34663	3948	11772	772	528	1300	16428	2374	5620	405	339	745
Special Intervention	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transfer Of Technology	18933	4101	11777	140	155	295	28661	7827	21231	121	218	339	22811	4512	16905	117	180	297
Women Empowerment	6731	6731	8179	48	60	108	14733	14733	9731	106	109	214	8746	8746	7942	37	61	98
Total:	**154973**	**35173**	**####**	**7068**	**5777**	**12777**	**####**	**47171**	**971480**	**7208**	**7668**	**14876**	**####**	**39068**	**####**	**5088**	**7954**	**12999**

	2009-10						2010-11						Total [2006-07 TO 2010-11]					
	No. of Farmers	Of which, No. of Women	Area Covered (ha)	Financial Assistance Provided(Rs.)			No. of Farmers	Of which, No. of Women	Area Covered (ha)	Financial Assistance Provided(Rs.)			No. of Farmers	Of which, No. of Women	Area Covered (ha)	Financial Assistance Provided(Rs.)		
				Cash	Kind	Total				Cash	Kind	Total				Cash	Kind	Total
	10308	781	7436	134	203	337	1940	830	532	164	116	280	44363	3667	31794	761	974	1735
	127451	21323	104985	3404	5821	9225	86144	17093	91615	2782	5276	8058	520807	87324	411973	16535	24333	40771
	5	0	5	3	0	3	3029	754	218	9	8	17	21248	1849	596	37	18	55
	13093	2025	19848	11	102	112	3422	1276	8316	3	0	3	27751	4116	46545	45	174	220
	0	0	0	0	0	0	71			12	0	12	71	0	0	12	0	12
	0	0	0	0	0	0	7		7	0	50	50	13	1	7	6	50	56
	560	29	515	143	62	205	4	30	4	2	15	17	2568	151	1694	915	135	1051
	65	0	46	82	70	153	56	3	59	201	95	296	402	29	336	756	492	1247
	57505	52203	1442353	1544	2119	3663	41960	6369	2485946	825	1689	2513	302849	73186	6599091	7661	8935	16582
	11092	1855	6150	388	380	767	11310	1720	4768	291	1220	1511	81778	11131	31926	2056	2726	4782
	0	0	0	0	0	0	500	175	8	5	18	22	500	175	8	5	18	22
	17065	3459	11085	118	221	339	31395	4289	31512	83	107	189	118865	24188	92509	579	882	1460
	15807	15807	4659	39	33	72	974	974	240	8	1	9	46991	46991	30751	238	263	501
	252951	**87000**	**####**	**5866**	**9012**	**14878**	**181080**	**32726**	**####**	**4392**	**8596**	**12986**	**1171480**	**241138**	**7250499**	**29623**	**39008**	**68518**

Annexure 4.2 State-wise Fund Allocation, Release & Expenditure under Horticulture Mission for North East and Himalayan States [2001-02 to 2009-10]

	2001-02			2002-03			2003-04			2004-05		
	Alloc.	Rele.	Exp.	Alloc.	Rele.	Exp.	Alloc.	Rele.	Exp.	Alloc.	Rele.	Exp.
