

Horticulture Development under Technology Mission in Northeastern States

India has maintained its second rank in the global production of fruits and vegetables, next only to China. Though the production of food grains and Horticultural produce are not meaningfully comparable due to fundamental differences in the nature of their farming, characteristics of produce, nature of land requirements, and most importantly, their nutritional purpose and value, it has come to light that horticultural farming is more productive and gainful. The special attention given to the sector, especially after the introduction of the Horticulture Mission for North East and Himalayan States (HMNEH) and the National Horticulture Mission (NHM) in the 11th Plan, has resulted in bumper production of horticulture produce in India and Northeast region.

HORTICULTURE has emerged as one of the potential agriculture enterprises in accelerating the growth of the economy. Its role in the country's nutritional security, poverty alleviation and employment generation programmes is becoming increasingly important. It offers not only a wide range of options to the farmers for crop diversification, but also provides ample scope for sustaining large number of Agro industries which generate huge employment opportunities. India is currently producing 350 million tonnes of horticulture produce from an area of 28.10 million ha, which has surpassed the estimated food grain production of 316.06 million tonnes. As a result of changing dietary patterns, the composition of agricultural production has diversified over the years. The area under horticulture crops has grown from 18.44 million ha in 2004-05 to 28.10 million ha in 2022-23 while the productivity has increased from 9.05 tonne per ha in 2004-05 to 12.19 tonne per ha in 2022-23.

Horticulture Scenario in Northeastern States

The Northeastern Region comprise eight States, *viz.*, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura have 7.7% of the total geographical area of the country and a population of 51 million. In Northeast, there can be no single

strategy as crops, soil, food habits, cultural practices and economic systems are extremely diverse. Nearly two thirds of the region is under hill terrain. The great altitudinal differences in the region coupled with varied physiography contribute to extreme climate variations in the entire region, having definite pockets representing temperate, sub-tropical and tropical areas. The variations are seen within a small area itself, thus making flora and agricultural practices very specific to small units. Added to this and as a result of this, we have a wide variation in temperature and precipitation within the region, which have their own impact on Horticulture. The Northeastern States endowed with diverse agro-climatic conditions are suitable for production of large variety of horticultural crops. Most of the fruits, vegetables, flowers and spices of the region being organic in nature, have market within and outside the country. The Northeast states are rich in biodiversity with a large variety of flora and fauna.

The Northeastern lie in the Eastern Himalayan Agro-climatic zone. The tropical and sub-tropical climate, alluvial soil of the Brahmaputra and Barak valley, and the temperate climate of the hills that have laterite and sandy soil, support a wide variety of plants in the region. The region has high precipitation and climatic conditions suitable for a wide variety of tropical and



temperate horticulture crops. The dense forest covers across 67.05% of the total geographical area generates large quantities of humus that add to the fertility of the soil. Out of approximately 15,000 species of flowering plants available in India, the Northeast region alone accounts for about 8,000 species and six out of the nine important vegetation types found in India. The region enjoys a comparative advantage in terms of climate and soil. The good quality spices especially ginger and chilli of the region not only have high domestic demand but also have export potential, especially in South and Southeast Asian countries.

The study recommended that the region has immense potential for development of various horticulture crops to improve livelihood of the populace. The study suggested vertical and horizontal integration of all Government of India programmes for development of Horticulture in these states. Based on this study “*Technology Mission for Integrated Development of Horticulture in North Eastern States*” (TMNE) was launched during 2001-02 with an outlay of ₹ 229.38 crores during the IX plan. The mission was launched to be implemented and monitored by by SFAC

with an end-to-end approach having four mini missions for R&D, production, PHM and Marketing and Processing. The mission was implemented with bottom up approach and allocations were based on AAP prepared at district level. The mission was Centrally Sponsored Scheme with 100% share from Government of India. Funds under the mission were routed directly by SFAC to District Horticulture Officer for approved components as per AAP.

