Advancement in Horticultural Projects under the Integrated Development Mission in the Kolasib District

Dr Lalramnunmawii[1*], Dr R. Lalthankima[2], Dr Laltanpuii Ralte[3],

[1*]Associate Professor, Government Lawngtlai College,
[2]Associate Professor, Government Lawngtlai College,
[3]Associate Professor, Mizoram University.

Abstract
India's burgeoning horticulture sector, which has expanded considerably due to advancements in agricultural technology. It underscores the growing appreciation for the nutritional benefits of fruits and vegetables within a predominantly vegetarian society, alongside the cultural significance of flowers. India's varied climate, ample natural resources, and accessible technology offer substantial opportunities for horticultural development, promising poverty reduction, enhanced nutritional security, and higher farmer incomes. Furthermore, horticulture plays a vital role in the nation's agricultural GDP and overall growth objectives, supporting numerous agro-industries and generating employment opportunities.

Keywords: Agriculture, Horticulture, growth, Production, Climate, Security, Resources, Income, Industries, Employment

Introduction
The origin of horticulture can be traced back to the time when man began to cultivate gardens for growing vegetables and fruits. Before that man led a nomadic way of life. They kept on roaming around to hunt wild animals and collect plants and plant parts for their food. Soon after they consumed the food available in and around their place, they had to shift to another place where animals and plants were in abundance. Permanent settlement was not possible until they learnt to cultivate plants and domesticate animals. During those days, men solely depended on nature for their medicines, ornaments and food. The early men collected plants not only for their foodstuff but also for medicinal and cosmetic purposes. Evidence shows that as far back as 7000 B.C. women may have begun to cultivate a few wild plants which they had sampled and found edible.[1] As time passed, more plants were collected, cultivated and propagated, usually by seed.
Starvation frequently occurred during the early period of mankind which compelled them to explore ways to preserve food. On achieving the techniques of preservation, they realised that they do not need to wander around in the wild daily anymore. Thus, they began the permanent settlement. As their lives were more stable and secured, they again started to cultivate the area of land within and around their dwellings and planted seeds of different plants and vegetables. As the space they had within their area was limited, grains and other crops that need an extensive coverage were planted farther from their dwellings. However, for convenience, practicality, and perhaps even beauty, those vegetables and fruits that required intensive cultivation and extra care were grown closer home. Thus horticulture was born.
Mizoram covers the geographical area of 21,081 Sq. km., out of which 11.56 lakh hectares (55%) is identified as potential area for horticulture crops. However, only 11.96 % of the total potential area is covered so far which proves that there is still a vast scope for further development of horticulture in the State[2]. It is, therefore, a very big challenge to utilise as many as the identified potential area for attaining self-sufficiency and achieving economic growth in Mizoram.
Horticulture (Latin hortus = garden; cultura = cultivation), is the science and art of growing fruits, vegetables, flowers, shrubs and trees[3]. It originally meant the practice of gardening and, by extension, now means the cultivation of plants once grown in gardens. It includes the growing of fruits (especially tree fruits), production of vegetable crops, production of flowers, and ornamental horticulture, known as landscaping gardening, which includes the maintenance and design of home grounds, public gardens and parks, private estates, botanical gardens, and recreational areas such as golf courses, football fields and baseball diamonds.
Horticulture development programmes currently implemented in the state may be discussed as follows:

Mission for Integrated Development of Horticulture (MIDH)
This paper outlines the development of horticulture in Mizoram, specifically focusing on the Mission for Integrated Development of Horticulture (MIDH). It details how MIDH, a centrally sponsored scheme, superseded previous initiatives like the Horticulture Mission for Northeast & Himalayan States (HMNEH) to foster comprehensive growth in various horticulture sectors across India, with a particular emphasis on Mizoram. The text also examines the implementation of

[1] Halfacre, Gordon R., & Barden, John A., (1979), *Horticulture*, New Delhi: McGraw-Hill Book Company, pp.1.
[2] Department of Horticulture, *Important Achievements of Horticuture Department during 2019-2020.*(2020), pp.1.
[3] Singh, Bijender, (2009), *Horticulture at a glance*, New Delhi: Kalyani Publishers, pp.1.

MIDH in Mizoram, highlighting financial allocations, covered areas, and specific activities undertaken, such as production of planting materials, fruit and vegetable cultivation, water source creation, and post-harvest management. Furthermore, the document presents survey results from Kolasib district regarding beneficiaries' experiences with land ownership, financial assistance, training participation, and access to extension services. The MIDH was formulated in 2014-2015 and became operational in the same year. It integrated various on-going horticulture schemes in different parts of the country. The schemes which were subsumed by the Mission to be its sub-missions are:
The provided text outlines several key Indian government initiatives and organizations dedicated to the advancement of horticulture. It details the establishment dates and scopes of programs like the National Horticulture Mission (NHM), launched in 2005-2006 for most regions, and the Horticulture Mission for Northeast & Himalayan States (HMNEH), created in 2010-2011 to address specific regional needs. The document also introduces the National Bamboo Mission (NBM) from 2006-2007, and significant boards such as the National Horticulture Board (NHB), formed in 1984 for integrated development, and the Coconut Development Board (CDB), established in 1981 to boost coconut productivity. Finally, it mentions the Central Institute for Horticulture (CIH), a 2006 institution providing technical support for the Northeast region.

