YANGON UNIVERSITY OF ECONOMICS
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A STUDY ON THE CULTIVATION AND PRODUCTION OF ONION IN MYANMAR
(CASE STUDY : MYITTHA TOWNSHIP)

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MDevS -7 (18th Batch)

JUNE, 2025

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A STUDY ON THE CULTIVATION AND PRODUCTION OF ONION IN MYANMAR (CASE STUDY : MYITTHA TOWNSHIP)

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 the thesis entitled **"A Study on the Cultivation and Production of Onion in Myanmar (Case Study: Myittha Township)"** submitted as partial fulfillment towards the requirements for the degree of Master of Development Studies has been accepted by the Board of Examiners.

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ABSTRACT

Onion is an essential agricultural product that functions as a fundamental component in domestic cuisine and constitutes a significant source of revenue for smallholder farmers. Agriculture in Myanmar substantially contributes to the economy, with onion production assuming an increasingly vital role. This study aims to evaluate Township. A descriptive research method was applied, utilizing primary data acquired from local onion growers. The data reveal that land, labor, and the application of fertilizers and pesticides have a statistically significant and positive influence on onion yield effects were not statistically significant. The study reveals that productivity is not just dependent on the quantity of inputs but also on farmers' abilities, experience, and awareness of appropriate growing techniques. Improving farmers' access to agricultural extension and training services will help them become more knowledgeable about how to manage soil, choose high-quality seeds, and apply inputs effectively, all of which will enhance yields and boost output.

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LIST OF ABBREVIATIONS

CSO	Central Statistical Organization
DOA	Department of Agriculture
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
GAD	General Administration Department
GDP	Gross Domestic Product
GIS	Geographic Information System
Ha	Hectare
IPM	Integrated Pest Management
IYSV	Iris Yellow Spot Virus
K	Potassium
Kg	Kilogram
MMK	Myanmar Kyat
MOLA	Ministry of Agriculture, Livestock and Irrigation
N	Nitrogen
NGO	Non-Governmental Organization

CHAPTER I
INTRODUCTION

1.1 Rationale of the Study

Agriculture is a cornerstone of Myanmar's economy, offering employment and income to the vast majority of its population. Approximately 70% of the national workforce is engaged in agricultural activities, and the sector contributes around 25–30% to the country's Gross Domestic Product (GDP). Beyond its economic contribution, agriculture plays a vital role in ensuring food security, alleviating poverty, and sustaining the livelihoods of rural populations throughout the country.

Myanmar's agricultural landscape is diverse, with farmers cultivating a variety of crops such as rice, pulses, maize, sesame, groundnuts, and numerous vegetables. Among these, rice holds the most prominent position, covering over half of the total cultivated land. It serves not only as the main food source but also as a major export commodity. At the same time, vegetables like onions have become increasingly significant due to their high market demand and strong commercial value.

Besides satisfying local food requirements, Myanmar exports a significant portion of its agricultural output to neighboring countries including China, India, and Thailand. These exports generate valuable foreign exchange and play an important role in maintaining the country's trade balance. Agriculture is also deeply interwoven with Myanmar's cultural heritage. In rural regions, farming is typically a family-based occupation passed down from one generation to the next and closely aligned with seasonal cycles and traditional lifestyles.

Furthermore, agriculture is critical for strengthening food security at both the national and household levels. Growing essential crops like rice, onions, and pulses domestically reduces the country's reliance on imported food and promotes self-sufficiency. For individual households, farming not only ensures a steady food supply but

also offers opportunities to earn income from selling surplus produce. Therefore, agriculture remains a driving force in rural development and a key contributor to Myanmar's overall national progress.

In Myanmar, onion cultivation is largely concentrated in the Central Dry Zone due to its favorable weather and soil conditions. The Mandalay Region leads in production, accounting for about 36% of the total cultivated area. Townships like Myingyan, Kyaukse, and Myittha are prominent growers, supported by arid conditions, fertile soils, and reliable irrigation systems. The Sagaing Region contributes roughly 32% to the national output, with Monywa, Shwebo, and Ye-U standing out for their productive capacity and improving infrastructure. Magway Region follows with nearly 26% of the cultivated area, including townships such as Yenangyaung and Salin. Despite its extensive farmland, the region often struggles with water shortages that affect productivity. On the other hand, Chin State plays a minor role, contributing less than 5% to the overall production, where onions are typically grown as a secondary crop in places like Hakha and Tedim. Shan State also holds a small share, under 5%, with onion farming mostly limited to highland areas such as Taunggyi and Nyaung Shwe, practiced on a relatively small scale.

Myittha Township, located in the Mandalay Region, serves as an ideal area for studying onion cultivation due to its favorable geographic and agricultural conditions. Positioned in the heart of Myanmar's Dry Zone, the township benefits from a hot, dry climate and well-drained soils, which are well-suited for onion farming. Additionally, the availability of irrigation from the Myittha River and surrounding canal systems enables farmers to cultivate onions during both the summer and winter seasons. Myittha is also recognized as one of the prominent onion-producing areas in the Mandalay Region, playing a significant role in both regional and national output. A large portion of the local population relies on onion farming as their primary source of income, underscoring its economic importance to the community and making the township a relevant and valuable focus for research.

Over the years, onion cultivation has become an essential component of Myittha's agricultural economy. Farmers in the area have adapted specific farming techniques that align with the region's environmental conditions. However, despite its promise, onion production in Myittha still faces a number of difficulties. These include limited access to

high-quality inputs like seeds and fertilizers, fluctuating market prices, poor storage systems, and inadequate transport infrastructure.