The Centrally Sponsored Scheme TMNE was implemented with the following objectives:

- To harness the potential of Horticulture of the region by increasing production and productivity of Horticultural crops.
- To maximize economic, ecological and social benefits through desirable diversification.
- To develop additional infrastructure for production of planting material, storage, processing and marketing of Horticultural produce.
- To provide skillfull employment in the region.

The mission consisted of four mini missions, namely:
Mini Mission I: Research – Coordinated and implemented by Indian Council of Agricultural Research.

Table 1. Production of Fruits and Vegetables in Northeast States during 2000-01

State	Area (in '000 ha)	Production (in '000 mt)	Productivity (in mt/ha)
Arunachal Pradesh	65.2	196.5	3.01
Assam	351.9	4197.9	11.93
Manipur	34.3	185.8	5.42
Meghalaya	59.2	473.1	7.99
Mizoram	24.4	106.1	4.35
Nagaland	47.7	533.3	11.18
Sikkim	21.6	63.8	2.95
Tripura	56.4	729.7	12.94
Total	660.7	6486.2	9.82

Table 2. Production of Fruits and Vegetables in Northeast States during 2012-13 and 2022-23

State	2012-13				2022-23			
	Fruits		Vegetables		Fruits		Vegetables	
	Area (in '000 ha)	Production (in '000 mt)	Area (in '000 ha)	Production (in '000 mt)	Area (in '000 ha)	Production (in '000 mt)	Area (in '000 ha)	Production (in '000 mt)
Arunachal Pradesh	86.86	312.24	1.74	42.04	30.09	138.16	2.62	17.41
Assam	150.71	2073.80	280.63	3428.27	161.98	2504.19	306.24	3747.51
Manipur	48.61	454.01	30.44	292.33	43.12	468.16	38.35	376.58
Meghalaya	33.15	316.57	40.45	403.37	37.57	381.05	50.33	530.47
Mizoram	49.67	303.72	36.37	247.78	66.47	345.36	40.67	224.64
Nagaland	37.23	275.95	26.00	207.74	35.40	344.87	42.28	473.48
Sikkim	14.65	22.46	25.56	132.51	27.31	67.64	25.71	142.90
Tripura	54.61	645.18	41.50	675.80	54.96	568.88	50.41	1072.59
Total	475.49	4403.93	482.69	5429.84	456.9	4818.31	556.61	6585.58

Source: NHB

This Mini Mission concentrates on technology generation appropriate to the region. Major components under MM-I are supply of quality seed and planting material, technology assessment, refinement and standardization, On-farm demonstrations and training.

Mini Mission II: Production and Productivity – Coordinated by Department of Agriculture & Cooperation and implemented by States. This mini mission aims at increasing production and productivity of horticulture crops through adoption of improved technologies.

Mini Mission III: Post-harvest management and Marketing - Coordinated by Department of Agriculture & Cooperation; implemented by Directorate of Marketing & Inspection (DMI) and National Horticulture Board (NHB). This Mini Mission aims for efficient post-harvest management technologies which includes development of On-farm handling units, cold storage facilities, efficient transport and creation of marketing linkage.

Mini Mission IV: Processing - Coordinated and implemented by Ministry of Food Processing Industries, Government of India. This Mini Mission aims at promoting processing industry for value addition to horticulture produce by promoting new processing units, upgradation of existing units and promotional activities.

The scheme had tremendous response in the form of enhanced production and productivity of horticulture crops. Based on the success of the mission and demand from Himalayan States, the mission was extended to Himachal Pradesh, J&K and Uttarakhand in 2003-04 and subsequently during 2005-06, the mission was extended to potential districts of all states as National Horticulture Mission. During X plan period, mission in NE states was implemented with an outlay of ₹ 845.00 crores. During XI plan period, an outlay of ₹ 2,500.70 was approved and during XII period an outlay of ₹ 3,000.00 crores was approved for the programmes.