The provided text outlines the organizational framework for the Mission for Integrated Development of Horticulture (MIDH), detailing its multi-tiered implementation strategy. It describes the governance structure from the national level, featuring a General Council and Executive Committee, down to state-level committees and the involvement of Panchayati Raj Institutions in local operations like crop identification and feedback. The document also identifies various technical support groups and their respective roles, such as the National Horticulture Board supporting certain missions and the National Centre for Cold-chain Development assisting with post-harvest management. Additionally, it notes the possibility of engaging external service providers to offer specialized technical assistance, subject to approval by the Executive Committee.

MIDH in Mizoram
MIDH has been implemented in Mizoram since the inception of the programme in 2014. As a matter of fact, it is merely a continuation of the on-going scheme of Horticulture Mission for Northeast and Himalayan (HMNEH) which had commenced from 2010-2011 (formerly known as Technology Mission for Northeast (TMNE). It is regarded as the most important horticulture scheme being implemented in the state as it is formulated solely for the development of horticulture throughout the country. As Horticulture Department was assigned to be the agency for formulation of the Mission's components and their implementation, it has worked out various areas of horticulture activity from the very start of the mission.

Fund Allocation and Areas of Implementation under MIDH in Mizoram for 2014-2021

Sl. No	Component	2014-2015			2016-2017			2017-2018			2018-2019			2019-2020			2020-2021		
		Physical Target (Ha)	Target Covered (Ha)	Financial Alocation (in Lakhs)	Physical Target (Ha)	Target Covered (Ha)	Financial Alocation (in Lakhs)	Physical Target (Ha)	Target Covered (Ha)	Financial Alocation (in Lakhs	Physical Target (Ha)	Target Covered (Ha)	Financial Alocation (in Lakhs)	Physical Target (Ha)	Target Covered (Ha)	Financial Alocation (in Lakhs)	Physical Target (Ha)	Target Covered (Ha)	Financial Alocation (in Lakhs)
I	Production of planting Materials			100			50	5	5	50			20						
II	Establishment of new Garden																		
	1.Fruits	1492	1492	690.70			523.3251100	1070	1070	1014	600	600	348	980	980	639.95	1550	1550	905.05
	2.Vegetables	140	140	35	400	400	20	560	560	140	500	500	125	708	708	177	700	700	175
	3.Flowers	52	52	26	50	50	25	20	20	10	80	80	40						
	4.Spaces	480	480	72	340	340	51	61.66	61.66	9.25	300	300	45	550	550	82.50	500	500	75
	5.Aromatic Plants	10	10	4															
	6.1st Year of Maintenance	825	825	87.56	270	270	45	380	380	62	730	730	202	500	500	110	500	500	140
	7.2nd Year of Maintenance	1000	1000	87															
III	Rejuvenation/ Replacement of Senile Plantation, canopy Management	2000	2000	400	1600	1600	320	500	500	100							600	600	120
IV	Creation of Water Sources	596 No	596 No	681	162 no	162 no	266.3	690 no	690 no	862			450			415			550
V	Protected Cultivation	279995 sqm	279995 sqm	692.59			481.8						470.85			244.95			431.84
VI	Integrated Pest/ Nutrient Management (IPM/INM)	8740	8740	104.88	15000	15000	180	19867	19867	238.4	13000	13000	156				10000	10000	120
VII	Establishment of Centre of Excellence for Horticulture	1 No	1 No	500	4 no	4 no	100												
VIII	Pollination Support through beekeeping	2655 N0	2655 N0	21.24			723			186									
IX	Horticulture Machanization	650 No	650 No	97.50	888 no	888 no	186						140						112.5
X	Human Resource Development			175.17			30						174.52			93			77
XI	Intergrated Post Harvest Management			36.4						140			50			128.5			244.2
XII	Special Intervention			10									110						
XIII	Mission Management			278						798.46			268.4			262.405			258.99

The above table outlines the annual financial allocations and strategic shifts within a horticulture development scheme in Mizoram from 2014 to 2021. It details how funds were distributed across various activities, highlighting changes in component emphasis each year, such as the introduction of Research and Development or marketing infrastructure. The document also notes the successful utilization of allocated funds and the achievement of target land coverage for cultivation. Furthermore, it points out modifications in the scheme's components over time, including the addition and

removal of specific activities, and the alteration in funding patterns for Northeastern states. Overall, the source provides a chronological overview of the scheme's implementation, financial management, and evolving priorities.

Implementation of the Scheme

This discusses **Mizoram's continued involvement** in the Horticulture Mission for Northeast and Himalayas (HMNEH), even after its integration into the Mission for Integrated Development of Horticulture (MIDH) in 2014. **HMNEH's success** in states like Mizoram actually influenced the creation of MIDH. Initially, Mizoram and other Northeastern states received **complete central government funding** for HMNEH. However, starting from the 2015-2016 fiscal year, the **funding structure changed** to a 90:10 ratio, with both the Central and State Governments contributing.