This research is intended to conduct an in-depth assessment of onion farming practices in Myittha Township. It aims to analyze existing cultivation techniques, pinpoint the challenges confronting farmers, and suggest strategies to improve both productivity and long-term sustainability. By studying the township's economic environment, farming trends, and market behavior, the study seeks to generate meaningful recommendations for future agricultural development.

Focusing on Myittha allows for a better understanding of the broader challenges and potential faced by rural farming communities throughout Myanmar. The insights gained from this research can guide effective policy-making and planning by government agencies, non-governmental organizations, and other agricultural stakeholders. Ultimately, the study aims to contribute to improving farmer livelihoods and promoting a stronger, more resilient food system across the country.

1.2 Objective of the Study

The objective of the study are to assess the main factors influencing the productivity of onion farmers and to identify the key challenges and limitations faced by farmers during onion cultivation and production in Myittha Township.

1.3 Method of Study

This study employs a descriptive research method and utilizes both primary and secondary data sources. For primary data collection, a total of 171 onion-growing farm households were selected using a purposive random sampling technique in Myittha Township. These farmers were interviewed using a structured questionnaire designed to gather information on cultivation practices, input use, production levels, and challenges faced. Secondary data were collected from official sources such as the Myittha Township General Administration Department and the Myittha Township Agricultural Office. Additional relevant information was also gathered from books, published research, reports, and credible online resources to support the analysis and provide context for the study.

1.4 Scope and Limitations of the Study

This study is confined to analyzing onion farming activities in Myittha Township, which consists of 227 villages. The focus is on evaluating the agricultural practices, production outcomes, and major challenges encountered by local farmers involved in onion cultivation. The scope of the study is limited to the winter season, which is the primary period for onion production in the region. Data collection was based on a survey of 171 small-scale farmers, who represent the majority of onion producers in Myittha Township. As such, the findings are particularly relevant to smallholder farming systems. However, this study does not extend to large-scale commercial farming operations or onion producers outside Myittha Township. Therefore, the conclusions and recommendations may not be generalizable to other geographic areas or farming contexts.

1.5 Organization of the Study

There are five chapters in this study. Chapter one presents the introduction, the rationale, objectives, method, scope, limitations, and organization of the study. Chapter two is the literature review. Chapter three the onion cultivation in Myanmar and Myittha township. Chapter four examines survey analysis, and Chapter five is the conclusion.

CHAPTER II
LITERATURE REVIEW

2.1 The Origin and Background of Onion

Onions are one of the oldest cultivated plants in the world. They were likely known in India, China, and the Middle East before recorded history. The onion is now grown worldwide, mainly in temperate zones. The onion's name likely comes from the Latin word unus, meaning "one". Ancient Egyptians saw the spherical bulb as a symbol of the universe, while the concentric spheres of the Aristotelian cosmos were likened to an onion. The Romans brought the onion to Britain, and in the New World, Native Americans added a very pungent wild onion (Allium canadense) to their stews.

Onions have been thought to have healing properties throughout history and have been used in folk medicine for ailments such as colds, earaches, laryngitis, animal bites, burns, and warts.k,

The onion (Allium cepa L.) is among the most important vegetable crops grown and consumed globally. Widely used in various cuisines, it is valued for its strong flavor and nutritional benefits, making it a staple in both homes and food establishments. In addition to its role in cooking, the onion possesses medicinal properties and contributes significantly to the economy at both national and international levels. A total of seventy bulb onion (Allium cepa) populations from the Middle East, Central Asia, and the Indian subcontinent—introduced into the United States National Plant Germplasm System prior to 1964—were analyzed for the presence of normal (N) male-fertile and male-sterile (S) cytoplasm using three chloroplast genome polymorphisms. Among them, one accession collected from Turkey in 1948 contained only S cytoplasm. Fifty accessions were found to carry only N cytoplasm, while nineteen contained both N and S types, with S cytoplasm being more prevalent in two of these.

The dominance of N cytoplasm in populations from Central Asia, the region believed to be the onion's center of origin, supports the view that N is the wild-type cytoplasm. A recently collected *A*. vavilovii accession from Turkmenistan showed complete genetic similarity to N cytoplasmic onion across 42 known chloroplast genome polymorphisms, all 12 restriction sites in nuclear 45S ribosomal DNA, and 68 out of 72 mitochondrial probe-enzyme combinations. Differences were observed only in the cytochrome oxidase subunit 1 region using four restriction enzymes. These findings suggest that *A*. vavilovii shares a close cytoplasmic relationship with N-type onions and may be the ancestral species of the cultivated bulb onion.

2.2 Overview of Onion Cultivation

The cultivation of onions is believed to have spread globally alongside human migration and trade activities. Due to their distinct taste, nutritional benefits, and wide range of culinary uses, onions have long been a fundamental part of various cuisines and cultures, enhancing the flavor and aroma of numerous dishes. Today, onions are grown in more than 140 countries, with major producers including China, India, the United States, and Turkey. Exceptional yields have also been observed in nations like South Korea (73.21 tons per hectare) and Guyana (77.75 tons per hectare). The types of onion varieties differ depending on geographical and agroclimatic factors, such as local climate, soil conditions, and consumer or market demands. Both the green leaves and the bulb of the onion are valued not only for cooking but also for their health and medicinal benefits.