A. MM -I												
1. NE states including Sikkim	250.00	250.00	250.00	175.00	175.00	175.00	100.00	100.00	100.00	700.00	700.00	700.00
2. Jammu & Kashmir	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00
3. Himachal Pradesh	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00
4. Uttaranchal	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00
B. MM - II												
1. Arunachal Pradesh	728.85	728.85	728.85	1099.00	1099.00	1099.00	1220.00	1220.00	1220.00	1500.00	1645.55	1645.55
2. Assam	611.12	611.12	611.12	1092.15	1092.15	1092.15	1400.00	1400.00	1400.00	1425.00	871.00	871.00
3. Manipur	487.03	487.03	487.03	685.00	685.00	685.00	638.00	638.00	638.00	1100.00	1286.25	1286.25
4. Meghalaya	625.71	625.71	625.71	775.60	775.60	775.60	937.00	850.00	850.00	1211.00	1395.99	1395.99
5. Mizoram	508.95	508.95	508.95	1099.73	1099.73	1099.73	1089.00	1089.00	1089.00	1632.20	1801.30	1801.30
6. Nagaland	551.70	551.70	551.70	979.00	979.00	979.00	1256.00	1256.00	1256.00	1875.00	1467.30	1467.30
7. Sikkim	616.77	616.77	616.77	855.00	855.00	855.00	1000.00	1000.00	1000.00	1150.00	1150.00	1150.00
8. Tripura	512.40	512.40	512.40	785.00	785.00	785.00	900.00	900.00	900.00	1012.80	1111.30	1111.30
9. Jammu & Kashmir	0.00	0.00	0.00	0.00	0.00	0.00	650.00	650.00	650.00	1450.00	1233.00	1233.00
10. Himachal Pradesh	0.00	0.00	0.00	0.00	0.00	0.00	650.00	650.00	650.00	1300.00	1300.00	1300.00
11. Uttarakhand	0.00	0.00	0.00	0.00	0.00	0.00	564.72	564.72	564.72	1300.00	975.00	975.00
Service charges & otherProject based proposals.	102.43	102.43	102.43	129.52	129.52	129.52	0.00	101.28	101.28	0.00	89.09	89.09
– NE States												
– HS												
C. MM - III											1672.49	1672.49
NE States	1380.00	1380.00	1380.00	1350.00	1350.00	1350.00	1020.00	1020.00	1020.00			
– SFAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
– NHB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Himalayan States												
– SFAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
– NHB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. MM - IV	350.00	350.00	350.00	75.00	75.00	75.00	100.00	100.00	100.00	1850.99	120.00	120.00
J&K, HP & Uttarakhand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	441.50	500.00	500.00
Grant for Creation of Capital Assets												
Grand Total	**6724.96**	**6724.96**	**6724.96**	**9100.00**	**9100.00**	**9100.00**	**11824.72**	**11839.00**	**11839.00**	**18248.49**	**17618.27**	**17618.27**

**Ministry of Food Processing Industries would implement its schemes, from 10% allocation of its outlay, for mission programmes. The additional requirements if any would be provided by the Mission.*

	2005-06			2006-07			2007-08			2008-09			2009-10		
	Alloc.	Rele.	Exp.	Alloc.	Rele.	Exp.	Alloc.	Rele.	Exp.	Alloc.	Rele.	Exp.	Alloc.	Rele.	Exp.
	0.00	0.00	0.00	0.00	0.00	0.00	440.00	440.00	440.00	600.00	500.00	500.00	400.00	400.00	400.00
	250.00	250.00	250.00	100.00	87.50	87.50	297.00	296.99	296.99	350.00	200.00	200.00	200.00	200.00	200.00
	250.00	250.00	250.00	100.00	87.50	87.50	238.00	150.00	150.00	350.00	100.00	100.00	200.00	200.00	200.00
	250.00	250.00	250.00	100.00	100.00	100.00	365.00	365.00	365.00	300.00	200.00	200.00	200.00	200.00	200.00