The provided text discusses the implementation of the HMNEH/MIDH scheme across all districts of Mizoram. It highlights how thousands of farmers have received assistance since the program's inception. The document emphasizes the crucial role of various horticultural offices and technical field staff, such as Demonstrators and Circle Officers, in the scheme's success. These personnel are credited with monitoring, inspecting, and guiding farmers, even in remote regions. Finally, the text indicates that HMNEH/MIDH has supported various important horticulture crops and activities.:

1. **Production of Planting Material**: This emphasizes the critical role of high-quality planting material in achieving superior crop yields and produce quality, extending beyond just fruits to all agricultural products. It highlights the increasing challenges in horticulture, such as global climate change, rising pest threats, and growing demand for produce, which necessitate the development of more resilient crops. To address these issues, the Horticulture Department has implemented various initiatives, including establishing High-Tech Nurseries, importing planting materials and seeds, and upgrading existing nursery infrastructure to meet accreditation standards. Since its inception in 2014-2015, this scheme has seen significant investment, with approximately 35 lakh rupees spent to cover around 38 hectares of land.
This describes the implementation and status of High Tech Nurseries within Mizoram's Horticulture Centres of Excellence, noting that only the Lunglei facility currently operates as such. These nurseries utilize advanced technology for temperature control, vending, and irrigation. Additionally, the text highlights the importance of importing planting materials for certain crops, like Dragon Fruit and Anthurium, which were initially unfamiliar to the region but have since significantly contributed to the development of planting materials in Mizoram. This strategic blend of local innovation and imported resources aims to enhance agricultural productivity.

Development of nurseries owned and managed by the Department to be able to get accreditation has also been an important task under the scheme. The Department has established nurseries in every district, division and subdivision to meet the demands of the farmers. All the Department-owned nurseries could successfully get accreditation but subject to revision after every 5 years. This accreditation is given by Central Institute of Horticulture, Nagaland.

2. **Fruits**: This describes a scheme focused on fruit cultivation. It highlights the importance of fruit development since the mission's beginning, listing a variety of fruits like Dragon Fruit, Kiwi, and Mango included in the program. The scheme encompasses several subcomponents such as establishing new gardens, providing first and second-year maintenance, and managing existing plantations through rejuvenation or replacement. Financially, the initiative has allocated approximately 7116 lakhs and has impacted around 22130 hectares of land. This document clearly outlines the scope and progress of this fruit development effort.
3. **Vegetable**: This outlines a significant agricultural scheme focused on vegetable production within a specific state. This initiative has been active since its inception, demonstrating a substantial financial investment of approximately 1551 lakhs rupees to cultivate over 5881 hectares of land. The scheme encompasses the growth of a diverse range of vegetables, including various types of tomatoes, cabbages, broccoli, lady's finger, beans, and capsicum. To enhance output, the department has acquired hybrid seeds from other regions.
4. **Flower**: The cultivation of Anthurium and other flowers, which was a significant undertaking from the scheme's inception until 2018-2019. Over 272 hectares of land were utilized for this purpose, with an investment exceeding Rupees 454 lakh. Since its 2006 import from Holland, Anthurium has emerged as a highly sought-after flower within the state, even being exported nationally and internationally. The MIDH intervention played a crucial role in boosting its production, meeting high demand for diverse occasions like funerals, weddings, and government functions.
5. **Spice:** The cultivation of spices has been a continuous and significant component of the MIDH initiative since its beginning. This agricultural effort specifically focuses on turmeric, chili (categorized as a seed spice), and ginger. The program has successfully encompassed approximately 2,812 hectares of land, incurring an expenditure of around Rs. 454 lakhs to date.
6. **Mushroom**: The government initiative to promote mushroom cultivation under the MIDH program. This program, active for three years from 2015 to 2018, specifically focused on Oyster Mushroom cultivation. To support farmers, the Department established several nurseries across different districts, including Aizawl, Lunglei, Mamit, Champhai, and Kolasib. These nurseries were crucial for providing subsidized planting material, known as spawn, directly to the farmers, thereby facilitating the adoption of mushroom farming.

7. Aromatic Plant: this discusses an initiative focused on cultivating aromatic plants for the purpose of extracting essential oils, recognizing their importance for human well-being. This specific program, which included Aloe Vera and Citronella cultivation, was implemented for a limited two-year period from 2014 to 2016. During its operation, approximately Rs. 20 lakhs were invested to cover 50 hectares of land, indicating a concentrated effort to integrate these plants into the scheme.

8. Creation of Water sources: The crucial role of water availability for successful crop cultivation, particularly in Mizoram, where monsoon rainfall is abundant but dry season farming presents challenges. To address this, the MIDH sub-component 'Creation of Water Sources' has been implemented annually to provide water for winter/Rabi crops. This initiative has resulted in the construction of 44 community water tanks and approximately 3093 individual water tanks, with initial individual tanks being Reinforced Cement Concrete (RCC) before transitioning to prefabricated and Geomembrane tanks with capacities of 15,000-20,000 liters.

9. Protected Cultivation: The growing popularity of protected cultivation, such as greenhouses and shade houses, for horticultural crops in Mizoram. This surge is largely attributed to government-sponsored schemes like MIDH/HMNEH and RKVY, which offer substantial financial support. These structures primarily serve to shield crops from harsh weather conditions and enable off-season cultivation. Furthermore, they are utilized for producing high-quality planting materials for various vegetables, fruits, and flowers, highlighting a significant investment in this agricultural method within the state.

10. Promotion of Integrated Pest Management (IPM): The critical need for special care in horticulture crops to maximize their yield, acknowledging that various enemies, particularly pests, threaten their productivity and survival. To combat this challenge, Pest Management has been a core component of crop cultivation efforts since its inception, with significant financial investment and land coverage. The approach extends beyond mere pesticide distribution, emphasizing comprehensive knowledge transfer through training, demonstrations, and ongoing oversight regarding the safe and effective handling of these chemicals.

