

**HORTICULTURE ADMINISTRATION IN MIZORAM
SINCE STATEHOOD**

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
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PHILOSOPHY**

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**HORTICULTURE ADMINISTRATION IN MIZORAM
SINCE STATEHOOD**

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Submitted

**In partial fulfilment of the requirement of the Degree of Doctor of
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CERTIFICATE

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This Thesis has been the outcome of his original work and it does not form a part of any other Thesis submitted for award of any other degree.

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DECLARATION

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December, 2023

I, R. Lalthankima, hereby declare that the subject matter of this thesis is the record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other University/Institute.

This is being submitted to the Mizoram University for the degree of Doctor of Philosophy in Public Administration.

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ABBREVIATIONS

AD-----Anno Domini

ADC-----Autonomous District Council

ADHO-----Assistant Divisional Horticulture Officer

AIBP-----Accelerated Irrigation Benefit Programme

AICRP-----All India Coordinated Research Project

APEDA-----Agriculture and Processed Food Export Development Authority

DCAD-----District Council Affairs Department

BDO-----Block Development Officer

BJP----- Bharatiya Janata Party

BPL-----Below Poverty Line

CADC-----Chakma Autonomous District Council

CDB-----Coconut Development Board

CEM-----Chief Executive Member

CHO-----Circle Horticulture Officers

CIH-----Central Institute for Horticulture

COE-----Centre of Excellence

CSS-----Centrally Sponsored Scheme

DAP-----District Agriculture Plan

DBT-----Direct Benefit Transfer

DHO-----Divisional Horticulture Officer

DMC-----District Mission Committee

ECM-----Evangelical Church of Maraland

EM-----Executive Member

FAO-----Finance & Account Officer

FIG-----Farmer Interest Group

FPO-----Farmer Producer Organisation

GIS-----Geographic Information System

GDP-----Gross Domestic Product

GSDP-----Gross State Domestic Product

HDO-----Horticulture Development officer

HEO-----Horticulture Extension Officer

HMNEH-----Horticulture Mission for North East and Himalayan

IARI-----Indian Agricultural Research Institute

ICAR-----Indian Council for Agriculture Research

IFAD-----International Fund for Agricultural Development

Ifoam-----International Federation of Organic Agriculture Movement

IHR-----Indian Institute of Horticultural Research

IISR----- Indian Institute of Spices Research

IKK-----Isua Krista Kohhran

INC-----Indian National Congress

INM-----Integrated Nutrient Management

IPM-----Integrated Pest Management

IWMP-----Integrated Watershed Management Programme

JICA-----Japan International Cooperation Agency

LADC-----Lai Autonomous District Council

LDC-----Lower Division Clerk

LIKBK-----Lairam Isua Krista Baptist Kohhran

MADC-----Mara Autonomous District Council

MAHFED-----Mizoram State Agriculture, Horticulture and Marketing Cooperative
Federation

MAMCO -----Mizoram Agriculture Marketing Corporation

MCS-----Mizoram Civil Service

MDC-----Members of District Council

MDF-----Mizo Democratic Front

MF&AS-----Mizoram Finance & Account Service

MHIP-----Mizo Hmeichhe Insuihkhawm Pawl

MIDH-----Mission for Integrated Development of Horticulture

MIFCO -----Mizoram Food and Allied Industries Corporation

MIMER-----Mizoram Institute of Medical Education and Research

MKVI----- BMizoram Khadi & Village Industries Board

MLA-----Members of Legislative Assembly

MNF-----Mizo National Front

MNFF-----Mizo National Famine Front

MPC-----Mizoram Peoples'e Conference

MPSC-----Mizoram Public Service Commission

MSL -----Mean Sea Level

MSU-----Mizo Student Union

MTP-----Mara ThyutliaPy

MULCO-----Mizoram Multi-Commodity Producers Cooperative Union Ltd.

MUP-----Mizo Upa Pawl

MZP-----Mizo Zirlai Pawl

NABARD-----National Bank for Agriculture and Rural Development

NBM-----National Bamboo Mission

NCCD-----National Centre for Cold-chain Development

NDC-----National Development Council

NEC-----North Eastern Council

NEDP-----New Economic Development Policy

NGO-----Non Government Organisation

NHB-----National Horticulture Board

NHM-----National Horticulture Mission

NICRA-----National Initiative on Climate Resilient Agriculture

NIT-----National Institute of Technology

NLA-----National Level Agencies

NLUP-----New Land Use Policy

NMMIN-----National Mission on Micro-Irrigation

NMMP-----National Mission on Medicinal Plants

NOVOD -----National Oilseeds and Vegetable Oils Development

NLUP-----New Land Use Policy

NPOP-----National Program for Organic Production

NSC-----National Steering Committee

OIL-----Oil India Limited

ONGC-----Oil and Natural Gas Commission

RKVY-----Rastriya Krishi Vikas Yojana

RTI-----Right to Information

PC-----People’s Conference

PFMS-----Public Financial Monitoring System

PHC-----Plant Health Clinic

PLRC-----Pawi-Lakher Regional Council

PMKSY-----Pradhan Mantri Krishi Sinchayee Yojana

RKVY----- Rashtriya Krishi Vikas Yojana

RKVY-RAFTAAR-----Rashtriya Krishi Vikas Yojana- Remunerative Approaches for
Agriculture and Allied Sector Rejuvenation

SAP-----State Agriculture Plan

SAU----- State Agricultural Universities

SEDP-----State Economic Development Policy

SDHO-----Sub-Divisional Horticulture Officer

SDO----- Sub-Divisional Officer

SFAC-----Small Farmers Agribusiness Consortium

SLEC-----State Level Executive Committee

SLPSC -----Sate Level Project Screening Committee

SLSC -----State Level Sanctioning Committee

SPAB-----State Purchase Advisory Board

TMNE-----Technology Mission for North-Eastern States

TSG-----Technical Support Group

UDC-----Upper Division Clerk

USDA-----United States Department of Agriculture

UT-----Union Territory

VIUC-----Vegetable Initiative for Urban Clusters

WHO-----World Health Organisation

WRC-----Wet Rice Cultivation

YCA-----Young Chama Association

YLA-----Young Lai Association

YMA-----Young Mizo Association

ZIDCO-----Zoram Industrial Development Corporation

ZPM-----Zoram People Forum

ZNP-----Zoram Nationalist Party

CHAPTER –I

INTRODUCTION

Horticulture (Latin hortus = garden; cultura = cultivation), is the science and art of growing fruits, vegetables, flowers, shrubs and trees¹. 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

On the basis of commercial aspects, horticulture is divided into three specialized areas: the nursery industry, the plant-growing industry and the seed-production industry. The nursery industry deals with the production of fruit trees. The plant-growing industry supplies annual, biennial and perennial plants to the vegetable and flower grower as well as to the ornamental horticulturists. The seed-growing industry produces the seed required for flower and vegetable growing.

The most advanced countries in the field of modern horticulture are the following:- in Europe, the Netherlands, Germany, France, Belgium and the United Kingdom: in Americas, the United States: in Africa, South Africa: and in Australasia, Australia, Tasmania and New Zealand. In recent years India, Japan, China and Russia have extended their horticultural crop production².

The history of horticulture is traced as it gradually developed independent of agriculture, into the sophisticated art and science that it is today. Its separation from agriculture as a distinct activity is usually dated from the Middle Ages in Europe.

¹ Singh, Bijender, (2009), *Horticulture at a glance*, New Delhi: Kalyani Publishers, pp.1.

² Prasad, S., and Kuma, U., (2005), *Principles of Horticulture*, Jodhpur: Agrobios, pp.1.

Actually, the history and evolution of horticulture is intimately connected to the history and development of agriculture. As such, horticulture is part of the story of humanity's desire to gain control over nature. Although horticulture and agriculture have many practices in common, horticulture is distinguished by its specialized practices, for example grafting, and by the smaller scale of its operation³.

India has witnessed one of the oldest history of horticulture. From the old Hindu literature like Vedas, Puranas etc. we come to know that a variety of fruits and vegetables had been grown in India for a number of centuries. Some important fruits which originated in India are strawberry, raspberry, pear, apricot, golden coloured citrus, mango etc⁴. At present, India is the largest producer of fruits and the second largest producer of vegetables in the world being next only to China. It shares 11 percent of fruits production and seven percent of vegetable production in the world.

With the technological development in the field of agriculture, India has made rapid progress in horticulture too along with increased foodgrain production. With the changing life style and food habit, the importance of vegetables and fruits in the human diet is being increasingly realized. They supply a great number of essential nutrients to the population of the country that is largely vegetarian. The use of flower is considered inevitable in many cultural and religious practices of many nations including India. Owing to the varied agro-climatic zones, abundance of natural resources like sunlight and water, existence of large number of small and marginal farmers and technology available for their production, India has considerable potential to increase its production of horticultural crops⁵. It is the fastest growing sector within agriculture. It contributes in poverty alleviation, nutritional security and provides ample scope for farmers to increase their income. It further helps in sustaining large number of agro-based industries which generate huge employment opportunities. Presently horticulture contributes 28 per cent of agricultural Gross Domestic Product (GDP). The national goal of achieving 4.0 per

³<https://www.eolss.net/sample-chapters/c09/e6-156-07-00.pdf> accessed on 16. 12. 2018

⁴ Singh, Bijender, (2009), op. Cit., pp.1.

⁵ Singh, S.B., Prakash, N., and SV Ngachan, S.V., (2011), *New Perspective on Marketing of Horticultural Crops in North East India*, New Delhi: Today and Tomorrow's Printer and Publishers, pp.1.

cent growth in agriculture can be achieved through major contribution from horticulture growth⁶.

STATEMENT OF THE PROBLEM

As with the rest of the country, agriculture and its allied activities are the mainstay of the people of Mizoram. The existence of subtropical to temperate climatic condition and fertile soil in this region offer good scope for the cultivation of various types of vegetables, fruits and flowers throughout the year. It would not be an exaggeration to say that there is literally no crop that cannot be grown in Mizoram.

Anticipating the significant role which could be played by the horticulture sector for meeting economic challenges like income enhancement, unemployment problems, deforestation, rural development etc., much effort have been taken by the Central government and the state government for the development of horticulture in the state. The horticulture related programmes/projects which are being implemented in the state are: National Mission on Micro-Irrigation (NMMI), National Mission on Medicinal Plants (NMMP), Rastriya Krishi Vikas Yojana (RKVY), National Technology Mission, Horticulture Mission for North East and Himalayan (HMNEH), New Land Use Policy (NLUP), State Economic Development Policy (SEDP)-the flagship programme of the government of Mizoram.

Though there has been a remarkable increase of production in the horticulture sector, a very large quantity of the products are reported to get spoiled every year. This may be due to inadequate or improper harvesting, post-harvest handling, lack of processing facilities and the absence of linkage between the processors and the marketers of fruits and vegetables⁷.

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

⁶www.krishisewa.com/articles/miscellaneous/258-indian-horticulture-sector.html accessed on 21.12.2018

⁷ Meena, R.K., and Yadav, J.S., (2001), *Horticulture Marketing and Post Harvest Management*, Jaipur: Pointer Publishers, pp.2.

scope for further development of horticulture in the State⁸. 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.

As per the reports on import and export of agriculture and allied commodities prepared by the Department of Trade and Commerce, Government of Mizoram, the total quantity of vegetables and fruits imported in 2017 was 181,410 Qtls and in 2018 it was 120,202 Qtls. Considering the amount of imported food items, self-sufficiency in food is still considered as the biggest challenge in Mizoram till today.

REVIEW OF LITERATURE

A number of books, articles, documents etc., have been studied by the researcher and the following important literatures were reviewed.

K L Chadha, A K Singh, S K Singh and W S Dhillon's (2013) book *Horticulture for Food and Environment Security* is a compilation of 56 lectures on diverse issues in horticulture given by scientists and experts from India and abroad. It covers themes like global horticulture scenario, use of cutting edge technology, peri urban and urban horticulture, pre- and post harvest management, disease management strategies and other horticulture concerns.

S B Singh, NPrakash and S VNgachan (2011) in their book *New Perspectives on Marketing of Horticulture Crops in North East India* have highlighted that the production of horticultural crops has assumed great importance in the North-Eastern Hill region of India in view of the diversified topography, agro-climatic conditions and fertile soil resources. Various Central and State horticulture related schemes/projects are also mentioned alongwith the process of implementation and their impacts.

Mahmood N. Malik's (2010) book *Horticulture* is a collaborative academic exercise undertaken by a group of leading agricultural scientists, aiming at putting

⁸ Department of Horticulture, *Important Achievements of Horticulture Department during 2019-2020*.(2020), pp.1.

together and reviewing the available scientific information on various aspects of horticulture. It discusses systematically the topics like the development and structure of flowers and fruits, plant metabolism, vegetative and floral growth of plants, advanced method of improvement, etc.

E P Christopher's (2009) book *Introductory Horticulture* describes the various horticultural practices along with their scientific background. It deals with classification, structure and growth of plants: climatic requirement of horticultural crops: soil selection and management etc. It also discusses in detail the principles and practices used for growing more vegetables, flower and fruit crops. Principle of land-scaping, growth abnormalities of plant and control of insects and diseases have also been covered in this book.

K V Peter's (2009) book *Basics of Horticulture* carries information on fundamentals of vegetables, fruits, ornamental plants, spices, medicinal and aromatic plants and post-harvest technology. Its chapters elaborate on horticultural crops, ideal soil, climate, water requirement, pest, disease and nematode management, biotechnology of spices and mechanization of orchards.

J Bimal Deb and B Ray Datta's (2006) edited book *Changing Agriculture Scenario in North East India* is the compilation of twenty six seminar papers. The book analyzes the impact of recent agricultural changes on population growth, migration and health of the rural people in the region. It also addresses a variety of issues concerning crop diversification pattern, land size and productivity, land-use pattern, land ceiling, agrarian reform and the role of women in agriculture sector.

V B Singh, Y Y Kikon and C S Maiti (2006) book *Horticulture for sustainable Income and Environment Protection* contains 86 papers presented at a national seminar on Horticulture for Sustainable Development and Environment protection, jointly organised by Nagaland University and Department of Horticulture, government of Nagaland. The book analyses different dimensions of horticultural development in India, in general and N E region in particular.

B P Maithani (2005) in his book *Shifting cultivation in North- East India* mentioned that shifting cultivation is regarded as a first step in transition from food gathering and hunting to food production and is widespread in the hills and mountains of North-East India. It also deals with various measures adopted for controlling shifting cultivation. It highlights the factors contributing to its tenacity and the issues involved in addressing the problem.

D K Singh (2004) in his book *Hi-Tech Horticulture* deals with the basic concept of Hitech horticulture by mentioning that it is a chain system of cultivation having proper linkage right from selection of seed variety for sowing to supplying it to the end user. The book consists of the introduction of hitech horticulture and its medicinal use, use of plant bioregulators, water and pest management, protected cultivation, organic and biodynamic farming and many more.

V K Sharma (2004) in his book *Advances in Horticulture* has mentioned that horticulture has a special significance for the economic development, especially of the hilly region. The book covers advances in strategies, production, plant protection, value addition and other important areas of horticulture development. The author urges that in order to increase the productivity of horticultural crops growers must take the advantage of the expertise of scientists.

R K Meena and J S Yadav's (2001) book *Horticulture Marketing and Post-Harvest management* ventures to probe into all the facets of horticulture marketing coupled with the success story of some horticultural fruits marketing. It indicates that horticulture has already gained ground and with the increasing demand for organic food round the globe, it would further dominate the domestic and international market in the times to come. The authors are of the opinion that under these circumstances, India can take full advantage of its agro-climatic conditions in multiplying the productivity, marketing and exports.

H P Stuckey's (1997) book *Management of Horticulture* is the presentation of useful scientific information based on the author's life long work on his study and production. In this book, the detailed information on each crop has been classified under

a thematic section: site selection, procuring of plants, propagation, planting and cultivation, soil management etc. It also deals with the management of home orchards, home vegetable garden and the beautification of home grounds.

G K Kaul's (1989) book *Horticultural Crops in India* states that there has been a gradual change in Indian agriculture particularly in land use system, input utilization, marketing etc. It also stated that the quest for higher productivity is leading to serious problems of soil salinity and high water table in irrigated areas. All these factors have provided ideal conditions for major trends towards diversification, mostly in favour of horticultural crops.

K C Azad, Swarup R and B KSikka (1988) in their book *Horticultural development in Hill Areas* highlight the factor responsible for horticulture development in Himachal Pradesh. Economic viability of fruits and marketing has also been covered.

Krishna Murari (2017) in his article "Farmers' Movement in Independent India" Published in *Indian Journal of Public Administration* divides peasant movements in independent India into three categories: (i) movements organised by the peasants against semi-feudal and neo-feudal exploitation and oppression of poor peasants and landless agricultural labourers: (ii) Movement led by the rich peasants and farmers who own larger holding and have also enriched themselves as a result of Green Revolution ; and (iii) Agrarian movement that were mainly accelerated by the onset of economic liberalisation and globalisation in so far as these impacted the agricultural production, processing and marketing.

E Thippeswamy (2015) in his article "*Organic Farming and the Quality of Food*" published in the *Journal of Rural Development* has stressed the importance of Organic Farming to provide better quality of food for health. Though more productive, everyone should try to avoid food items adulterated with harmful chemicals. He also stressed on the importance of awareness among the people especially the illiterate and backward sections of the society as these people are still extensively using hazardous chemicals in their agriculture and related activities.

Masroor Ahmad Beg (2015) in his article “*Agriculture Price and its Impact on Farmers Income*” published in *The Indian Journal of Economics* deals with the application of the economic theory delineating the vexed problem of the farmers. The paper reveals that perpetuation of rural poverty is due to low prices of major food staples like rice, wheat and pulses as these crops provide main source of earning for the people in the rural areas. Urban poverty is also high due to augmentation in the prices of these major foods as urban people have to spend larger portion of their income for purchasing food items. Because of these situations, rural farmers need to be guaranteed of profitable price of their produce and the urban and non-farming class be assured of food at affordable price to ameliorate them from poverty.

P M Singh, S K Sanwal and Rameswar Singh (2015) in their article “*Development of Vegetables in India- a historical account*” published in the *Journal Indian Horticulture* pointed out that Government of India has given concerted efforts for the development of vegetables especially after independence. Because of the efforts put forth by the government, India has now become second largest producer of vegetables next only to china. However, progress in the true sense can be realized only when each individual is able to consume a recommended quantity which is still far.

Savita Ahlawatand and Dhian Kaur (2015) in their article “*Climate Change and Food Production in North West India*” published in *Indian Journal of Agricultural Research* states that climate change is one of the most challenging environmental issues as it poses potential threat to different sectors of economy at global level. Being an open activity, the quantity and quality of agricultural products has been greatly affected by change in climatic condition. It does affect not only food production of a particular region but also pose a serious threat to the food security of the country as a whole.

Som Dutt (2015) in his article “*Horticulture Activities for Plant Lovers published in the Journal Indian Horticulture*” talks about horticulture show organized by Indian Agricultural Research Institute in collaboration with Delhi Agri-Horticultural Society under the theme of Horticulture for Health and Wealth. In his article, the author has given a brief report on the Show. He has stressed the importance of the Show by saying

that it created awareness among the professional garden lovers and staff of horticulture departments in public and private sector, corporate houses and public at large to learn more about modern techniques in ornamental horticulture and landscaping.

Pradeep Agrawal and Durairaj Kumarasamy (2012) in their article “*Food Price Inflation in India: Causes and Cures*” Published in *Indian economic Review* analyses the demand and supply of food in India to understand the domestic policies needed to control food inflation. They have stated that food inflation has been caused mainly by changing pattern in food demand. This is compounded by structural problems, which inhibit adequate supply side responses to these changing consumption pattern, and failure of the government to tackle them.

The above review of books and articles has provided ample information on the what, where, how and when of the horticulture in different places. After going through different literatures on horticulture and its related activities, the researcher is greatly motivated to have an in-depth analysis on the horticulture administrative system in Mizoram as no study has been done on the specific topic. The review helps the researcher as well to understand the right step and appropriate strategies to be undertaken while doing research.

SCOPE OF THE STUDY

Currently, various Central horticulture schemes have been implemented in Mizoram through the Department of Horticulture, Government of Mizoram. Mission for Integrated Development of Horticulture (MIDH), *Rashtriya Krishi Vikas Yojana (RKVY)*, *Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)* are some important Centrally Sponsored Schemes (CSS) implemented for the development of horticulture in the state. Under these schemes, thousands of horticulture farmers in the state have been assisted with the expenditure of huge amount of money. The progress in term of area coverage and productivity has also been noticeable. Therefore, the schemes sponsored by the central government which are being implemented in the state are covered by the present research work.

Under the current conditions the desired horticultural development in Mizoram can be achieved only when government take active part right from the beginning as it is the primary source of technical know-how and financial resources. Thus, the role which has been played by the Department of Horticulture, Government of Mizoram for the said development is covered by the study.

OBJECTIVE OF THE STUDY

The following are the objectives of the research.

1. To study the institutional framework for horticulture development in Mizoram.
2. To explore the role played by the Government of Mizoram towards the development of horticulture.
3. To find out the effect of the horticulture schemes being implemented in Mizoram on the lives of the people.
4. To identify the problems in the path of horticulture development administration.
5. To explore and suggest remedial measures.

RESEARCH QUESTIONS

The following are the questions formulated for empirical verification in the study:

1. What are the institutional mechanisms present for horticulture development and their role in Mizoram?
2. Do the horticulture schemes implemented in Mizoram have impact on the social and economic life of the people?
3. What are the problems in the process of horticulture development in Mizoram?
4. What are the suitable measures for tackling the problems?

METHODOLOGY

Research Design

The present study is cross sectional in nature and descriptive in design. Mixed method was applied which involves an approach of enquiry that contains qualitative and

quantitative techniques. The present study was undertaken with the help of both primary and secondary data. The primary data were collected through open-ended interview schedule and various other techniques such as field observation, in-depth interviews, reports, Acts and documentary examination to collect the relevant data for the study.

Sampling

Random purposive sampling method was adopted to collect primary data from horticulture farmers and government officials for the study area. Hence, 57, 54 and 48 farmers from Kolasib, Serchhip and Mamit respectively for MIDH, for RKVY, 60, 28 and 36 farmers from Kolasib, Serchhip and Mamit respectively and 20, 24 and 20 farmers from Kolasib, Serchhip and Mamit districts took part in the study. Unstructured and semi-structured interviews were also conducted with 17 officials of the concerned department. Along with the field interviews with the respondents; observation method, was also adopted to get information.

Sources of Data

For the present study, relevant data were collected from both primary and secondary sources. Primary data were collected through open ended semi structured interview schedule from 159 beneficiaries and 7 officials for MIDH, 124 beneficiaries and 5 officials for RKVY and 64 beneficiaries and 5 government officials.

Secondary sources of data were collected from published documents of the Government of India and Mizoram viz., records of the Ministry of Agriculture and Farmers Welfare, Government of India, records of the Department of Horticulture, Government of Mizoram, records of the department of Agriculture, Government of Mizoram, reports of Economic Survey, Statistical Handbook of Mizoram. Further, it includes data collected from books, articles, journals, magazines, and concerned Government Websites etc.

Data Analysis

The collected data were processed and analyzed by using simple percentages and Descriptive Statistics

CHAPTERISATION

Chapter I : Introduction

Chapter II : Horticulture: A conceptual Study

Chapter III : Institutional Mechanisms of Horticulture Administration

Chapter IV : Development Programmes in Horticulture

Chapter V : Results and Discussion

Chapter VI : Conclusion

Mizoram: A profile

Mizoram is one of the seven sister states in the north eastern India. It is a mountainous region with rugged hills, valleys, rivers and lakes. The name originated from the word '*mizo*', the name of the native occupants and '*ram*', which means land, thus, the term '*Mizoram*' implies "land of the Mizos". Its capital city is Aizawl. Mizoram shares inter-state borders with Assam in the north which is approximately 123 kms, with Tripura in the west approximately 66 kms and with Manipur in the north approximately 95 kms. It also shares international border of approximately 404 kms in the east with Myanmar and with Bangladesh in the southwest approximately 318 kms. Thus, Mizoram occupies an area of great strategic importance, sharing a total boundary length of 722 kms (approx) with the neighbouring countries. The length of Mizoram from North to South is 277kms and 121kms from East to West. It is one of the smallest states of India in terms of population and area. It has a total area of 21,087 square kilometres with 10,97,206 population.

As with some other states in the north east region in India, Mizoram was one of the districts in Assam until 1972 when it was carved out as a Union Territory. It was granted statehood to be the 23rd state of the Indian Union on 20th February, 1987.

History

It is difficult to present a vivid account of the historical and cultural background as well as the evolution of settlement in Mizoram. This is because of the fact that there is no integrated historical account of the region as it was occupied by tribals who have lived for a number of years in isolation. No authentic evidence could be found on the lives of the Mizo people before the 17th century.

Anthropological evidence shows that the Mizos, the inhabitants of Mizoram are of Mongoloid stock in origin who had migrated to the present habitation somewhere from China. This perception is also augmented by legendary folktales and folklores. The Mizo language belongs to the Tibeto-Burmese family of language. The Mizos claim to be the descendents from *Chhinlung*, a mythical cave, somewhere east of Shan state in erstwhile Burma bordering China. Migration seems to have started as early as the beginning of the 15th century AD. However, historians are of different opinions on the time when migration started. According to Zawla, the migration to the hills began in 1463, whilst Professor Luce estimates the migration took place during the 16th century. Soppit believes that the first batch of the Mizo tribes after crossing Tiau river settled in Mizoram sometime in the middle of the 16th century. Liangkhaia also believes that a section of Hmars (sub-tribe of Mizo) entered the Manipur plain about the middle of the 16th century and the beginning of the 17th century AD⁹.

The exploration of the Mizoram (Lushai Hills) and the neighbouring hill areas first started from the west when Chittagong in Bengal was a British administrative post and a garrison. In 1777, sixteen years after the occupation of Chittagong by the British, a detachment of military police under the command of Captain Ellester went into the hills east of Chittagong. This detachment explored only the Chittagong Hill Tracts touching only the border of the Lushai Hills. There was widespread contact between the Lushais and the outside world during the first Burmese War of 1824-25, the Burmese and the Arakan forces made deep inroads into these hills. Lallula was the first chief who came to

⁹ Pachuau, Lalrintluanga, (2009), *Mizoram*, New Delhi: Northern Book Centre, pp.2.

be known to the outsiders and who led the Lushais while migrating from Myanmar to the western hills¹⁰.

During the period of British colonialism, the mountainous land of Mizoram was neither commercially inspiring nor having mineral resources to attract the British to penetrate into these hills. Hence, they did not take control over these hills for many years, until the lives and properties of the British subjects, inhabiting the bordering areas were endangered by the Mizos¹¹. The first encounter of the Mizos with the British was in 1824 when the Mizos ambushed and killed some plain traders who penetrated into the hills along Dhaleshwari to collect bamboo and timber. No stern action was taken from the British side as it was discovered that the incident was an act of retaliation by the Mizos because some Zamindars of Pratabgarh circle of Sylhet district refused to present the usual gifts to the hill visitors, when they went to the plain areas¹². The Mizos continued to conduct a number of raids on the villages in Chittagong Hill Tracts, Sylhet, Cachar etc., without strong retaliation from the other side until 1889 when the second Lushai expedition was carried out by the British.

The Lushai Expedition of 1871-72, Lushai Expedition, 1888-1889 and the Chi-Lushai Expedition, 1889-90, were epoch making in the history of Mizoram. Earlier, the Britishers did not want to put the Lushai Hills under their control as they found that they could not gain anything by advancing into it. It should be kept in mind that even before the Lushai expeditions, some Mizo chiefs like Suakpuilala entered a peace agreement with the British officials, such as, Edgar, The Deputy Commissioner of Cachar and Major McDonald. The reasons for the Lushai Expedition in 1871-72 were the series of attack on Ainarkhal, Alexandrapore and tea garden at Katlichera on 23rd January 1871, the attack of tea gardens at Monierkhal, Nugdigram and Darmaikhal on 27th January and the attack of villages in Tripura and the hills surrounding Imphal valley in Manipur. In the attacks, many were killed including tea planter - Winchester while his daughter Mary Winchester was captured and taken captive. In order to prevent future raids from the Mizos, the Government of India decided to send a strong army into the Lushai Hills. The

¹⁰ Joshi, H.G., (2005), *Mizoram: Past and Present*, New Delhi: Mittal Publication, pp.12.

¹¹ Prasad, R.N., (1987), *Government and Politics in Mizoram*, Northern Book Centre, pp.15.

¹² *Ibid*, pp.16.

Lushais were forced to surrender and accept the superiority of the British for the first time. The Lushais on the western side made a mutual relationship with the British and acted as the gatemen in the southern frontier. Trade relations between the Lushais and the British were once again restored¹³.

Peace between the Lushais and the British prevailed for about sixteen years till the murder of British officers Lt. Stewart and other two soldiers by Hausata. The killing of the British officers enraged the British and compelled them to take punitive action once again against the Lushais in 1889. However, the action brought only temporary peace. Later, a large section of the Lushais continued their raids in the adjacent plain areas. This led to the famous expedition known as Chin-Lushai Expedition of 1889-90 which was operated from Silchar and Chittagong. The expedition was successful in punishing chiefs who were responsible for the raid. All the principal tribes of the North and South Lushai Hills were brought under control. Aizawl was made the headquarters of administration under the Assam province. Capt. Browne was appointed as political officer of North Lushai Hills on 1st April, 1890. The South Lushai Hills was carved out as a separate district in 1891 with its headquarters at Lunglei under Bengal Province and placed under a political officer. The chiefs realised that it would be futile to fight against the British force which was superior in all respects. They agreed to pay royalty and accepted British domination. Finally, the North Lushai Hills District and the South Lushai Hills District were amalgamated and brought under the authority of Assam Government.¹⁴ The tract known as Rothangpuia's village (Rutton Poiy's) in the Chittagong Hill Tracts was also transferred to Assam. The Government of Assam was in overall control of the areas, but the rural administration was left to the local Chief called "Lal" subject to the general control of the Superintendent and his Assistants who was also in-charge of the administration of civil and criminal justice.¹⁵ The Chin Hills

¹³ Singh, S.N., (1994), *Mizoram: Historical, Geographical, Social, Economic, Political and Administrative*, New Delhi: Mittal Publication, pp.36.

¹⁴ Ibid, pp.38.

¹⁵ Department of Education and Human Resources, Government of Mizoram, *Mizoram District Gazetteers*, pp.1.

Regulation Act of 1896 was imposed which restricted the movement of outsiders into Mizoram. This marked the beginning of stability in the area¹⁶.

In the year 1898-99 Major Shakespeare formulated the 'Land Settlement' policy under which each chief was given a certain area within which he and his people could move about, as they liked. In 1935 under the Government of India Act, 1935, the Lushai Hills became an 'Excluded Area', that is, the hills were outside the control of the provincial legislatures and responsibility to Parliament for its administration rested on the Viceroy, who had further empowered the Governor of Assam to administer the Lushai Hills on his behalf. In accordance with the provisions of the Sixth Schedule of the Constitution of India, a District Council with executive, legislative and judicial powers on certain matters was established at Aizawl in 1952. Election to the Council was held in the same year. With the coming into force of the Assam Autonomous District (Administration of Justice) Regulation, 1952, on 12th April 1952 the Lushai Hills no longer remained an Excluded area. The designations of the Superintendent and Assistant Superintendent, Lushai Hills were changed to those of Deputy Commissioner and Assistant to the Deputy Commissioner.

With political consciousness surfacing after independence, the move for changing "Lushai" to "Mizo" took shape by an Act of Parliament. Thus, the name Lushai Hills District was changed to Mizo Hills District with effect from 1st September 1954, by an Act called the Lushai Hills District (change of Name) Act, 1954 assented to by the President of India on 20th April 1954. The District Council and the Regional Council being fully established, the existence of Chiefs as administrative agents was abolished, with the Assam Lushai Hills District (Acquisition of Chief's Right) Act, the rights and interests of 259 Chiefs were acquired by the Government and handed over to the District Council on 1st April, 1955.¹⁷ The Mizo Hills District remained a part of Assam till January 1972, when it was made a Union Territory with the name Mizoram; vide section 6 of the North Eastern Area (Reorganisation Act, 1971, (Act No. 18 of 1971). With Mizoram becoming a Union Territory the administration has become fully

¹⁶ Ibid, pp.38.

¹⁷ Ibid. pp. 50-55.

autonomous. The whole Union Territory was divided into three Districts having 30 (thirty) Assembly Constituencies. A popular Ministry was installed in May 1972. Towards the beginning of 1976, the Government of India and the Mizo National Front (MNF) leaders began their negotiation for a lasting peace. An agreement was reached between the representatives of both sides on the 1st July 1976, which brought to a halt the hardships and sufferings caused by the hostilities since 1966.

Topography

Mizoram, as stated earlier, is a mountainous region situated in the north eastern corner of India. Geographically, it is situated between 92°.15' E to 93°.29' E longitude and 22°.58'N to 24°.35'N latitude¹⁸. The tropic of cancer runs through the state at the southern periphery of Aizawl city at 23°33" North latitude. The altitude ranges from 21 meters at Tlabung to 2,175 meters at Phawngpui. The area below the elevation of 500 meters above MSL (Mean Sea Level) is 10,56,269 hectare, between 500 to 1,000 meters is 7,09,136 hectares; from 1,000 to 1,300 meters is 1,96,350 hectares and above 1,300 meters is 1,46,947 hectares on any particular slope of the land¹⁹. Hill ranges in Mizoram run from north to south. They are higher in the middle and smaller at both ends. The hills are rough and their heights irregular. The average height of the hills is 900 meters but the highest peak, the Blue Mountain also known as Phawngpuitlang by the Mizos reaches upto 2,165 meters high. It is located in the southern part of Mizoram at Siaha District. As compared to the other hill states in the North East, hill slopes in Mizoram are steeper causing difficulties in cultivation of crops. Cutting through the narrow and deep gorges are swift rivers interspersed with rapid and sheer drops. Most of them eventually join the Barak river of Cachar District of Assam, though the Khawthlangtupui meanders off into the Bangladesh plains and the Chhimtupui (Kolodyne) into Myanmar²⁰. The major rivers flowing towards the north are Tuivai, Tuivawl, Tuirial, Tlawng and Teirei. Rivers like Tupui, Tuichang and Mat are flowing

¹⁸ Directorate of Economic and Statistic, Government of Mizoram, *Statistical Handbook* (2012), pp. XVII.

¹⁹ Ralte, Laltanpuii., (2005), *Agriculture Development Administration in Mizoram*, A Thesis submitted to Mizoram University for the Degree of Doctor of Philosophy, pp.3.

²⁰ Ibid, p.3

towards the south. Tuichawng is the only river which flows toward the west. Amongst the rivers in Mizoram, Tlawng is the longest (185 km) and Chhimtuipui is the largest.

Climate/Rainfall

The climate of Mizoram is pleasant throughout the year. It is cool in the higher elevation and humid in the plains but still enjoyable. The climate of the entire state is directly influenced by monsoon. The state receives heavy rainfall between May and September. The average rainfall is 275 centimetres (2750 mm) every year. The north western portion of the state receives the highest rainfall- more than 350 centimetres (3500 mm) per year. The rainfall also increases southward with increase in humidity. In the capital Aizawl, rainfall is about 215 centimetres (2150 mm) and in Lunglei, another major centre, about 350 centimetres (3500 mm). The state is in a region where cyclones and landslides can cause weather-related emergencies. The study of the available rainfall data shows that the highest monthly rainfall in Mizoram was in July 1983 which was 602.60 centimetres (6020.6mm). Precipitation is heavy in summer, from May to September, and last till late October. Normally July and August are the wettest months, whereas December and January are the driest months²¹.

Table No. 1.1: Year-Wise Monthly Rainfall in Mizoram (in mm) for 8 years

Sl. No	Month	Year							
		2020	2019	2018	2017	2016	2015	2014	2013
1	Jan	40.01	1.1	4.7	0.0	2.20	10.20	0.0	0.0
2	Feb	12.8	43.2	3.0	5.7	26.70	6.30	1.46	1.46
3	March	3.2	39.3	25.4	124.4	84.30	31.50	4.70	4.70
4	April	113.6	68.5	99.5	289.9	161.40	281.0	65.60	65.60
5	May	192.8	186.04	256.0	237.3	259.90	146.30	499.30	499.30
6	June	251	270.2	574.2	534.2	407.60	298.20	293.10	293.10
7	July	439.4	534.8	343.7	394.2	323.30	481.90	351.90	351.90

²¹ Pachuau, Rintluanga, (2013), *Mizoram: A Study in Comprehensive Geography*, New Delhi: Northern Book Centre, pp.42.

8	August	323.7	275.4	336.9	441.0	371.20	444.20	519.90	519.90
9	Sept	245	248.3	161.0	344.7	398.80	296.20	476	476
10	Oct	281.3	87.3	137.4	269.1	175.60	175.40	209.20	209
11	Nov	29.7	50.5	6.1	13.0	70.40	7.0	1.30	1.30
12	Dec	0	8.1	8.6	58.8	00	1.50	0.0	0.0
	Total	1943.8	1812.74	1958.5	2712.3	2213.7	2179.7	1821.20	2422.5

Source: Meteorological Data of Mizoram by Directorate of Economic and Statistic, Government of Mizoram

Based on variation and rainfall, there are three different types of seasons in Mizoram. These are:

- 1) The cold season or winter
- 2) The warm season or spring
- 3) The rainy season or summer

The cold season starts from November and lasts till the end of February. The temperature during this season is comparatively low. It varies from 11°Celsius to 23°Celsius, but not too cold to tolerate. It rains very less and whatever amount of rainfall is received come from the northern side generally known as retreating monsoon. This season witness pleasant atmosphere with clear blue sky in the absence of cloud covering. Mist covers the valleys in the morning time which gives enchanting view everywhere.

The warm season or spring starts from March and lasts till the earlier part of April. The temperature during this season varies from 19°Celsius to 29°Celsius. The earlier part of this season witnessed bright sunshine and clear blue sky with little or no cloud. However, the later part is disrupted by the coming of pre-monsoon rains. Due to the little or no cloud, maximum sunshine is received during this season. This is the warmest season throughout the year in Mizoram.

The rainy season or summer is the longest season in Mizoram covering about six months. It starts from May and last till October. It is the longest season in Mizoram. The

season starts with strong winds, lightning and thunders coming from the Bay of Bengal. Sometimes hailstorms occur in many places. Mizoram receives heavy rainfall during this season. More than 40 percent of the annual rainfall is received during July and August. Though the temperature still remains high, it is kept cool to some extent by the rains. During this season landslides takes place in many places; floods also occur in river valleys. Most of the natural calamities in Mizoram are faced during this season.

Soil

The soils of Mizoram are dominated mainly by loose sedimentary formation and are generally young, immature and sandy. They are developed from such parent rocks as sandstones, shales and siltstones. Derived soils with red, loamy texture is also found with high level of laterite. Acidity is high but low in potash and phosphorus. In uneroded soil, nitrogen content is comparatively higher which is still fostered by accumulation of organic matters. Soils in the river valleys are heavier as they are washed down by the rain from higher places. The surface soil of the hilly terrains are dark, highly leached and poor in bases, rich in iron and low in pH values ranging from 4.5-5.5(highly acidity). They are well drained, deep to very deep, rich in organic carbon, low in available phosphate content and high in available potash. Soils of the valley flat lands are dark brown, poor in bases, moderately acidic with pH ranging from 5.5-6.0, medium to high in organic carbon content, low available phosphate and medium to high potash. They are deep to very deep but moderately to poorly drained. The soils below the plough layers in some places are very poorly drained. They are alluvial and colluvial, most fertile and most productive soil. Water table is high, within one metre of the surface. They are utilized for cultivation of wet rice. The soils of the narrow valleys have light and coarse texture. They are well drained, well aerated and skeletal, receiving new deposits of alluvium at frequent intervals. They are acidic soil, moderately rich in organic carbon, low in phosphate and medium in available potash content. They are less fertile and mainly used for cultivation of rice and vegetables.

Analysis of soil samples from different parts of Mizoram indicates that manganese, copper and iron ore are adequately available except zinc. The pH content

mostly decreases with depth. In most cases the organic carbon content of soils and the clay and silt contents of alluvial soils is higher than those found in the soils of the lower elevation²².

Vegetation

Natural vegetation of Mizoram is influenced by latitude, climate and soil. Western and eastern parts of the state have marked differences on their vegetation. Out of the geographical area of 21,087 sq.km., 15,935 sq.km is covered by forest which account for about 75 percent of the area of the state. Conducive climatic conditions like adequate rainfall, moderate temperature etc., in Mizoram favours the luxuriant growth of vegetation in the region. The type of vegetation ranges from Tropical to Sub-Tropical trees. Generally, the forest of Mizoram can be described as wooded forest in the higher elevation and bamboo forests in the lower ridges. Forest in Mizoram can be classified according to vegetation into:

- 1) Tropical Wet-Evergreen Forest
- 2) Tropical Semi-Evergreen Forest
- 3) Mountain Sub-Tropical Forest

Tropical Wet Evergreen Forest is found at places where there is a high precipitation. In Mizoram, this type of forest is found in the western part of the state. It is rich in vegetation. Some important vegetation in this forest are *Gmelina arborea* (Thlanvawng), *Michelia champaca* (Ngiau), *Dysoxylum binectiferum* (Sahatah), *Dipterocarpus turbinatus* (Lawngthing), *Cordia alliodora* (Muk) etc. Bamboo of different species like *Melocanabambusoides* (Mautak), *Bambusa tulda* (Rawthing), *Dendrocalamus longispatus* (Rawnal), *Dendrocalamus hamiltonii* (Phulrua) and *Teinostachyus dumulloo* (Rawthla) are also found in abundance. Some species of trees having ecological importance are also numerous in this type of forest.

Fifty percent of the total area of Mizoram is covered by Tropical Semi-Evergreen Forest. It is in the central part of the region from Chhimtupui (Kolodyne) river in the

²² Pachuau, Rintluanga, (2009), *op. cit*, pp.44.

south to North end of the state. Many important timber species found in the tropical wet-evergreen forest are also found in this forest. Some other important species of tree are *Schima Wallichii* (Char), *Cedrela toona* (Tei), *Terminalia myricarpa* (Char), *Duabangasonneratioides* (Zuang) and *Tetrameles nudicaulis* (Thingdawl)

Mountain Sub Tropical forests are found in higher places, mostly in the eastern side of the state. Strips of this type of forest are also found in the western part at W. Bungle area and in Sangau area in the south. Dominant vegetations in this forest are *Rhododendron* (Chhawkhlei), *Quercus dealdata* (Fah), *Prunus ceracoides* (Tlaizawng), *Myrica nagi* (Keifang), *Emblia officinalis* (Sunhlu), *Rhus javanica* (Khawmhma).

It is to be kept in mind that vegetation in Mizoram has undergone a tremendous change due to human activities like clearance for jhum land, collection of firewood, timber, forest fire, over-grazing etc. Most of the dense forest with various species of vegetation have been destroyed and has become almost barren land.

Mineral Resources

Unfortunately, Mizoram is not rich in minerals of economic importance. It has mineral resources like limestone, sandstone, clay, coal, petroleum, however not plenty enough to put an impact on the national mineral map, till today. Mizoram contributes less than 1% of the national mineral production. Major deposits of economic utility have not been reported so far in the State. No mineral production (except minor minerals) has been reported from Mizoram. Occurrence of sandstone, limestone, shale, clay, coal and pyrites are reported from the State. Further, a strong possibility of uranium deposit lies in the State, but it has yet to be explored thoroughly. Mizoram falls under category number one or proven commercial oil productivity zone which roughly estimates about 170 million metric tons of untapped crude reserves. Recently, Oil and Natural Gas Commission (ONGC) has confirmed the presence of Petroleum at Bilkhawthlir (Kolasib District) and ONGC, Oil India Limited (OIL) etc., are working on the exploration operation in different parts of the state. "Economic Boom" is expected through the successful oil exploration in Mizoram. The state is devoid of any major mineral based industries. Only unorganized mining and quarries exist in the state and their contribution

to the state's economy is minimal. On the basis of current availability of workable deposits of sandstone, limestone, shale, clay and minor coal deposits- cement, pottery, sandstone and tile manufacturing units can be developed to a great extent. In the near future, subject to the realization of full-fledged crude oil production, the state can go for establishment of polymer, plastic and paint industries. However, the major obstacles such as lack of all necessary raw materials, high cost of transportation, poor market-connectivity, power supply shortage, unavailability of skilled labour etc., need to be overcome, in order to create a healthy environment friendly industry²³.

Demography

Mizoram is a sparsely populated state. It is the second least populated state in India. As per the 2011 Census, Mizoram has a population of 1,097,206 with 555,339 males and 541,867 females reflecting 23.48 percent growth rate since 2001 census as can be seen in Table. No.1.2. the population of Mizoram forms 0.09 percent of India's population in 2011. In 2001, the figure was 0.09 percent. The sex ratio of the state is 976 females per 1000 males, which is higher than the national ratio of 940 females per 1000 males. The density of population is 52 persons per square kilometre which is lower than the national level of 382 persons per square kilometre. Due to its remoteness, mountainous landscape, political instability due to insurgency (1966-1987), low economy etc., the density and growth rate of population in Mizoram is comparatively low. At the district level, Aizawl district has the highest density with 113 persons per square kilometre. It is followed by Kolasib district with 61 persons per square kilometre and Lawngtlai and Serchhip district having 46 persons per square kilometre. Mamit district has the lowest density with only 28 persons per square kilometre. It is worthwhile to mention that Aizawl district has larger female population with 1009 females per 1000 males. Among the notified towns in Mizoram, Aizawl, the capital city of the state, has highest population of 293,414 persons (144,913 males and 148,503 females). Lunglei stands second having 57,011 persons (29,474 males and 27,537 females). Biata has the lowest population with 2,277 persons (1,134 males and 1,143

²³https://www.researchgate.net/publication/281851610_Mineral_Based_Industries_in_Mizoram_An_Ap_praisal, accessed on 24.02.2019

females). Nearly 52 percent of the total population of Mizoram lives in urban areas which is much higher than the national level (31.16 percent).

The population of Mizoram consist of numerous ethnic tribes. However, they are collectively called Mizo. Some important tribes in Mizoram are Lusei, Hmar, Paite, Pawi, Mara, Chakma, Brus etc. Most of the people in Mizoram belong to Scheduled Tribe. They comprise more than 90 percent (1,036,115) of the total population of the state. As per 2011 Census, the population of Scheduled Caste and others is 1,218 and 59,873 respectively.

Table No. 1.2: Population Trend in Mizoram (1901-2011)

Sl. No	Year	Males	Females	Total	Decadal Variation (%)
1	1901	39,004	43,430	82,434	-
2	1911	43,028	48,176	91,204	10.64
3	1921	46,652	51,754	98,406	7.90
4	1931	59,186	65,218	124,404	26.42
5	1941	73,885	78,931	152,786	22.81
6	1951	96,136	100,066	196,202	28.42
7	1961	132,465	133,598	266,063	35.61
8	1971	170,824	161,566	332,390	24.93
9	1981	257,239	236,518	493,757	48.55
10	1991	358,978	330,778	689,756	39.70
11	2001	459,109	429,464	888,573	28.82
12	2011	555,339	541,867	1,097,206	23.48

Source: Directorate of Census Operation, Mizoram

Table No. 1.3 enumerates that among the eight districts in Mizoram, six districts such as Mamit, Champhai, Serchhip, Lunglei, Lawngtlai and Siaha have larger rural population. However, in Aizawl and Kolasib districts, the urban population surpassed rural population at considerable extend. In Aizawl district where the capital city of the state, Aizawl, is located, the number of population in urban areas is more than the triple of rural population.

Table No. 1.3: District-Wise Rural and Urban Population (2011 Census).

Sl.No	District	Persons/Males/ Females	Rural	Urban
1	Mamit	P	71,465	14,899
		M	37,135	7,693
		F	34,330	7,206
2	Kolasib	P	37,077	46,878
		M	19,097	23,821
		F	17,980	23,057
3	Aizawl	P	85,555	3,14,754
		M	43,780	1,55,490
		F	41,775	1,59,264
4	Champhai	P	77,216	48,529
		M	39,110	24,278
		F	38,106	24,251
5	Serchhip	P	32,918	32,019
		M	16,643	16,208
		F	16,275	15,811
6	Lunglei	P	92,676	68,752
		M	47,577	35,314
		F	45,099	33,438
7	Lawngtlai	P	97,064	20,830

		M	49,940	10,659
		F	47,124	10,171
8	Siaha	P	31,464	25,110
		M	15,853	12,741
		F	15,611	12,369

Source: Directorate of Census Operations, Mizoram

Administration

Lushai Hills was one of the Scheduled Districts under the provision of the Scheduled District Act, 1874, due to its hilly terrain and the primitive people who inhabited the area with very little resources. However, political administration in Mizoram had begun officially from 1890, when the territory of the then Lushai Hills or Mizo Hills was divided into North Lushai Hills and South Lushai Hills. The North Lushai Hills was placed under the provincial government of Assam and the South Lushai Hills under government of Bengal. Aijal (present Aizawl) was made the Headquarters of the North Lushai Hills while Lunglei as the headquarters of the Southern portion. In 1898, the two Lushai hills were merged into one District under one Superintendent. It was categorised as 'Backward Tract' in 1919 under the provision of the Government of India Act 1919. This was as per the recommendation made by British political officers like Robert Reid, who was in favour of the exclusion of the area from the reform schemes. As a result, the provincial government of Assam had no power over the administration of the Lushai Hills. The Governor of Assam was made in charge of the administration of the backward area. Thus, the Lushai Hills District could not have representatives in the Assam Legislative Assembly. In 1935, the Lushai Hills District, along with Naga Hills District and the North Cachar Hills District, was labelled as 'Excluded Area' under the provision of Government of India Act 1935. The administration of Excluded area was in the hand of the Governor of Assam from 1937 to 1947 when India got its independence from the British rule. The Governor acted independently from the Assam Government. No Act of the Federal Legislature or of the Provincial Legislature, shall apply to an excluded area or a partially excluded area.

Again, the Government of India Act 1935 kept the Lushais outside the main stream. They could not have any voice in matters concerning their administration as they were not allowed to have representative in the provincial government.

Administration after Independence

When India attained independence from the British in August, 1947, the Lushai Hills District continued to be one of the districts of Assam. Its name was later changed into Mizo District in 1954 by the Indian Parliament. The first District Council election was held on 5th April, 1952. The election was contested in 20 constituencies. There were 2 nominated seats also. The Mizo Union was the first ever party who won the election of Mizo District Council by winning 15 seats while their opponent-Zalen Pawl captured the rest five. When the normal tenure of the Council expired, the second District Council election was held on 25th January 1957 with two big parties, Mizo Union and Zalen Pawl, contesting the election. The Mizo Union got a majority again by winning 11 seats. The third election which was held on 5th February, 1962 also favoured the Mizo Union. However, it was defeated in the fourth election by a new party called Indian National Congress (INC) with 13 seats while Mizo Union secured 7 seats only.

Mizo District Council was upgraded to the status of Union Territory (UT) in 1972. It was Mrs. Indira Gandhi, the then Prime Minister of India, who inaugurated the Union Territory on 21st January, 1972 at Aizawl. The first UT election was held in 30 constituencies. Mizo Union once again came in the fore front by securing 23 seats, while the INC and independent candidates took 4 and 3 seats respectively. The second election which was held on 17th May, 1978, was won by the new regional party- People's Conference (PC). It was headed by Brig. T. Sailo. But, the President's rule was declared after only 5 months of its tenure due to a split in the party in power. The UT Assembly election for the third time was held on 24th and 27th April, 1979. People's Conference Party came in power again by securing 18 seats. Brig. T. Sailo emerged as a Chief Minister for the second time. The last election to the UT Assembly was held on 25th April, 1984. The Indian National Congress (INC) under the leadership of Lalthanhawla won majority by securing 20 seats. It was followed by PC party with 8 seats.

Insurgency

It broke out in March, 1966, and lasted for about 20 years. It came to an end on 30th June 1986 with the signing of the Mizoram Peace Accord by the Mizo National Front (MNF) and the Government of India. Signatories of the Accord were Laldenga, leader of the movement, R.D Pradan, Home Secretary and Lalkhama, Chief Secretary to the Government of Mizoram. The movement for independence was the result of the dissatisfaction of the larger percentage of the Mizo people especially the youth with the apathy of the Assam government towards area during the *mautam* famine in the region. The famine, remarks N.C. Asthana and Anjali Nirmal, “sowed the seeds of resentment which came to be directed against the Government of India.” First, the Mizo National Famine Front (MNFF) was formed. By the time the famine was over, it was overwhelmed by ethnicity and political consideration in the light of Naga revolt, and converted itself into Mizo National Front (MNF) under the vibrant leadership of Laldenga.²⁴ Its aim was to establish a sovereign state of Mizos. The MNF started their action for freedom in 1966 that compelled the Government of India to declare MNF as unlawful and the region as Disturbed Area. Till today, Mizoram is regarded as one of the most peaceful state in sovereign India. It sowed the seeds belongingness and discarding tendency to keep aloof among the different sub clans of the Mizo. The government of India also changed its course of actions on the Mizos by conferring statehood and numerous central assistances to the people of Mizoram.

Political Development after Statehood

Mizoram was granted statehood to be the 23rd state in 20th February, 1987 with the 53rd Amendment to the Indian Constitution in 1986. Conferring of the statehood was one of the most significant outcomes of the Peace Accord signed between Government of India and MNF. The accord marked the end of the political instability, turmoil and insecurity among the people of Mizoram. So far, eight general elections to the State Assembly have been held after Mizoram acquired statehood. The first election was held

²⁴ Malsawmkima (Ed.), (2015), *Socio -Economic and Political Impact of Insurgency in Mizoram*, Aizawl: Government Aizawl North College. pp.50

on 16th February, 1987 soon after the granting of statehood. It was the MNF party which won the majority by winning 24 seats. But the government led by MNF lasted for only fifteen months due to the withdrawal of 9 MLAs (Members of Legislative Assembly). President's rule was declared on 7th September, 1988. The second election to the State Assembly was held on 21st January, 1989. The political parties which contested in the election were Congress (I), MNF, MNF (D), PC and Hmar People Convention (HPC). The first ever coalition government led by Congress (I) and MNF (D) with Lalthanhawla as Chief Minister was witnessed in Mizoram. The government could successfully manage itself and lasted till the end of the normal tenure. The third Assembly Election was held on 30th November, 1993. Another coalition government was formed by the Congress with its alliance-Mizoram Janata Party, formerly known as PC. Lalthanhawla was once again sworn in as the Chief Minister of Mizoram. The fourth State Assembly election was held on 25th November 1998. MNF came into power once again by securing 21 seats. It was followed by MPC with 12 seats, Indian National Congress (INC) with 6 seats and Independent with 1 seat. Mr Zoramthanga led the government as Chief Minister of the state. The fifth election to the State Assembly was held on 21st November, 2003. This election was contested from five corners- MNF, INC, ZNP, MPC and MDF being the contesting parties. MNF party won the majority by bagging 21 seats for two consecutive terms. Again Zoramthanga led the government for one term. The sixth election was held on 2nd December, 2008. It was a sweeping victory for the Congress party which won 32 seats out of the total 40 seats. MNF could manage to get only 4 seats. Lalthanhawla was elected as the Chief Minister of State for the fourth time. The seventh State Assembly election was held on 25th November, 2013. People choose the Congress to be a ruling party for the second consecutive term. Out of the total 40 seats, Congress won 34 seats and the remaining seats were distributed between MNF with 5 seats and MPC with 1 seat only. ZNP, BJP and other parties who were contested in the election failed to get even a single seat.