Table 3. Physical Progress under Horticulture Mission for Northeast States from 2001-02 to 2012-13

State	Area Expansion (Ha.)	Rejuvenation (ha)	Nurseries (No.)	Creation of Water Sources (No.)	Protected Cultivation/ Green House (sqm.)	Vermi compost unit (No.)	Adoption of Organic Farming (Ha.)	Training of Farmers including women (No.)	Horticulture Mechanization (No.)
	Total (2001-02 to 2012-13)	Total (2001-02 to 2012-13)	Total (2001-02 to 2012-13)	Total (2001-02 to 2012-13)	Total (2001-02 to 2012-13)	Total (2001-02 to 2012-13)	Total (2001-02 to 2012-13)	Total (2001-02 to 2012-13)	Total (2001-02 to 2012-13)
Arunachal Pradesh	79,002	10,379	125	1,475	510,960	825	6,590	73,343	5,974
Assam	75,078	13,415	103	3,145	402,879	3,644	750	40,044	8,880
Manipur	62,912	4,144	64	2,749	1,611,016	6,407	740	58,643	11,293
Meghalaya	42,229	1,972	211	1,674	1,328,821	2,715	866	30,629	5,414
Mizoram	86,445	8,340	37	5,381	2,558,696	476	4,898	68,297	14,107
Nagaland	78,368	3,560	155	3,505	1,960,829	1,487	4,667	50,076	13,111
Sikkim	55,163	4,960	161	1,501	1,922,944	1,697	17,258	77,434	11,483
Tripura	54,594	4,382	189	3,561	884	3,243	1,614	59,068	13,722
Total (NE States)	5,33,791	51,152	1,045	22,991	10,297,029	20,494	37,383	457,534	83,984

Table 4. PHM, Marketing and Processing Infrastructure created under HMNEH (Nos.)

State	Wholesale Markets	Rural Primary Markets/Apni Mandies	Cold storages	Processing units
Arunachal Pradesh	6	24	1	3
Assam	2	43	22	9
Manipur	0	3	0	10
Meghalaya	2	11	0	5
Mizoram	10	96	1	2
Nagaland	8	184	1	6
Sikkim	1	14	0	0
Tripura	3	0	2	1
Total (NER*)	32	375	27	36

Source: SFAC

The year wise and state wise funds released under the mission are as under:

Table 5. Horticulture Mission for North East and Himalayan States (HMNEH)

(₹ in crore)

Year	BE	RE	Release
2001-02	67.25	67.25	67.25
2002-03	120.00	120.00	91.00
2003-04	134.22	118.39	118.39
2004-05	200.00	176.72	176.72
2005-06	170.00	185.00	187.39
2006-07	205.40	284.71	284.71
2007-08	293.40	323.40	321.76
2008-09	299.00	383.00	291.39
2009-10	349.00	359.00	325.72
2010-11	400.00	432.40	399.98
2011-12	500.00	490.00	493.13
2012-13	500.00	450.68	442.26
2013-14	550.00	530.00	532.99
2014-15	549.00	350.00	402.02
2015-16	350.00	300.00	325.99
2016-17	320.00	–	313.84
2017-18	353.30	–	365.61
2018-19	450.00	–	325.25
2019-20	485.00	–	270.12
2020-21	470.00	–	197.75
2021-22	220.00	220.00	89.32
2022-23	223.74	223.74	119.47
2023-24	279.68	–	61.73*
Total	7,488.99	5013.13	6,203.79

Source: DAFW, SFAC

The mission has achieved crop-specific area expansion with cluster approach, providing easy access to market infrastructure resulting in a large number of processing units being set up under MMIV of the mission. The impact of the mission led to phenomenal increase in production of horticulture crops i.e. fruits, vegetables, plantation crops, floriculture and spices and provided avenues for higher income to farmers. The increased levels of production can be seen by comparing the production levels of the base year 2000 with the current level as given in Tables.

Major achievements

Major achievements for various components like area expansion and creation of infrastructure under the scheme since 2001-02 till 2012-13 is as under:

Fruits and vegetables account for a significant proportion of the total consumption expenditure of middle and high-income groups. Due to the enlargement of the market for these crops in recent years, the horticulture sector is fast emerging as an important sector providing

lucrative income and employment to the farm sector and supporting a large number of agro-based industries in Northeastern States.