11. Promotion of Integrated Nutrient Management (INM): This highlights a key initiative aimed at enhancing horticultural crop health and yield. Soil fertility naturally declines after a few years of cultivation, necessitating interventions to sustain productivity. To address this, the Mission for Integrated Development of Horticulture (MIDH) has consistently promoted Integrated Nutrient Management since its inception. This ongoing effort focuses on providing ample fertilizers and other essential nutrients to the soil. As a result of these measures, over 62,235 hectares of land have been successfully treated, with significant financial investment, demonstrating a commitment to agricultural sustainability.

12. Pollination Support through Beekeeping: This highlights the longstanding recognition of bees as crucial pollinators and their significant role in horticultural development. It specifically mentions the implementation of the Honeybee Colony and Bee Hives initiative under MIDH during the 2014-2016 period. Financial resources, exceeding Rs. 30 lakh, were allocated to this program, demonstrating a substantial investment. The funds were primarily used for the distribution of approximately 4,335 ready-made beehives to apiarists, underscoring an effort to support and expand beekeeping practices.

13. Horticulture Mechanization: This provided the benefits of agricultural mechanization, particularly in horticulture. It highlights how machines can improve land preparation, weeding, and harvesting efficiency. The document further explains that mechanization leads to faster work, higher quality products, and reduced labor needs. Specifically, it mentions the significant financial investment made by MIDH/HMNEH in Mizoram, spending over 838 lakh rupees to acquire more than 4800 pieces of equipment, which were subsequently distributed to farmers at subsidized rates. This initiative underscores the importance of machinery in modernizing agricultural practices.

14. Human Resource Development: Development of manpower has always been the most noticeable feature of government initiatives as their success or failure very much depends on the personnel who are in-charge. In the case of MIDH as well, various necessary steps have been taken to develop human resources both officials and farmers of the state. The fund utilized against each activity for Human Resource Development under the scheme are as below:

a)	Training of farmer (within the state)	Rs. 270 Lakhs
b)	Training of farmers (outside the state)	Rs.107 Lakhs
c)	Exposure visit of farmers (outside the country)	Rs. 56 Lakhs
d)	Training/Study tour of technical staff/field staff (within the state)	Rs 49.26 Lakhs
e)	Study tour of technical staff/field staff to progressive states.	Rs.177 Lakhs
f)	Training/Study tour of technical staff/field staff (Outside India)	Rs. 186 Lakhs
g)	HRD for Gardener/Skill Development	Rs. 81 Lakhs

15. Integrated Post Harvest Management: Post harvest management has been one of the most challenging tasks in both agriculture and horticulture. Once crops are harvested, some need further treatments before reaching the consumers. This is necessary for maintaining value, value addition, availability of supplies during the off season, etc., since most horticulture crops are highly perishable if left untreated. So far, more than Rs. 1678 lakhs have been spent to undertake the following activities under the component -Integrated Post Harvest Management.

a) Construction of 169 Pack Houses (9mx6m) at the expense of Rupees 338 lakhs.
b) Construction of 1741 Pusa Zero energy cool chambers (100kg) by spending Rupees 34 lakhs (approx).
c) Construction of 73 Evaporated/low energy cool chambers (8mt) with the expenditure of more than Rupees 180 lakhs.

d) Setting up of 10 Integrated Pack Houses with facilities for conveyer belt, sorting, grading units, washing, drying and weighing by spending Rupees 250 lakhs (approx).
e) Purchase of 13 Refrigerated Vans/Transport vehicles with an expenditure of Rupees 149 lakhs (approx).
f) Setting up of 25 Cold Rooms (Solar based storage facilities) with an expenditure of Rupees 187.5 lakhs (approx.).
g) Setting up of 36 Primary Processing Unit (Solar based drier) with an expenditure of Rupees 79 lakhs (approx).
h) 399 Ripening Chambers with an expenditure of Rupees 199 lakhs (approx).

16. Mission Management: Efficient management is essential for the successful implementation of any scheme whether it is of a Central or State government. Mismanagement may lead to the failure of the scheme even if a huge amount of fund is allocated. To ensure effective and efficient management of the scheme, the following activities have been undertaken under MIDH in Mizoram.
a) Administrative expenses for State & District Mission Offices and implementing agencies, project preparation, computerization of offices, contingency etc.
b) Institutional strengthening, hire and purchase of vehicle, purchase of computers.
c) Seminar, workshops, exhibitions, Kisan Mela, Horticulture Show, Honey festival at District, State and National level.
d) Information dissemination through publicity, literature in a printed form, advertisement etc.
e) Development of technology packages in electronic form to be shared through IT network.
f) Baseline survey and strengthening horticultural statistical data base.

17. Establishment of Market Infrastructure for Horticulture Crops: MIDH/HMNEH has been formulated and implemented not only to increase productivity and expansion of areas under cultivation alone but improving the economic status of horticulture farmers as well. Thus, establishment of market infrastructure, where farmers can sell off their products, has been an important component of the scheme since the first year of implementation. So far, Rs. 370 lakhs (approx.) has been spent to undertake the following activities-
a) Purchase of Mobile Vending Cart: 400 vending carts were purchased and distributed to the fruits and vegetables vendors free of cost.
b) Construction of Rural Market/Apni Mandies/Direct Market: 20 markets were constructed at roadsides, mostly along the national highways in different villages where rural farmers can sell their produces.
c) Retail Outlet: 4 (four) retail outlets were constructed under the scheme where horticulture crops such as fruits, vegetables are sold at retail price.