	1300.00	1300.00	1300.00	1612.90	1612.90	1612.90	2830.00	2830.00	2830.00	2600.00	1765.00	1765.00	2850.00	1492.00	1492.00
	1300.00	1300.00	1300.00	1400.00	1400.00	1400.00	2680.00	2680.00	2680.00	3952.00	3675.00	3675.00	3900.00	3743.00	3171.00
	1500.00	1500.00	1500.00	1700.00	1700.00	1700.00	2228.00	2228.00	2228.00	2500.00	2500.00	2500.00	3050.00	3029.00	3029.00
	1500.00	1700.00	1700.00	2000.00	2000.00	2000.00	2700.00	2700.00	2700.00	3248.00	2862.50	2862.50	3000.00	1932.00	1932.00
	1800.00	1800.00	1800.00	3200.00	3200.00	3200.00	3095.00	3095.00	3095.00	3325.00	3050.00	3050.00	3500.00	3500.00	3434.00
	1700.00	1700.00	1700.00	2356.00	2356.00	2356.00	2500.00	2500.00	2500.00	3300.00	2450.00	2450.00	3950.00	3950.00	3950.00
	1700.00	1800.00	1800.00	2331.00	2331.00	2331.00	3110.00	3110.00	3110.00	3315.00	2675.00	2675.00	3750.00	3428.20	3428.20
	1500.00	1500.00	1500.00	1400.00	1400.00	1400.00	2400.00	2400.00	2400.00	2200.00	1700.00	1700.00	3000.00	3000.00	3000.00
	1550.00	1550.00	1550.00	3500.00	2933.00	2933.00	2000.00	2000.00	2000.00	2800.00	1815.00	1815.00	1700.00	1700.00	1100.00
	1100.00	1100.00	1100.00	4000.00	4000.00	4000.00	2400.00	2400.00	2400.00	3220.00	2100.00	2100.00	1700.00	1589.00	1589.00
	1100.00	1100.00	1100.00	4000.00	4000.00	4000.00	2839.94	2839.94	2839.94	2800.00	2000.00	2000.00	1700.00	1700.00	1700.00
	250.00	89.21	89.21	140.50	114.00	114.00	300.06	266.35	266.35	470.00	145.12	145.12	250.00	58.93	58.93
	0.00	1350.00	1350.00		850.00	850.00		1175.00	1175.00		801.95	801.95		400.00	200.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1550.00			1000.00	200.00	200.00	1250.00	700.00	700.00	1740.00	600.00	600.00	500.00	2050.00	2050.00
	200.00	200.00	200.00	400.00			700.00	0.00	0.00	1230.00			2050.00		
	18800.00	**18739.21**	**18739.21**	**29340.40**	**28371.90**	**28371.90**	**32373.00**	**32176.28**	**32176.28**	**38300.00**	**29139.57**	**29139.57**	**35900.00**	**32572.13**	**31134.13**

Annexure 6.1 Consolidated state-wise and component-wise physical targets & achievements under hmneh [2001-02 to 2009-10]

Component/Activity				Arunachal Pr.		Assam		Manipur		Meghalaya		Mizoram	
	MM-II			Target	ach.	Target	Ach.	Target	Ach	Target	Ach.	Target	Ach.
A	1	Area expansion incl. Rejuvenation		68286	64511	81446	76048	54051	50677	35386	34416	76276	75383
		i.Fruits	13000/ha	38904	37672	36420	34555	31150	26833	16151	15866	44123	43468
		ii.Vegetables	upto 13000/ ha	5295	4857	7675	6534	13700	15805	7027	7027	11030	11009
		iii.Spices	13000/ha	9355	9129	13275	12169	4985	4316	4155	3775	8080	8191
		iv.Plant.crops	13000/ha	0	0	6955	6313	315	105	3420	3220	670	670
		v.Medicinal plants	13000/ha	1402	1395	710	630	200	75	353	278	2265	1893
		vi. Aromatic plants	5000/ha	7242	6382	1496	1366	160	110	65	35	969	802
		vii. Flowers (ha) 13000/unit of 0.2 ha	13000/unit	1680	1596	3565	3365	1791	1689	2696	2696	4479	4690
		viii. Roots and Tubers (ha)	13000/unit	0	0	0	0	0	0	519	519	0	0
		ix) saffron	13000/ha	0	0	0	0	0	0	0	0	0	0
		Rejuvenation		4408	3480	11350	11115	1750	1744	1000	1000	4660	4660
		Area Expansion (Crop only)		63878	61031	70096	64933	52301	48933	34386	33416	71616	70723
	2	Model Floriculture Centre	7000000/ Nos.	2	2	2	2	1	2	11	11	1	2
	3	Mushroom units	50 lakh/unit	4	4	2	2	2	6	2	1	6	8
