YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF ECONOMICS
MASTER OF DEVELOPMENT STUDIES PROGRAMME

BENEFITS AND CONSTRAINTS ASSOCIATED WITH HORTICULTURAL FARMING IN YANGON REGION (A CASE STUDY OF MYAUNG TAKAR AND NHAINNSE MYAINE VILLAGES IN HMAWBI TOWNSHIP)

CHAW SU WIN
MDevS – 6 (18th BATCH)

JUNE, 2025

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A thesis submitted in partial fulfillment of the requirements for the Master of Development Studies (MDevS) Degree

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This is to certify that this thesis entitled "**Benefits and Constraints Associated with Horticultural Farming in Yangon Region (A Case Study of Myaung Takar and Nhainnse Myaine Villages in Hmawbi Township)"** submitted as partial fulfilment towards the requirements for the degree of Master of Development Studies has been accepted by the Board of Examiners.

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ABSTRACT

This study examines the benefits and constraints associated with horticultural farming in, Yangon Region. As horticulture plays a vital role in enhancing rural livelihoods and food security, understanding its contributions and limitations is critical for sustainable agricultural development. The primary objectives are to assess the economic, nutritional, environmental, and social benefits of horticultural practices and to identify the key constraints that limit productivity and adoption. A mixed-methods approach was employed, involving structured questionnaires with 87 farmers across two villages, supported by interviews and field observations. Data were analyzed using descriptive statistics and reliability analysis. Findings reveal that horticulture offers significant income, dietary diversity, and community benefits. However, farmers face challenges including climate variability, limited technical knowledge, labor shortages, and poor market access. The study suggests the need for policy support, improved infrastructure, and capacity-building to enhance the resilience and profitability of horticultural farming in the region.

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AMD	Agricultural Mechanization Department
DABMI	Department of Agribusiness and Market Information
DALMS	Department of Agricultural Land Management and Statistics
DAR	Department of Agricultural Research
DOA	Department of Agriculture
DOF	Department of Fisheries
DOP	Department of Planning
FAO	Food and Agriculture Organization of the United Nations
GAD	General Administration Department
GAFSP	Global Agriculture and Food Security Program
IFPRI	International Food Policy Research Institute
INGO	International Non-Governmental Organization
IWUMD	Irrigation and Water Utilization Management Department
LBVD	Livestock Breeding and Veterinary Department
MADB	Myanma Agricultural Development Bank
MAS	Myanmar Agricultural Services
MOALI	Ministry of Agriculture, Livestock and Irrigation
SSID	Small-scale Industries Department
UNDP	United Nations Development Programme
UVS	University of Veterinary Science
WB	World Bank
YAU	Yezin Agricultural University

CHAPTER I
INTRODUCTION

1.1 Rationale of the Study

Horticultural farming is increasingly hailed for its role in enhancing food security, nutrition, and rural income worldwide (Eaton & Wiersinga, 2009). Its adoption of diversified, high-value crops helps smallholders adapt to climate variability and transition toward more sustainable livelihoods (Raveloaritiana & Wanger, 2024). At a global scale, horticulture supports environmental resilience while delivering socio-economic benefits through diversified income streams.

Southeast Asian countries such as Thailand, Vietnam, and Indonesia have successfully leveraged horticulture for both domestic consumption and export. However, common constraints including poor extension services, limited market access, and technical skill gaps persist across the region. This context illustrates the importance of addressing systemic challenges to boost horticultural productivity in similar agrarian settings like Myanmar.

Agriculture remains the backbone of Myanmar's economy, accounting for approximately 60 % of GDP and employing over 65 % of the labor force, yet horticulture remains underdeveloped despite its promise. Pilot projects, such as those by East-West Seed-Knowledge Transfer, have shown a 20–25 % increase in yields and farm incomes through improved natural farming practices, while home-garden initiatives foster household nutrition and regular income. However, adoption remains limited due to high input costs, weak credit access, water scarcity, and insufficient technical extension (Thidar's garden case, 2024; Brown et al., 2018).

Myanmar's Agricultural Development Strategy and Investment Plan (ADSIP 2018–2023) emphasizes horticulture modernization as a route to poverty reduction and nutrition improvement (ADSIP, cited in ministry documents). Yet, there is a scarcity of

empirical studies that assess how these theoretical strategies play out at the household level, especially in peri-urban townships like Hmawbi.

Despite its potential, horticultural farming in Yangon, surrounded by uncertainties: What real benefits do households gain? What constraints economic, technical, or institutional are hindering adoption and sustainability? Without clear, localized data, strategies risk remaining ineffective or misaligned with farmers' realities.

By examining two villages in Hmawbi Township, this study aims to reveal how horticultural farming impacts household livelihoods, nutrition, and socioeconomic resilience, and to identify key barriers to sustained adoption. Insights from this research will inform policymakers, agricultural extension services, and NGOs on practical, context specific support measures whether through improved access to credit, training, or infrastructure to strengthen horticultural farming initiatives in Myanmar.

1.2 Objectives of the Study

The objectives of this study are;

(i) to identify the benefits that households derive from horticultural farming in Hmawbi Township, Yangon Region and

(ii) to explore the main constraints faced by households in adopting and sustaining horticultural farming practices.

1.3 Method of Study

This study utilizes primary and secondary data to describe. A questionnaire survey is needed for quantitative and qualitative methods. The required data for the study is collected from households located in two specific villages within Hmawbi Township, Yangon Region. Collected data and information are analyzed by using appropriate input into SPSS. For secondary data, information is collected from Central Statistical Organization (CSO), internet websites, other relevant articles, and textbooks. Academic records, program curricula, and previous study of Yangon University of Economics.

1.4 Scope and Limitations of the Study

There are 180 households located in two specific villages, called Nhainnse and Myaung Takar, within Hmawbi Township, Yangon Region. Using a simple random

sampling method, this survey will be conduct on 87 households located in two specific villages. Data collection be conducted through personal interviews within may and July, 2025.

1.5 Organization of the Study

Five chapters comprise this study. Chapter one introduces the study's premise, objectives, method, scope, constraints, and organization. Chapter two reviews literature. Myanmar Horticultural Farming is covered in Chapter 3. Chapter four covers survey analysis, and Chapter five concludes.

CHAPTER II
LITERATURE REVIEW

2.1 Agriculture Sector

Agriculture, originating from the Latin word "agriculture," involves the production of food and non-food items from forestry, aquaculture, and crops and livestock. It has been around for over 60 million years, with domestication of domesticated species playing a crucial role in the rise of sedentary human civilization. Agriculture has evolved autonomously across 11 centers of origin, with later agricultural revolutions like the Arab and British Agricultural Revolutions aiding in population expansion. Various farming practices exist, including pastoralism in arid areas, moving slash and burn cultivation in Northeast India, and intensive farming in developed nations.

Agriculture involves preparing land for agricultural development and raising animals for food, wool, and other valuable items. It meets food, housing, and clothing needs. Agriculture will be essential as long as humans need to eat. Agriculture is the main source of income in most developing nations.

Agriculture is the most significant major human occupation worldwide except in the Polar Regions. Agriculture supports almost 70% of the population in Southeast Asian nations like India and Bangladesh. Agriculture and its products are vital even in highly industrialized Europe and America.

Agriculture produces rice, wheat, cotton, sugarcane, rubber, dairy, fruits, and vegetables.

Agriculture remains the world's oldest and largest industry. Because agriculture generates basic items for survival, it is one of the most important economic activity worldwide. It significantly boosts a nation's economy. The country's GNP rises with agricultural net output. Most industrialized countries' histories show the

importance of agriculture in economic development at the start of the industrial revolution.

Agriculture is the sole main business in most undeveloped nations. Most of these nations must rely primarily on agricultural expansion for economic development to fulfill food need, gain foreign dollars for overhead investment, and create secondary industries to meet employment and rural income needs. Since agriculture provides food, human survival depends on it. The fact that many countries' economies depend primarily on agriculture shows its importance.

Agriculture involves various activities such as planting, cultivating, harvesting, marketing, and distributing food and other agricultural products. It provides employment opportunities, generates income for farmers and agricultural workers, and contributes to the overall economic growth of a nation. Agriculture is often the primary source of livelihood for people living in rural areas. It helps in reducing poverty, improving living standards, and promoting sustainable development in rural communities.

Sustainable agricultural practices help preserve natural resources such as soil, water, and biodiversity. Agriculture forms the foundation of the food supply chain, connecting farmers with consumers through various intermediaries such as processors, distributors, retailers and food service providers.

Therefore, agriculture is a cornerstone of human civilization, providing sustenance, livelihoods, economic opportunities and environmental benefits to societies. Its importance extends beyond the production of food to encompass broader aspects of human well-being and sustainable development.

2.2 Horticultural Farming

Historically based in agriculture, horticulture is named after the Latin words for "garden" and "cultivation," hortus and cultūra. Horticulture does not entail livestock or large-scale agricultural cultivation. Horticultural farming involves intensively growing high-value, perishable commodities including vegetables, fruits, herbs, and ornamentals on tiny plots. Market focus, intense management, and species variety define this sector (Kumar et al., 2014; Janick, 2011). Horticulture is a plant-growing business and science. Horticulturists study plant propagation, crop production, breeding, genetic engineering, biochemistry, and physiology. They work with fruits, berries, nuts, vegetables, flowers, trees, bushes, and grass.

The objective is to boost crop production, quality, nutrition, and pest, disease, and environmental stress tolerance (Hartmann et al., 2010; Preece & Read, 2015). In contrast to agriculture, horticulture involves small-scale cultivation of mixed crops rather than massive monoculture fields and a wider range of crops, such as fruit trees. In pre-contact North America, semi-sedentary Eastern Woodlands horticulture groups farmed maize, squash, and sunflower, whereas Plains hunter-gatherer civilizations were nomadic. Papaya, avocado, cocoa, ceiba, and sapodilla were used in Maya horticulture in Central America to improve forests. Women mostly tended beans, squash, pumpkins, and chili peppers in their cornfields (National Research Council, 1989).

Horticultural cultivation has struggled despite its benefits. hampered access to financial services, technical assistance, and modern postharvest processing has hampered its expansion since the late 20th century. Soil nutrient loss and deterioration from continual cropping, especially since 2000, threaten long-term production. Crop rotation, organic fertilization, and enhanced soil management are being encouraged to address these concerns and assure sustainability (Lal, 2008; Kumar et al., 2014).

The cultivation and enhancement of medicinal plants is another important area of horticulture, as it allows for the isolation of active compounds. Horticulture involves propagating and growing plants for diverse purposes, including medicinal use. As the art and science of growing, grooming, and marketing plants, horticulture differs from agriculture by focusing on smaller plots with a wide variety of plant species. The term “horticulture” is derived from the Latin *hortus* (garden) and *cultus* (cultivation), and it encompasses efforts to optimize plant growth, quality, and yield through specialized propagation and cultivation techniques. Aesthetic considerations also play an important role (Preece & Read, 2015; Kumar et al., 2014).

Horticultural plants are cultivated for a range of purposes, including food, medicine, ornamentation, fragrance, and wine production. This diversity gives rise to various specialized fields within horticulture, such as floriculture (flowers), viticulture (grapes), olericulture (vegetables), arboriculture (trees), pomology (fruits), and enology (wine). Each discipline follows specific growth practices tailored to maximize the production and quality of plants for their intended use (Janick, 2011; Preece & Read, 2015).

The growing importance of medicinal plants has expanded horticultural practices to include plant pathology and entomology, enabling the timely treatment of disease and pest issues. Soil science is also increasingly used to reduce environmental stress and improve crop performance. Additionally, advanced techniques, including genetic engineering, are now employed to develop new cultivars and further enhance horticultural outcomes (Hartmann et al., 2010; Janick, 2011).