18. Research and Development: This component of work had been carried out in 2015-2016 only. Rs. 23 lakhs were spent for the purpose.

19. Organic Farming: Under the scheme, the component - Organic Farming was carried out in 2015-2016 only. For this purpose, Rs. 12 lakhs were spent to set up 25 Vermicomposting units.

20. Special Intervention: Under this component of the scheme, some portion of fund was reserved for emergent and unforeseen circumstances. However, this component of the scheme was carried out in 2014-2015 and 2018-2019 only with an expenditure of Rs. 120 lakhs.

21. Formation of Farmer Interest Groups (FIGs)/Farmer Producer Organisations (FPOs): As the need for formation of FIGs and FPOs in the guidelines of the scheme was highlighted, the Department took initiatives to set up societies/associations for the smooth implementation of the scheme and to ensure the welfare of the farmers. Mizoram Dragon Fruit Association, Mizoram Anthurium Growers Association at village, district and state level etc., are important associations formed with the assistance received under the scheme. These associations have been playing many important roles for promoting the welfare of their members since their formation. The cooperation and collaboration with the Department has contributed to the promotion of horticulture within the state.

Marketing

The different mechanisms for selling off the produces by the respondents are reflected in the below table. Respondents who sold their produces to the intermediaries are highest in number with 43.39 percent followed by 18.87 percent who sold their produces directly in the market. 13.21 percent sold both directly and through intermediaries, while 9.43 percent sold their produces through the arrangement made by the concerned department as well as the intermediaries and 7.55 percent each sold through department arrangement alone and those who did not sell any of their produces.

The intermediaries are mostly people of the state who procure the items for resale at higher prices in the urban areas. They mostly collect the produces at-farm on cash payment while a few take on credit and pay at a later date. The marketing provision provided by the Horticulture Department is mainly in terms of creation of infrastructure, that is, road-side market for the farmers. During the COVID-19 pandemic the farmers sold their produces to the Department who further sells them to the Local and Village Level Task Force for resale to the members of their locality or villages.

Table showing Marketing of the produces

Sl.No	Mode of selling	Kolasib	Percentage
1	**Sold directly**	**9**	**15.78**
2	**Sold intermediaries**	**27**	**47.36**
3	**Through Dept arrangement**	**-**	**-**
4	**Through both Sl.No 1 and 2**	**9**	**15.78**
5	**Through both Sl.No 2 and 4**	**-**	**-**
6	**Not sold**	**12**	**21.05**

The reason cited by the respondents who did not sell their produces was due to low production in terms of quantity, which was only sufficient for the family consumption. Those who sold directly did so by vending their produces in the local markets.

In Kolasib district, those respondents who sold their produces to intermediaries are highest in number constituting 43.39 percent of the total number of respondents of the district. They are followed by both respondents who sold directly in the market only and respondents who sold both directly and to the intermediaries constituting 18.86 percent each. However, there are respondents who did not sell their produces contributing 7.54 percent of respondents.

Table showing Marketing of the produces (Crop/Trade Wise)

Sl. No	Mode of selling	No of Respondents (Crop/Trade Wise)				Total	Percentage
		Fruits	Vegetables	Flower	Infrastructure		
1	Sold directly	12	9	3	6	**30**	**18.86**
2	Sold to Intermediaries	15	21	15	18	**69**	**43.39**
3	Through Dept Arrangement		6		6	**12**	**7.54**
4	Both Sl No. 1 and 2	6	9	6		**21**	**13.20**
5	Both Sl No. 2 and 3	9	3		3	**15**	**9.43**
6	Not Sold	6			6	**12**	**7.54**

Every crop/trade under the scheme also witnessed highest number of respondents who sold produces to the intermediaries. Regarding their number, respondents with vegetables constituted 30.43 percent followed by infrastructure with 26.09 percent and fruits and flowers with 21.74 percent each.

Marketing Problem

Table in below shows the number of respondents with problems and those having no problem in marketing their produces. 54.72 percent of respondents could sell their produces without any obstacle whereas 45.28 percent are facing some problem in marketing their produces.

In Kolasib district, 57.89 percent of respondents respectively have not experienced any difficulties in selling off their produces whereas 42.11 percent from Kolasib, are hampered by some problem in one way or another.

Table showing Problems/Issues in selling off the horticulture crops

SN	District	Crop/Trade	Respondent with no problem	Respondents with problem
1	**Kolasib**	Fruit	9	6
		Vegetable	9	3
		Flower		12
		Infrastructure	15	3
4	**Total**		**33**	**24**
5	**Percentage**		**57.89**	**42.11**

The nature of problem and the number of respondents belonging to different crops/trades among those facing problems in marketing is highlighted in the above table shows Multiple responses have been stated during the interview with the beneficiaries. Lockdown imposed due to the pandemic during 2020-2022 has been the biggest problem which the respondents have dealt with. Producing more than what can be sold off in the available market (mostly local markets) is the second biggest problem in marketing. Several respondents from all four trades have stated this as a problem faced.