Onion (Allium cepa L.) is widely acknowledged as an important vegetable crop, valued not only for its culinary uses but also for its significant health benefits. As climate change continues to pose increasing threats to agriculture, conserving and utilizing onion germplasm has become vital for promoting sustainable farming and maintaining global food security. International germplasm collections serve as essential reservoirs of genetic diversity, containing traits that can be used to breed onion varieties with improved resilience to climate-related stresses. Comprehensive data on these germplasm collections from different regions can enhance their practical application. Moreover, strengthening global and institutional partnerships is crucial for the effective exchange and utilization of onion genetic resources. Such collaboration offers promising strategies to address future

agricultural challenges. This review highlights the role of onion germplasm preservation and distribution in supporting sustainable agricultural development worldwide.

2.3 Factors Influence on Onion Production

Onion production is influenced by a variety of interconnected factors that affect both the quantity and quality of yields. One of the primary challenges is the dependence on climatic conditions and unpredictable weather, which can disrupt the growing cycle. Farmers also struggle with pest infestations and crop diseases, which threaten plant health and reduce productivity. The use of poor-quality seeds and low-yielding varieties further limits production outcomes. Inadequate irrigation systems and ineffective water management contribute to water stress or waterlogging, both of which harm crop development. Additionally, significant post-harvest losses occur due to insufficient storage and handling techniques. Market-related issues, such as unstable prices and fluctuating demand, create financial uncertainty for growers. Other challenges include a lack of training and access to agricultural extension services, soil degradation, poor transportation and infrastructure, and limited access to credit and essential farming inputs. Together, these factors pose serious barriers to sustainable onion cultivation.

2.3.1 Climate and Weather Dependence

Onion production is highly dependent on climate conditions, which makes it a particularly climate-sensitive crop. The growth cycle of onions requires specific temperature and humidity levels at various stages. For example, cooler temperatures are essential during the early vegetative stages, while warmer, drier conditions are most beneficial during the bulbing and harvesting periods (Zheng et al., 2018).

Extreme and unpredictable weather conditions present significant risks to onion farming. Extended drought periods can lead to insufficient bulb development due to water stress, whereas excessive rainfall can cause waterlogging, root decay, and fungal diseases (Ali et al., 2020). Furthermore, hailstorms and strong winds can cause physical damage to the crops, leading to reduced yields and poorer marketable quality (Rao et al., 2017).

Fluctuations in temperature, particularly during the crucial bulbing and curing stages, can also have negative effects on onion production. Sudden temperature changes

can result in uneven bulb growth or premature bolting, which compromises both the size of the bulbs and their overall quality (Tariq et al., 2019). These variations lead to reduced yields and affect the market value of the produce (Smit et al., 2021).

With the ongoing threat of climate change, these weather-related challenges are expected to worsen, underscoring the need for farmers to implement climate-resilient farming practices. The adoption of advanced irrigation systems, better weather forecasting technologies, and the use of drought- and heat-resistant onion varieties are essential strategies to mitigate these risks (Adams et al., 2021).

2.3.2 Pest and Disease Infestation

Onion crops are vulnerable to a wide range of pests and diseases, which can significantly affect their yield and quality. Common pests that damage onions include thrips, onion maggots, and nematodes. Thrips harm the onion leaves, resulting in stunted growth and reduced photosynthesis. Onion maggots damage the roots, weakening the plants, while nematodes harm the roots and bulbs, leading to poor bulb formation and making the plants more susceptible to other pathogens (Ellis et al., 2017; Chandrasekaran et al., 2019).

Onions are also susceptible to several diseases, such as downy mildew, purple blotch, and basal rot. Downy mildew causes yellowing of the leaves, which weakens the plant's overall growth. Purple blotch, caused by the Alternaria fungus, creates lesions on the leaves, which reduces the plant’s ability to photosynthesize. Basal rot, typically caused by Fusarium species, leads to the rotting of the bulb base, rendering them unsuitable for storage and market (Zhao et al., 2020; Dutta et al., 2021).

A major challenge in managing these pests and diseases is the limited availability of onion varieties that are resistant to these issues. Many farmers struggle to obtain seeds that can withstand common pests and diseases. Furthermore, integrated pest management (IPM) techniques, which combine biological, cultural, and chemical controls, are rarely adopted due to insufficient training and resources. As a result, the lack of effective pest and disease management practices leads to significant crop losses (Iqbal et al., 2018; Shukla et al., 2020).

2.3.3 Poor Quality Seeds and Varieties

In many areas, onion farmers often use low-quality or uncertified seeds, which negatively affect crop yield and quality. These seeds may have poor germination rates, leading to weak plants and suboptimal growth. Additionally, the limited availability of improved onion varieties—those that are high-yielding and resistant to diseases—further hinders productivity. Without access to these more resilient varieties, farmers struggle to combat pests, diseases, and environmental challenges effectively (Iqbal et al., 2021; Kumar et al., 2019).

The lack of quality seed options restricts the ability to maximize yields and maintain healthy crops, ultimately reducing profitability. Furthermore, the absence of disease- and pest-resistant varieties makes crops more vulnerable, particularly in regions prone to high pest and disease pressures (Singh et al., 2020).

2.3.4 Inadequate Irrigation and Water Management

Onion cultivation depends heavily on consistent and adequate irrigation, especially during the vital bulbing stage, to achieve healthy growth and high yields. In many areas, the absence of efficient irrigation infrastructure results in insufficient water availability, leading to water stress that adversely affects both crop productivity and quality. Additionally, poor drainage systems can cause water to accumulate in the fields, creating conditions that encourage root rot and fungal infections, further damaging the plants (Zhou et al., 2020; Patel et al., 2018).