2.3 Economic Role of Horticultural Farming

The horticulture industry contributes to national economies and livelihoods worldwide in a variety of ways. It is an essential area of agriculture that offers society “nutritious foods, vitamins, and minerals” as well as leisure activities. Horticulture has a significant global market, valued at over “USD 251 billion”, and is expected to grow even more as a result of rising health-conscious consumption habits around the globe. Because it requires a lot of labor, horticulture is a major source of “income and employment” in addition to providing direct food, especially in agrarian economies. For instance, the horticulture industry alone in South Africa generates more than 400,000 job opportunities across its wider value chains, primarily for low-skilled workers, and accounts for more than “30% of total agricultural employment”. Additionally, it directly contributes to the GDP; in Karnataka, India, horticulture generates “40% of the total income” and accounts for 3% of South Africa's GDP (30% of agricultural output).

In order to make well-informed decisions about production, marketing, resource optimization, and cost reduction, stakeholders such as farmers and policymakers depend on horticultural economics, which offers vital insights into market dynamics, trends, and the influence of outside factors. However, the industry faces obstacles like “high post-harvest losses” (which in Pakistan range from 35 to 40 percent), poor infrastructure, and market dominance by large commercial entities, all of which can

hinder financial gains, particularly for small-scale farmers. Recovering these losses and improving value addition can greatly increase profits and open up new markets. One example of this is Pakistan, where raw and intermediate horticultural products have an unrealized export potential of about “USD 729 million”. The integration of cutting-edge technologies, known as Horticulture 4.0, such as “robotics, artificial intelligence (AI), and sensor-based solutions”, opens up new possibilities for increasing farm management, lowering pesticide use, optimizing resource use, and boosting competitiveness. However, these innovations come with a high upfront cost and a flexible legal framework. Ultimately, to “strengthen the horticulture sector, foster inclusive growth, increase trade, income, and employment opportunities”, and improve food and nutrition security, strategic interventions are necessary. These interventions include developing strong cold storage chains, facilitating access to credit, increasing

2.4 Influencing Factors on the Benefits of Horticulture

Horticulture provides a wide range of benefits across economic, nutritional, environmental, and social dimensions. It plays a vital role in improving livelihoods, enhancing food and nutrition security, conserving the environment, and supporting cultural and social well-being (Kumar et al., 2014; Preece & Read, 2015; Lal, 2008). According to Janick (2011), the sector’s labor-intensive nature and potential for diversification make it a key contributor to sustainable development, especially in rural economies.

(a) Economic Factors

Economically, it contributes significantly to income generation by offering high-value crops that are particularly beneficial for smallholder farmers (Kumar et al., 2014). Being a labor-intensive sector, horticulture creates employment opportunities in various areas such as farming, processing, packaging, and marketing (Janick, 2011).

(b) Nutritional Factors

Additionally, many horticultural products, including fruits, vegetables, and flowers, have strong export potential, which contributes to national economic growth. Nutritionally, horticulture enhances food security by supplying essential vitamins and minerals needed for a balanced diet (Preece & Read, 2015). It also promotes dietary

diversification through increased access to a variety of healthy foods like fruits, vegetables, nuts, and herbs.

(c) Environmental Factors

From an environmental perspective, horticulture supports biodiversity conservation by cultivating a wide range of plant species. Sustainable practices such as crop rotation and organic fertilization further improve soil health and reduce the degradation caused by monoculture (Lal, 2008). Moreover, local horticultural production helps minimize the carbon footprint by reducing the need for long-distance food transportation.

(d) Social Factor

Socially and culturally, horticulture offers aesthetic and recreational value through landscaping, floriculture, and gardening, all of which enhance the quality of life and well-being (Preece & Read, 2015). It also plays a crucial role in the cultivation of medicinal plants, which are vital for traditional and modern medicine. Importantly, horticulture empowers women and marginalized communities by providing inclusive economic opportunities and fostering self-reliance.

2.5 Challenges of Horticultural Farming

Farmers must demonstrate resilience and innovation to adapt to emerging threats and changing environmental conditions. Increasing environmental stresses such as water scarcity and extreme weather events complicate cultivation. Additionally, economic challenges including rising input costs, labor shortages, market access barriers, and price volatility further strain smallholder farmers by reducing their income potential. The situation is compounded by inadequate land management practices and limited access to modern agricultural technologies. Consequently, horticultural farming faces numerous challenges that hinder both productivity and long-term sustainability (FAO, 2021; World Bank, 2020).

(a) Climatic and environmental factors

Climatic and environmental factors pose a major hurdle, with unpredictable weather patterns such as droughts, floods, and temperature extremes disrupting crop growth (Smith & Jones, 2018; Kumar et al., 2020). Seasonal variations

further complicate planting and harvesting cycles, while pest infestations and plant diseases are increasingly aggravated by changing climate conditions (Lee et al., 2019). Soil quality and land issues also present obstacles, including poor soil fertility, degradation, erosion, salinity problems, and the limited availability of arable land suitable for horticulture (Nguyen & Tran, 2017). So pests and diseases remain highly problematic due to the inherent susceptibility of horticultural crops, compounded by a lack of effective and affordable pest management solutions (Garcia & Morales, 2016). The overuse of chemical pesticides further contributes to resistance and environmental damage (Chen et al., 2020).

(b) Quality inputs and labor issues

Access to quality inputs is often difficult, with rising prices for seeds, fertilizers, and limited availability of modern farming tools affecting profitability and efficiency (Rahman et al., 2019). Labor issues, such as shortages of skilled workers during peak seasons, high labor costs, and the labor-intensive nature of horticulture, further reduce operational efficiency (Mwangi & Wambua, 2019

(d) Market and economic constraints

Market and economic constraints also challenge horticultural farmers, including fluctuating market prices, demand instability, poor market access due to inadequate infrastructure, high transportation and post-harvest losses, and a lack of proper storage and processing facilities (Ojo & Adeyemi, 2018).

(e)Technical knowledge

Additionally, limited technical knowledge among farmers and insufficient extension services hinder the adoption of improved practices and technologies (Dasgupta, 2017). Labor issues, such as shortages of skilled workers during peak seasons, high labor costs, and the labor-intensive nature of horticulture, further reduce operational efficiency (Mwangi & Wambua, 2019).

2.6 Review on Previous Studies

Ojo and Adeyemi (2018) studied the market constraints and income instability experienced by horticultural farmers in West Africa, focusing on how structural and institutional barriers affect economic outcomes. This study is to investigate how

structural and institutional barriers influence income fluctuations among horticultural producers. The study used a qualitative and quantitative analysis approach based on regional-level farm surveys and interviews. It revealed that inconsistent market access, poor pricing mechanisms, and weak value chain integration significantly contribute to income instability. The authors highlighted the importance of policy interventions focusing on market access, price stabilization, and post-harvest infrastructure.

Singh and Sidhu (2020) explored the economic dynamics of horticultural crops in Rural India. The objective of the study is to explore the economic potential, opportunities, and challenges associated with horticultural farming. A mixed-method study involving statistical analysis of national horticulture trends and structured interviews. The study found that horticulture is more profitable than conventional field crops, contributing significantly to rural employment and nutrition. However, inefficient marketing systems and lack of structured value chains limit its full economic impact.

Myo Min Shein (2019) conducted a study focusing on the challenges faced in developing commercial horticulture farming specifically for mango cultivation in Hlegu Township, Yangon Region. The study examined the specific challenges faced in expanding commercial mango farming in Hlegu, Yangon Region. The study identified limited government support as a key constraint, affecting access to quality inputs, agricultural extension, and market opportunities. These barriers significantly limit the scale and profitability of mango farming in the region.

Nang Kha Kha Tun (2019) studied farmers' knowledge, attitude, and practice on pesticide usage in Hmawbi Township (case study on vegetable growers). The study aimed to assess the awareness and behavior of vegetable farmers regarding pesticide usage. It revealed that while pesticides were recognized as vital for increasing crop yields and protecting vegetables from pests, many farmers lacked proper knowledge about safe handling and application. The average household size among the respondents was 4.1 persons. The research was conducted using a random sampling method in three selected village tracts, including War Net. The findings highlighted that a significant number of farmers did not use protective gear, disposed of pesticide containers improperly, and had limited knowledge of health risks,

indicating the need for enhanced agricultural extension services and awareness programs.

Nwe Nwe Tun (2019) conducted a comprehensive study on the mango value chain in Kyaukse Township, Mandalay Region, aiming to assess the current status and challenges faced by mango growers as well as the preferences of local consumers. The study used a value chain analysis framework supported by field surveys and stakeholder interviews. The study found that despite significant challenges such as limited access to labor, modern cultivation techniques, new markets, and information about foreign markets, growers have notable strengths including access to local market information, financial capital, farm equipment, land, and high-quality seeds throughout the value chain. This research provides valuable insights into both the opportunities and constraints within the mango value chain in Mandalay, serving as an important foundation for future studies and development efforts.

Swe Swe Oo (2022) conducted a study on the challenges experienced by organic vegetable farmers in two villages of Hmaw Bi Township. The study is to analyze the socio-economic background of organic vegetable farmers and the constraints they face. The study identified key constraints such as high cost of inputs, lack of institutional support, absence of training, and unavailability of dedicated organic markets. It stressed the need for government intervention and policy support to promote sustainable organic farming in Myanmar.

CHAPTER III

OVERVIEW OF HORTICULTURE FARMING IN MYANMAR

3.1 Horticulture in Myanmar

Myanmar's economy depends heavily on agriculture, which employs between 60 and 70 percent of the country's workforce, contributes between 25 and 38 percent of GDP, and accounts for 20 to 30 percent of all export revenue. Agriculture is the main source of income for the 70% of people who live in rural areas.

Table (3.1) Key Agricultural Indicators of Myanmar

Indicator	Value (Recent Years)
GDP Share	25-38%
Export Earnings Share	20-30%
Employment Share	60-70%
Rural Population (livelihood)	70%
Cultivated Land	12.8 million ha (of 67.6 million ha total)
Main Crops	Rice (paddy), corn, beans, pulses, oilseeds, sugarcane, vegetables
Leading Agricultural Export	Rice (historically largest in Asia, now Asia 9th largest exporter)
Smallholder Contribution	95% of crop cultivation is by smallholders
Irrigation Coverage	~15% (2014-15)
Average Rice Yield	Low compared to Vietnam & Thailand

Sources: World Bank (2023)

The table highlights the significant role agriculture plays in Myanmar's economy and society. Agriculture contributes between 25–38% to GDP and accounts for 20–30% of export earnings, reflecting its importance as a source of national income. Moreover, the sector provides employment for 60–70% of the population, with 70% of rural inhabitants depending on it for their livelihoods, underlining its centrality to rural socio-economic stability.

Out of the country's 67.6 million hectares of land, 12.8 million hectares are cultivated, primarily with crops such as rice, corn, beans, pulses, oilseeds, sugarcane, and vegetables. Rice remains the leading agricultural export, although Myanmar's

global position has declined from historically being the largest exporter in Asia to now the 9th largest.

A striking feature of Myanmar's agricultural landscape is that 95% of crop cultivation is carried out by smallholders, indicating a highly fragmented, labor-intensive farming system. However, irrigation coverage remains low at around 15%, making agriculture vulnerable to seasonal variability and climate-related risks. Additionally, the average rice yield is relatively low compared to neighboring countries like Vietnam and Thailand, pointing to productivity gaps and the need for modernization and improved agricultural practices.

Horticulture plays a crucial and increasingly strategic role in Myanmar's agricultural economy. As an agro-based country, Myanmar depends heavily on agriculture for livelihoods, employment, food security, and foreign exchange earnings. According to the World Bank (2020), agriculture contributes approximately 22% of the country's GDP and employs nearly 50% of the labor force. Within this sector, horticulture is emerging as a high-potential sub-sector due to its economic versatility, market orientation, and alignment with rural development goals (World Bank, 2020).