Inconvenience in transportation also has caused a lot of problem for some respondents, especially those dealing with vegetables as most farms are located in areas without proper road connectivity and thus, beyond the reach of any type of vehicle.

Post Harvest Management

Table showing Utilisation of Post Harvest Management

Sl No	District	Crop/Trade	No. of Respondents undertaking PHM	No. of Respondents with no PHM
1	Kolasib	Fruit	6	9
		Vegetable	0	12
		Flower	0	12
		Infrastructure	0	18
2	**Total**		**6**	**51**
3	**Percentage**		**10.52**	**89.48**

The above table represents the number of respondents who have or have not utilized Post Harvest Management activities. Post Harvest Management activities such as preservation in Cold Storage Facilities, Value Addition etc., have been undertaken by 10.52 percent of the respondents while 89.48 have not incorporated post-harvest management processes.

Regarding the number of respondents based on crop or trade who have not taken post-harvest management activities, vegetable, flower and infrastructure has highest number of respondents with 100 percent followed by fruits with 60 percent. 40 percent respondent under fruit have undertaken post-harvest management. The post-harvest management utilised by the respondents was mainly confined to use of cold storage facility.

Regarding the cold storage there exist in Kolasib district which are run by the concerned department. Further, the cold storage facilities are of basic standard without compartmentalised temperature control which has rendered the facility unsuitable for certain crops.

Future Plans
Table showing Future Plan of the Respondents

Sl.No	District	Crop/Trade	Respondents who can grow/expand	Respondents who can continue with further assistance	Can't Say	Respondent who already quit
1	**Kolasib**	**Fruit**	3	12	Nil	Nil
		Vegetable	3	6	3	Nil
		Flower	Nil	12	Nil	Nil
		Infrastructure	9	9	Nil	Nil
2	**Total**		**15**	**39**	**3**	**Nil**
3	**Percentage**		**26.31**	**68.42**	**5.26**	**Nil**

The above table reflects the future plan of the respondents in relation to the continuance of their trades. Respondents who think that they can continue their horticulture activities only with the assistance from government or any other institutions are highest in number constituting 68.42 percent of respondents. They are followed by those who think they can grow and expand their activities even without additional assistance at 26.31 percent. 5.26 percent unable to specify their ability to continue who are confined in the district.

Additional Aid and Income Source

Table showing Additional source of income

Sl.No	District	Crop/Trade	Respondents with other Regular source of income	Respondent without other Regular source of income
1	**Kolasib**	**Fruit**	15	0
		Vegetable	12	0
		Flower	12	0
		Infrastructure	18	0
4	**Total**		57	-
5	**Percentage**		**100**	**-**

Table above depicts the number of respondents who have regular source of income in addition to their income from the horticultural activity and those who do not have any other source of income. The study area/ district has the highest number wherein all respondents have other regular source of income.

Table showing Farmers with additional back up from the Dept

SN	District	Crop/Trade	Respondents with additional back up	Respondents without additional back up
1	**Kolasib**	**Fruit**	12	3
		Vegetable	6	6
		Flower	12	0
		Infrastructure	6	12
4	**Total**		**36**	**21**
5	**Percentage**		**63.16**	**36.84**

As can be seen in the above table respondents receiving additional assistances/back up from the government stands at 63.16 percent while 36.84 percent have not received any back up other than assistance they received under the scheme.

In respect of the number of respondents based on different crops/trade who received additional back up, flower contributed the highest in additional back up as 100 percent received back up followed by fruit respondent contributing 80 percent. Vegetables contributed 50 percent while infrastructure contributed 33.33 percent respectively. Regarding respondents who are without additional back up, infrastructure constituted 66.68 percent while vegetables have 50 percent and fruit has 20 percent of respondents.

RESULTS AND DISCUSSION

The impact of horticultural development schemes in Mizoram, India. It highlights how various government initiatives, both central and state-sponsored, have positively influenced the socio-economic well-being of horticulture farmers. The text indicates that these schemes have led many residents, particularly in rural areas, to adopt horticulture as a primary or supplementary source of income, thereby boosting the state's economy. The document outlines a research methodology focusing on the Kolasib district to analyze the schemes' implementation, their effects, and the future plans of both beneficiaries and the implementing agency, using 57 farmer and 8 official respondents.

The Mission for Integrated Development of Horticulture (MIDH), a significant agricultural initiative in Mizoram, India. Formerly known as the Horticulture Mission for Northeast and Himalayas (HMNEH), this program has allocated substantial funds and covered over 80,000 hectares of land across all districts. However, the document highlights a potential overstatement of area coverage due to recurring funding for the same beneficiaries and land under certain scheme components. The paper will specifically examine factors influencing horticulture management in Kolasib District, focusing on aspects like land ownership, beneficiary assistance, group membership, training participation, and extension services.

Extension Services

Technical/extension guidance from the concerned department was received by 90.57 percent of the respondents in the course of their work whereas 9.43 percent did not receive any guidance.

Table showing Whether received technical/extension Guidance?

Sl.No	District	Crop/Trade	Yes	No
1	**Kolasib**	**Fruit**	9	6
		Vegetable	12	
		Flower	12	
		Infrastructure	15	3
4	**Total**		**48**	**9**
5	**Percentage**		**84.21**	**15.79**

Among the respondents in Kolasib district, 84.21 percent received guidance from the concerned department whereas 15.79 percent carried out their activities without any guidance. Of the respondents with fruit, 60 percent were given guidance from the department more than once while 40 percent did not received any guidance or supervision. In respect of the number of respondents with vegetables as well as those with flowers, 100 percent received guidance from the department and there is not a single respondent who worked without any guidance. Regarding the respondents under infrastructure, 83.33 percent received guidance or supervision whereas 16.67 percent of them worked on their own.