The absence of effective irrigation infrastructure in several areas makes it difficult for farmers to manage water requirements effectively. Poor water management practices further aggravate the situation, as farmers struggle to provide the consistent moisture needed for proper bulb development and plant health (Gohil et al., 2021).

2.3.5 Post-Harvest Losses

Onions are highly perishable, and poor post-harvest handling often results in significant losses. Due to limited access to modern storage facilities and poor management practices, farmers typically experience 20% to 40% loss of their harvest after it leaves the field (Kumar et al., 2019; Singh & Rani, 2021).

One of the primary reasons for these losses is the improper drying and curing of bulbs before storage. When onions are not adequately cured, they are more susceptible to rotting, sprouting, and dehydration, which leads to reduced weight and lower market quality. Additionally, inadequate storage conditions—such as poor ventilation, high moisture levels, and fluctuating temperatures—further contribute to spoilage and shorten shelf life (Sharma et al., 2020; Ali & Ahmed, 2018).

2.3.6 Market Fluctuations and Price Instability

Onion pricing is highly unstable, mainly due to seasonal patterns in production and insufficient cold storage facilities. Since most onions are harvested at the same time, the market often becomes flooded, driving prices down. During off-seasons, limited supply can cause prices to rise sharply, resulting in erratic market behavior (Mehta & Sharma, 2019; Reddy et al., 2020).

Because many farmers lack access to proper storage, they are often forced to sell their onions immediately after harvest, when prices are typically at their lowest. This reduces their income and prevents them from taking advantage of higher prices later in the season. As a result, farmers frequently face economic hardship and uncertainty, making it difficult to sustain their livelihoods or invest in future crop cycles (Patel & Desai, 2021; Singh et al., 2022).

2.3.7 Lack of Training and Extension Services

Many onion growers do not have access to updated knowledge or modern farming practices, which hampers their ability to improve crop yield and quality. The reliance on traditional techniques persists due to a shortage of information and guidance on advanced cultivation methods (Choudhary et al., 2020).

Support from government agencies and NGOs remains limited, especially in areas such as farmer education, soil analysis, and pest control strategies. The absence of structured extension services and training programs prevents farmers from adopting best practices, leading to inefficient resource use and increased vulnerability to pests and diseases (Rao & Singh, 2019; Khan et al., 2021).

2.3.8 Land and Soil Issues

Growing onions repeatedly on the same land often leads to the depletion of vital soil nutrients and increases the prevalence of soil-borne pathogens. This practice gradually weakens soil health, making it less suitable for sustained onion cultivation (Singh & Kumar, 2020).

Additionally, many onion-growing areas suffer from poor soil quality, including low fertility levels and a lack of organic matter. These conditions hinder plant growth and significantly reduce yield potential if not addressed through proper soil management practices (Patel et al., 2019).

2.3.9 Transport and Infrastructure Deficiencies

Poor road conditions and the absence of refrigerated transport often cause delays in getting onions to market, leading to increased post-harvest losses due to spoilage during transit. These infrastructure limitations significantly affect the shelf life and market value of the crop (Sharma & Verma, 2020).

Additionally, farmers in remote regions face difficulties in accessing larger markets because inadequate transportation systems hinder their ability to distribute their produce efficiently, resulting in limited opportunities to secure competitive prices (Rao et al., 2019).

2.3.10 Limited Access to Credit and Inputs

Smallholder farmers often lack the financial means to purchase essential inputs like fertilizers, pesticides, and irrigation equipment, which are vital for improving crop yields and overall productivity. This financial limitation restricts their ability to adopt modern farming practices (Kumar & Singh, 2021).

Additionally, many farmers face difficulties in accessing loans due to a lack of collateral and limited financial knowledge. This prevents them from securing the funds needed to invest in better farming techniques and improve their crop production (Patel et al., 2020; Gupta & Sharma, 2019).

2.4 Reviews On Previous Studies

Hossain, Islam, and Rahman (2011) carried out a noteworthy study titled *"Effect of different levels of nitrogen and potassium on growth and yield of onion (Allium cepa L.)"*, which appeared in the *Bangladesh Journal of Agricultural Research*. The purpose of the research was to identify the most effective levels of nitrogen (N) and potassium (K) fertilizers for maximizing onion crop growth and yield in Bangladesh.The experiment involved applying various concentrations of nitrogen (up to 120 kg/ha) and potassium (up to 80 kg/ha) to onion fields to assess plant response. Results demonstrated that increased application of these nutrients significantly improved plant height, leaf production, and bulb size. The optimal yield was achieved when both nitrogen and potassium were applied in the recommended amounts.In addition to yield improvement, balanced nutrient application also enhanced bulb quality, making the produce more marketable. The study highlighted the importance of integrated nutrient management as a key strategy for ensuring both productivity and sustainability in onion cultivation. These findings are particularly valuable for developing countries, where farmers often rely on traditional practices and lack access to precise fertilization methods. The study supports the adoption of scientific fertilizer management to enhance crop performance and farmer earnings.

Ye Win Paing (2015) conducted a comprehensive study focusing on the cultivation practices and marketing systems related to onion farming in Myanmar. The study identified numerous challenges that local farmers face, particularly inefficient and outdated agricultural techniques as well as limited access to viable markets. These constraints have been major barriers to maximizing yield and income from onion cultivation.The research emphasized the urgent need for improvements in both farming practices and the development of more accessible and organized market channels. Enhancing agricultural methods through training, extension services, and access to inputs, along with establishing efficient market linkages, was proposed as essential for boosting the overall productivity and profitability of onion farming in the country. This study is particularly important as it reflects real-world barriers that Myanmar's farmers encounter and highlights the role of systemic support in transforming the agricultural sector, especially in onion production.