The Mizoram Legislative Assembly election was held on 28th November, 2018 in 40 constituencies. The MNF party under the leadership of Zoramthanga won majority by securing 26 seats. It was a serious setback for Congress party who secured 34 seats in the last election held in 2013. This time they secure only five seats. Independent

candidates supported by ZPM (Zoram People Forum) stood second by securing 8 seats. Bharatiya Janata Party (BJP) who failed to secure even a single seat in the 2013 election also made a remarkable debut by taking 1 seat from 38- Tuichawng constituency. Chief Minister Zoramthanga along with his Council of Minister had occupied their office by taking an oath on 15th December 2018.

Currently, there are 11 districts in Mizoram including the three districts that were established in 2019 by the State Government. They are (1) Aizawl district with Aizawl as district capital and state capital, (2) Lunglei district with Lunglei town as its district capital, (3) Siaha with Siaha town as its capital, (4) Champhai district with Champhai town as its capital, (5) Kolasib with Kolasib Town as its capital, (6) Serchhip District with Serchhip as its capital, (7) Lawngtlai District with Lawngtlai town as its capital and (8) Mamit district with Mamit Town as its capital, (9) Saitual District, with Saitual as its capital, (10) Hnahthial District, with Hnahthial as its capital and (11) Khawzawl District, with Khawzawl as its capital. Each district is administratively headed by Deputy Commissioner/District Collector.

Existence of Autonomous District Councils is another important feature of the administrative set up in Mizoram. Currently, there are three Autonomous District Councils- Mara Autonomous District Council (MADC), Lai Autonomous District Council (LADC) and Chakma Autonomous District Council (CADC). They all operate in southern part of Mizoram. MADC is meant to serve the Mara ethnic group, LADC for Lai ethnic group and CADC for Chakma ethnic group.

For administrative convenience, each district is divided into two or more sub-divisions. Currently there are 23 Sub-Divisions in Mizoram. Each Sub-Division is administratively headed by a Sub-Divisional Officer (SDO Sadar) belonging to the Mizoram Civil Service. Mizoram is further divided into 26 R.D Blocks. Each block is headed by a Block Development Officer (BDO). BDOs are usually drawn from the junior grade of the Mizoram Civil Service (MCS).

As per the 2011 Census, there are 23 notified towns and 830 villages in Mizoram. Notified towns in Mizoram along with their population are: Zawlnuam (3,733), **Mamit**

(11,617), Lengpui (7,884), Vairengte (10,554), Bairabi (4,320), **Kolasib** (24,272), North Kawnpui(7,732), Darlawn(3,769), Saitual(11,619), Sairang(5,950), Aizawl(.293,416), Khawzawl(11,022), Champhai(32,734), Khawhai (2,496), Biате (2,277), **Serchhip** (21,158), Thenzawl (7,259), North Vanlaiphai (3,602), Tlabung (4,554), Lunglei (57,011), Hnahthial 7,187), Lawngtlai 20,830) and Siaha 25,110). Among the 830 villages, 704 villages are inhabited while 126 villages are uninhabited.

Autonomous District Councils

The Lushai Hills District Council (later named as Mizo District Council) and the Pawi-Lakher Regional Council (PLRC) came into being with the enactment of the Assam Autonomous District (Constitution of the District Council) Act by the Government of Assam in 1951. It was based on the provision of the Sixth Schedule of the Constitution. Aizawl and the then Saiha were made the Headquarters of Mizo District Council and Pawi-Lakher Regional Council respectively. The Mizo District Council was abolished in 1972 after 20 years of its existence when Mizoram became Union Territory. However, the Pawi, Lakher and the Chakmas did not want abolition PLRC, thus the PLRC was trifurcated into three regional councils, namely, Pawi Regional Council, Lakher Regional Council and the Chakma Regional Council on 2nd April, 1972 and then upgraded to the status of District Council on 29th April 1972. In 1988, Pawi Autonomous District Council was changed to Lai Autonomous District Council and Lakher Autonomous District Council to Mara Autonomous District Council. The three District Councils occupy strategic positions as they share international borders with Myanmar and Bangladesh. In accordance with paragraph 2(6) of the Sixth Schedule to the Constitution of India, the Government of Mizoram enacted the Mizoram Autonomous District Council (Constitution and Conduct of Business of the District Councils) Rules, 1974, which then became the basis of governance for the three ADCs of Mizoram. Further, the Government of Mizoram also created a separate department, in the Secretariat known as ‘District Council Affairs Department (DCAD)’, to look after the affairs of the three ADCs of Mizoram. Funds for the District Councils are channelized through this Department, with the approval of the State Finance

Department. As the Governor is the Executive Head of the State Government he/she also is the Executive Head of the various District Councils within the state.

District Councils in Mizoram have three main organs- Legislative, Executive and Judiciary. The business session of the Council is conducted by the Chairman. There is also a Deputy Chairman to assist the Chairman and to conduct the session in case of the absence of the Chairman. They are elected by the elected Members of District Council (MDC) of the Council. The normal tenure of the Council is five years. There is also a provision for extension of the term for one year. The Sixth Schedule to the Constitution prescribes 18 subjects on which the District Councils can make legislations, within their respective jurisdiction. Some of them are: Land Revenue, Education up to elementary standard, Forest, Public Health and Sanitation, Marriage and Divorce, Establishment of Village Council and Town Committee etc.

The District Council also has an Executive Committee whose function is more or less similar to that of the Cabinet of the State Govt. The Chief Executive Member (CEM) is the Head of the Executive Committee and is elected by the MDCs from amongst themselves. Executive Members (EM) among the MDCs are appointed by the Governor of Mizoram on the recommendation of CEM. Being the leader of the executive branch of the Council, it is the duty of the CEM to distribute portfolios to the EMs. The post of CEM and EMs are similar to that of the Chief Minister and Cabinet Ministers of the State Government respectively. Each Autonomous District Council has two Secretaries, one for the Executive Committee, designated as Executive Secretary and the other for the Legislature, designated as Legislative Secretary. The post of Executive Secretary is similar to the Chief Secretary of the State Government and the Legislative Secretary is similar to Secretary, Assembly Secretariat of the State Government.

Besides Legislative and Executive organs, the Judiciary is an integral part of the Autonomous District Councils. Para 4 of the Sixth Schedule of the Constitution empowers the District Council to set up Village Council Court and District Council Court within their jurisdiction. There is also a provision for setting up of Intermediate

District Council Court. Rules and regulation with regard to the constitution of the courts might be framed by the Council with prior approval of the Government. However, cases which can be trial in these courts should be the case between a tribal and another tribal only. If non-tribals are involved, the case automatically is out of the purview of the courts of the District Council. In addition to this, they are not allowed to try cases where the offence is punishable by death or transportation for life or imprisonment for more than five years.

The District Councils are endowed with some financial powers in respect of assessment and collection of land revenue and also imposition of taxes within their respective area. The following are the taxes levied and collected by the District Councils:

1. Land revenue
2. Land and building taxes
3. Taxes on profession, trades, callings and employment
4. Taxes on animals, vehicles and boats
5. Taxes for maintenance of schools, dispensaries and roads
6. Taxes on the entry of goods into a market for sale
7. Tolls on persons
8. Issuance of licences or leases for the purpose of procuring or extraction of minerals

In addition to the incomes from taxes, the District Councils derive their revenue from grants in-aid, loans and advances etc., from the State Government and Central Government.

Inner Line Regulation

The Inner Line Regulation was created by the British Government to protect the interests of the government from the tribal people in the hill areas who used to invade the British subjects in the nearby plain areas. It was an imaginary line drawn to divide between the tribal people and those from outside their area so that neither party could

enter beyond the line without a permit issued by the competent authority. This is an outcome of the Bengal Eastern Frontier Regulations, 1873, which protected Crown's interest in the tea, oil and elephant trade by prohibiting British subjects from entering into these Protected Areas. It continues to operate in Mizoram till today. It has been further safeguarded by the peace accord signed by the Government of India and Mizo National Front (MNF). Its continuance has been accepted by the Government of India keeping in view the need for protection of the Mizos from economic exploitation and the loss of their cultural identity.

Mizo Society after Independence

Although traditions and social customs occupy a significant part in the Mizo society, the society has witnessed tremendous changes since the coming of the British. Changes have been brought in by British administration, political development since independence, advancement in science and technology, education, Christianity, economic development, etc. The Mizos in the past had a distinct society. Nowadays, it has become more or less submerged with the western society, Indian society and the society of the Far East nations. The role of information technology through social media like television, mobile phones, internet etc., is very much responsible for these changes.

Mizo society has been a closed-knit society since time immemorial. There is no caste or class system like they have in the Hindu or Muslim society. It is free from rank or status. All can freely participate in all social or religious functions. Discrimination on the ground of caste or class has not been experienced till today. However, the society is made up of different ethnic groups. Among the various tribal groups, Lusei is dominating sub-tribe. Some important tribal groups of the Mizo tribe are Ralte, Hmar, Pawis/Lai, Paite, Mara etc. Each group has different clans and separate dialect. Many of the present Mizo customs, culture and traditions are drawn from the Lusei. Mizo language officially known as Mizo tawng or Mizo which is spoken by majority of the Mizo people is also mostly drawn from the Lusei dialect though some dialects of other sub-tribes are also incorporated into it. Apart from the Mizos, Chakmas and Reangs

form separate and distinct social groups. They inhabit the south-western and western parts of the state.

Most of the people living in Mizoram belong to the Scheduled Tribe. They comprise more than 90 percent of the total population of the state. As per the 2011 Census, people belonging to the Scheduled Castes are only 1,218 in number. Others belonging to neither Scheduled Tribes nor Scheduled Castes are 59,873 in number. Mizoram is the only state in India which has largest concentration of Scheduled Tribe.

Christianity

It is one of the most significant features of the Mizo Society. As per 2011 Census, about 87 percent (9,56,331) of the population are Christians. There are also few followers of Hinduism, Islam, Sikhism, Buddhism and Jainism. Christianity was introduced in Mizoram at the end of the 17th Century AD by the European Missionaries. After 100 years of preaching the gospel of Christianity for the first time, most of the people in Mizoram have embraced Christianity as their religion. However, people belong to different denominations of the Christian faith. Presbyterian Church, Baptist Church, United Pentecostal Church (North East), United Pentecostal Church (Mizoram), Salvation Army, Lairam Isua Krista Kohhran (LIKBK), Evangelical Church of Maraland (ECM), Isua Krista Kohhran (IKK) etc., are some important denominations in Mizoram. More than half of the Christians that is, 6,04,514, in Mizoram belong to the Presbyterian Church. It is followed by Baptist Church of Mizoram with 173,373 members and other denominations. The northern portion of the state which has larger concentration of population is dominated by the Presbyterian Church while the southern part is dominated by the Baptist Church. It is worth stating that there exist mutual understandings among the various denominations. Only minor issues have been experienced so far.

Status of Women

Christianity, education and various legislations framed both by the central and state government from time to time has enhanced the position of the women in the Mizo

society. As per 2011 census, around 90 percent of Mizo women are literate showing that there has been a remarkable change in the status of women. In the past, especially, before the coming of the British, the women folk were in an unsatisfactory situation. They had no right to inherit their parent's property. "*Hmeichhhe fin in tuikhur ral a kai lo*" (Wisdom of women does not reach beyond the public well), "*Hmeichhia leh Chakai in sakhua an nei lo*" (Women and crabs do not have a religion of their own) were the popular phrases which depicted the under-privileged status of women in the past. Nowadays, compared to several other Indian societies, women in the Mizo society appears to enjoy a better status.

Women are now enjoying equal rights and opportunities with men folk in many aspects of life. Discrimination on the ground of sex has been greatly minimised. Reservations for women in different walks of life have further upgraded their status. In political institutions of different levels, we find women fill the positions which are reserved for them. In higher level of education, women are now no less than men. There are many families dependent on the women family members. The post in various public and private sectors are filled by women due to their successes in academics. The founding of the Mizoram Hmeichhe Insuihkhawm Pawl (MHIP) (Mizo Women Association) in 1974 was also regarded as an epoch making in the development of women in the Mizo society. The importance of its contribution to the development of women cannot be overemphasized. Eminent scholars among the women have also made remarkable contributions by enlightening the Mizos in general and women in particular through their writings and speeches.

Women in Mizo society are fortunate to have no burden of dowry as is practised in other parts of the country. Child marriage is absent in the society. Both men and women are free to choose the time to get married and the persons whom they would marry. With the framing of The Mizo Marriage, Divorce and Inheritance of Property Act, 2014, women are now entitled to their ancestor's property. Female infanticide which is found rampant in other parts of the country has not be found to take place in the Mizo society which can be attributed to the reason why the sex ratio in Mizoram at 976:1000 is higher than any other state as well as the national average of 943:1000. In

short, it can be said that position of women in Mizo society is quite satisfactory in spite of the fact that there is still long way to go.

Education

Formal education has become an integral part of the Mizo society since the coming of Christian missionaries. Introduction of education was, in fact, one of the most important works done by the missionaries. Mizoram is now the second most literate state next only to Kerala. As per the 2011 Census, 91.33 percent of the population of the state are literate. It is noteworthy that women literacy rate too is higher than any other state in the country except Kerala. As of today, there are 1969 Primary Schools, 1580 Middle Schools, 669 High Schools, 175 Higher Secondary Schools, 78 colleges of different studies including National Institute of Technology (NIT), College of Veterinary Science & Animal Husbandry, Theological College, etc. and 2 Universities.²⁵ Apart from the said institutions, there are some institutions of technical importance such as Polytechnic Institutions, Industrial training Institutions etc. The above number of institutions not only render its services to fulfil the academic needs of the population (1,097,206) of Mizoram but of many from outside the state who comes every year to enrol themselves in the colleges and universities. The average drop-out rate at primary, middle and high school stage is 8.5, 9, and 9.25 respectively. The number of students enrolled in the higher studies in different colleges and the two universities for the academic year 2017-2018 was 36,861 in number. Further, there are considerable numbers of Mizo who are enrolled in various institutions in other states and even in different foreign countries.

Civil Society Organisations

Mizoram is a home of numerous interest and pressure groups. Their number is countless because many of them are yet to be registered. Apart from the Churches, some important Civil Society Organisations in Mizoram are - Young Mizo Association (YMA), Mizo Upa Pawl (MUP), Mizo Hmeichhe Insuihkhawm Pawl (MHIP), Young Lai Association (YLA), Young Chakma Association (YCA), Mara ThyutliaPy (MTP),

²⁵ Statistical Handbook 2018, Directorate of Economic and Statistics

Mizo Zirlai Pawl (MZP), Mizo Students Union (MSU) etc. While some are for the whole society most of them are meant to serve the interests of some particular sections of the society. Their contributions in their own way for the development of the Mizos are praiseworthy. As a matter of fact, even policies and programmes being implemented by the government are bound to fail without active cooperation from their side. Because of this, the state government seek their advices from time to time.

Amongst the Non-Government Organisations (NGOs) in Mizoram, YMA is the largest in respect of membership and area coverage. In 2017-18, the membership strength of YMA is 4,27,393 (2,54,944 male and 1,72,449 female) covering the whole of Mizoram. It is followed by MHIP with 2,89,300 members. Other large NGOs are MUP with 64,078 members, YLA with 52,252 members, MTP with 12,000 members and YCA with 16321 members. Students Associations other than the said NGOs like Mizo Zirlai Pawl (MZP), Mizo Student Union (MSU) etc., also have remarkable contributions not only for the students but also for the whole society. As a matter of fact, they are the strongest force pushing the government and others towards the fulfilment of the interest of the people. Their potentials and abilities have been experienced by the Mizo people from time to time.

Festivals

Before the advent of Christianity, Mizos used to have three major festivals round the year. They were Chapchar Kut, Mim Kut and Pawl Kut. These festivals were celebrated with great enthusiasm. As the Christian missionaries discouraged the celebration of these festivals, Mizos, after embracing Christianity as their religion, neglected their centuries-old festivals for a number of years. However, Chapchar Kut and Pawl Kut are now revived although not in the same aspect as in the past. Chapchar Kut was celebrated once again as early as 1962. It usually falls during the spring season. This is the time of the year when the most arduous part of the jhum operation is completed. The festival is now celebrated with the active participation of the governments and the NGOs. During its celebration, people perform traditional dances, sports and other practices. People are expected to wear traditional dresses in their

respective work places also. Recently, Pawl Kut is also celebrated once again. With the harvesting over and the tilling for the year completed, this festival is unique in among the various festivals as children are also included in the celebration. It usually falls in the month of December or January.

Christmas may be regarded as the biggest festival of the Mizos after the coming of Christianity. It is the festival to remember the birth of Jesus Christ. As most of the Mizos are Christians, Christmas is celebrated throughout the length and breadth of the state with great zeal. Community feast is one of the most important components of the celebration. Churches play a leading role in the celebration by organising feast and services for its members. Special functions and gatherings are organised in many areas to mark their preparation for the coming Christmas. Good Friday and Easter Sunday are also regarded as important festivals of the Mizo Christians. They are observed with great devotion.

Anthurium Festival is another important festival of the Mizos which have been introduced by the Government of the state since 2006. This festival is celebrated with the aim of attracting more tourists to Mizoram. It is held every year usually in the month of September. Its celebration is organised by the Department of Tourism in collaboration with Horticulture Department. Usually, it lasts for three days. It falls during the season when the anthurium flower is in a full bloom.

Language

Mizoram is a mono-lingual state. The common language which is spoken by almost all the people is 'Mizo'. It is mainly based on the Lusei dialect but incorporate many words from other sub-tribes and sub-clans. The Mizo language or *Mizo tawng* belongs to the Tibeto-Burmese language family. Mizo scholars and academicians are putting their best effort to include *Mizo* in the Eight Schedule to the Constitution of India. As it is a dominant language, *Mizo* is being used as the mother tongue by more than 73 percent of the state's population. The Chakma language stands second in respect of the number of speakers. It is followed by Lakher and Lai. Paite, Hmar and Reang/Bru are also spoken by some indigenous people.

Public Health

Though it is still unsatisfactory in some respects, people are becoming more conscious about their health since the last two decades. Many have now adopted healthy lifestyles not only by changing their diet and giving up smoking, drinking and consumption of other intoxicants but also introducing some healthy activities like physical exercises, cleanliness etc., in their day to day life. Even the government have taken great strides through awareness campaigns in various forms to ensure that people are leading a healthy life. Government is now trying hard to make sure that each and every individual get adequate health facilities.

Table No. 1.4: Number of Hospitals and Health Centres

Sl. No	Hospital/Health Centres	2016-17	2019-20
1	General Hospitals		
	(a) Government	9	9
	(b) Private/Nursing home	15	14
	(c) Society/Church	5	7
2	Cancer Hospital	1	1
3	Referral Hospital	1	1
4	Ayush Hospital	1	1
5	Leprosy Hospital	1	1
6	Sub-District Hospital	5	5
7	Community Health Centre (CHC)	9	9
8	Primary Health Centre (PHC)	57	57
9	Urban Primary Health Centre (UPHC)	8	8
10	Health Sub Centre	372	372
11	Health Sub Centre Clinics	162	171

12	Ayush Dispensaries	9	9
13	Mobile Medical Unit	8	8

Source: Directorate of Health & Family Welfare, Government of Mizoram

As shown in the Table No. 1.4, the Government of Mizoram has established 14 general hospitals and one each for Cancer, Referral, Ayush and Leprosy to provide health facilities to the people. Apart from the establishment of the general hospitals in all district capitals, the state government has set up Community Health Centres (CHC), Primary Health Centres (PHC), Urban Primary Health Centres (UPHC), Health Sub Centre, Health Sub Centres Clinics, Ayush Dispensaries and Mobile Medical Units in different parts of the state.

Civil societies such as churches and private individuals also have remarkable contributions towards the health care of the people. Synod Hospital, Durtlang; Christian Hospital, Serkawn; Seventh Day Adventist Hospital, Aizawl etc., are some important hospitals run by churches in Mizoram. They are equipped with a number of beds and modern advanced medical facilities. The role played by private individuals towards the health care of the people is also commendable. Many hospitals in Mizoram, today, are owned and managed by individual philanthropist. They relieve the burden of the government to a great extent and sometimes turn out to be provider of better service. They also donate charities to different hospitals and other health centres.

Table No. 1.5 highlights the status of Mizoram based on the indicators of National Family Health Survey. As per the report of the Department of Health and Family Welfare Department, Government of Mizoram, there is not much difference between the urban and the rural areas with regard to the performance of the government based on the key indicators listed in the table.

According to the report of the Directorate, Health and Family Welfare Department in 2017-18, there are 437 registered Doctors, 83 Ayush Doctors, 665 Health workers, 827 Staff Nurses, 75 Lab Technicians and 83 pharmacists in Mizoram. The establishment of Mizoram Institute of Medical Education and Research (MIMER) [later

renamed as Zoram Medical College (ZMC)] under the Centrally Sponsored Scheme 'Establishment of New Medical Colleges attached with existing District/Referral hospitals' was also an important landmark in the health administration of Mizoram. It was inaugurated by the former Chief Minister Lalthanhawla on 7th August, 2018. It is located in Falkawn which is about 16 Km from Aizawl. As of April, 2022, the institution offers MBBS degree course with 16 departments. The intake capacity is 100 per year.

Table No: 1.5 Key Indicators of National Family Health Survey 2016-17

Sl. No	Particulars	Urban	Rural	Total
1	Households with improved drinking-water source (%)	94.1	87.8	91.5
2	Households with improved sanitation facility (%)	90.9	73.1	83.5
3	Total fertility rate	2.0	2,7	2.3
4	Mothers who had antenatal check up in the first trimester (%)	77.0	52.1	65.7
5	Mothers who had full antenatal care (%)	47.9	27.0	38.5
6	Institutional births (%)	97.2	61.0	80.1
7	Children age 12-23 months fully immunized (BCG, measles, 3 doses of polio and DPT (%)	49.8	51.3	50.5
8	Children below 5 years who are stunted (%)	22.7	33.8	28.0
9	Children age 6-59 months who are anaemia (%)	13.2	22.3	17.7
10	Women who use any kind of tobacco (%)	59.2	59.3	59.2
11	Men who use any kind of tobacco (%)	82.0	77.7	80.4
12	Women who consume alcohol (%)	6.7	2.2	5.0
13	Men who consume alcohol (%)	52.3	44.9	49.6

Source: Directorate of Health & Family Welfare, Government of Mizoram

Mizoram recorded one of the lowest Infant Mortality Rate at 16.47 in 2020 while the national average is 27 per 1000 live births. The death rate in Mizoram which is 4.97 in 2020 was also better than the national average which was 7.35. With regard to the

birth rate, Mizoram has recorded 17.20 in 2020 which was higher than the national average of 16.57.

Table No. 1.6: Birth Rate, Death Rate and Infant Mortality Rate (as per CRS) in Mizoram (Per 1000)

Sl. No	Particulars	2017	2018	2019	2020
1	Birth Rate				
	i) Rural	15.97	13.82	15.32	13.61
	ii) Urban	22.79	18.44	20.49	20.56
	iii) Mizoram	19.53	16.25	18.05	17.20
2	Death Rate				
	i) Rural	3.9	3.52	3.63	3.46
	ii) Urban	7.24	4.97	6.24	6.31
	iii) Mizoram	5.64	4.29	5.01	4.97
3	Infant Mortality Rate				
	i) Rural	12.50	10.52	7.96	11.55
	ii) Urban	20.48	17.15	16.90	19.37
	iii) Mizoram	17.35	14.49	13.31	16.47

Source: Statistical Handbook 2020&2021, Directorate of Economics & Statistics

Economy

Economically, Mizoram was once one of the most backward states in the Indian Union. Geographical disadvantages like isolated location, rugged topography, soil texture and political instability during 1966-1987 were considered as the reasons for its backwardness. However, it is now one of the fastest growing economies along with Gujarat, Jharkhand and Tripura which achieve more than 8 percent growth rate during the last four years. According to the Statistical Handbook Mizoram 2020 prepared by Directorate of Economic & Statistics, Government of Mizoram, the Gross State Domestic Product (GSDP) at constant prices for the year 2019-2020 was projected to be Rs. 18797.07 crore against Rs 16478.20 crore for the year 2018-2019 and the Per Capita Income for the year 2019-2020 is Rs 204018 against Rs 176620 for the previous year. Service sector always contributes the highest percent towards the State GDP. In 2019-2020, the contribution of Service Sector is projected to be 43.28. It is followed by Agriculture & Allied Sector and Industry Sector sharing 30.64 and 26.08 percent respectively.

Table No. 1.7: Estimates of SGDP and SNDP and Per Capita Income at Current and Constant Prices (2011-2012 Series)

Year	GSDP (Rs. in Crores)		NSDP (Rs. In Crores)		Per Capita Income (In Rupees)	
	At Current Prices	At Constant Prices	At Current Prices	At Constant Prices	At Current Prices	At Constant Prices
2014-15	13,509.40	11,261.04	12,067.05	9,960.02	103,049	85,056
2015-16	15,138.86	12,323.60	13,595.32	10,947.91	114,055	91,845
2016-17	17,613.18	13,789.10	15,660.41	12,367.89	128,998	101,877
2017-18	19385.33	14761.01	18238.62	13779.41	155222	117272
2018-19	22287.41	16478.20	20947.12	15371.64	176620	129609
2019-20	26502.56	18797.07	24424.02	17797.26	204018	148663

Source: Statistical Handbook 2020, Directorate of Economics & Statistics

Table No. 1.8: Percentage Sectoral Share of GSDP

Year	Agriculture & Allied Sector	Industry Sector	Service Sector
2014-2015	31.49	20.87	47.63
2015-2016	31.41	20.74	47.85
2016-2017	30.01	24.27	47.72
2017-2018	26.51	26.64	46.85
2018-2019	25.27	29.18	45.55
2019-2020 (Projected)	26.08	30.64	43.28

Source: Statistical Handbook 2020, Directorate of Economics & Statistics

Agriculture

Mizoram is predominantly an agrarian state. Majority of the population, more than 60 percent of the total population, rely on the agriculture and allied sector. It is regarded as the main stay and biggest source of livelihood in Mizoram. Mizoram is fortunate to have conducive climatic conditions for the growth of different kinds of crops, fruits and vegetables. Literally, it is often said that there is no crop that cannot be grown in Mizoram. The main crops that are grown in Mizoram are Rice, Cotton, Sugarcane, Maize, Pulses, Oilseeds, Ginger, Chillies and potato etc. Rice continues to remain the principal food crop and the staple food of the Mizos. Compared to the land cultivated for other crops, land used for the cultivation of rice is much larger. For the year 2017-18, 36,114.2 hectare of land is put under the cultivation of rice producing 59,605.6 metric ton at the rate of 1.65 kg/Ha. Out of the total areas under rice cultivation, Jhuming covers 19,587.5 Ha., whereas the total area covered under Wet Rice Cultivation (WRC) (both Kharif and Rabi) is 16,526.7 Ha. Though there are surplus productions of certain crops like spices etc., which are being exported to other states,

there is a huge gap between the requirement and production of pulses, vegetables, oilseeds, rice and maize²⁶.

Jhum or Shifting cultivation is the most common method of cultivation in Mizoram. It is one of the most primitive methods of cultivation in which the plots are shifted every year. Jhuming may be also called the 'slash and burn' method of cultivation for crop production. It is, as a matter of fact, an integral part of socio-cultural life of the Mizos. This type of cultivation involves clearing of forest with the help of axes and daos, drying and burning the debris and then cropping. The Jhum cycle during the pre-independence period was 15 or more years. However, due to the ever increasing population and increasing demand for land, the cycle has been narrowed down to 5-10 years. In Jhum land, a variety of crops especially annual and seasonal crops are grown together. Rice is grown as a staple crop and other vegetables as supplementaries. Weeding work is done three or four times before harvest, depending upon the necessity. Chemical fertilizers are seldom used in Jhums.

Jhuming is an unrewarding method of cultivation in terms of the vegetation destroyed in the process, and in terms of productivity. The value of forest destroyed by jhuming in Mizoram is estimated to be more than Rs. 100 crores annually. Soil erosion caused by it is also immense. It is estimated that an average of 16.84 metric tons of soil per hectare is lost through erosion every year²⁷. Fortunately, the area under Jhum cultivation in Mizoram is decreasing year by year. This is the result of the untiring efforts which have been made by the government through the implementation of various Central and State sponsored agriculture schemes, such as, Oil Palm development programme, Sugarcane cultivation programme etc. The area under Jhum cultivation has decreased from 44,947 hectare at the beginning of 11th Plan to 19,602 hectare during 2016-2017 which accounts for more than 56 percent reduction.

²⁶ Economic Survey 2017-18. Planning and Programme Implementation Department. pp.211.

²⁷Pachau, Lalrintluanga, *Op. cit*, pp.85.

Industry

Industrial development in Mizoram is still at the initial stage. It is one of the most industrially backward states of the country and is classified as 'Non-industries district under category 'A'. Hilly terrain, lack of adequate infrastructure like road, power and market, lack of expertise, lack of raw material etc., are the dominant factors for the slow pace of industrialisation in the state. It seems, therefore, not easy to boost up the pace of industrialization amidst all the adverse factors. As such, whatsoever can be called as 'industry' in Mizoram is mainly small and cottage industries.

Major industries in Mizoram are mostly forest and agriculture based industries. There is no such industry which can be called 'large scale industry'. As on 31.3.2020, there are 8773 industries in Mizoram. Among the industries, food production, wool, silk, synthetic fibre industry, hosiery & garment, wood production and repair service are the dominant trades accounting for more than 70 percent of the total industrial units. In spite of many obstacles, industrial sector has slowly made a significant contribution in the GSDP. The industrial sector has also generated employment for a number of people which was at 60509 in the year 2020 as shown in the table below.

The establishment of Industrial Training Institute in 1964, creation of the Department of Industries (now Commerce & Industries Department) in 1972, the setting up of Zoram Industrial Development Corporation (ZIDCO) in 1978, the establishment of Mizoram Khadi & Village Industries Board (MKVI B), Mizoram Multi-Commodity Producers Cooperative Union Ltd. (MULCO) and formulation of Industrial Policy in 1989, are some important efforts taken up by the Government of Mizoram in order to promote industrial development in the state.

Table No. 1.9: Numbers of Micro, Small and Medium Enterprises (MSME)/Small Scale Industries (SSI) and Persons Employed as on 31.3.2020

Sl No	Type of Industry	No. of Units	No. of Persons employed
1	Food Production	845	5659
2	Tobacco Production	6	36
3	Wool, Silk, Synthetic, Fibre Textile	206	1358
4	Hosiery & Garments	2016	12972
5	Wood Product	1213	6715
6	Paper Product & Printing	506	3826
7	Leather Products	36	238
8	Rubber & Plastic Products	140	1003
9	Chemical & Chemical Products	204	1251
10	Non Metallic Mineral Product	0	0
11	Metal Product	1450	9747
12	Machinery & Parts Except Electrical	13	155
13	Electric Machinery & Apparatus	22	145
14	Miscellaneous Manufacturing Industries	257	2440
15	Water Work & Supply	36	259
16	Construction	8	148
17	Activities Allied to Construction	409	4843
18	Restaurants & Hotels	36	298
19	Education, Scientific and Research Services	40	277
20	Medical & Health Services	34	274
21	Personal Services	17	307
22	Repair Services	737	4647
23	Services not classified elsewhere	737	439
24	Others	451	3472
	Total	8773	60509

Source: Directorate of Commerce & Industries.

Workforce/Employment

The population when classified into workers and non-workers has been further divided workers into main workers and marginal workers by the 1981 Census. As per 2011 Census, there are 486,705 persons classified as workers in Mizoram. Out of the total number of workers, the number of main workers and marginal workers are 415,030 and 71,675 respectively. The total number of non-workers is also estimated to be 610,501.

Table No. 1.10: District Wise Population of Workers and Non-Workers (2011 Census)

Sl. No	District	Main Workers			Marginal Workers			Non Workers		
		Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
1	Mamit	30,467	5,718	36,285	2,693	461	3,154	38,305	8,720	47,025
2	Kolasib	14,672	15,025	29,697	3,029	3,946	6,975	19,376	27,907	47,283
3	Aizawl	40,272	111,138	151,410	4,140	19,086	23,226	41,143	184,530	225,673
4	Champhai	36,363	16,748	53,111	2,704	4,527	7,231	38,149	27,254	65,403
5	Serchhip	16,472	13,366	29,838	1,176	1,383	2,559	15,270	17,270	32,540
6	Lunglei	38,512	23,501	62,013	11,628	4,651	16,279	42,536	40,600	83,136
7	Lawngtlai	32,703	5,379	38,082	6,166	1,318	7,484	58,195	14,133	72,328
8	Siaha	8,363	6,331	14,694	3,022	1,745	4,767	20,079	17,034	37,113
Total		217,824	197,206	415,030	34,558	37,117	71,675	273,053	337,448	610,501

Source: Directorate of Census Operations, Mizoram

As shown in Table No 1.10, the number of non-workers in Mizoram is more than 6 lakhs which is much larger than the sum total of the number of both main and marginal workers. Aizawl, the most populous district, has the largest number of both main and marginal workers whereas Siaha district has the least number. With regard to the number

of non workers, Aizawl stands first contributing more than two lakhs followed by Lunglei district with about eighty thousand.

According to the Statistical Handbook 2020 prepared by Directorate of Economics & Statistics, 28129 job seekers are registered at the employment exchange offices in 2020. Of the total number of registered job seekers, 14324 are Male and 13805 are Female. The number of Graduate and above degree holders is 12,235. It clearly indicates that unemployment has become an acute problem in Mizoram. Absence of large scale industries, ever increasing number of educated youth etc., are the main reasons behind the unemployment in Mizoram.

Table No. 1.11: No. of Job Seekers as per Live Register of Employment Exchange.

Sl. No		2018-19			2019-20		
		Male	Female	Total	Male	Female	Total
Category/Education Level							
1	Unskilled	67	52	119	22	37	59
2	Under Matric/MSLC	2103	549	2652	2392	1757	4149
3	HSLC	2136	1495	3631	2439	1554	3993
4	HSSLC	3206	2830	6036	3473	3302	6775
5	Graduate (Arts/SC/Com)	7721	6935	14656	2427	3151	5578
6	Graduate (Engineering)	142	48	190	200	63	263
7	Graduate (Medical)	-	-	-	6	8	14
8	Graduate (Dental)	3	2	5	11	15	26
9	Graduate (Pharm.)	10	2	12	18	11	29
10	Graduate (Computer Application)	87	19	106	95	34	129
11	Graduate (others)	44	43	87	90	108	198
12	Post Graduate (Arts/Sc/Com)	614	736	1350	829	1114	1943

13	Post Graduate (Engineering)	10	4	14	13	5	18
14	Post Graduate (Medical)	2	3	5	2	4	6
15	Post Graduate-MCA (Com.Appl)	34	13	47	56	23	79
16	MBA	60	52	113	45	37	82
17	MSW	29	101	130	38	117	155
18	Post Graduate (Others)	20	23	43	-	3	3
19	M. Phil	16	28	44	23	33	56
20	Ph. D	-	-	-	-	-	-
21	Technical Trade (EXIT)	567	790	1357	1004	1448	2452
22	Physically Handicapped	821	786	1607	851	823	1674
23	Non-Mizo	58	51	109	290	143	433
	Total	9072	6898	15970	14324	13805	28129

Source: Directorate of Labour, Employment, Skill Development & Entrepreneurship (LESDE)

In Mizoram, the government is the institution that has the largest number of employee. As per the latest Census of Government Employees and Workers, Mizoram, published in 2018 by Directorate of Economic and Statistics, Government of Mizoram- As on 31.03.2018, the total number of Employees & Workers under Government of Mizoram was 54771. The total number of Male Employees & Workers was 37759, which is 68.94% of total Employees & Worker. The total number of Female Employees & Workers was 17012, which is 31.06% of the Employees & Workers. The Mizoram Synod also has made significant contribution in generating employment in the state. As on 2018, there are 2848 workers under the Mizoram Synod. Other Churches, Autonomous District Councils, Central Government institutions, private educational

institutions, industries etc., are some other institutions which provide employment to the people of Mizoram.

Poverty

As per the survey conducted by State Planning and Programme Implementation Department in 2016, there are 56,584 families Below Poverty Line (BPL) in Mizoram. They constitute 19.63 percent of the total number of households. The survey found that five villages namely, Pamchung, Rabung, Tlangmawi, Chawngtlai and Rianglei are BPL free villages. The survey also revealed that Lawngtlai District has the highest number of BPL families at 13,162 out of the total number of 61,503 households. It is followed by Aizawl District with 12,668 households. Champhai District has the lowest percent of BPL families at 9.35 whereas Mamit district has the highest percentage at 25.64. The number of BPL families has dramatically gone down by 41 percent from the last list prepared in 2015. In 2015, there are 1,37,800 families living under below poverty line.

Table No. 1.12: District-Wise No. of BPL Households as per BPL Survey-2016

Sl. No	District	Households			No. of BPL Household			% of BPL
		Rural	Urban	Total	Rural	Urban	Total	
1	Mamit	17,310	2,853	20,163	6,804	382	7,186	35.64
2	Kolasib	7,900	11,459	19,359	1,635	1,766	3,401	17.57
3	Aizawl	19,188	73,591	92,779	3,706	8,962	12,668	13.65
4	Champhai	19,492	9,551	29,043	2,217	498	2,715	9.35
5	Serchhip	7,303	6,538	13,841	968	802	1,770	12.79
6	Lunglei	13,250	24,747	37,997	8,724	2,713	11,437	30.10
7	Lawngtlai	56,524	5,069	61,593	12,129	1,033	13,162	21.37
8	Siaha	7,897	5,519	13,416	3,617	628	4,245	31.64
	Mizoram	148,864	139,327	288,191	39,800	16,784	56,584	19.63

Source: Statistical Handbook 2020, Directorate of Economics & Statistics

As can be seen in Table No. 1.12, Lawngtlai District has got the highest number of BPL households at 13,162 with a large number of them residing in the rural areas of the district accounting to 12,129 households. Aizawl district though with the highest population comes second in terms of the BPL households in the urban area while it stands at the fourth position in relation to the rural areas after Lawngtlai, Lunglei and Mamit districts. In relation to the general population Mamit district has the highest number at 35.64 per cent while Champhai district has the lowest at 9.35 per cent.

Chapter -II

HORTICULTURE: A CONCEPTUAL STUDY

The origin of horticulture can be traced back to the time when man began to cultivate gardens for growing vegetables and fruits. Before that men 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.²⁸ 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.

²⁸ Halfacre, Gordon R., & Barden, John A., (1979), *Horticulture*, New Delhi: McGraw-Hill Book Company, pp.1.

Some major centres in the valley of Nile, Euphrates and Tigris rivers in the Middle East, in China and Mesoamerica and, in West and East Africa are considered as where agriculture and horticulture had its beginning. As early as 3000BC, not only was fire discovered, but also all our major crops were domesticated. More than half of the world's food crops including turnips, onion, carrot, lettuce, apple, pears, banana, peach, citrus fruits and almond were believed to have originated in Asia. From the Mediterranean Centers came cabbage, broccoli and cauliflower. From Mesoamerica came corns, beans, tomato, cacao, squash, avocado, potato and sweet potatoes.

One of the earliest writings on the healing power of plants was discovered on the tablet made in about 2100 BC in Sumerian civilisation. One of the earliest written list of vegetables and herbs is found on the tablet of Marduk Shumaddin probably dating back to the 7th century BC in Babylon, predating the hanging garden of Babylon. The tablet listed the plants in the garden of king Marduk-apla-iddina, Babylon, who reigned from 721 to 710 BC. The plants listed in the tablet were garlic, onion, leek, lettuce, beet, cucumber, radish, herbs and spices, dill, mint, sunflower or bastard saffron, coriander, thyme, hyssop and asafoetida.

Horticulture in a proper shape and form was said to be born in Egypt back in around 3000 BC. Figs, dates, bananas, cucumber, grapes, olives, melons, lettuce and lemons were some horticultural crops cultivated by the Egyptians during those days. With the passage of time, they soon discovered how to develop landscape gardens in which flowering plants, shades trees and ornamental shrubs were planted and cultivated because of their beauty alone. The first systematic irrigation and hydraulic engineering was also associated with the Egyptian civilisation. They constructed canals, dikes, sluices, basins etc., to water their fields. However, some horticulture historians are of the opinion that advances in horticulture did not happen in Egypt alone. Some of their ideas were borrowed and refined from the horticulture practices already found in the near and middle east. Sumerians were thought to be one of the inventors of the irrigation system.

Important landmark in the development of horticulture also occurred in Greek civilisation. Greek civilisation rose in 1800 BC and flourished during the Hellenic period (750-450 BC). It benefited horticulture as Greek writings on agriculture and horticulture

notably spread in the Mediterranean region. They were also influenced by the earlier horticulture ideas and practices such as Persian garden model. During this period, the Greek acquired the knowledge of grafting, budding, legume rotation etc. Theophrastus was one of the renowned horticulturists among the Greeks. He had conducted a deep study on plants and vegetables. From his observation he found out some facts on plants like the absorption of nutrients through the roots for use by the plants, the increase in flowering due to root pruning, the process of cross-pollination etc. Significant development in Horticulture during the Roman Empire in 2nd century BC was also noteworthy. They did not simply inherit and adopt Greek ideas and techniques but improved on them. The Romans used cultural techniques such as planting legumes to improve the soil, applying manure to improve the nutritive content of the soil etc. They also discovered how to store fruits for the winter season by placing them in straw in a dry place. During Roman Empire, some scientific researches were carried out by scientists. Dioscorides was one of them. In his research, Diocorides identified plants and listed their medicinal values. In his book, he described the roots, stems, leaves and the flowers of plants. His research served as an important reference for a number of centuries.

Pre-Colombian Central and South Americas between 8000-2000 BC also witnessed significant development in the field of horticulture. Three South American civilizations viz Aztec, Maya and Inca belong to that period. Archaeologist found the remains of three irrigation canals dating from 4th millennium BC and 3rd millennium BC. The Incas knew how to construct terrace and irrigation. They were believed to be great horticulturist rather than large scale agriculturist. They used their horticulture plants for contraception, medicines, dyes and poison. During the Aztec period, their horticultural practices were closely linked with religion. Their gardens were full of ornamental plants, aromatic and medicinal plants that symbolized various myths and gods rather than foodstuff. Flowers of different kinds were also grown for their religious rites and practices. Early Mayas practiced shifting cultivation which is still practiced today by the tribal people in different places. Corns, beans, root vegetables and fruits were important horticulture crops of Mayas. Cultivation of Cacao is also thought to have originated in the Maya civilisation.

The Chinese and Japanese in the past were also great horticultural innovators. Some new fruits and vegetables were introduced from Central Asia and India into China in 6th Century BC. By the 1200s, the Chinese people knew how to construct Greenhouses using oiled papers where they grow flowers and vegetables. Ornamental gardens were originated in China in 2nd Century BC. Common features in Chinese, and later in that of the Japanese, formal garden consist of pool/lakes, islands, connecting bridges, waterfalls, mounds, stones and rocks. The visit of Marco Polo and the Arab traders spread the Chinese style of horticulture and plants such as spices were exported to Europe in 900 BC. The famous 'Bonsai' is also said to have originated in China around 500-1000 BC, which then spread eastward to Korea and then Japan. The Japanese were also famous for their style of gardening. Their first treatise on the art of gardening appeared in the early 13th Century. Being heavily influenced by Zen Buddhism, Japanese gardens had a meditative focus having trees, rocks, sands and garden furnishing combined into an abstract representation of nature.

Horticulture in the Middle Ages

After the collapse of the Roman Empire in the 5th century, Europe entered into a new period called 'Middle Ages'. Agriculture and horticulture practices were continued to practice among the protected estates of the nobles. The expansion of Islam in the early 700s also introduced new kind of fruits and vegetables. The downfall of Roman Empire also paved the way for the emergence of Christian Monasteries. These Monasteries became the repository of European horticulture knowledge and practices. In these monasteries, horticulture practices in the past were passed on and maintained and many plants and vegetables were cultivated. Herbal medicines thrived in these protected environments. Some monks who cultivated spices and herbs in their garden became proficient in applying herbal medicines to treat diseases and ailments. This knowledge was passed down from generation to generation in religious institutions as well as through individuals and, became the foundation of modern medicines.

Horticultural tools continued to be upgraded during the Middle age. Once Iron was discovered, the strength and design of tools improved. This innovation allowed man to cultivate more land, which was thought to be uncultivable and expedited the labour.

When the so called 'Dark Age' came to an end in the 13th century, Europe began to have a new face. Cities began to emerge, agriculture and horticulture continued to expand at a faster pace and learning and knowledge revived once again. As the civil turmoil settled down, cities and towns could sustain development. Economics activities were also increased. Then the capitalism based on money economy began. Horticulture crops (herbs, vegetables, fruits and flowers) became important economic goods in the market. Rise of City Republics in Italy in the 1200s were instrumental for expanding trade with the East on its rich spices. Another important landmark in horticulture during this period was the formal recognition of Horticulture as a separate field from agriculture. Agriculture was now seen as divided into agronomy, horticulture and forestry. Tools were further upgraded to suit different horticulture activities. However, in other parts of the world, clear separation between horticulture and agronomy was not recognised and people still use primitive tools for daily horticultural operations.

Horticulture in Modern Times

Horticulture entered a new remarkable era in 1700 AD with the coming of a Swedish physician and botanist Linnaeus (1707-1778). He was with great ability to systematize and describe, developed the binomial system of classification of plants, which is still used today. The publication of the work of Charles Darwin *On the Origin of Species by Means of Natural Selection or the Preservation of Favored Races in the Struggle for Life* (1859) was the development in plant research next to the works of Linnaeus. In his book, Charles Darwin discussed about *geotropism*, the movement of plants in response to gravity, and *phototropism*, the movement of plants in response to light. Gregor Mendel was also actively involved in research on plants in the 1800s. He did classic work breeding sweet peas. His observations were on seven contrasting pairs of traits in the peas, eg., tall plants and short plants. Unfortunately, he was ahead of his time and his study of inheritance was not accepted and appreciated until many years after he passed away. Liberty Hyde Bailey, born in 1858 in the United States, was the modern day Dioscorides. He spent almost his entire life studying plants and pioneered many practices of horticulture in America. *Encyclopaedia of American Horticulture, Manual of Cultivated Plants, Hortus, Hortus Second, Hortus Third and How Plants get*

their Names are some important works of Bailey. His works are considered as the supreme authority on cultivated-plants nomenclature, taxonomy and pruning. The contributions made by the gardener and farmers in the eighteenth and nineteenth century added greatly to the knowledge of crop production and preservation and storage of fruits and vegetables. These discoveries and inventions aided the efficient production and storage of food to a great extend.

Brief History of Horticulture in India

In India, the history of agriculture/horticulture begins with the activities of the people of the Indus Valley civilization. The soil fertility, with heavy monsoon rainfall during those days and the water of the Indus River were conducive to the growth of some domesticated plants. The study of plants and plant's life was a distinctly comprehensive science in ancient India, a branch which dealt with the making and maintenance of gardens. The Vedas and other literature mention that ancient Indians gave great importance to gardens and parks. Kings and their subjects took special interest in gardening. During those days, it was considered that gardening was one of the most important duties of the king in the city and his palaces. The king could be become an ideal king only when he is capable of having gardens filled with fruit-bearing trees, pools and tanks with beautiful lotus flowers, plants with fragrant flowers etc. Gardens were not constructed for the kings alone, but rather gardens for recreation and enjoyment of the subjects were also constructed in many places. Sometimes even gardens in palaces were opened for public use. To make the gardens and parks more beautiful and attractive, plants were planted in a systematic manner-in rows, in groups or clusters, spacing them in such a manner that the distance between two trees should not be less than ten feet. A special class of experts in the art of gardening emerged during those days due to the government's protection of the art.

In ancient India, flowers occupied an important place in the society. They are used to manufacture different types of perfumes and cosmetics. Since they were used on different occasions and for religious rites, flowers became an important component of business. People took up the business of cultivating, collecting and selling of flowers along with its fruits. This further helped them in their advancement in the art and science

of horticulture. Since nourishment of plants is necessary to get abundance of flowers and fruits, horticulturists knew different techniques of preparing special types of manure which would nourish the trees to yield more good fruits. Different types of fertilisers are prescribed for different plants. There are details of preparing nutrient solutions, treatment of plant diseases etc., in works like 'Vrikshayurveda' of Surapala. A special type of fertilising solution called 'Kunapajala' is mentioned in other treatises like 'Upavanavenoda', and Sivatatvaratnakara'

The ancient Indians knew the importance of soil for successful cultivation of plants. They prepared gardens keeping in view the availability of soil type in the region. They categorised soil into three types- dry, wet and ordinary. Each of these is again of six types depending upon the colour and taste. However, levelled grounds with availability of plenty of water and rich with sprouts of grass are generally commended since all trees and plants grow well on such grounds with a few exceptions.

Many tips are given in books on horticulture about the attractive patterns in which trees and plants should be arranged - in the form of Nandyavarta, Swastika, Mandapa, Sarvatobhadra etc. Plants, though they need good sunlight and open air, requires protection from dew, storm, smoke, fire and heavy rains. For example, flowering trees should be planted in the middle of the row of trees, fruit giving trees should be planted and protected with wallshaving ditches around them. To protect plants and trees from hailstorm they should be smeared on all sides with the ash of a tree hit by lightning. Ancient Indians looked after the plants and trees as members of their family (as we see in Kalidasa's portrayal of Shakuntala's love towards plants, particularly the Jasmine creeper Vanajyotsna). Destruction of plants was regarded as serious offence and the culprit was severely punished. In Atharvaveda and in some Buddhist texts fungi and pestiferous insects are referred to and the gardener was punished for negligence. Even religious methods are mentioned in 'Upavanavinoda' for the protection of plant life from moths, insects, ants etc. Newly planted trees should be watered both in the morning and evening. In hemanta or sisira trees should be watered on alternate days, in spring every day and during summer both morning and evening. Any weeds, creepers, grass etc., growing next to plants should be removed. Many tips for the healthy growth of trees are

given. During rainy and autumn seasons when it does not rain, a circular ditch (alavala) under the tree should be filled with water. Sometimes the water poured will not get absorbed in the soil, it indicates indigestion, and in such a case water should not be poured. Maintenance of public parks and preservation of plant life depend mainly on availability of water. In dry places where rainfall was scarce it was advised to draw water from underground for irrigation. Since underground water had to be ascertained by several means like vegetable growth on the ground, it developed into an art in ancient India. Various methods of propagation of plants were also discovered during the ancient time in India.²⁹

Horticulture in Medieval India

Horticulture had witnessed a new height during medieval period particularly the period of Mughal Dynasty. The Emperors and their nobles were very fond of having beautiful orchards. Almost every noble had orchards in and around their residence. Plants in the gardens were arranged in systematic patterns.

A number of fruits were brought to India from other countries during 16th and 17th century. Pineapple was one of the fruits which was brought from Latin America and introduced by the Portuguese in India. Soon after its introduction, pineapple became popular and was cultivated in the length and breadth of the country. Papaya and cashew-nut were also introduced by the Portuguese. Cherries were brought from Afghanistan and cultivated in Kashmir by the method of grafting. Grafting technique was very common for producing better fruits in terms of quality and quantity. Oranges, other citrus fruits, apricots, mangoes etc., were fruits on which the method of grafting was successfully used. Coconut was also grown everywhere in India during those days. Seeds of different varieties of watermelon and grapes were also imported to India from Afghanistan. Different varieties of vegetables were consumed in medieval India. Potato and tomato were introduced in India in the 17th century.

India was famous for its variety of spices. Pepper, clove, turmeric, cardamom and ginger were popular spices grown in India. These spices were exported in a large

²⁹<https://www.speakingtree.in/blog/horticulture-in-ancient-india>, accessed on 27.08.2018

scale to various regions in Asia and Europe. Saffron was also grown in Kashmir region and became popular because of its flavour and colour. Lignum and Lac were forest products used for medicinal purpose. They were exported to different places.

Agriculture/Horticulture in medieval India heavily depended on rains. Crops and vegetables were grown keeping in view on availability of rain water. Well irrigation system was also employed to meet the water need of the fields and gardens. Wells-masonry well and non-masonry were dug in many places. Tanks, ponds and reservoirs were other sources of water. Since construction of reservoirs was beyond individual capacity, it was to be handled by the state, local chiefs and other officials authorities.

Horticulture during British Period

During the British rule the Indian economy remained agrarian. It was estimated that about 85% of the economy derived their livelihood directly or indirectly from agriculture and allied activities like horticulture etc. Unlike pre-colonial India, the feature of self-sufficiency disappeared in the colonial state. This led to various famines to which the colonizers paid no attention as it did not affect their profit margins. The Agricultural sector continued to experience deterioration and stagnation, particularly marked by low levels of agricultural productivity.

The Indian agricultural sector, which supported almost the entire economy, went towards stagnation. There was negligible introduction of reforms to ensure an increase in productivity. On the contrary, the Britishers continued to extract profits which broke the knees of Indian agricultural sector.

The major cause of this sorry state of Indian agriculture was the various land settlement systems of the colonial government. The highlight of this was the zamindari system which was practiced in the then Bengal presidency. Under this, the majority of profits went to the zamindars instead of the cultivators, ultimately filling up the pockets of their colonial bosses.

Just like their colonial masters, the zamindars did nothing to improve the state of agriculture or horticulture. They were only concerned with collecting rent despite the

economic condition and the plight of the cultivators. However, the revenue settlement policy particularly fuelled this ruthless nature adopted by the zamindars. Under this, the rent can be paid until a fixed date, failing which their colonial masters would take away all their rights.

Agricultural or horticultural technologies remained primitive with no efforts to improve conditions from the British government. Even after the introduction of fertilizer technology farmers used natural manure, which resulted in low production. This coupled with lack of proper irrigation facilities aggravated the misery.

The motive behind agricultural activities shifted from self-sustenance to commercialization focused on the increase of profits for the colonial masters. As a result, there was an increase in the yield of cash crops, but it helped the farmers in no way. Farmers were now mass producing cash crops instead of food crops, which were ultimately used for the benefit of British industries with adverse impact for the Indian farmers. These cash crops include cotton, jute, oilseeds, sugarcane, tobacco etc.

Additionally, at the time of partition, a large portion of fertile and highly irrigated land went to Pakistan, especially the jute producing areas that went with East Pakistan (now Bangladesh). Hence, the jute industry received a heavy setback. By and large, the Britishers further added to the plight of Indian agricultural system and left with an enormous task ahead of us³⁰.