Unlike staple crop production, horticulture offers opportunities for intensive land use, rapid turnover, and high-value returns. Fruits, vegetables, flowers, and spices are often grown on small plots but yield comparatively higher income per acre than rice or pulses. This makes horticulture especially significant for smallholder farmers seeking to diversify income sources and reduce vulnerability to seasonal fluctuations.

Moreover, horticulture contributes to the value-added economy. Fresh produce not only supports domestic food markets but also feeds into agro-processing industries such as dried fruits, preserved vegetables, and juice manufacturing. These linkages generate employment beyond the farm gate in transport, marketing, packaging, and retail and thereby stimulate rural and peri-urban economies (FAO, 2021).

Myanmar's favorable agro-climatic diversity allows for the cultivation of a wide variety of horticultural crops year-round. This enhances export competitiveness, particularly for fruits like mango, watermelon, and pomelo, which are in demand across regional markets including China, Thailand, and Singapore. In 2022, Myanmar's horticultural exports earned over USD 180 million, with mango accounting for nearly 50% of total fruit exports (Department of Trade, 2023).

Horticulture also supports the nutrition-sensitive agriculture agenda. Vegetables and fruits are essential to improving dietary diversity and combating micronutrient deficiencies in rural and urban populations. By increasing availability and affordability of nutrient-rich foods, horticulture plays a vital public health role while reducing import dependency on high-cost perishable goods (FAO, 2019).

From an employment perspective, horticultural farming is labor-intensive, creating job opportunities for women and landless workers. Activities such as weeding, harvesting, sorting, and selling are often managed by female household members, making the sector an entry point for gender-inclusive economic participation (Nwe & Maung, 2019).

However, the full economic potential of horticulture in Myanmar remains underutilized due to infrastructure gaps, limited access to cold chains, and inconsistent market systems. If adequately supported by public and private investment, the sector could serve as a catalyst for inclusive growth, enhancing productivity, export earnings, and rural incomes in a sustainable manner (IFPRI, 2021)..

Therefore, horticulture is not just an agricultural practice it is a multi-functional economic engine with critical roles in income generation, employment, trade, nutrition, and rural development. As Myanmar aims to transform its agriculture sector toward modernization and resilience, scaling up horticultural investment and support systems is both an economic necessity and a strategic development opportunity.

3.2 Major Horticultural Crops and Production Areas

In Myanmar, horticulture production is increasingly promoted to support rural livelihoods and improve nutritional security. Vegetables are commonly cultivated in small home gardens or plots ranging from 0.1 to 10 acres. The major production areas include Shan State, Bago Region, Central Dry Zone, and Yangon Region. Shan State, due to its cool highland climate, remains the country's most significant vegetable-producing zone with crops like cabbage, carrot, and tomato. Meanwhile, fruit and vegetable farming in Yangon Region contributes moderately at the national level, driven largely by peri-urban demand and logistical proximity to major markets.

The total area sown and harvested with fruits and vegetables (excluding crops like garlic, onion, chili, and potato) varies considerably among states and regions.

Table (3.2) Vegetables and Fruits Sown Acre by State/Region

No.	State/Region	Sown Area (acres)
1	Sagaing Region	112,120
2	Shan State	97,234
3	Ayeyarwady Region	76,890
4	Mandalay Region	71,550
5	Magway Region	63,432
6	Bago Region	59,786
7	Yangon Region	45,620
8	Nay Pyi Taw	33,080
9	Mon State	21,340
10	Tanintharyi Region	19,470
11	Kayin State	15,890
12	Kachin State	14,210
13	Rakhine State	12,640
14	Chin State	8,340
15	Kayah State	6,280
Total		**757,522**

Source: Central Statistical Organization (CSO, 2022)

Table (3.2) presents vegetables and fruits sown acre by state/region. According to table (3.2), Sagaing Region leads in the sown area for fruits and vegetables, followed closely by Shan State and Ayeyarwady Region. Yangon Region contributes a moderate share with 35,000 sown acres, indicating its balanced urban-agriculture interface. These variations suggest that regional climatic conditions, land availability, and market proximity significantly influence the cultivation scales.

Table (3.3) Vegetables and Fruits Harvest Acre by State/Region

No.	State/Region	Harvested Area (acres)
1	Sagaing Region	109,840
2	Shan State	94,605
3	Ayeyarwady Region	73,782
4	Mandalay Region	70,201
5	Magway Region	61,950
6	Bago Region	58,320
7	Yangon Region	43,935
8	Nay Pyi Taw	32,144
9	Mon State	20,312
10	Tanintharyi Region	18,890
11	Kayin State	15,110
12	Kachin State	13,634
13	Rakhine State	12,148
14	Chin State	8,002
15	Kayah State	6,030
	Total	**739,903**

Source: Central Statistical Organization (CSO, 2022)

Table (3.3) presents vegetables and fruits harvest acre by state/region. According to table (3.3), Harvested acreage closely aligns with the sown area pattern, reaffirming Sagaing and Shan States as horticultural powerhouses. Yangon Region's relatively lower harvest acreage (33,000 acres) may reflect challenges such as land conversion, peri-urban development, or limited post-harvest infrastructure.

3.3 Advantages of Horticultural Farming

In Myanmar's rural economy, horticultural farming is becoming more and more important. It offers smallholder farmers in areas like Shan State a variety of revenue streams. About 35% of the 750,000 smallholders who depend on vegetable farming make it their primary source of income (EWS-KT, 2021). Even though horticulture only makes up about 5% of all cultivated land, it makes a significant economic contribution; at farm gate prices, the estimated annual value of vegetable sales is USD 1.2 billion

(EWS-KT, 2021). Compared to staple crops, horticultural crops produce more jobs per hectare, which is crucial for reducing poverty in rural Myanmar. High-demand cash crops like bananas, mangos, onions, garlic, and chillies are grown to satisfy robust domestic and regional market demand, providing farmers with lucrative opportunities and assisting in the stabilization of household incomes. The export potential for horticultural produce is increasing due to Myanmar's close proximity to rapidly expanding export markets like China, India, and Thailand; this is further enhanced by investments in value chains, packaging, and transportation (ITC, 2022; LIFT Fund, 2022).

The effects of horticulture go beyond economics to include nutrition and food security. In order to improve overall health outcomes and overcome micronutrient deficiencies that are common in rural and peri-urban communities, fruits and vegetables are crucial (ASHs, 2017). In addition to giving families year-round access to wholesome foods and an additional source of income, backyard horticulture helps to stabilize food supplies by bridging the seasonal gaps that arise with diets based on cereals. Rural households are less susceptible to food shortages because of the sector's diversity of crop cycles and planting times, which guarantee a consistent supply of produce. In terms of the environment, horticultural farming is very compatible with Myanmar's diverse climate and abundant agro-biodiversity. The country's varied agro-climatic zones allow for the cultivation of more than 60 different horticultural crop types (ISHs, 2018). Particularly in central dry zones, combining fruit trees with annual vegetable crops in agroforestry systems helps lessen the effects of drought, water scarcity, and warming temperatures. Crop diversification naturally lowers the risks of pests and diseases in comparison to monocultures, and these practices also preserve soil health, reduce erosion, and increase ecosystem resilience. Numerous horticultural products can be grown in regions such as southern Shan State due to the high fertility of the land. Additionally, encouraging indigenous cultivars and traditional crops strengthens Myanmar's position as a regional hub for genetic resources, aiding in the preservation of biodiversity (CGSpace, 2022).

There are also significant socioeconomic and gender empowerment advantages to horticultural farming. The industry is especially significant for women, who frequently take the lead in the production, processing, and marketing of horticultural crops, and it offers vital off-season jobs for rural households. These positions support rural entrepreneurship, improve women's social and economic standing, give young

people opportunities, and advance inclusive development (ILO, 2024). Horticultural products' high perishability encourages the growth of value-added processing sectors like packaging and dehydration, which raise rural incomes and enhance product quality for both domestic and international markets. Value addition and enhanced branding have increased horticultural revenues and connected agriculture to the tourism industry at popular tourist destinations like Inle Lake (ITC, 2022).

Myanmar's geographic location increases opportunities for exporting fresh produce by giving it access to thriving regional markets. In addition to improving farmer prices, the expanded market connectivity stimulates investments in logistics and post-harvest technology. Horticultural farming provides resilience against erratic rainfall and climatic extremes, which are increasingly impacting Myanmar's agriculture, with the help of climate-adaptive measures like drip irrigation and agroforestry techniques. Compared to monoculture cereal systems, horticultural systems are less susceptible to market or climatic shocks due to their inherent diversity, which supports more stable rural livelihoods (Acta Horticulturae, 2018).

Additionally, horticultural farming promotes farmer education and technology adaptation. Higher yields and higher-quality produce are the outcome of investments in farmer extension programs, seed improvement, and research. Higher profits and more sustainable farming methods are facilitated by these developments, which also make it easier to adopt better varieties, more effective water management, and contemporary post-harvest techniques. Increased farmer knowledge, resource efficiency, and market integration are the outcomes of government, private sector, and development organization support (ASHs, 2017; LIFT Fund, 2022).

Lastly, horticulture promotes rural development that is sustainable. Even the poorest households can produce a significant income thanks to its reliance on smaller plots and intensive management, which fits in well with the nation's high rural density and dispersed land holdings. Horticultural farming improves food security, boosts rural economies, and helps to reduce poverty through year-round cropping, ecologically conscious production, and market-driven diversification. Horticulture has the potential to revolutionize Myanmar's agricultural and rural development plans with sustained infrastructure upgrades, funding, and extension assistance (UNCTAD, 2024).

3.4 Government Policies and Support Programs

The Government of Myanmar has recognized the strategic importance of horticulture in achieving agricultural diversification, rural development, and food security. As such, several key policies and support initiatives have been introduced to strengthen the horticulture sector, particularly targeting smallholder farmers.

One of the most prominent national frameworks is the Agriculture Development Strategy and Investment Plan (ADSIP 2018–2023), which outlines clear priorities for increasing productivity, market access, and sustainability in agriculture. This strategy, developed under the Ministry of Agriculture, Livestock and Irrigation (MOALI), emphasizes public-private collaboration and the promotion of value-added crops such as fruits and vegetables (MOALI, 2018). The ADSIP also integrates cross-cutting themes such as gender equity, climate resilience, and environmental sustainability.

To enhance plant health and ensure safe production systems, the Myanmar Plant Health System Strategy (2016–2020) was introduced. This program aims to integrate extension services, research, and regulatory oversight, with a focus on reducing post-harvest losses and controlling pests and diseases (FAO Myanmar, 2017). The strategy supports early detection systems and farmer-level pest control training, particularly for high-value horticultural crops.

In line with intellectual property and innovation support, the Plant Variety Protection Law, enacted in 2016, seeks to encourage the development of new plant varieties by protecting breeders' rights. This policy is expected to increase the availability of high-quality horticultural seeds and encourage private sector participation in varietal research and development (Tun, 2019).

At the project level, multiple initiatives have been implemented in partnership with international development agencies. One such example is the Project for Strengthening Horticultural Crop Value Chain Through Food Safety Approach, jointly supported by JICA and MOALI. Launched in key regions such as Hmawbi Township (Yangon Region) and Kalaw (Shan State), the project introduces Good Agricultural Practices (GAP), improves post-harvest handling, and trains farmers in pesticide management and traceability systems (JICA, 2021).

In an effort to promote sustainable agriculture, organic farming initiatives have been introduced with support from both the Asian Development Bank (ADB) and NGOs such as the Myanmar Organic Agriculture Group (MOAG). These programs

provide training on composting, natural pest control, and the use of biofertilizers, especially targeting smallholder vegetable farmers (Myint, 2020).

Additionally, extension services remain a critical support mechanism. Although limited in coverage, the government provides periodic training sessions, technical booklets, and demonstration plots. Recent efforts have focused on expanding access to these services through mobile teams and township-level agricultural officers.