B		Creation of Water Sources											
		i) Community Tanks (Hec.)	1000000/ unit of 10 ha	1019	987	484	359	899	810	532	456	1465	1304
		ii) Tube Wells/units	12500/unit	212	212	2785	2660	1085	1040	1006	985	3152	3102
C		On Farm Water Management											
		i) Drip Irrigation (max./units)	28500/ha	2308	2226	2243	2073	1330	1076	4092	4070	2250	2230
		ii) Sprinkler irrigation	15000	0	0	0	0	150	50	726	573	900	900
		iii) Mulching	7000/ha	0	0	2239	2197	2270	2030	1322	1321	1050	989
		iv) Low Cost Green House (SQ M)	125	28000	28000	170100	170000	319570	319089	200858	100954	88347	88345
		v) Green House (500 sq.m.)	325	85460	85460	20290	20279	116487	126259	139399	139306	322701	322701
		vi) Low Cost Tunnel (Sq. mtr.)	5	253100	253100	0	0	1680	0	22400	22400	500	500
		vii) Shade nets (Sq. mtr.)	14/Sq.m	10000	10000	220500	210500	1191430	849000	364429	364429	1772000	1722000
		viii) Antihail nets (per tree)	500/tree	0	0	0	0	5340	4500	7150	7144	0	0
		ix) Anti Hail Gun (Project based)	8000000	0	0	0	0	0	0	0	0	0	0
		x) Poly sheet (Sq.m)	0.00005	0	0	0	0	0	0	0	0	0	0
		xi) Anti bird net (ha)	0.02	0	0	0	0	0	0	0	0	0	0
D		On farm handling	50000/unit	900	900	335	104	876	591	220	183	1386	1318
E		Production of Planting Material											
		a) Private Sector		0	0	0	0	0	0	0	0	0	0
		i) Big Nursery	8 lakh/unit	11	11	19	9	9	1	9	11	6	1
		ii) Small Nursery	1.5 lakh/unit	34	34	77	40	22	40	60	62	14	12
		iii) Herbal garden	1.5 lakh/unit	0	0	19	6	3	0	2	2	0	1
		iv) Tissue Culture Unit	10 lakh/unit	0	0	0	0	2	0	1	1	0	0
		b) Public Sector		0	0	0	0	0	0	0	0	0	0
		i) Big Nursery	18 lakh/unit	11	10	5	4	5	8	27	28	3	3
		ii) Small Nursery	3 lakh/unit	17	17	0	0	9	9	37	31	5	6
		iii) Herbal garden	3 lakh/unit	1	1	0	0	1	0	0	0	0	1
		iv) Tissue Culture Unit	21 lakh/unit	0	0	0	1	0	0	0	1	1	2
F		Transfer of technology											
		i) Training of farmers-within state	1500/farmer	12904	10804	25790	18405	14930	15207	8815	6207	11240	10303
		ii) Training outside state	2500/farmer	5350	4300	5925	3165	2616	2346	6266	3746	3990	3890
		iii) Training of Trainers	50000/trainer	124	112	107	82	265	280	148	136	241	241
		Training Centre		0	0	0	0	0	0	0	0	0	0
		iv) Gardners Training Centre	2 lakh/centre	7	7	17	14	8	3	2	2	3	3
		v) Supervisores Training Centre	20 lakh/ centre	0	0	20	15	1	2	0	0	8	7
		vi) Malies training center	2.000	0	0	0	0	0	0	0	0	0	0
G		Popularization of Organic farming and use of bio-fertilizers											
		i.Adoption of Org.farming	10000/ha	5408	4608	1100	750	612	740	1956	866	3261	3243
		ii. Certification	5 lakh/group	0	0	7	7	1	1	7	0	36	36
		iii.Earthworm units	30000/unit	304	282	1908	1802	1980	1887	3137	2715	452	436

Nagaland		Sikkim		Tripura		Total North East Region (NER)		Himachal Pr.		Jammu & Kashmir		Uttarakhand		Total Himalayan States (HS)		TOTAL NER + HS
Target	Ach.	Target	Ach	Target	Ach	Target	Ach	Target	Ach	Target	Ach	Target	Ach	Target	Ach	AchTarget
58755	59058	53616	46092	41443	37726	469260	443910	32940	33140	25168	22873	68797	68652	126905	124665	568575596165
28359	28359	11056	9515	13840	11329	220003	207597	26234	26589	13787	13450	39417	38431	79438	78470	286066299441
8730	8560	14155	12247	16185	18503	83797	84542	3884	3731	2376	1526	12232	14403	18492	19660	104202102289