One noticeable development in the field of horticulture during the colonial period was the formation of the Royal Agri-Horticultural Society in the then Calcutta on 19th September 1820 by Dr William Carey- an English Baptist Missionary. The society was founded with the objectives of development in agriculture and horticulture in India. The society introduced and popularized the cultivation of Europeans vegetables like cauliflower, cabbage, peas, potato, tomato etc., by importing improved and new types of vegetables from Europe and Cape of Good Hope and distributed these to its different branches and the individual gardeners. The society had also introduced maize and high

³⁰ <https://www.toppr.com/guides/economics/indian-economy-on-the-eve-of-independence/agricultural-sector/> accessed on 27.08.2018

yielding rice from America. From 1849 to 1857, the first systematic cultivation of vegetables was done at Government Botanical Gardens in Ootacamund. This garden continued to serve as the main source of supply for seeds, seedlings and vegetables to individual gardeners.

Other important milestones were the setting up of Imperial Council of Agricultural Research in 1929 on the recommendation of Royal Commission on Agriculture and the establishment of All India Seed Growers, Merchants and Nurserymen's Association in 1964. The Council was supposed to guide the research activities of central and provincial departments of agriculture.

Horticulture after Independence

After attaining independence in 1947, the government of India laid emphasis on achieving food production especially cereals like wheat, rice etc. The need to increase foodgrain production to secure reasonable availability of staple food was pressing at that time. Development of high yielding varieties of wheat and rice and high production technologies and their adoption in areas of assured irrigation paved the way towards food security. The efforts brought about the so call 'Green revolution' in the late sixties and early seventies. The setting up of the Indian Institute of Horticultural Research (IIHR) at New Delhi in 1967 which was later moved to Bangalore in September, 1968, and starting of eight All India Coordinated Crop Improvement Projects to cover different horticultural crops were the important steps taken for the development of horticulture in early period of independence. The objectives of IIHR are:

1. Increasing productivity and quality of horticultural crops through varietal improvement and developing sustainable integrated crop management practices.
2. Production of quality planting material of Horticultural crops.
3. Effective utilization of natural resources and enhancement of input use efficiency.
4. Effective plant health management.
5. Post-harvest management and value addition.

6. Dissemination, popularization, adoption and impact assessment of IIHR technologies³¹.

The formulation of the Indian Seeds Act in 1966 to provide legal framework for seed certification and develop better quality seeds to the Indian cultivators, All India Coordinated Research Project on tuber-crops in 1969, the release of first hybrid of tomato and capsicum for commercial cultivation in 1973 by Indo American Hybrid Seeds, Bangalore, were some other noticeable landmarks during the early period of independence.

However, horticulture was given less attention until the 1980's when the Government of India began to realise that horticultural crops, for which the Indian topography and agro climates are well suited, is an ideal method of achieving sustainability of small holdings, increasing employment, improving environment, providing an enormous export potential and above all achieving nutritional security. As a result, due emphasis on diversification to horticultural crops was given only during the last two decades.

National Agricultural Research Programme initiated by Indian Council for Agriculture Research(ICAR), the starting of the full fledged Division of Vegetable Crops and Floriculture at Indian Agriculture Research Institute(IARI) in 1982, the establishment of several State Agricultural Universities (SAU), All India Coordinated Research Project(AICRP) during the 4th five-year plan and ad-hoc schemes, Central Agriculture Universities in Manipur, College of Horticulture& Forestry in Arunachal Pradesh greatly enhances the development of vegetables in the country during the last three decades.

One of the most important landmarks in the development of horticulture in India after independence was the setting up of National Horticulture Board (NHB) by the Government of India in April, 1984. The Board was set up on the recommendation made by Dr. M. S. Swaminathan, the then member of the Planning Commission. The Board was created to improve the integrated development of horticulture industry and to

³¹<https://www.iihr.res.in/about-us-iihr>, accessed on 28.08.2018

help in coordinating and sustaining the production and processing of fruits and vegetables. One of the major objectives of NHB has been to provide assistance in securing the availability of quality planting materials. The Board seeks to achieve it by promoting setting up of scion and rootstock banks/mother plant nurseries and carrying out accreditation/rating of horticulture nurseries.

The Horticulture Mission started by the Government of India in the beginning of the 20th century has been a giant step towards the development of horticulture including vegetables at the grower level, the ultimate beneficiary and contributor to the process of development. The scope of this mission has now been broadened with integration of different programmes such as National Horticulture Mission (NHM), Horticulture Mission for North East Himalayan States (HMNEH), National Bamboo Mission (NBM), Coconut Development Board (CDB) etc., into one and rechristening it as Mission for Integrated development of Horticulture (MIDH)³² during 2005-2006. Horticulture has also been given due importance in the mega project 'National Initiative on Climate Resilient Agriculture' (NICRA) which is meant to mitigate the changing climatic conditions. This project has been launched by the Government of India in February, 2011. This mega project has three major objectives of strategic research, technology demonstration and capacity building.

In the recent past, progress has been made in the evolution of off-season varieties of certain vegetable crops which has made possible their cultivation round the year thereby ensuring a continuous supply. Valuable progress has been made in the development, standardization and management of technology with respect to judicious use of organic manures, mineral nutrients, bio-fertilizers, weedicides, irrigation, plant growth regulators, plant protection measures and vegetable based cropping system for higher production of quality vegetables. Similarly, remarkable improvements have been made in post-harvest handling of various vegetables. Storage practices have been developed to protect vegetables and add to consumer appeal. Improvement in

³² Singh, P M., Sanwal S K., and Singh, Rameshwar,(2015), *Development of Vegetables in India, Indian Horticulture*, Vol 60, No 6,pp.32.

refrigerated rail wagons, trucks and trailers have helped to reduce losses during transport.³³

With the serious efforts made by Government of India for the development of horticulture after attaining independence, India has made a giant leap in vegetable and fruits production and today only China is ahead of India in respect of the area and production of fruits and vegetables. The horticulture production of the country which was just 15 million tonnes at the time of independence has now become more than 162 million tonnes. However, desired development will be acquired only when each and every single individual can consumes the recommended 300g vegetable per day which is still ahead of us.

Table No. 2.1: Crop Wise Area and Production of Horticulture Crops for Three Years (2016-17to 2018-2019)

Crops	2014-2015		2017-2018		2018-2019	
	Area ('000Ha)	Production ('000MT)	Area ('000Ha)	Production ('000MT)	Area ('000Ha)	Production ('000MT)
Fruits	6235	89514	6506	97358	6648	98579
Vegetables	9417	166566	10259	184399	10100	185883
Flowers	240	2143	324	2785	313	2865
Plantation Crops	3534	15575	3744	18082	3886	16368
Spices	3317	6108	33878	8124	3895	9216
Total	23410	280986	24711	310748	24836	312911

Source: Horticulture Statistics at a glance, 2020, Ministry of Agriculture and Farmers Welfare, Government of India

Table No 2.1 shows that during 2014-2018, there has been a remarkable increase in terms of area coverage, production and productivity of horticulture in India. Among

³³ Ibid pp.32.

the horticulture crops, vegetables have always contributed largest share followed by fruits, plantation crops, spices and flower.

Meaning, scope and importance of Horticulture

Meaning

The first-known use of the term *horticultura* is found in Peter Laurenberg's writing in 1631. Philips, in *The New World of Words*, was the first to use the term horticulture in English to refer to the science and art of growing fruits, vegetables, flowers, and ornamental plants³⁴. Various experts in the field of horticulture have given different definitions of horticulture. However, it is quite impossible to give the exact definition for universal acceptance. Neither is it easy to enumerate its coverage with definiteness. Nonetheless, substantial ideas on the concept, scope, and definition of horticulture can be had from the writings of various experts in the field.

Liberty Hyde Bailey (1858-1954) defines horticulture as the growing of flowers, fruits and vegetables, and of plants for ornament and fancy.

Merriam-Webster Dictionary defines horticulture as the science and art of growing fruits, vegetables, flowers, or ornamental plants

According to Janick (1972), *horticulture in its present concept is that part of plant agriculture concerned with so-called "garden crops" as contrasted with agronomy (field crops, mainly grains and forages) and forestry (forest trees and products)*. He gave the following definition of horticulture: it is the branch of agriculture concerned with intensively cultured plants directly used by man for food, for medicinal purposes, or for aesthetic gratification³⁵.

According to Louisiana State University, "Horticulture is the science and art involved in the marketing processing, cultivation, and propagation of ornamental plants, flowers, turf, vegetables, fruits, and nuts. Horticulture is unique among plant sciences

³⁴Halfacre, Gordon R. & Barden, John A, (1979), *op cit.* p.1.

³⁵ <https://www.cropsreview.com/what-is-horticulture/> , accessed on 28.08.2018

because it not only involves science and technology, but it also incorporates art and principles of design”.

According to University of Minnesota, “Horticulture is the art and science of growing and maintaining ornamental plants and fruits, vegetables, and nuts to eat and use in and around our homes. Though a part of agriculture, horticulture does not include agronomic crop production or other agricultural products for animal consumption”.

From the above definitions, conclusions can be made to give a general idea on what horticulture is:

1. Horticulture is a branch of plant agriculture.
2. It is the science and art of producing, improving, marketing and using fruits, vegetables, flowers and other ornamental plants.
3. Horticulture deals with intensively cultured and high nutritious crops.
4. Horticultural crops include the vegetables, fruits, and nuts which are directly consumed by man for food, the flowers and other ornamental plants for aesthetic uses or visual enjoyment, beverage plants (tea, coffee etc.), and those used for medicinal purposes.

Scope of Horticulture

Horticulture is a wide field and includes a great variety and diversity of crops. Basically, there are five divisions or branches of horticulture today. Based on crop grouping and plant use, the main divisions or branches of horticulture are: (i) Pomology or fruit production, (ii) Olericulture which deals with vegetable production, (iii) Floriculture or flower production, (iv) Nursery culture deals with nursery crop production and (v) Landscape designing also known as Landscaping. Sometimes floriculture and landscaping are treated together as one branch. Probably, Pomology is the oldest among the five branches of horticulture. Besides these branches, some new commercial branches like seed production and marketing, greenhouse crops,

pharmaceutical crops, processing and storage, arboriculture (cultivating and caring for trees specimen purpose), advertising, service of equipment, photography, machinery, pesticides etc. emerged in the recent past.

Pomology

Humans have loved eating fresh fruits since time immemorial. Fruits now occupy a vital place in our daily diet due to their taste and vitamins and minerals presence in them. Today, everyone is trying to have a healthy diet by adding fruits as many as possible to remain healthy and strong. Therefore, fruit growing became an integral part of horticulture. It is always a big task for horticulturist particularly pomologist to produce more fruits with better quality and quantity. Due to the untiring efforts of the horticulturist, developments have happened all the time, but there still lies a very big challenge ahead of us even in the 21st century.

The term pomology is derived from two Latin words pome- fruits and logos- culture. “Poma” in Greek means fruits later subsequently transferred in to “Pome” in Latin means fruits, “logos” study. It is, therefore, the study of fruits. Those who are involved in the science of pomology are called Pomologist. Botanists define fruits as a ripened ovary while horticulturist definition is slightly different as they include floral parts as well. Generally a fruit is said to be edible, fleshy, or dry portion of plant whose development is closely associated with the flower. Pomological research is mainly concerned with the development, enhancement, cultivation and physiological studies of fruit trees. The goals of fruit tree improvement include upgrading of fruit quality, regulation/control of production periods, and lessening/reduction of production cost.

Pomology is said to have originated in the United States in the 19th century when horticulturist working in United States Department of Agriculture (USDA) established a separate Pomology Division in 1886. The first fruit tree nursery was also started in New York, United States by the Prince family in 1730. However, fruit production on commercial purpose is of more recent origin- only when long distance transportation (shipping) became possible in the mid-1800s.

The production of fruit for commercial purposes is known as Orcharding. It is typically based on long-lived perennials, many of which do not bear fruits until several years after they planted³⁶. Some other important activities under Pomology are viticulture and citriculture. Viticulture deals with the cultivation of grapes whereas Citriculture is about the cultivation of citrus fruits.

Needless to say, it is not easy to grow trees and fruit trees, in particular, as it requires knowledge and effort to cultivate. While people have been growing fruit for a very, long time, the knowledge of how to do so has only improved over the centuries. Advancement in science and technology, including genetic engineering, has helped us to create trees that are more resistant to extreme weather and diseases and provide fruits that are more in number, delicious and nutritious.

Every year more than 675 million metric tons of fruit are produced in the world. There are more than 2000 identified types of fruit. Tomato (as identified as fruit by horticulturist and botanist) is the most produced fruit. Other common fruits produced and consumed by man are banana, mango, watermelon orange, pineapple, grapes, citrus fruits, strawberry etc. The highest annual fruit harvest in the world occurs in Asia. China is the largest producer of fruits producing about 154.364million metric tons in 2014-2015. India comes next to China producing about 82.632 million tons. Research and development projects in horticulture crops have yielded results that have led to increased rate of horticulture crops production irrespective of adverse climatic conditions. Fruits productivity increases from 14.3 Tonnes/Ha in 2015-16 to 14.6 Tonnes/Ha in 2016-17. It is estimated that fruit production in India reached 93 million tonnes in 2016-2017. Other major fruit producing countries are Brazil, USA, Italy, Spain, Indonesia, Mexico, Philippines, Iran, turkey and others.

³⁶ Malik, Mahmood N., (2008), *Horticulture*, Delhi: Biotech Books, pp. 285.

Table No. 2.2: Percentage Share of Production of various Horticulture Crops between 2013-2014 to 2017-2018 in India

Crops	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Fruits	31.1	30.8	31.5	30.9	31.2
Vegetables	58.7	60.3	59.1	59.3	59.2
Flowers & aromatics	1.0	1.1	1.1	1.1	1.2
Plantation Crops	5.9	5.5	5.8	6.0	5.8
Spices	2.1	2.2	2.4	2.7	2.6
Total Horticulture	100.0	100.0	100.0	100.0	100.0

Source: Horticulture Statistics at a glance 2020, Ministry of Agriculture and Farmers Welfare, Government of India.

Percentage share of production of different horticulture crops during 2013-2018 were shown in Table 2.2. Out of the total production of horticulture during the said period, vegetables have contributed the largest share at about 59 percent. They were followed by fruits crops by sharing 31 percent (approximate). Flowers and aromatics have the least contribution which stood at 1percent.

Table 2.3 represents the all India area coverage, production and productivity of fruit crops during 2006-2007 to 2017-2018 in India. Though there had been rise and fall in the area covered under the cultivation of fruits in the country, the production and productivity had increased every year since 2006-2007. During this decade, fruit production increased from about 60 million Metric Ton (MT) to more than 97 million Metric ton (MT). Productivity also increased from 10.72 MT/Ha in 2006-2007 to 14.96 MT/Ha in 2017-2018.

Table No. 2.3: All India Area, Production and Productivity of Fruits over the years 2006-2007 to 2017-2018

Year	Area ('000 Ha)	Production ('000MT)	Productivity (MT/Ha)
2006-2007	5554	59563	10.72
2007-2008	5857	65587	11.20
2008-2009	6101	68466	11.22
2009-2010	6329	71516	11.30
2010-2011	6383	74878	11.73
2011-2012	6705	76424	11.40
2012-2013	6982	81285	11.64
2013-2014	7216	88977	12.33
2014-2015	6110	86602	14.17
2015-2016	6301	90183	14.31
2016-2017	6373	92918	14.58
2017-2018	6506	97358	14.96

Source: Horticulture Statistics at a glance 2020, Ministry of Agriculture and Farmers Welfare, Government of India

Olericulture

The term Olericulture is derived from Latin 'oleris' which means 'an herb'. Thus, Olericulture is the study of vegetable production including cultivar selection, seedbed preparation, establishment of vegetable crops by seeds and transplantation, storage, processing and marketing. Persons who are involved in the field of olericulture are called olericulturist. A vegetable can be said as the edible part of an herbaceous garden plant used either fresh or processed. The edible portion may be fruit, leaf, tuber, root or any other part of the plant. Vegetables are known for their richness in carbohydrates, proteins, Vitamins A, Vitamins B, Vitamins C and minerals. It is important to note that there is no clear-cut demarcation line between fruit and vegetable.

In comparison with orcharding, the vegetable industry is more flexible as most vegetables are grown as annuals and shift in cultivars. Home gardening, market gardening and truck gardening are the three main categories of vegetable production. In addition, there are several small, specialized production types like vegetable forcing, production for processing, seed production and mushroom culture³⁷. It is estimated that there are more than 20,000 species of edible plants yet only 20 species contribute 90% of our food. Some important horticulture crops identified as vegetable are potato, onion, cabbage, cauliflower, carrot, lettuce, eggplant, chillies and pepper, garlic etc.

Home gardening is the oldest form of olericulture. It is the growing of vegetable for domestic use. It is the only method which can provide us fresh vegetables and the choice of crops can be made as per the likings of the family members. However, home gardening began to disappear as the rural people are also becoming dependent on market for their vegetable supplies. Home gardening is becoming popular particularly in western countries due to the emergence of organic farming-farming without pesticides and other harmful chemicals. In *Market gardening* vegetables are grown for commercial purpose. It is made near cities and towns where larger population reside. This type of market gardening serves the needs of urban people who have no land, time and interest to grow vegetables of their own. Improvement in modern transport and communication system added the importance of market gardening as gardeners are enabled to serve even larger areas. However, there are chances of excessive use of preservatives, pesticides and chemicals which are hazardous to human health. Sometimes gardeners face some problems when there is surplus production due to the competition among them. To avoid this kind of situation, gardeners should carefully choose time of sowing and the right kind of variety. *Truck gardening* refers to the production of vegetables in a larger scale for distant markets. Gardeners have to be careful in selection of variety of crop to be sown and the places where crop to be grown. Less perishable crops are usually chosen for this kind of gardening. Improvement in means of communication, transport and information-roads, railways, telephone etc., changed the situation. Gardeners now can carry and sell even perishable vegetables like tomato etc., to the distant markets.

³⁷ Ibid, p. 10

Global vegetable production has been increasing every year. In 2016, 1075.2 million metric tons of vegetable is produced worldwide. China shared almost half of the world vegetable production. China is followed by India producing 176 million tonnes in 2016-2017 contributing nearly 14 percent of world vegetable production. West Bengal, Uttar Pradesh, Bihar, Madhya Pradesh, Odisha, Gujarat and Karnataka are major vegetable producing states in India. The vast production base offers India tremendous opportunities for export. During 2017-18, India exported fruits and vegetables worth Rs. 9,410.81 crores/ 1,459.93 USD millions which comprised of fruits worth Rs. 4,229.03 crores/ 655.90 USD millions and vegetables worth Rs. 5181.78 crores/ 804.03 USD millions. The major destinations for Indian fruits and vegetables are United Arab Emirates (UAE), Sri Lanka, Netherland, Bangladesh, Malaysia, Nepal, United Kingdom(UK), Saudi Arabia and Qatar³⁸. United States, Brazil, Turkey, Nigeria, Myanmar, Nepal Iran, Vietnam, Philippines are other major producers of vegetables.

Table No. 2.4 shows that there was yearly escalation in the area coverage, production and productivity of vegetables in India during 2006-2007 to 20017-2018. In respect of the area coverage since 2006-2007, more than 10 million hectare of land had been covered for the cultivation of vegetables. The production was also rose to 184 million metric ton in 2017-2018 from 114 million metric ton in 2006-2007.

Table No. 2.4: All India Area, production and Productivity of Vegetables over the years 2006-2007 to 2016-2017

Year	Area ('000Ha)	Production ('000MT)	Productivity (MT/Ha)
2006-2007	7581	114993	15.17
2007-2008	7848	128449	16.37
2008-2009	7981	129077	16.17
2009-2010	7985	133738	16.75
2010-2011	8495	146554	17.25

³⁸ https://apeda.gov.in/apedawebsite/six_head_product/FFV.htm accessed on 27.09.2018

2011-2012	8989	156325	17.39
2012-2013	9205	162187	17.62
2013-2014	9396	162897	17.34
2014-2015	9542	169478	17.76
2015-2016	10106	169064	16.73
2016-2017	10238	178172	17.40
2017-2018	10259	184394	17.97

Source: Horticulture Statistics at a glance 2020, Ministry of Agriculture and Farmers Welfare, Government of India.

Floriculture

This branch of horticulture deals with growing, marketing, and arranging flowers and foliage plants. Individuals who are involved in this field are called floriculturists. Floriculture crops are classified as *bedding plants, flowering pot plants, foliage plants or houseplants, and cut flowers*. Bedding plants have gained its popularity during the last decade due to the interest in environmental protection. Petunias, marigold and geraniums are popular bedding plants. Most bedding plants are annual flowers used in landscaping. Flowering potted plants include easter lily, poinsettia, orchid etc. They are sold as whole plants in bloom. Foliage plants do not produce flower. They are grown because of their beautiful foliage. Ferns, palms etc., are called foliage plants or houseplants. Rose, snapdragon, carnation etc., are cut flowers. They are mostly sold in bunches. It is a dominant in floriculture industry.

Flowers and other floricultural plants have always occupied an important place in human lives. Nowadays, events, occasions, social and religious functions organised for different purposes are including at least a small bunch of flowers. Flowers have been used very often to express our joy and sympathy for a number of generations. In the previous centuries, flowers were grown outdoors and resulted in small, poor quality flowers. However, advancement in science and technology particularly in the field of botany, horticultural sciences etc., have brought us to a new phase of development to

produce flowers and other ornamental plants of better quality and in larger quantity. As their popularity is ever increasing, flowers provide us numerous employment opportunities to generate income. It has become an important part of business at the local, national and even international level markets. Today production of floriculture plants is a highly competitive worldwide industry actively engaging more than 145 countries. Netherland, Colombia, Ecuador, Kenya, Ethiopia and Malaysia are major flower exporting countries in the world. Netherland shares more than half of the world flower production. It is followed by Colombia and Ecuador with export worth 1.4 billion US Dollar and 881.5 million US Dollar respectively.

Indian society has been closely associated with floriculture plants since long time back. It witnessed one of the oldest floriculture practices. In every walk of Indian life, we see flowers and other ornamental plants occupy an important place. They are indispensable in religious rituals and practices among the Hindus, Muslims, Christians, etc. Though primitive type of flower cultivation is still going on, commercial floriculture began to emerge during the last two decades. Karnataka, Tamil Nadu and Andhra Pradesh are the major flower producing states in the country. Recently Uttaranchal and Mizoram have also emerged as a new centre for cut flowers. The liberalisation policy adopted by the Government of India in 1991 brought a drastic change in Indian floriculture. The government has now identified floriculture as the most promising industry and accorded it export oriented status. The 1991 economic policy, application of science and technology and the increasing demand of flowers have made floriculture a high growth industry. It has been found that commercial floriculture has higher potential per unit area than most of the field crops and is therefore a lucrative business. Indian floriculture industry has now been shifted from traditional flowers to cut flowers for export purposes.

In 2015-2016, the total area covered under the cultivation of floriculture crops in India was about 249 thousand hectare. It was estimated that 1659 thousand tonnes loose flowers and 484 thousand tonnes cut flowers were produced in the same year. The country has export 20703.46 metric tonnes of floriculture products to the foreign countries like United States of America (USA), Netherland, United Kingdom, Germany

and United Arab Emirates (UAE) etc. Export of Indian floriculture produces currently worth Rs. 507.31crores/78.73 USD millions.

Nursery Culture

Nursery industry is another important area of horticulture. A nursery is a place where plants (trees, shrubs, vines etc.) are grown, propagated and nurtured until they can be placed in a permanent planting field. Propagation in nurseries may be made from seed or cuttings, buying rooted cuttings from other nurseries which specialise in cutting and grow them to a usable size or purchase plants of a usable size and sell them. Nursery industries are of different component/types including the *wholesale nurseries* which sell plants only to businesses such as retail outlets and other nurseries; *retail nurseries* which sell plants directly to the general public; *landscape nurseries* which may grow its own plants or purchase plants from other nurseries for formulating and executing a landscape design; *mail-order nurseries* in which plant stock can be purchase through the catalogue prepared to display the stocks they can offer for sale; *agency nurseries* are selling their plants through agents or their representatives. As compared to other nurseries, agency nurseries are less in number, and they need highly specialised skills. Sometimes the different types of nurseries are classified according to the types of plants they grow. Fruit nurseries are meant to propagate fruit crops only, vegetable nurseries propagate almost all vegetable crops, ornamental plant nurseries are for ornamental or flower crops and medicinal and aromatic nurseries are for plants of medicinal values.

Adequate availability of true and good quality of planting material is indispensable for horticulture development. In India, with a view to ensuring availability of genuine and quality planting material, The Seeds Act and the Nursery Registration Act came into force in 1966. However, as per the report of the Working Group on Horticulture and Plantation Crops for the Eleventh Five Year Plan, the Nursery Registration Act is in operation in respect of horticulture nurseries only in the States of Punjab, Maharashtra, Himachal Pradesh, Uttar Pradesh, Uttarakhand, Jammu and Kashmir, Orissa and Tamil Nadu while there is no such kind of Act in the States of Arunachal Pradesh, Chhattisgarh, Jharkhand, Madhya Pradesh, Manipur, Meghalaya,

Mizoram, Nagaland, Rajasthan, Sikkim, Tripura and West Bengal. In 2008, National Horticulture Board introduced voluntary system of recognition of horticulture nurseries which is a system of graded certification of production system and procedure in respect of a candidate horticulture nursery.

Landscape Design

Landscape design is an independent profession concerned with the planning and planting of outdoor space to secure the most desirable relationship between land form, structure, and plants to meet man's needs for function and beauty. It is the combination of the elements of science and art to create aesthetically pleasing expansion of indoor living to the outdoor living. It is one branch of horticulture since plants are integral part of the design. A person who designs landscape is called 'landscape designer'. A landscape designer offers his design plan including general plan, construction plan, planting plants, and specifications, but does not sell plants³⁹. He must have working knowledge in arts and science related to landscaping.

Landscaping or landscape design is not simply beautifying the yard by planting trees, shrubs or flowers; it is the aesthetic and functional development of space. Landscape design can be incorporated into a wide variety of projects, from parks and green spaces, to gardens, sports sites and large estates such as housing developments, business parks, universities, hospital complexes etc. It may be used to regenerate or improve sites such as brownfield sites or contaminated sites and may be part of a biodiversity offsetting programme to help mitigate the loss of habitat that may result from a new development. Landscape design is often divided into 'softscape' or 'soft landscape' and 'hardscape' or 'hard landscape'. Softscape or soft landscape includes all types of plant life, from flowers and trees to shrubs and groundcover. It naturally changes and evolves over time, driven by the climate, time of year and other conditions. Careful consideration should be given to the amount of maintenance that these elements will require to stay in good order. Hard landscape or hardscape consists of the inanimate elements of landscaping. They are 'hard' and unchanging, although they may be movable and adaptable to the environment. They can also have effects on the soft environment,

³⁹ Halfacre, Gordon R., & Barden, John A., *Op. cit.*, pp.13.

such as paving which increases water run-off. Hardscape might include, walkways, walls, outdoor 'rooms' and performance areas, gazebos, fences, and so on⁴⁰.

Importance of Horticulture

Global production of horticultural crops is in million tonnes. They provide us many essential components of our everyday meal. Horticulture generates employment- a profession for researchers and teachers and an occupation for gardeners or farmers. It has now become one of the most important components of trade at local, national and international level. It is a source of physical exercise and means to generate even a small income for individual amateurs. It also provides individual's aesthetic needs by providing garden full of beautiful flowers and other beautiful horticultural crops. Mental wellness and economic prosperity of individuals and nations are also greatly determined by horticulture.

Horticulture and nutrition: Fruits and vegetables are essential components of a healthy diet. They are excellent sources of carbohydrates, proteins, vitamins, minerals, fiber etc. As per the World Health Organisation (WHO) recommendation, a person needs at least 450 grams of fruits and vegetables per day to have a balanced diet. Consuming fruits and vegetables not only keep us growing and healthy, but also reduce the risk of many diseases. For example, potatoes, bananas etc., are rich in starch which gives us energy; Peaches, beans, pecans are rich in protein while avocados, olives and nuts are good sources of fats. It is estimated that more than 30 percent of the food consumed in the world is provided by horticultural sector.

Horticulture and economic development: In India, the importance of horticulture in national economy has been recognised. Presently, more than 33 percent of agriculture Gross Domestic Production (GDP) and about 37 percent of the total export of agriculture commodities is contributed by horticulture sector. On per hectare basis, horticulture crops are more productive than agriculture crops because fruits have longer life and their production increases with advancement in age. Vegetables can also be cultivated 3 to 4 times each year. As compared to agriculture, more horticultural crops can be grown in

⁴⁰ https://www.designingbuildings.co.uk/wiki/Landscape_design accessed on 01.10.2018

the same area of land. It is found out that growers of horticultural crops particularly fruits and vegetables earn more income. Many agro industries are horticulture based industries. Raw materials provided by horticulture are timbers, paper, perfumes, feeds, fertilizers furniture etc. Horticulture generates employment by providing job opportunities at every level of production. Hence, horticulture is a solution for many unemployment related problems.

Horticulture and entertainment: Horticultural crops are not consumed as food only, many of the crops especially flowers and trees of different kinds provide means of recreation for human beings. Leisure time in a garden full of beautiful trees and flowers refreshes the body, mind and spirit. Due to this, public sectors and private sectors in many places constructed parks, botanical gardens and beautiful landscape where individuals can enjoy the beauty of nature. This aesthetic nature of horticulture promotes mental wellness and a mode of relaxation. Medical science also recognised horticultural gardens as an important therapy for treating mental related diseases.

Horticulture and environment protection: Horticulture plays a crucial role in environment protection. Plants act as a regulator of the presence of harmful gases like Carbon Dioxide, Carbon Monoxide etc., produced by factories. Soil erosion can be best prevented by planting trees. Trees serve as a protection from natural calamities caused by storms, landslides etc. The presence of some horticultural crops makes the climate mild and moderate for human habitation in many places. Some portions of land which are thought to be wastelands can be utilized for cultivation of apple, custard apple, karonda, litchi etc.

Horticulture and Medicines: Many horticultural plants are cultivated because of their medicinal values. It is estimated that more than 30000 medicinal plants are being used worldwide so far. Around a quarter of the medicines prescribed by doctors are derived from medicinal plants cultivated under horticulture sector. Some horticultural crops having medicinal values are ginger, lavender, garlic, spinach, catnip, thyme, lady fern, sage, peppermint, chamomile, poppy, tulsi, noni, aloe, periwinkle, medicinal dioscorea, medicinal solanum etc. Medicinal plants not only provide health benefits to

those who use them as medicines, but also they provide income benefits to those who cultivate and harvest them, as well as to those who sell them in the market.

Horticulture and Agriculture

Horticulture is often identified as one branch of Agriculture which deals with cultivation of fruits and vegetables; it is actually different from agriculture. The two can be easily related because both always employ the same techniques for productions, for example, in the cultivation of crops which is an agricultural process, many horticultural techniques are applied. Some opine that horticulture is a distinct discipline having separate activities of its own as well as separate industry.

As compared to horticulture, agriculture is an extremely wider field. It refers to field cultivation- large scale cultivation. It is the science of growing food crops and rearing animals for farming. It involves the whole web of processes employed in the redirection of the natural flow of the food chain and the rechanneling of energy. Horticultural practices use the same techniques and methods as in agriculture, but, unlike agriculture, it tries to promote biodiversity and the ecological succession. The most notable difference between agriculture and horticulture is that horticulture deals with small scale gardening and usually in small plots of land while agriculture is practiced on large scale with extensive crop cultivation. In agriculture, some heavy machines are needed to make large scale production but in horticulture, machines do not involve much like agriculture does. Another difference between them is regarding the crops they are dealing with. Horticulture mainly focuses on fruits, vegetables, flowers and other ornamental plants whereas agriculture mainly deals with cereals like rice, wheat, corn, etc. Animal husbandry is also dealt with by agriculture. Poultry, cattle rearing etc., are important activities under the umbrella of agriculture. However, the main concern of agriculture is on human consumption, and in horticulture, the concern is on consumption, ornamental and aesthetical. The plants that horticulturist dealing with do not necessarily have to produce food.

Agronomy and Forestry also have a close relationship with horticulture. However, there are slight differences between them. One notable difference of

Horticulture from Agronomy and Forestry is that most of the consumable horticultural crops usually have high water content, are highly perishable and consumed fresh whereas agronomic forest products are used when they are in the non-living state, when dry and can be stored for a longer period. Some horticulture crops like ornamental plants and spices are grown because of their aesthetic and food value, for enjoyment and eating pleasure while agronomy emphasize on cereal foodstuff such as rice, wheat, corn etc.

Table No. 2.5: Production of Horticulture vis-à-vis Foodgrains in India

Year	Production (in Million Tonnes)	
	Total Horticulture	Total Foodgrains
2001-2002	145.79	212.85
2002-2003	144.38	174.77
2003-2004	153.30	213.19
2004-2005	166.94	198.36
2005-2006	182.82	208.60
2006-2007	191.81	217.28
2007-2008	211.24	230.78
2008-2009	214.72	234.47
2009-2010	223.09	218.11
2010-1011	240.53	244.49
2011-2012	257.28	259.29
2012-2013	268.85	257.13
2013-2014	277.35	265.57
2014-2015	280.99	252.02
2015-2016	286.19	251.57
2016-2017	295.16	273.38
2017-2018	306.8	285.17
2018-2019	311.05	295.67
2019-2020	320.77	296

Source: Department of Agriculture, Cooperation & Farmers' Welfare, Govt. of India;

Table No 2.5 highlights the comparison between the production of horticulture and agriculture for 16 years since 2001-2002 to 2019-2020. Till, 2008-2009, produces of agriculture were more than horticulture. However, since 2009-2010, the production of horticulture began to surpass the agriculture production. During 2019-2020, Horticulture produces was 320.77 million tonnes whereas agriculture production was 296 million tonnes.

Climate change and horticulture

Global warming and climate change have emerged as the greatest threat to mankind in the present century. During the last 30 years, the earth temperature has risen by 0.6 degree Celsius. Climate change occurs due to natural causes as well as human activities. Natural causes of climate change are associated with cosmological and geological processes such as solar activity, volcanic eruptions, earth-sun geometry and concentration of greenhouse gases like carbon dioxide, methane, nitrous oxide etc. Human activity such as excessive consumption of fossil fuels in industries and transport, increase in agricultural activities and ever increasing population also contribute to climate change by producing greenhouse gases. The average world's temperature between 1860 and 2000 was 15.08 degree Celsius. However, since 1980 the annual average temperature has been more than this average and is rising every year. Climate change is witnessed in almost all parts of the world but the change is not uniform. Scientist prepared various models to predict the rise of global temperature for this century. All the models foresee that global warming will increase along with the increase of greenhouse gases. It is predicted that global average temperature is likely to rise in the range of 1.4-5.8 degree Celsius by the end of the 21st century. Climate change is occurring along with shifting pattern of rainfall, change of seasonal pattern, melting of ice cap, rising sea level and increasing incidents of extreme weather events like flood, drought and frosting. In India, due to climate change, it is predicted that Western Ghats and the surrounding areas may be deprived of normal rainfall due to change in monsoon pattern. It is predicted that many species of plants will become vulnerable or even extinct. Plains of India will also severely be affected. Agriculture lands will no more be suitable for growing any kind of crops in the future to come.

It is predicted that climate change and its parameters like uneven rainfall pattern and unpredictable rise in temperature will have direct and indirect impact on agriculture and horticulture.

A study conducted at Indian Institute of Spices Research (IISR), Calicut using GIS models envisage the future impact of climate change on horticulture as follows:

1. Many areas presently suitable for spices would become unsuitable in another 25 years. There would be new areas which presently unsuitable would become highly suitable for cultivation of spices and in other horticultural crops.
2. Production timing will change due to rise in temperature. Due to rise in temperature, photoperiods may not show much variation. As a result, photosensitive crops will mature faster.
3. The winter regime and chilling duration will reduce in temperate regions affecting the temperate crops.
4. Pollination will be affected adversely because of higher temperature. Floral abortions, flower and fruit drop will occur frequently.
5. The requirement of annual irrigation will increase and heat unit requirement will be achieved in much lesser time.
6. Higher temperatures will reduce tuber initiation process in potato, reduce quality in tomatoes and pollination in many crops. In case of crucifers, it may lead to bolting; anthocyan production may be affected in apples and capsicum. Tip burn and blossom end rot will be the common phenomenon in tomatoes.
7. Coastal regions can expect much faster percolation of sea water in inland water tables causing more salinity⁴¹

⁴¹ <https://www.ijset.net/journal/139.pdf>. accessed on 05.10.2018.

As temperature is rising, it is beyond doubt that climate change will have a great impact on productivity of horticultural crops. However, the changes can be harmless as increase of Carbon Dioxide in atmosphere may enhance faster photosynthesis and rise in temperature may hasten maturity process. To address the possible adverse effects of climate change on the horticulture crops sound adaptation strategies should be developed. One strategy to tackle the threats posed by climate change is developing new varieties which are more tolerant to heat and cold and more resistant to pest and diseases. Our present horticulture practices may need some modification in respect of fertilizer application to improve soil fertility. Providing adequate water supply through developed irrigation system will be effective to conserve the presence of moisture in soil. Sometimes excessive soil moisture can take place due to heavy monsoon and such problems can be solved by choosing the higher place/ raised beds to grow crops. Greenhouses where there can be controlled temperature may also protect the productivity and quality of crops. Above all, conservation of water and forests, reforestation is dire necessity to address our problems due to the world's rising temperature.

Horticulture and Organic Farming

Organic farming is not a new method of growing crops. It is as old as agriculture. Its difference from conventional farming lies on how nutrition is received by plants and protection of crops from diseases and pests. Organic farming can simply be defined as the practice of growing crops which avoids or excludes the use of off-farm inputs like synthetic pesticides, herbicides and fertilizers. It rather relies upon crop *rotation, use of crop residues, use of biological fertilizers, animal manures and green manures without disturbing the environment, off farm organic wastes, mechanical cultivation, mineral-bearing rocks and aspects of biological pests control to maintain soil productivity and tilt to supply plant nutrients and to control insect- pest diseases and weeds. Organic farming has four principles. They were established by International Federation of Organic Agriculture Movement (IFOAM) in 2005. The principles are:*

1. *Principle of Health*: Organic farming /agriculture should sustain and enhance the health of soil, plants, animals and human and planet as one and indivisible.
2. *Principle of Ecology*: It should be based on living ecological system and cycles, work with them, emulate them and help sustain them.
3. *Principle of Fairness*: Organic agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.
4. *Principle of Care*: Organic agriculture should be managed in a precautionary and responsible manner to protect health and well being of current and future generations and the environment⁴².

During the last three decades, organic crops have gained the attention of health conscious people worldwide. Communities are becoming aware of issues such as agrochemical residues, quality of production and food safety and security. As health conscious people are increasing, organic farming is developing rapidly in the field of agriculture and allied activities. It has now occupied a prominent place in horticulture too. Worldwide, over 37.5 million ha of land (0.87% of total agricultural land) is being managed organically by 1.9 million producers in 164 countries. In addition, there is another 31 million ha certified for wild harvest collection. Global sales of organic products have reached U.S. \$75 billion, with the U.S. and Europe as the largest consumers⁴³.

Organic farming is not something new in India. It has been practiced since many years ago in different parts of the country particularly tribal areas, hilly region and areas which receive abundant rainfall. During the post independence era, there was excessive use of chemical fertilizers and insecticides with the objective of self sufficiency in food grains. In the beginning, the result was satisfactory but it had a long lasting adverse effect on soil, water and air causing health hazards to human. Realising the adverse impacts of the use of harmful chemicals, the Government of India has turned to organic farming to promote agriculture. Cashew nuts, spices, pineapple, passion fruits, vegetables, banana, mango, are horticultural crops which are grown organically. Among

⁴²<https://www.ifoam.bio/why-organic/shaping-agriculture/four-principles-organic>, accessed on 11.10.2018

⁴³https://www.mdpi.com/2311-7524/2/4/17_, accessed on 11.10.2018

the horticultural crops, fruits have greater potential for export as they are valued much as organic food. As per the report of The International Federation of Organic Agriculture Movements (IFOAM), India rank 9th in terms of World's Organic Agricultural Land and 1st in terms of the number of producers. Institutional support for export of organic products was started with the launching of National Program for Organic Production (NPOP) by Agriculture and Processed Food Export Development Authority (APEDA), Ministry of Commerce in 2000. The programme includes the accreditation programme for Certification Bodies, standards for organic production, promotion of organic farming etc. Presently, there are 26 accredited certification agencies in India. The NPOP standards for production and accreditation system have been recognized by the European Commission and Switzerland for unprocessed plant products as equivalent to their country standards. Similarly, USDA has recognized NPOP conformity assessment procedures of accreditation as equivalent to that of the US. With these recognitions, Indian organic products duly certified by the accredited certification agencies of India are accepted by the importing countries. The establishment of Centre for Organic Farming at Ghaziabad and the starting of assistances under the National Horticulture Mission launched by India's Department of Agriculture and Cooperation in 2005 are also important government interventions for transitioning to organic farming of agricultural crops including horticultural crops. As a result of these interventions, organic agriculture has seen unexpectedly high growth.

As per the report of APEDA, as on 31st March, 2018, India has brought 3.56 million hectares under organic certification process, including 1.78 million ha (50%) cultivable areas and another 1.78 million hectare (50%) for wild harvest collection. Among the states, Madhya Pradesh has the largest area under organic certification, followed by Maharashtra and Uttar Pradesh. In 2016, Sikkim made remarkable progress by converting its entire cultivable land under organic farming. Mizoram also declared its intention to bring its entire cultivable area under organic farming.

During 2017 - 2018, Indian Organic production was around 1.70 million tonnes. The products includes all varieties of food such as Oil Seeds, Sugar cane, Cereals & Millets, Cotton, Pulses, Medicinal Plants, Tea, Fruits, Spices, Dry Fruits, Vegetables, Coffee etc. The production is not limited to the edible sector but also the inedible sectors such as

organic cotton fibre, garments, cosmetics, functional food products etc. More than 150 countries are now actively involved in export-import of certified organic products. India is the leading exporter among these nations exporting more than 135 products. USA, European Union, Switzerland, Australia, New Zealand, South East Asian Countries, West Asia and South Africa are the main importers of the Indian organic products. The total volume of exports of Indian organic product during 2017-2018 was 4.58 lakh metric tonnes which was worth 515.44 US million dollars.

Chapter –III

INSTITUTIONAL MECHANISMS OF HORTICULTURE ADMINISTRATION

The concerted efforts for the development of horticulture in Mizoram is said to be started in 1908 when Major H.W.C Cole I.A (known among the Mizo as Kawl Sap) initiated rubber plantation at Chite. Here, he introduced some fruits and vegetables like Oranges, Pineapples, mustards, cabbages, turnips etc. However, during those days, all horticultural activities were placed under the umbrella of agriculture. It continued to be one of the important activities of agriculture even after the creation of the full fledged Directorate of Agriculture in 1972 when Mizoram acquired the status of a Union Territory. Horticulture was made one of the wings under the Department of Agriculture along with Animal Husbandry & Veterinary and Fisheries till 1993 when the Department of Agriculture was trifurcated. During this time Horticulture was under the Department of Agriculture, it was administered by a Joint Director along with supporting staff.

In 1993, Horticulture and Fishery were carved out into separate departments. Subsequent to the separation the following wings remained under the Department of Agriculture:

1. Food-grain Development
2. Agriculture Farm & Quality Seed Production
3. Manure & Fertilizers
4. Plant Protection
5. Commercial Crop Development
6. Extension & Farmers' Training
7. Crop Insurance
8. Development of Oilseeds
9. Assistance to Small Marginal Farmers

10. Agriculture Research and Education
11. Agriculture Marketing
12. State Soil Survey Organisation
13. Agriculture Machineries & Implements
14. Minor Irrigation

Meanwhile, the Wings allocated to the Department of Horticulture were:

1. Fruit Development
2. Vegetable Development
3. Spices Development
4. Floriculture Development
5. Mushroom Development
6. Plantation Crops
7. Horticulture Research & Education
8. Extension & Training
9. Horticulture Farm & Quality Seed Production
10. Plant Protection
11. Manures & Fertilizers
12. Roots and Tuber Crops

Fisheries Department was headed by Joint Director who looked after all matters related to Fishery

Initially, the newly created Horticulture Department was manned by the existing officers and staff headed by the Joint Director. However, a common cadre for Group A and Group B (both Gazetted & Non-Gazetted) officers of agriculture and horticulture was maintained for three years post-separation. The assets belonging to the Department of Agriculture since its inception were also reallocated between the Department of Agriculture and Horticulture as under:

Farms retained by the Department of Agriculture were:

1. Neihbawih Farm
2. Rotlang Farm
3. Ngengpui Farm
4. Thingdawl Farm
5. Thenzawl Farm
6. Saitual Farm

Farms allocated to the Department of Horticulture are:

1. Chite Farm
2. Vairengte Farm
3. Champhai Farm
4. Rihte Farm
5. Tuitlawk Farm
6. Khanpui Farm
7. Lengpui Farm
8. Phawngpui Farm
9. Changtlai Farm

Besides distribution of farms, other important assets like standing crops, buildings, water tanks, machineries, chemicals and fertilizers, seeds, stationeries and utensils etc., were also distributed between the two departments in 1993 at the time of trifurcation.

Immediately, after the creation of the Department of Horticulture, distribution of posts was done out of the existing posts in the ratio of 60:40 for Agriculture and Horticulture respectively. However, redistribution was made in the ratio of 50:50 in 1996. Distribution and transfer of posts between Agriculture and Horticulture department was settled between 1993 and 1997. Initially, 87 officers (Gazetted) and some subordinate staff were transferred to Horticulture Department. The following are the name of posts transferred to the Department of Horticulture at the initial stage:

1. Joint Director (1)
2. Project Officer (1)
3. Deputy Director (1)
4. Agronomist (1)
5. Horticulture Development Officer (HDO) (1)
6. Junior Project Officer (3)
7. Spices Development Officer (1)
8. Horticulture Census Officer (1)
9. Assistant Potato Development Officer (1)
10. Assistant Horticulturist (1)
11. Assistant Horticulture Officer cum Farm manager (1)
12. Junior Microbiologist (1)
13. Subject Matter Specialist (SMS) (3)
14. Sub-Divisional Horticulture Officer (2)
15. Group B Non Gazetted Post (38)
16. Subordinate Service (UDC, LDC, Driver, Peon etc) (87)

The visions, missions, objectives and functions of the Department of Horticulture are as under:

Vision

1. Self sufficient in Horticulture produces to meet the state requirement.
2. To have surplus production for sale outside the state as well as for Exports.
3. Impart new technologies in Horticulture fields and disseminate the same to the cultivators in Mizoram

Mission:

1. Upliftment of farmers by creating employment opportunities.
2. To encourage commercial cultivation of economically important Horticulture crops as a source of livelihood to the farmers.

3. To rehabilitate the traditional jhumias on a sustained productive farming for improving their socio-economic conditions.

4. Import technology in the practice of precision farming like covered cultivation (Hi-Tech Greenhouses etc.) to have quality product and to increase the production and productivity per unit area.

Objectives:

1. To enhance horticulture production, improve nutritional security and income support of the farming community.

2. Uplift the economic condition and livelihood of the rural population.

3. Ensuring higher income to farmers through improvement in the production, supply chain and market linkages of horticulture produce.

4. Promotion of horticulture as an integrated activity involving animal husbandry, silviculture, apiculture, fisheries etc.

5. Create opportunities for employment generation for skilled and unskilled persons, especially unemployed youth.

6. Eradication of Jhuming practice and to create opportunities for permanent settlements.

Functions:

The Department of Horticulture was assigned to perform various activities related to the following works-

1. Fruit Development.

2. Vegetable Development.

3. Spices Development.

4. Floriculture Development.
5. Mushroom Development.
6. Plantation Crops.
7. Horticulture Research and Education.
8. Extension and Training.
9. Horticulture Centres & Quality Seed Production.
10. Plant Protection.
11. Manures & Fertilizers.
12. Roots & Tuber Crops.
13. Tea Plantation.
14. Implementation of Centrally Sponsored Schemes such as:
 - a) Integrated Development of Horticulture (MIDH) (
 - b) Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)
 - c) Rashtriya Krishi Vikash Yojana (RKVY)
 - d) Implementation of provisions under Article 275 (1)

Organisation

Till 2020, the Department of Horticulture, Government of Mizoram had been functioning through 1 (one) Directorate, 8 (eight) Divisional offices, 4 (four) Sub-Divisional offices, 39 (thirty nine) Circle offices and 8 (eight) Horticulture Centres. The Centres are established for demonstration and production of quality planting materials.

However, the Department was restructured in October 2020 whereby Divisional, Sub-Divisional and Circle offices were replaced by District Horticulture offices in all the 11 (eleven) districts and Block Horticulture Offices in all RD Blocks, that is, 26 within the state.

Directorate

It is headed by the Director of Horticulture. The promotion of horticulture and all related activities are planned, executed and monitored by the Government of Mizoram through the Department of Horticulture. It is the Directorate which provides technical back up for the development of horticulture in the State, so that production and productivity show an upward trend. This is achieved by way of implementation of various schemes, demonstrations, trainings, supply of quality planting materials and inputs etc. The aims and objectives of the Department are to be achieved by the extension services provided through the District Horticulture Offices and Block Horticulture offices. To ensure efficiency in the Department, the Directorate is divided into different sections. Each Section is headed by a Deputy Director. Subjects assigned to each Section are as follows:

1. Fruit Section

- a) Fruits
- b) Implementation of Mission for Integrated Development of Horticulture (MIDH) Schemes
- c) Nursery
- d) Import of Planting Material
- e) Statistics
- f) Rejuvenation/Canopy Management
- g) Special Intervention

2. Vegetable Section

- a) Vegetables

- b) Implementation of Rashtrya Krishi Vikas Yojana (RKVY) Scheme
- c) Protected Cultivation
- d) Post Harvest Management
- e) National Horticulture Board (NHB)
- f) New Land Use Policy (NLUP- discontinued from 2018)
- g) New Economic Development Policy (NEDP-discontinued from 2018)
- h) Colaboration with International Fund for Agricultural Development (IFAD)

3. Extension & Training Section

- a) Human Resource Development
- b) Research & Education
- c) Horticulture Mechanization
- d) Vehicles
- e) Corporation- Mizoram Food and Allied Industries Corporation (MIFCO), Mizoram Agriculture Marketing Corporation (MAMCO), Mizoram State Agriculture, Horticulture and Marketing Cooperative Federation (MAHFED), other Societies etc.
- f) Central Store
- g) Publicity
- h) Exhibition/ Exposure visit within and outside the state

4. Spices Section

- a) Spices
- b) Plantation Crops
- c) Organic Farming
- d) Bee Keeping
- e) Coconut Board/ Tea Board/The National Oilseeds and Vegetable Oils Development(NOVOD) Board
- f) Disaster Management
- g) Horticulture Centres/ Centre of Excellence
- h) Collaboration with North Eastern Council (NEC),

- i) Collaboration with Agricultural and Processed Food Products Export Development Authority (APEDA)/ National Bank for Agriculture and Rural Development (NABARD)/Banks/ Indian Council Agricultural Research (ICAR) etc.

5. Planning Section

- a) Office establishment
- b) Planning
- c) Account
- d) Plant Protection (Integrated Pest Management) Quarantine/ Plant Health Clinic (PHC)/ Integrated Nutrient Management (INM)/Manure&Fertilizer)
- e) State Purchase Advisory Board (SPAB)/Department Purchase Advisory Board (DPAB)
- f) Result Framework Document
- g) Collaboration with Japan International Cooperation Agency (JICA)
- h) Direct Benefit Transfer (DBT)
- i) Right to Information (RTI)
- j) Plant Health Clinic
- k) Technical Committee
- l) Local Purchase Committee
- m) Public Financial Monitoring System (PFMS)
- n) Provisions under Article 275 (i)

6. Floriculture Section

- a) Floriculture/ Landscaping
- b) Creation of Water Sources
- c) Maintenance of gardens of VIP quarters'
- d) Engineering
- e) Implementation of Pradhan Mantri Krishi Sinchayee Yojana(PMKSY)
- f) Mushroom Development
- g) Medicinal & Aromatic Plant

Division Offices/District Offices

Before the Department was restructured in 2020, there were 8 Divisional Horticulture offices. They were headed by the Divisional Horticulture Officers. It was the responsibility of the divisional offices to implement horticultural development works as allotted by Directorate of the Department, in accordance with proposals or suggestions for development of their respective jurisdiction submitted to Head of Department. Before reorganisation, the following were the Divisional offices of the Department of Horticulture in Mizoram-

1. Kolasib Division
2. Serchhip Division
3. Tuidam Division
4. Aizawl Division
5. Khawzawl Division
6. Lunglei Division
7. Lawngtlai Division
8. Saiha Division

Since October 2020, with the reorganisation of the Department, Divisional offices were replaced by District offices. Currently, there are 11 District offices. The newly created districts like Hnahthial District, Khawzawl District and Saitual District have their own District Horticulture Offices as well. The functions and responsibilities of the District Office are similar to those of the previous Divisional offices. The office is headed by a District Horticulture Officer.

Sub Division Offices

Before the reorganisation, the Sub-Divisional Office was subordinate to the Division and was headed by Sub-Divisional Officers. They functioned as field establishments under the Division. During this period, there were four sub-divisions:

1. Rawpuichhip Sub-Division

2. Mamit Sub-Division
3. Champhai Sub-Division
4. Hnahthial Sub Division

Horticulture Circle Offices

They were headed by Circle Horticulture Officers (CHO)/Horticulture Extension Officers (HEO) who belongs to Group A. The main duties of CHOs/ HEOs was to propagate the knowledge of horticultural technology to farmers. Their primary role was to help the farmers and farming societies to make better decisions to increase horticulture production. They act as the Liaison Officers between the farmers and Government, providing guidance to the farmers on how to maximize their crop yields and profits, provide guidance and demonstrations on the latest technologies and impart training to get full advantage of such technologies. Before restructuring the department, there were 38 Circle Offices under Horticulture Department:

1. Kolasib Circle
2. Lungdai Circle
3. Bukpui Circle
4. Serchhip Circle
5. North Vanlaiphai Circle
6. Chhingchhip Circle
7. Suangpuilawn Circle
8. Keifang Circle
9. Darlawn Circle
10. Aibawk Circle
11. Aizawl Circle
12. Zawlnuam Circle
13. Zamuang Circle
14. Tuidam Circle
15. Reiek Circle
16. Rawpuichhip Circle

17. Mamit Circle
18. West Phaileng Circle
19. Khawzawl Circle
20. Kawlkulh Circle
21. Khawhai Circle
22. Ngopa Circle
23. Champhai Circle
24. Samthang Circle
25. Saiha Circle
26. Tuipang Circle
27. Lunglei Circle
28. Haulawng Circle
29. Thingfal Circle
30. Lungsen Circle
31. Tlabung Circle
32. Hnahthial Circle
33. South Vanglaiphai
34. Thingsai Circle
35. Lungpher Circle
36. Lawngtlai Circle
37. Chawngte Circle
38. Diltlang Circle

Block Horticulture Office

When the Department was reorganised and restructured in 2020, Sub-Divisional and Circle Offices were replaced by Block Horticulture Offices. The functions and responsibilities of both Sub-Divisional Offices and Circle Offices were taken up by these newly created Block Offices. Currently, there are 26 Block Horticulture Offices under the Department. These offices are headed by a Block Horticulture Officer.