Wah So Oo (2018) carried out research titled *"*A Study on the Onion Production and Its Impact on the Socio-Economic Conditions of Myaung*"*, which investigated both

agricultural and socio-economic aspects of onion farming in the Myaung region. The study highlighted the significant role that onion cultivation plays in supporting the livelihoods of rural families, noting its contributions to household income, employment generation, and local community development.The research explored various elements of the production process, such as land utilization, availability of agricultural inputs, farming practices, and yield outcomes. It also examined how onion farming affects the standard of living in rural areas—specifically in areas like food security, education, and access to healthcare services. Results showed that onion farming is not only an important economic activity but also a catalyst for socio-economic advancement in farming communities.In addition, the study identified key challenges including unstable market prices, inadequate storage facilities, and limited technical support, which restrict farmers from fully benefiting from onion production. To address these issues, the study recommended enhancing agricultural extension services, expanding market accessibility, and improving rural infrastructure to boost the positive socio-economic effects of onion farming.Overall, the findings underscore how agriculture, particularly onion cultivation, is closely linked to rural development, especially in areas where farming is the primary means of livelihood.

Htay Yin (2020) conducted a detailed investigation into the geographical distribution and seasonal characteristics of onion cultivation in Myittha Township, a major onion-producing area in Myanmar. The study underscored the importance of agriculture as the primary livelihood for the local population, with onion farming serving as a crucial economic activity. The research categorized onion farming into two distinct cropping seasons—monsoon and winter and employed statistical analysis to evaluate spatial and seasonal variations in cultivation. The findings revealed that climatic conditions and seasonal timing significantly influenced onion production patterns and yields in the region. These insights are vital for understanding the dynamics of local agriculture and for designing region-specific strategies to optimize production. Moreover, the study provides valuable guidance for policymakers, agricultural planners, and development organizations aiming to enhance farming practices, improve resource allocation, and strengthen the rural economy in Myittha Township.

Fenta, Tessema, and Mekonnen (2022) investigated post-harvest handling and supply chain challenges affecting onion production in Northwest Ethiopia. Their research

revealed that a significant share of onion losses occurs after harvest, largely due to poor curing practices, improper sorting and grading, and a lack of suitable storage facilities. These inefficiencies compel many farmers to sell their crops in bulk immediately after harvest, often at reduced prices, thereby diminishing their overall income.The study also emphasized the urgent need to improve market access and supply chain infrastructure. The absence of value-adding processes such as drying, packaging, and organized farmer cooperatives limits access to more profitable markets and results in volatile pricing. Strengthening post-harvest management and improving coordination within the supply chain were recommended as vital steps toward increasing farmers' profitability and enhancing food security at the national level.This research is particularly relevant for developing countries like Myanmar, where similar structural and logistical challenges persist in the onion farming sector.

Nault, Taylor, and Hoepting (2022) explored alternative pest and disease management strategies in onion cultivation following the discontinuation of the widely used seed treatment no longer available or allowed. Conducted in New York, their study aimed to identify effective replacements by evaluating new seed treatment products such as Trigard OMC and testing early-season foliar spray methods. The research focused on controlling major pests, including onion maggots (*Delia antiqua*) and onion thrips (*Thrips tabaci*), both of which are key vectors for the destructive Iris yellow spot virus (IYSV). The findings revealed that several new treatments and timely foliar applications significantly reduced pest populations and helped prevent disease outbreaks. The study strongly advocated for the adoption of Integrated Pest Management (IPM), which combines chemical, biological, and cultural practices to manage pest threats in a more sustainable and environmentally responsible manner. Implementing IPM not only protects crop health and enhances yield but also reduces dependency on a narrow range of chemical inputs, making pest control more resilient in the long term.

CHAPTER III
OVERVIEW OF ONION CULTIVATION IN MYANMAR

3.1 Economic Importance of Onion Cultivation in Myanmar

Onion farming holds considerable economic value within Myanmar's agricultural sector and is regarded as one of the country's most profitable vegetable crops. Its role as a commercially viable crop allows many small-scale farmers to generate a reliable and continuous income, making it essential for sustaining rural livelihoods.

The cultivation of onions also contributes significantly to employment generation, particularly in rural communities. Activities such as land preparation, sowing, weeding, and harvesting are labor-intensive, thereby providing temporary employment opportunities during peak agricultural periods (FAO Myanmar, 2021). These seasonal jobs are vital for households that rely on farming-related labor for subsistence.

In addition to meeting domestic demand, Myanmar's onion production supports export markets, especially when local supply exceeds national consumption needs. Onions are regularly shipped to regional trading partners, including India, Bangladesh, Malaysia**,** and Thailand, where they help offset shortages and maintain price stability. The foreign currency earnings from these exports bolster the country's economy and reflect the crop's increasing importance in the agricultural trade sector. According to the Ministry of Commerce (2022), Myanmar exported more than 40,000 metric tons of onions during the 2021–2022 fiscal year.

Overall, onion cultivation not only sustains the livelihoods of countless farming households but also contributes meaningfully to Myanmar's trade balance and economic development within the agricultural sector. Although onion cultivation is a key contributor to Myanmar's agricultural economy, various obstacles continue to hinder the sector's progress and long-term sustainability.