Another vital area of policy intervention is market access improvement and financial support. The Ministry of Commerce and MOALI have collaborated on rural infrastructure upgrades such as feeder roads and cold storage facilities. Simultaneously, microfinance institutions (MFIs) and rural development banks have been encouraged to provide seasonal loans for input procurement under monitored lending frameworks (ADB, 2022).

In conclusion, while Myanmar has developed a comprehensive policy environment to support horticultural farming, effective implementation, outreach, and institutional coordination remain challenges. Strengthening these areas, particularly through decentralized training programs, inclusive financing mechanisms, and improved logistics, will be crucial to unlocking the full potential of the country's horticulture sector.

3.5 Horticultural Farming in Yangon Region

Vegetables like beets, lettuce, cauliflower, tomatoes, and cabbage are among the many crops grown in the Yangon Region's horticultural farming, although their yields typically lag behind those of other countries. Major fruit crops grown in the area include bananas, watermelon, mangos, and different kinds of melons. Production of ornamentals and floriculture is receiving a lot of investment, led by organizations such as the Yangon Horti-Flori Public Company Limited. Despite their importance to local agriculture, onions, chili peppers, and garden peas are usually categorized as "major crops" rather than vegetables in national statistics. One of the most recent efforts is a massive project valued at over 10 billion MMK (roughly 6.2 million EUR or $5 million USD) that aims to promote organic horticultural and floriculture production with an emphasis on quality and safety standards as well as market price monitoring. The creation of the Danyingone wholesale market in Insein Township is also boosting the agricultural value chain and bolstering trade for fruits, vegetables, and flowers. It employs strict quality control procedures and real-time pricing.

Notwithstanding these developments, the industry continues to face difficulties. Because of restricted access to high-quality seeds, necessary inputs, and sophisticated technical knowledge, yield levels continue to be low. Inadequate handling, storage, and transportation infrastructure also contributes to significant post-harvest losses, which lower the quantity and quality of produce that reaches markets. Farmers' efforts to modernize their operations and increase productivity are further hampered by obstacles to financial access and technology adoption. However, horticulture is becoming more and more important for Yangon's urban and peri-urban livelihoods, providing fresh produce to satisfy the city's sizable urban population and advancing more general objectives of nutrition and food security. Due to the growing demand for premium fruits, vegetables, and ornamentals both domestically and abroad, the industry is generally thought to have significant potential for export growth. Horticultural crops make up about 5% of Myanmar's total sown area, with a sizable portion of that area being used for urban consumption. The Yangon Region reported a total net sown area of 1,364,821 acres in 2017–2018.

The Yangon Region's horticultural sector is expanding rapidly due to investment, crop diversification, and infrastructure upgrades, with potential for improved food security and economic diversification.

3.5.1 Horticulture Crop Production in Yangon Region

In the 2022–2023 production year, the Yangon Region will produce roughly 59,000 acres of horticulture crops in table (3.4).

Table (3.4) Horticulture Production Area in Yangon Region

	2022-2023	2023-2024
Yangon Region (Total)	59,158	19,023
Dagon (District)	1,287	221
Dagon (East)	425	65
Dagon (South)	427	72
Dagon (Portal)	405	69
Dagon (North)	30	15
Kamayut (District)	-	-
Kamayut	-	-
Bahan	-	-
Than lin (District)	6,840	2,133
Than lin	1411	227
Kyauk Tan	1442	318
Ta Tar	492	144

Source: Yangon Region Department of Agricultural Office, 2024.

With roughly 17,000 acres under cultivation, Taik Gyi District is the largest production area among them. The project's target area, Hmawbi District, comes in second with roughly 15,000 acres, and Twantay District comes in third with roughly 13,000 acres. The largest production area by township is Taik Gyi Township (17,368 acres), followed by Hmawbi Township (12,200 acres) and Twantay Township (7,517 acres).

Table (3.4) presents the horticultural production area in Yangon Region, reflecting the extent of vegetable and fruit cultivation across the four townships—Taikkyi, Hmawbi, Hlegu, and Mingaladon

Table (3.5) Horticulture Production Area in Yangon Region

	2022-2023	2023-2024
Thone Kywa	1353	915
Ka Yan	2142	529
Ko Ko island	-	-
Ton Tay (District)	13,291	5,079
Ton Tay	7,517	1,745
Kok Mhu	4,107	2454
Kon Chan Kone	1439	809
Da la	228	71
Seik Kyi Kanaungto	-	-
Mhaw bi (District)	15,303	6,546
Mhaw bi	12,200	4,995
Than Ta Pin	3,103	1,551
Hle Gu (District)	2,846	1,428
Hle Gu	2,846	1,428
Tike Gyi (District)	17,368	3,287
Tike Gyi	1,831	3,287
Mingaladone (District)	1,040	234
Mingaladone	791	154
Shwe Pyi Thar	392	80
Inn Sein (District)	60	95
Inn Sein	160	30
Hlaing Tha Ya (East)	172	65
Hlaing Tha Ya (West)	-	-
Thin gyan kyun (District)	-	-
Bo Ta thaung (District)	-	-

Source: Yangon Region Department of Agricultural Office, 2024.

Among these, Taikkyi Township records the highest cultivation area with 17,000 acres, highlighting its leading role in horticultural production in the region. Hmawbi Township, the focus of this study, follows with a substantial area of 13,500 acres under cultivation, indicating its significant contribution to vegetable and fruit

supply, particularly due to its proximity to Yangon's urban markets. Hlegu Township covers 11,200 acres, while Mingaladon has the smallest share at 7,300 acres. These figures suggest a concentrated distribution of horticultural activity, with northern townships like Taikkyi and Hmawbi benefiting from favorable agro-climatic conditions and established farming practices. The data underline the agricultural importance of Hmawbi Township and support its selection as a case study area for assessing the benefits and constraints of horticultural farming.

3.5.2 Vegetable Production of Hmawbi Township

Yangon Market is conveniently located in Hmawbi Township, and farmers benefit greatly from the production of vegetables. The market in Yangon is enormous. Hmawbi Township's output is insufficient to meet the needs of all Yangon Urban Area consumers. The excellent highway roads are an additional benefit. It can reach every market for every product that the farmers harvest in a drive of one to two hours. According to the Department of Agriculture Land Management & Statistics (DALMS), the chosen crops were divided into three groups based on the type of sown acre and season.

The first three largest crops planted during the 2022–2023 monsoon season, totalling more than 500 acres, are radish, water spinach, and rosella. Long beans, okra, bottle gourds, cucumbers, and concinna leaves are the next most common crops planted on 300–500 acres. Eggplant, Soap Acacia Leaves, Mustard, Snake Gourd, Bitter Gourd and Lettuce are the three most common crops planted on less than 300 acres. Among the crops listed in the table below, there may be very little or no production or no sown acreage. During the monsoon season, roughly 380 acres are planted with crops other than those on the list.

The first largest crops planted, spanning more than 500 acres, during the winter season of 2022–2023, which coincides with the monsoon season, are 1) radish, 2) bottle gourd, and 3) water spinach. Long beans, cucumbers, okra, and concinna leaves are the next most common crops planted on 300–500 acres. Soap Acacia leaves, eggplant, pumpkin, lettuce, marrow, mustard, bitter gourd and ridge gourd are the three most common crops planted on less than 300 acres. About 380 acres are planted with crops other than those on the list during the winter.

Furthermore, only two seasons are classified for data collection by the DOA Township Office: the winter season (December–May) and the monsoon season (June–November) for the production of horticulture crops.

Table (3.6) Vegetable Cultivation of Hmawbi Township at 2022-2023 (Monsoon Season)

No.	Crops	Unit	Cultivation Acre	Harvest Acre	Yield/Acre	Production
1	Cabbage	Piece	-	-	-	-
2	Cauliflower	Piece	-	-	-	-
3	Lettuce	Bundle	45	45	1,700	76,500
4	Tomato	Viss	-	-	-	-
5	Mustard	Bundle	220	220	2,000	440,000
6	Raddish	Bundle	515	515	5,100	2,626,500
7	Carrot	Viss	-	-	-	-
8	Water Melon	Piece	-	-	-	-
9	Bottle Gourd	Piece	403	403	5,000	2,015,000
10	Asparagus	Bundle	-	-	-	-
11	Water Spinach	Bundle	550	550	5,000	2,750,000
12	Coriander	Bundle	-	-	-	-
13	Roselle	Bundle	1,050	1,050	5,000	5,250,000
14	Long bean	Bundle	480	480	2,400	1,152,000
15	Green bean	Viss	-	-	-	-
16	Green pea	Viss	-	-	-	-
17	Eggplant	Viss	250	250	2,500	625,000
18	Marrow	Piece	-	-	-	-
19	Pumpkin	Piece	-	-	-	-
20	Ridge Gourd	Piece	60	60	2,300	138,000
21	Snake Gourd	Piece	-	-	-	-
22	Okra	Bundle	430	430	2,300	989,000
23	Cucumber	Piece	330	330	2,500	825,000
24	Bitter Gourd	Piece	50	50	2,400	120,000
25	Safflower	Viss	-	-	-	-
26	Leek	Viss	-	-	-	-
27	Drum Stick	Viss	-	-	-	-
28	Soap Acacia Leaves	Viss	245	245	2,900	710,500
29	Concinna Leaves	Viss	302	302	2,700	815,400
30	Goa bean	Viss	-	-	-	-
31	Chayote	Piece	-	-	-	-
32	Other	-	380	380	5,200	1,976,000
	Total	-	**6,650**	**6,650**	**3,739**	**24,861,900**

Source: DALMS; Hmawbi Township, 2023.

Table (3.6) illustrates the vegetable cultivation data in Hmawbi Township during the 2022–2023 monsoon season. The table reveals that monsoon vegetable production is concentrated on key crops such as long bean, water spinach, and okra, which are widely favored by local consumers and suited to wet-season conditions. The total cultivated acreage during this season indicates the importance of seasonal timing in farmers' planting decisions, especially for crops that thrive in Myanmar's tropical monsoon climate. Farmers often prioritize monsoon cultivation for crops with shorter growing periods and high local demand, allowing for rapid harvesting and immediate market distribution.

The data also suggest that vegetable production during the monsoon season serves not only for household consumption but also contributes to regional food supply chains, particularly to urban markets like Yangon. The relatively lower input costs and natural rainfall availability during this season make cultivation feasible even for resource-constrained smallholders. However, risks such as waterlogging, pests, and diseases remain prevalent, potentially affecting yields. Therefore, while the monsoon season is an essential cultivation period, it requires strategic planning and crop selection to ensure optimal productivity and resilience.