Horticulture Centre/Centre of Excellence

Horticulture Centres or Centre of Excellence are the integral part of the Horticulture Department. They are headed by a Farm Manager. Centres are set up to produce planting materials which were to be distributed to the farmers; to demonstrate advanced technologies in order to boost the quality of high value horticulture crops including flowers and vegetables. Quality planting materials are being produced every year in these centres. They are equipped with various facilities and infrastructures. They are continually strengthened to produce more and more. As on April 2023, there are four Horticulture Centres and four Centres of Excellence (COE) operated under the Department of Horticulture. They are:

1. Zawlnuam Horticulture Centre
2. Champhai Horticulture Centre
3. Maudarh Horticulture Centre
4. Chite Horticulture Centre

Centres of Excellence

1. Centre of Excellence Thingdawl
2. Centre of Excellence Thiak
3. Centre of Excellence Serchhip
4. Centre of Excellence Lunglei

Horticulture Farm

Horticulture Farms are set up to meet the needs of the farmers. They are also utilized for producing planting materials. They provide guidance to the farmers in accordance to their needs and requests. One or two staff in the Sub-Divisional Offices is entrusted to look after these farms. Currently, there are five horticulture farms. They are:

1. Vairengte Horticulture Farm
2. Kawlkulh Horticulture Farm
3. Samthang Horticulture Farm

4. Tuitlawk Horticulture Farm
5. Rihte Horticulture Farm

Personnel

The Department is manned by specialists in the field of agriculture, horticulture and horticulture engineering. They are assisted by clerical staff like Upper Division Clerk (UDC), Lower Division Clerk (LDC) and the IV grades.

Before the reorganisation of the department in 2020, the qualifications and experience required for the different posts in the Department are:-

1. Director – B.Sc (Horti) with at least 5 years service in Grade II (Joint Director).
2. Joint Director – B.Sc (Horti) with at least 5 years service in Grade III (Deputy Director or its equivalent post).
3. Deputy Director/DHO(Divisional Horticulture Officer) – B.sc (Horti) with at least 5 years service in Grade IV (Horticulture Development officer (HDO) or equivalent posts).
4. Horticulture Development officer (HDO)/Assistant Divisional Horticulture Officer (ADHO)/ Sub-Divisional Horticulture Officer (SDHO) – B.Sc (Horti) with at least 5 years service in Grade V (Horticulture Extension Officer).
5. Horticulture Extension Officer- 50% for B.Sc (Horti)-Direct recruitment through Mizoram Public Service Commission (MPSC). 25% for Promotion from Assistant Horticulture Extension Officer (AHEO)/Senior Horticulture Demonstrator (SrHD) with at least 5 years service. Another 25% for AHEO and SrHD having BSc (Horti) with at least 3 years service.
6. Assistant Engineer (AE)- At least 5 years service as Junior Engineer (JE).
7. Finance & Account Officer (FAO)- drawn from Mizoram Finance & Account Service (MF&AS).
8. Junior Engineer (JE)- Diploma in Engineering.
9. Senior Demonstrator/Assistant Horticulture Extension Officer –Direct recruitment from BSc (Horti)/ at least 5 years service in Horticulture Demonstrator (HD).

10. Horticulture Demonstrator – Higher Secondary School Leaving Certificate (HSSLC). They are made to undergo in-service training like Basic Agriculture Training (BAT)

One important aspect of the reorganisation of the Horticulture Department is restructuring the service cadre of Mizoram Horticulture Service (MHS) along with some re-designation. The following are some important changes made along with the restructuring of the Department:

1. Creation of four new posts - 1 Super time, 1 selection grade and 2 Junior Administrative Grade.
2. Creation of 2 new posts of Additional Directors (Selection Grade)
3. Creation of 2 more Joint Director Post to add to the existing 2 posts (Junior Administrative Grade)
4. Creation of Senior Grade posts comprising of 3 (three) new posts of Dy Director, 1 Project Officer (Bamboo), 11 posts of District Horticulture Officer, 1 Project Officer (CoE) and 1 Project Officer (RD).
5. Creation of 57 posts at Junior Grade level - Asst. Director-16, Asst. District Horticulture Officer-11, Block Horticulture Officer-26 and Asst. Project Officer-5.

Powers, Functions and Duties of Officers and other employees

Director:

The Director of Horticulture, as the Administrative Head of the Horticulture Department in the State, exercises all the technical, administrative and financial powers as exercised by the Head of a Department under the Government of Mizoram. He/She controls all the horticulture development affairs in the state and issues special instructions/ directions considered necessary for administrative and professional measure. Any major policy matter relating to horticulture activity or professional activity is undertaken by him/ her in consultation with other senior officers of the

Department. He/She is also responsible for preparation of the budget and appropriation for the Department for consolidation and approval of the State Government.

Additional Directors:

The Director is currently assisted by two Additional Directors. They give directions and instructions as per the wishes of the Director. They take the charge of Director when he/she is on leave or under any situation when the Director is not in a position to perform his or her duties.

Joint Directors

There are four Joint Directors in the Directorate of Horticulture under whom 9 (nine) Deputy Directors function as sectional heads, who are assisted by Asst. Directors. The Joint Directors of Horticulture assist the Director and Additional Director in the performance of their duties and responsibilities. He/She is responsible for finalization of all the establishment and technical matters, and any other jobs assigned by the Head of the Department.

Deputy Directors

There are 26 officers of the rank of Deputy Director out of which 9 are Deputy Directors at the Directorate and 11 District Horticulture Officers assisting 4 Joint Directors, 2 Additional Director and 1 Director. Each Deputy Director in the Directorate is assigned to look after at least one Section. The divisions of sections under the Deputy Directors are as follows:

1. Deputy Director-Planning
2. Deputy Director-Fruits
3. Deputy Director-Vegetables
4. Deputy Director-Spices
5. Deputy Director-Extension & Training
6. Deputy Director-Floriculture
7. Deputy Director-Bamboo

8. Deputy Director-Account
9. Deputy Director- Administration

District Horticulture Officers

The District Horticulture Officer is the administrative head and controlling officer in his / her district. He/She is responsible for the successful implementation of all the functions and development schemes in the Horticulture Department including extension services. He / She is assisted by the Assistant District Horticulture Officer. He issues orders and instructions to the subordinate offices within his jurisdiction.

Assistant Directors

There is one or two Assistant Director in each section in the Directorate. Their duties are to assist the Deputy Director in the performance of his duties as the head of the section.

Block Horticulture Officers

Block Horticulture Officers are the backbones of the Department. They assist their senior Officers at Directorate and district level in all respects, execute power, take up tasks and provide extension services to the farmers.

They are also assigned the role of Reports and Returns, Preparation of Action Plans, Detailed Project Report (DPR), field verification, supervision of scheme implementation, beneficiary and field identification, diagnosis of diseased and infected plants with free prescription of pesticides or insecticides, free delivery of extension services to farmers etc. Besides, they assist their senior Officers and execute their assignments as per instruction of their superiors. They are also assigned the duties of resource person/ subject matter specialist / instructor / trainee / organizer in the event of training, sensitization and awareness programme, demonstration, horticulture fair, exhibition, seminar, field visit, exposure visit etc.

Senior Horticulture Demonstrators/Assistant Horticulture Extension Officers

Being a sub-ordinate officer's post, they are assigned the duty and role of assistants to both their senior officers as well as farmers. They guide, demonstrate, advise, innovate and teach the farmers. Give instruction to the Demonstrator as per the need of farmers. Collect necessary information available from Departments, institutions, fields, locality and further utilize them for betterment of farmers.

Horticulture Demonstrator

They are representatives of the Department to the farming communities. They are in the forefront to face the challenges arising from field, farmers, entrepreneurs, Self Help Group and the villagers as a whole. They are assigned the duty of field demonstration with extension services to the farmers without imposing consultation fee. They are assigned to conduct verification of farmers' field activities, identification of field and beneficiary details, reports and returns, dissemination latest technology, impart innovation and motivate farmers, clarify confusions and queries of farmers. They practically link the Department with farming communities at field as well as village levels. They collect the required information from farmers and submit reports to the concerned authorities. They also disseminate of relevant information from the Department to farmers. They assist Sr. Horticulture Demonstrator in administration and field functions at block and village level; execute their tasks as per instructions of their superiors. They are Demonstrators who demonstrate, teach, train, guide and supervise farmers at the grass root level.

Common Service Post serving in the Department

There are various Common Service Posts under the Department. This service and the incumbents play an important role in the functioning and maintenance of records of the Department depending on the post they occupy which is very vital for good

governance and prompt delivery of services to the public. Some of the post and their roles are briefly highlighted below:-

- 1) **Finance & Account Officer (FAO):** The Department has no permanent FAO at present. The FAO attached to the Department has to perform duties of 2 to 3 Department which is very cumbersome for the incumbent as he has to attend 2 to 3 different offices, besides in case of urgent work which needs immediate action becomes impossible resulting in various difficulties for the Department. The Department is implementing various programmes and schemes both under State Government and under CSS like NLUP, MIDH, PMKSY, RKVY, NEC etc. where the financial involvement is very high and the expertise of Finance & Account Officer is required by the Department in maintaining check and balances and financial management of the Department. FAO service is of great significance in preparation of budgets, audits, managing accounting activities including reconciliations etc., and also in monitoring the Department receipt and expenditure.
- 2) **Superintendent:** The Department has one Superintendent who is posted at Directorate of Horticulture, Aizawl. The Superintendent plays a vital role in the administration and establishment of the Department and also in the management of manpower of the Department. The role of the Superintendent has to look after the service matters of all the staff of the Department and also to maintain the service records of the employees which needs constant and regular updation. He/She is assisted by Assistant, UDC, LDC of the Department, still it is a huge task for a single person to supervise maintenance of records and proposal for a full fledged Department.
- 3) **Assistant Engineer:** The role of the Assistant Engineer of the Department is to check the schemes/works executed by the Department both in the Directorate as well as in the District/Divisions and Sub-Divisions and to accord the Technical/Financial approval of large schemes. Preparation of estimates and

drawings, feasibility study and monitoring the works executed by the Department such as construction of water tanks, construction of Market Shed, construction of Pack House, establishment and installation of Cold Storage, construction of horticulture link roads etc., come under his/her purview.

- 4) **Junior Engineer:** Designing and execution of works under the Department is one of the key roles of the Junior Engineers. They also keep records of measurement of works executed, preparation of estimate of construction works and preparation of drawing and maps of the works to be executed.

- 5) **Draughtsman:** The role of the draughtsman is tracing work of the various engineering and architectural works of the Department such as horticulture potential area map, other maps and design prepared by Assistant Engineer and Junior Engineer of the Department and also help in the planning and designing of various project works taken up by the Department.

- 6) **Assistant:** The Assistant deployed in the Department at Directorate, District/Division and Sub-Divisions deals with reports and returns of establishment and section concerned, receipts, and submit cases to the Section Officers or Superintendent as the cases may be. In general the duties involves receipts, record maintenance, Opening and maintenance of files, references, noting and drafting of various types of data, statistics and information and maintenance of various register.

- 7) **Upper Divisional Clerk (UDC):** In the Directorate, Divisions and Sub-Divisions the UDCs are assigned the duties as highlighted for Assistants because of lack of assistants and quantum of works. The burden of work assigned to UDCs is very high which always results to poor performance in timely submission of correspondence Reports and returns, data, file movement etc.

8) Lower Divisional Clerk (LDC): LDCs are generally entrusted with work of routine nature for example – registration of dak, maintenance of diary, file register, file movement, indexing and recording, typing, comparing, dispatch, submission of routine and simple drafts etc. Therefore, they play an important role for the Department in maintaining the records and files of the Department.

9) Tractor Operator/Dozer Operator/Driver/ Asst. Tractor Operator/Asst. Dozer Operator: The incumbents are the guardian of the vehicle they are assigned to. They are expected to perform their duty diligently and with vigilance. Since, farmers' field are in far flung areas and mostly not connected by all weathered road, the task of the drivers/ operators are very cumbersome and plays an important role during monitoring and visits of fields by officials and dignitaries. They are at call for duty during the day and night.

10) Peon/Helper/Chowkidar: They are on duty at the office they work. They carry and deliver dak within and outside the office. They also ensure the cleanliness and general up-keep of the section/office where they are posted and of furniture, fixture and equipments. In case of chowkidar they keep watch of the office during and after office hours and takes precautionary measures relating to fire, burglary and damage to office property.

Staffing Pattern prior to the reorganisation

As shown in Table No 3.1, the District Offices were headed by Divisional Horticulture Officer (DHO). He/She was assisted by two Assistant District Horticulture Officers (ADHOs), a number of technical and office staff such as Senior Horticulture Demonstrators, Horticulture Demonstrator, Junior Engineer, Head Assistant, UDC, etc. Divisional Offices were designed to be manned by 21 personnel.

Table No. 3.1: Staffing Pattern for Divisional Offices

1	DHO	1 No.
2	ADHO	2 Nos.
3	HEO	1 No.
4	Senior HD	2 Nos.
5	HD	2 Nos.
6	JE	1 No.
7	Head Assistant	1 No.
8	UDC	2 Nos.
9	LDC	3 Nos.
10	Operator/Driver	3 Nos.
11	Peon/Chowkider/Sweeper	3 Nos.

Staffing pattern for Sub-Divisional Offices is shown in Table No 3.2. Sub-Divisional offices were established to be manned by fourteen personnel under the headship of Sub-Divisional Horticulture Officer (SDHO). He was assisted by one Horticulture Extension Officer (HEO) and two senior Horticulture Demonstrators. Daily office works were carried out by SDHO with the help of subordinate staff like one UDC, two LDCs and four 4th Grade employees.

Table No. 3.2: Staffing Pattern for Sub-Divisional Offices

1	SDHO	1 No.
2	HEO	1 No.
3	Senior HD	2 Nos.
4	UDC	1No.
5	HD	3Nos.
6	LDC	2Nos.
7	Chowkider/Sweeper	1No.
8	Peon	2Nos.
9	Driver	1 No.

Table No. 3.3: Staffing Pattern for Circle Offices

1	HEO	1 Nos.
2	Senior HD	1 No.
3	HD	5 Nos.
4	Peon cum Chowkider	1 Nos.

As can be seen in Table No. 3.3, the head of Circle Offices was Horticulture Extension Officer (HEO). He was assisted by subordinate staff like one Senior Horticulture Demonstrator, five demonstrators and one 4th Grade employees. Altogether, there were eight personnel in Circle Offices.

However, after the reorganization of the Department, there have been differences with regard to the number of employees for District and Block Offices. No strict uniform staffing pattern is followed anymore. The strength of the office is now determined by the area and number of activities undertaken by the office.

The latest Pay Levels (as on 31.03.2023) of the following incumbents in the Department of Horticulture as per 7th Pay Commission are as follow:- (Account Section, Department of Horticulture, Government of Mizoram)

1. Director	Level 13A
2. Additional Director	Level 13
3. Jt. Director	Level 12
4. Dy. Director/Project Officer/DHO	Level 11
5. Assistant Director/ADHO/BHO	Level 10
6. FAO/Supdt/AE/	Level 10
7. Assistant/Drafman/JE/Sr HD/AHEO	Level 7
8. UDC	Level 6
9. HD/LDC/Bulldozer Operator/Tractor Operator	Level 4
10. Driver	Level 2
11. Group D	Level 1

Associations within the Department

To ensure and maintain integrity among the employees and to increase productivity and efficiency towards the development of horticulture in Mizoram, the following associations and committees had been formed within the Department of Horticulture:

1. Mizoram Horticulture Service Association

It was formed in 23rd March, 1994. Currently, its Headquarter is located in Aizawl. Any person amongst the Mizoram Horticulture Service is eligible to be the member of a Association. The aim and objective of the Association are: 1) To promote the common service interest of its members. 2) To function as a welfare organisation for its member. 3) To improve co-operation, unity and fraternity amongst its members. 4) To join hands with the Government in furtherance of the aims of Horticulture Department. 5) To promote the welfare and dignity of all members of the Association. 6) To promote true co-operation for achieving qualitative improvement in the field of horticulture. 7) To chalk out ways and means for progress and improvement of horticulture. 8) To promote national integration. 9) To coordinate and enhance the scientific and technological aspiration and insights of the members for the formulation of various policies of horticulture department. 10) To act in concert with similar associations on all matters of common interests. 11) To guide and help its members in the discharge of their duties with zeal and honesty in preparing Horticulture officials to be responsible citizens. 12) To do such things as are incidental or conducive to the stated objectives or one of them.

2. Mizoram Horticulture Officers & Staff Welfare Association

It was formed on 31st March 1994. It's headquarter is located in Aizawl. Any appointed employee of the department is eligible to become a member of the Association. The aim and objectives of the Association are: 1) To safeguard and promote the welfare of its members. 2) To ensure rights and dignities of the members. 3) To promote active cooperation amongst its members.

3. Directorate Horticulture Officers and Staff Welfare Association

It was formed on 7th August, 2002. It is also known as Directorate Welfare Association. Membership is opened to all the employees (Regular as well as Contract) in the Directorate from the highest to the lowest rank. The aims and objectives of the Association are: 1) To promote active cooperation among the officers and staff in the Directorate. 2) To promote the welfare and dignity of all the members. 3) To work for the development of horticulture in the state. 4) To create peaceful atmosphere within the Directorate.

4. Mizoram Horticulture Diploma Holder Association

It was formed as Subordinate Horticulture Service Association on 29 April 2010. Later on 15th December 2016, it was changed to Mizoram Horticulture Diploma Holder Association. The aims and objectives of the Association are: 1) To promote the welfare of the members. 2) To handle the field works of the Department with prompt action.

In addition to the above associations, the following Committees were also formed to ensure smooth functioning of the Department.

1. Local Purchase Committee
2. Departmental Purchase Inspection Committee
3. Technical Committee

Infrastructure

1. Centre of Excellence: Currently, there are four Centres of Excellence working under the Department. They are one of the most valuable assets that the department have. These Centres are well equipped with latest technology mostly from Israel. They are set up to produce quality planting material for farmers in Mizoram. Open cultivation of some vegetables and flowers are also undertaken for making profits.

2. Horticulture Centre: These Centres are also set up to produce quality planting materials. Presently, the Department is looking after four centres at Chite, Champhai, Maudarh and Zawlnuam villages. Their working and functions are more or less the same with Centre of Excellence.
3. Horticulture Farm: There are five Horticulture Farms where trials or demonstrations are carried out.
4. Multipurpose Packing House: The Department of Horticulture is currently having five Multipurpose Packing Houses. They are located in four Centres of Excellence and in Chite Horticulture Centre.
5. Cold Storage: Each Multipurpose Packing House is equipped with Cold Storage Facilities. They are used to store larger quantity of perishable horticulture products.
6. Generator: To meet the power demand to carry out horticulture activities, each Centre of Excellence and some Horticulture Centres are equipped with high voltage generator. These generators are utilized by outsiders in the surrounding as well.
7. Training Centres: Training Centres are established in each Centre of Excellence and in Chite Horticulture Centre. They are meant to give training to farmers. Trainings are conducted as per the availability of funds.
8. Farmers' Hostel: Farmers' Hostels are also attached to every COE and some Horticulture Centres. They are meant to accommodate farmers while undergoing training conducted by the Centres.
9. Tissue Culture Laboratory: This is one of the most valuable assets possessed by some Centres.
10. Green House: The Department has numerous green houses in different places. They are used for Fruit and Vegetable Nursery, Scion Bank, Rose Cultivation etc.
11. Open Cultivation: Some Centre of Excellence and Horticulture Centres are looking after a considerably vast area of land for open cultivation. These cultivations are mostly used for making monetary profits.

12. Library: It is located in the Directorate and meant for the officials as well as public.
13. Publication: A quarterly magazine 'Huan Enkawltu' is published and distributed to the farmers free of cost. Other booklets, leaflets etc., on package practices of various horticulture crops and other relevant topics are also published.

Awards and Achievements

The Department of Horticulture has been awarded numerous awards and appreciations at national and international levels. Some of the noticeable awards and appreciations given to the Department are:

1. Best Horticulture State Award 2019 presented by Agriculture Today.
2. 2nd Prize for Promoting Horticulture in the State at Government Achievement Schemes Expo 2013, International Agriculture and Horticulture Expo 2013 and Food & Technology 2013 organised by NNS.
3. Excellent Achievement Award at Government Achievement Schemes Expo 2011, International Agriculture and Horticulture Expo 2011 and Food & Technology 2011 organised by NNS.
4. Excellent Display Award at Horticulture Expo 2012 by Media Today Group
5. Certificate of Appreciation at Global Agri Connect in 2012 and 2013 organised by National Skill Foundation of India.
6. Best Display of Anthurium at Global Agri Connect 2011 organised by National Skill Foundation of India.
7. Excellent Display Award at Horticulture Expo 2011.
8. 2nd Best Display Award at HARITKRANT-BARAMATI 2010 organised by Flower Grower's Association, Maharashtra.
9. Winner at 17th Annual Flower Show 2010 organised by The Green Silchar
10. 1st Award in National Floral Art Competition at Floral Expo 2009 by Media Today Group.
11. 2nd Best Stall Award (North East Category) in International Flower Show 2005 & 2008 organised by Government of Sikkim.

12. 2nd Best State Display Award at Flora Show 2006 by Media Today Group.

Chapter –IV

DEVELOPMENT PROGRAMMES IN HORTICULTURE

Horticulture seems to get more and more attention and recognition in Mizoram. This is due to the growing health consciousness among the people, economic viability and feasibility of the horticulture crops, suitability of soil of the land etc. The topography of the state also has a significant contribution for the development of horticulture as large scale industries could not be set up due to the absence of vast flat land and scarcity of mineral resources, power etc. However, the climatic conditions and soil composition of Mizoram is found to be suitable for the cultivation of a vast variety of horticulture crops. Farmers in different regions are slowly weaning away from the age old practice of Jhum cultivation which is detrimental to the environment and are moving towards permanent farming where they can grow more profitable crops with more environment friendly activities without having to shift and clear new plots every year.

Even before the introduction of various Central and State horticulture programs and projects, horticulture occupied a very important place in the lives of the people of Mizoram. The Mizos used to be self-sufficient in foodgrains, fruits and vegetables. They grew most of the horticulture crops that are grown today but at a rather less commercial level. Most crops they grew were for their consumption alone. They hardly thought of making profits. However during those days, they gave more emphasis on cereals particularly rice which is the the staple food item of the Mizos since time immemorial.

The formation of the Department of Agriculture since the inception of Union Territory (UT) in 1972 was an important milestone for the development of agriculture and its allied activities including horticulture. Another important milestone was achieved with the formation of Horticulture Department as a full-fledged department on 2nd September 1997. Since its inception in 1993, the Department has been implementing various horticulture schemes of the Central and State governments till today. Schemes

such as Technology Mission for North-Eastern States (TMNE), National Mission on Medicinal Plants (NMMP), Mission for Integrated Development of Horticulture (MIDH), Rashtriya Krishi Vikas Yojana (RKVY), Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) etc., are some horticulture schemes being implemented in Mizoram. The State Government has also been undertaking many horticultural activities through programs such as New Land Used Policy (NLUP), New Economic Development Policy (NEDP) and State Economic Development Policy (SEDP) as drawn up under various governments formed by different political parties.

Development Programmes

Horticulture development programmes currently implemented in the state may be discussed as follows:

Mission for Integrated Development of Horticulture (MIDH)

MIDH can be regarded as the most important horticulture scheme which is being implemented for the development of horticulture in Mizoram. It is a Centrally Sponsored Scheme (CSS) implemented in Mizoram, formulated purely for the holistic growth of horticulture alone throughout the country covering horticulture sectors such as fruits, vegetables, root & tuber crops, mushrooms, spices, flowers, aromatic plants, coconut, cashew, cocoa and bamboo. Under the scheme the Central Government contributes 100 percent of the fund from the total outlay of the scheme (Operational Guidelines of MIDH, 2014. P.6). Other states in the North East also enjoy similar funding pattern, where they do not need to have contribution to the total outlay of the scheme. However, the matching share between the Centre and states other than the North East States has been 85:15. In case of the National Horticulture Board (NHB), Coconut Development Board (CDB), Central Institute for Horticulture (CIH) and the National Level Agencies (NLA), the Central Government contributes 100 percent. Technical advice and administrative support to State Governments/State Horticulture Missions (SHMs) for the Saffron Mission and other horticulture-related activities like the Rashtriya Krishi Vikas Yojana (RKVY) are also provided by the Mission.

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:

1. *National Horticulture Mission (NHM)*: It was launched in 2005-2006. This mission has been implemented in all States and Union Territories except the North Eastern States and states in the Himalayan region.
2. *Horticulture Mission for North East & Himalayan States (HMNEH)*: It was launched in 2010-2011 and became a part of MIDH since 2014-2015 when MIDH was launched to subsume the existing schemes implemented in the country. Previously, it was known as 'Technology Mission for North-Eastern States (TMNE). This Mission covers all the North East States including Sikkim and the Himalayan regions such as Jammu & Kashmir, Himachal Pradesh and Uttarakhand.
3. *National Bamboo Mission (NBM)*: This Mission was started in 2006-2007. It was subsumed by MIDH to be one of its sub-missions in 2011-2012. NBM has been implemented in all the States and Union Territories.
4. *National Horticulture Board (NHB)*: It was set up in April 1984 to improve integrated development of horticulture based industries and to help in coordinating and sustaining the production and processing of fruits and vegetables. All States and Union Territories have been placed under its purview since its inception.
5. *Coconut Development Board (CDB)*: It was established in January 1981 with a focus to increase productivity and product diversification. The Board covers all States and Union Territories where coconut is grown.
6. *Central Institute for Horticulture (CIH)*: It was set up by the Government of India on March 2006. It is located at Medziphema, Nagaland. The institute was set up to provide technical support on various aspects of horticulture for the holistic development in the North East Region through human resource development and capacity building.

MIDH is so structured to be implemented through various levels from national to district or different levels of Panchayati Raj Institution. At the national level, a General Council was established to be chaired by the Union Minister of Agriculture. The General Council has an Executive Committee (EC) headed by the Secretary, Department of Agriculture & Cooperation. The Executive Committee is to oversee the activities of the Mission and approve Action Plans of State Horticulture Missions and national level agencies. At the State level, there is a State Level Executive Committee (SLEC) chaired by the Agricultural Production Commissioner or Principal Secretary Horticulture/Agriculture/Environment & Forests. It was set up to oversee the implementation of programmes of the respective States. The Committee is also entrusted with multiple functions such as preparation of Strategic/Perspective and Annual State Level Action Plan, organize base-line survey, clear project based proposals, receive funds from National Mission Authority, State Government and other sources for carrying on the Mission's activities, release funds to implementing agencies etc. At the district level, a District Mission Committee (DMC) is formed to be responsible for carrying forward the objectives of the Mission for project formulation, implementation and monitoring. In the case of HMNEH states like Mizoram, the Committee is headed by the Deputy Commissioner/District Collector. The Guidelines also provides some provisions for Panchayati Raj Institutions to be an important body for the smooth implementation of the Mission. They are expected to have a role in crop identification, training and awareness creation and giving feedback to the concerned government functionaries. The formation of Technical Support Group (TSG) is also an important aspect of MIDH. As per the Guidelines, National Horticulture Mission (NHM) and National Bamboo Mission (NBM) are being supported by National Horticulture Board (NHB) and Horticulture Mission for North East and Himalayans (HMNEH) and Vegetable Initiative for Urban Clusters (VIUC) by Small Farmers Agribusiness Consortium (SFAC). For post-harvest management and cold chain projects across NHM and HMNEH, technical support is provided by the National Centre for Cold-chain Development (NCCD). Service providers can also be engaged for providing technical services in accordance with the Terms of Reference laid for the purpose and approved by the Executive Committee (Operational Guidelines of MIDH, 2014).

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 North East and Himalayan (HMNEH) which had commenced from 2010-2011 (formerly known as Technology Mission for North East (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.

Table No. 4.1.1: Fund Allocation and Areas of Implementation under MIDH in Mizoram for 2014-2015

Sl No	Component	Physical Target	Target Covered	Financial Allocation (in Lakhs)
I	Production of Planting Materials			100
II	Establishment of New Garden			
	1. Fruits	1492 Ha	1492 Ha	690.70
	2. Vegetables	140 Ha	140 Ha	35
	3. Flowers	52 Ha	52 Ha	26
	4. Spices	480 Ha	480 Ha	72
	5. Aromatic Plants	10 Ha	10 Ha	4
	6. 1 st Year of Maintenance	825 Ha	825 Ha	87.56
	7. 2 nd Year Maintenance	1000 Ha	1000 Ha	87
III	Rejuvenation/Replacement of Senile Plantation, Canopy Management	2000 Ha	2000 Ha	400
IV	Creation of Water Sources	596 No.	596 No.	681

V	Protected Cultivation	279995 Sqm	279995 Sqm	692.59
VI	Integrated Pest/Nutrient Management (IPM/INM)	8740	8740	104.88
VII	Establishment of Centre of Excellence for Horticulture	1 No	1 No	500
VIII	Pollination Support through beekeeping	2655 No.	2655 No.	21.24
IX	Horticulture Mechanization	650 No.	650 No.	97.50
X	Human Resource Development			175.17
XI	Integrated Post Harvest Management			36.4
XII	Special Intervention			10
XIII	Mission Management			278

Source: Directorate, Department of Horticulture, Government of Mizoram.

During 2014-2015, fund allocated to Mizoram for the implementation of different horticulture activities under the scheme was Rs. 4100 lakhs. The details of fund allocation against each component were as given in Table No. 4.1.1. During this first year of the implementation, 13 areas of activities/components were carried out. The concerned department could successfully cover its target areas of land by utilizing all funds allocated.

Table No. 4.1.2 Fund: Allocation and Areas of Activity under MIDH to Mizoram during 2015-2016

Sl. No	Component	Physical Target	Target Covered	Financial Allocation (Rs in Lakh)
I	Research & Development	1 No	1 No	23
II	Production of Planting Materials	6 Ha	6 Ha	130
III	Establishment of New Garden			
	1. Fruits	1190 Ha	1190 Ha	634.87
	2. Vegetable	110 Ha	110 Ha	27.50
	3. Mushroom			20
	4. Flowers	0.50 Ha	0.50 Ha	35
	5. Spices	130 Ha	130 Ha	19.50
	6. Aromatic Plants	40 Ha	40 Ha	16
	7. 1 st Year Maintenance for Fruits	490 Ha	490 Ha	34.00
	8. 2 nd Year Maintenance	315 Ha	315 Ha	31.90
IV	Rejuvenation/Replacement of Senile Plantation, Canopy Management	2158 Ha	2158 Ha	431.60
V	Creation of Water Sources	572 No.	572 No.	659.4
VI	Protected Cultivation	236667 Sqm	236667 Sqm	458.24
VII	Integrated Pest/Nutrient Management	6600 Ha	6600 Ha	79.2
VIII	Organic Farming (Vermicompost Unit)	25	25	12.50
IX	Centre of Excellence	2 No	2 No	400
X	Pollination Support through Beekeeping (Honey bee colony and Beehives)	1680 No	1680 No	13.44
XI	Horticulture Mechanization	777	777	116.55
XII	Human Resource Development (Training, Exposure Visits etc.)			161.55

XIII	Integrated Post Harvest Management (Pack House, Cool Chamber (Low energy/zero energy))	1186 No	1186 No	158.92
XIV	Mission Management			190.83
XV	Establishment of Marketing Infrastructure for Horticulture Crops	1 No.	1 No.	25

Source: Directorate, Department of Horticulture, Government of Mizoram.

For the year 2015-2016, fund amounting to Rs. 3833.33 lakhs was allocated to the State. New areas of activities such as Research and Development, Organic Farming and Establishment of Marketing Infrastructure for Horticulture Crops were added to be the component of the Mission and implemented as per action plan. The funding pattern for the North East States has also been made as 90:10 between Government of India and the States Government since this year.

Table No. 4.1.3: Fund Allocation and Areas of Implementation under MIDH in Mizoram for 2016-2017

Sl. No.	Component	Physical Target	Target Achieved	Financial Allocation (in Lakh)
I	Production of Planting Materials			50
II	Establishment of New Garden			
	1. Fruits			523.325
	2. Vegetables	400 Ha	400 Ha	100
	3. Mushroom (Production Unit)	1 No	1 No	20
	4. Flowers	50 Ha	50 Ha	25
	5. Spices	340 Ha	340 Ha	51
	6. 1 st Year of Maintenance for Fruits	270 Ha	270 Ha	45
III	Rejuvenation/ Replacement of Senile Plantation, Canopy Management	1600 Ha	1600 Ha	320

IV	Creation of Water Resources	162 No.	162 No.	266.3
V	Protected Cultivation			481.8
VI	Integrated Pest/Nutrient Management	15000 Ha	15000 Ha	180
VII	Horticulture Mechanization	888 No.	888 No.	186
VIII	Human Resource Development			110.77
IX	Technology Dissemination through Demonstration/Front Line Demonstration	4 No.	4 No.	100
X	Integrated Post Harvest Management	203 No.	203 No.	723
XI	Mission Management			286.9
XII	Establishment of Marketing Infrastructure for Horticulture Crops	200 No.	200 No.	30

Source: Directorate, Department of Horticulture, Government of Mizoram.

As can be seen in Table No 4.1.3, the total fund allocated for different components of the scheme during 2016-2017 was approximately 3400 lakhs. During this year of implementation, emphasis was given to Integrated Post Harvest Management by allocating more than Rs. 700 lakhs. Setting up of cold storage facilities, sorting and grading facilities etc., in different horticulture centres were the initiatives taken under this component.

Table No. 4.1.4: Fund Allocation and Areas of Implementation under MIDH in Mizoram for 2017-2018

Sl No.	Component	Physical Target	Target Achieved	Financial Allocation (in Lakh)
I	Production of Planting Materials	5 Ha	5 Ha	50
II	Establishment of New Garden			
	1. Fruits	1070 Ha	1070 Ha	1014
	2. Vegetables	560 Ha	560 Ha	140
	3. Mushroom (Production Unit)	1 No	1 No	20

	4. Flowers	20 Ha	20 Ha	10
	5. Spices	61.66 Ha	61.66 Ha	9.25
	6. 1 st Year Maintenance for Fruits	380 Ha	380 Ha	62
III	Rejuvenation/Replacement of Senile Plantation, Canopy Management	500 Ha	500 Ha	100
IV	Creation of Water Sources	690 No.	690 No.	862
V	Protected Cultivation			620
VI	Integrated Pest/Nutrient Management	19867 Ha	19867 Ha	238.4
VII	Horticulture Mechanization			186
VIII	Human Resource Development			136
IX	Technology Dissemination through Demonstration/Frontline Demonstration			225
X	Integrated Post Harvest Management			140
XI	Mission Management			798.46

Source: Directorate, Department of Horticulture, Government of Mizoram

For the implementation of eleven sub components of the scheme during 2017-2018, an allocation of Rs 4600 lakhs (approx) was assigned and utilized as per the plan. Among the horticulture crops, cultivation of fruits continued to be the activity that acquired largest fund allocation that is more than 1000 lakhs rupees. Construction of community water tanks, individual water tank etc., under the component of Creation of Water Sources and construction of different types of greenhouse under the component of Protected Cultivation are other areas of the scheme where emphasis was given.

Table No. 4.1.5: Fund Allocation and Areas of Implementation under MIDH in Mizoram for 2018-2019

Sl No	Component	Physical Target	Target Achieved	Financial Allocation (in Lakh)
I	Production of Planting Materials			20
II	Establishment Of New Garden			
	1. Fruits	600 Ha	600 Ha	348
	2. Vegetables	500 Ha	500 Ha	125
	3. Flowers	80 Ha	80 Ha	40
	4. Spices	300 Ha	300 Ha	45
	5. 1 st Year Management for Fruits	730 Ha	730 Ha	202
III	Rejuvenation/Replacement of Senile Plantation, Canopy Management	400 Ha	400 Ha	80
IV	Creation of Water Sources			450
V	Protected Cultivation			470.85
VI	Integrated Pest/Nutrient Management	13000	13000	156
VII	Horticulture Mechanization			140
VIII	Human Resource Development			174.52
IX	Integrated Post Harvest Management			50
X	Special Intervention			110
XI	Mission Management			268.4

Source: Directorate, Department of Horticulture, Government of Mizoram

As enumerated in Table No. 4.1.5, during 2018-2019, a new component that is *Special Intervention* was introduced for tackling any issues that may come up in the process of the implementation of the scheme. For this particular component, Rs. 110 lakhs was allocated and utilized. For all the components listed in the plan, Rs. 2500 lakhs (approx) was allocated and utilized. The area of land to be covered during this period was also successfully covered.

Table No. 4.1.6: Fund Allocation and Areas of Implementation under MIDH in Mizoram for 2019-2020

Sl No.	Component	Physical Target	Target Achieved	Financial Allocation (in Lakh)
I	Establishment of New Garden			
	1. Fruits	980 Ha	980 Ha	639.95
	2. Vegetables	708 Ha	708 Ha	177
	3. Spices	550 Ha	550 Ha	82.50
II	1 st Year Maintenance	500 Ha	500 Ha	110
III	Rejuvenation/Replacement of Senile Plantation, Canopy Management	500 Ha	500 Ha	100
IV	Creation of Water Sources			415
V	Protected Cultivation			244.95
VI	Human Resource Development			93
VII	Integrated Post Harvest Management			128.5
VIII	Mission Management			262.405
IX	Establishment of Marketing Infrastructure for Horticulture Crops			82.50

Source: Directorate, Department of Horticulture, Government of Mizoram

As seen in the 4.1.6, only nine components of the scheme were implemented during 2019-2020. The components in the previous years such as Production of Planting Materials, Integrated Pest/Nutrient Management, Horticulture Mechanization, Special Intervention, Mission Management were not included in the area of implementation during this year. Cultivation of flowers was also not implemented. However, the component named Establishment of Marketing Infrastructure for Horticulture Crops to assist horticulture farmers in selling off their produces was introduced once again to be an important component of the scheme.

Table No. 4.1.7: Fund Allocation and Areas of Implementation under MIDH in Mizoram for 2020-2021

Sl No	Component	Physical Target	Target Achieved	Financial Allocation (in Lakh)
I	Establishment of New Garden			
	1. Fruits	1550 Ha	1550 Ha	905.05
	2. Vegetables	700 Ha	700 Ha	175
	3. Spices	500 Ha	500 Ha	75
II	1 st Year Maintenance for Fruits	500 Ha	500 Ha	140
III	Rejuvenation/Replacement of Senile Plantation, Canopy Management	600 Ha	600 Ha	120
IV	Creation of Water Sources			550
V	Protected Cultivation			431.84
VI	Integrated Pest/Nutrient Management	10000 Ha	10000 Ha	120
VII	Horticulture Mechanization			112.5
VIII	Human Resource Development			77
IX	Integrated Post Harvest Management			244.2
X	Mission Management			258.99
XI	Establishment of Market Infrastructure for Horticulture Crops	9 No.	9 No.	123.75

Source: Directorate, Department of Horticulture, Government of Mizoram

In the year 2020-2021, the scheme was once again implemented under the eleven components listed in the plan. The components which were excluded in the last year of implementation were brought back to be the area of activities. The total amount of fund allocated during this period was Rs. 3300 lakh (approx). The target area of land was also successfully covered with the utilization of allocated fund.

Implementation of the Scheme

Mizoram is fortunate enough to be able to continue the implementation of Horticulture Mission for North East and Himalayas (HMNEH) even after it was subsumed by MIDH in 2014. As a matter of fact, MIDH was inspired by the result of the successful implementation of HMNEH by the concerned states including Mizoram. For the first year of implementation, Mizoram and other North East States, received 100% funding from the Central Government. However, from the second year of implementation (2015-2016) till date, the scheme was modified by the Government of India to be funded by both the Central Government and the State Government in the ratio of 90:10.

In Mizoram, HMNEH/MIDH has been implemented in all districts covering the length and breadth of the states. So far, thousands of farmers have been assisted since the inception of the scheme. The role being played by the District Horticulture Offices, Sub Divisional Offices and the technical staff (field staff such as Demonstrator, Circle Officer etc.) in the process of implementation of the scheme is worth mentioning. In fact, they have been the backbone of the scheme as they carry out the work of monitoring, inspecting and guiding the farmers by visiting the farmers' field even in the remotest area. As highlighted, HMNEH/MIDH has been implemented in different areas of activity, some important horticulture crops/activities which have been undertaken under the scheme since its inception are:

1. **Production of Planting Material:** Good quality planting material is necessary to have better plant capable of producing more fruits with better quality and number. Even in the case of other crops bearing no fruits, better planting materials leads to more produces with better quality. Due to global climate change, rising number and threat of pests which can cause even total failure of the cultivation of some crops, increasing demand of horticulture fruits, vegetables etc., production of more tolerant horticulture crops has become the biggest challenge of the horticulture experts. Keeping this situation in view, the Horticulture Department has been undertaking the sub components of work such as High-Tech Nursery, Import of Planting Materials, Upgradation of Nursery

Infrastructure to meet accreditation norms, Import of seeds etc. So far, about Rupees 35 (Thirty Five) lakhs has been spent covering around 38 (Thirty Eight) hectare of land under the scheme since its introduction in 2014-2015.

Photoplate No 1: Nurseries at Chite Horticulture Centre producing planting materials of Citrus, Papaya etc



(Source: R. Lalthankima, Research Scholar)

Photoplate No 2: Nursery at Chite Horticulture Centre where Scion plant/crops such as orange of different varieties, mango, Guava etc are prepared



(Source: R. Lalthankima, Research Scholar)

High Tech Nursery is nursery equipped with advanced technology having controlled temperature, advanced vending system, computerized drip irrigation etc. Since the inception of the scheme, High Tech Nurseries have been set up in three Horticulture Centres of Excellence such as Lunglei Centre of Excellence, Thiak Centre of Excellence, Thingdawl Centre of Excellence and Chite Horticulture Centre. However, as of today, nurseries under Lunglei Centre of Excellence alone can continue working as a High Tech Nursery.

Import of planting materials is also sometimes necessary to have better products as the local grown crops sometimes fail to produce desirable result. Crops like Dragon Fruit, Anthurium (Flower) etc., were imported from other states and foreign countries at the initial stage of mission implementation. These crops were not known to many in the State before they were introduced by the Horticulture Department. Apart from the contributions made by indigenous crops, the imported crops also made a tremendous contribution in the development of planting materials in Mizoram.

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 is has established nurseries in every district, division and sub division 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:** Since the inception of the mission, development of the cultivation of fruits has been given special emphasis to be an important component of the scheme. Dragon Fruit, Kiwi, Papaya, Banana, Mandarin Orange, Strawberry, Grape, Mango, citrus fruits etc., are the fruits covered under the scheme. Four sub components of the scheme such as Establishment of New Gardens, First Year of Maintenance, Second Year of Maintenance and Rejuvenation/Replacement of Senile Plantation, Canopy Management have been implemented for the development of fruits. Since the introduction of the Mission, about Rs. 7116 lakh has been spent covering about 22130 hectare of land.

Photoplate No. 3: Farms of Lalzarliana, Kolasib District, where Dragon Fruits are cultivated under MIDH



(Source: R. Lalthankima, Research Scholar)

Photoplate No. 4: Beneficiary of MIDH is harvesting his hard work at Serchhip District.



(Source: R. Lalthankima Research Scholar)

Photoplate No. 5: Orange has been one of the most important horticulture crops undertaken under MIDH. Location: Serchhip District



(Source: R. Lalthankima, Research Scholar)

3. **Vegetable:** Vegetable has been an important part of the scheme since the first year of its implementation. About Rs. 1551 lakhs has been spent covering more than 5881 hectare of land for the production of vegetables for the entire State under the scheme. Production of different vegetables such as Tomato (Greenhouse and Open), Off-season Cabbage, Chinese Cabbage, Broccoli, Lady's finger, Bean, Capsicum etc., are undertaken. To produce more vegetables, the Department has imported hybrid seeds of different vegetables from other states.

Photoplate No.6: Tomato under protected cultivation (Greenhouse) - Lalpiannghaka's, Greenhouse at Serchhip District, a beneficiary of MIDH (Vegetable).



(Photo: Lalnunzira, Beneficiary of MIDH, Serchhip District)

Photoplate No. 7: Cultivation of Chinese Cabbage under MIDH at Hualtu, Serchhip District. Greenhouse of Mr. Vanlalhmuaka, one of the beneficiaries of MIDH (Vegetable)



(Source: Vanlalhmuaka, Beneficiary of MIDH, Serchhip District)

Photoplate No. 8: Lalmuanpuia Sailo's Farm-Cultivation of Off-Season Cabbage under MIDH at Hualtu, Serchhip District



(Source: Lalmuanpuia Sailo, Hualtu, Serchhip)

4. **Flower:** Cultivation of Anthurium, Rose etc., was undertaken under one of the component, *Flower*, from the start of the scheme till 2018-2019. About 272 hectares of land had been covered by spending more than Rupees 454 lakh. Anthurium has now become one of the most popular flowers in the State since it was imported from Holland in 2006. This flower has been exported to other states and foreign countries as well. The intervention of MIDH has greatly boosted the production. It is in high demand for many occasions and events such as funeral, wedding, government events etc.

Photoplate No. 9: Pi Lalramhluni's cultivation of Anthurium at Kolasib, Kolasib District. She is one of the beneficiaries under flower component of MIDH



(Source: R. Lalthankima, Research Scholar)

5. **Spice:** Cultivation of Spices have been an integral part of MIDH and undertaken every year since its inception. Turmeric, Chilli (Seed Spice), Ginger etc., have been chosen as the spices for implementation. So far, about 2812 hectare of land has been covered with an expenditure of approximately Rs. 454 lakhs.
6. **Mushroom:** Under MIDH, mushroom cultivation was undertaken only for three years between 2015-16, 2016-2017 and 2017-18. During the implementation, Oyster Mushroom alone had been taken up. In order to promote mushroom

cultivation, the Department had set up nurseries for mushroom at Chite Horticulture Centre (Aizawl District), Lunglei, Tuidam (Mamit District), Champhai, and Thingdawl (Kolasib District) where farmers can collect planting material (Spawn) on subsidized price.

7. **Aromatic Plant:** Realizing the necessity of essential oils for the well being of man, cultivation of aromatic plants was included to be a part of the scheme. However, it was included only for two year, that is, 2014-2015 and 2015-2016. Aloe Vera and Citronella cultivation were undertaken under this component. About Rs. 20 lakhs was spent to cover 50 hectare of land during the period of implementation.
8. **Creation of Water sources:** Abundant supply of water is a prerequisite for the successful cultivation of any crop. Though Mizoram is receiving abundant supply of rainfall during monsoon season, practicing cultivation of fruits and vegetables during the dry season has always been a tedious task except for those who have farms on the river banks. Keeping in view this difficult situation, the sub-copoment 'Creation of Water Sources' under MIDH has been carried out every year to make water available for farmers particularly those who are dealing with winter crops/Rabi crops. So far, 44 community water tanks in different villages have been constructed with an expenditure of Rs. 1100 lakhs, water harvesting system for individuals has also been carried out under which about 3093 individual water tanks were constructed with an expenditure of more than Rs. 2783 lakhs. At the initial stage of implementation of the scheme, individual water tanks were of Reinforced Cement Concrete (RCC). Later, prefabricated and Geomembrane tanks have been provided to farmers. The capacity of individual water tank provided to farmers under MIDH is 15000-20000 litre.
9. **Protected Cultivation:** Cultivation of horticulture crops under protected area (Greenhouse and Shade House) has become popular in Mizoram especially after the introduction of the Centrally Sponsored Schemes like MIDH/HMNEH, RKVY etc., as these schemes provide more funds for the purpose. Greenhouses and Shade Houses (Protected Cultivation) are used to cultivate crops mostly in

order to protect them from extreme climate and weather such as intense heat, cold, storm, excessive rainfall etc. They are also used to grow crops during off-season. Tomatoes, Beans, Anthuriums, Roses etc., are some crops cultivated under protected environment in the state. Production of quality planting material of vegetables, fruits and flowers is also carried out in protected cultivation. Since the inception of the scheme, a number of Greenhouses (Tubular Structure), Shade Net Houses (Wooden Structure) covering more than 12,91,882 sq.m have been constructed with an expenditure of Rs. 2,263 lakhs. The funds available under this Protected Cultivation are also being utilized for the cost of planting materials of high value vegetables grown in poly houses.

Photoplate No. 10: Greenhouse of Mr. Lalbiakruala, one of the beneficiaries of MIDH, where Tomato has been cultivated.



(Source: R. Lalthankima, Research Scholar)

Photoplate No. 11: Scion Bank of Citrus fruits mango, papaya etc., under protected environment (Greenhouse Nursery) for experiment/trial to produce quality planting materials. Location: Chite Horticulture Centre, Aizawl



(Photo: R. Lalthankima, Researcher)

10. **Promotion of Integrated Pest Management (IPM):** Most horticulture crops need special care to produce more. However, these crops have many enemies which can adversely affect their productivity and cause even their death. Pests of different kinds have been the worst enemy of fruits and vegetables since time immemorial. To meet this challenge, Pest Management has been an integral part of the scheme since the first year of implementation. So far, an amount of Rs. 304 lakh has been spent to cover more than 25,396 hectare of land. Under Integrated Pest Management, distribution of pesticides alone has not been the activity, but imparting knowledge through trainings, demonstrations, monitoring and inspections on how to handle these chemicals have also been given special attention.
11. **Promotion of Integrated Nutrient Management (INM):** Another measure which has been taken up for special care of the horticulture crops is to provide abundant supply of fertilizers and other nutrients. Soil loses its fertility after two or three years of cultivation. In order to ensure better growth and better

productivity of crops, soil fertility has to be maintained. Under MIDH, Promotion of Integrated Nutrient Management has been undertaken every year from the start of the implementation of the scheme. So far, more than 62,235 hectare of land has been covered by spending more than Rs. 746 lakhs for this purpose.

12. **Pollination Support through Beekeeping:** Bees are known as great pollinators since long time back. Their contribution to the growth of horticulture has also been acknowledged. Honey bee Colony and Bee Hives were undertaken under MIDH in 2014-2015 and 2015-2016. More than Rs. 30 lakh was spent to distribute about 4,335 ready-made boxes (beehives) to the Apiarists.
13. **Horticulture Mechanization:** The application of machines could bring desirable changes in respect of land preparation, weeding and even in the process of harvesting. The use of machine means faster work within lesser time, quality product, lesser demand for man power etc. Thus, mechanization of horticulture has become an important aspect of MIDH/HMNEH in Mizoram. So far, funds amounting to more than 838 lakhs rupees has been spent to purchase more than 4800 machines and equipments such as Power Tillers (8 bhp and above), Power Tillers (below 20 bhp) for land development - tillage and equipments for seed bed preparation, digging, planting and sowing. These purchased machines were later distributed to the farmers at subsidized rate.

Photoplate No. 12: Beneficiaries of MIDH under the component of Horticulture Mechanization received Power Tiller at subsidized rate



(Source: Department of Horticulture, Government of Mizoram)

14. **Human Resource Development:** Development of man power 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

Photoplate No. 13: Training of horticulture farmers at District Horticulture Office, Serchhip



(Source: Department of Horticulture, Government of Mizoram)

Photoplate No. 14: Training of Department Officers at Orange Orchard, Rulpuihlim



(Source: Department of Horticulture, Government of Mizoram)

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 has been spent to undertake the following activities under the component -Integrated Post Harvest Management.

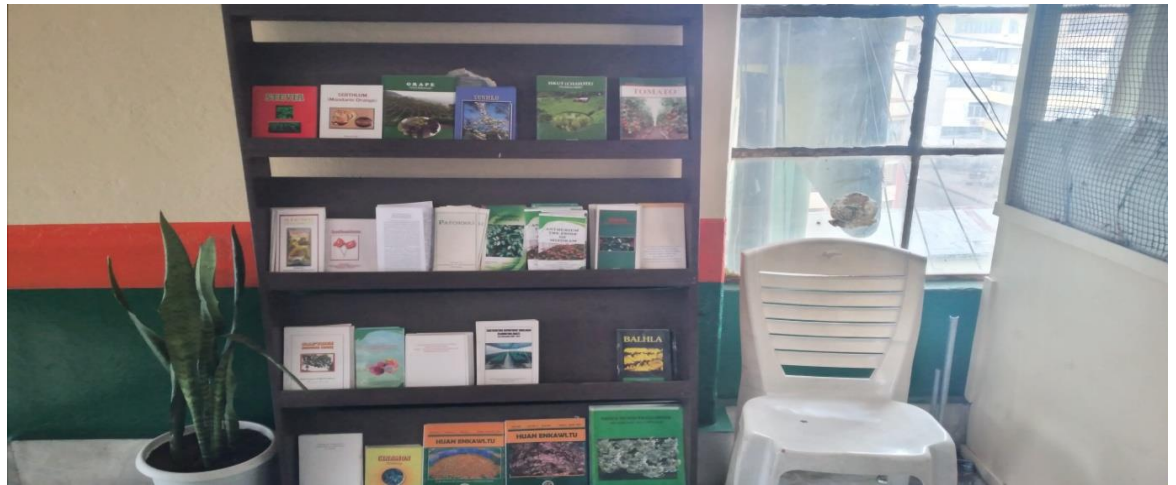
- a) Construction of 169 Pack Houses (9mx6m) at the expense of Rupees 338 lakhs.
- b) Construction of 1741 Pusa Zero energy cool chambers (100kg) by spending Rupees 34 lakhs (approx).
- c) Construction of 73 Evaporated/low energy cool chambers (8mt) with the expenditure of more than Rupees 180 lakhs.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

Photoplate No. 15: A collection of books/leaflets on horticulture crops displayed at the Directorate. These books/leaflets can be collected by farmers free of cost



(Source: R. Lalthankima, Research Scholar)

Photoplate No. 16: Lawngtlai Horticulture Division display their products at Horticulture Fair, 2015



(Source: Department of Horticulture, Government of Mizoram)

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 road sides, 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.

Photoplate No. 17: Fruits and vegetables vendors selling their items on Mobile Vending Carts



(Source: R. Lalthankima, Research Scholar)

Photoplate No. 18: Rural Market at Lengte, Mamit District



(Source: R. Lalthankima, Research Scholar)

18. **Research and Development:** This component of work had been carried out in 2015-2016 only. Rs. 23 lakhs was 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 was 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.

Rashtriya Krishi Vikas Yojana (RKVY)

More than 50 per cent of the labour force of the country still depends upon agriculture for their livelihood. Slow growth in agriculture and allied sectors can lead to severe strain in the economy because the population dependent upon this sector is still very large. The main reason behind the slow growth in agriculture is the consistent decrease in investments in the sector by the state governments. While public and private investments are increasing in sectors such as infrastructure, similar investments are not coming in agriculture and allied sectors, leading to distress among the community of farmers, especially those of the small and marginal sections. Hence the need for the states to increase their investments in the agriculture and allied sectors has been felt.