10700	11223	17118	16173	4935	3515	72603	68491	1299	1300	1281	1015	4428	3511	7008	5825	7431779611
2927	2877	0	0	2660	926	16947	14111	0	0	0	0	0	0	0	0	1411116947
1883	1883	160	35	50	32	7023	6221	25	139	79	55	50	50	154	244	64647177
1175	1175	110	28	50	59	11267	9957	61	152	54	49	25	25	140	226	1018311407
3981	3981	5527	4054	1348	988	25068	23059	1349	1142	926	792	3148	3072	5423	5006	2806530491
0	0	800	800	0	0	1319	1319	0	0	0	0	0	0	0	0	13191319
0	0	0	0	0	0	0	0	0	0	455	168	0	0	455	168	168455
1000	1000	4690	3240	2375	2375	31233	28614	0	0	6210	5818	9497	9160	15707	14978	4359246940
57755	58058	48926	42852	39068	35351	438027	415296	32940	33140	18958	17055	59300	59492	111198	109687	524983549225
3	3	1	1	3	2	24	25	2	2	0	0	0	0	2	2	2726
4	4	4	1	1	0	25	26	0	0	1	1	0	0	1	1	2726
1507	1507	1425	1267	1668	1515	8999	8205	1540	1534	950	752	849	760	3339	3046	1125112338
1084	1084	0	0	2380	1326	11704	10409	1353	1231	3590	2177	1220	1096	6163	4504	1491317867
1216	1216	1479	1369	695	199	15613	14459	816	760	108	0	2020	1437	2944	2197	1665618557
550	550	0	0	0	0	2326	2073	859	782	90	1	740	294	1689	1077	31504015
1215	1215	620	615	0	0	8716	8367	952	48	391	111	2080	1714	3423	1873	1024012139
81343	81343	494504	451800	363067	57	1745789	1239588	152144	137061	317094	177592	140500	117078	609738	431731	16713192355527
154366	154366	277443	264316	76435	332	1192581	1113019	673272	648272	9120	7894	105150	68073	787542	724239	18372581980123
50000	50000	4000	400	0	0	331680	326400	55150	22400	50020	0	0	0	105170	22400	348800436850
1010120	1010120	802904	763378	1178095	495	6549478	4929922	356372	111473	2000	0	48650	27250	407022	138723	50686456956500
0	0	9450	9050	140	0	22080	20694	42313	25530	0	0	36500	28190	78813	53720	74414100893
0	0	0	0	0	0	0	0	2	1	0	0	0	0	2	1	12
450000	450000	0	0	0	0	450000	450000	0	0	0	0	0	0	0	0	450000450000
0	0	0	0	0	0	0	0	0	0	0	0	75	0	75	0	075
1520	1520	96	37	329	207	5662	4860	1370	1447	1826	1284	1066	743	4262	3474	83349924
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00
12	12	19	44	9	6	94	95	12	9	1	1	7	7	20	17	112114
100	100	76	74	53	29	436	391	64	34	143	140	58	35	265	209	600701
0	0	8	11	0	0	32	20	25	13	16	0	0	0	41	13	3373
2	2	3	3	0	0	8	6	10	6	0	0	4	2	14	8	1422
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00
8	8	9	9	8	10	76	80	9	7	27	21	17	10	53	38	118129
2	2	15	13	34	32	119	110	29	23	45	40	19	6	93	69	179212
2	2	0	0	0	0	4	4	2	11	0	0	0	0	2	11	156
0	0	0	1	2	2	3	7	2	0	0	0	2	3	4	3	107
11050	11050	22200	23805	22000	23097	128929	118878	12890	12823	11501	9070	13395	9794	37786	31687	150565166715
3013	3013	5640	4649	4390	3181	37190	28290	6954	6165	2290	1603	6505	4725	15749	12493	4078352939
205	205	162	123	174	99	1426	1278	100	122	54	18	392	545	546	685	19631972
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00
2	2	18	8	6	9	63	48	3	3	0	0	23	15	26	18	6689
3	3	5	4	6	6	43	37	2	2	1	0	4	2	7	4	4150
0	0	0	0	0	0	0	0	0	0	2	2	0	0	2	2	22
4127	1677	8680	5808	2260	1498	27404	19190	1637	696	1289	922	2828	2312	5754	3930	2312033158
0	0	21	18	12	4	84	66	3	2	0	0	15	15	18	17	83102
1187	1187	1070	997	1600	1507	11638	10813	5195	5343	540	446	2340	2062	8075	7851	1866419713

Component/Activity				Arunachal Pr.		Assam		Manipur		Meghalaya		Mizoram	
	MM-II			Target	ach.	Target	Ach.	Target	Ach	Target	Ach.	Target	Ach.