Table (3.7) Vegetable Cultivation of Hmawbi Township at 2022-2023 (Winter Season)

No.	Crops	Unit	Cultivation Acre	Harvest Acre	Yield/Acre	Production
1	Cabbage	Piece	-	-	-	-
2	Cauliflower	Piece	-	-	-	-
3	Lettuce	Bundle	105	105	1,800	189,000
4	Tomato	Viss	-	-	-	-
5	Mustard	Bundle	95	95	4,500	427,500
6	Radish	Bundle	610	610	3,100	1,189,100
7	Carrot	Viss	-	-	-	-
8	Water Melon	Piece	-	-	-	-
9	Bottle Gourd	Piece	740	740	4,800	3,552,000
10	Asparagus	Bundle	-	-	-	-
11	Water Spinach	Bundle	670	670	3,500	2,345,000
12	Coriander	Bundle	-	-	-	-
13	Roselle	Bundle	778	778	4,500	3,501,000
14	Long bean	Bundle	350	450	2,600	1,170,000

Table (3.7) Vegetable Cultivation of Hmawbi Township at 2022-2023 (Winter Season) (Continued)

No.	Crops	Unit	Cultivation Acre	Harvest Acre	Yield/Acre	Production
15	Green bean	Viss	-	-	-	-
16	Green pea	Viss	-	-	-	-
17	Eggplant	Viss	150	150	3,500	525,000
18	Marrow	Piece	-	-	-	-
19	Pumpkin	Piece	150	150	4,800	489,600
20	Ridge Gourd	Piece	30	30	3,000	90,000
21	Snake Gourd	Piece	-	-	-	-
22	Okra	Bundle	320	320	4,000	1,280,000
23	Cucumber	Piece	348	348	4,800	1,670,400
24	Bitter Gourd	Piece	75	75	3,000	225,000
25	Safflower	Viss	-	-	-	-
26	Leek	Viss	-	-	-	-
27	Drum Stick	Viss	-	-	-	-
28	Soap Acacia Leaves	Viss	245	245	3,900	955,500
29	Concinna Leaves	Viss	302	302	2,900	875,800
30	Goa bean	Viss	-	-	-	-
31	Chayoke	Piece	-	-	-	-
32	Other	-	380	380	5,200	1,976,000
	Total		**5,580**	**5,550**	**3,943**	**21,882,800**

Source: DALMS; Hmawbi Township,2023.

Table (3.6) presents the vegetable cultivation statistics for Hmawbi Township during the 2022–2023 winter season. Compared to the monsoon season, winter cultivation covers a broader variety of crops, including cabbage, cauliflower, tomato, and mustard, which are more suitable for the cooler and drier conditions of the season. Farmers in the region utilize this favorable climatic window to diversify production, take advantage of longer growing cycles, and supply high-value crops to markets. The increase in crop variety during the winter season demonstrates both the adaptive strategies of local farmers and the ecological suitability of the township for year-round horticulture.

Winter vegetable cultivation is also associated with higher market prices and better-quality produce, due to reduced pest pressure and the possibility of improved

post-harvest handling. However, it often requires more inputs such as irrigation and fertilizers, raising production costs. This season thus reflects a more commercial orientation of farming activities, as many farmers aim to generate higher profits from urban consumers during this period. The success of winter crop production highlights the potential for expanded horticultural development in Hmawbi Township, provided that appropriate support systems such as irrigation infrastructure and market access are in place.

CHAPTER IV
SURVEY ANALYSIS

4.1 Survey Profile

Hmawbi Township is one of the cultivated areas and it is situated between North Latitude 73° 36′ and East Longitude 176° to 136° at Yangon Region, Myanmar. The township area is 183.78 square miles and 27 feet above sea level. It borders Hlegu Township to the east, Htantabin Township to the west, Mingaladon Township to the south and Taikkyi Township to the north. The map of Hmawbi Township described (in Appendix-B). Hmawbi Township has a tropical wet and dry climate with the maximum temperature at 39.3° C and the minimum at 10° C.

The following Table (4.1) presents the number of wards, village tracts, villages, households, and population of Hmawbi Township according to the Hmawbi Township General Administration Department (March, 2023). The township has a total population of 242,628, with 47% residing in urban and 53% in rural areas. Agriculture is the main livelihood source for the majority of residents.

Table (4.1) Households, Wards, Village Tracts, Villages and Population

Particular	Urban (No.)	Rural (No.)
No. of House	6010	52997
No. of Household	6590	56781
No. of Wards	4	-
No. of Village Tracts	-	39
No. of Villages	-	195
Under 18 Total Male Population	2967	26053
Under 18 Total Female Population	3045	27031
Over 18 Total Male Population	9691	75475
Over 18 Total Female Population	10010	88356
Total Male Population	12658	101528
Total Female Population	13055	115387
Total Population	**114186**	**128442**

Source: Hmawbi Township, General Administration Department, 2023.

4.2 Survey Design

This survey was managed at HmawBi Township in Yangon Region. In this study, the farmers who are involving in horticulture farming in Hmaw Bi Township, Yangon Region. There are 180 households located in two specific villages, called Hnin Si Myaing and Myaung Dakka, within Hmaw Bi Township, Yangon Region. Using a simple random sampling method, this survey will be conduct on 87 households located in two specific villages.

The required data were collected from households located in two specific villages within Hmaw Bi Township, Yangon Region by using structured questionnaire. The questionnaire contains with three parts in the survey and the first one contains with the respondent's general characteristics. The second part consists of specific information about benefits of horticultural farming (factors of economic, nutritional, environmental and social). The last part is examined about the challenges in horticultural farming at Hmaw Bi Township, Yangon Region.

4.2.1 Reliability Analysis

The study tested for reliability for the instruments by using Cronbach's alpha to know the items used in each part are true item or not. Cronbach's alpha is one of the most common measures of reliability and also an indicator of consistency. It can measure the internal consistency of the items in a scale. It is not a measure of homogeneity. If repeated measurements are made on the characteristics, reliability produces consistent result. According to hair et al. (1922), the Cronbach's alpha procedure is an estimate of reliability based on the average correlation between items within each dimension where 0.6 is sufficient and the score of over 0.8 is considered to be excellent. The strength of the figure can be seen in Table (4.2).

Table (4.2) Cronbach's Alpha Analysis

No.	Part	Variable	No. of items	Coefficient of Cronbach's alpha (α)	Reliability Level
1	Benefits of Horticultural farming	Economic factors	7	0.77	Acceptable
		Nutritional factors	10	0.91	Excellent
		Environmental Factors	10	0.78	Acceptable
		Social Factors	10	0.86	Excellent
2	Challenges in Horticultural Farming	Climate & Environmental Factors	8	0.76	Acceptable
		Quality Inputs & Labour issues	10	0.6	Questionable
		Market & Economic Constraints	10	0.79	Acceptable
		Technical Knowledge	10	0.77	Acceptable

Source: Survey Data , 2025.

Internal consistency is measured by Cronbach (α) that indicate how closely linked a group of items are related to one another. For the benefits of horticultural farming, four variable areas were consisted. The Economic Factors category, consisting of 7 items, calculated a Cronbach's alpha of 0.77, pointing an acceptable level of reliability. This means that the items are reasonably consistent in measuring the economic benefits of horticultural farming. The Nutritional Factors variable, with 10 items, expressed excellent reliability with the Cronbach's alpha of 0.91, reflecting a high degree of internal consistency among items. Moreover, the Environmental Factors category contained a Cronbach's alpha of 0.78, which is also considered acceptable. Similarly, Social factors, conducted with 10 items, achieved an excellent reliability score of 0.86, expressing that the items effectively capture the social dimensions of horticultural farming benefits.

In terms of the challenges in horticultural farming, four variables were consisted. Climate and Environmental Factors, included with 8 items, had a Cronbach's alpha of 0.76, which is within the acceptable range, pointing consistent item responses. The Quality Inputs and labor Issues variable, also comprising 10 items, analyzed a relatively low alpha value of 0.6, which is classified as questionable. This shows that the items in this category may not reliably measure the same underlying construct and may need refinement. The market and Economic Constraints dimension, with 10 items, demonstrated acceptable reliability with an alpha of 0.79. lastly, the Technical knowledge factor, also containing 10 items, expressed an alpha of 0.77, indicating acceptable internal consistency among the items.

4.3 Survey Results

This section includes the presentation, analysis, and interpretation of survey findings gathered from the responses of 87 households from the organization through a survey questionnaire**.**

4.3.1 Demographic Information

The demographic characteristics of the respondents include age, education level, household size and experiences as detailed in the table below.

(i) Age Distribution

The age distribution of the respondents reveals a balanced representation across various age groups. Individuals under 20 years old comprise a youthful segment, often associated with students or those still dependent. The 21–30 age group represents a significant portion of young adults who are likely entering the workforce or pursuing higher education. The 31–40 group reflects early to mid-career individuals, often balancing work and family responsibilities. Respondents aged 41–50 are generally considered middle-aged, likely holding experienced roles in their professional lives. Finally, those above 50 represent the mature or older adult population, who may be nearing retirement or engaged in leadership roles. This diverse age distribution provides insights into varying needs, perspectives, and priorities across the population.

Table (4.3) Age Distribution of the Respondents

Age	Frequency	Percentage
Under 20	-	-
21 – 30	-	-
31 – 40	-	-
41 – 50	32	37
Above 50	55	63
Total	**87**	**100**

Source: Survey Data, 2025.

Based on the data presented in Table (4.3) regarding the age distribution of respondents, the majority fall within the above 50 age group, accounting for 63% of the total respondents. The second-largest group includes individuals aged 41 to 50, who represent 37% of the sample. Notably, there were no respondents reported in the age brackets of Under 20, 21–30, or 31–40. This suggests that the respondent base is predominantly composed of older individuals, with no participation from younger age groups.

(ii) Education Level of Farmers

The education level of farmers (respondents) refers to the extent of formal or informal schooling and training that a farmer has received, which may range from basic literacy to higher agricultural or technical education. The level of education outcomes by farmers is presented in the Table and Figure below.

Table (4.4) Education Level of Farmers

Level of Education	Frequency	Percentage
No formal Education	14	17
Primary School	25	29
Secondary School	23	26
High School	8	9
Vocational Trainings	7	8
University of Higher	10	11
Total	**87**	**100**

Source: Survey Data, 2025.

Based on the data from Table (4.4), the educational background of the farmers surveyed varies significantly. The largest proportion, 29%, have completed primary school, followed closely by 26% who have reached the secondary school level. A notable 17% of respondents reported having no formal education at all. Smaller segments of the population completed high school 9%, received vocational training 8%, or attained university or higher education 11%.

(iii) Household Size

Household size significantly influences both the advantages and challenges encountered in horticultural farming. In larger families, the availability of more household labor can be a major benefit, especially for tasks that require intensive effort such as preparing land, planting, weeding, and harvesting. This often helps reduce labor costs, enhances productivity, and allows farmers to cultivate more land. Moreover, big households may enjoy better food security and dietary diversity through increased self-consumption of fruits and vegetables.

Table (4.5) Household Size

No. of people per household	Frequency	Percentage
1 – 3 person	15	17
4 – 6 person	67	77
Above 6 person	5	6
Total	**87**	**100**

Source: Survey Data, 2025.

According to the Table (4.5), 77%, live in households comprising 4 to 6 people. Smaller households, with 1 to 3 members, account for 17% of the sample. Only a small portion, 6%, concluded living in households with more than six individuals. This indicates that medium-sized households are most common among the respondents, with relatively few livings in either very small or large family units.

(iv) Experience in Horticultural Farming

Horticultural farming in Myanmar, particularly in areas like Hmawbi Township, is largely shaped by farmers' practical experience and traditional knowledge passed

down through generations. Many households engaged in horticulture have over a decade of hands-on experience, which influences their crop selection, planting methods, and seasonal timing. This experience enables farmers to adapt to local environmental conditions, manage pests and diseases effectively, and optimize yields. However, the reliance on traditional practices also means limited exposure to modern techniques and innovations, which can restrict productivity and sustainability.

Table (4.6) Experience in Horticultural Farming

Experience (years)	Frequency	Percentage
Below 1 year	-	-
1 – 3 Years	-	-
4 – 6 Years	39	45
Above 6 Years	48	55
Total	**87**	**100**

Source: Survey Data, 2025.

According to Table (4.6), the majority of respondents (55%) have more than six years of experience in horticultural farming, while 45% have between four and six years of experience. Notably, no respondents reported having less than four years of experience. This suggests that the surveyed group is composed entirely of experienced farmers, with all participants having practiced horticulture for at least four years, indicating a high level of expertise and familiarity with the field.

4.3.2 Benefits of Horticultural Farming

The benefits of horticultural farming were measured using a five-point Likert scale, from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree to 5 = strongly agree. The mean value of all variables can be categorized into four level of benefits in horticultural farming received by farmers in Hmaw Bi Township, Yangon Region. In addition, mean values of less than 3 is categorized as low benefits, mean value between 3 and 4 is also categorized as moderate level of benefit and mean value of above 4 is also categorized as high level of benefit received by farmers lived in Hmaw Bi Township, Yangon Region.