This paper examines the development and challenges within the horticulture sector in Mizoram, India, specifically focusing on the impact of government schemes like MIDH . It begins by establishing the national importance of horticulture in India and then traces its historical progression in Mizoram, from traditional practices to modern departmental initiatives. The research identifies key issues hindering success, such as delayed funding, staff shortages, political interference, and an unstable market, alongside environmental factors like rugged topography and water scarcity. Finally, the text proposes actionable solutions including timely fund release, increased staffing, improved quality control

of planting materials, and enhanced market stability, to foster the continued growth and potential of horticulture in the region.

The study on horticulture in Kolasib District highlighted several major findings regarding the administration, farmers' profiles, implementation of schemes, challenges faced, and the overall impact of horticulture development.

Here are the major findings:

- **Department of Horticulture's central role**: The Department of Horticulture, Government of Mizoram, has been the most important institution for horticulture administration in the state since 1993, operating through its Directorate and offices at district, sub-division, and circle levels.
- **Demographics of horticulture farmers**:
  - **Age**: The largest group of horticulture farmers under the schemes falls in the **51-60 age bracket**, while farmers aged 18-30 and 31-41 are the least in number. This suggests that the most effective workforce is engaged in other activities, leading to a need for additional labour, which in turn creates employment avenues.
  - **Education**: Most farmers have passed **Middle School standard**, with very few holding master's degrees. No illiterate farmers were found to be undertaking horticulture activities under the schemes.
  - **Gender disparity**: There is a significant gender disparity, with **male beneficiary farmers constituting approximately 70 percent** and females only 30 percent across the three schemes.
- **Land holding and ownership**:
  - **Land size**: More than half of the farmers operate on **less than 1 hectare of land**, indicating that land holdings are generally not vast enough for large-scale production.
  - **Ownership**: Approximately **86 percent of farmers conduct their horticulture activities on their own land**, while the rest use borrowed land.
- **Farmer association membership**: About **70 percent of respondents are members of at least one Farmers Interest Group (FIG)**, which are found to significantly contribute to farmer welfare and problem-solving.
- **Training and support**:
  - **Training participation**: A high percentage, **78.87 percent, of respondents have undergone at least one or two trainings** organized by the implementing agency.
  - **Training helpfulness**: Of those who attended, **93.08 percent found their training helpful** in their work.
  - **Follow-up support**: **80.93 percent of beneficiaries received follow-up technical guidance, inspection, and monitoring** from the implementing agency to ensure effective utilization of assistance.
- **Problems faced by farmers**: Most farmers encounter one or more problems, with **plant diseases, pests, and scarcity of water** being common issues.

- **Marketing challenges**:
  - **Sales channels**: Farmers primarily sell their produce to **intermediaries (39.06 percent)**, while some sell directly in the market or through departmental arrangements. A portion of farmers did not sell any of their produce.
  - **Marketing problems**: Approximately **half of the beneficiaries faced marketing problems**, including the impact of the Covid-19 pandemic, unstable markets, and competition from imported commodities.
- **Profitability of horticulture activities**:
  - **Income levels**: The largest group, about **40 percent, made profits between Rupees 50,000-99,000 per year**, while only 9 percent earned more than Rupees 1 lakh per year.
  - **Unprofitable ventures**: **8 percent of respondents still failed to make a profit** from their horticulture activities.
- **Post-harvest management**: Most respondents **could not utilize available post-harvest management facilities** like cold storage, sorting, and grading facilities, and value addition activities were rarely undertaken by beneficiaries.
- **Increased horticulture coverage**: The implementation of MIDH has led to **significant progress in increasing horticulture coverage**, successfully achieving target areas for almost a decade. Consequently, about **13 percent of the identified horticulture potential area in the state is now utilized** for cultivation.

LIMITATION

The study on horticulture in Mizoram had several limitations. These limitations primarily relate to the scope and representativeness of the research:

- **Confinement to specific schemes and districts:** The study was limited to one specific scheme: Mission for Integrated Development of Horticulture (MIDH). Furthermore, it was conducted only in selected districts which is Kolasib.
- **Exclusion of other significant schemes:** The study did not include other horticulture schemes implemented in the state, such as those in collaboration with the National Bank for Agriculture and Rural Development (NABARD), Japan, NLUP, SEDP, Article 275 (1), and the National Bamboo Mission (NBM). These excluded schemes have received considerable funding and are believed to have had an impact on Mizoram's horticulture context.
- **Limited representation of the state's horticulture scenario:** Because the study was confined to only one districts, it may not fully represent the entire horticulture scenario in Mizoram.

CONCLUSION

The conclusion drawn from the significant efforts made in horticulture development in Kolasib District, the progress achieved, and the persistent challenges that hinder full realization of its potential.

• **Significant Efforts and Investment**: Both the Government of India and the State Government have put considerable effort into horticulture development in Kolasib District through various Centrally Sponsored Schemes (CSS) and State Schemes. These efforts include substantial fund allocation, dissemination of expertise through training, technical guidance, and market arrangements.