RKVY was initiated by National Development Council (NDC) in 2007 to be an umbrella scheme to ensure holistic development of agriculture and allied activities. It was the outcome of the concern of NDC on the slow progress in the field of agriculture and allied activities. The NDC resolved that strategies for agricultural development should be reoriented and redirected to meet the needs of farmers and called upon the Central and State governments to initiate a new strategy to revitalize agriculture. The NDC reaffirmed its aspiration to achieve at least 4 per cent annual growth in the agricultural sector during the 11th plan. Every state is eligible for fund allocation under RKVY if the state is maintaining or increasing the State Plan expenditure for Agricultural and Allied sectors in its total State Plan. Further, it was also required of the states to formulate District Agriculture Plan (DAP) and State Agriculture Plan (SAP). The scheme was implemented as an Additional Central Assistance to State Plan Scheme with 100 percent Central assistance. However, the funding pattern was changed with the launch of Rashtriya Krishi Vikas Yojana- Remunerative Approaches for Agriculture and Allied Sector Rejuvenation (RKVY-RAFTAAR) in 2017 in the ratio of 60:40 between the Centre and the State, 90:10 for North Eastern States and 100 percent

central grant for UTs. (Operational Guidelines of Rashtriya Krishi Vikas Yojana-Remunerative Approaches for Agriculture and Allied Sector Rejuvenation, 2017. p. 2)

RKVY was formulated with some important objectives:

1. To incentivize the states to increase their investments in agriculture and allied activities.
2. Providing flexibility and autonomy to states in planning and implementing agriculture and allied service schemes.
3. Ensuring agriculture plans for the district and state are based on agro-climatic condition, available technology and natural resources.
4. To give priority to local crops in agricultural plan of the state.
5. To reduce the yield gap in important crops.
6. Maximizing returns to farmers in agriculture and allied activities.
7. To address the agriculture and allied sectors in an integrated manner to bring about measurable changes in production and productivity. (RKVY Operational Guidelines, 2014. p. 1)

RKVY continue to be executed as a state plan. DAP and SAP has been made the cornerstone for formulation of planning and implementation of the scheme. Some sectors specified by the Planning Commission for the basis of expenditure are Crop Husbandry including Horticulture, Animal Husbandry and Fisheries, Dairy Development, Agriculture Research and Education, Forestry and Wildlife, Plantation and Agricultural Marketing, Food Storage and Warehousing, Soil and Water Conservation etc. Under RKVY, every state is required to constitute State Level Project Screening Committee (SLPSC) to be headed by Agriculture Production Commissioner or any officers appointed by the Chief Secretary. SLPSC screens all proposals in accordance with the guidelines of RKVY. It also screen all Detailed Project Reports (DPRs) prepared by different departments for suitability and adherence to the guidelines (RKVY Operational Guidelines, 2014). State Level Sanctioning Committee (SLSC) is

also constituted to sanction project proposals recommended by SLPSC. It is headed by the Chief Secretary of the State with at least one representative of the Government of India in a meeting.

Taking into consideration the feedbacks from States and experiences in the implementation of the scheme, the Government of India decided to continue RKVY in November 2017 and renamed it as Rashtriya Krishi Vikas Yojana- Remunerative Approaches for Agriculture and Allied Sector Rejuvenation (RKVY-RAFTAAR). This scheme was launch to be implemented within three year from 2017-2018 to 2019-2020 with some new objectives. RKVY-RAFTAAR aims at (i) making farming a remunerative economic activity through strengthening the farmers' effort, risk mitigation and promoting agri-business entrepreneurship and (ii) to strengthen the farmer' efforts through creation of required pre and post-harvest agri-infrastructure that increases access to quality inputs, storage, market facilities etc., and enables farmers to make informed choices. The matching share for expenditure between Centre and State has been made as 60:40 but in the case of North East States, it is 90:10. (RKVY-RAFTAAR Operational Guidelines 2017-2020. P.2)

Horticulture Sector under RKVY in Mizoram

Horticulture has been one of the most important sectors under RKVY since the inception of the scheme. In Mizoram, the Department of Horticulture has been entrusted the role of being the implementing agency of the horticulture sector. The Department started to implement the scheme since 2010-2011.

During 2010-2011, the scheme was implemented in six horticulture divisions of the time namely, Aizawl, Saiha, Kolasib, Lawngtlai, Tuidam (Mamit District) and Khawzawl (Champhai District). The component of the scheme called Rain Water Harvesting Structure was undertaken in the Aizawl, Saiha, Kolasib and Lawngtlai divisions. A total of 18 structures were constructed by spending a total amount of Rs. 22.50 lakh only in these divisions. In Tuidam and Aizawl divisions, the component of the scheme called Stream Water Harvesting Structure was implemented. In these divisions, five structures/tanks were constructed with a total amount of Rs. 5 lakh only.

Khawzawl and Aizawl division had also undertaken the works of the establishment of Market Infrastructure. To undertake this component of works, Rs. 57 lakh only had been spent to construct four markets.

Table No. 4.2.1: Items of Work/Component of the Scheme undertaken during 2011-2012 under Horticulture Sector of RKVY

<i>Sl No</i>	<i>Items of work undertaken</i>	<i>District/Division</i>	<i>Amount Spent (in lakh)</i>
1	90 Protected Cultivation (Green House)	All Divisions except Lawngtlai & Saiha	45 (approx)
2	43 Protected Cultivation (Shade House)	All Divisions except Lawngtlai & Saiha	21 (approx)
3	Baseline Survey (under NVIUC)	All Divisions except Lawngtlai & Saiha	7 (approx)
4	Promotion of 35 Farmers Producer Organizations (FPO)	All Divisions except Lawngtlai & Saiha	56 (approx)
5	Trainings of Farmers	All Divisions except Lawngtlai & Saiha	10 (approx)
6	10 Vegetable Cultivation (Open pollinated and Hybrid)	All Divisions except Lawngtlai & Saiha	33 (approx)
7	73 Protected Cultivation (Green House/Shade House)	All Divisions except Lawngtlai & Saiha	36 (approx)

Source: Directorate, Department of Horticulture, Government of Mizoram

Total fund allocated for the implementation of the scheme during 2011-2012 was Rs. 211.125 lakhs. All items of works were implemented in all horticulture divisions except Lawngtlai and Saiha divisions. As the Central Government had given special emphasis on enhancing vegetable production, National Vegetable Initiative for Urban Clusters (NVIUC) had also been introduced as an important component of the RKVY. Under NVIUC, four items of works such as Baseline Survey, Promotion of FPO, Training of Farmers and Vegetable Cultivation were implemented during this period.

During 2012-2013, the fund allocated to the horticulture sector was increased manifold. The activities undertaken were also remarkably increased. During this period, total fund allocated to horticulture sector was Rs. 1951 lakhs to undertake 14 items of work.

Table No. 4.2.2: Items of Work/Component of the Scheme undertaken during 2012-2013 under Horticulture Sector of RKVY

<i>Sl No</i>	<i>Items of Work undertaken</i>	<i>District/Division</i>	<i>Amount Spent (in lakh) (approx)</i>
1	323 Protected Cultivation of Green Houses	All Divisions except Lawngtlai & Saiha	302
2	249 (approx) acre of land for Spices Crop Bench Terrace	All Divisions except Lawngtlai & Saiha	249
3	Construction of 250 Individual Rain Water Tanks	All Divisions except Lawngtlai & Saiha	257
4	Construction of 12 Community Water Tanks	All Divisions except Lawngtlai & Saiha	207
5	Construction of 6 Rural Market Sheds	All Divisions except Lawngtlai & Saiha	60
6	400 hectare of land for Captive Plantation such as Mandarin Orange, Passion Fruit, Grape, Pineapple	All Divisions except Lawngtlai & Saiha	454
7	Preparation of 140 acre of land for Vegetable crop Bench Terrace	All Divisions except Lawngtlai & Saiha	94
8	Up-gradation & Extension of multi crop Nursery at Thingdawl Horticulture Farm	Kolasib	35

9	Promotion of 50 Farmer Interest Groups (FIG)	All Divisions except Lawngtlai, Saiha and Serchhip	29
10	Training of 700 Farmers	All Divisions except Lawngtlai, Saiha and Serchhip.	10
11	Construction of 4 Retail Shops	Aizawl, Lunglei & Kolasib	20
12	To cover 575 area of land under Integrated Nutrient Management (INM)/ Integrated Pest Management (IPM)	All Divisions except Lawngtlai, Saiha and Serchhip	5
13	To cover 1102 area of land under Vegetable Cultivation such as Open Pollinated & Hybrid	All Divisions except Lawngtlai, Saiha and Serchhip	166
14	Setting up of Protected Cultivation such as 26 Green Houses 26 Shade Houses.	All Divisions except Lawngtlai, Saiha and Serchhip	60

Source: Directorate, Department of Horticulture, Government of Mizoram

All these items of works were carried out in all horticulture divisions except in Lawngtlai and Saiha. Serchhip Division was also excluded in some components.

Photoplate No. 19: Tomato cultivation in Greenhouse of Pi B. Lalsawmliani-one of the beneficiaries of RKVY, Kolasib Division



(Source: R. Lalthankima, Research Scholar)

During 2013-2014, in Mizoram, Rs. 649.230 lakhs had been spent for the horticulture sector under RKVY. The important horticulture activity such as the cultivation of Aromatic and Medicinal Plants (Aloe Vera, Cintronella) which was implemented in Serchhip district was, for the first time, introduced as one of the components of the scheme. The activities undertaken during this period were:

Table No. 4.2.3: Items of Work/Component of the Scheme undertaken during 2013-2014 under Horticulture Sector of RKVY.

<i>Sl No</i>	<i>Items of Work undertaken</i>	<i>District/Division</i>	<i>Amount Spent (in lakh) (approx)</i>
1	Cultivation of Vegetable Crops (Open Pollinated) to cover 148 (approx) hectare of land	All Divisions except Lawngtlai & Saiha	148
2	Cultivation of Vegetable Crop (Hybrid) covering 198 (approx) hectare of land	All Divisions except Lawngtlai & Saiha	66
3	Cultivation of Aromatic & Medicinal Plant covering 53 (approx) hectare of land	Serchhip	30
4	Construction of 6 Storage Go-down	All Divisions except Lawngtlai & Saiha	60
5	Establishment of 100 Greenhouses	All Divisions except Lawngtlai, Saiha and Tuidam (Mamit District)	159
6	6 Portable Pack Houses	All Divisions except Lawngtlai & Saiha	60
7	Construction of 60 Individual Water Tank	All Divisions except Lawngtlai & Saiha	61
8	Cultivation of Fruit Crop- Mandarin Orange covering 155 hectare of land	All Divisions except Lawngtlai & Saiha	93

Source: Directorate, Department of Horticulture, Government of Mizoram

Photoplate No. 20: Cultivation of Vegetable Crops under RKVY: Field of Pu Lalmuanpuia, Serchhip Division



(Source: R. Lalthankima, Research Scholar)

National Vegetable Initiative for Urban Clusters (NVIUC) also continued to be an important component of the scheme with an expenditure of 85 lakhs rupees taken out of the total fund allocated. The activities undertaken under NVIUC during this period were:

1. Formation of 50 Farmers Interest Groups (FIGs) with expenditure of Rs. 60 lakhs.
2. Cultivation of Hybrid Vegetable covering 30 hectare of land by spending Rs. 10 lakhs.
3. Formation of Farmers Producer Organization (FPO) by the Directorate, Department of Horticulture with the allocation of fund-Rupees 35 lakhs

4. INM/IPM covering 448 hectare of land with expenditure of Rs. more than 4 lakhs.
5. Organizing 55 trainings for Farmers with expenditure of Rs. 10 lakhs.
6. Technical Support from Directorate, Department of Horticulture at the cost of Rs. 6 lakhs.

During 2014-2015, cultivation of fruit crops and infrastructure development continued to be an important target of the scheme. Rs. 1425 lakh was allocated to undertake 17 horticulture activities including 8 items of work under NVIUC. All districts except Lawngtlai and Saiha were once again selected for the implementation of the scheme. Cultivation of fruit crops like Dragon fruit and Strawberry and construction of Horticulture Link Road were added as new component of the scheme. From this period, the scheme was usually divided into four sub-components having different items of works. The component/items of activities undertaken during 2014-2015 were as follows:

Table No 4.2.4: Items of Work/Component of the Scheme undertaken during 2014-2015 under Horticulture Sector of RKVY.

<i>SL No</i>	<i>Item of Work</i>	<i>District/Division</i>	<i>Amount Spent (in Lakh) (approx)</i>
1	40 hectare of land under the cultivation of mandarin orange without Drip Irrigation	All Division except Lawngtlai & Saiha	200
2	160 hectare of land under Cultivation of Dragon Fruit	Aizawl, Lunglei and Mamit	100
3	Cultivation of Strawberry without Drip Irrigation covering 80 hectare of land	Aizawl & Mamit	50
4	Cultivation of Hybrid Vegetable	All divisions except	180

	Crops covering 720 hectare of land	Lawngtlai and Saiha	
5	Promotion of INM/IPM covering 5000 hectare of land	All divisions except Lawngtlai and Saiha	60
6	Training of Farmers within the state	All divisions except Lawngtlai and Saiha	10
7	Construction of Tubular Structure Greenhouse	All divisions except Lawngtlai and Saiha	284
8	Construction of Individual Rain water Storage Tank	All divisions except Lawngtlai and Saiha	216
9	Construction of 25 km horticulture link road	All divisions except Lawngtlai and Saiha	125

Source: Directorate, Department of Horticulture, Government of Mizoram

Items of works under NVIUC were again made an integral part of the scheme acquiring 200 lakhs rupees allocation. However, they were implemented in Aizawl and Lunglei district only. The components of the scheme implemented under NVIUC were:

1. Construction of 5140 sq.m. Greenhouse (Tubular Structure) at the cost of Rs. 80 lakhs
2. Cultivation of Hybrid Vegetable covering 286 hectare of land with expenditure of Rs. 71 lakhs
3. Promotion of INM/IPM covering 710 hectare of land at the cost of Rs. 8 lakhs
4. Construction of 5 Pack House at the cost of Rs. 10 lakh
5. Setting up of 2 Evaporation/Low Energy Cool Chamber at the cost of Rs. 5 lakhs
6. Construction of 10 Low cost Onion Storage Structure at the cost of Rs. 8 lakhs
7. Training of 600 Farmers within the state at the expense of Rs. 6 lakhs

8. Technical Support-Group Management from the Directorate, Department of Horticulture for Rs. 10 lakhs.

During 2015-2016, the horticulture activities undertaken were comparatively less but still covering all the districts that it covered in the previous years. The fund allocated was also comparatively less at Rs. 235.50 lakh only. During this period, the scheme was broken up into 6 components only. They were:

Table No. 4.2.5: Items of Work/Component of the Scheme undertaken during 2015-2016 under Horticulture Sector of RKVY.

<i>Sl No</i>	<i>Item of Work</i>	<i>District/Division</i>	<i>Amount Spent (in Lakh) (approx)</i>
1	Cultivation of Vegetable Crops (Hybrid) covering 400 ha of land	All division except Lawngtlai and Saiha	100
2	Promotion of INM/IPM covering 2000 ha of land	All division except Lawngtlai and Saiha	24
3	Training of 500 Farmers	All division except Lawngtlai and Saiha	0.98
4	Technical Support Group Management & Monitoring	From Directorate	3.5
5	Construction of 3000 Tubular Structure Green Houses	All division except Lawngtlai and Saiha	36
6	Construction of 51 Individual Rainwater Storage Tank.	All division except Lawngtlai and Saiha	45

Source: Directorate, Department of Horticulture, Government of Mizoram

During 2016-2017, Rs. 239 lakh was allocated towards horticulture sector to undertake 18 items of activities. New items such as cultivation of new variety of papaya (Red Lady), leveling preparation of bed for land development etc., were added as components of the scheme. The components/items of work undertaken during this period were as follows:

Table No. 4.2.6: Items of Work/Component of the Scheme undertaken during 2016-2017 under Horticulture Sector of RKVY.

<i>Sl No</i>	<i>Items of Work</i>	<i>District/Division</i>	<i>Amount Spent (in Lakh) (approx)</i>
1	Cultivation of High Value Vegetables under Protected Cultivation covering 1900 sq.m. of land.	Aizawl, Lunglei and Kolasib	13
2	Land Development including leveling preparation of bed covering 20000sq.m. of land	Aizawl, Lunglei and Kolasib	3
3	Farm Input	Aizawl, Lunglei and Kolasib	9
4	Training of 1500 farmers	All division except Lawngtlai and Saiha	15
5	Cultivation of Papaya (Red Lady) covering 51 acre of land.	Srchip, Khawzawl and Tuidam (Mamit District)	63
6	Construction of 3 Training Halls	Aizawl, Lunglei and Kolasib	21

7	Construction of 15 Farm Houses for Trainers under Farmers Training Centre	Aizawl, Lunglei and Kolasib	15
8	Construction of 15 Individual water Tanks	Aizawl, Lunglei and Kolasib	13
9	Installation of Green House covering 3438 sq.m. of land.	Aizawl and Lunglei	33
10	Training Material	Aizawl, Lunglei and Kolasib	0.6
11	Training Equipment	Aizawl, Lunglei and Kolasib	1.5
12	Construction of Pack House for Zo Anthurium Growers Society (ZAGS)	Aizawl	4
13	Setting up of Cold Room of 30MT Capacity	Aizawl	15
14	Packaging Material	Aizawl	6.5
15	Packing and Grading	Aizawl	7
16	Installation of Greenhouse covering 1701 sq.m. in Flagship District	Aizawl	16

17	Micro Irrigation-Drip Irrigation and Sprinkler Irrigation covering 19520sq.m.	Aizawl	1
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Source: Directorate, Department of Horticulture, Government of Mizoram

For the period 2017-2018, fund amounting to Rs. 95.13 lakh was allocated to the horticulture sector to undertake 3 items of work. The setting up of Plant Health Clinic in Lunglei, Serchhip and Kolasib is the new activity implemented under the scheme during this period. The other items of activity such as Cultivation of Vegetable Crops (Hybrid) and organization of Training of Farmers in all districts were also undertaken.

Table No. 4.2.7: Items of Work/Component of the Scheme undertaken during 2017-2018 under Horticulture Sector of RKVY.

<i>Sl No</i>	<i>Items of Work</i>	<i>District/Division</i>	<i>Amount Spent (in Lakh) (approx)</i>
1	Cultivation of vegetable crops (Hybrid) covering 48 ha. of land	All divisions except Lawngtlai and Saiha	12
2	Training of farmers within the state	Lunglei, Serchhip and Kolasib	8
3	Organization of 3 Plan Health Clinic	Lunglei, Serchhip and Kolasib	75

Source: Directorate, Department of Horticulture, Government of Mizoram

RKVY has been formulated to be implemented till 2018 but the Government of India decided to continue it with a new name - Rashtriya Krishi Vikas Yojana- Remunerative Approaches for Agriculture and Allied Sector Rejuvenation (RKVY-RAFTAAR) for the year extending up to 2019-2020. Mizoram, along with the North East States, also automatically continued with the implementation of the scheme with all allied sectors under the scheme.

As can be seen in Table 4.2.8, for the horticulture sector during 2018-2019, Rs.120.33 lakh fund was allocated to the state of Mizoram to undertake 12 items of horticulture activity. Mamit District was chosen to be the only area for carrying out those activities. During this period, the scheme had been broken up into 4 sub-components under which the following activities were taken up:

Table 4.2.8 Items of Work/Component of the Scheme undertaken during 2018-2019 under Horticulture Sector of RKVY-RAFTAAR.

<i>Sl No</i>	<i>Items of Work</i>	<i>District/Division</i>	<i>Amount Spent (in Lakh) (approx)</i>
1	Cultivation of Turmeric (Pre-Harvest) covering 10 ha. of land	Mamit	3
2	Cultivation of Turmeric (Post-Harvest)- Construction of Solar Tunnel Dryer, Plastic Crates and Garden Tool Kit	Mamit	5
3	Cultivation of Turmeric-Value Addition	Mamit	12
4	Purchase of Packing Material of Processed Turmeric and Technical Support (under Flexi Fund)	Mamit	3
5	Enhancement of productivity for plantation and Fruits	Mamit	6
6	Construction of Collection Centre	Mamit	25

7	Distribution of Plastic Crates	Mamit	4
Activities undertaken under the Sub-Component- Value Addition Linked Production Projects			
8	Construction of Fermentation Tank Cum Community Water Tank at Zamuang, Tuidam Division, Mamit District	Mamit	43
9	Site Development for Construction of Community Water Tank at Zamuang, Tuidam Division, Mamit District	Mamit	2.7
10	Fencing of Collection Centre/Fermentation Tank Premises	Mamit	8
11	Group Management, Stationery, Survey, Investigation etc., for Technical Support Group	Mamit	5.6
12	Farmers' Trainings within the state	Mamit	2

Source: Directorate, Department of Horticulture, Government of Mizoram

During 2019-2020, horticulture sector under the scheme was implemented with a fund amounting to 107.93 lakhs rupees. Like the previous year, it was broken up into four sub-components under which 9 items of activity were taken up. Spices, particularly

turmeric and storage of water at a large scale continued to acquire an important place in component of the scheme. The following are the areas of activity during 2019-2020:

Table No. 4.2.9: Items of Work/Component of the Scheme undertaken during 2019-2020 under Horticulture Sector of RKVY-RAFTAAR.

<i>Sl No</i>	<i>Items of Work</i>	<i>District/Division</i>	<i>Amount Spent (in Lakh) (approx)</i>
1	Turmeric Cultivation covering 50 ha of land	Mamit	15
2	Enhancement of Productivity of plantation and Fruit Crops	Mamit	15
3	Construction of 200 Tunnel Dryer (Solar)	Mamit	10
4	Plastic Crates for Handling Turmeric Rhizomes/Fingers	Mamit	5
5	Purchase of Garden Tool Kit for Turmeric	Mamit	3.4
6	Construction of Community Water Tank cum Fermentation tank for Fruit Crops at Tuidam Village	Mamit	43
7	Earth Cutting and Leveling for development of Community Water Tank	Mamit	3.5

8	Technical Support-Group Management, Stationery, Survey, Vehicle Hiring, Investigation etc.	Mamit	12
9	Training of Farmers within the state	Mamit	1

Source: Directorate, Department of Horticulture, Government of Mizoram

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

In India, only about 48 percent of net agricultural area has been covered under irrigation and the remaining areas are still dependent on rainfall (unirrigated area). This leads to the less productivity of agriculture and its allied activities. To expand cultivable area under assured irrigation, to reduce water wastage and to improve efficiency in water usage, the Government of India formulated PMKSY in 2015. The program was launched on 1st July, 2015 with an expectation to encourage farmers to invest more in farming leading to improve productivity and increase farm income. It focuses on both creating sources of water for assured irrigation as well as creating protective irrigation. Micro irrigation has been given paramount importance for maximizing efficiency in water usage at farm level.

PMKSY has four components. In fact, some of them were on-going programs which were subsumed under PMKSY and implemented by different implementing agencies:

1. Accelerated Irrigation Benefit Programme (AIBP). It was launched by the Government of India in 1996-1997 to provide assistance of the Central Government to major and medium irrigation projects of the State and Central Government. When the Union Government introduced PMKSY, AIBP was subsumed to be one its components.

2. PMKSY (Har Khet ko Pani): It focuses on augmentation of sources of water, development of ground water, deviation of water from areas where there is plenty of water to areas where water is scarce, supplementation of rain water beyond IWMP and MGNREGA, recreation of traditional water bodies etc.
3. PMKSY (Per Drop More Crop): It focuses on micro water storage structure, efficient water transportation, and accuracy of irrigation system, covering input cost beyond MGNREGA permissible limits, secondary storage, water lifting devices, additional activities, coordination and management.
4. PMKSY (Watershed Development): It focuses on ridge area management, drainage line management, conservation of soil and moisture, rainwater harvesting structure, undertakings of livelihood support etc.

PMKSY is designed to be supervised and monitored by National Steering Committee (NSC) chaired by Prime Minister and National Executive Committee (NEC) chaired by the Vice Chairman, NitiAayog. At the state level, PMKSY is of a three-tier structure. At the apex, there is a State Level Sanctioning Committee (SLSC) headed by the Chief Secretary. At the intermediate level, there is an Inter-Departmental Working Group (IDWG) chaired by Agriculture Production Committee or Development Commissioner. There are also District Level Implementing Committees (DLICs) chaired by District Collector/Magistrate. Direct Benefit Transfer (DBT) is utilized for the implementation of the scheme. The pattern of assistance to be paid to farmers under the scheme is 55 percent for small and marginal farmers and 45 percent for other farmers. This will be met by both Central Government and State Government in the ratio of 60:40. But in the case of states in the North East and Himalayas, the ratio of sharing is made 90:10. For the Union Territories, it is 100 percent grant from the Central Government.

District Irrigation Plans have been given great significance for successful planning and implementation of PMKSY as it can identifies gaps in irrigation chain, assessing available resources and resources that can be added from the on-going scheme of both State and Central Government. The scheme is monitored through web-portal of

PMKSY designed by the Central Government. All states and union territories are required to upload their physical and financial progress during the preceding month on the said portal by 5th of every month. (Operational Guidelines of Per Drop More Crop (Micro Irrigation) PMKSY 2017. p.5).

PMKSY in Mizoram

PMKSY has become an important scheme in a state like Mizoram where agriculture and its allied activities are almost solely dependent on rainfall. Till the recent past, almost all the productions were of monsoon season except for very few crops such as Chilli, Bitter Gourd, Brinjal etc. The formulation and implementation of PMKSY has already brought a significant change in the pattern and productivity of agriculture as well as horticulture in the state. All of the scheme's components are being implemented by different department in different parts of the State. The Department of Agriculture has been assigned as the Nodal Department under which components of the scheme are distributed among the different departments. The following are the components of the scheme and their implementing agencies in Mizoram

1. PMKSY (Har Khet Ko Pani) by Irrigation & Water Resource Department
2. Accelerated Irrigation Benefit Programme (AIBP) by Irrigation & Water Resource Department.
3. ***PMKSY (Per Drop More Crop) by Horticulture Department.***
4. Special Intervention by Department of Agriculture
5. Watershed Development by Rural Development Department

Among the implementing agencies of the scheme, the Department of Horticulture has been assigned the task of implementing the component-**Per Drop More Crop (Micro Irrigation)**. The Department has been implementing the scheme since the inception of the scheme in 2015.

During 2015-2016, the scheme was broken up into 4 items. All these items were implemented in all divisions including Lawngtlai and Saiha where District Councils are in operation. Rs. 252 lakh fund was allocated to implement all these items. The

following were the areas of activities/items undertaken in the implementation of the scheme;

1. **Micro Irrigation at Open Field:** In this area of activity, Rs. 120 lakhs was spent to carry out (i) *Drip Irrigation system* for wide space crops such as Mandarin Orange (in all divisions) and Dragon Fruit (in Aizawl, Tuidam and Kolasib divisions) and (ii) Drip Irrigation for closed space crops like flowers, vegetables and strawberry.
2. **Micro Irrigation under Protected Cultivation:** Under this component of the scheme, Drip Irrigation for the closed space crops such as flowers and vegetables had been undertaken in all horticulture divisions by spending Rs. 100 lakhs.
3. **Training Programme:** Under this component, Rs. 7 lakhs was spent to organize training for technical staff and stakeholders.
4. **Administrative Cost:** 5% of the total cost of the scheme was utilized for administrative expenses such as appointment of staff on contract basis, stationery, supervision etc.

Photoplate No. 21: Cultivation of Dragon Fruit with Drip Irrigation. field of Pu H. Lalzuitluanga, beneficiary of PMKSY, Serchhip District.



(Source: Lalzuitluanga, Serchhip)

During 2016-2017, Rs. 697.53 lakh was proposed to be the total cost of the scheme where 54 percent, 6 percent and 40 percent were to be contributed by the Government of India, State Government and the beneficiaries respectively. During this period, 4 components of works were undertaken for different horticulture crops and one agriculture crop. The following were the components of the scheme on which fund was utilized during this period.

1. **Micro Irrigation at Open Field:** i) Installation of Drip Irrigation (Wide Spaced) for fruit crops like Mandarin Orange, Kiwi, Dragon Fruit and Grape with an expenditure of Rs. 89 lakhs covering 302 ha. of land. ii) Installation of Drip Irrigation (Closed Spaced) for flowers, vegetables and strawberry at the cost of Rs. 126 Lakhs covering 189 ha. of land.
2. **Micro Irrigation for Protected Cultivation:** 1) Installation of Drip Irrigation for flowers and vegetables at the cost of Rs. 30 lakhs covering 24 ha. area of land. 2) Installation of Micro Sprinkler Irrigation for vegetables and flowers to cover 72 ha. of land.
3. **Installation of Micro Irrigation (Drip Irrigation) at open field** for agriculture crops like Oil Palm to cover 424 ha. of land at the cost of Rs. 179 lakhs.
4. **Training Programme:** Organization 19 number of trainings for farmers and technical staff by spending Rupees 9 lakhs.
5. 5% of the fund i.e Rs. 20 lakhs was utilized for administrative cost/Contingency

Photoplate No. 22: Cultivation of Tomato with Drip Irrigation under Protected Cultivation (Greenhouse). Greenhouse of Pu Lalkrossliana, Serchhip District



(Source: R. Lalthankima, Research Scholar)

During 2017-2018, Rs.850.67 had been allocated to carry out 5 components of the scheme by following the same funding pattern as the previous year. The following were the components of the scheme on which fund was utilized during this period.

1. ***Micro-Irrigation on Horticulture Crop at Open Field:*** 1) Drip Irrigation system at wide space for selected fruits like Mandarin Orange, Kiwi and Dragon Fruit at the cost of Rs. 280 lakhs. 2) Drip Irrigation at Closed Spaced for flowers and vegetables at the cost of Rs. 179 lakhs.
2. ***Micro-Irrigation under Protected Cultivation:*** Drip Irrigation System under Closed Spaced for flowers and vegetables covering 200 ha. of land at the cost of Rs. 179 lakhs.
3. ***Micro Irrigation for Agriculture Crop at Open Field:*** Installation of Drip Irrigation for agriculture crop like Oil Palm to cover 456 ha. of land at the cost of Rs. 205 lakhs.
4. An expenditure of Rs. 9.5 lakh was spent for training Programme

5. 5% of the project cost i.e. Rs. 24 lakhs was spared and utilized for administrative cost or contingency.

During 2018-2019, the total cost of the project was Rs. 866.66 lakhs. From this period, the funding pattern has been altered whereby the Government of India and the state government share the burden in the ratio of 90:10. The areas of activity under which the scheme was implemented during this period were as follows:

1. **Micro Irrigation at Open Field:** (i) Installation of drip irrigation system for Dragon Fruit at the cost of Rs. 198 lakhs covering 761 ha. of land. (ii) Installation of drip irrigation for vegetables and Strawberry to cover 271 ha. of land at the cost of Rs. 176 lakhs.
2. **Micro Irrigation under protected Cultivation:** Installation of Drip Irrigation for vegetables and flowers to cover 337 ha. of land at the cost of Rs. 158 lakhs.
3. **Micro Irrigation system at Open Field:** Installation of Drip Irrigation system for Oil Palm covering 655 ha. of land at the cost of Rs. 190 Lakhs (approx).
4. Organization of 30 Training Programmes at the rate of Rs. 50000 per training. Rupees 15 lakhs was spent for this purpose.
5. 5% of the project cost i.e Rs. 49 lakhs was utilized for administrative cost or Contingency.

During 2019-2020, Rs. 1800.66 lakhs was the total cost of the project. It was spent to carry out four components of the scheme. (i) **Drip Irrigation system** of different spacing like 2mx2m(1Ha), 4mx4m (Ha), 1.2x1.2m (1Ha) and 1.2x0.6m (0.4) were installed at the cost of Rupees 1041 lakhs (approx) to feed various horticulture crops covering around 834 ha. of land. (ii) **Sprinkle Irrigation system** of different spacing such as Portable Sprinkler 63mm (1ha), Micro Sprinkler 3mx3m (1Ha), Mini Sprinkler (1Ha), Semi permanent Sprinkler (1Ha) and large volume sprinkler irrigation system (Rain gun) 63mm (1ha) were also undertaken covering 537 ha. of land at the cost of about Rs. 263.96 lakh. (iii) During this period, **Development of Human resources and Media** was introduced to be a new component of the scheme. About Rs. 40 lakhs was spent for organizing i) Training of Stakeholder within the state, ii) Exposure visit of Stakeholders (outside the state and abroad), iii) Study Tours of Technical Personnel and Field Staff

within the state, to the progressive states within the country and outside the country. 5% of the fund was utilized for *administrative cost*.

During 2020-2021, the scheme was undertaken at the cost Rs. 1249.99 lakh (approx). The components of work carried out during this period were 4 in number.

1. ***Drip Irrigation*** of four spacing covering 464 ha. of land at the cost of Rs. 930 lakhs to cover 648 hectare of land.
2. ***Sprinkle Irrigation*** (Large Volume 63mm and Mini sprinkler 8mx8m) covering 111 hectare of land with an expenditure of Rupees 128 lakhs.
3. ***Human Resource Development & Media***. Under this component, training of stakeholders within the state, Exposure Visit of Stakeholders (Outside the state and Outside India) and Study Tours of Technical Personnel and Field Staff within the state, to progressive states in the country and outside India were organized. The expenditure incurred for these purposes was Rupees 99 lakhs.
4. 5% of the project cost was reserved for administrative cost.

Chapter –V

RESULTS AND DISCUSSION

As mentioned in the previous chapters, various schemes have been implemented in Mizoram for the development of horticulture. Even during the time when Horticulture was a Wing under the umbrella of the Department of Agriculture many horticultural development activities were carried out for uplifting horticulture farmers and increasing horticultural produces thereby contributing to the economy of the state. These horticultural activities of the government, whether Centrally Sponsored Schemes or State Schemes, seemed to have had numerous positive results on many aspects of the lives of the people especially that of the horticulture farmers. As a result, most of the people in the rural areas and some in urban areas have taken up horticulture as a means of livelihood or at least as a source additional income.

In this chapter, attempts have been made to find out socio-economic profile of the beneficiaries, different aspects of the implementation of the schemes including problems and issues, impact of the schemes, future plan of the beneficiaries and implementing agency with and without the schemes, etc. To conduct this research, three districts such as Kolasib, Serchhip and Mamit were selected as sample districts. With regard to the number of respondents under MIDH, 159 farmer respondents and 8 official respondents were selected. Kolasib district contributed the largest number of farmer respondents at 57 whereas Serchhip and Mamit contributed 51 and 48 respectively. The number of farmer respondents under RKVY is 124 and official respondents are 8. Out of the total number of farmer respondents, Kolasib, Serchhip and Mamit contributed 60, 28 and 36 respondents respectively. In respect of PMKSY, 48 farmer respondents and 8 official respondents were selected from sample districts. Under this scheme, 12 farmer respondents were selected from Serchhip district whereas Kolasib and Mamit contributed 10 each.

Among the various horticulture schemes/programme, Mission for Integrated Development of Horticulture (MIDH) formerly known as Horticulture Mission for North East and Himalayas (HMNEH) has been one of the most important schemes in Mizoram in terms of area coverage and fund allocation. MIDH has been formulated and implemented to cover all districts in the state. So far, more than 80 thousand hectare of land has been covered by different activities under MIDH by spending 26 thousand lakhs rupees (approx). However, it may be brought to light here that the area coverage often encompasses the same area for consecutive years due to repetitive funding of the same beneficiaries under some components of the scheme such as Integrated Pest/Nutrient Management, Rejuvenation/Replacement of Senile Plantation, Canopy Management etc.

Gender Distribution

Table 5.1.1 shows the gender distribution of respondents under MIDH. In Kolasib district, there are 57 respondents with 33 (57.89 percent) males and 24 (42.11 percent) females.

Table No. 5.1.1: Gender of the Respondents under MIDH

Sl No	Trade	District						Total		Total	Percentage	
		Kolasib		Serchhip		Mamit		M	F		M	F
		M	F	M	F	M	F					
1	Fruits	9	6	15	-	12	6	36	12	48	75	25
2	Vegetables	9	3	15	-	12	3	36	6	42	85.71	14.29
3	Flowers	-	12	-	12	-	-	-	24	24	-	100
4	Infrastructure	15	3	12	-	15	-	42	3	45	93.33	6.67
5	Total	33	24	42	12	39	9	114	45	159	71.70	28.30

In Serchhip district, out of 54 respondents males are 42 (77.78 percent) and 12 (22.22 percent) are females. Mamit district has a total number of 48 respondents. Among them, there are 39 (81.25 percent) are male whereas 9 (18.75 percent) are females.

The male respondents constituted 71.70 percent whereas female respondents are of 28.30 percent in the cumulative of the three districts. Out of the total number of 159 respondents, 48 (30.19 percent) respondents are under fruits crops, with males being 36 at 75 percent while that of the females stands at 12 accounting for 25 percent. As can be seen in Table No.5.1.1 the number female beneficiaries undertaking fruit cultivation are half and less than half of the total respondents in both Kolasib and Mamit district respectively, while there are no females undertaking the trade in Serchhip district.

The number of respondents under vegetable component of the scheme is 42 (26.42 percent), with a wide disparity between the genders. The male respondents were 36 in number (85.71 percent) while there were 6 (14.29 percent) females. Of the respondents from Serchhip district there were no female respondents while Kolasib and Mamit districts had 25 and 20 percent female respondents.

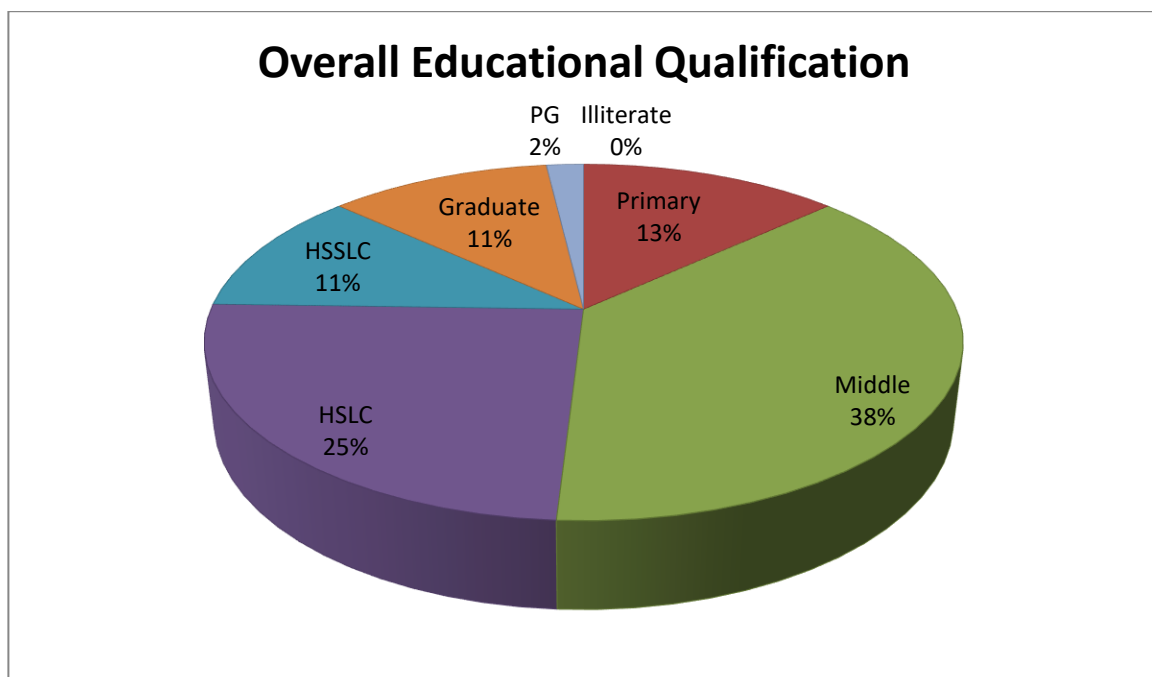
Under the flower component there are 24 respondents. It is found notable that there are no males undertaking the component and all respondents were females. Further, flower component has not been implemented in Mamit district. The reason cited during the course of the interviews with the officials was the reluctance of the farmers to take up the trade due to the lack of marketing avenues.

In contrast to the flower component the infrastructure component is dominated by the males with the number of male beneficiaries undertaking the scheme being 42 (93.33 percent) and there were only 3 females (6.67 percent) out of the total of 45 respondents under the component. None of the respondents were females in both Serchhip and Mamit district while there were 3 females in Kolasib district out of the 18 that were interviewed, accounting for 20 percent as can be seen in the table above.

Educational Qualification

The chart below shows the educational level acquired by the respondents in three districts. Among the total number of 159 respondents, there is no respondent who can neither read nor write. Respondents who have passed Middle School standard are highest in number contributing 37.73 percent of the total number of respondents. They are followed by respondents who have passed their Matriculation or High School Leaving Certificate (HSLC) at 24.54 percent, 13 percent having studied up to Primary School and 11.32 percent each for both Higher Secondary School Leaving Certificate and Graduate. There are three Post Graduate Degree holders among the respondent as well contributing only 1.88 percent.

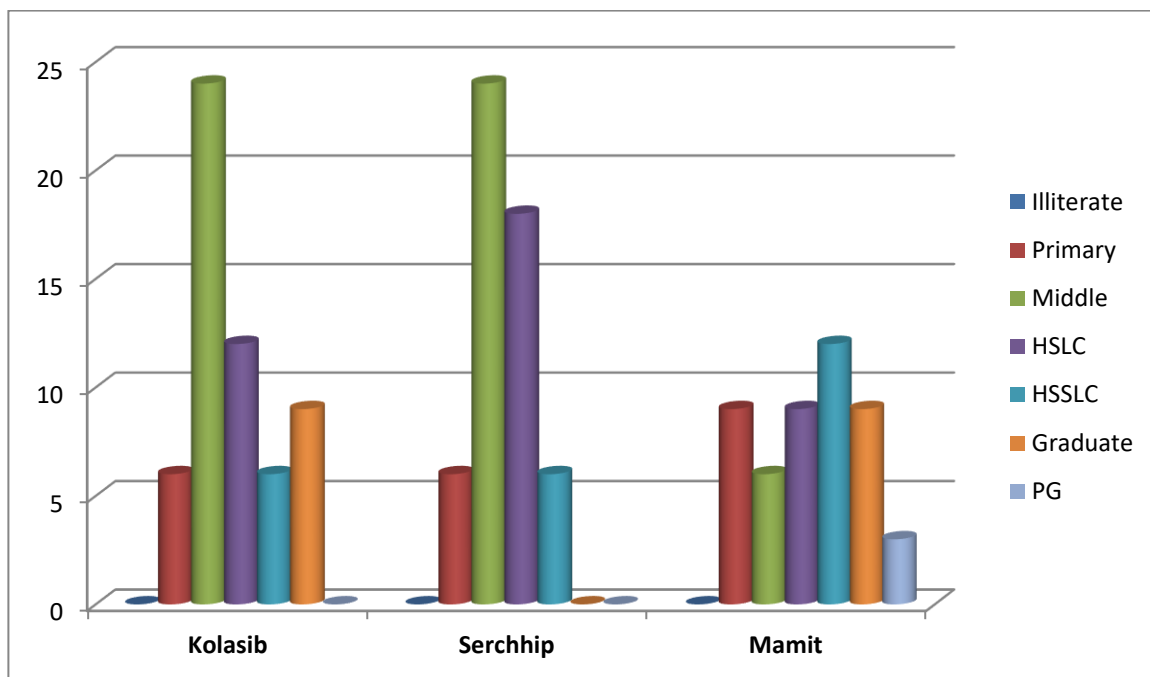
Figure 1: Overall Educational Level of Respondents under MIDH



As shown in the chart below, in Kolasib district has the number of respondents possessing up to Middle School education were the highest in number at 24 accounting for 42.11 percent of the total respondents of the district. There were neither illiterates nor Post Graduate degree holders. Among the respondents of Serchhip district, there

were no illiterates, Graduate or Post Graduate degree holders. The highest number of respondents was those who studied up to Middle School at 24, that is, 44.45 percent of the respondents. Similar to the other two districts there are no illiterates in Mamit district too. However, unlike the other two districts there were 3 beneficiaries who were Post Graduate degree holders, at the percentage of 6.25 within the district.

Figure 2: Educational Level of Respondents under MIDH in 3 Districts



Marital Status

Table No. 5.1.2: Marital Status of Respondents under MIDH

Sl No	District	Married	Unmarried	Total
1	Kolasib	57	Nil	57
2	Serchhip	54	Nil	54
3	Mamit	39	9	48
4	Grand Total	150	9	159
5	Percentage	94.34	5.66	100

The marital status of respondents in the three districts is shown in Table No. 5.1.2. Of the total respondents, 150 which constitute 94.33 percent of respondents are married and living with their family while 9 respondents i.e., 5.66 percent of the total respondents are single. All respondents- in Kolasib and Serchhip district are married accounting for 35.84 percent and 33.96 of the total number of respondents respectively. In Mamit district, there are 9 unmarried respondents constituting 18.75 percent while another 39 who constituted 81.25 percent are married out of the total respondents from the district.

Age Groups

Table No. 5.1.3: Age Group of Respondents under MIDH

SN	Category	District			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	Below 18	Nil	Nil	Nil		
2	18-30	Nil	3		3	1.89
3	31-40	Nil	6	3	9	5.66
4	41-50	21	15	9	45	28.30
5	51-60	18	21	24	63	39.62
6	61-70	18	9	9	36	22.64
7	71-80	Nil	Nil	3	3	1.89
	Total	57	54	48	159	100

Table 5.1.3 depicts the age group of respondents in all the three selected districts. Respondents belonging to the age group of 51-60 are highest in number forming 39 percent of the total respondents while there is no respondent in the age group below 18 years. Respondents in the age group of 41-50 stood second in terms of the number of

respondents which constitute 28.30 percent. There are 36 respondents in the age group of 61-70 constituting 22.64 percent. Respondents are 9 in number in the age group of 31-40 and stood fourth. They constituted 5.66 percent of the total respondents. Age group such as 71-80 and 18-30 have same number of respondents i.e only 3 each constituting 1.88 percent. Only Mamit district has respondents who are 70 or more years old. Likewise, respondents belong to the age group of 18-30 are found only in Serchhip.

The differences in the age distributed may be attributed to the fact that the lower age groups are still undergoing their academic pursuits or venturing out of their villages in search of greener pastures in terms of jobs. Meanwhile the upper age group of 71 – 80 years contributed lesser number due to health deterioration and lack of stamina caused by age.

Trades Undertaken

The number of respondents based on the activity carried out under the scheme is shown in Table 5.1.4. Respondents who are dealing with fruits within the areas under study are highest in number with 30.19 percent. They are followed by respondents under infrastructure who constituted 28.30 percent. Vegetables growers stood third in terms of the number of respondent with 26.42 percent. Respondents in flower component were lowest in number by contributing 15 percent of the total respondents. All respondents under flower are women only. As already stated both Kolasib and Serchhip districts have respondents in all trades whereas Mamit district does not implement the flower component.

Among the 48 respondents with fruits, Mamit district has contributed the highest number constituting 37.5 percent respondents whereas Kolasib and Serchhip districts contribute 31.25 percent each.

With regards to the number of respondents under vegetable, both Serchhip and Mamit districts contribute 35.71 percent each while Kolasib comprises 28.57 percent out of the total number in vegetable component.

In respect of the number of respondents with flower, the respondents are equally distributed between Kolasib and Serchhip districts at 50.00 percent.

Table No. 5.1.4: No of Trade/Crop undertaken by the Respondents under MIDH

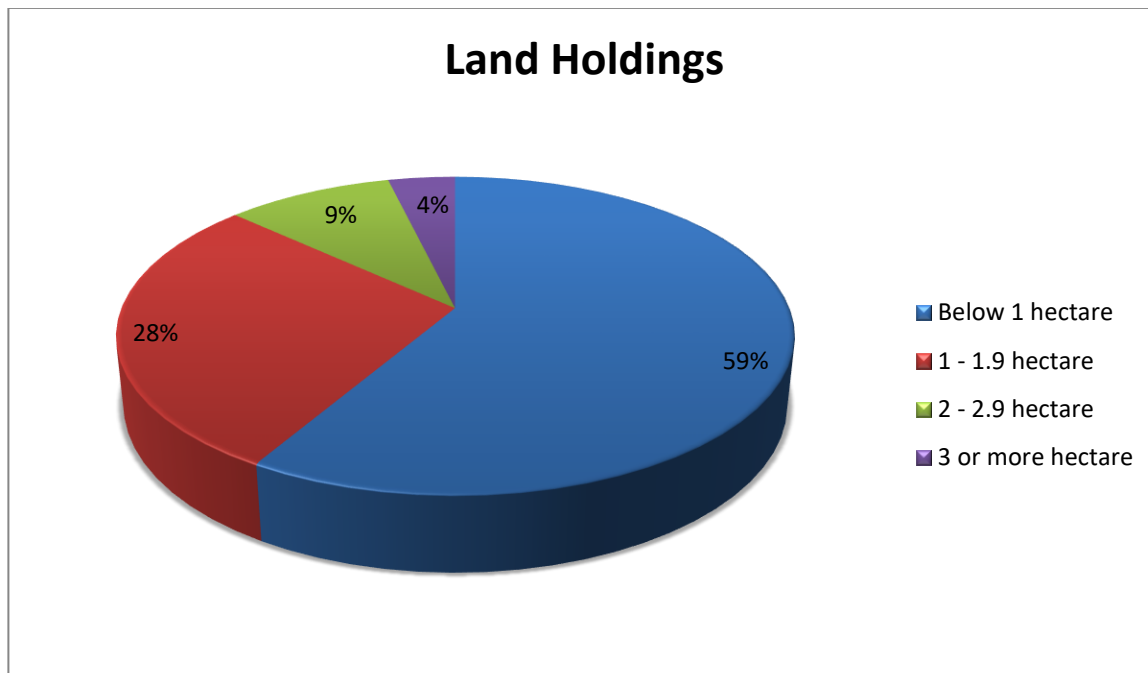
SN	Trade	District			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	Fruits	15	15	18	48	30.19
2	Vegetables	12	15	15	42	26.42
3	Flowers	12	12	Nil	24	15.09
4	Infrastructure	18	12	15	45	28.30
	Total	57	54	48	159	100

Under infrastructure component, Kolasib district has the highest number 40 percent respondents followed by Mamit district has 33.33 percent and the least being in Serchhip district at 26.67 percent.

Land Holding

The pie chart below shows the land holding status of respondents in terms of area. Respondents having less than 1 hectare of land contributed the highest number among the respondents with 58.49 percent while respondents having 3 or more hectares of land contributed the least number constituting 3.77 percent only. Respondents having 1-1.9 hectares of land stood second in terms of area of land owned with 28.30 percent followed by 9.43 percent of respondents with 2-2.9 hectares of land.

Figure 3: Land Holdings Status under MIDH



As can be seen in Table No. 5.1.5 among the respondents having less than 1 hectare of land, there maximum number of respondents at 30, that is, 32.26 percent undertakes vegetable cultivation with Serchhip district having the maximum of 12, that is, 40 percent of those under the trade and equal numbers in Kolasib and Mamit district, at 9 accounting for 30 percent each. In this category of land holding the least number of respondents are those under fruit component at 15, that is, 16.13 percent. Those under flower and infrastructure components account for 24 (23.81 percent) each of the total number of people with less than 1 hectare landholding.

With regards to landholding of 1-1.9 hectare of land, there are 33 fruit growers at 73.33 percent, 9 vegetable growers contributing 20 percent and 3 under the infrastructure component at 6.67 percent out of the total respondents with similar land holdings. None of the respondents were involved in the flower component. In respect of the number of respondents having 2-2.9 hectare of land, there are 15 respondents undertaking infrastructural component while none of those engaged in the other trades has similar landholding. The larger landholding of 3 hectares or more is seen only with 3 vegetable growers and 3 engaged in infrastructural component all from Mamit district.

Table No. 5.1.5: Trade-wise Land Holding Status (Area) under MIDH

SN	District	Crop/Trade	Area				Total
			Below 1 Hectare	1 – 1.9 Hectare	2 – 2.9 Hectare	3 or more Hectare	
1	Kolasib	Fruits	3	12			15
		Vegetables	9	3			12
		Flower	12				12
		Infrastructure	6	3	9		18
2	Serchhip	Fruits	3	12			15
		Vegetables	12	3			15
		Flower	12				12
		Infrastructure	12				12
3	Mamit	Fruits	9	9			18
		Vegetables	9	3		3	15
		Flower					
		Infrastructure	6		6	3	15
4	Grand Total		93	45	15	6	159
5	Percentage		58.49	28.30	9.43	3.77	100

Land Ownership

Table 5.1.6 depicts the land ownership status of the respondents. Out of the total of 159 respondents 138 (86.79) possesses the land on which they are undertaking the scheme while 21 (13.20) respondents are working on land owned by others. It may be highlighted here that respondents working on land owned by others do so free of cost. Such lands are mostly owned by other beneficiaries who possess larger expanses of land, so as to enable the clustering of beneficiaries.

Table No. 5.1.6: Land Ownership Status of the Respondents under MIDH

SN	District	Crop/Trade	Owned	Rented	Total
1	Kolasib	Fruits	15	-	15
		Vegetables	12	-	12
		Flower	12	-	12
		Infrastructure	15	3	18
2	Serchhip	Fruits	15	-	15
		Vegetables	12	3	15
		Flower	12	-	15
		Infrastructure	3	9	12
3	Mamit	Fruits	18	-	18
		Vegetables	12	3	15
		Flower	-	-	
		Infrastructure	12	3	15
4	Grand Total		138	21	159
5	Percentage		86.79	13.21	100

It is found that in Kolasib district has got the highest number of land owners at 54 while those who were undertaking their activity on rented were only 3, all of them being a part of the infrastructure component. The trend appears to be the same in all the three districts studied in that those in the infrastructure component all have beneficiaries who are working on rented land. Both Serchhip district and Mamit district have the same number at 42 each and 9 and 3 respondents working on rented land respectively. Besides in both the districts there were also 3 respondents each who are carrying out their activities under the vegetable component on rented land.

Among the respondents who undertake their horticulture activity on their own land under the scheme, the maximum number are those involved in fruit component at

48 respondents constituting 34.78 percent, 36 with vegetable constituting 26.09, 30 respondents with infrastructure constituting 21.74 percent and the least being those engaged in flower component at 24 respondents constituting 17.39 percent.

With regard to the number of respondents depending on rented land in the three districts, there are 15 respondents with infrastructure constituting 71.43 and 6 respondents with vegetable who constituted 28.57 percent of the total while those with fruit and flower component are all found to be working on their own land. Out of the 45 respondents in infrastructure component, which comprises of construction of greenhouse, there are 15 respondents working on the land of others constituting 33.33 percent of those involved in the component.