(i) Dimension of Economic Factors

In this study, the economic factors includes ten variables: the probability of horticultural farming, reliance on horticultural income, access to credit, affordability of labor, local market demand, access to buyers, and fairness of product pricing. Table (4.7) presents the individual mean scores and standard deviations for each of these factors based on responses from horticultural farmers.

Table (4.7) Benefits of Horticultural Farming Dimensions of Economic Factors

No.	Statement	Mean	Standard Deviation
1.	Horticultural farming is a profitable agricultural activity for my household.	4.27	0.65
2.	I rely on horticultural crops as my primary source of income.	4.27	0.64
3.	The cost of inputs (seeds, fertilizers, pesticides) is too high for sustainable profit.	3.45	0.82
4.	I can afford to hire laborers during peak horticultural seasons.	3.82	0.4
5.	There is strong demand for horticultural products in local markets.	4.27	0.65
6.	I can access reliable buyers or wholesalers to sell my horticultural produce.	4.09	0.54
7.	I receive fair prices for my horticultural products in the market.	4.1	0.7
Overall		**4.04**	**0.63**

Source: Survey Data, 2025.

The analysis of the economic factors influencing horticultural farming, as presented in Table (4.7), indicates that farmers generally perceive the activity as economically beneficial. The high overall mean 4.04 indicates that farmers generally agree that horticultural farming provides solid economic benefits such as profitability, steady income and strong market demand. The relatively low standard deviation suggests respondents were fairly consistent across the sample group, with most farmers sharing similar views. The highest-rated aspects include the profitability of horticultural farming and its role as a primary income source, both with a mean score of 4.27. Similarly, farmers acknowledged strong local market demand for horticultural products

and reliable access to buyers, also scoring high, which suggests a stable and supportive market environment.

Additionally, due to the mean of 4.1 and standard deviation of 0.7, the perception of receiving fair prices and the ability to afford labor during peak seasons further reinforce the economic viability of horticulture according to the mean and standard deviation are 3.82 and 0.4 respectively. However, the high cost of inputs such as seeds, fertilizers, and pesticides emerged as a notable concern, receiving the lowest mean score of 3.45. Overall, the dimension of economic factors scored a mean of 4.04 with a standard deviation of 0.63, highlighting a generally positive but slightly varied perception among farmers regarding the financial aspects of horticultural farming. Therefore, while experience provides a valuable foundation, integrating formal training and agricultural extension services is essential for enhancing the effectiveness and resilience of horticultural farming.

(ii) Dimension of Nutritional Factors

Nutritional factors also includes ten variables: household consumption of fresh produce, balanced and nutritious diet, reduction of food expenses, decreased dependency on market vegetables/fruits, maintenance of food diversity year-round, food availability during economic hardship, community food security, improved household health, better access for children to fresh food. Table (4.8) describes the individual mean scores of the 10 statements related to the nutritional outcomes of horticultural practices.

Table (4.8) Benefits of Horticultural Farming Dimensions of Nutritional Factors

No.	Statements	Mean	Standard Deviation
1.	My family consumes more fresh produce (vegetables/fruits) because we grow them ourselves.	4.18	0.6
2.	Growing horticultural crops helps ensure a more balanced and nutritious diet.	4.55	0.52
3.	Access to home-grown vegetables has lowered our food expenses.	4.55	0.69
4.	Horticulture has helped reduce our household's dependency on market-purchased vegetables and fruits.	4.46	0.52
5.	Seasonal horticultural crops help us maintain food diversity throughout the year.	4.36	0.67
6.	Horticultural crops provide a reliable source of food during periods of economic hardship.	4.67	0.68
7.	Horticulture helps reduce food insecurity in our community	4.45	0.52
8.	Since practicing horticulture, my family's overall health has improved due to better nutrition.	4.27	0.65
9.	Children in my household have better access to fresh fruits and vegetables.	4.45	0.52
10.	We are more aware of the importance of consuming nutrient-rich foods because of horticultural practices.	4.64	0.5
Overall		**4.44**	**0.59**

Source: Survey Data, 2025.

According to the Table (4.8), reveals several positive outcomes for households engaging in these practices. The overall mean score of 4.44 indicates a high level of agreement among respondents regarding the benefits of horticulture on nutrition.

Among the ten evaluated statements, the highest-rated factor was the reliability of horticultural crops during periods of economic hardship due to the value of mean is 4.67, suggesting that such practices play a crucial role in ensuring food availability during challenging times. Additionally, according to the value of mean is 4.45, growing horticultural crops was found to significantly contribute to a balanced and nutritious diet, and also led to a reduction in food expenses, reflecting the economic benefits of home-grown produce. With mean scores of 4.64 for increased awareness of nutrient-rich food consumption, 4.46 for reduced dependence on market produce, and 4.45 for improved access to fresh food for children, the findings highlight significant benefits of horticultural farming. These results suggest that horticultural practices not only strengthen food security but also have a positive impact on household health and nutrition.

(iii) Dimension of Environmental Factors

In this study, the environmental includes ten variables: soil degradation prevention, soil fertility improvement, erosion reduction, compost or organic matter use, biodiversity enhancement, contribution to greenery, better water retention, climate adaptation, responsible chemical use, and lowering the environmental footprint. Table (4.9) presents the individual mean score of these environmental factors as perceived by horticultural farmers.

Table (4.9) Benefits of Horticultural Farming Dimensions of Environmental Factors

No.	Statements	Mean	Standard Deviation
1.	Horticultural farming helps prevent soil degradation on my land.	4.18	0.4
2.	Growing a variety of horticultural crops improves soil fertility.	4.18	0.6
3.	Horticultural practices on my farm reduce the risk of soil erosion.	4	0.77
4.	I use compost or organic matter in horticulture, which improves soil health.	3.82	0.6
5.	Horticulture increases the biodiversity of plants grown on my farm.	4.27	0.47
6.	My farm contributes to local greenery and tree cover through horticulture.	4.55	0.69
7.	Horticultural crops help in better water retention and reduce evaporation from the soil.	4.36	0.67
8.	My horticultural practices are adapted to climate conditions to protect the environment.	4.27	0.79
9.	I avoid excessive use of chemical fertilizers and pesticides in my horticultural farming.	3.73	0.76
10.	My farming contributes to reducing the environmental footprint of agricultural activities in the area.	4.27	0.78
Overall		**4.16**	**0.65**

Source: Survey Data, 2025.

Table (4.9) highlight the environmental benefits of horticultural farming as perceived by the respondents. With an overall mean score of 4.16, it is evident that

horticultural practices are widely recognized for their positive impact on environmental sustainability. Among the various statements, the highest mean score 4.55 was observed for the contribution of horticulture to local greenery and tree cover, indicating a strong role in enhancing the natural landscape. With the mean score of 4.36 for improved water retention and reduced soil evaporation, as well as increased plant biodiversity with the mean score of 4.27, were also notable benefits. Practices such as using compost or organic matter (mean = 3.82) and avoiding excessive use of chemicals (mean = 3.73) received relatively lower scores, suggesting room for improvement in adopting more sustainable inputs. Overall, the table suggest that horticultural farming contributes significantly to environmental health by preventing soil degradation, reducing erosion, and adapting to climate conditions, while also fostering biodiversity and ecological balance.

(iv) Dimension of Social Factors

In this study, the social factor also includes ten variables: the impact of horticultural farming on household livelihood security, family cooperation, women's participation, support for children's education, collaboration among neighbors, participation in local groups, knowledge exchange, quality of life, self-reliance, and empowerment in decision-making. Table (4.10) describes the individual and overall mean scores of these statements, based on the respondents involved in horticultural farming activities.

Table (4.10) Benefits of Horticultural Farming Dimensions of Social Factors

No.	Statements	Mean	Standard Deviation
1.	Horticultural farming has strengthened the livelihood security of my household.	4.64	0.5
2.	It promotes cooperation and shared work among family members.	4	0.89
3.	Women in my household actively participate in horticultural activities.	4.45	0.52
4.	It supports the education of children by providing income for school expenses.	4.36	0.5
5.	Horticultural farming promotes collaboration among neighbours (e.g., sharing tools, seeds, or water).	3.9	0.7
6.	I have participated in local farmer groups or cooperatives related to horticulture.	3.73	0.65
7.	I often exchange knowledge and farming experiences with other horticultural farmers in my community	3.82	0.75
8.	Horticultural farming has improved my quality of life.	4.18	0.6
9.	It gives me a sense of pride and self-reliance.	4.36	0.5
10.	Horticulture has empowered me to make more decisions in family or community affairs.	4.36	0.67
Overall		**4.18**	**0.63**

Source: Survey Data, 2025.

The results presented in Table (4.10) illustrate the social benefits of horticultural farming as perceived by respondents, with an overall mean score of 4.18, reflecting a generally positive impact on various social dimensions. Farmers generally agreed on the social advantages of horticulture, like community bonding, women's involvement,

and improved family well-being due to the overall mean (4.18). The responses were consistent, as indicated by the relatively low standard deviation (0.63). The most significant benefit was the enhancement of household livelihood security (mean = 4.64), indicating that horticultural activities contribute substantially to economic stability. High mean scores were also observed for increased women's participation as shown by a mean of 4.45, self-reliance and support for children's education as shown by a mean of 4.36, and empowerment in decision-making as shown by a mean of 4.36, suggesting that horticulture plays a vital role in strengthening both individual and family capacities. With a mean score of 4.18, improved quality of life stands out as a significant benefit of horticultural farming, alongside family cooperation, which scored a mean of 4.00, highlighting its positive influence on household dynamics. However, participation in local groups and knowledge exchange received relatively lower scores, suggesting areas where community engagement could be strengthened due to the values of mean are 3.73 and 3.82 respectively. Overall, horticultural farming plays a meaningful role in social development by enhancing livelihoods, fostering empowerment, and promoting community cohesion.

4.3.3 Challenges in Horticultural Farming

Challenges in Horticultural Farming consists of climate and environmental factors, quality inputs and labor issues, market and economic constraints and technical knowledge.

(i) Dimension of Climate and Environmental Factors

Table (4.11) presented the challenges in horticultural farming from dimension of climate and environmental factors.

Table (4.11) Challenges in Horticultural Farming from Dimensions of Climate & Environmental Factors

No.	Statements	Mean	Standard Deviation
1.	Unpredictable weather patterns (e.g., sudden droughts or floods) negatively affect my horticultural production.	4.18	0.4
2.	Extreme temperatures (either too hot or too cold) have damaged my crops in the past year.	4.18	0.6
3.	I have observed changes in rainfall patterns that affect my irrigation plans.	4	0.77
4.	Climatic changes have increased pest infestations on my farm.	3.82	0.6
5.	I have experienced more plant diseases due to changing environmental conditions.	4.27	0.47
6.	Soil erosion has reduced the quality and quantity of my cultivable land.	4.55	0.69
7.	I face difficulties due to land degradation caused by environmental factors.	4.36	0.67
8.	I am aware of sustainable practices to reduce environmental impact, but cannot implement them due to cost or lack of knowledge.	4.27	0.79
Overall		**4.2**	**0.62**

Source: Survey Data, 2025.

The unpredictable weather patterns (e.g., sudden droughts or floods) negatively affect my horticultural production, the respondents agreed as shown by a mean of 4.18 and a standard deviation of 0.4. The respondents agree that extreme temperatures (either too hot or too cold) have damaged my crops in the past year, with a mean of 4.18 and a standard deviation of 0.6. The question on whether I have observed changes in rainfall patterns that affect my irrigation plans so that farmers agreed with this as shown by the mean value of 4 and standard deviation of 0.77.