Ten horticulture crops from the Northeast were given the GI registration in 2014, granting the region exclusive rights to produce them. These include Arunachal orange, Khasi mandarin, Tezpur litchi, Kachai lemon, Indian wild orange popularly known as ‘Memang narang’, Tripura queen pineapple, Nagatree tomato, Assam Karbi Anglong ginger, Mizo Chilli, and Sikkim large cardamom.

The annual growth rates of the major fruit crops, such as banana in Assam (3%), mandarin in Manipur (6.7%), and pineapple in Meghalaya (6.3%) and the corresponding low instability index of 3.72%, 9.6%, and 5.87% respectively reflect the success of the strategies adopted in these states. Sikkim and Nagaland have registered 10.1% and 8% annual growth rates in production with relatively lesser annual increase in land for growing fruits. The annual growth rate in fruit production is almost double the growth rate

Table 6. Mission-wise /State wise release of funds under HMNEH

(₹ in lakh)													
	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Mini Mission-I													
NRC for Orchids, Sikkim	250.00	175.00	100.00	700.00			440.00	500.00	400.00	700.00	800.00	350.00	4,415.00
CITH, Srinagar for J&K			100.00	100.00	250.00	87.50	296.99	200.00	200.00	500.00	600.00	250.00	2,584.49
CPRI, Shimla for HP			100.00	100.00	250.00	87.50	150.00	100.00	200.00	500.00	500.00	250.00	2,237.50
VPKAS, Almora for Uttarakhand			100.00	100.00	250.00	100.00	365.00	200.00	200.00	500.00	450.00	150.00	2,415.00
Mini Mission-II													
Arunachal Pradesh	728.85	1,099.00	1,220.00	1,645.55	1,300.00	1,612.90	2,830.00	1,765.00	1,492.00	2,684.60	4,363.65	4,741.76	25,483.31
Assam	611.12	1,092.15	1,400.00	871.00	1,300.00	1,400.00	2,680.00	3,675.00	3,743.00	2,995.02	2,500.00	3,748.76	26,016.05
Manipur	487.03	685.00	638.00	1,286.25	1,500.00	1,700.00	2,228.00	2,500.00	3,029.00	3,951.00	4,650.00	4,893.00	27,547.28
Meghalaya	625.71	775.60	850.00	1,395.99	1,700.00	2,000.00	2,700.00	2,862.50	1,932.00	2,675.00	3,444.50	2,900.00	23,861.30
Mizoram	508.95	1,099.73	1,089.00	1,801.30	1,800.00	3,200.00	3,095.00	3,050.00	3,500.00	3,890.00	3,835.15	4,310.00	31,179.13
Nagaland	551.70	979.00	1,256.00	1,467.30	1,700.00	2,356.00	2,500.00	2,450.00	3,950.00	4,400.00	4,555.00	4,355.00	30,520.00
Sikkim	616.77	855.00	1,000.00	1,150.00	1,800.00	2,331.00	3,110.00	2,675.00	3,428.20	2,455.00	4,250.66	4,289.30	27,960.93
Tripura	512.40	785.00	900.00	1,111.30	1,500.00	1,400.00	2,400.00	1,700.00	3,000.00	2,620.00	3,950.00	4,480.00	24,358.70
Jammu & Kashmir			650.00	1,233.00	1,550.00	2,933.00	2,000.00	1,815.00	1,700.00	3,000.00	3,357.50	1,825.00	20,063.50
Himachal Pradesh			650.00	1,300.00	1,100.00	4,000.00	2,400.00	2,100.00	1,589.00	1,500.00	3,531.21	2,755.41	20,925.62
Uttarakhand			564.72	975.00	1,100.00	4,000.00	2839.94	2,000.00	1,700.00	2,900.00	3,000.00	1,023.35	20,103.01
Service charges & other Project based proposals	102.43	129.52	101.28	89.09	89.21	114.00	266.35	145.12	58.93	392.58	320.33	263.02	2,071.86
Mini Mission-III	1,380.00	1,350.00	1,020.00	1,672.49	1,350.00	850.00	1,175.00	801.95	400.00	1,573.18	1,963.18	1,341.76	14,877.56
Mini Mission-IV	350.00	75.00	100.00	620.00	200.00	300.00	700.00	600.00	2,050.00	2,761.62	3,241.82	2,300.00	13,298.44
Total	6,724.96	9,100.00	11,839.00	17,618.27	18,739.21	28,471.90	32,176.28	29,139.57	32,572.13	39,998.00	49,313.00	44,226.36	319,918.68