• **Progress and Achievements**: Notable progress has been made under schemes such as Mission for Integrated Development of Horticulture (MIDH). As a result of these initiatives, Mizoram was recognized as the 'Best Horticulture State' in 2019. Approximately 13,200 hectares of land have been covered under the horticulture sector.

• **Unrealized Potential**: Despite the progress, horticulture only covers 11.96 percent of the identified horticulture potential area in the state, indicating substantial room for further development.

• **Persistent Problems Hinder Desired Results**: The study concludes that desirable results have not been fully achieved due to several identified problems. These include:

◦ Cultivation of poor-quality planting materials.
◦ Shortage of technical and non-technical staff to oversee the schemes effectively.
◦ Selection of undeserving beneficiaries.
◦ Absence of a stable market for horticulture produces.

• **Overall Importance of Horticulture**: Horticulture is recognized for its vital contributions to people's well-being, providing nutrition, generating income, achieving sustainability for small land holdings, creating employment, and protecting the environment. Its significance in India was truly recognized in the 1980s, and it has since become a major sector with substantial government investment (over 2000 crores). India stands as the biggest producer of fruits and vegetables in the world, second only to China.

Reference

1. Acquaah, George, (2009), *Horticulture: Principles and Practices*, London: Pearson Education.
2. Adams, C.R., and Early, M.P., (2004), *Principles of Horticulture*, Oxford: Elsevier.
3. Arunachalam, R., and Seetharaman, Netaji., (2004). *Sustainable Agriculture*, Jodhpur: Agrobios.
4. Azad, K.C, Swarup, R. and Sikka, B.K., (1988), .*Horticultural Development in Hill Areas,* Delhi: Mittal Publications.
5. Banerjee, Utpal, (2008), *Horticulture*, Jaipur: Mangal Deep Publication.
6. Bhattacharjee, S.K., (2006), .*Advances in Ornamental Horticulture*, Jaipur: Pointer Publisher.
7. Chadha, K.L, Singh, A.K, Singh, S,K and Dhillon, W.S., (2013), *Horticulture for Food and Environment Security*, New Delhi: Westville Publishing House.
8. Christopher, E.P., (2009), *Introductory Horticulture*, New Delhi: Biotech Books.
9. Deb. Bimal.J and Ray, B.Datta, (2006), Changing Agriculture Scenario in North East India, New Delhi: Concept Publishing Company.
10. Eckman, Karlyn and Ralte, Laltanpuii, (2015), *Integrated Land Use Management in the Eastern Himalayas*, New Delhi: Akansha Publishing House
11. Gupta, Mukesh, (2004), *Organic Agriculture Development in India*, Jaipur: ABD Publishers.
12. Ghosh, S.P., (1985), *Horticulture in North-Eastern India*, New Delhi: Associated Publishing Company.
13. Kaul, G.L., (1989), *Horticulture Crops in India*, New Delhi: Anmol Publications.
14. Malik, Mahmood. N., (2010), *Horticulture*, New Delhi: Biotech Books.
15. Maithani, B.P., (2005), *Shifting Cultivation in North-East India: Policy Issues and Options,* New Delhi: Mittal Publications.
16. Meena, R.K. and Yadav, J.S., (2001), *Horticulture Marketing and Post Harvest Management*, Jaipur: Pointer Publishers.
17. Palaniappan, S.P and Annadurai, (2003), *Organic farming: Theory and Practice*, Jodhpur: Scientific Publisher.
18. Peter, K. V., (2009), *Basics of Horticulture*, New Delhi: New India Publishing Agency.
19. Prakash, N. Roy, S.S. Sharma, P.K and Ngachan, S.V., (2013), *Developing the Potential of Underutilized Horticultural Crops of Hill region*, New Delhi: Today and Tomorrow's printers and Publisher.
20. Prasad and Kumar, (2005), *Principle of Horticulture*, Jodhpur: Agrobios.
21. Ram, Raspati, (1989), *Agriculture Development and Planning in India*, New Delhi: Criterion Publications.
22. Sati, Vishswambhar Prasad., (2004), *Horticultural Development in Hills*, New Delhi: Mittal Publications.
23. Saurat, Vivek, (2003), *Rural Development: Major Issues in Agricultural Management*, Delhi: Dominant Publishers and Distributors.
24. Singh, Bijendra, (2007), *Horticulture at a glance*, Noida: Kalyani Publishers.
25. Singh, D.K., (2004), *Hi-Tech Horticulture*, Udaipur: Agrotech Publishing Academy.
26. Singh, R.P., (1995), *Sustainable Development of Dryland Agriculture in India*, Jodhpur: Scientific Publisher

27. Singh, S.B. Prakash, N. and Ngachan, S.V., (2011), *New Perspectives on Marketing of Horticultural Crops in North East India*, New Delhi: Today and Tomorrow's Printers and Publishers.
28. Singh, V.B., Kikon,Y.Y, and Maiti,C.S., (2006), *Horticulture for Sustainable Income and Environmental Protection*, New Delhi: Concept Publishing Company.
29. Sharma, V.K., (2004), .*Advances in Horticulture*, New Delhi: Deep and Deep Publications.
30. Sudheer, K.P. and Indir,V., (2007), *Post Harvest Technology of Horticultural technology*, New Delhi: New India Publishing Agency.
31. Thansanga, R., (2000), *Agriculture in Mizoram*, Aizawl: Directorate of Agriculture.