On a question of whether climatic changes have increased pest infestations on my farm, the farmers agreed with a mean of 3.82 and a standard deviation of 0.6. Farmers strongly agreed that they have experienced more plant diseases due to changing environmental conditions and soil erosion has reduced the quality and quantity of my cultivable land due to the values of mean are 4.27 and 4.55 respectively. Asked if farmers face difficulties due to land degradation caused by environmental factors and they are also aware of sustainable practices to reduce environmental impact, but cannot implement them due to cost or lack of knowledge, farmers strongly agreed as shown by a mean of 4.36 and 4.27. The overall mean (4.2) indicates a high level of agreement among farmers that climate issues (unpredictable weather, pests, erosion) severely affect their farming. The overall standard deviation suggests that nearly all respondents experienced these challenges similarly.

(ii) Dimension of Quality Inputs & Labor Issues

Table (4.12) described the challenges in horticultural farming from dimension of quality inputs and labor issues.

Table (4.12) Challenges in Horticultural Farming from Dimensions of Quality Inputs & Labor Issues

No.	Statements	Mean	Standard Deviation
1.	I often face shortages or delays in getting necessary fertilizers.	3.64	0.5
2.	Available pesticides are not effective in managing crop pests and diseases.	3.73	0.47
3.	Skilled laborers are not readily available in my area.	3.55	0.82
4.	It is difficult to access high-quality seeds for horticultural crops.	3.91	0.54
5.	Lack of training or technical support affects labour productivity on my farm.	3.82	0.6
6.	The cost of hiring farm labour is increasing each year.	4.27	0.65
7.	Young people in my area are not interested in agricultural work.	3.55	0.52
8.	I rely heavily on family labour due to labour shortages.	4.55	0.69
9.	There is no assurance of health and safety for laborers, which is a concern for my farming operation.	3.73	0.79
10.	Labour-related challenges limit the expansion of my horticultural activities.	3.45	0.52
Overall		**3.82**	**0.61**

Source: Survey Data, 2025.

In this study, challenges in horticultural farming from dimension of quality inputs & labor issues has ten variables. According to the Table (4.12), asked on that farmers often face shortages or delays in getting necessary fertilizers, the respondents

agreed to this an indicated by a mean of 3.64 and a standard deviation of 0.5. On the issue of pesticide effectiveness, farmers reported that available pesticides are not effective in managing crop pests and diseases, with a mean of 3.73 and a standard deviation of 0.47. The availability of skilled labor was also identified as a concern, with a mean score of 3.55 and a relatively higher standard deviation of 0.82, suggesting some variation in responses. Difficulty in accessing high-quality seeds for horticultural crops received a mean score of 3.91 and a standard deviation of 0.54, showing a strong agreement among respondents. Additionally, the lack of training or technical support affecting labor productivity on farms was supported with a mean of 3.82 and a standard deviation of 0.6.

One of the most critical issues was the increasing cost of hiring farm labor, which scored a high mean of 4.27 and a standard deviation of 0.65. Furthermore, respondents noted that young people in their area show little interest in agricultural work, reflected in a mean of 3.55 and a standard deviation of 0.52. The reliance on family labor due to labor shortages emerged as the most prominent concern, receiving the highest mean of 4.55 and a standard deviation of 0.69.

(iii) Dimension of Market & Economic Constraints

Table (4.13) described the challenges in horticultural farming from dimension of market and economic constraints.

Table (4.13) Challenges in Horticultural Farming from Dimension of Market & Economic Constraints

No.	Statements	Mean	Standard Deviation
1.	I face difficulty in accessing reliable markets to sell my horticultural produce.	4	0.45
2.	There is a lack of market information (e.g., prices, demand trends) for horticultural crops.	3.82	0.6
3.	Price fluctuations greatly affect my income from horticultural farming.	4	0.63
4.	I do not get fair prices for my horticultural produce in local markets.	3.82	0.87
5.	Middlemen take a large share of the profit from my produce sales.	4	0.63
6.	The cost of inputs (seeds, fertilizers, pesticides) is too high for small-scale farmers.	4.45	0.52
7.	I face financial difficulties in investing in horticultural farming.	4.18	0.75
8.	I have limited access to credit or loans to support my horticulture business.	3.82	1.08
9.	Transportation costs reduce my overall profit margin.	3.91	1.14
10.	Lack of storage and processing facilities forces me to sell produce	4.18	0.75
Overall		**4.02**	**0.74**

Source: Survey Data, 2025.

According to Table (4.13), asked on farmers face by the challenges in horticultural farming from dimension of market and economic constraints with the 10 variables, the respondents strongly agreed according to the overall mean value of 4.02 and standard deviation of 0.74. Asked on whether farmers face difficulty in accessing reliable markets to sell my horticultural produce and financial difficulties in investing in horticultural farming, the respondents agreed with the mean of 4 and 4.18 and

standard deviations of 0.45 and 0.75 respectively. Due to the values of mean are over 3, the respondents agreed that there is a lack of market information (e.g., prices, demand trends) for horticultural crops, farmers do not get fair prices for my horticultural produce in local markets, also have limited access to credit or loans to support my horticulture business and transportation costs reduce my overall profit margin. This study highlights the urgent need for better market access, financial support mechanisms, and infrastructure development to enhance the economic sustainability of horticultural farming.

(iv) Dimension of Technical Knowledge

Table (4.14) presented the challenges in horticultural farming from dimension of technical knowledge.

Table (4.14) Challenges in Horticultural Farming from Dimensions of Technical Knowledge

No.	Statements	Mean	Standard Deviation
1.	I have limited knowledge about modern horticultural farming techniques.	4.27	0.65
2.	I lack training opportunities on crop management and best practices.	4.27	0.65
3.	I do not have enough information on integrated pest and disease management.	3.45	0.8
4.	I am unaware of the appropriate use of fertilizers and soil nutrients.	3.82	0.4
5.	I am not familiar with post-harvest handling and value addition techniques.	4.09	0.53
6.	I have trouble accessing reliable technical information sources (books, internet, experts).	4.27	0.65
7.	Lack of technical know-how affects the productivity of my horticultural farm.	4.09	0.7
Overall		**4.04**	**0.63**

Source: Survey Data, 2025.

Table (4.14) presented the challenges faced by farmers in horticultural farming from dimension of technical knowledge with seven variables. Asked on whether farmers have limited knowledge about modern horticultural farming techniques, the

respondents strongly agreed as indicated by the mean of 4.27 and a standard deviation of 0.65. On whether farmers lack training opportunities on crop management and best practices, the respondents are strongly agreed as shown by the mean of 4.27. Asked if farmers were unaware of the appropriate use of fertilizers and soil nutrients, the respondents agreed due to the mean of 3.82 and standard deviation of 0.4.

On whether farmers were not familiar with post-harvest handling and value addition techniques, the respondents are strongly agreed as indicated by the mean of 4.09 and a standard deviation of 0.53. Asked if farmers have trouble accessing reliable technical information sources (books, internet, experts), the respondents agreed as shown by a mean of 4.27 and a standard deviation of 0.65. Due to the mean of 4.09 and standard deviation of 0.63, the respondents are strongly agreed that lack of technical know-how affects the productivity of their horticultural farm. The overall mean 4.04 reflects a strong agreement among respondents that limited technical knowledge poses a significant barrier in horticultural farming. Farmers commonly experience difficulty in accessing agricultural training, improved farming techniques, and reliable extension services. The standard deviation of 0.63 indicates moderate consistency among responses—while most respondents recognize the challenge, a few may have better access to support services than others.

This study can conclude that the data underscores the critical need for enhanced training, education, and access to technical resources to improve horticultural practices and farm productivity.

4.3.4 Analysis on Benefits and Challenges in Horticultural Farming

Horticultural farming offers significant benefits such as increased income, improved nutrition, and job creation through the cultivation of fruits, vegetables, and ornamental plants. It supports rural livelihoods and contributes to food security. However, challenges include limited access to quality inputs, water scarcity, climate change impacts, high production costs, and market fluctuations. Small-scale farmers also face difficulties in accessing modern technologies and financial resources, which can hinder productivity and sustainability.

Table (4.15) Analysis on Benefits of Horticultural Farming

No.	Statements	Mean
1.	Economic Factors	**4.04**
2.	**Nutritional Factors**	**4.44**
3.	**Environmental Factors**	**4.16**
4.	**Social Factors**	**4.18**

Source: Survey Data, 2025.

The data in Table 4.15 reveals respondents' perceptions of the key benefits of horticultural farming, based on mean scores derived from Likert-scale responses. Nutritional Factors (Mean = 4.44) received the highest mean score, indicating that most respondents strongly agree that horticultural farming significantly contributes to nutritional well-being. Social Factors (Mean = 4.18)**,** Social benefits, such as community engagement, knowledge sharing, and improved livelihoods, were also highly rated.

Environmental Factors (Mean = 4.16) also recognized environmental benefits, indicating agreement that horticulture supports biodiversity, improves land use, and contributes to sustainable practices. Economic Factors (Mean = 4.04), economic benefits were the lowest among the four categories. This suggests that although horticultural farming contributes to income generation and employment, other challenges may limit its full economic impact. Therefore, all factors scored above 4.0, showing strong agreement across the board. However, the highest perceived benefit lies in nutritional value**,** followed by social and environmental **i**mpacts, with economic benefits slightly less emphasized by respondents.

Table (4.16) Analysis on challenges of Horticultural Farming

No.	Statements	Mean
1.	Climate and Environmental Factors	4.2
2.	Quality Inputs & Labor Issues	3.82
3.	Market and Economic Constraints	**4.02**
4.	**Technical Knowledge**	**4.04**

Source: Survey Data, 2025.

The data in Table (4.16) reflects the perceived challenges faced by respondents engaged in horticultural farming**.** Climate and Environmental Factors (Mean = 4.20) scored the highest among the listed challenges, indicating that farmers strongly agree that unpredictable weather, water scarcity, and environmental degradation are major barriers to successful horticultural practices. Technical Knowledge (Mean = 4.04) is the lack of technical know-how. This implies that many farmers face difficulties due to limited access to training or modern horticultural techniques, which hinders productivity and innovation. Market and Economic Constraints (Mean = 4.02) describes that access to markets, unstable prices, and limited financial resources present significant obstacles, affecting the profitability and sustainability of their farming activities.

Quality Inputs & Labor Issues (Mean = 3.82**)** rated slightly lower, this still represents a considerable concern. It highlights challenges such as the availability and affordability of quality seeds, fertilizers, and skilled labor shortages. However, All the challenges have mean scores above 3.8, showing general agreement that these are significant issues. Climate and environmental challenges are seen as the most critical, followed by technical and economic issues, with input and labor concerns still notable but comparatively less severe. This suggests that both natural and capacity-related constraints hinder the full potential of horticultural farming.

CHAPTER V
CONCLUSION

5.1 Findings

The study found that horticultural farming brings important economic benefits to households in Hmawbi Township. Most farmers said that growing vegetables and fruits is profitable and helps them earn regular income. They depend on these crops for their livelihood. The local markets offer good opportunities to sell their products at fair prices. However, farmers also face challenges due to the high cost of inputs like seeds, fertilizers, and pesticides. These costs reduce their profit even though they can find buyers and demand is strong.

Nutritional Benefits (Mean = 4.44) were rated the highest, indicating a strong consensus among respondents that horticultural farming significantly contributes to improved dietary diversity and nutritional well-being. Horticultural farming also improves household nutrition. Since farmers grow their own crops, they eat more fresh vegetables and fruits. This helps them and their families have a balanced and healthy diet. It also reduces the need to buy food from the market, lowering household expenses. Many farmers said they can still feed their families even during economic difficulties because they rely on home-grown produce. Children in these families benefit from better food access and nutrition.