Assistance to Beneficiaries

The table below 5.1.7 reflects whether respondents received assistance in cash or kind. 21 (13.20 percent) respondents received assistance in cash only while 84 (54.71 percent) received assistance in kind only. 51 (32.07 percent) received assistance both in cash and kind. With regard to the number of respondents receiving assistance in cash only, respondents with infrastructure constituted 7.54 percent being the highest followed by fruit constituting 3.77 percent, respondents and the least being vegetable at 1.88 percent of the total respondents.

In respect of the number of respondents who received assistance in kind only, vegetable comprises 20.75 percent of the respondents, flower 15.09 percent, infrastructure 13 percent and fruit 5.66 percent of the total respondents. Out of the 51 respondents who receive assistance both in cash and in kind, fruit constituted 64.71 percent, infrastructure 23.53 percent and vegetable 11.76 percent.

Among the 57 respondents in Kolasib district, 12 respondents which is 21.1 percent received assistance in cash only while 36.84 received in kind only and 42.11 percent were assisted in both cash and kind. In Serchhip district, none received cash for assistance while 83.33 percent received in kind only and 16.67 percent received both cash and kind. In Mamit district, those respondents who received assistance in cash only, in kind only and both cash and kind are 18.75, 43.75 and 37.5 percent respectively.

Table No. 5.1.7: Assistance Received in Cash or Kind

SN	District	Crop/Trade	In Cash	In Kind	Both	Total
1	Kolasib	Fruits	3		12	15
		Vegetables	3	9		12
		Flower		12		12
		Infrastructure	6		12	18
2	Serchhip	Fruits		6	9	15
		Vegetables		15		15
		Flower		12		12
		Infrastructure		12		12
3	Mamit	Fruits	3	3	12	18
		Vegetables		9	6	15
		Flower				
		Infrastructure	6	9		15
4	Grand Total		21	87	51	159
5	Percentage		13.20	54.71	32.07	100

Table 5.1.8 is about the number of instalment received by respondents. 69 respondents which accounts for 43.39 percent received assistance only once while 39.63 percent received assistance twice and 16.98 percent received thrice or more.

In Kolasib district, 27 respondents (43.37 percent) received assistance as one time assistance, another 47.37 percent received two instalments and 5.26 percent received three times or more. In Serchhip district, 15 respondents which constituted 27.78 percent received assistance only once, 44.44 percent for twice and 27.78 percent for thrice or more. In Mamit district, 27 respondents which is 56.25 percent received assistance once, 25 percent twice and 18.75 percent received three or more instalments

Table No. 5.1.8: No. of Assistance Received

SN	District	Crop/Trade	1 Instalment	2 instalments	3 or more instalments
1	Kolasib	Fruit	3	12	
		Vegetable	12		
		Flower	3	6	3
		Infrastructure	9	9	
2	Serchhip	Fruit	3	12	
		Vegetable	6	6	3
		Flower	3		9
		Infrastructure	3	6	3
3	Mamit	Fruit	9	6	3
		Vegetable	9	3	3
		Flower			
		Infrastructure	9	3	3
4	Total		69	63	27
5	Percentage		43.4	39.62	16.98

Among the fruit respondents, 31.25 percent respondents received one instalment, 62.5 percent received two instalments and 6.25 percent received three or more instalments. With regard to the number of respondents with vegetable, 64.29 percent of the total respondent received assistance once, 21.43 percent twice, 14.3 percent three times or more. Among the respondents with flower 25 percent received assistance only once, another 25 percent twice and 50 percent trice or more. In respect of

the respondents with infrastructure, 46.67 percent received assistance once, another 40 percent twice and 13.33 percent received trice or more.

Table No. 5.1.9: Timely Receipt of Assistance

SN	District	Crop/Trade	Yes	No
1.	Kolasib	Fruit	15	
		Vegetable	12	
		Flower	12	
		Infrastructure	18	
2.	Serchhip	Fruit	12	3
		Vegetable	15	
		Flower	12	
		Infrastructure	9	3
3.	Mamit	Fruit	18	
		Vegetable	12	3
		Flower		
		Infrastructure	15	
4.	<i>Total</i>		150	9
5.	<i>Percentage</i>		94.33	5.66

The above table 5.1.9 reveals whether respondents received assistance on time. 94.33 percent could receive assistance on time without any delay whereas 5.66 percent witness delay in receiving assistance. In Kolasib district all respondents could receive assistance on time while 6 respondents in Serchhip and 3 respondents in Mamit district failed to do so.

Among the respondents with fruit, 45 (93.75 percent) received assistance on time while 3 (6.25 percent) witnessed delay. With regards to the respondents with vegetable, 39 (92.86 percent) received assistance on time while 7.14 percent failed to receive on

time. All respondents, that is, 24 involved in flower component received assistance on time. In respect of the respondents with infrastructure, 42 (93.33 percent) of the respondents could get assistance on time whereas there was a delay in assistance for 3 (6.67 percent) respondents.

Membership in Farmers' Interest Group (FIG)

Table No. 5.1.10: Membership in FIG

Sl. No.	District	Crop/Trade	Yes	No
1.	Kolasib	Fruit	15	
		Vegetable	6	6
		Flower	12	
		Infrastructure	3	15
2.	Serchhip	Fruit	15	
		Vegetable	15	
		Flower	12	
		Infrastructure	12	
3.	Mamit	Fruit	12	6
		Vegetable	9	6
		Flower		
		Infrastructure	9	6
4.	Total		120	39
5.	Percentage		75.47	24.52

The above table 5.1.10 shows respondents' membership in any association or society related to their horticulture activities. 75.47 percent are registered in one or more associations related to their horticulture activities while 24.53 percent do not have membership in any related association. In Kolasib district, 63.16 percent are members of

their activity related association whereas 36.84 percent does not belong to any association. Serchhip district has 100 percent membership in their activity related association. In Mamit district, 62.5 percent belongs to at least one association whereas 37.5 percent does not join any horticulture related association.

In relation to the components among the respondents with fruit, 87.5 percent are members of their activity related association/society while 12.5 percent does not join any. Among the vegetable respondents, 71.43 percent are members of related association while 28.57 percent are not. With regard to flower respondents, 100 percent of the respondents are with related association being the only component with all respondents having membership. Among the respondents with infrastructure, 53.33 percent are members of associations related to their horticulture activity whereas 46.67 percent are without any membership.

Participation in Trainings under the Scheme

Table No. 5.1.11: Whether attended Training (s)?

SN	District	Crop/Trade	Yes	No
1	Kolasib	Fruit	15	
		Vegetable	9	3
		Flower	12	
		Infrastructure	18	
2	Serchhip	Fruit	12	3
		Vegetable	9	6
		Flower	12	
		Infrastructure	12	
3	Mamit	Fruit	12	6
		Vegetable	3	12
		Flower		

		Infrastructure		15
4	Total		114	45
5	Percentage		71.70	28.30

Table 5.1.11 highlights whether the respondents attended training (s) organised for their activity under the scheme. 71.70 percent attended one or more trainings whereas 28.30 percent did not attend any. In Kolasib district, 94.74 percent attended at least one training and 5.26 percent did not. In Serchhip district, 83.33 percent attended training while 16.67 percent did not participate in any training. In Mamit district those who have attended training accounts for 31.25 percent while those who have not constitutes 68.75 percent.

Among the fruit respondents, 81.25 percent attended training and 18.75 percent have not. With regard to vegetables, the number of respondents who have attended training and those who have attended none are equal at 50 percent each. In respect to respondents with flower, all of have successfully undergone at least one training. Among the respondents with infrastructure, 66.67 percent had undergone training whereas 33.33 did not have any training under the scheme.

Table No. 5.1.12: Is/Are Training (s) Helpful?

SN	District	Crop/Trade	Yes	No	No Opinion
1	Kolasib	Fruit	12		3
		Vegetable	9		
		Flower	12		
		Infrastructure	18		
2	Serchhip	Fruit	12		
		Vegetable	9		
		Flower	9	3	
		Infrastructure	12		

3	Mamit	Fruit	12		
		Vegetable	3		
		Flower			
		Infrastructure			
4	Total		108	3	3
5	Percentage		94.74	2.63	2.63

As shown in Table No.5.1.12, 92.10 percent have found the training(s) attended by them helpful in the course of their work whereas 2.63 percent felt that their training were not that helpful in relation to their performance in the chosen component of the scheme. Those without concrete opinion on the utility of the trainings underwent accounts for another 2.63 percent of the respondents. A number of those cited that a number of the skills and processes imparted during the course of training were difficult to practice on farm.

In Kolasib district, 94.44 percent thought that the training organised under the scheme are helping them in their activities whereas 5.56 percent perceived the training as neither positive nor negative in its impact. In Serchhip district, 93.33 percent of the attendees are of the opinion that their training helped them in their works while 6.67 percent did not agree with them. In Mamit district all respondents who had attended trainings found that it enhanced their capacity in performing their farming activity.

With regard to the number of respondents under the fruit component, 92.31percent agreed that trainings were helpful in their course of work whereas 7.69 percent do not have an opinion on the usefulness of the trainings. Among the respondents with vegetables who attended training, all 21 (100 percent) respondents thought that trainings helped them and there is no single respondent who has opposite opinion. In respect of the number of respondents among the flower grower under the scheme, 87.5 percent cited having gained skills and knowledge from their training and 12.5 percent respondents did not gain from their training. Among the respondents with

infrastructure, 81.81 agreed that the training augmented their performance whereas 18.18 percent perceive their training as not beneficial.

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 No. 5.1.13: Whether received technical/extension Guidance?

SN	District	Crop/Trade	Yes	No
1	Kolasib	Fruit	9	6
		Vegetable	12	
		Flower	12	
		Infrastructure	15	3
2	Serchhip	Fruit	15	
		Vegetable	15	
		Flower	12	
		Infrastructure	12	
3	Mamit	Fruit	15	3
		Vegetable	15	
		Flower		
		Infrastructure	12	3
4	Total		144	15
5	Percentage		90.57	9.43

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. In Serchhip district all respondents, that is, 100 percent

were given technical or extension guidance at least once. 87.5 percent received guidance in Mamit district, while 12.5 percent carried out their work without any guidance.

Of the respondents with fruit, 81.25 percent were given guidance from the department more than once while 18.75 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. With regard to the respondents under infrastructure, 86.67 percent received guidance or supervision whereas 13.33 percent of them worked on their own.

Inspection and Monitoring by the Department

Table no. 5.1.14 enumerates the number of respondents who received inspection and monitoring from the department to make sure that assistances rendered were utilized as stipulated in the scheme. 86.79 percent of respondents were inspected and monitored by the department whereas 13.21 percent were not.

In Kolasib district, 84.21 percent of respondents were inspected and monitored to see utilization of the assistance received whereas 15.79 percent did not witness any inspection and monitoring activities. In Serchhip district also, 88.89 percent respondents were inspected and monitored by the concerned department whereas 11.11 percent were uninspected with regard to the utilization of assistance received. In Mamit district, 87.5 percent were monitored while 12.5 percent were not.

With regard to the number of inspected respondents, 68.75 percent respondents from fruit, 100 percent respondents from vegetable component and flower component, 86.67 percent respondents from infrastructure were inspected by the department at least once or more whereas the department neither monitored nor inspected 31.25 percent and 13.33 percent from fruit and infrastructure respectively. Out of all the three districts, Serchhip has got the highest number of respondents who were inspected and monitored at 88.89 percent, followed by Mamit district at 87.5 percent and the least number at Kolasib with 84.21 percent having been inspected and monitored.

In Serchhip district 100 percent inspection and monitoring was seen in those undertaking vegetables, flowers and infrastructure. Among the respondents in fruit component 83.33 percent were inspected and monitored while 16.67 percent stated that no inspection or monitoring was undertaken.

Table No. 5.1.14: Inspection and Monitoring

SN	District	Crop/Trade	Yes	No
1	Kolasib	Fruit	9	6
		Vegetable	12	
		Flower	12	
		Infrastructure	15	3
2	Serchhip	Fruit	9	6
		Vegetable	15	
		Flower	12	
		Infrastructure	12	
3	Mamit	Fruit	15	3
		Vegetable	15	
		Flower		
		Infrastructure	12	3
4	Total		138	21
5	Percentage		86.79	13.21

Mamit district witnessed complete inspection and monitoring of those in vegetables trade while it stood at 83.33 percent in fruit and 80 percent in infrastructure. The number of respondents who were not inspected nor monitored stood at 16.67 percent and 20 percent in fruit and infrastructure respectively.

Inspection and monitoring were conducted with all respondents in the vegetable and flower trade in Kolasib district. 83.33 percent of the respondents involved in

infrastructure and 60 percent of those in fruit were inspected and monitored in the course of implementation.

Problems and Issues of Respondents

Table No 5.1.15 depicts the number of respondents who have problems and who have no problems and issues in the course of their activities under the scheme. 73.58 percent are facing some problems while 26.42 percent respondents carried out their activities without facing any big obstacle.

Table No. 5.1.15: No of Respondents with and without problems and issues

SN	District	Crop/Trade	No of Respondents with Problems	No of Respondents without Problems
1	Kolasib	Fruits	3	12
		Vegetables	12	0
		Flower	9	3
		Infrastructure	12	6
2	Serchhip	Fruits	15	0
		Vegetables	9	6
		Flower	12	0
		Infrastructure	12	0
3	Mamit	Fruits	12	6
		Vegetables	12	3
		Flower		
		Infrastructure	9	6
4	G. Total		117	42
5	Percentage		73.58	26.42

In Serchhip district, 88.89 percent of respondents have been facing one or more problems which hampered their works while 11.11 percent have not witnessed any issues. In Kolasib and Mamit district, respondents facing difficulties in the course of

work are 63.16 percent and 68.75 percent respectively. Respondents who have not faced any issue in Kolasib are 36.84 and in Mamit it is 31.25 percent.

With regard to the number of respondents with problems in their horticulture activities under the scheme, respondents with fruit constitute 25.64 percent, respondents with vegetable 28.21 percent, respondents with flower 17.95 and respondents with infrastructure constituted 28.26 percent. Among the respondents who have not faced any problems, respondents with fruit contributed 42.86 percent followed by respondent with infrastructure constituting 28.57, respondents with vegetable contributing 21.43 percent, 7.14 percent constituted by respondents with flower. There is no respondent who have faced any issue among the respondents with vegetable in Kolasib. In Serchhip district, all respondents except those under vegetables have faced at least some kind of difficulties in their horticulture activities.

Table No. 5.1.16: Nature of the Problems and Issues (District-wise)

SN	Problem/Issue	No of Respondents in Districts			Total
		Kolasib	Serchhip	Mamit	
1	Scarcity of water	9	15	3	27
2	Poor quality of Soil	3	3	0	6
3	Plant Disease	3	30	21	54
4	Poor Quality of Planting Materials	6	0	0	6
5	Scarcity of fertilizers	3	0	0	3
6	Storms/Flood/ other calamities	6	3	3	12
7	Scarcity of farm materials	3	0	0	3
8	Insufficient Assistance	3	0	0	3
9	Pest		18	6	24
10	Theft		3	0	3

11	Extreme temperature of GH due to lack of control mechanism			6	6
12	No device for water distribution (Pipes etc)			6	6

Table No. 5.1.16 shows the nature of problems faced by the respondents with problems while carrying out their horticulture activities under the scheme with multiple responses. Out of the total number of respondents with problems those facing the problem of plant diseases are the highest in number constituting 46.15 percent which is followed by scarcity of water with 23.08 percent, pest issues by 20.51 percent, natural calamities, such as storms, floods etc., 10.26 percent. Those facing problems due to poor quality of planting materials, poor quality of soil, extreme temperature of greenhouse, lack of watering implements such as pipes etc., with 5.13 percent each and scarcity of fertilizers, scarcity of farm materials, insufficient assistance and menace of wild animals with 2.56 percent each as well.

In Kolasib district, respondents who have been dealing with the problem of scarcity of water are highest in number constituting 25 percent followed by both poor quality of planting materials and natural calamities with 16.67 percent each and poor quality of soil, plant diseases, scarcity of fertilizers, scarcity of farm materials and insufficient assistance who constituted 8.33 percent each.

In Serchhip district, plant disease has been the biggest problem faced by most of the respondents who constituted 62.5 percent. Pest has been the second biggest problem faced by 37.5 percent of respondents. They are followed by scarcity of water with 31.25 percent of respondents and poor quality of soil, natural calamities and robbery 6.25 percent.

In Mamit district too, the number of respondents who have faced plant disease problem is highest contributing 63.64 percent. They are followed by pest, absence of

temperature control mechanism in greenhouses leading to extreme temperature, no device for watering of farms (pipes etc.,) with 18.18 percent of respondents and scarcity of water and natural calamities with 9.09 percent.

As shown in Table 5.1.17 the problem of plant diseases is the gravest of the problems faced in all the trades as stated by 12.82 percent each of the respondents (out of the total number of respondents facing problem i.e 117) in the case of fruits and vegetables and 10.26 percent each in flower and infrastructure. With regard to the number of respondents with fruit crop/trade both scarcity of water as well as attack of crops by pests is reported by 7.69 percent each, 5.13 percent with natural calamities and 2.56 percent with theft.

Table No. 5.1.17: Nature of the Problems and Issues (Trade-wise)

SN	Problem/Issue	No of Respondents (Crop/Trade Wise)				Total
		Fruits	Vegetables	Flower	Infrastructure	
1	No Problem	18	9	3	12	42
2	Scarcity of water	9	6	9	3	27
3	Poor quality of Soil		3	3		6
4	Plant Disease	15	15	12	12	54
5	Poor Quality of Planting Materials		3		3	6
6	Scarcity of fertilizers			3		3
7	Storms/Flood/ other calamities	6	3		3	12
8	Scarcity of farm materials			3		3
9	Insufficient Assistance				3	3
10	Pest	9	3	3	9	24
11	Theft	3				3
12	Extreme temperature of GH due to lack of control		3		3	6

	mechanism					
13	No device for water distribution (Pipes etc)				6	6
14	Wild Animals		3			3

In respect of the number of respondents with vegetable crop/trade 5.13 percent deals with scarcity of water and 2.56 percent of respondents each for poor quality of soil, poor quality of planting materials, natural calamities, pest, extreme temperature of green house and wild animals.

In respect of the number of respondents with flower 7.69 percent have been facing the problem of scarcity of water and 2.56 percent each faces problems such as poor quality of soil, scarcity of fertilizers, scarcity of farm materials and pests.

Regarding the number of respondents with infrastructure 7.69 percent encounter pests problem, 5.13 percent with lack of device for water distribution and 2.56 percent by scarcity of water, poor quality of planting materials, natural calamities, extreme temperature of greenhouse and insufficient assistance.

Labour Utilisation

Table No. 5.1.18: Utilisation of Labour

Sl.No.	District	Trade	Farmers with additional Labour (Regular)	Farmers with additional labour (Occasional)	Farmers without additional labour
1	Kolasib	Fruits	3	12	
		Vegs	6	9	
		Flower		12	
		Infra	3	9	3
2	Serchhip	Fruits	6	9	
		Vegs		12	

		Flower	6	6	
		Infra		6	9
3	Mamit	Fruits		15	3
		Vegs	3	9	3
		Flower			
		Infra	3	9	3
4	G. Total		30	108	21
5	Percentage		18.87	67.92	13.20

As can be seen in Table No. 5.1.18 farmers employing regular additional labour accounts for 18.87 percent of the respondents while those employing labour occasionally are at 67.92 percent and those which manages their trade without any additional labour comprises 13.20 percent.

In Kolasib District, 21.05 percent of respondents hired additional labour regularly to carry out their horticulture works whereas 73.68 percent depends upon additional labour occasionally. In the meantime 5.26 percent of respondents could carry out their activities on their own without any additional help. In Serchhip district also, 22.22 percent of respondents rely on additional labour on regular basis. The percentage of respondents with occasional additional labour and without additional labour is 61.11 percent and 16.67 percent respectively.

In Mamit district, only 12.5 percent of respondents employed regular additional labour while 68.75 percent of respondents depend on occasional labour. There are also some respondents who do not need additional labour constituting 18.75 percent.

It may be stated that even respondents who solely depend on others do not employ labour throughout the year. However, they are said to be fully dependent on the additional hands for all the labour intensive farming activities such as clearing, weeding, sowing and harvesting.

In relation to the components, those under fruit employing additional regular labour constitute 18.75 percent of the respondents, while those employing additional labour occasionally accounts for 75 percent and 6.25 percent manages on their own.

Under vegetables, 21.43 percent employ additional regular labour, 71.43 percent with occasional additional labour and 7.14 do not employ others to tend to their farms.

The number of respondents employing additional labour regularly under the flower component stands at 25 percent of the total respondents in the trade. The percentage of those employing occasional labour accounts for 75 percent. All respondents in the component utilises the services of others either regularly or occasionally.

In infrastructure regular employment of additional labour is undertaken by 13.33 percent respondents, occasional additional labour by 53.33 percent while 33.33 percent functions without additional labour.

In addition to the employment opportunities provided to the horticulture farmers through the scheme, those employing additional labour contributes towards providing employment for others.

Financial Profit of Respondents

Table No. 5.1.19: Average monetary Profit of Respondents

Sl No	Profit	No of Respondent					
		Fruits	Vegetables	Flower	Infrastructure	Total	Percentage
1	No Profit	6	3		3	12	7.54
2	Below 10000				3	3	1.88
3	10000-29000		3		6	9	5.66
4	30000-49000	9	3	6	9	27	16.98

5	50000-99000	15	15	18	12	60	37.73
6	1 Lakh-1.9 lakh	9	6	6	9	30	18.86
7	2 lakh-2.9 lakh	3				3	1.88
8	3 lakh-3.9 lakh	3	3		3	9	5.66
9	4 Lakh-4.9 Lakh		3			3	1.88
10	5 lakh- 5.9 lakh	3				3	1.88

Table No. 5.1.19 reveals the trade-wise average monetary profits of respondents under MIDH. Among the respondents those who have not made any profit are 12 (7.54 percent of the total respondents) in number of which 50 percent are respondents with fruit, 25 percent each with vegetables and infrastructure. There are 3 respondents from infrastructure alone which constitute 1.88 percent who could make profit below Rs 10,000 per annum. Respondents who could make profit between Rs 10,000 - 29,000 constituted 5.66 percent with respondents with vegetables and infrastructure contributing 33.33 and 66.67 respectively. Among the 27 (16.98 percent) respondents with profit of Rs 30,000-49,000, fruit constituted 33.33 percent, vegetables 11.11 percent, flower 22.22 percent and 33.33 percent of those under infrastructure. Out of the 37.73 percent of respondents with a profit of Rs.50,000 - 99,000, 25 percent each are from fruits and vegetables, 30 percent are from flower and 20 percent are from infrastructure. 18.87 percent of respondents could make a profit of 1-1.9 lakh. Among these respondents, 30 percent each are respondents with fruit and infrastructure, 20 percent each from vegetables and flowers. 1.88 percent of respondents from fruit component only could make a profit of 2 - 2.9 lakhs. Respondents with fruit, vegetables and infrastructure totalling to 5.66 percent consisting of 1.89 percent each are able to make a profit of Rs 3-3.9 lakhs. 1.89 percent of total respondents could make a profit of Rs 4-4.9 lakhs all of them undertaking vegetable component of the scheme. The largest profit that the respondents could make so far is 5-6 lakhs. This largest profit has been made only by respondents with fruit constituting 1.88 percent of total respondents.

Table No. 5.1.20: Average Monetary Profit of Respondents under MIDH (District Wise)

Sn	Profit	Kolasib	Serchhip	Mamit	Total	Percentage
1	No Profit		6	6	12	7.54
2	Below 10000	3			3	1.88
3	10000-29000	9			9	5.66
4	30000-49000	12	9	6	27	16.98
5	50000-99000	24	24	12	60	37.73
6	1 -1.9 lakhs	3	18	9	30	18.86
7	2 -2.9 lakhs	3			3	1.88
8	3 -3.9 lakh	3	3	3	9	5.66
9	4 -4.9 Lakh			3	3	1.88
10	5 - 5.9 lakh			3	3	1.88

Table No 5.1.20 highlights the average monetary profits of the respondents (district-wise) under MIDH. 12 respondents (7.54 percent) failed to make any profit, 50 percent each from Serchhip and Mamit district respectively, while there are none from Kolasib district.

Respondents who could make a profit of less than Rs. 10,000 and those in the range of Rs. 10,000 – 29,000 in a year all hail from Kolasib district, with 1.88 percent making a profit of less than Rs. 10,000 and 5.66 percent in the latter profit range. Among the 16.98 percent of respondents with profit amounting Rs 30000-49000, Kolasib district, Serchhip district and Mamit district contribute 44.44, 33.33 and 22.22 percent respectively. With regard to the number of respondents with profit of Rs 50000-99000, Kolasib and Serchhip district contributed 40 percent each, and Mamit district 20 percent. In respect of profit Rs 1-1.9 lakh, respondents from Kolasib, Serchhip and Mamit district contributed 10, 60 and 30 percent respectively. Only Kolasib district has respondents who could make a profit of Rs 2-2.9 lakh. They constituted 1.88 percent of the total respondents only. With regard to profit of Rs 3-3.9 lakh, there are 9 respondents out of which all the three districts have respondents constituting 33.33 percent each.

Regarding the number of respondents with profit Rs 4-4.9, only Mamit district has respondents within this range of profit constituting 1.88 percent of the total respondents. The biggest profit so far which the respondents could make has been 5-6 lakh. The 3 respondents who could gain this profit constituted 1.88 percent and all belonged to Mamit District.

Marketing

The different mechanisms for selling off the produces by the respondents are reflected in Table No. 5.1.21. 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 No. 5.1.21: Marketing of the produces

SN	Mode of selling	No of Respondents in Districts			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	Sold directly	9	9	12	30	18.86
2	Sold to Intermediaries	27	18	24	69	43.39
3	Through Dept Arrangement		12		12	7.54

4	Through both Sl. No. 1 and 2	9	3	9	21	13.20
5	Through both Sl. No. 2 and 3		12	3	15	9.43
6	Not Sold	12			12	7.54

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 47.37 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 15.79 percent each. However, there are respondents who did not sell their produces contributing 21.05 percent of respondents.

In Serchhip district also, respondents who sold their produces to the intermediaries are highest in number with 33.33 percent of the total number of respondents followed by respondent who sold their produces through department arrangement only and both through department arrangement and intermediaries constituting 22.22 percent each. Respondents who sold directly through local markets stand at 16.67 percent and respondents who sold both directly and through intermediaries at 5.56 percent.

In Mamit district, respondents who sold their produces to the intermediaries contributed the highest number constituting 50 percent of respondents. Respondents who sold directly in the market constitute 25 percent followed by respondents who sold directly and to intermediaries with 18.75 percent and respondents who sold through department arrangement and to intermediaries constituting 6.25 percent.

Table No. 5.1.22: Marketing of the produces (Crop/Trade Wise)

SN	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
	Through Dept Arrangement		6		6	12	7.54
3	Both Sl No. 1 and 2	6	9	6		21	13.20
4	Both Sl No. 2 and 3	9	3		3	15	9.43
5	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. With regard to 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.

In respect of the number of respondents who sold their produces without any third party intervention, those with fruits are the highest in number constituting 40 percent. They are followed by respondents with vegetables contributing 30 percent, respondents with infrastructure accounts for 20 percent and respondents with flower constitute 10 percent only.

Regarding respondents who sold with the help of the arrangements made by the concerned department, both vegetables and infrastructure contributed 50 percent each. No respondents from fruits and vegetables utilised any departmental arrangement in marketing their produces.

Among the respondents who sold their produces by themselves and to the intermediaries, there is no respondent from infrastructure while vegetables constituted 42.86 and fruits and flower 28.57 percent each.

There are also some respondents who sold both to the intermediaries and through the department arrangement. Fruits constituted 60 percent followed by both vegetables and infrastructure constituting 20 percent each.

Respondents who do not have surplus produce for sale besides their own consumption accounts for 3.77 percent of the total respondents out of which eboth from fruits and infrastructure contributed 50 percent each.

Marketing Problem

Table No.5.1.23 represents 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, Serchhip and Mamit district, 57.89, 55.56 and 50 percent of respondents respectively have not experienced any difficulties in selling off their produces whereas 42.11, 44.44 and 50 percent from Kolasib, Serchhip and Mamit respectively are hampered by some problem in one way or another. Kolasib district has the highest percentage of respondents without problem whereas Mamit district has the highest percentage of respondents facing one or more problems in marketing their produces.

Table No. 5.1.23: 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
2	Serchhip	Fruit	12	3
		Vegetable	9	6
		Flower		12
		Infrastructure	9	3
3	Mamit	Fruit	15	3
		Vegetable		15
		Flower	NA	NA
		Infrastructure	9	6
4	Total		87	72
5	Percentage		54.72	45.28

With regard to the number of respondents with crop/trade having no issue in marketing, respondents with fruits constituted 41.38 percent followed by respondents with infrastructure- 37.93 percent, respondents with vegetables being 20.69 percent and all respondents with flower are found to have certain problems.

Regarding the number of respondents facing problems in marketing, respondents with fruits and infrastructure contributed 16.67 percent each while respondents with vegetables and flowers contributed 33.33 percent each. Thus, fruits witnessed highest number of respondents who could sell their produces without any obstacle while vegetables and flower have the highest number of respondents facing marketing problems.

Table No. 5.1.24: Nature of the Marketing Problems

SN	Nature of the Problem	Crop/Trade				Total
		Fruits	Vegetables	Flower	Infrastructure	
1	Due Lockdown during Pandemic	18	24	18	30	90
2	Competition with imported items		12			12
3	Less demand of the produces	12	18	12	6	48
4	Transportation Problem		6			6

The nature of problem and the number of respondents belonging to different crops/trades among those facing problems in marketing is highlighted in Table No. 5.1.24. Multiple responses have been stated in the course of 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. With regard to lockdown problem, respondents under infrastructure are found to have been the ones most disrupted in their activity followed by those with vegetables, fruits and flower respectively. However, it is expected that respondents facing issues due to lockdown would be able to recover with the lifting of the imposition of lockdown.

Producing more than what can be sold off in the available market (mostly local markets) is the second biggest problem in marketing. A number of respondents from all four trades have stated this as a problem faced as shown in the table above. The problem was found to be more profound with respondents undertaking vegetables particularly Chinese Cabbage. The reason cited being the unfamiliarity of the general masses with the particular vegetable. In contrast, there are also instances where the respondents, specifically those under infrastructure, have been unable to produce sufficient quantity to meet their own consumption requirement and for sale.

Another hurdle that has been faced is the competition that has arose due to the import of similar vegetables from other states. This is due to the fact that most imported items are lower in terms of the selling price and more affordable for the general masses.

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 No. 5.1.25: 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	Serchhip	Fruit	0	15
		Vegetable	3	12
		Flower	0	9
		Infrastructure	9	6
3	Mamit	Fruit	3	15
		Vegetable	3	12
		Flower		
		Infrastructure	3	12
4	Total		27	132
5	Percentage		16.98	83.01

Table No.5.1.25 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

16.98 percent of the respondents while 83.01 have not incorporated post harvest management processes.

With regard to the number of respondents who have undertaken the post harvest management activities, 44.44 percent are from Serchhip, 33.33 percent from Mamit and 22.22 percent are from Kolasib district. In respect of the respondents without any post harvest management activities, respondents from Kolasib district contributed the highest number constituting 38.64 percent, followed by Serchhip and Mamit with 31.82 and 29.54 percent respectively.

Regarding the number of respondents based on crop or trade who have undertaken post harvest management activities, infrastructure has highest number of respondents with 44.44 percent followed by fruits with 33.33 percent and 22.22 percent from vegetables. No respondent under flower have undertaken any post harvest management effort. Considering the number of respondents without post harvest management activities, fruits have the highest number constituting 29.55 percent, vegetables and infrastructure with 27.27 percent each and 15.91 percent from flower.

The post harvest management utilised by the respondents was mainly confined to use of cold storage facility. Only one respondent from Mamit district attempted at value addition by extracting the juice of pineapple. However, he was unable to continue the process as the juice had fermented during storage and was not permissible for sale within the state due to the implementation of total prohibition.

In regards to the cold storage there exist one each in Kolasib district and Serchhip district which are run by the concerned department. In Mamit district one private-owned cold storage has been set up. However, the respondents have stated that they are unable to utilise the cold storage facility for extended period due to the high electricity tariff which has to be borne by the users. 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 No. 5.1.26: Future Plan of the Respondents

SN	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	Serchhip	Fruit	0	12	Nil	3
		Vegetable	3	12	Nil	Nil
		Flower	Nil	12	Nil	Nil
		Infrastructure	Nil	12	Nil	Nil
3	Mamit	Fruit	Nil	15	Nil	3
		Vegetable	3	9	Nil	3
		Flower	NA	NA	NA	NA
		Infrastructure	3	12	Nil	Nil
4	Total		24	123	3	9
5	Percentage		15.09	77.35	1.88	5.66

Table No. 5.1.26 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 77.36 percent of respondents. They are followed by those who think they can grow and expand their activities even without additional assistance at 15.09 percent. 5.66 percent already gave up their activity while 1.89 percent are unable to specify their ability to continue who are confined to Kolasib district all being involved in vegetables component.

With regard to the number of respondents who are planning to grow and expand their activities, respondents in Kolasib district constituted 62.5 percent, Serchhip district has only 12.5 percent and Mamit district has 25 percent of the respondents.

The number of respondents who can continue their activities only with additional assistance are highest in Serchhip with 39.02 percent, followed by Kolasib with 31.71 percent and Mamit district with 29.27 percent.

There are those respondents who already quit their horticulture activities in Serchhip and Mamit district with 33.33 percent and 66.67 percent respectively whereas all respondents in Kolasib are still continuing their trade. However, there are respondents contributing 1.88 percent who do not have any plan for their future activity in Kolasib district.

When viewed from the perspective of the crop/trade those undertaking infrastructure component comprises the highest number of respondents who plan to expand their undertaking with or without assistance from the government or other organisation with 50 percent respondents while vegetables has 37.5 percent and fruits has 12.5 percent. There is no respondent with flower who has plans to grow and expand.

Among the respondents who can continue to carry out their activities only with further assistances, fruit has largest number of respondents constituting 31.71 percent. They are followed by infrastructure with 26.83 percent, vegetables with 21.95 percent and flower with 19.51 percent.

In respect of the number of respondents who have already quit their horticulture activities, fruit and vegetables constituted 66.67 and 33.33 percent respectively.

Additional Aid and Income Source

Table No. 5.1.27: Additional source of income

SN	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
2	Serchhip	Fruit	15	0
		Vegetable	12	3
		Flower	12	0
		Infrastructure	9	3
3	Mamit	Fruit	18	0
		Vegetable	9	6
		Flower	0	0
		Infrastructure	9	6
4	Total		141	18
5	Percentage		88.68	11.32

Table No. 5.1.27 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. Respondents who have other regular source of income are much higher in number constituting 88.68 percent in comparison to the 11.32 percent of respondents who solely depend on horticultural activities for their livelihood.

Kolasib district has the highest number wherein all respondents have other regular source of income. Meanwhile Serchhip district has 88.89 percent of respondents with regular source of income and 11.11 percent without any other income source. In Mamit district, 75 percent of respondents are involved in other economic activities for supplementing their income whereas 25 percent solely rely on horticultural activities for their livelihood.

With regard to respondents who are dealing with fruit and flower, all of them, at 100 percent, are engaged in other income generating activities whereas vegetables and infrastructure have constituted 78.57 percent and 80 percent respectively.

Regarding the number of respondents who do not have any other source of income, respondents with vegetables and infrastructure constituted 50 percent each while there is none from respondents with flower and fruits.

Table No. 5.1.28: 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
2	Serchhip	Fruit	6	9
		Vegetable	12	3
		Flower	6	6
		Infrastructure	12	0
3	Mamit	Fruit	12	6
		Vegetable	15	0
		Flower	0	0
		Infrastructure	9	6
4	Total		108	51
5	Percentage		67.92	32.08

As can be seen in Table No. 5.1.28 respondents receiving additional assistances/back up from the government stands at 67.92 percent while 32.08 have not received any back up other than assistance they received under the scheme.

In Kolasib district, 63.16 percent of respondents received back up assistance from the department while 36.84 percent have received assistance under the scheme only. Serchhip district has 66.67 percent of respondents who received additional back up and 33.33 percent who have not. In Mamit district, respondents who have and have not received any back up from the government are 75 and 25 percent respectively.

In respect of the number of respondents based on different crops/trade who received additional back up, vegetables contributed the highest number of respondents with 30.55 percent while other crops/trade such as fruits, infrastructure and flower contributed 27.78 percent, 25 percent and 16.67 percent respectively. With regard to respondents who are without additional back up, fruits and infrastructure constituted 35.29 percent each while vegetables has 17.65 percent and flower has 11.76 percent of respondents.

RKVY

Next to MIDH, Rashtriya Krishi Vikas Yojana (RKVY) is another important scheme implemented for the development of horticulture in Mizoram. Horticulture has been one of the components of the scheme; its contribution towards the expansion of area coverage under horticulture has been recognized. The amount of funds allocated and utilized has contributed towards several positive changes on many horticulture activities in the state. Since the inception of the scheme, more than 6 thousand lakhs has been spent to cover more than 10 thousand hectares of land and for undertaking other activities such as construction of community and individual water tanks, setting up of greenhouses, construction of roadside markets, etc. Regarding the number of districts covered in the implementation of the scheme, Lawngtlai and Siaha districts were excluded as they have been receiving separate funding due to their status of Autonomous District Council.

Gender Distribution

Table No. 5.2.1: Gender of the Respondents under RKVY

Sl No	Trade	District						Total		G Total	Percentage	
		Kolasib		Serchhip		Mamit		M	F		M	F
		M	F	M	F	M	F			M		
1	Fruit	24		12				36		36	29.03	
2	Vegetable	12	8	12				24	8	32	19.35	6.45
3	Spice					32	4	32	4	36	25.80	3.22
4	Infrastructure	12	4	4				16	4	20	12.90	3.22
5	Total	48	12	28		32	4	108	16	124	87.10	12.90

Table 5.2.1 shows the gender distribution of respondents under RKVY. In Kolasib district, there are 60 respondents with 48 (80 percent) males and 12 (20) females. In Serchhip district, there are 28 respondents. All of them are male. Mamit district has a total number of 36 respondents. Among them, there are 32 (88.89 percent) males whereas 4 (11.11 percent) are females.

The male respondents constituted 87.10 percent whereas female respondents are of 12.90 percent in the cumulative of the three districts. Out of the total number of 124 respondents, 36 (20.03 percent) respondents are under fruit crops. As can be seen in There are no female respondents undertaking fruit cultivation in all three selected districts.

The number of respondents under vegetable component of the scheme is 32 (25.81 percent), with a wide disparity between the genders. The male respondents were 24 in number (75 percent) while there were 8 (25 percent) females. Under the spice component there are 36 respondents. Under the scheme, only turmeric was undertaken in Mamit district out of all the districts under study. With regard to the number of respondents under infrastructure, there are 16 (80 percent) males whereas female respondents are only 4 in number constituting 20 percent.

Out of the total number of respondents in Mamit, male respondents are of 88.89 percent while female respondents constituted 11.11 percent only. Of the respondents from Serchhip district, there were no female respondents while Kolasib and Mamit districts had 20 and 11.11 percent female respondents respectively.

Educational Qualification

Table No. 5.2.2 shows the educational level acquired by the respondents in the three districts. Among the total number of 124 respondents, there is no respondent who is illiterate or any Post Graduate degree holders. Respondents who have passed Middle School standard are highest in number contributing 48.38 percent of the total number of respondents. They are followed by respondents who possess Graduation degree at 19.35 percent, 16.12 percent having studied up to High School Leaving Certificate (HSLC),

while 9.67 percent passed Primary School and 6.45 percent are with Higher Secondary Leaving Certificate (HSSLC).

Table No. 5.2.2: Educational Level of Respondents under RKVY

Sl No	Education Level	No of Respondents in Districts			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	Illiterate					
2	Primary School		4	8	10	9.67
3	Middle School	24	16	20	60	48.38
4	HSLC	12	4	4	20	16.12
5	HSSLC	4		4	8	6.45
6	Graduate	20	4		24	19.35
7	Post Graduate					

Kolasib district has the largest number of respondents possessing up to Middle School education at 24 accounting for 40 percent of the total respondents of the district. There were neither illiterates nor Post Graduate degree holders. Among the respondents of Serchhip district as well, there were no illiterates, HSSLC or Post Graduate degree holders. The highest number of respondents was those who studied up to Middle School at 16, that is, 57.14 percent of the respondents. Similar to the other two districts there are no illiterates, and Post Graduate degree holders in Mamit district too. However, unlike the other two districts there were no beneficiaries who were Graduates.

Marital Status

The marital status of the respondents in the three districts is shown in Table No. 5.2.3. Of the total respondents, 116 which constitute 93.54 percent of respondents are married and living with their family while 8 respondents i.e., 6.45 percent of the total

respondents are single. All respondents in Mamit district are married accounting for 29.03 of the total number of respondents in the three districts.

Table No. 5.2.3: Marital Status of Respondents under RKVY

Sl No	District	Married	Unmarried
1	Kolasib	56	4
2	Serchhip	24	4
3	Mamit	36	
4	Total	116	8
5	Percentage	93.54	6.45

In Kolasib and Serchhip districts, there are 4 unmarried respondents from each district constituting 6.67 percent and 14.28 percent of the number of respondents respectively. 56 respondents who constituted 93.33 percent in Kolasib and 24 respondents comprising 85.71 percent in Serchhip are married.

Age Groups

Table 5.2.4 depicts the age group of respondents in all the three selected districts. Respondents belonging to the age group of 51-60 are highest in number forming 35.48 percent of the total respondents while there are no respondents in the age group of 18-30 and below 18 years. Respondents in the age group of 41-50 stood second in terms of the number of respondents which constitute 32.25 percent. There are 28 respondents in the age group of 61-70 constituting 22.58 percent. The respondents are 8 in number in the age group of 71-80 and stood fourth. They constituted 6.45 percent of the total respondents. The age group of 31-40 has only 4 respondents whose percent stands at

3.22. Only Mamit district has no respondents who are 70 or more years old. Likewise, respondents belonging to the age group of 18-30 are found only in Serchhip district.

Table No. 5.2.4: Age Group of Respondents under RKVY

SN	Category	District			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	Below 18					
2	18-30					
3	31-40	4			4	3.22
4	41-50	12	12	16	40	32.25
5	51-60	24	4	16	44	35.48
6	61-70	16	8	4	28	22.58
7	71-80	4	4		8	6.45

The differences in the age distribution may be due to the fact that the lower age groups are still learning in schools and colleges or searching for better jobs to earn more in urban areas. Meanwhile the upper age group of 71 – 80 years contributed lesser number due to health deterioration and lack of stamina caused by age.

Trades Undertaken

The number of respondents based on the activity carried out under the scheme is shown in Table 5.2.5. Respondents who are dealing with fruits and spices within the areas under study are highest in number with 29.03 percent each. They are followed by respondents under vegetables who constituted 25.80 percent and respondents under infrastructure who comprises 16.12 of the total number of respondents. As already stated

both Kolasib and Serchhip districts have respondents in all trades except spice whereas Mamit district implement only the spice component.

Among the 36 respondents with fruits, Kolasib district has contributed the highest number constituting 66.66 percent respondents whereas Serchhip district contributes 12 respondents who represent 33.33 percent.

Table No. 5.2.5: No of Trade/Crop undertaken by the Respondents under RKVY

SN	Trade	District			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	Fruits	24	12		36	29.03
2	Vegetables	20	12		32	25.80
3	Spice			36	36	29.03
4	Infrastructure	16	4		20	16.12

With regards to the number of respondents under vegetable, Kolasib contributed 20 respondents whose percentage stands at 62.5 while Serchhip district has 12 respondents who constituted 46.87 percent.

In respect of the number of respondents with spice, all the 36 respondents hailed from Mamit district only. Under infrastructure component, respondents in Kolasib are 16 in number while Serchhip has only 4 respondents.

Land Holding

The table below shows the land holding status of respondents in terms of area. Respondents having 1-2 hectare of land contributed the highest number among the respondents with 29.03 percent while respondents having 5-6 hectares of land contributed the least number constituting 3.22 percent only. Respondents having 3-4

hectares of land stood second in terms of area of land owned with 28.22 percent followed by 23.38 percent of respondents with 2-3 hectares of land

Table No. 5.2.6: Land Holding Status (Area) under RKVY

District	Crop/Trade	Below 1 Hectare	1-2 Hectare	2-3 Hectare	3-4 Hectare	4-5 Hectare	5-6 Hectare	6 or more Hectare
Kolasib	Fruit	8	4		4	4		
	Veg			8	12		4	
	Spice							
	Infra		4	4	4	4		
Serchhip	Fruit			4	4	4		
	Veg		4	8				
	Spice							
	Infra			1	3			
Mamit	Fruit							
	Veg							
	Spice		24	4	8			
	Infra							
Total		8	36	29	35	12	4	
Percentage		6.45	29.03	23.38	28.22	9.67	3.22	

As can be seen in Table No. 5.2.6, all respondents having less than 1 hectare of land and 5-6 hectare of land belong to Kolasib district only. With regard to the number of respondents having 1-2 hectare of land, respondents in Mamit district contributed the largest number at 24 while Kolasib and Serchhip contributed 8 and 4 respondents respectively. In respect of the number of respondents having 2-3 hectare of land, there are 13 respondents in Serchhip district followed by Kolasib district with 12 respondents and Mamit with 4 respondents only. Among the 35 respondents having 3-4 hectare of

land, Kolasib contributed 20 respondents whereas there are 8 in Mamit and 7 in Serchhip district. Only Kolasib and Serchhip have respondents having 4-5 hectare of land with a number of 8 and 4 respectively.

Land Ownership

Table No. 5.2.7: Land Ownership Status of the Respondents under RKVY

1	District	Crop/Trade	Owned	Rented
2	Kolasib	Fruit	24	
		Veg	20	
		Spice		
		Infrastructure	16	
3	Serchhip	Fruit	12	
		Veg	8	4
		Spice		
		Infrastructure	4	
4	Mamit	Fruit		
		Veg		
		Spice	28	8
		Infrastructure		
5	Total		112	12
6	Percentage		90.32	9.67

The above table 5.2.7 depicts the land ownership status of the respondents. Out of the total of 124 respondents 112 (90.32 percent) possesses the land on which they are undertaking the scheme while 12 (9.67 percent) respondents are working on land owned by others. It may be highlighted here that respondents dependent on land owned by

others do so free of cost. Such lands are mostly owned by other beneficiaries who possess larger area of land as they are more convenient to establish clustering.

It is found that Kolasib district has got the highest number of land owners at 60 while there are none who were undertaking their activity on rented land. In Serchhip district, 24 respondents could undertake their activities on their own land while 4 depended on the land of others. 28 respondents in Mamit carried out their horticultural activities on their own land whereas 8 respondents need to depend on others land.

Among the respondents who had undertaken their horticultural activity on their own land under the scheme, the maximum number are those involved in fruit component at 32.14 percent, vegetable and spice contributed 25 percent each while infrastructure constituted 17.86 percent.

With regard to the total number of respondents depending on rented land in the three districts, there are 8 respondents with spice constituting 66.67 percent and 4 respondents with vegetables who constituted 33.33 percent of the total while those with fruit and infrastructure component are all found to be working on their own land.

Assistance to Beneficiaries

Table No 5.2.8 reflects whether respondents received assistance in cash or kind. 22(17.74 percent) respondents received assistance in cash only while 66 (53.22 percent) received assistance in kind only. 36(29.03 percent) received assistance both in cash and kind. With regard to the number of respondents receiving assistance in cash only, respondents with infrastructure constituted 45.45 percent being the highest followed by spice constituting 36.36 percent respondents and vegetables with 18.18 percent of the total respondents. No respondent belonging to fruit component received assistance in cash only.

In respect of the number of respondents who received assistance in kind only, fruits comprise 48.48 percent of the respondents, vegetables 36.36 percent, infrastructure 9.09 percent and spice 6.06 percent. Out of the 36 respondents who received assistance

both in cash and in kind, spice constituted 66.67 percent while infrastructure, fruits and vegetables contributed 11.11 percent each.

Table No. 5.2.8: Form of Assistance Received (Cash or Kind) under RKVY

SN	District	Crop/Trade	In Cash	In Kind	Both
1	Kolasib	Fruit		24	
		Vegetable	4	12	4
		Spice			
		Infrastructure	8	4	4
2	Serchhip	Fruit		8	4
		Vegetable		12	
		Spice			
		Infrastructure	2	2	
3	Mamit	Fruit			
		Vegetable			
		Spice	8	4	24
		Infrastructure			
4	Total		22	66	36
5	Percentage		17.74	53.22	29.03

The Table No. 5.2.9 relates the number of installments received by respondents. 36 respondents which accounts for 29.03 percent received assistance only once while those who received assistance twice or thrice or more are similar in number comprising 35.48 percent each.

Table No. 5.2.9: No. of Installments of Assistance Received under RKVY

SN	District	Crop/Trade	1 Instalment	2 instalments	3 or more instalments
1	Kolasib	Fruit	4		20
		Vegetable	8	12	
		Spice			
		Infrastructure		16	
2	Serchhip	Fruit	8	4	
		Vegetable	4		8
		Spice			
		Infrastructure	4		
3	Mamit	Fruit			
		Vegetable			
		Spice	8	12	16
		Infrastructure			
4	Total		36	44	44
5	Percentage		29.03	35.48	35.48

In Kolasib district, 20 percent received assistance as one time assistance, another 46.67 percent received two instalments and 33.33 received three times or more. In Serchhip district, 16 respondents which constituted 57.14 percent received assistance only once, 14.29 percent twice and 28.57percent thrice or more. In Mamit district, 8

respondents which accounts for 22.22 percent received assistance once, 33.33 percent twice and 44.44 percent received three or more instalments.

Among the fruit respondents, 33.33 percent respondents received one instalment, 11.11 percent received two instalments and 55.56 percent received three or more instalments. With regard to the number of respondents with vegetables, those who received assistance only once and twice are similar in number and constituted 37.5 percent each while 25 percent received assistance three or more than three times.

Among the respondents with spice 22.22 percent received assistance only once, another 33.33 percent twice and 44.44 percent thrice or more. In respect of the respondents with infrastructure, 20 percent received assistance once; another 44.44 percent twice and none received thrice or more.

Timely Receipt of Assistance

The table below reveals whether respondents received assistance on time. 92.55 percent could receive assistance on time without any delay whereas 6.45 percent witness delay in receiving assistance.

In Kolasib district all respondents could receive assistance on time while Serchhip and Mamit have 4 respondents each who could not receive assistance on time.

All respondents under the component of fruits received assistance on time. With regards to the number of the respondents with vegetables, 28 (87.5 percent) received assistance on time while 12.5 percent failed to receive on time. 32 respondents in spice who constituted 88.89 percent received assistance on time while 11.11 percent failed to do so. In respect of the respondents with infrastructure, all respondents could get assistance on time.

Table No. 5.2.10: Timely Receipt of Assistance under RKVY

SN	District	Crop/Trade	Yes	No
1	Kolasib	Fruit	24	
		Vegetable	20	
		Spice		
		Infrastructure	16	
2	Serchhip	Fruit	12	
		Vegetable	8	4
		Spice		
		Infrastructure	4	
3	Mamit	Fruit		
		Vegetable		
		Spice	32	4
		Infrastructure		
4	Total		116	8
5	Percentage		92.47	6.45

Membership in Farmer's Interest Group (FIG)

Table 5.2.11 shows respondents' membership in any association or society related to their horticulture activities. 70.97 percent are registered in one or more associations related to their horticulture activities while 29.03 percent do not have membership in any related association. In Kolasib district, 40 percent are members of their activity related association whereas 60 percent does not belong to any association. Serchhip and Mamit district has 100 percent membership in their activity related association.

Table No. 5.2.11: Membership in FIG

Sl No	District	Crop/Trade	Yes	No
1	<i>Kolasib</i>	Fruit	16	8
		Vegetable		20
		Spice		
		Infrastructure	8	8
2	<i>Serchhip</i>	Fruit	12	
		Vegetable	12	
		Spice		
		Infrastructure	4	
3	<i>Mamit</i>	Fruit		
		Vegetable		
		Spice	36	
		Infrastructure		
4	<i>Total</i>		88	36
5	<i>Percentage</i>		70.97	29.03

In relation to the components among the respondents with fruit, 77.78 percent are members of their activity related association/society while 22.22 percent does not join any. Among the vegetable respondents, 37.5 percent are members of related association while 62.5 percent are not. With regard to spice respondents, 100 percent of the respondents are with related association being the only component with all respondents having membership. Among the respondents with infrastructure, 60 percent are members of associations related to their horticulture activity whereas 40 percent are without any membership.

Participation in Training under the scheme

Table 5.1.12 highlights whether the respondents attended training/s organised for their activity under the scheme. 71.42 percent attended one or more trainings whereas 22.58 percent did not attend any. In Kolasib district, 93.33 percent attended at least one training whereas 6.67 percent did not attend any.

Table No. 5.2.12: Whether attended Training (s)?

SN	District	Crop/Trade	Yes	No
1	Kolasib	Fruit	20	4
		Vegetable	20	
		Spice		
		Infrastructure	16	
2	Serchhip	Fruit	4	8
		Vegetable	8	4
		Spice		
		Infrastructure	4	
3	Mamit	Fruit		
		Vegetable		
		Spice	24	12
		Infrastructure		
4	Total		96	28
5	Percentage		77.42	22.58

In Serchhip district, 57.14 percent attended training while 42.86 percent did not participate in any training. In Mamit district those who have attended training accounts for 66.67 percent while those who have not constitutes 33.33 percent.

Among the fruit respondents, 66.67 percent attended training and 33.33 percent have not. With regard to vegetables, the numbers of respondents who have attended training are of 87.5 percent while 12.5 percent have not attended any. With respect to respondents with spice, 24 respondents which constituted 66.67 percent could

successfully undergo at least one training session but 33.33 percent did not participate in any training. Among the respondents with infrastructure, all of them have attended one or more training organised for their activities.

Table No. 5.2.13: Is/Are Training (s) Helpful?

SN	District	Crop/Trade	Yes	No
1	Kolasib	Fruit	20	
		Vegetable	20	
		Spice		
		Infrastructure	16	
2	Serchhip	Fruit	4	
		Vegetable	4	4
		Spice		
		Infrastructure	4	
3	Mamit	Fruit		
		Vegetable		
		Spice	20	4
		Infrastructure		
4	Total		88	8
5	Percentage		91.66	8.33

As shown in Table No 5.2.13, 91.67 percent have found the training(s) attended by them helpful in the course of their work whereas 8.33 percent felt that their training were not that helpful in relation to their performance in the chosen component of the scheme. A number of them cited that a number of the skills and processes imparted during the course of training were difficult to practice on farm.

In Kolasib district, 100 percent thought that the training organised under the scheme are helping them in their activities. But in Serchhip district, 75 percent of the attendees are of the opinion that their training helped them in their works while 25

percent did not agree with them. In Mamit district 20 respondents who had attended trainings found that it enhanced their capacity in performing their farming activity but another 4 are of the opinion that the trainings did not contribute towards enhancement of their activities.