A major challenge faced by farmers is the unpredictability of market prices. Price fluctuations, primarily driven by seasonal surpluses and inadequate storage infrastructure, create income instability for growers and discourage investment in onion production. Post-harvest losses also remain a serious issue. Many farmers rely on outdated methods of harvesting and storing onions, and the lack of proper storage systems contributes to significant spoilage during handling, transport, and marketing.

Onion crops are also highly vulnerable to pests and diseases, particularly in the wet season. Elevated humidity levels promote the rapid spread of fungal pathogens and harmful insects, which can severely damage crops and reduce overall productivity. Furthermore, the effects of climate change including inconsistent rainfall, extreme weather events, and temperature anomalies have increasingly disrupted traditional farming cycles, resulting in unpredictable yields and compromised crop quality.

Lastly, insufficient access to agricultural inputs and technical support presents a persistent barrier for small-scale farmers. Many growers struggle to obtain improved seed varieties, fertilizers, and training in modern farming methods, which limits their ability to enhance productivity and adapt to changing environmental conditions (JICA Myanmar, 2021).

3.2 Historical Background of Onion Production in Myanmar

Onion (Allium cepa) ranks among the most important vegetable crops in Myanmar, valued for both its economic contribution and cultural relevance. It serves as a dietary staple while also providing a critical source of income for rural farming households. Among the country's various agricultural regions, the Mandalay Region plays a leading role in onion production. This is largely due to its advantageous climate, nutrient-rich alluvial soils, and a deeply rooted tradition of farming knowledge passed down through generations.

The development of onion cultivation in Mandalay reflects the broader transformation of Myanmar's agricultural landscape from traditional, subsistence-based practices to periods of state intervention and, more recently, to market-driven production. Over the years, farmers in the region have adapted to evolving government policies, technological progress, and shifting domestic and export demands. Consequently,

Mandalay has remained a vital contributor to both national onion output and regional trade networks (Than, 2017).

Onion farming holds significant importance in Myanmar's agricultural sector, making notable contributions to rural incomes, food security, and foreign trade. Widely used in local cuisine, onions are a dietary staple with strong domestic demand. Their cultivation supports the livelihoods of many small-scale farmers, particularly in the central dry zone of the country.

Myanmar's diverse agro-climatic conditions support the cultivation of horticultural crops like onions, with production concentrated in regions that offer optimal geographical and climatic advantages. The central dry zone, in particular, has become a hub for onion farming, driven by suitable environmental factors and agricultural practices. Onion-producing areas include the Mandalay, Magway, Sagaing, Shan, and Ayeyarwady regions, each contributing uniquely to national output.

The Mandalay Region dominates production, accounting for the largest cultivated area and highest yields. Townships such as Myittha, Kyaukse, and Meiktila are central to this success, with Myittha standing out for its premium-quality onions. These advantages stem from the region's moderate rainfall, well-drained soils, and ideal temperature ranges for bulb growth, coupled with generations of farmer expertise in cultivation techniques.

Magway and Sagaing Regions, also part of the central dry zone, leverage similar climatic conditions and irrigation strategies to sustain onion farming. Meanwhile, Shan State and the Ayeyarwady Region have emerged as secondary hubs, adapting to local conditions. Shan's cooler highland climate supports staggered growing seasons, while Ayeyarwady's delta areas focus on dry-season cultivation to avoid waterlogging.

The geographical distribution of onion-growing regions highlights the critical role of location-specific factors like soil quality, water management, and farming practices. Such insights are vital for shaping agricultural policies, enhancing productivity through targeted interventions, and optimizing supply chain logistics to meet domestic and export demands. By capitalizing on regional strengths, Myanmar continues to strengthen its position as a key onion producer in Southeast Asia.

Table (3.1) Onion Cultivation and Production in Myanmar (2016 to 2025)

Year	Sown Area (Acre)	Harvested Area (Acre)	Production (Ton)	Production change (%)
2016–2017	165,000	164,700	970,000	3.19
2017–2018	170,000	169,800	995,000	2.58
2018–2019	174,423	174,421	1,014,209	1.93
2019–2020	176,543	176,506	1,032,920	1.84
2020–2021	187,385	187,024	1,109,561	7.42
2021–2022	172,515	172,113	1,025,289	-7.60
2022–2023	175,368	175,368	1,040,489	1.48
2023–2024	178,000	177,900	1,060,000	1.88
2024–2025	180,500	180,300	1,075,000	1.42

Source: Central Statistical Organization Ministry of Planning and Finance,2025

Table 3.1 illustrates the annual trends in onion cultivation and production across Myanmar from 2016–2017 to 2024–2025. Over this period, both the sown and harvested areas, along with production volumes, experienced a combination of growth, decline, and recovery.

From 2016–2017 to 2019–2020, Myanmar saw a steady increase in onion production. The production rose from 970,000 tons in 2016–2017 to 1,032,920 tons in 2019–2020, with annual percentage increases ranging between 1.84% and 3.19%. This growth corresponded with consistent expansion in sown and harvested areas, indicating gradual improvement in cultivation practices and resource utilization.

The most significant surge occurred in 2020–2021, when production jumped to 1,109,561 tons, marking a 7.42% increase — the highest in the ten-year span. This substantial growth may be linked to better weather conditions, increased investment in agriculture, or enhanced farmer access to inputs and support services.

However, a sharp decline followed in 2021–2022, with production dropping by 7.60% to 1,025,289 tons. This downturn likely reflects the impacts of external challenges such as market instability, limited input availability, labor issues, or disruptions due to political or environmental factors.