Source: SFAC



in the area under cultivation in the region as a whole. In case of vegetables, the annual rate of growth of production of vegetables is found to be higher than that of the per annum growth rate in the area under cultivation in the states of Meghalaya, Nagaland, Sikkim, and Tripura. While the areas under cultivation and production are relatively stable in Meghalaya and Tripura, they are found to be moderately stable in Nagaland and Sikkim. Favourable agro-climatic conditions in Meghalaya and Tripura offer tremendous scope for the cultivation of a wide variety of vegetables throughout the year. Improvement in irrigation facilities through the introduction of drip irrigation and sprinkler irrigation, protected cultivation of vegetables, provision of modern farm implements and tools, and other facilities to the farmers under the Technology Mission for Integrated Development of Horticulture have enabled the states to make remarkable progress in the production of vegetables. Despite a decline in the annual growth rate in the area under production by 0.65% in Arunachal Pradesh, the state has recorded an increase of 6.1% per annum in the production of vegetables. Improvement in irrigation facilities, expansion of protected cultivation system to avert the impact of harsh weather conditions, and adoption of organic farming to maintain soil fertility secure higher stability in both the area under cultivation and production of vegetables. Assam, Manipur, and Mizoram have been found to have brought more land under cultivation of vegetables but have not been able to increase production commensurately. Among these three states, Mizoram's vegetable production has been the least, growing at 2.7% per annum compared to an 11.1% annual increase in the growth rate of the area under cultivation. Though Assam is the major vegetable producing state in the region with low instability (5.5%) in the area under cultivation, yet the state has recorded a are some of the measures that may be undertaken to negligible per annum increase of 0.6% in production with moderate instability (17.29%) during the period. The small-sized scattered holdings in the state are a major hindrance in adopting large-scale production using modern technology. The region as a whole has witnessed 4.4 % and 2.9% annual growth rates in area and production of vegetables respectively with

a low instability index. This is an encouraging trend as farmers can diversify and adopt multi-cropping which will yield sustained income throughout the year besides making the region self-sufficient.

Arunachal Pradesh and Sikkim have recorded stable growth in the area under cultivation and production of spices during the period. Spice cultivation, thus, appears to be a viable alternative in the farm sector and should be encouraged in these states. For example, one of the major spices of Sikkim is ginger. ginger production has registered a 2.1% per annum growth rate. Spice cultivation also appears to have very good prospects in Assam. The state has recorded 9.1% per annum growth in the area under spice cultivation and a 19% annual growth rate in production. The average yield of the major spices, i.e., ginger, turmeric, chilli, and black pepper has increased over the years in the state. production of two of the major spice crops i.e., turmeric and chilli cultivated in Meghalaya and Nagaland. The region as a whole has witnessed a lower annual growth rate in production (3.4%) compared to the area under cultivation (7.6%). Spice production is found to be moderately unstable at 20.17%. This indicates that the region is yet to realise its true potential in Spice production.

Organically produced spices of the region, namely, the Lakadong turmeric which has high curcumin content, the less fibrous Nadia ginger, and the highly pungent Bird's eye chilli and King chilli have niche markets both within and outside the country.

The growth and proportionate increase in the annual rates of production, as compared to the area under cultivation, indicates that the budgetary support and policy directions under Technology Mission has made favourable conditions for optimum utilization of resources like soil and climatic conditions, use of high-quality seeds and better usage of technical know-how.

For further interaction, please write to:

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