With regard to the number of respondents under the fruit and infrastructure component, 100 percent agreed that trainings were helpful in their course of work. Among the respondents with vegetables who attended training, 24(85.71 percent) respondents thought that trainings helped them and there are 4 respondents (14.29 percent) who have the opposite opinion. In respect of the number of respondents among the spice growers under the scheme, 88.33 percent cited having gained skills and knowledge from their training and 16.67 percent respondents did not benefit from their training.

Extension Services

Table 5.2.14 shows whether respondents under the scheme had received any extension guidance from the implementing agency. Technical/extension guidance from the concerned Department was received by 70.97 percent of the respondents in the course of their work whereas 29.03 percent did not receive any guidance.

Among the respondents in Kolasib district, 73.33 percent received guidance from the concerned Department whereas 26.67 percent carried out their activities on their own without any external guidance. In Serchhip district respondents comprising 85.71 percent were given technical or extension guidance at least once while 14.28 did not received any. 55.56 percent received guidance in Mamit district, while 44.44 percent carried out their work without any guidance.

Of the respondents with fruit, 77.78 percent were given guidance from the Department more than once while 22.22 percent did not received any guidance or supervision. In respect of the number of respondents with vegetables, 87.5 percent received guidance from the Department and 12.5 percent worked without any guidance. With regard to the respondents under spice, 55.56 percent received guidance or supervision whereas 44.44 percent of them worked on their own. All respondents under

infrastructure were given extension guidance from the concerned Department through technical staff.

Table No. 5.2.14: Whether received technical/extension Guidance?

SN	District	Crop/Trade	Yes	No
1	Kolasib	Fruit	20	4
		Vegetable	16	4
		Spice		
		Infrastructure	8	8
2	Serchhip	Fruit	8	4
		Vegetable	12	
		Spice		
		Infrastructure	4	
3	Mamit	Fruit		
		Vegetable		
		Spice	20	16
		Infrastructure		
4	Total		88	36
5	Percentage		70.96	29.03

Table no 5.2.15 enumerates the number of respondents who received inspection and monitoring from the Department to make sure that assistances rendered were utilized as stipulated in the scheme. 70.97 were inspected and monitored by the Department whereas 29.03 percent were not.

Table No. 5.2.15: Inspection and Monitoring under RKVY

SN	District	Crop/Trade	Yes	No
1	Kolasib	Fruit	20	4
		Vegetable	16	4
		Spice		
		Infrastructure	8	8
2	Serchhip	Fruit	8	4
		Vegetable	12	
		Spice		
		Infrastructure	4	
3	Mamit	Fruit		
		Vegetable		
		Spice	20	16
		Infrastructure		
4	Total		88	36
5	Percentage		70.97	29.03

With regard to the number of inspected respondents, 77.78 percent respondents of fruit, 87.5 percent respondents of vegetables, 55.56 percent of spice and 60 percent of infrastructure component were inspected by the Department at least once or more whereas the Department neither monitored nor inspected 22.22 percent, 12.5 percent, 44.45 percent and 40 percent from fruit, vegetable, spice and infrastructure respectively. Out of all the three districts, Kolasib has got the highest number of respondents who were inspected and monitored at 44 (73.33 percent), followed by Serchhip district at 24 (85.71) percent and the least number at Mamit with 55.56 percent having been inspected and monitored.

Problems and Issues of Respondents

Table No 5.2.16 depicts the number of respondents who have problems and those who have no problems or issues in the course of their activities under the scheme. 64.52 percent are facing some problems while 35.48 percent respondents carried out their activities without facing any big obstacle.

Table No. 5.2.16: No of Respondents with and without problems and issues in the course of work

SN	District	Crop/Trade	No of Respondents with Problems	No of Respondents without Problems
1	Kolasib	Fruits	20	4
		Vegetable	16	4
		Spice		
		Infrastructure	8	8
2	Serchhip	Fruit	8	4
		Vegetable	8	4
		Spice		
		Infrastructure	4	
3	Mamit	Fruit		
		Vegetable		
		Spice	16	20
		Infrastructure		
4	G. Total		80	44
5	Percentage		64.52	35.48

In Kolasib district, 73.33 percent of respondents have been facing one or more problems which hampered their works while 26.67 percent have not witnessed any issues. In Serchhip and Mamit district, respondents facing difficulties in their course of work are 71.43 percent and 44.44 percent respectively. Respondents who have not faced any issue in Serchhip are 28.57 percent and in Mamit it is 55.56 percent.

With regard to the number of respondents with problems in their horticulture activities under the scheme, 71.79 percent of respondents from fruits, 75 percent of respondents from vegetables, 44.45 percent from spices and 60 percent from infrastructure have faced one or more problems. Among the respondents who have not faced any problems, spices component has 55.56 percent followed by infrastructure constituting 40 percent, vegetables have 25 percent respondents and respondents with fruits are contributing 22.22 percent.

Table No. 5.2.17 shows the nature of problems faced by the respondents with problems while carrying out their horticulture activities under the scheme with multiple responses. Out of the total number of respondents with problems those facing the problem of pests are the highest in number constituting 45 percent which is followed by both poor quality of planting materials and theft with 15 percent each, poor quality of soil, plant diseases and natural calamities with 10 percent each. Scarcity of water, scarcity of fertilizers, unsuitable location of farm and wild animals were also among the serious issue faced by the respondents contributing 5 percent each.

In Kolasib district, respondents who have been dealing with the pest problem are highest in number constituting 36.36 percent followed by both poor quality of planting materials with 27.27 percent, natural calamities, poor quality of soil and theft with 18.19 percent each and scarcity of water and scarcity of fertilizers with 9.09 percent.

In Serchhip district as well, pests has been the biggest problem faced by most of the respondents who constituted 50 percent. They are followed by respondents facing problems such as plant diseases, theft and encroachment by wild animals constituting 16.67 percent each.

In Mamit district, the number of respondents who have faced pest problem is highest contributing 50 percent. They are followed by plant diseases and inappropriate location of farm whose percent stands at 25 each.

Table No. 5.2.17: Nature of the Problems and Issues (District wise)

SN	Problem/Issue	No of Respondents in Districts			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	Scarcity of water	4			4	5
2	Poor quality of Soil	8			8	10
3	Plant Disease		4	4	8	10
4	Poor Quality of Planting Materials	12			12	15
5	Scarcity of fertilizers	4			4	5
6	Storms/Flood/ other calamities	8			8	10
7	Insufficient Assistance					
8	Pest	16	12	8	36	45
9	Theft	8	4		12	15
10	Inappropriate Location of Farm			4	4	5
11	Wild Animals		4		4	5

As depicted in Table No. 5.2.18, among the respondents of fruits with problems, pest problem has been the biggest problem being faced by 13 respondents while plant disease and attack of wild animals have been faced by the least number of respondents with 2 respondents each. For vegetable growers, the number of respondents facing the problem of pests is the highest with 7 respondents while 2 respondents each are facing problems associated with scarcity of water, plant diseases, poor quality planting materials, natural calamities and wild animals. With regard to the number of respondents undertaking spices, 6 respondents are facing pest problems while scarcity of fertilizers and natural calamities are the problems for 2 respondents each. In respect of the infrastructure component, 10 respondents encountered pest problems followed by 4 respondents each facing problems with plant diseases and natural calamities. Scarcity of water is the problem faced by the least number accounted for 1 respondent only.

Table No. 5.2.18: Nature of the Problems (Trade Wise)

SN	Problem/Issue	No of Respondents (Crop/Trade Wise)				Total
		Fruit	Vegetable	Spice	Infrastructure	
1	Scarcity of water	1	2		1	4
2	Poor quality of Soil	4	4			8
3	Plant Disease	2	2		4	8
4	Poor Quality of Planting Materials	10	2			12
5	Scarcity of fertilizers			2	2	4
6	Storms/Flood/ other calamities		2	2	4	8
7	Pest	13	7	6	10	36
8	Robbery	8	4			12
9	Wild Animals	2	2			4

Labour Utilisation

As can be seen in Table No. 5.2.19, farmers employing regular labour accounted for 33.06 percent of the respondents while those employing labour occasionally are at 66.93 percent. There are no respondents under the scheme who could not carry out their activities without employing additional labour.

In Kolasib District, 46.67 percent of respondents hired additional labour regularly to carry out their horticulture works whereas 53.33 percent depends upon additional labour occasionally. In Serchhip district also, 17.86 percent of the respondents rely on additional labour on regular basis while the percentage of respondents with occasional additional labour is 82.14

Table No. 5.2.19: Utilisation of Labour

Sn	District	Trade	Farmers with additional Labour (Regular)	Farmers with additional labour (Occasional)	Farmers without additional labour
1	Kolasib	Fruits	16	8	
		Veg	8	12	
		Spice			
		Infra	4	12	
		Total	28	32	
2	Serchhip	Fruit	4	8	
		Veg		12	
		Spice			
		Infra	1	3	
		Total	5	23	
3	Mamit	Fruit			
		Veg			
		Spice	8	28	
		Infra			
		Total	8	28	
4	G. Total		41	83	
5	Percentage		33.06	66.93	

In Mamit district, only 22.22 percent of respondents employed regular additional labour while 77.78 percent of respondents depend on occasional labour. There are no respondents who do not need additional labour.

It may be stated that even respondents who regularly depend on others do not employ labour throughout the year. However, they are said to be fully dependent on the additional hands for all the labour intensive farming activities such as clearing, weeding, sowing and harvesting.

In relation to the components, those under fruit employing additional regular labour constitute 55.56 percent of the respondents, while those employing additional labour occasionally accounts for 44.44 percent. Under vegetables, 25 percent employ additional regular labour, 75 percent are with occasional additional labour. The number of respondents employing additional labour regularly under the spice component stands at 22.22 percent of the total respondents in the trade. The percentage of those employing occasional labour accounts for 77.78 percent. All respondents in the component utilises the services of others either regularly or occasionally. In infrastructure, regular employment of additional labour is undertaken by 25 percent respondents whereas occasional additional labour is employed by 75 percent.

In addition to the employment opportunities provided to the horticulture farmers through the scheme, those employing additional labour contributes towards providing employment for others.

Table No. 5.2.20 reveals the trade-wise average monetary profits of respondents under RKVY. Among the respondents those who have not made any profit are 19.35 percent of which 83.33 percent are respondents with fruit, 16.67 percent with spice. There are 4 respondents from infrastructure alone which constitute 3.23 percent of the total number of respondents who could make profit below Rs 10,000 per annum. Respondents who could make profit between Rs 10,000 - 29,000 are from both fruits and vegetables constituting 3.22 percent each.

Among the 12.90 percent respondents with profit of Rs 30,000-49,000, vegetables and infrastructure constituted 25 percent each, spice with 50 percent. Out of the 38.70 percent of respondents with a profit of Rs.50,000 - 99,000, 16.67 percent are from fruits, 25 percent each are from vegetables and infrastructure, 33.33 percent are from spice.

9.67 percent of total respondents could make a profit of 1-1.9 lakh. Among these respondents, 33.33 percent each are respondents with fruits, vegetables and spice. A minute percentage of 6.46 of the total respondents could make a profit of 2 - 2.9 lakhs. This profit could be made only by respondents under fruits. With regard to the number

of respondents who can make 3-3.9 lakhs profit, there are 3 respondents from infrastructure component constituting 3.22 percent of the total respondents.

Table No. 5.2.20: Yearly Average Monetary Profit of Respondents (Crop Wise) under RKVY

SN	Profit	No of Respondents				Total	Percentage
		Fruit	Vegetable	Spice	Infrastructure		
1	No Profit	20		4		24	19.35
2	Below 10000			4		4	3.23
3	10000-29000	4	4			8	6.45
4	30000-49000		4	8	4	16	12.90
5	50000-99000	8	12	16	12	48	38.70
6	1 Lakh-1.9 lakh	4	4	4		12	9.67
7	2 lakh-2.9 lakh		8			8	6.45
8	3 lakh-3.9 lakh				4	4	3.23
9	4 Lakh-4.9 Lakh						
10	5 lakh- 5.9 lakh						

Table No. 5.2.21 highlights the average district-wise monetary profits of the respondents under RKVY. 19.35 percent of respondents failed to make any profit, with 16.13 and 3.23 percent from Kolasib and Mamit district respectively, while all respondents from Serchhip district could make a certain level of profit.

Respondents who could make a profit of less than Rs. 10,000 are from Mamit district at 3.22 percent of the total number of respondents. Those with a profit in the range of Rs. 10,000 – 29,000 in a year all hail from Kolasib and Serchhip districts

totalling to 6.45 percent which is equally shared by the two districts. Among the 12.90 percent of respondents with profit amounting Rs 30000-49000, Kolasib district and Mamit district contribute 50 percent each. 38.70 percent of the respondents from all three districts could make a profit of Rs 50000-99000, with Kolasib, Serchhip and Mamit districts constituted 41.67, 25 and 33.33 percent respectively.

Table No. 5.2.21: Yearly Average Monetary Profit of Respondents (District Wise)

Sn	Profit	Kolasib	Serchhip	Mamit	Total	Percentage
1	No Profit	20		4	24	19.35
2	Below 10000			4	4	3.23
3	10000-29000	4	4		8	6.45
4	30000-49000	8		8	16	12.90
5	50000-99000	20	12	16	48	38.70
6	1 Lakh-1.9 lakh	4	4	4	12	9.67
7	2 lakh-2.9 lakh		8		8	6.45
8	3 lakh-3.9 lakh	4			4	3.23
9	4 Lakh-4.9 Lakh					
10	5 lakh- 5.9 lakh					

In respect of profit of Rs 1-1.9 lakh, respondents from Kolasib, Serchhip and Mamit district contributed 9.67 percent. Only Serchhip district has respondents who could make a profit of Rs 2-2.9 lakh. They constituted 6.45 percent of the total number of respondents. Further, with regard to a profit of Rs 3-3.9 lakh, only Kolasib district has respondents constituting 3.23 percent.

The different mechanisms for selling off the produces by the respondents are reflected in Table No. 5.2.22. Respondents who sold their produces to the intermediaries are highest in number with 36.29 percent followed by 25.81 percent who could not sell their produces in the market. 13.71 percent sold both directly and through

intermediaries. While 12.90 percent sold their produces through the arrangement made by the concerned department, 11.29 percent sold directly in the market.

Table No. 5.2.22: Marketing of the Produces

SN	Mode of selling	No of Respondents in Districts			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	Sold directly	4	10		14	11.29
2	Sold to Intermediaries	20	13	12	45	36.29
3	Both Sl No 1 and 2	8	5	4	17	13.71
4	Through Dept Arrangement			16	16	12.90
5	Both Sl no 2 and 4					
6	Not Sold	28		4	32	25.81
	Total	60	28	36	124	100

Similar to MIDH the intermediaries are mostly people of the state who procure the items for resale at higher prices in the urban areas. Collection of the produces is done by the buyers on- site at the farm on cash payment. Some intermediaries also obtain the items from the farmers on credit and pay at a later date. 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. The Horticulture Department has provided its input through creation of infrastructure, that is, road-side market for the farmers. The department helped in the distribution of the produces to the consumers

through the Local Task Force constituted at the village and local level during the COVID-19 pandemic.

In Kolasib district, those respondents who sold their produces to intermediaries are 20 in number constituting 33.33 percent of the total number of respondents of the district. They are followed by both respondents who sold directly and to the intermediaries constituting 13.33 percent and those who sold directly in the market only which accounted for 6.67 percent. However, there are respondents who did not sell their produces through any medium contributing 46.67 percent of respondents.

In Serchhip district, respondents who sold their produces to the intermediaries are highest in number with 46.43 percent of the total number of respondents in the district followed by respondent who sold their produces directly in the market only constituting 37.71 percent and those who sold in the market and to the intermediaries comprising 17.86 percent.

In Mamit district, respondents who sold their produces through the arrangement made by the concerned department are highest in number with 44.44 percent. Respondents who sold to the intermediaries constitute 33.33 percent followed by respondents who sold directly and to intermediaries as well as those who utilised their produces only for their family consumption with 11.11 percent each.

As shown in Table 5.2.23, every crop/trade except infrastructure under the scheme also witnessed the highest number of respondents to have sold their produces to the intermediaries standing at 36.29 percent. With regard to their number, respondents with vegetables constituted 40 percent followed by both fruits and spice with 26.67 percent each and infrastructure with 6.67.

In respect of the 11.29 percent of respondents who sold their produces without any third party intervention, those with fruits are the highest in number constituting 57.14 percent. They are followed by respondents with vegetables contributing 28.57 percent and respondents with infrastructure accounts for 14.29 percent.

Regarding respondents who sold with the help of the arrangements made by the concerned Department, only spice has respondents which accounted for 12.91 percent of the total number of respondents.

Table No. 5.2.23: Marketing of the produces (Crop/Trade Wise)

SN	Mode of selling	No of Respondents (Crop/Trade Wise)				Total	Percentage
		Fruits	Vegetables	Spice	Infrastructure		
1	Sold directly	8	4		2	14	11.29
2	Sold to Intermediaries	12	18	12	3	45	36.29
3	Both Sl No. 1 and 2		9	4	4	17	13.71
4	Through Dept Arrangement			16		16	12.90
5	Both Sl No. 2 and 4						
6	Not Sold	18	4	4	6	32	25.81
		38	35	36	15	124	100

Among the total respondents of 13.71 percent who sold their produces by themselves and to the intermediaries, there is no respondent from fruits while vegetables constituted 52.94 and spice as well as infrastructure contributed 23.53 percent each.

Respondents who do not have surplus produce for sale besides their own consumption accounts for 25.81 percent with 56.25 percent, 18.75 percent from fruits and infrastructure components. Meanwhile, vegetables and spice contributes 12.5 percent each.

Table No. 5.2.24: Problems/ Issues in selling off the produces

SN	District	Crop/Trade	Respondents with no problem	Respondents with problem
1	Kolasib	Fruit	4	20
		Vegetable	12	8
		Spice		
		Infrastructure	8	8
2	Serchhip	Fruit	12	
		Vegetable	4	8
		Spice		
		Infrastructure	4	
3	Mamit	Fruit		
		Vegetable		
		Spice	16	20
		Infrastructure		
4	Total		60	64
5	Percentage		48.38	51.61

Table No.5.2.24 represents the number of respondents with problems and those having no problem in marketing their produces. 48.39 percent of respondents could sell their produces without any obstacle whereas 52.61 percent are facing some problem in marketing their produces.

In Kolasib, Serchhip and Mamit district, 40, 71.42 and 44.44 percent of respondents respectively have not experienced any difficulties in selling off their produces whereas 60, 28.57 and 55.56 percent from Kolasib, Serchhip and Mamit respectively are hampered by some problem in one way or another. Kolasib district has the highest percentage of respondents without problem whereas Mamit district has the

highest percentage of respondents facing one or more problems in marketing their produces.

With regard to the number of respondents having no issue in marketing, respondents with fruits, vegetables and spices contributed 26.67 percent each. They are followed by respondents under infrastructure with 20 percent.

Regarding the number of respondents facing problems in marketing, respondents with fruits and spice contributed 31.25 percent each while respondents with vegetables contributed 25 percent and respondents under infrastructure contributed 12.5 percent.

Thus, fruits and vegetables witnessed equal number of respondents who could sell their produces without any obstacle while the highest number of respondents facing marketing problems belongs to both fruits and spice.

Table No. 5.2.25: Nature of the Marketing Problems

SN	Nature of the Problem	Crop/Trade				Total	Percentage
		Fruit	Vegetable	Spice	Infrastructure		
1	Lockdown due to Pandemic	4	4	4		12	18.75
2	Excessive produces		8		4	12	18.75
3	Poor harvest of imported Planting material	18				18rr	25
4	Unstable Market	4	4	18		26	37.5

The nature of the problem and the number of respondents belonging to different crops/trades among those facing problems in marketing is highlighted in Table No. 5.2.25. Multiple responses have been stated in the course of the interview with the beneficiaries. Unstable market has been the biggest problem which the respondents have encountered. With regard to unstable market, respondents under spice are found to have

been the ones most disrupted in their activity followed by those with both fruits and vegetables.

Poor quality of the produces is the second biggest marketing problems faced by respondents under the scheme. Respondents under fruits who are undertaking the cultivation of imported planting materials are adversely affected by this problem; as such materials appear to be unsuitable for cultivation in the state. Though the fruiting quantity is huge, they are not marketable due to their poor quality.

Producing more than what can be sold off in the local markets and inability of producing in quantities sufficient for export coupled with the recent imposition of a series of lockdown during the Covid-19 pandemic are also creating problems in marketing. A number of respondents from all trades except infrastructure have stated these as a problem faced as shown in the table above. However, it is expected that respondents facing issues due to lockdown would be able to recover after the lifting of the imposition of lockdown.

Table No. 5.2.26: Whether Post Harvest Management is utilised

Sl No	District	Crop/Trade	No. of Respondents with PHM	No. of Respondents with no PHM
1	Kolasib	Fruit		24
		Vegetable		20
		Spice		
		Infrastructure		16
2	Serchhip	Fruit		12
		Vegetable		12
		Spice		
		Infrastructure		4
3	Mamit	Fruit		
		Vegetable		
		Spice	12	24
		Infrastructure		

4	Total	12	112
5	Percentage	9.68	90.32

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 9.68 percent of the respondents while 90.32 have not incorporated post harvest management processes.

With regard to the number of respondents who have undertaken the post harvest management activities, respondents from Mamit district only are undertaking post harvest management activities. In respect of the respondents without any post harvest management activities, respondents from Kolasib district contributed the highest number constituting 53.57 percent of the total respondents, followed by Serchhip and Mamit with 25 and 24.43 percent respectively.

Regarding the number of respondents based on crop or trade who have undertaken post harvest management activities, only respondents undertaking spice are carrying out post harvest management activities. No respondents under fruits, vegetables and infrastructure have undertaken any post harvest management effort.

Future Plans of the Respondents

Table No. 5.2.27 reflects the future plans of the respondents in relation to the continuance of their trades. Respondents who think that they can continue their horticulture activities only with assistance from the government or any other source are highest in number constituting 50 percent of the total number of respondents. They are followed by those who think they can grow and expand their activities even without additional assistance at 20.97 percent. 19.35 percent already gave up their activity while 9.68 percent are giving up on their crop and plan to undertake a new crop.

With regard to the number of respondents who are planning to grow and expand their activities without further assistance, respondents in Kolasib district constituted

92.31 percent while Serchhip district has only 7.69 percent. There are no respondents who think they can grow or expand on their own in Mamit district.

The number of respondents who can continue their activities only with further assistance are highest in Mamit with 38.71 percent, followed by Serchhip with 35.48 percent and Kolasib district with 25.81 percent.

Table No. 5.2.27: Post-Scheme Plans of the Respondents

SN	District	Crop/Trade	Respondents who can grow/expand without additional assistance	Respondents who can continue only with further assistance	Plan to change crop	Respondent who already gave up their trade
1	Kolasib	Fruit	4	4	12	4
		Vegetable	12	4		4
		Spice				
		Infrastructure	8	8		
2	Serchhip	Fruit		8		4
		Vegetable		12		
		Spice				
		Infrastructure	2	2		
3	Mamit	Fruit				
		Vegetable				
		Spice		24		12
		Infrastructure				
4	Total		26	62	12	24
5	Percentage		20.97	50	9.68	19.35

There are respondents who have already given up their horticulture activities in Mamit, Kolasib and Serchhip district with 50 percent, 33.33 and 16.67 percent

respectively. Meanwhile, there are 12 respondents in Kolasib district who are planning to take up new crops as they have failed with the crop they are undertaking.

When viewed from the perspective of the crop/trade those undertaking vegetables component comprises the highest number of respondents who plan to expand their undertaking with or without assistance from the government or other organisation with 46.15 percent respondents while infrastructure has 38.46 percent and fruits has 15.38 percent. There is no respondent with spice who has plans to grow and expand.

Among the respondents who can continue to carry out their activities only with further assistance, spice has largest number of respondents constituting 38.71 percent. They are followed by vegetables, fruits and infrastructure with 25.81, 19.35 and 16.12 percent respectively.

In respect of the number of respondents who have already given up their horticulture activities, spice has 50 percent while fruit contributed 33.33 percent and vegetables with 16.67 percent.

Additional Aid and Income Source

Table No. 5.2.28 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. Respondents who have other regular source of income are much higher in number at 77.42 percent in comparison to the 22.58 percent of respondents who solely depend on the horticultural activities for their livelihood.

Serchhip district has the highest percentage of respondents having other supplementary source of income at 100 percent. Meanwhile Kolasib district has 86.67 percent of respondents with regular source of income and 13.33 percent without any other income source. In Mamit district, respondents who are involved in other economic activities for supplementing their income and those solely relying on horticultural activities for their livelihood share 50 percent each.

With regard to number of respondents engaged in other income generating activities those dealing with vegetables and fruits comprise 32.65 percent each whereas spice and infrastructure have constituted 18.37 and 16.33 percent respectively.

Table No. 5.2.28: Additional Source of Income

SN	District	Crop/Trade	Respondents with other Regular source of income	Respondent without other Regular source of income
1	Kolasib	Fruit	20	4
		Vegetable	20	
		Spice		
		Infrastructure	12	4
2	Serchhip	Fruit	12	
		Vegetable	12	
		Spice		
		Infrastructure	4	
3	Mamit	Fruit		
		Vegetable		
		Spice	18	18
		Infrastructure		
4	Total		98	26
5	Percentage		77.41	22.58

Regarding the number of respondents who do not have any other source of income, respondents with spice are 69.23 percent, infrastructure and fruits have 15.38 percent each while there are none from respondents undertaking vegetable component.

Additional Back Up for Respondents

As can be seen in Table No. 5.2.29, respondents receiving additional assistances/back up from the government in kind, stands at 41.94 percent while 58.06 have not received any back up other than the assistance they received under the scheme.

In Kolasib district, 40 percent of respondents received back up assistance from the Department while 60 percent have received assistance under the scheme only. Serchhip district has 57.14 percent of respondents who received additional back up and 42.86 percent who have not. In Mamit district, respondents who have and have not received any back up from the government are 33.33 and 66.67 percent respectively.

Table No. 5.2.29: 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	4	20
		Vegetable	12	8
		Spice		
		Infrastructure	8	8
2	Serchhip	Fruit	4	8
		Vegetable	8	4
		Spice		
		Infrastructure	4	
3	Mamit	Fruit		
		Vegetable		
		Spice	12	24
		Infrastructure		
4	Total		52	72
5	Percentage		41.94	58.06

In respect of the number of respondents based on different crops/trade who received additional back up, vegetables contributed the highest number of respondents with 38.46 percent while other crops/trade such as spice and infrastructure contributed 23.08 percent each and 15.38 percent by those involved in fruits. With regard to respondents who are without additional back up, fruits contributed highest number which constituted 38.89 percent while spice has 33.33 percent, vegetables has 16.67 percent and infrastructure is of 11.11 percent of respondents.

PMKSY

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) has also been an important Centrally Sponsored Scheme implemented for horticulture development in the state. Though Horticulture Department has been dealing with just one of the component related to horticulture sector, namely, PMKSY (Per Drop More Crop), 7500 hectare of horticulture land has been covered with an expenditure of Rupees 5000 lakhs (approx) under the scheme. As PMKSY has been designed to cover all districts in Mizoram, no district has been left out in its implementation.

Table No. 5.3.1: Gender of the Respondents under PMKSY

SN	Gender	District			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	Male	16	24	20	60	93.75
2	Female	4			4	6.25

Table 5.3.1 shows the gender distribution of respondents under PMKSY. In Kolasib district, there are 20 respondents with 20 (80 percent) males and 4 (20 percent) females. In Serchhip and Mamit district, all respondents are males at 24 and 20 respectively. It is found that the scheme is dominated by males in terms of beneficiaries

Table No. 5.3.2 shows the educational level of the respondents in three districts. Among the total number of 64 respondents, there is no respondent who can neither read nor write. Respondents who have passed Middle School and Matriculation or High School Leaving Certificate (HSLC) are highest in number contributing 25 percent each of the total number of respondents. They are followed by respondents who have completed their Primary level and Graduation at 18.75 percent each while those with

Higher Secondary School Leaving Certificate (HSSLC) comprises a 12.5 percent. There are no Post Graduates among the respondents.

Table No. 5.3.2: Education Level of the Respondents under PMKSY

SN	Education Level	District			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	Illiterate					
2	Primary School		4	8	12	18.75
3	Middle School	4	12		16	25
4	HSLC	4	4	8	16	25
5	HSSLC		4	4	8	12.5
6	Graduate	12			12	18.75
7	Post Graduate					

All the respondents of the study who have completed their graduation were from Kolasib district accounting for 60 percent of the total respondents of the district. Among the respondents of Serchhip district, there were no illiterates, Graduate or Post Graduate degree holders. The highest number of respondents was those who studied up to Middle School at 12, that is, 50 percent of the respondents. However, unlike the other two districts, in Mamit district, there were no beneficiaries who had completed their Middle School level education, while 40 percent each possessed Primary education and HSLC. The other 20 percent had HSSLC level education.

The marital status of respondents in the three districts is shown in Table No. 5.3.3. Of the total respondents, 60 which constitute 93.75 percent of respondents are married and living with their family while 4 respondents i.e., 6.25 percent of the total respondents are single. All respondents- in Kolasib and Serchhip district are married accounting for 31.25 and 37.5 percent of the total respondents respectively. In Mamit district, there are 4 unmarried respondents constituting 20 percent while 16 who constituted 80 percent are married out of the total respondents from the district

Table No. 5.3.3: Marital Status of Respondents under PMKSY

SN	District	Married	Unmarried	Total	Percentage
1	Kolasib	20		20	31.25
2	Serchhip	24		24	37.5
3	Mamit	16	4	20	31.25
4	Total	60	4	64	100

Table No. 5.3.4: Age Group of Respondents under PMKSY

SN	Category	District			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	Below 18					
2	18-30					
3	31-40	4	4	8	12.5	
4	41-50	8	8	16	25	
5	51-60		4	8	12.5	
6	61-70	4	4	8	12.5	
7	71-80	4	4	8	12.5	

Table 5.3.4 depicts the age group of respondents in all the three selected districts. Respondents belonging to the age group of 41-50 and 61-70 are highest in number forming 25 percent each of the total respondents. There are no respondents in the age group of 30 years and below. Respondents in the age group of 51-60 and 71-80 stood

second in terms of the number of respondents constituting 18.75 percent each. There are 8 respondents in the age group of 31-40 constituting 12.5 percent. In Kolasib district there were no respondents between the age of 51-60 years.

The majority of the respondents in all three districts are between the age of 41 and 80. This shows that the scheme is handled mostly by those of older age group while the younger generations who can contribute more in terms of labour are either lesser in number or do not participate.

Table No. 5.3.5: No of Crop/Trade undertaken under PMKSY

SN	Trade	District			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	Fruits	16	12	20	48	75
2	Vegetables	4	12		16	25

The number of respondents based on the activity carried out under the scheme is shown in Table 5.3.5. Respondents who are dealing with fruits within the areas under study are higher in number with 75 percent. Vegetables growers in terms of the number of respondent stood at 25 percent.

Among the 48 respondents with fruits, Mamit district has contributed the highest number constituting 41.67 percent respondents whereas Kolasib and Serchhip districts contribute 33.33 and 25 percent respectively.

With regards to the number of respondents under vegetables, Kolasib districts contribute 25 percent while Serchhip district comprises 75 percent out of the total number in vegetables component.

Table No. 5.3.6: Land Holding Status (Area)

SN	District	Crop/Trade	Area						
			Below 1 Hectare	1-1.9 Hectare	2-2.9 Hectare	3-3.9 Hectare	4-4.9 Hectare	5-5.9 Hectare	6 or More
1	Kolasib	Fruits		4	8		4		
		Vegetables				4			
2	Serchhip	Fruits			4	4			4
		Vegetables	8	4					
3	Mamit	Fruits			4	8			8
		Vegetables							
4	Total		8	8	16	16	4		12
5	Percentage		12.5	12.5	25	25	6.25		18.75

Table 5.3.6 shows the land holding status of respondents in terms of area. Respondents having 2 -2.9 and 3-3.9 hectare of land contributed 25 percent each while respondents having 1-1.9 and below 1 hectare were 12.5 percent each. Those working on 4-4.9 hectares of land were the least in number constituting 6.25 percent only. None of the respondents were found to have possessed 5-5.9 hectares of land while there were 18.75 percent of respondents who had 6 or more hectares of land.

As can be seen in Table No. 5.3.6 among the respondents having less than 1 hectare of land are all under vegetable component in Serchhip district alone and comprises 50 percent of those under the trade.

With regards to landholding of 1-1.9 hectare of land, all respondents belonged to those undertaking fruit component with equal number in Kolasib district and Serchhip district.

In respect of the number of respondents having 2-2.9 hectare of land, all respondents are engaged in fruit with 50 percent from Kolasib district and 25 percent each from Serchhip and Mamit districts.

Those landholding of 3 -3.9 hectares is seen with 75 percent being respondents under fruit, 25 percent of which are from Serchhip district 50 percent are from Mamit district. 25 percent under this category of land holding are from vegetables all being located in Kolasib district.

Landholding of 4 - 4.9 hectares are found among respondents from Kolasib district undertaking the fruit component and stands at 20 percent of the total respondents in the district. Those with landholding of 6 or more hectares of land are from the fruit component alone with 33.33 percent being from Serchhip district and 66.67 percent from Mamit district.

Table No. 5.3.7: Land Holding Status (Ownership)

SN	District	Crop/Trade	Owned	Rented
1	Kolasib	Fruit	16	
		Vegetable	4	
2	Serchhip	Fruit	12	
		Vegetable		12
3	Mamit	Fruit	20	
		Vegetable		
4	Total		52	12
5	Percentage		81.25	18.75

The above table 5.3.7 depicts the land ownership status of the respondents. Out of the total of 64 respondents 52 (81.25 percent) possesses the land on which they are undertaking the scheme while 12 (18.75 percent) respondents are working on land owned by others. Lands which are not possessed by the respondents are mostly owned by other beneficiaries who possess larger expanses of land free of cost.

It is found that in Kolasib and Mamit district has got equal number of land owners at 20 38.46 percent each. In Kolasib district 80 percent of those who owned the land were involved in fruit while 20 percent were undertaking vegetables. Meanwhile in Mamit district all land owners were under the fruit component. Only Serchhip district has respondents working on rented land who are all under the vegetable component.

Among the respondents who undertake their horticulture activity on their own land under the scheme, the maximum number are those involved in fruit component at 48 respondents constituting 92.30 percent of the total, while 7.69 percent are with vegetable.

Table No. 5.3.8: Was Assistance Received in Cash or Kind

SN	District	Crop/Trade	In Cash	In Kind	Both
1	Kolasib	Fruit	8	4	4
		Vegetable			4
2	Serchhip	Fruit		4	8
		Vegetable		8	4
3	Mamit	Fruit		4	16
		Vegetable			
4	Total		8	20	36
5	Percentage		12.5	31.25	56.25

The above table 5.3.8 reflects whether respondents received assistance in cash or kind. 12.50 percent respondents received assistance in cash only while 31.25 percent received assistance in kind only. 56.25 percent received assistance both in cash and kind. With regard to the number of respondents receiving assistance in cash only, all respondents were with fruit and confined to Kolasib district.

In respect of the number of respondents who received assistance in kind only, vegetables comprise 40 percent of the respondents and fruits 60 percent. Out of the 64

respondents who received assistance both in cash and in kind, fruit constituted 77.78 percent and vegetables 22.22 percent.

Table No. 5.3.9: No. of Instalments Received

SN	District	Crop/Trade	1 Instalment	2 instalments	3 or more instalments
1	Kolasib	Fruit	4	4	8
		Vegetable		4	
2	Serchhip	Fruit	4	8	
		Vegetable		12	
3	Mamit	Fruit	12	4	4
		Vegetable			
4	Total		20	32	12
5	Percentage		31.25	50	18.75

The above table 5.3.9 is about the number of instalment received by respondents. 20 respondents which accounts for 31.25 percent received assistance only once while 50 percent received assistance twice and 18.75 percent received thrice or more.

In Kolasib district, 20 percent received assistance as one time assistance; another 40 percent received two instalments and 40 percent received three times or more. In Serchhip district, 4 respondents which constituted 16.67 percent received assistance only once, 83.33 percent twice and none of the respondents received thrice or more. In Mamit district, 12 respondents which is 60 percent received assistance once, 20 percent each received two or more instalments.

Among the fruits respondents, 41.67 percent respondents received one instalment, 33.33 percent received two instalments and 26 percent received three or more instalments. With regard to the number of respondents with vegetables, all respondents received assistance twice.

Table No. 5.3.10: Was Assistance (s) Received on Time?

SN	District	Crop/Trade	Yes	No
1	Kolasib	Fruit	16	
		Vegetable	4	
2	Serchhip	Fruit	12	
		Vegetable	12	
3	Mamit	Fruit	20	
		Vegetable		
4	Total		64	
5	Percentage		100	

The above table 5.3.10 reveals whether respondents received assistance on time. All respondents in both components from all three districts stated that there was timely receipt of assistance.

Table No. 5.3.11: Membership of FIG

Sl No	District	Crop/Trade	Yes	No
1	Kolasib	Fruit	16	
		Vegetable	4	
2	Serchhip	Fruit	12	
		Vegetable	12	
3	Mamit	Fruit	16	4
		Vegetable		
4	Total		60	4
5	Percentage		93.75	6.25

The above table 5.3.11 shows respondents' membership in any association or society related to their horticulture activities. 93.75 percent are registered in one or more associations related to their horticulture activities while 6.25 percent do not have membership in any related association. In Kolasib and Serchhip districts, all respondents accounting for 73.33 percent of the total registered respondents are members of their activity related association with Kolasib alone accounting for 33.33 percent and Serchhip district constituting 40 percent. In Mamit district 80 percent of the respondents, accounting for 26.67 percent of those with membership, are associated with one or the other Farmers Interest Group whereas 20 percent does not belong to any association. Mamit is the lone district where there exist respondents without membership in FIGs all being confined to the fruit component.

Table No. 5.3.12: Participation in Training (s)

SN	District	Crop/Trade	Yes	No
1	Kolasib	Fruit	12	4
		Vegetable	4	
2	Serchhip	Fruit	12	
		Vegetable	12	
3	Mamit	Fruit	16	4
		Vegetable		
4	Total		56	8
5	Percentage		87.5	12.5

Table 5.3.12 highlights whether the respondents attended training (s) organised for their activity under the scheme. 87.5 percent attended one or more trainings whereas 12.5 percent did not attend any. In Kolasib district, 80 percent attended at least one training and 20 percent did not attend any. In Serchhip district all respondents accounting for 37.5 percent of the total respondents attended training. In Mamit district

those who have attended training accounts for 80 percent while those who have not constitutes 20 percent.

Among the fruit respondents, 83.33 percent attended training while 16.67 percent had not attended any. With regard to vegetables, all respondents in all districts have attended training.

Table No. 5.3.13: Is/Are Training (s) Helpful?

SN	District	Crop/Trade	Yes	No	No Idea
1	Kolasib	Fruit	12		
		Vegetable	4		
2	Serchhip	Fruit	12		
		Vegetable	12		
3	Mamit	Fruit	12		4
		Vegetable			
4	Total		52		4
5	Percentage		92.86		7.14

As shown in Table No. 5.3.13, 92.86 percent have found the training(s) attended by them helpful in the course of their work whereas 7.14 percent did not have any concrete opinion on the utility of the trainings underwent.

In Kolasib district and Serchhip district all respondents of both trades felt that the trainings were useful accounting for 28.57 percent and 42.86 percent of the total respondents with training respondents respectively. In Mamit district 75 percent of the respondents thought that the training organised under the scheme are helping them in their activities whereas 25 percent perceived the training as neither positive nor negative in its impact.

All respondents under vegetable component who had undergone training were of the opinion that the trainings enhanced their capacity where as under the fruit component 10 percent of the respondents did not feel its impact.

Table No. 5.3.14: Whether received technical/extension Guidance?

SN	District	Crop/Trade	Yes	No
1	Kolasib	Fruit	8	8
		Vegetable	4	
2	Serchhip	Fruit	12	
		Vegetable	12	
3	Mamit	Fruit	16	4
		Vegetable		
4	Total		52	12
5	Percentage		81.25	18.75

Technical/extension guidance from the concerned department was received by 81.25 percent of the respondents in the course of their work whereas 18.75 percent did not receive any guidance.

Among the respondents in Kolasib district, 60 percent received guidance from the concerned department whereas 40 percent carried out their activities without any guidance. In Serchhip district all respondents, that is, 100 percent were given technical or extension guidance at least once. 80 percent received guidance in Mamit district, while 20 percent did not receive any guidance.

Of the respondents with fruits, 36 (75 percent) respondents were given guidance from the department, with 22.22 being respondents from Kolasib district, 33.33 percent and 44.44 in Serchhip and Mamit districts respectively. 25 percent of the total respondents did not receive any guidance or supervision 66.67 percent of which is comprised of respondents from Kolasib district and 33.33 percent from Mamit. In

respect of the number of respondents with vegetables 100 percent received guidance from the department and there none performed their work without any guidance.

Table No. 5.3.15: Inspection and Monitoring from the Department

SN	District	Crop/Trade	Yes	No
1	Kolasib	Fruit	12	4
		Vegetable	4	
2	Serchhip	Fruit	12	
		Vegetable	12	
3	Mamit	Fruit	12	8
		Vegetable		
4	Total		52	12
5	Percentage		81.25	18.75

Table no. 5.3.15 enumerates the number of respondents who received inspection and monitoring from the department to make sure that assistances rendered were utilized as stipulated in the scheme. 81.25 percent of respondents were inspected and monitored by the department whereas 18.75 percent were not.

In Kolasib district, 80 percent of respondents were inspected and monitored to see utilization of the assistance received whereas 20 percent did not witness any inspection and monitoring activities. In Serchhip district all respondents were inspected and monitored by the concerned department with regard to the utilization of assistance received. In Mamit district, 60 percent were monitored while 40 percent were not.

With regard to the number of inspected respondents in relation to their trade, 75 percent respondents from fruit and 100 percent respondents from vegetables component were inspected by the department at least once or more whereas the department neither monitored nor inspected 25 percent from fruit component. Out of all the three districts, Serchhip has got the highest number of respondents who were inspected and monitored

at 100 percent, followed by Kolasib district at 80 percent and the least number at Mamit with 60 percent having been inspected and monitored.

Inspection and monitoring were conducted with all respondents under vegetable in all the three districts whereas in the case of fruit component, 25 percent of those in Kolasib district and 40 percent in Mamit district were not inspected and monitored in the course of implementation.

Table No. 5.3.16: No of Respondents with and without problems and issues in the course of work

SN	District	Crop/Trade	No of Respondents with Problems	No of Respondents without Problems
1	Kolasib	Fruits	12	4
		Vegetable		4
2	Serchhip	Fruit	12	
		Vegetable	12	
3	Mamit	Fruit	20	
		Vegetable		
4	Total		56	8
6	Percentage		87.5	12.5

The table above depicts the number of respondents who have problems and those who have no problems or issues in the course of their activities under the scheme. 87.5 percent are facing some problems while 12.5 percent respondents carried out their activities without facing obstacle.

In Serchhip and Mamit districts, all respondents have been facing one or more problems which hampered their works. In Kolasib district, respondents facing difficulties in the course of work comprises 60 percent of the respondents whereas those who have not faced any issue are at 40 percent in the district. There is no respondent who have faced any issue among the respondents with vegetables in Kolasib district.

With regard to the number of respondents with problems in their horticulture activities under the scheme, respondents with fruit constitute 78.57 percent, and those with vegetables constitute 21.43 percent. Among the respondents who have not faced any problems, respondents with fruit and vegetables contributed 50 percent each.

Table No. 5.3.17: Nature of the Problems and Issues faced by the Respondents in the course of work

SN	Problem/Issue	No of Respondents in Districts			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	No Problem	8			8	12.5
2	Scarcity of water	4	8	4	16	25
3	Poor quality of Soil					
4	Plant Disease	4	20	12	36	56.25
5	Poor Quality of Planting Materials			4	4	6.25
6	Scarcity of fertilizers	4			4	6.25
7	Storms/Flood/ other calamities					
8	Scarcity of farm materials					
9	Insufficient Assistance					
10	Pest		12		12	18.75
11	Robbery					
12	Extreme temperature of GH		4	4	8	12.5
13	No device for water distribution (Pipes etc)					

Table No. 5.3.17 shows the nature of problems faced by the respondents with problems while carrying out their horticulture activities under the scheme with multiple responses. During the course of the interview with the beneficiaries, there were a number of multiple responses in relation to the problems faced. Out of the total number of respondents with problems those facing the problem of plant diseases are the highest in number constituting at 36 respondents which is followed by scarcity of water with 16 respondents, pest issues by 12 respondents, 8 respondents with issues regarding extreme temperature in the greenhouses which are set up without temperature control mechanisms, 4 respondents each faced the problem of scarcity of fertilizers and poor planting materials.

In Kolasib district, the main problems faced are scarcity of water, plant diseases and scarcity of fertilizers with equal number of respondents facing the problems. In Serchhip district, plant disease has been the biggest problem faced by 20 respondents. Pest is the second biggest problem faced by 12 respondents. They are followed by scarcity of water with 8 respondents and lack of temperature controls in greenhouses by 4 respondents. In Mamit district too, the number of respondents who have faced plant disease problem is highest contributing 12 respondents. Equal number of respondents at 4 each, have stated facing the problems of scarcity of water, poor quality planting materials and extreme temperature in greenhouse.

Labour Utilisation

As can be seen in Table No. 5.3.18 farmers employing regular additional labour accounts for 18.75 percent of the respondents while those employing labour occasionally are at 75 percent and those which manages their trade without any additional labour comprises 6.25 percent.

In Kolasib District, 20 percent of respondents hired additional labour regularly to carry out their horticulture works whereas 80 percent depends upon additional labour occasionally. None could carry out their activities on their own without additional help. In Serchhip district also, 16.67 percent of respondents rely on additional labour on

regular basis. The percentage of respondents with occasional additional labour and without additional labour is 66.66 percent and 16.67 percent respectively.

Table No. 5.3.18: Utilisation of Labour

Sn	District	Trade	Farmers with additional Labour (Regular)	Farmers with additional labour (Occasional)	Farmers without additional labour
1	Kolasib	Fruits	4	12	
		Veg		4	
		Total			
2	Serchhip	Fruit	4	8	
		Veg		8	4
		Total			
3	Mamit	Fruit	4	16	
		Veg			
		Total			
4	G. Total		12	48	4
5	Percentage		18.75	75	6.25

Financial Profit of Respondents

Table No. 5.3.19 highlights the average monetary profits of the respondents (district-wise) under PMKSY. 12.5 percent of respondents failed to make any profit, 50 percent each from Kolasib and Mamit district respectively, while there are none from Serchhip district who did not make any profit.

All respondents could make a profit of more than Rs. 10,000. Those in the range of Rs. 10,000 – 29,000 in a year all hail from Kolasib district. Among the 43.75 percent of respondents with profit amounting Rs 50000-99000, Kolasib district, Serchhip district and Mamit district contribute 28.57, 57.14 and 14.29 percent respectively.

Table No. 5.3.19: Average Monetary Profit of Respondents

Sn	Profit	Kolasib	Serchhip	Mamit	Total	Percentage
1	No Profit	4		4	8	12.5
2	Below 10000					
3	10000-29000	4			4	6.25
4	30000-49000					
5	50000-99000	8	16	4	28	43.75
6	1 Lakh-1.9 lakh		4	4	8	12.75
7	2 lakh-2.9 lakh	4			4	6.75
8	3 lakh-3.9 lakh					
9	4 Lakh-4.9 Lakh		4	4	8	12.75
10	5 lakh- 5.9 lakh			4	4	6.75s

With regard to the number of respondents with profit of Rs 1-1.9 lakh, Serchhip and Mamit district constituted 50 percent each. No respondent from Kolasib district are found to make profit within the range. In respect of profit Rs 2-2.9 lakh, respondents from Kolasib alone could make the said profit. Regarding the number of respondents with profit Rs 4-4.9, both Serchhip and Mamit districts has equal number of respondents within this range of profit. The biggest profit which the respondents could make so far is 5-6 lakh confined to Mamit district accounting for 6.25 percent of the total number of respondents in the three districts.

Marketing

The different mechanisms for selling off the produces by the respondents are reflected in Table No. 5.3.20. Respondents who sold their produces to the intermediaries

are highest in number with 37.5 percent followed by 25 percent who sold their produces both directly and through intermediaries, while 12.5 percent sold their produces through the arrangement made by the concerned department as well as the intermediaries and 6.25 percent sold through department arrangement alone.

Table No. 5.3.20: Marketing of the produces

SN	Mode of selling	No of Respondents in Districts			Total	Percentage
		Kolasib	Serchhip	Mamit		
1	Sold directly					
2	Sold to Intermediaries	8	12	4	24	37.5
3	Both Sl No 1 and 2	4		12	16	25
4	Through Dept Arrangement		4		4	6,25
5	Both Sl no 2 and 4		8		8	12.5
6	Not Sold	8		4	12	18.75

In Kolasib district, those respondents who sold their produces to intermediaries and those who do not sell but utilise for family consumption alone are equal in number at 40 percent each. Respondents who sold both directly as well as to the intermediaries constitute 20 percent.

In Serchhip district too, respondents who sold their produces to the intermediaries are highest in number with 50 percent of the total number of respondents followed by respondent who sold their produces both through department arrangement and intermediaries constituting 33.33 percent each. Respondents who sold through the arrangement made by the concerned department alone accounts for 16.67 percent. All

respondents in the district had sufficient produces to be sold in the market besides their own consumption.

Table No. 5.3.21: Marketing of the produces (Crop/Trade Wise)

SN	Mode of selling	No of Respondents (Crop/Trade Wise)		Total	Percentage
		Fruit	Vegetable		
1	Sold directly				
2	Sold to Intermediaries	24		24	37.5
3	Both SI No. 1 and 2	16 (12)	(4)	16	25
4	Through Dept Arrangement		8	8	12.5
5	Both SI No. 2 and 4		4	4	6.25
6	Not Sold	12		12	18.75

Respondents who sold their produces to the intermediaries comprise the highest number among those under fruit component accounting for 50 percent. Those who sold directly in the market as well as to intermediaries and those who do not sell their produces under the component constitute 25 percent each.

Among the respondents under vegetable component 50 percent sold their produces through the arrangements made by the department concerned only while 25 percent each are constituted by those who sold to intermediaries as well as the departmental channel and to intermediaries and directly in the market.

Marketing Problems

Table No.5.3.22 represents the number of respondents with problems and those having no problem in marketing their produces. 43.75 percent of respondents could sell their produces without any obstacle whereas 56.25 percent are facing some problem in marketing their produces.

Table No. 5.3.22: Problems/Issues in selling off the produces

SN	District	Crop/Trade	Respondent with no problem	Respondents with problem
1	Kolasib	Fruit		16
		Vegetable		4
2	Serchhip	Fruit	8	4
		Vegetable	8	4
3	Mamit	Fruit	12	8
		Vegetable		
4	Total		28	36
5	Percentage		43.75	56.25

All respondents of Kolasib have stated that they faced certain hurdles in marketing their produces. Meanwhile in Serchhip and Mamit districts, 66.67 and 60 percent of respondents respectively have not experienced any difficulties in selling off their produces. The number of respondents facing problems in the two districts stands at 33.33 percent in Serchhip district and 40 percent in Mamit district.

With regard to the number of respondents with crop/trade having no issue in marketing, respondents with fruits constituted 71.43 percent while respondents with vegetables accounts for 16.67 percent.

Regarding the number of respondents facing problems in marketing, respondents with fruits contributed 77.78 percent while respondents with vegetables contributed 22.22 percent.

Table No. 5.3.23: Nature of the Marketing Problems

SN No	Nature of the Problem	Crop		Total	Percentage
		Fruit	Vegetable		
1	Lockdown due to Pandemic	4	4	8	12.5
2	Excessive produces				
3	Sparse Produces	12		12	18.75
4	Competition with imported items		4	4	6.25
5	Less demand of the produces	8		8	12.5
6	Transportation Problem	4		4	6.25

The nature of problem and the number of respondents belonging to different crops/trades among those facing problems in marketing is highlighted in Table No. 5.3.23. Multiple responses have been stated in the course of the interview with the beneficiaries. Lockdown imposed due to the pandemic during 2020-2022 and less demand of the crop has been the biggest problems which the respondents have dealt with. Other problems stated are competition with imported items and transportation issues. 12 respondents could not sell their produces as they had no surplus produces other than their family consumption.

Table No. 5.3.24: Utilisation of Post Harvest Management

Sl No	District	Crop/Trade	No. of Respondents with PHM	No. of Respondents with no PHM
1	Kolasib	Fruit		16
		Vegetable		4
2	Serchhip	Fruit	4	8
		Vegetable	12	
3	Mamit	Fruit	4	16
		Vegetable		
4	Total		20	44
5	Percentage		31.25	68.75

Table No. 5.3.24 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 31.25 percent of the respondents while 68.75 have not incorporated post harvest management processes.

With regard to the number of respondents who have undertaken the post harvest management activities, 80 percent are from Serchhip and 20 percent from Mamit. No respondent from Kolasib district have undertaken any kind of post harvest management. In respect of the respondents without any post harvest management activities, respondents from Kolasib, Serchhip and Mamit district constitute 45.45, 18.18 and 36.36 percent respectively.

Regarding the number of respondents based on crop or trade who have undertaken post harvest management activities, vegetables has a higher number of respondents with 60 percent and fruits with 40 percent.

Future Plans

The table below 5.3.25 reflects the future plans 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 81.25 percent of respondents. They are followed by those who think they can grow and expand their activities even without additional assistance at 12.5 percent. 6.25 percent, all hailing from Mamit district already gave up their activity.

Table No. 5.3.25: Future Plan of the Respondents

SN	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	4	12		
		Vegetable	4			
2	Serchhip	Fruit		12		
		Vegetable		12		
3	Mamit	Fruit		16		4
		Vegetable				
4	Total		8	52		4
5	Percentage		12.5	81.25		6.25

With regard to the number of respondents who are planning to grow and expand their activities, all respondents belonged to Kolasib district. All respondents from Serchhip district stated that they can continue their activities only with additional

assistance accounting for 46.15 percent of those with similar view, followed by respondents of Mamit district with 30.77 percent and 23.08 from Kolasib district.

When viewed from the perspective of the crop/trade those undertaking fruit component and vegetable component comprises 50 percent each of the respondents all being confined to Kolasib district.

Among the respondents who can continue to carry out their activities with assistance only, the respondents from fruit constitute 76.92 percent while those under vegetables contribute 23.08 percent. In respect of the number of respondents who have already abandoned their horticulture activities all respondents are under fruit component.