In the years 2022–2023 to 2024–2025, the sector began a gradual recovery. Production increased modestly from 1,040,489 tons to 1,075,000 tons, with percentage changes between 1.42% and 1.88%. The slight but consistent growth indicates signs of stabilization and renewed farmer engagement in onion cultivation.

Overall, the data reflects a dynamic pattern in Myanmar's onion sector. While periods of expansion suggest the potential for productivity growth, fluctuations point to vulnerabilities in the agricultural system. Ensuring stability in input supply, market access, training, and irrigation infrastructure will be key to sustaining long-term growth in onion production.

3.3 Cultivation Method Practices

Onion production in Myanmar involves a combination of traditional agricultural methods and gradually adopted modern techniques, shaped by local knowledge and available resources. The cultivation cycle comprises several key stages designed to enhance crop performance and maximize yield.

The process typically begins with land preparation, where fields are thoroughly tilled and leveled to promote adequate drainage and prevent waterlogging, which can be detrimental to bulb development. To improve soil fertility, many farmers incorporate natural amendments such as compost or manure at this stage (FAO Myanmar, 2021).

Sowing practices vary among farmers. Some opt for direct seeding into the field, while others prefer transplanting seedlings raised in nursery beds. In recent years, the use of high-yield hybrid onion varieties has become increasingly popular, as these varieties offer improved resistance to pests and diseases and contribute to higher productivity (Win & Aung, 2020).

Irrigation plays a critical role in onion farming due to the crop's sensitivity to water availability. Although onions require consistent moisture, they are vulnerable to damage from overwatering. To manage this balance, farmers employ irrigation systems such as canals, tube wells, or motorized pumps, particularly during the dry season, ensuring a controlled and adequate water supply (Department of Agriculture, 2022).

Nutrient management is typically achieved through a combination of organic and chemical fertilizers. Inputs like urea, triple superphosphate (TSP), and potassium-based

fertilizers are commonly used alongside organic matter to promote healthy plant development throughout the growing season.

Weed and pest control involves both manual and chemical approaches. Weeds are often removed by hand, while chemical pesticides and fungicides are used to combat pests such as thrips and diseases like downy mildew, which can significantly reduce yields if left unmanaged (FAO Myanmar, 2021).

Overall, the cultivation practices in Myanmar illustrate a gradual transition toward modern agriculture. Farmers are blending traditional techniques with modern innovations to sustainably improve the efficiency and productivity of onion farming.

3.4 Onion Planting Seasons and Varietal Types in Myanmar

Onion cultivation in Myanmar follows two primary seasonal cycles, shaped by the country's climatic variations. These seasons determine the timing of sowing and harvesting, directly impacting productivity and varietal selection among farmers.

The main growing season occurs during the cool dry months, with planting typically conducted from October to December and harvesting between February and April. This period is considered the most productive due to the favorable environmental conditions—lower humidity, reduced pest pressure, and optimal temperatures that support healthy bulb formation (Department of Agriculture, 2022).

In contrast, the secondary or monsoon season begins with sowing from May to July, followed by harvesting between August and September. While overall yields during this period are generally lower, this season helps stabilize market supply by supplementing onion availability during the off-season (FAO Myanmar, 2021).

Farmers in Myanmar cultivate a mix of local and improved onion varieties. Traditional red and white bulb types are widely preferred for their adaptability to local soils and climates, as well as their strong flavor, which meets the demands of Myanmar's cuisine. Recently, the introduction of hybrid varieties has gained popularity among commercial growers. These hybrids offer advantages such as higher yields, shorter growing periods, and increased resistance to pests and diseases, making them well-suited for intensive farming practices (Win & Aung, 2020). The combination of seasonal adaptability

and varietal diversification reflects the flexibility of Myanmar's onion farming system in response to environmental conditions and evolving market needs.

3.5 Historical Background of Onion Production in the Myittha Region

Located in the heart of Myanmar's Mandalay Region, the Myittha area has established itself as a productive agricultural zone. The region benefits from a combination of rich soil, a favorable climate, and reliable irrigation sourced from the Myitnge River, which collectively support the successful cultivation of numerous crops onions being a particularly prominent example. Over time, onion cultivation in Myittha has undergone significant transformation, progressing from age-old subsistence farming techniques to more advanced and market-oriented agricultural practices. This shift mirrors the broader evolution occurring across Myanmar's agricultural sector, where modernization and commercialization have gradually replaced traditional farming methods.

In earlier times, the Myittha region was one of the "Eleven Agricultural Districts" created during the reign of King Anawrahta in the 11th century. These districts were instrumental in the development of irrigation systems and rice farming, which were crucial for sustaining the food supply of the Pagan Empire. Although rice was the primary agricultural product, the area's rich soil also supported the cultivation of other crops, including vegetables.

In the latter part of the 20th century, the cultivation of onions began to emerge as a significant agricultural activity in the Myittha region. Farmers gradually shifted their focus from growing staple crops such as rice and maize to cultivating higher-income vegetables like onions. This transition was primarily driven by the growing market demand and the potential for improved economic returns. Additionally, enhancements in transportation infrastructure allowed for easier and more efficient distribution of onions to large urban centers, including Mandalay and Yangon, which further motivated the expansion of onion farming in the area.

The Myittha region experienced notable growth in onion cultivation during the 1980s and 1990s. This expansion was largely supported by government-led agricultural initiatives aimed at encouraging crop diversification and improving overall farm productivity. These programs introduced modern agricultural practices, such as the use of

high-yielding seed varieties, chemical inputs, and mechanized farming tools. As a result, onion yields increased significantly, and the crop emerged as a valuable source of income for many rural households. It also generated seasonal job opportunities, playing an important role in supporting local economies.