H		Promotion & popularization of Agricultural Equipments Incl. PMRP											
		i) Manual operated	1500/equipt	4510	5154	9832	4933	7630	7600	4618	2811	9645	9527
		ii) Power Tiller	45000/unit	50	23	1403	1373	534	538	546	502	100	15
		iii) Diesel Engine	9000/unit	111	71	1815	1775	952	832	838	817	1290	947
		iv) Power Operated	5000/unit	100	0	825	757	706	690	528	408	1841	1590
		v) Power Drawn	45000/unit	16	16	0	0	0	0	0	0	220	180
		vi Weed Cutters	0.1500	0	0	0	0	0	0	0	0	0	0
		vii) *Horticulture equipments for canopy management, pruning, etc.	45000/unit	0	0	0	0	465	465	55	55	76	76
		viii) Pit Hole Digger	0.1500	0	0	0	0	0	0	0	0	0	0
I		Promotion of Integrated pest Management											
		i.Adoption of IPM	1000/ha	5400	4750	17802	9904	9760	8628	8024	6060	27169	26034
		ii.Disease fore casting units	4 lakh/unit	8	7	2	2	4	2	4	3	2	1
		iii. Plant Health Clinic		3	3	4	3	2	0	1	1	1	1
		IV. Leaf Analaysis Lab		0	0	0	0	2	2	1	1	1	1
		bio control lab		1	1	1	1	1	0	1	0	0	0
J.		Promotion of Integrated Nutrient Management (INM)/ (IPM)/Sanitary and Phytosanitary											
		INM		0	0	0	0	0	0	300	300	0	0
M		Centre of Excellence for HM Prog.		0	0	0	0	0	0	0	0	0	0
K		Bee Keeping	250/unit	1320	1272	6535	4305	12100	10600	2950	2950	5975	3975
		Bee colonies with bee hives	0.0080	0	0	1500	870	5100	6200	0	0	0	0
		Development of Bee Breeders	2.5000	0	0	0	0	0	0	0	0	10	10
		Bee Hives	3.5000	0	0	0	0	0	0	0	0	4	4
L		Entrepreneurial Development of Women Farmers											
		i) Training of Women (5 days)	1000/trainer	0	0	17472	13392	8900	7383	8071	5321	9883	10040
		ii) Self help group	5000/gp	0	0	1828	1228	1520	1120	2660	1725	120	170
		iv) Dev. of curriculum/Distt.	20000/ activity	0	0	0	0	0	0	0	0	0	8
		v) Refresher Training of facilitaters/dist.	10000/ facilitater	0	0	0	0	0	0	0	0	0	0
		III) Base line survey	10000/nos.	0	0	0	0	0	0	0	0	0	0
H		Distillation unit for Aro. Plants	200,000/unit	37	20	2	2	0	0	0	0	20	23
		Workshops/Seminar		5	3	15	40	15	9	8	9	2	2
	MM-III												
M		Market infrastructure		0	0	0	0	0	0	0	0	0	0
		1) Wholesale Markets		0	6	0	2	0	0	0	2	0	10
		2) Rural Primary Markets		0	24	0	43	0	0	0	11	0	96
		3) Apni Mandies		0	0	0	0	0	0	0	0	0	0
		4) State Grading Labs.		0	2	0	7	0	0	0	2	0	2
		5) Ropeways		0	0	0	0	0	0	0	0	0	0
	MM-IV												
N		Processing frastructure		0	0	0	0	0	0	0	0	0	0