Table No. 5.3.26: Whether Respondents are with other source of income

SN	District	Crop/Trade	Respondents with other Regular source of income	Respondent without other Regular source of income
1	Kolasib	Fruit	12	
		Vegetable	8	4
2	Serchhip	Fruit	16	
		Vegetable	4	
3	Mamit	Fruit	16	4
		Vegetable		
4	Total		56	8
5	Percentage		87.5	12.5

Table No. 5.3.26 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. Respondents who have other regular source of income are much higher in number constituting 87.5 percent while 12.5 percent of respondents solely depend on their horticultural activities for their livelihood.

Kolasib district has the 100 percent of respondents within the district having other regular source of income, accounting for 35.71 percent of the total number having additional income source. 20 respondents at Serchhip district has regular additional source of income and comprises equal number with Kolasib district at 35.71 percent of the total with additional income within the three districts. In Mamit district, 80 percent of respondents are involved in other economic activities for supplementing their income whereas 20 percent solely rely on horticultural activities for their livelihood. They account for 28.57 percent and 50 percent of those with additional income and without additional income within the three districts studied respectively.

With regard to respondents who are dealing with fruits 91.67 percent have regular additional income source while the number stands at 66.67 percent among those dealing with vegetables.

Table No. 5.3.27: 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	4
		Vegetable		4
2	Serchhip	Fruit	12	
		Vegetable	12	
3	Mamit	Fruit	8	12
		Vegetable		
4	Total		44	20
5	Percentage		68.75	31.25

As can be seen in Table No. 5.3.27, respondents receiving additional assistances/back up from the government stands at 68.75 percent while 31.25 percent have not received any back up other than the assistance they received under the scheme.

In Kolasib district, 60 percent of respondents received back up assistance from the department while 40 percent have received assistance under the scheme only. All

respondents in Serchhip district have received additional back up. Meanwhile in Mamit district, respondents who have and have not received any back up from the government are 40 and 60 percent respectively.

In respect of the number of respondents based on crops/trade who received additional back up, vegetables contributed 27.27 percent while fruits contributed 72.73 percent.

Chapter-VI

CONCLUSION

As mentioned in the previous chapters, in India, horticulture is getting more recognition and appreciation due to the contributions of its produces for the survival and well being of the people in respect of nutrition for better health and income generation. Its ability to achieve sustainability of small land holdings, employment generation, environment protection, more export potential etc., has added to its significance. However, importance of horticulture is said to be recognised during the 1980s only after the leaders of the country and the experts realised the said ability of horticulture for achieving the goals of the nation in some respects. As of today, horticulture has become one of the most important sectors which the Government of India has undertaken with the investment of more than 2000 crore⁴⁴. Due to the increasing investment and various initiatives in horticulture sector, India became the biggest producer of fruits and vegetables in the world. Only China is ahead of India in this regard.

Among the UTs and states in the country, Mizoram is also doing well for promotion of horticulture in the state. As a matter of fact, Mizoram has been very much closely associated with horticulture since time immemorial. Even before the coming of the British, Mizoram used to be self sufficient in agriculture and its allied activities including horticulture. The main focus was on the cultivation of rice and vegetables. All their agriculture and horticulture were carried out on Jhum land and no permanent farming was heard during those days. Their produces were also for their consumption alone without any attempt to utilise the produces for generation of additional income. Even during the time of British, the government did not make any remarkable development in terms of fund allocation and intervention of technical expertise.

⁴⁴ <https://prsindia.org/budgets/parliament/demand-for-grants-2022-23-analysis-agriculture-and-farmers-welfare>, accessed on 15.10.1022

Horticulture began to take a new shape when Mizoram was upgraded from the status of District Council to Union Territory in 1972. During those days, the government of Mizoram took initiatives for horticulture development by placing horticulture as one of the wings under the Department of Agriculture. The Horticulture Wing was assigned to look after 12 subjects including Fruit Development, Vegetable Development, Spices Development, Floriculture Development etc. It was headed by a Joint Director. Horticulture once again took a new shape when Horticulture Department was carved out of the Department of Agriculture to become a full-fledged department in 1993. Since then, the Department of Horticulture continues to be one of the most important departments which have close link with the general masses of the state.

In Mizoram, much effort has been made by both the Government of India and the State Government for the development of horticulture in the state by formulating and implementing various Centrally Sponsored Schemes (CSS) and State schemes. Under these schemes, thousands of lakhs have been spent to provide assistance to the horticulture farmers as well as to take various steps for horticulture development in the state. Among the CSS which are meant to develop horticulture in the state, MIDH, RKVY, PMKSY are some noticeable schemes making some remarkable progress in the state. Due to the efforts of the Department of Horticulture under the said schemes along with the state initiated schemes like NLUP etc., and other CSS, Mizoram was awarded 'Best Horticulture State' in 2019. As per the record of the Department of Horticulture, about 13200 ha. of land has been covered so far under the horticulture sector. However, it should be kept in mind that horticulture covers only 11.96 per cent of the area identified as horticulture potential area which reflects that there still is much to be done for the further development of horticulture in the state.

Summary

The thesis is divided into six chapters. The first chapter deals with an *Introduction to the Study*. This chapter discusses the concept, necessity and significance of horticulture, brief profile of Mizoram including history, polity, administration, economy etc., of the state, review of literature, statement of the research problem, scope and objectives of the study, research questions, and methodology applied in the study.

The second chapter presents *A Conceptual Study of Horticulture*. The chapter begins with historical aspect of horticulture since the time when man began permanent settlement in different parts of the world. The development and evolution of horticulture in India through different periods such as ancient times, medieval period, colonial period and the post colonial period is also discussed. The chapter presents meaning, scope and importance of horticulture at present, different branches of horticulture such as Pomology, Olericulture, Floriculture, Landscaping etc., along with the present status and contribution of Indian horticulture in world's economy in a brief manner. Relationship between horticulture and agriculture, organic farming, climate change and horticulture are also highlighted.

The third chapter discusses the *Institutional Mechanism for Horticulture Administration*. Origin, development, organisational structure, mission, objectives and visions of the Department of Horticulture, Government of Mizoram are discussed in this chapter. The goals and objectives of the Department, incumbents along with their duties and responsibilities, various associations for promoting welfare of the staff within the Department, infrastructure belonging to the Department for the development of horticulture as well as awards and achievements which have been received are also briefly highlighted in this chapter.

The fourth chapter, *Development Programme in Horticulture*, discusses about the three important horticulture schemes implemented in Mizoram. These schemes are sponsored by the Central Government in 90:10 funding pattern. Among the various schemes being undertaken in Mizoram, three schemes namely, Mission for Integrated Development of Horticulture (MIDH), Rashtriya Krishi Vikas Yojana (RKVY) and Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) along with their origin, fund allocation and utilization, area coverage are discussed in this chapter.

The fifth chapter provides the *Results and Discussion* on the collected data from different respondents from selected districts - Kolasib, Serchhip and Mamit. The respondents comprises of 277 beneficiaries from the selected districts and 17 department officials interviewed during 2021 to 2022. In this chapter, the socio-economic profile of the beneficiary respondents is also discussed. The chapter further focuses on the land

holding status of the respondents, participation of respondents in trainings organised under the schemes, the inspection and monitoring activities of the implementing agency, membership of respondents in Farmers Interest Group (FIG), the utilisation of post harvest management facilities, employment generation due to the implementation of the schemes, marketing of the produces under the scheme, impact of horticultural activities (undertaken under the schemes) on income of respondents, problems faced by the farmers in the course of their work, farmers' future plan with or without assistance from the government or any other institutions etc.

The sixth Chapter is the concluding chapter in which the summary of the study and major findings are stated. Problems encountered in the implementation of the schemes covered by the study and suggestions for improvement as well as the limitations faced in the course of the study are dealt with in this chapter. Scope for further research has also been highlighted.

Major Findings

1. The Department of Horticulture, Government of Mizoram has been the most important institution available for administration of horticulture in the state since 1993 when it became a full fledged department. The functions and responsibilities assigned to the Department are carried out by the Directorate, offices at district, sub-division and circle level. Currently, the Department is the implementing agency of CSS such as MIDH, RKVY, PMKSY etc., and some state horticulture policies.
2. With regard to the age of horticulture farmers under the schemes, farmers belonging to the age group of 51-60 are largest in number whereas number of farmers belonging to age group of 18-30 and 31-41 are the least. This indicates that the most effective workforces are engaged in other activities which, further compels most farmers to employ additional labour. At the same time requirement of additional labour has created employment avenues for a number of people.

3. In respect of the educational qualifications obtained by farmers under the schemes, those who have passed Middle School standard are highest in number whereas those who possessed Master Degree are the least. There are no illiterate farmers who have undertaken horticultural activities under the schemes.
4. There is a wide gender disparity among the horticulture farmers. Under the three schemes, the number of male beneficiary farmers constituted approximately 70 percent of the total number of farmers while females contributed only 30 percent.
5. More than half of the farmers are carrying out their activities in - areas less than 1 hectare of land while about 3 percent of the farmers could utilise 3 or more hectares of land for their horticulture activities. It is found that land holding of the farmers is not vast enough to undertake large scale production.
6. With regard to the ownership of land, about 86 percent of farmers under the schemes are undertaking their horticulture activities on their own land whereas the rest conduct their farm activities on borrowed land.
7. Regarding the membership of farmers in FIGs, about 70 percent of respondents are members of at least one association which is linked to their activities while 30 percent of farmers are not members of any association. Membership in Farmers Interest Groups is found to have great contribution in providing welfare to the farmers, solving their problems etc.
8. Training to impart knowledge and expertise has been an important component of each scheme. 78.87 percent of respondents have undergone at least one or two training(s) organised by the implementing agency. Amongst the respondents who have attended trainings, 93.08 percent of them found that their training have been helpful in the course of their work.

9. After organisation of training, follow up programme in terms of technical guidance, inspection and monitoring were also given due emphasis to ensure that beneficiaries utilized their assistance in the most effective manner in their activities. 80.93 percent of respondents under the schemes have received such kind of care from the implementing agency.
10. The study discovered that most of the farmers are facing one or more problems in the course of their work. Plant diseases, pest, scarcity of water etc., are common problems encountered by the farmers.
11. With regard to marketing of the produces, farmers sold off their produces in different ways. Those who sold to the intermediaries are highest in number which accounted for 39.06 percent of the total number of respondents. Some sold directly in the market while some utilized arrangements made by the concerned Department. At the same time, there are some farmers who have not sold any of their produces. About half of the beneficiaries of the schemes encountered marketing problems. Covid-19 pandemic, unstable market, competition with imported commodities etc., are some common marketing problems faced by the beneficiaries of the schemes in relation to marketing of their produces.
12. Respondents who could make profit amounting to Rupees 50000-99000/year are the largest in number comprising about 40 percent of the total respondents while respondents who could make more than Rupees 1 lakh/year are only 9 percent. 8 percent of respondents still fail to make profit from their horticulture activities
13. The study also revealed that most respondents could not utilize the available post harvest management facilities like cold storage facilities, sorting facilities, grading facilities etc. Value addition activities were also not undertaken by most beneficiaries.

14. The implementation of MIDH, RKVY and PMKSY has brought significant progress in increasing horticulture coverage as well. Since the target areas to be covered under the schemes were successfully achieved in every year of implementation for almost a decade, about 13 percent of the identified horticulture potential area in the state has now been utilized for undertaking cultivation of different kinds of horticulture crops.

Problems & Challenges:

It is no doubt that horticulture in Mizoram has seen some progress with the implementation of MIDH, RKVY and PMKSY. Area covered, production and productivity are comparatively much higher with the coming of these schemes. In the mean time, many issues and problems are identified in the implementation process which further affected and at times almost led to total failure in some activities. The problems and issues which are discovered during the conduct of the study are as follows:

1. **Delay in Release of Funds:** The success of every scheme depends on timely release of funds whether it is under the central or state scheme. In the case of centrally sponsored horticulture schemes implemented in Mizoram as well, timely release of fund from both Government of India and the State Government is vital as activities under these schemes very much depends on season, rainfall, climate etc., In the case of MIDH, RKVY and PMKSY, the government of India could usually release its share on time when the implementing agency in the state could provide all the necessary documents such as Utilization Report etc., to the Central government within the stipulated time. However, late release of fund had occurred twice or thrice on the part of the Government of India due to the failure of the implementing agency to provide the required documents on time.

In respect of the State Matching Share (SMS), the state government has been always late to release fund. This problem has not been specific to horticultures schemes alone, but common to all the schemes where State Government is required to contribute its share of funding. Late release of State Matching Share has created a number of problems such as lapsing of fund,

deduction of Central share, untimely receipt of fund by beneficiaries etc., which hampers the smooth flow of the implementation process. During the course of the interviews with the concerned officials it was found that sometimes the implementing agency is required to make adjustments in the amount disbursed and materials supplied to beneficiaries. Often the state government needs to be pressurised to release its share.

2. **Shortage of Staff (Technical/Non-Technical):** One of the biggest problems that the concerned officials reiterated while discussing problems in the implementation process with regard to MIDH, RKVY and PMKSY is the shortage of staff. As these schemes are being implemented to cover even the remote areas, the problem is enhanced when there is a need to carry out the monitoring and inspecting activities. Though a number of employees are recruited (mostly on contract basis) under the sub-component such as Management Cost etc., the implementing agency that is the Department of Horticulture is very much in need of more personnel especially technical experts to look after the schemes. The failure of the state government to fill the regular vacant posts due to the death and retirement of personnel on superannuation pension also added to the problem. In addition to this problem, many farmers are in need of technical expertise throughout the year as they are lacking in knowledge in many respects, such as, pest control, application of fertilizers and manures etc. However, the miniscule number of technical staff of the department has rendered them unable to devote the time and energy required to reach each and every farmer even when there is urgent need on the part of the farmer. The situation due to the shortage of staff has adversely affected the productivity of the schemes.
3. **Political Interference in the selection of beneficiaries:** The implementing agency is entrusted with the task of selection of farmers to be assisted under the schemes. They are to perform this task without fear or favour on any ground. However, political parties especially those in power have been said to interfere in the selection process of the beneficiaries in most districts either directly or

indirectly. It has been stated in the course of the interview that interference of political parties occurs the most when assistances were given in cash. Such situations often lead to undeserving farmers receiving assistance at the expense of the deserving ones.

4. **Topography:** Mizoram is a hilly terrain with rough hills of irregular height. There is hardly any area which can be called as plain. The rough topography of Mizoram rendered various impediments to horticulture activities. The implementation of MIDH, RKVY and PMKSY also sometimes fail to produce the desired results due to the difficulties brought in by the unfavourable landscape of the state. The concerned officials are required to keep in mind such hurdles while working out plans and estimates for the state. Some difficulties caused by the rough topography of the state are:

i) Difficulties in utilizing heavy farm machineries and equipments necessary for large scale production.

ii) Construction and improvement of roads which would expedite and ease transportation of raw materials and produces is difficult in the hilly terrains. In the absence of such connectivity farmers are compelled to transport the farming materials as well as their harvest manually which not only adds to the onus of the farmers but also results in higher cost of production.

iii) Working on the rough hilly terrain is tedious and exhausting as compared to working in the plain areas with or without improved farming tools and implements.

iv) The above issues caused by the topography have led to the condition wherein the area that can be taken care of by an individual in hilly areas is comparatively less than that in the plains. This further impedes large scale production. The above problems caused by the rough topography of the state affects not only the course of work but even the price of the horticulture produces in the market.

5. **Supply of Poor Quality Planting Materials:** In the implementation of MIDH and RKVY, supply of poor quality planting materials to the horticulture farmers has been found to take place a number of times which in turn adversely affect the quality and quantity of the produces and often lead to total failure leaving the farmers in despair. Such was the case of the farmers dealing with the cultivation of different varieties of orange, the planting materials of which were imported from other countries. The trees could bear many fruits but, it was reported that most of the farmers dealing with these varieties of orange are unable to sell their produces as the fruits were void of juice. The situation has been found to lead to wastage of energy and time of the farmers which further left them perplexed, discouraged and hesitant to undertake new initiatives in their farms. Cultivation of poor quality of planting materials adversely affected the government as well. The investment it made in the form of money and human resources/capital became wasted and drained without fruitful results. Some cultivators of other horticulture crops, such as, dragon fruit and spices also have reported experiencing similar situations. Instances have further been cited where the situation has led to misunderstandings between farmers and officials of the implementing agency which were compensated on certain occasions.
6. **Selection of Uncommitted Beneficiaries:** Thousands of beneficiaries have been given assistance under MIDH, RKVY and PMKSY in the whole of Mizoram since their inception. The amount that has been disbursed under the schemes to provide assistance to the farmers appears to be sufficient to make remarkable changes. However, a number of farmers selected as beneficiaries are stated to be half-hearted in their commitment to the schemes. They rather wish to receive assistance without any commitment to progress in their horticulture activities. In some places, there are some beneficiaries who have not taken up their horticulture activity to fulfil the conditions of the scheme under which they are assisted. Such conditions generally arose when assistances were given in cash. From the interview with leaders of some farmers' associations, it is discovered that there are some beneficiaries who misused assistance and spent the cash they received for other purposes such as purchase of household appliances like

television, refrigerator, mobile phone etc. In the mean time, there are a number of deserving farmers who have undertaken their horticulture activities on their own for a long time but had either not received any assistance or had received miniscule assistance, more often in kind. In every district, it is found that there still exist an attitude among the people towards the government schemes that assistances given are considered as a free gift which can be spent in any manner they wish. They were not hesitant to go against the wishes of the scheme. The activities of the personnel of the concerned department especially the technical experts are not up to the expectations. Some farmers during the interview said that officials seldom paid a visit to their fields which often lead to dearth of expert guidance in the course of their work. Shortage of technical staff as well as negligence of duty among the officials seems to be causative factors.

7. **Insufficiency of Assistance:** From the discussions and interviews with officials and farmers, it is found that the assistances given under the schemes are often less than the expectation of the farmers to undertake meaningful activities. The area which can be covered with the assistance provided appears to be insufficient in terms of productivity and production. In some cases, farmers are expected to take initiative in advance on their own expense before the government can hand over assistance to them.

With regard to the assistance given in kind as well, the quantity received by the farmers/beneficiaries are not adequate to meet the annual needs. They are often meant to cover only some portions of the need of the farmers. In order to ensure that the farm materials such as planting materials, fertilizers, pesticides etc., are available at the time of need, farmers have to spent a fairly large amount of money from their own pockets.

There are times when the concerned department outlets are is out of stock in respect of the horticulture farming inputs and materials. At times the local markets as well are in shortage of supply that farmers do not have access to their needs even if willing to procure from their own pocket. On account of the said

situation, the productivity and the production of the horticulture farmers are at all times less than the anticipated results.

8. **Unstable Market:** In Mizoram, markets have not been stable in relation to prices as well as quantity of sale of horticulture produces since long time back. As this kind of situation has been experienced a number of times, many farmers were discouraged and sometimes compelled to give up their activities. Some reasons attributed for instability of market in Mizoram are:

- a) **Shortage of consumers:** The population of Mizoram have not been large enough to consume all the produces of horticulture farmers. Mizoram is one of the least populated states in India having hardly eleven lakhs population as per the 2011 Census. When produces are more than the population of the state can consume, farmers have no choice but to leave their produces to perish even in the streets or to sell them at a loss.
- b) **Absence of proper channel for export of the produces:** Though some horticulture produces such as Anthurium (Flower), Dragon Fruit etc., are sold to other states and foreign countries through the arrangement made by the concerned department and some societies, many produces are still unable to reach beyond the state
- c) **Too much reliance on intermediaries:** In Mizoram, most of the horticulture farmers do not sell their produces directly in the market. Their produces are sold on-farm to the intermediaries who collect them from their fields and later sold to the retailers/vendors. The prices at the time of the collection are decided through bargaining and compromising between the farmer and the intermediaries which mostly turns out in favour of the latter.
- d) **Competition with imported items:** Import of fruits and vegetables from neighbouring states adversely affect the sale of the local produces. Since most of the imported items can be bought at a cheaper rate, people rather choose them to save their money or due to low purchasing power. Majority of the people in Mizoram are still ignorant about the value of the locally grown crops even though they are comparatively fresh and organic with more nutritional value.

e) **High cost of production:** In Mizoram, the cost of production is higher than other places in India. This is due to the rough topography of the state, high cost of labour, high cost of horticulture materials, high cost of transportation etc. As the cost of production is high, farmers in Mizoram do not have a choice but to sell their produces at higher prices to make profit.

9. **Shortage of Post Harvest Management Facilities and Activities:** Most horticulture crops are perishable commodities which require post harvest management to increase their shelf life. Though the Horticulture Department has set- up Multi Purpose Packing House in five locations, usually equipped with various facilities such as Cold Storage Devices, Sorting and Grading facilities etc., in various horticulture centres, most farmers in the state are not in a position to utilize these infrastructures as they are inaccessible to them. Those who have utilised it too could do so for merely one or two weeks due to high tariff of electricity and inconvenient in transportation. Thus, the said facilities fail to serve the purpose they have to achieve. Farmers still need to sell as much of their produces as possible within the shortest span of time.

Only a few farmers are undertaking value addition activities for their produces to ensure better marketability on and off season. At the same time, there are hardly any individual or firm within the state who can carry out the activities for value addition which would assure stable market for the farmers to sell their produces regularly.

10. **Scarcity of Water:** Scarcity of water during the dry season starting from November and lasting till the beginning of May has rendered it difficult to carry out horticulture activities and produces also tend to be comparatively less. Though the concerned department have taken various steps under MIDH, RKVY and PMKSY, such as, construction of community water tanks, individual water tank of different kinds, etc., not all farmers have received such provisions. At the same time, those beneficiaries who had received the same too, are still struggling with the problem of scarcity of water as the capacity of the reservoirs

are insufficient to store the required quantity of water to meet the needs of the farming activities throughout the year.

Some beneficiaries have no other choice but to give up their activities till the monsoon comes. At the same time, some farmers who continue their activities during the dry season produce comparatively less.

Problems faced in the Course of the Study

During the conduct of the study, the researcher has faced some problems which hampered the smooth flow of the research. Some are caused by unavoidable circumstances. There were certain problems faced which, however, could be solved to keep the research going. Few of the problems encountered by the researcher are stated below:

1. **Pandemic:** Covid-19 pandemic and the series of lockdown because of it have been the biggest problem faced during the course of the study. Due to the imposition of total and partial lockdowns and the threat of being infected with the virus, no field work could be conducted for almost two years. Contraction of the virus and the recuperation period led to the loss of considerable amount of time for the scholar.
2. **Difficulty in procuring required data:** The Department officials particularly people at the Headquarters were hesitant to disclose information required by the researcher. A wait time of 2 or more months was often required to get a single data which led to a delay in the progress of the work. For every information to be provided from the headquarters the approval of the Head of the Department had to be sought without which no information could be procured.
3. **Lack of documentation and maintenance of Record:** With regard to availability of information for the study, the concerned department often had no proper records on the information needed by the researcher to move forward in the study. Same was the case with a number of beneficiaries covered under the study wherein they were unable to provide concrete information as they had no

proper records about the activities undertaken under the scheme. Government records are the main source of information for social science research when it is conducted on the topic having a close link with the activities of the government. As a matter of fact, no research can be carried out without seeking information from the government as there is nothing in the society which is out of the concern of the government.

4. **Attitude of respondents:** A small number of respondents interviewed by the researcher appeared to be suspicious and reluctant to respond to the questions during the interview until they were given briefing on the purpose of the study. But, at the end of the day, they became very helpful for researcher in finding answer to the research questions. Meanwhile, some respondents asked for further assistances from the researcher as they could not differentiate research with those government officials who are in charge of the scheme under which they were assisted. Though the researcher was not in a position to fulfil the need of the respondent but very much moved and encouraged to put more efforts for the research.

Limitations of the Study

The study was confined to three schemes in three districts only. Other horticulture schemes in collaboration with National Bank for Agriculture and Rural Development (NABARD), Japan, NLUP, SEDP, Article 275 (1), National Bamboo Mission (NBM) etc., have been implemented in the state with the allocation of considerable amount of fund. These schemes seem to have some impacts on the horticulture context of Mizoram. Therefore, it is thought that further research on these schemes would be very helpful to understand the status of Horticulture in Mizoram.

Districts other than the selected ones have also implemented various schemes including the selected schemes and others as well. Other districts such as Champhai, Lunglei, Siahla etc., are having interesting success stories on their horticulture activities. Therefore, the study may not be adequate to represent the

entire scenario of horticulture in Mizoram. However, it is expected to strike the thoughts for further research to be carried out in the area.

Suggestion

As mentioned above, the implementing agency as well as the stakeholders of the scheme has encountered many obstacles in the process of the implementation of the scheme. Though a number of beneficiaries are still able to achieve desirable progress, many are adversely affected and further compelled to give up their activities. The following are some possible measures which can be taken both by the government and the beneficiaries.

- 1. Timely Release of Fund:** As found out during the study, the state government was stated to be always late in releasing its share of funding, concerted and untiring efforts of the officials of the government at all levels is the need of the day. As most horticultural activities depend on the season, climate etc., one delay can adversely affected the whole year's activities. To ensure the efficient implementation of the schemes, fund allocated should be released on time at any level whether it is central, state or district. The beneficiaries should be able to take all necessary steps to commence their activities on time.
- 2. Appointment of more staff:** More staff (technical or non-technical) need to be recruited and appointed by the Government of Mizoram. Even if the creation of new posts is difficult, the vacant posts due to the death and superannuation of the personnel should be filled as early as possible to ensure the availability of the required manpower and skill for successful implementation of schemes.
- 3. Awareness among the politician:** Politicians (at all levels) especially those in power should be well aware of the importance of the schemes and the possible damages that can be caused due to the selection of those who do not deserve assistance. They must abstain from interfering in the selection process whether it is directly or indirectly if they are not authorised by the appropriate authority.

Exertion of undue pressure by the people for preferential treatment also needs to be done away with.

4. **Thorough study on the suitability of land:** Careful analysis on the suitability of land is a must before undertaking any horticultural activities. Though the topography of the state might not be comparatively conducive for the cultivation of all horticulture crops, but understanding the kind of crops for a particular type of soil can greatly enhance the working of horticulture. It has been discovered during the course of the current study that cultivation of certain variety of crops successfully cultivated in other parts of the world has not had the expected outcome in terms of quality. Therefore, the technical staff of the concerned department and the beneficiaries should keep in mind the suitability of the land and its soil when they are to take initiatives under various schemes otherwise time and energy will be expended in vain even after huge amount of money is invested.
5. **Exploration and subsidisation of suitable machineries:** Thorough study on the available small machineries suitable for use in the rugged topography of Mizoram would help in reducing the onus of farmers as well as in expediting their works. Further, provisions for subsidisation for the farmers may be explored to enable them to have access to such machineries.
6. **Provision of connectivity:** The sites selected for carrying out horticulture activities should be easily approachable for easy transportation of planting materials and farm materials as well as the farm produces. The selected sites for implementation of schemes if not already armed with connectivity and linkages should be in areas where construction of link road will require less expenditure and where better quality connectivity is possible. Transportation problem caused by the rough topography of the state can also be avoided to a certain extent if the land for cultivation is chosen wisely..

7. **Supply of quality planting material:** Productivity and production of horticulture crops largely depends on the quality of planting materials supplied. Good quality planting materials means more productivity and production. In the same way, cultivation of poor quality planting materials can adversely affect the quality and quantity of the produces which may further lead to the total failure. The concerned department should take all necessary steps to ensure that only quality planting materials are disbursed to the beneficiaries. The department should take extra care while selecting firms for procuring and distributing planting materials and stern actions should be taken without any hesitation against firms who fail to comply with the provisions of their agreements. This is expected to prevent firms from supplying inferior quality planting materials in future.
8. **Selection of deserving farmers for assistance:** The implementing agency should take all possible measures to ensure that only the deserving farmers get assistance. Pressure from political leaders or any individuals should not be taken into consideration. Therefore, it is imperative that the personnel who are in charge of the schemes should carry out their duties and responsibilities without fear or favour.
9. **Sufficient Assistance:** In order to make farmers successful in the activities undertaken under the schemes, assistance given to them should be sufficient to meet at least their basic needs. Emphasis should be given on the sufficiency of funds and availability of farm materials such as fertilizers, pesticides etc., for each farmer rather than the number of farmers to be assisted.
10. **Stable Market:** Stable market where the farmers can sell off their produces at reasonable and regular prices are necessary for successful working of agriculture and its allied sectors including horticulture. To avoid market problem which have been faced by many farmers across the state, channels for exporting the produces of the farmers needs to be explored. Government can make meaningful effort for this task. Farmers' societies/associations as well as individuals with expertise

also can have remarkable contribution. The implementing agency should also keep in mind the possible marketing avenues while selecting the crops to be covered under the scheme.

11. **Utilization of Post Harvest Management Facilities/Activities:** More accessible cold storage facilities should be set up by the government to preserve the produces of the farmers. This is necessary for making the horticulture crop available in the market during the off season at profitable prices for farmers. Further, value-addition to the available produces would enhance the earning capacity of the farmers. The available facilities are also to be upgraded with advance technology so that they can be used to preserve more produces.
12. **Setting up of horticulture-based industries:** More agro/horticulture based industries in the state should be set up to take up the activities of *value addition*. The provision for regulating such industries should be simplified and more user friendly so that more industry will come up where farmers can sell their produces at lucrative prices. The Government can make huge contribution in this regard.
13. **More irrigation facilities:** Rivers and streams in our state can solve water problems of farmers to a great extent if there are more irrigation facilities. With regard to irrigation, government intervention is a must to have a better system. Farmers also should keep in mind that while they are about to undertake any horticultural activities, their farm should not be far from water sources like rivers, stream etc., otherwise their activities are likely to become wasted during the dry season.

Conclusion

With regard to the implementation of MIDH, RKVY and PMKSY in Mizoram, much effort has been put by both Government of India and the State Government in terms of fund allocation, dissemination of expertise through training, technical guidance, market arrangement etc. However, desirable results have not been achieved so far due to a number of problems such as cultivation of poor quality planting materials, shortage of technical and non-technical staff to look after the schemes, selection of undeserving beneficiaries, absence of stable market etc.

In Mizoram, much effort have been made by both the Government of India and State Government for the development of horticulture in the state by formulating and implementing various Centrally Sponsored Schemes (CSS) and State Schemes. Under these schemes, thousands of lakhs have been spent to provide assistance to the horticulture farmers as well as for taking various steps for horticulture development in the state. Among the CSS which are meant to develop horticulture in the state, MIDH, RKVY, PMKSY are some noticeable schemes for making remarkable progress in the state. Due to the efforts of the Department of Horticulture under the said schemes along with the state initiated schemes like NLUP, SEDP etc., and other CSS, Mizoram was awarded 'Best Horticulture State' in 2019. As per the record of the Department of Horticulture, about 13200 hectares of land has been covered so far under the horticulture sector. However, it should be kept in mind that horticulture covered only 11.96 per cent of the area identified as horticulture potential area which shows that there is still much to be done for further development of horticulture in the state.

Horticulture is getting more recognition and appreciation due to the contributions of its produces towards the well being of the people in respect of nutrition for better health and income generation. Its ability to achieve sustainability of small land holdings, employment generation, environment protection, more export potential etc., has added its significance. However, the importance of horticulture is said to be recognised since the 1980s only after the leaders of the country and the experts realised the said ability of horticulture for achieving the goals of the nation in some respects. As of today, horticulture has become one of the most important sectors which the Government of

India has undertaken with the investment of more than 2000 crores. Due to the increasing investment and various initiatives in horticulture sector, India became the biggest producer of fruits and vegetables in the world. Only China is ahead of India in this regard.

APPENDIX

Department of Public Administration

Mizoram University

Interview/Questionnaire Schedule for Beneficiaries

Scheme: _____

Name of the Beneficiary: _____

Phone No. _____

Village: _____

District: _____

Questions

1. Under which trade did you receive assistance? Fruits, Veg, etc....Name of fruits, veg. etc.

2. Did you apply for the trade? Year of receiving assistance/ Year of Starting farming.

3. What is your process of implementation

4. What is your Land-Holding? (area of your field) Ownership (rented or owned)

5. How many members of your family are engaged in the activity? (Along with age group)

6. How much assistance did you receive?

7. In Cash or in kind? Was it in Installment? If so, how many?

8. If assistance was in 2 installments, how much work could you complete with the first installment?

9. How many installment has you received? Amount? Did you receive the assistance on time?

10. Were any training organized for you? If yes, how many? And by whom and where? If not in station, were transportation and accommodation arranged by the Dept?

11. Were trainings, if any, helpful in relation to the trade?

12. Have you received any technical / extension guidance?

13. Had any inspection/monitoring been made on how you utilized the assistance from the Department and your progress? If yes, by whom?

14. Have you faced any issues in the course of your work? (in relation to the program)

15. How much/many could you harvest under the programme?

16. How do you sell your products? Directly in the market or through intermediaries or has the Dept. arranged marketing channels for you?

17. Have you had any problems in selling off your produces? If yes, what measures do you take for those items?

18. Do you utilize any type of Post Harvest Management system? If yes, how and where did you learn it from?

19. What is your plan when the scheme ends? (Would you be able to continue)

20. Your source of income during gestation period?

21. What is your income before and after the assistance? Has there been any difference in your income

22. Any impact on your livelihood? If yes, in what way? eg. Food, clothing, assets and property

23. Any other back up from the Department?

24. Any other source of income?

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ABSTRACT
HORTICULTURE ADMINISTRATION IN MIZORAM SINCE
STATEHOOD

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**HORTICULTURE ADMINISTRATION IN MIZORAM
SINCE STATEHOOD**

BY

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Submitted

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INTRODUCTION

Horticulture (Latin hortus = garden; cultura = cultivation), is the science and art of growing fruits, vegetables, flowers, shrubs and trees. 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

On the basis of commercial aspects, horticulture is divided into three specialized areas: the nursery industry, the plant-growing industry and the seed-production industry. The nursery industry deals with the production of fruit trees. The plant-growing industry supplies annual, biennial and perennial plants to the vegetable and flower grower as well as to the ornamental horticulturists. The seed-growing industry produces the seed required for flower and vegetable growing.

The most advanced countries in the field of modern horticulture are the following:- in Europe, the Netherlands, Germany, France, Belgium and the United Kingdom: in Americas, the United States: in Africa, South Africa: and in Australasia, Australia, Tasmania and New Zealand. In recent years India, Japan, China and Russia have extended their horticultural crop production

The history of horticulture is traced as it gradually developed independent of agriculture, into the sophisticated art and science that it is today. Its separation from agriculture as a distinct activity is usually dated from the Middle Ages in Europe. Actually, the history and evolution of horticulture is intimately connected to the history and development of agriculture. As such, horticulture is part of the story of humanity's desire to gain control over nature. Although horticulture and agriculture have many practices in common, horticulture is distinguished by its specialized practices, for example grafting, and by the smaller scale of its operation.

India has witnessed one of the oldest histories of horticulture. From the old Hindu literature like Vedas, Puranas etc. we come to know that a variety of fruits

and vegetables had been grown in India for a number of centuries. Some important fruits which originated in India are strawberry, raspberry, pear, apricot, golden coloured citrus, mango etc. At present, India is the largest producer of fruits and the second largest producer of vegetables in the world being next only to China. It shares 11 percent of fruits production and seven percent of vegetable production in the world.

With the technological development in the field of agriculture, India has made rapid progress in horticulture too along with increased food grain production. With the changing life style and food habit, the importance of vegetables and fruits in the human diet is being increasingly realized. They supply a great number of essential nutrients to the population of the country that is largely vegetarian. The use of flower is considered inevitable in many cultural and religious practices of many nations including India. Owing to the varied agro-climatic zones, abundance of natural resources like sunlight and water, existence of large number of small and marginal farmers and technology available for their production, India has considerable potential to increase its production of horticultural crops. It is the fastest growing sector within agriculture. It contributes in poverty alleviation, nutritional security and provides ample scope for farmers to increase their income. It further helps in sustaining large number of agro-based industries which generate huge employment opportunities. Presently horticulture contributes 28 per cent of agricultural GDP. The national goal of achieving 4.0 per cent growth in agriculture can be achieved through major contribution from horticulture growth

STATEMENT OF THE PROBLEM

As with the rest of the country, agriculture and its allied activities is the mainstay of the people of Mizoram. The existence of subtropical to temperate climatic conditions and fertile soil in this region offers good scope for the cultivation of various types of vegetables, fruits and flowers throughout the year. It would not be an exaggeration to say that there is literally no crop that cannot be grown in Mizoram.

Anticipating the significant role which could be played by the horticulture sector for meeting economic challenges like income enhancement, unemployment

problems, deforestation, and rural development etc., much effort have been taken by the Central government and the state government for the development of horticulture in the state. The horticulture related programmes/projects which are being implemented in the state are: *Mission for Integrated Development of Horticulture (MIDH)*, National Mission on Micro-Irrigation (NMMI), National Mission on Medicinal Plants (NMMP), *Rastriya Krishi Vikas Yojana (RKVY)*, Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), National Technology Mission and New Land Use Policy (NLUP) etc., the flagship programme of the government of Mizoram.

Though there has been a remarkable increase of production in the horticulture sector, a very large quantity of the produces are reported spoiled every year. This may be due to inadequate or improper harvesting, post-harvest handling, lack of processing facilities and the absence of linkage between the processors and the marketers of fruits and vegetables.

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. 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.

REVIEW OF LITERATURE

14 books, 7 articles, various documents of government etc., have been studied by the researcher and the following important literatures were reviewed. Among the books reviewed by the researcher, 11 of them were authored by Indian whereas 3 are from foreign authors.

The above reviewed books and articles has provided ample information on the what, where, how and when of the horticulture in different places. After going through different literatures on horticulture and its related activities, the researcher is greatly motivated to have an in-depth analysis on the horticulture administrative system in Mizoram as no study has been done on the specific topic. The review helps

the researcher as well to understand the right step and appropriate strategies to be undertaken while doing research.

SCOPE OF THE STUDY

Currently, various Central horticulture schemes have been implemented in Mizoram through the Department of Horticulture, Government of Mizoram. Mission for Integrated Development of Horticulture (MIDH), Rashtriya Krishi Vikas Yojana (RKVY), Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) are some important Centrally Sponsored Schemes (CSS) implemented for the development of horticulture in the state. Under these schemes, thousands of horticulture farmers in the state have been assisted with the expenditure of huge amount of money. The progress in terms of area coverage and productivity has also been noticeable. Therefore, the schemes sponsored by the central government which are being implemented in the state are covered by the present research work.

Under the current conditions the desired horticultural development in Mizoram can be achieved only when government take active part right from the beginning as it is the primary source of technical know-how and financial resources. Thus, the role which has been played by the Department of Horticulture, Government of Mizoram for the said development is covered by the study.

OBJECTIVE OF THE STUDY

The following are the objectives of the research.

1. To study the institutional framework for horticulture development in Mizoram.
2. To explore the role played by Government of Mizoram towards the development of horticulture.
3. To find out the effect of the horticulture schemes being implemented in Mizoram on the lives of the people.
4. To identify the problems in the path of horticulture development administration.
5. To explore and suggest remedial measures.

RESEARCH QUESTIONS

The following are the questions formulated for empirical verification in the study:

1. What are the institutional mechanism present for horticulture development and their role in Mizoram?
2. Do the horticulture schemes implemented in Mizoram have impact on the social and economic life of the people?
3. What are the problems in the process of horticulture development in Mizoram?
4. What are the suitable measures for tackling the problems?

METHODOLOGY

Research Design

The present study is cross sectional in nature and descriptive in design. Mixed method was applied which involves an approach of enquiry that contains qualitative and quantitative techniques. The present study was undertaken with the help of both primary and secondary data. The primary data were collected through open-ended semi-structured interview schedule and also used various techniques such as field observation, in-depth interviews, reports, Acts and documentary examination to collect the relevant data for the study.

Sampling

Random purposive sampling method was adopted to collect primary data from horticulture farmers and government officials for the study area. Hence, 57, 54 and 48 farmers from Kolasib, Serchhip and Mamit respectively for MIDH, for RKVY, 60, 28 and 36 farmers from Kolasib, Serchhip and Mamit respectively and 20, 24 and 20 farmers from Kolasib, Serchhip and Mamit districts took part in the survey. Unstructured and semi-structured interviews were also conducted with 17 department officials. While conducting field interview with the respondents; observation method, at the same time, was adopted to get information.

Sources of Data

For the present study, relevant data were collected from both primary and secondary sources. Primary data were collected through open ended semi structured interview schedule from 159 beneficiaries and 7 officials for MIDH, 124 beneficiaries and 5 officials for RKVY and 64 beneficiaries and 5 government officials.

Secondary sources of data were collected from published documents of the Government of India and Mizoram viz., records of the Ministry of Agriculture and Farmers Welfare, Government of India, records of the Department of Horticulture, Government of Mizoram, records of the Department of Agriculture, Government of Mizoram, Reports of Economic Survey, Statistical Handbook of Mizoram, etc. Further, it includes data collected from books, articles, journals, magazines, and concerned Government Websites etc.

Data collection

A semi-structured interview schedule was administered to collect quantitative and qualitative data to get information from beneficiaries of the schemes and officials of the department who are in charge of the said schemes.

Data Analysis

The collected data were processed and analyzed by using simple percentages and Descriptive Statistics.

CHAPTERISATION

The thesis is divided into six chapters. The first chapter deals with an *Introduction to the Study*. This chapter discusses the concept, necessity and significance of horticulture, brief profile of Mizoram including history, polity, administration, economy etc., of the state, review of literature, statement of the research problem, scope and objectives of the study, research questions, and methodology applied in the study.

The second chapter presents *Horticulture: A Conceptual Study*. The chapter begins with historical development of horticulture since the time when man began permanent settlement. The development and evolution of horticulture in India

through different periods such as ancient times, medieval period, colonial period and the post colonial period is also discussed. The chapter presents meaning, scope and importance of horticulture at present, different branches of horticulture such as Pomology, Olericulture, Floriculture, Landscaping etc., along with the present status and contribution of Indian horticulture in world's economy in a brief manner. Relationship between horticulture and agriculture, organic farming, climate change and horticulture are also highlighted.

The third chapter presents the *Institutional Mechanism for Horticulture Administration*. Origin, development, organisational structure, mission, objectives and visions of the Department of Horticulture, Government of Mizoram are discussed in this chapter. The goals and objectives of the department, incumbents along with their duties and responsibilities, infrastructure belongs to the department for the development of horticulture, working of associations for promoting welfare of the staff within the department as well as awards and achievements which have been received are also briefly highlighted in this chapter.

The fourth chapter *Development Programme in Horticulture* discusses about the three important horticulture schemes implemented in Mizoram. These schemes are sponsored by the Central Government in 90:10 funding pattern. Among the various schemes being undertaken in Mizoram, three schemes such as Mission for Integrated Development of Horticulture (MIDH), Rashtriya Krishi Vikas Yojana (RKVY) and Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) along with their origin, fund allocation and utilization, area coverage are discussed in this chapter.

The fifth chapter *Results and Discussion* provides the collected data from different respondents from selected districts namely, Kolasib, Serchhip and Mamit. The respondents of the survey comprise of 277 beneficiaries from the selected districts and 17 department officials during 2021 to 2022. In this chapter, the socio-economic profile of the beneficiaries' respondents is also discussed. The chapter focuses on the impact of horticultural activities (undertaken under the schemes) on income of respondents, problems faced by the farmers in the course of their work, land holding status of the respondents, membership of respondents in Farmers Interest Group (FIG), participation of respondents in trainings organised under the schemes, marketing of the produces under the scheme, farmers' future plan with or

without the assistance from the government or any other institutions, the utilisation of post harvest management facilities, the inspection and monitoring activities of the implementing agency, employment generation due to the implementation of the schemes etc.

The sixth chapter titled, Conclusion, is the concluding chapter in which the major findings and summary of the study are provided. Problems encountered by the respondents while carrying out horticultural activities, suggestions for the improvement in the implementation of the schemes covered by the study, limitation of the study and the new scope for further research have also been discussed in this chapter.

Major Findings

1. The Department of Horticulture, Government of Mizoram has been the most important institution available for administration of horticulture in the state since 1993 when it became full-fledged department. The functions and responsibilities assigned to the Department are carried out by the Directorates, offices at district, sub-division and circle level. Currently, the Department is the implementing agency of CSS such as MIDH, RKVY, PMKSY etc., and some state horticulture policies.
2. With regard to the age of horticulture farmers under the schemes, farmers belonging to the age group of 51-60 are largest in number whereas number of farmers belonging to age group of 18-30 and 31-41 are the least. This indicates that the most effective workforces are engaged in other activities which, further compels most farmers to employ additional labour. At the same time requirement of additional labour has created employment avenues for a number of people.
3. In respect of the educational qualifications obtained by farmers under the schemes, those who have passed Middle School standard are highest in number whereas those who possessed Master Degree are the least. There are no illiterate farmers who have undertaken horticultural activities under the schemes.

4. There is a wide gender disparity among the horticulture farmers. Under the three schemes, the number of male farmers constituted about 70 percent of the total number of farmers while female contributed only 30 percent.
5. It is found out that land holding area of the farmers is not vast enough to have large scale production. More than half of the farmers are carrying out their activities in the area less than 1 hectare of land while about 3 percent of the farmer could manage 3 or more hectare of land for their horticulture activities.
6. With regard to the ownership of land, about 86 percent of farmers under the schemes are undertaking their horticulture activities on their own land whereas the rest conduct their farm activities on borrowed land.
7. Farmers Interest Groups have great contribution for the development of horticulture by providing welfare to the farmers, solving their problems etc. Regarding the membership of farmers in FIGs, about 60-70 percent of respondents are member of at least one association which has link with their activities.
- 8 Training to impart knowledge and expertise has been an important component of each scheme. 78.87 percent of respondents have undergone at least one or two training(s) organised by the implementing agency. Amongst the respondents who have attended trainings, 93.08 percent of them found that their training have been helpful in the course of their work.
- 9 After organisation of training, follow up programme in terms of technical guidance, inspection and monitoring were also given due emphasis to ensure that beneficiaries utilized their assistance in the most effective manner in their activities. 80.93 percent of respondents under the schemes have received such kind of care from the implementing agency.

- 10 The study discovered that most farmers are facing one or more problems in the course of work. Plant diseases, pest, scarcity of water etc., are common problems encountered by farmers.
- 11 With regard to marketing of the produces, farmers sold off their produces in different ways. Those who sold to the intermediaries are highest in number which accounted for 39.06 percent of the total number of respondents. Some sold directly in the market while some utilized arrangements made by the concerned Department. At the same time, there are some farmers who have not sold any of their produces. About half of the beneficiaries of the schemes encountered marketing problems. Covid-19 pandemic, unstable market, competition with imported commodities etc., are some common marketing problems faced by the beneficiaries of the schemes in relation to marketing of their produces.
- 12 Impact of the schemes on the income of farmers is also found out by the study. Respondents who could make profit amounting Rupees 50000-99000/year are largest in number comprising about 40 percent of the total respondents while respondents who could make Rupees more than 1 lakhs/year are only about 9 percent. About 8 percent of respondents are failed to make profit from their horticulture activities.
- 13 The study also revealed that most respondents could not utilize the available post harvest management facilities like cold storage facilities, sorting facilities, grading facilities etc. Value addition activities were also not undertaken by most beneficiaries.
- 14 The implementation of MIDH, RKVY and PMKSY has brought significant progress in increasing horticulture coverage as well. Since the target areas to be covered under the schemes were successfully achieved in every year of implementation for almost a decade, about 13 percent of the identified horticulture potential area in the state has now been utilized for undertaking cultivation of different kinds of horticulture crops.

Issues and Challenges

- 1. Delay in Release of Funds:** Late release of fund had occurred twice or thrice on the part of the Government of India due to the failure of the implementing agency to provide the required documents on time.

In respect of the State Matching Share (SMS), the state government has been always late to release fund. This problem has not been on horticultures schemes alone, but common to all the schemes where State Government is required to contribute its share of funding.

- 2. Shortage of Staff (Technical/Non-Technical):** One of the biggest problems that the concerned officials reiterated while discussing problems in the implementation process with regard to MIDH, RKVY and PMKSY is the shortage of staff. As these schemes are being implemented to cover even the remote areas, the problem is enhanced when there is a need to carry out the monitoring and inspecting activities.

- 3. Interference of Political Parties in the selection process of beneficiaries:** Political parties especially those in power have been said to interfere in the selection process of the beneficiaries in most districts either directly or indirectly. It has been stated in the course of the interview that interference of political parties occurs the most when assistances were given in cash.

- 4. Topography:** The rough topography of Mizoram rendered various impediments to horticulture activities. The implementation of MIDH, RKVY and PMKSY also sometimes fail to produce the desired results due to the difficulties brought in by the unfavourable landscape of the state.

- 5. Supply of Poor Quality Planting Materials:** In the implementation of MIDH and RKVY, supply of poor quality planting materials to the horticulture farmers has been found to take place a number of times which in turn adversely affect the quality and quantity of the produces and often lead to total failure leaving the farmers in despair.

- 6. Selection of Uncommitted Beneficiaries:** However, a number of farmers selected as beneficiaries are stated to be half-hearted in their commitment to the schemes. They rather wish to receive assistance without any commitment to progress in their horticulture activities.
- 7. Insufficiency of Assistance:** The area which can be covered with the assistance provided appears to be insufficient in terms of productivity and production. In some cases, farmers are expected to take initiative in advance on their own expense before the government can hand over assistance to them.
- 8. Unstable Market:** In Mizoram, markets have not been stable in relation to prices as well as quantity of sale of horticulture produces since long time back. As this kind of situation has been experienced a number of times, many farmers were discouraged and sometimes compelled to give up their activities.
- 9. Shortage of Post Harvest Management Facilities and Activities:** Only a few farmers are undertaking value addition activities for their produces to ensure better marketability on and off season. At the same time, there are hardly any individual or firm within the state who can carry out the activities for value addition which would assure stable market for the farmers to sell their produces regularly.
- 10. Scarcity of Water:** Scarcity of water during the dry season starting from November and lasting till the beginning of May has rendered it difficult to carry out horticulture activities and produces also tend to be comparatively less.

Suggestions

- 1. Timely Release of Fund:** To ensure the efficient implementation of the schemes, fund allocated should be released on time at any level whether it is central, state or district. The beneficiaries should be able to take all necessary steps to commence their activities on time.

- 2. Appointment of more staff:** More staff (technical or non-technical) should be recruited and appointed by the government of Mizoram. Even if the creation of new posts is difficult, the vacant posts due to the death and superannuation pension of the personnel should be filled as early as possible.
- 3. Awareness among the politician:** Politicians must abstain from interfering in the selection process whether it is directly or indirectly if they are not authorised by the appropriate authority. Exertion of undue pressure by the people for preferential treatment also needs to be done away with.
- 4. Thorough study on the suitability of land:** Careful analysis on the suitability of land is a must before undertaking any horticultural activities. Though the topography of the state might not be comparatively conducive for the cultivation of all horticulture crops, but understanding the kind of crops for a particular type of soil can greatly enhance the working of horticulture.
- 5. Exploration and subsidisation of suitable machineries:** Thorough study on the available small machineries suitable for use in the rugged topography of Mizoram would help in reducing the onus of farmers as well as in expediting their works. Further, provisions for subsidisation for the farmers may be explored to enable them to have access to such machineries.
- 6. Provision of connectivity:** The sites selected for carrying out horticulture activities should be easily approachable for easy transportation of planting materials and farm materials as well as the farm produces.
- 7. Supply of quality planting material:** The department should take extra care while selecting firms for procuring and distributing planting materials and stern actions should be taken without any hesitation against firms who fail to comply with the provisions of their agreements.
- 8. Selection of deserving farmers for assistance:** The implementing agency should take all possible measures to ensure that only the deserving farmers get assistance.

9. **Sufficient Assistance:** Emphasis should be given on the sufficiency of funds and availability of farm materials such as fertilizers, pesticides etc., for each farmer rather than the number of farmers to be assisted.

10. **Stable Market:** Stable market where the farmers can sell off their produces at reasonable and regular prices are necessary for successful working of agriculture and its allied sectors including horticulture. To avoid market problem which have been faced by many farmers across the state, channels for exporting the produces of the farmers needs to be explored.

11. **Utilization of Post Harvest Management Facilities/Activities:** More accessible cold storage facilities should be set up by the government to preserve the produces of the farmers. This is necessary for making the horticulture crop available in the market during the off season at profitable prices for farmers. Further, value-addition to the available produces would enhance the earning capacity of the farmers. The available facilities are also to be upgraded with advance technology so that they can be used to preserve more produces.

12. **Setting up of horticulture-based industries:** More agro/horticulture based industries in the state should be set up to take up the activities of value addition.

13. **More irrigation facilities:** Rivers and streams in our state can solve water problems of farmers to a great extend if there are more irrigation facilities. With regard to irrigation, government intervention is a must to have a better system.

Problems faced in the Course of the Study

1. **Pandemic:** Covid-19 pandemic and the series of lockdown because of it have been the biggest problem faced during the course of the study. Due to the imposition of total and partial lockdowns and the threat of being infected with the virus, no field work could be conducted for almost two years.

2. **Difficulty in procuring required data:** The Department officials particularly people at the Headquarters were hesitant to disclose information required by the researcher. A wait time of 2 or more months was often required to get a single data which led to a delay in the progress of the work.
3. **Lack of documentation and maintenance of Record:** With regard to availability of information for the study, the concerned department often had no proper records on the information needed by the researcher to move forward in the study.
4. **Attitude of respondents:** A small number of respondents interviewed by the researcher appeared to be suspicious and reluctant to respond to the questions during the interview until they were given briefing on the purpose of the study.

Limitations of the Study

1. The study was confined to three schemes in three districts only. Other horticulture schemes in collaboration with National Bank for Agriculture and Rural Development (NABARD), Japan, NLUP, SEDP, Article 275 (1), National Bamboo Mission (NBM) etc., have been implemented in the state with the allocation of considerable amount of fund. These schemes seem to have some impacts on the horticulture context of Mizoram. Therefore, it is thought that further research on these schemes would be very helpful to understand the status of Horticulture in Mizoram.
2. Districts other than the selected ones have also implemented various schemes including the selected schemes and others as well. Other districts such as Champhai, Lunglei, Siahla etc., are having interesting success stories on their horticulture activities. Therefore, the study may not be adequate to represent the entire scenario of horticulture in Mizoram. However, it is expected to strike the thoughts for further research to be carried out in the area.

Conclusion

In Mizoram, much effort have been made by both Government of India and State Government for the development of horticulture in the state by formulating and implementing various Centrally Sponsored schemes (CSS) and State schemes. Under these schemes, thousand of lakhs has been spent to provide assistance to the horticulture farmers as well as to take various steps for horticulture development in the state. Among the CSS which are meant to develop horticulture in the state, MIDH, RKVY, PMKSY are some noticeable schemes for making some remarkable progress in the state. Due to the efforts of the Department of Horticulture under the said schemes along with the state initiated schemes like NLUP etc., and other CSS, Mizoram was awarded 'Best Horticulture State' in 2019. As per the record of the Department of Horticulture, about 13200 Hectare of land has been covered so far under the horticulture sector. However, it should be kept in mind that horticulture covered only 11.96 per cent of the area identified as horticulture potential area which shows that there still so much to be done for further development of horticulture in the state.