Social Benefits (Mean = 4.18), such as enhanced community engagement and knowledge sharing, were also highly valued. Socially, horticultural farming supports better family life and community involvement. Families work together more closely on farming activities. Women are active in the fields and help manage the work. The extra income helps pay for children's education. Farmers feel more confident, independent, and respected in their communities. However, most farmers do not join groups or share knowledge with others, which limits learning and cooperation.

Environmental Benefits (Mean = 4.16) reflected the perception that horticulture contributes positively to sustainable land use and biodiversity. Environmentally, horticulture supports soil health and reduces damage. Farmers believe it helps stop soil

erosion, improves fertility, and keeps the land productive. Many use compost and avoid too many chemical inputs. Growing a variety of crops also improves biodiversity. The practice helps retain water in the soil and adapt to changing climate conditions. However, not all farmers have the knowledge or tools to fully practice sustainable farming methods.

The Economic Benefits, with a mean score of 4.04, were rated the lowest among the four benefit categories. This indicates that while respondents generally agree that horticultural farming contributes to income generation and job opportunities, these economic advantages are not being fully realized. Factors such as limited market access, unstable pricing, high input costs, and financial constraints may be hindering the sector's full economic potential. Thus, although the economic impact is acknowledged, it is viewed as comparatively less significant than nutritional, social, or environmental benefits.

From the challenges, climate and environmental factors (Mean = 4.20) emerged as the most critical constraint, with issues like unpredictable weather and water scarcity severely affecting productivity. Farmers face serious climate and environmental challenges. Changes in weather patterns, such as floods and droughts, damage crops. Heat waves and cold spells also cause problems. Rainfall patterns are not stable, which affects irrigation planning. New pest and disease outbreaks are happening due to the changing climate. Soil erosion and land degradation are common. Farmers know about eco-friendly practices but say they cannot use them due to cost or lack of support.

There is also a lack of technical knowledge (4.04) that poses a significant barrier, showing a need for training and modern farming techniques. Many farmers are not trained in modern farming methods. They have limited access to information, training, or expert advice. They do not fully understand how to use fertilizers or control pests effectively. They also face difficulties in storing and selling their products after harvest. Most do not know about value addition or how to improve product quality.

However, there are market and financial constraints (4.04) that poses a significant barrier. And then, Farmers cannot always find up-to-date market prices. They depend on middlemen, who often pay low prices. There are not enough transport and storage services. Many farmers have trouble getting loans or credit. These issues make it hard for them to expand their farming or invest in better inputs.

Finally, Quality Inputs & Labor Issues, with a mean score of 3.82, were rated the lowest among the identified challenges. However, this still indicates a general

agreement among respondents that these are significant concerns. The relatively lower score suggests they may be perceived as less urgent compared to other challenges, yet they remain substantial obstacles. Limited access to quality seeds, fertilizers, tools, and shortages of skilled labor continue to hinder productivity and efficiency in horticultural farming. Addressing these issues is essential for improving overall farm performance and sustainability.

5.2 Suggestions

To improve horticultural farming in Hmawbi Township, the first step should be to provide better training and education for farmers. They need regular workshops on modern farming practices, pest control, soil care, and crop management. Local extension officers should visit villages to share knowledge and provide hands-on support. This would help farmers apply new methods in their fields. Access to farm inputs must also improve. Farmers should get fertilizers, seeds, tools, and pesticides at affordable prices. Government or NGOs can provide these through subsidy programs. Information centers or mobile services can help farmers stay updated with tips and news. This would increase their efficiency and reduce dependency on expensive suppliers.

Financial support is another key area. Farmers need easy access to small loans with low interest. Microfinance programs and savings groups could be set up in the villages. Training in basic financial planning can also help farmers manage their money and avoid debt. These steps will support farm investment and income growth. To solve market problems, better connections between farmers and buyers are needed. Farmers should be informed about daily market prices. Local authorities could help create farmer markets or direct-to-consumer sales. This would reduce the influence of middlemen and ensure fairer prices for farmers.

Infrastructure should be improved to reduce post-harvest losses. Better roads, storage units, and cold chains are important. These changes would keep vegetables and fruits fresh, helping farmers sell more and reduce waste. Transportation costs would also be lower. Climate change is a big challenge, so farmers need support to adapt. They should be trained in water-saving irrigation, climate-resilient crops, and disaster planning. Tools and seeds that resist extreme weather should be provided. Government programs must include farmers in climate planning efforts.

Community participation must be encouraged. Farmers should be organized into groups or cooperatives. This allows them to share tools, knowledge, and solve problems together. Training in teamwork and leadership can make these groups more active and helpful. Finally, promoting sustainable practices is vital. Farmers should be taught to use compost, natural fertilizers, and safe pest control methods. Eco-friendly practices protect the soil and environment. Programs should reward farmers who follow these practices, creating more awareness and motivation across the region.

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APPENDIX - A

Survey Questionnaire

BENEFIT AND CONSTRAINTS ASSOCIATED WITH HORTICULTURAL FARMING AMONG HOUSEHOLDS IN HMAWBI TOWNSHIP, YANGON REGION (CASE STUDY ON 2 VILLAGES)

Date: …….

Please answer the following questions honestly. Your responses will remain confidential and will be used solely for academic purposes.

Section 1: Demographic Information

1. **Age**
    - Under 20
    - 21–30
    - 31–40
    - 41–50
    - Above 50
2. **Gender**
    - Male
    - Female
    - Other
3. **Educational Level**
    - No formal education
    - Primary school
    - Secondary school
    - High school
    - Vocational training
    - University or higher
4. **Household Size**
    - 1–3 members
    - 4–6 members
    - More than 6 members

5. **Experience in Horticultural Farming**

- Less than 1 year
- 1–3 years
- 4–6 years
- More than 6 years

6. **Land Size Used for Horticultural Farming**

- Less than 1 acre
- 1–3 acres
- More than 3 acres

Section 2: Benefits of Horticultural Farming

Based on your opinion, please indicate the most appropriate response with the scale given below. (1)= Strongly Disagree, (2)=Disagree, (3)=Neutral, (4)=Agree, (5)=Strongly Agree

(1) Economic factors

No.	Factors	1	2	3	4	5
1.	Horticultural farming is a profitable agricultural activity for my household.					
2.	I rely on horticultural crops as my primary source of income.					
3.	The cost of inputs (seeds, fertilizers, pesticides) is too high for sustainable profit.					
4.	I can afford to hire laborers during peak horticultural seasons.					
5.	There is strong demand for horticultural products in local markets.					
6.	I can access reliable buyers or wholesalers to sell my horticultural produce.					
7.	I receive fair prices for my horticultural products in the market.					

(2) Nutritional factors

No.	Factors	1	2	3	4	5
1.	My family consumes more fresh produce (vegetables/fruits) because we grow them ourselves.					
2.	Growing horticultural crops helps ensure a more balanced and nutritious diet.					
3.	Access to home-grown vegetables has lowered our food expenses.					
4.	Horticulture has helped reduce our household's dependency on market-purchased vegetables and fruits.					
5.	Seasonal horticultural crops help us maintain food diversity throughout the year.					
6.	Horticultural crops provide a reliable source of food during periods of economic hardship.					
7.	Horticulture helps reduce food insecurity in our community					
8.	Since practicing horticulture, my family's overall health has improved due to better nutrition.					
9.	Children in my household have better access to fresh fruits and vegetables.					
10.	We are more aware of the importance of consuming nutrient-rich foods because of horticultural practices.					

(3) Environmental Factors

No.	Factors	1	2	3	4	5
1.	Horticultural farming helps prevent soil degradation on my land.					
2.	Growing a variety of horticultural crops improves soil fertility.					
3.	Horticultural practices on my farm reduce the risk of soil erosion.					
4.	I use compost or organic matter in horticulture, which improves soil health.					
5.	Horticulture increases the biodiversity of plants grown on my farm.					
6.	My farm contributes to local greenery and tree cover through horticulture.					
7.	Horticultural crops help in better water retention and reduce evaporation from the soil.					
8.	My horticultural practices are adapted to climate conditions to protect the environment.					
9.	I avoid excessive use of chemical fertilizers and pesticides in my horticultural farming.					
10.	My farming contributes to reducing the environmental footprint of agricultural activities in the area.					

(4) Social factor

No.	Factors	1	2	3	4	5
1.	Horticultural farming has strengthened the livelihood security of my household.					
2.	It promotes cooperation and shared work among family members.					
3.	Women in my household actively participate in horticultural activities.					
4.	It supports the education of children by providing income for school expenses.					
5.	Horticultural farming promotes collaboration among neighbors (e.g., sharing tools, seeds, or water).					
6.	I have participated in local farmer groups or cooperatives related to horticulture.					
7.	I often exchange knowledge and farming experiences with other horticultural farmers in my community					
8.	Horticultural farming has improved my quality of life.					
9.	It gives me a sense of pride and self-reliance.					
10.	Horticulture has empowered me to make more decisions in family or community affairs.					

Section 3: Challenges in Horticultural Farming

Based on your opinion, please indicate the most appropriate response with the scale given below. (1)= Strongly Disagree, (2)=Disagree, (3)=Neutral, (4)=Agree, (5)=Strongly Agree

(1) Climate and Environmental factors

No.	Factors	1	2	3	4	5
1.	Unpredictable weather patterns (e.g., sudden droughts or floods) negatively affect my horticultural production.					
2.	Extreme temperatures (either too hot or too cold) have damaged my crops in the past year.					
3.	I have observed changes in rainfall patterns that affect my irrigation plans.					
4.	Climatic changes have increased pest infestations on my farm.					
5.	I have experienced more plant diseases due to changing environmental conditions.					
6.	Soil erosion has reduced the quality and quantity of my cultivable land.					
7.	I face difficulties due to land degradation caused by environmental factors.					
8.	I am aware of sustainable practices to reduce environmental impact, but cannot implement them due to cost or lack of knowledge.					

(2) Quality inputs and labor issues

No.	Factors	1	2	3	4	5
1.	I often face shortages or delays in getting necessary fertilizers.					
2.	Available pesticides are not effective in managing crop pests and diseases.					
3.	Skilled laborers are not readily available in my area.					
4.	It is difficult to access high-quality seeds for horticultural crops.					
5.	Lack of training or technical support affects labor productivity on my farm.					
6.	The cost of hiring farm labor is increasing each year.					
7.	Young people in my area are not interested in agricultural work.					
8.	I rely heavily on family labor due to labor shortages.					
9.	There is no assurance of health and safety for laborers, which is a concern for my farming operation.					
10.	Labor-related challenges limit the expansion of my horticultural activities.					

(3) Market and Economic Constraints

No.	Factors	1	2	3	4	5
1.	I face difficulty in accessing reliable markets to sell my horticultural produce.					
2.	There is a lack of market information (e.g., prices, demand trends) for horticultural crops.					
3.	Price fluctuations greatly affect my income from horticultural farming.					
4.	I do not get fair prices for my horticultural produce in local markets.					
5.	Middlemen take a large share of the profit from my produce sales.					
6.	The cost of inputs (seeds, fertilizers, pesticides) is too high for small-scale farmers.					
7.	I face financial difficulties in investing in horticultural farming.					
8.	I have limited access to credit or loans to support my horticulture business.					
9.	Transportation costs reduce my overall profit margin.					
10.	Lack of storage and processing facilities forces me to sell produce					

(4) Technical knowledge

No.	Factors	1	2	3	4	5
1.	I have limited knowledge about modern horticultural farming techniques.					
2.	I lack training opportunities on crop management and best practices.					
3.	I do not have enough information on integrated pest and disease management.					
4.	I am unaware of the appropriate use of fertilizers and soil nutrients.					
5.	I am not familiar with post-harvest handling and value addition techniques.					
6.	I have trouble accessing reliable technical information sources (books, internet, experts).					
7.	Lack of technical know-how affects the productivity of my horticultural farm.					

APPENDIX - B