		1) New units		0	1	0	6	0	7	0	5	0	0
		2) Upgradation of Existing units		0	0	0	0	0	0	0	0	0	2

Nagaland		Sikkim		Tripura		Total North East Region (NER)		Himachal Pr.		Jammu & Kashmir		Uttarakhand		Total Himalayan States (HS)		TOTAL NER + HS
Target	Ach.	Target	Ach	Target	Ach	Target	Ach	Target	Ach	Target	Ach	Target	Ach	Target	Ach	AchTarget
7770	7770	8810	8630	5410	4424	58225	50849	9725	11225	8620	3570	1190	1081	19535	15876	6672577760
753	753	9	5	1849	1749	5244	4958	662	712	196	36	285	221	1143	969	59276387
930	930	0	0	1635	6567	7571	11939	525	490	0	0	1281	933	1806	1423	133629377
100	100	2335	2134	1125	756	7560	6435	5812	5811	1995	545	395	302	8202	6658	1309315762
170	170	0	0	50	0	456	366	0	0	0	0	0	0	0	0	366456
120	120	0	0	0	0	120	120	0	0	0	0	0	0	0	0	120120
0	0	0	0	0	0	596	596	0	0	34	24	0	0	34	24	620630
85	85	0	0	0	0	85	85	0	0	0	0	0	0	0	0	8585
11353	11353	31127	17932	5485	4274	116120	88935	1258	886	0	0	7314	1062	8572	1948	90883124692
0	0	9	3	1	1	30	19	2	1	0	0	2	2	4	3	2234
1	1	1	1	0	0	13	10	0	0	0	0	5	5	5	5	1518
0	0	0	0	1	1	5	5	2	2	0	0	0	0	2	2	77
0	0	0	0	0	0	4	2	1	2	0	0	1	0	2	2	46
1305	1305	0	0	0	0	1605	1605	0	0	0	0	0	0	0	0	16051605
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00
11653	12865	13420	5500	2800	2300	56753	43767	9932	9142	9934	6141	14700	12300	34566	27583	7135091319
4313	4313	3850	3100	0	0	14763	14483	1000	200	900	900	1400	0	3300	1100	1558318063
2	2	0	0	0	0	12	12	0	0	0	0	0	0	0	0	1212
0	0	3	3	0	0	7	7	0	0	0	0	0	0	0	0	77
1700	1700	14160	12550	9790	10290	69976	60676	5434	5009	4494	3757	12297	9720	22225	18486	7916292201
2449	2253	26	0	1040	1046	9643	7542	629	474	0	0	1501	1071	2130	1545	908711773
16	16	0	0	0	0	16	24	7	7	0	0	0	0	7	7	3123
0	0	0	0	0	0	0	0	12	12	0	0	0	51	12	63	6312
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00
0	0	0	0	0	0	59	45	0	0	0	0	0	0	0	0	4559
4	4	3	3	8	8	60	78	1	0	0	0	1	1	2	1	7962
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00
0	8	0	1	0	3	0	32	0	0	0	15	0	0	0	15	470
0	103	0	0	0	0	0	277	0	1	0	0	0	0	0	1	2780
0	52	0	14	0	0	0	66	0	0	0	0	0	0	0	0	660
0	0	0	3	0	0	0	16	0	0	0	0	0	2	0	2	180
0	0	0	0	0	0	0	0	0	0	0	0	0	31	0	31	310
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	00
0	5	0	0	0	1	0	25	0	13	0	8	0	17	0	38	630
0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	20

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