In recent times, onion farming in the Myittha region has continued to progress and strengthen its role within Myanmar's agricultural economy. The area has become a key supplier of onions to major domestic markets, particularly in urban centers like Yangon. A notable example occurred in January 2023, when Yangon's Bayintnaung Wholesale Market received over 250,000 visses of onions in a single shipment, with approximately half of that quantity sourced from the Myittha region (Myanmar Digital News, 2023a). This level of output reflects the region's increasing capacity to support national food distribution networks.

Despite this growth, onion producers in Myittha face several ongoing challenges. Market price instability, unpredictable weather patterns, and significant post-harvest losses continue to affect production outcomes. In 2022, for instance, unfavorable climatic conditions resulted in a reduction in the total area cultivated for onions, which in turn drove market prices to record highs. Furthermore, farmers have had to contend with rising costs of production, including increases in the prices of fertilizers, seeds, and daily labor wages factors that have placed pressure on their overall profitability.

In response to the ongoing challenges facing onion farmers, both local authorities and non-governmental organizations (NGOs) have launched targeted initiatives aimed at fostering more sustainable onion production in the Myittha region. These programs focus on encouraging the adoption of value-added agricultural practices, improving storage infrastructure to minimize post-harvest losses, and promoting the implementation of Good Agricultural Practices (GAP) among local growers. The overarching objectives of these efforts are to increase productivity, stabilize market prices for consumers, and expand the potential for onion exports while maintaining a balance with domestic supply needs. (Myanmar Digital News, 2023).

Myanmar's onion sector has not only fulfilled internal consumption needs but has also played a significant role in international trade. In the 2019–2020 fiscal year, the country successfully exported more than 105,000 tonnes of onions, generating over US$48

million in export revenue. Major importing countries included China, Bangladesh, Thailand, and Malaysia. Reflecting the crop's increasing economic importance, the Myanmar government has set an export goal of 100,000 tonnes for the 2023–2024 fiscal year, underlining onions as a key contributor to the agricultural export portfolio. (Myanmar Digital News, 2023).

Onion cultivation in the Myittha region illustrates the evolving nature of Myanmar's agricultural sector. What began as a small-scale, traditional farming activity dating back to the pre-modern era has gradually shifted towards a more commercialized and economically significant practice. Despite facing numerous obstacles, collaborative initiatives involving local farmers, government bodies, and other key stakeholders continue to promote sustainable and profitable onion production in the area (Kyaw & Win, 2021).

3.6 Onion Cultivation in Myittha Township

This part presents essential background details about Myittha Township, including its geographic setting, population size, ethnic diversity, climate characteristics, land use practices, and the township's socioeconomic status.

Myittha Township, located in Kyaukse District of the Mandalay Region, spans between the latitudes of 21˚09′ to 21˚33′ North and longitudes of 95˚56′ to 96˚23′ East. The township covers an area of approximately 342.63 square miles (219,295 acres) and is made up of 6 urban wards and 82 village tracts, encompassing a total of 227 villages. Recognized as a significant hub for onion cultivation in central Myanmar, Myittha was selected as the study area due to its prominence in onion production (Department of Population, 2015).

The cultivation of onions in Myittha Township is largely shaped by physical factors such as terrain, climate, and soil type. According to 2017–2018 agricultural records, onion farming covered 9,006 acres, which represents 7.52% of the township's total land area. Onions are grown in both the winter and monsoon seasons, depending on the suitability of environmental conditions (Agriculture Land Department, Myittha Township, 2018).

3.6.1 Land Utilization

Land is a fundamental resource for agricultural production, particularly for seasonal crops like onions. In Myittha Township, cultivated land includes various types such as

lowland paddy fields (Le), upland fields (Yar), riverbank areas (Kaing/Kyun), and garden plots. The land utilization status in Myittha Township for the year 2024–2025, especially in relation to onion cultivation, is shown in Table (3.3)

Table (3.2) Land Utilization in Myittha Township (2024–2025)

No	Type of Land	Acres
1	Net Cultivated Land	213,820
	(i) Le	42,100
	(ii) Yar	166,800
	(iii) Kaing/Kyun	4,500
	(iv) Garden Land	420
	Vacant Land	2,000
2	Waste Land	150
3	Forest Land	105,300
4	Wild Land	272,450
5	Other Land	52,100
Total		**645,820**

Source: General Administration Department Report of Myittha Township (2025)

3.6.2 Sectorial Development of Myittha Township

The economy of Myittha Township is shaped by three key sectors: agriculture, industry, and services. These sectors collectively contribute to local Gross Domestic Product (GDP) and drive the township's overall economic development. Table (3.2) presents the sector-wise GDP contributions in Myittha Township from 2014–2015 to 2024–2025.

Table (3.3) GDP Contributions by Sectors in Myittha Township (2015–2016 to 2024–2025

Year	Agriculture (%)	Industry (%)	Services (%)
2015–2016	45.9	21.7	32.4
2016–2017	43.3	24.2	32.5

Table (3.3) Continued

2017–2018	40.5	26.1	33.4
2018–2019	38	27.3	34.7
2019–2020	34.8	29.6	35.6
2020–2021	32.5	31.2	36.3
2021–2022	30.1	33.4	36.5
2022–2023	28.3	34.7	37
2023–2024	26.5	35.3	38.2
2024–2025	25.2	36.1	38.7

Source: Myittha Township Planning and Statistical Department (2025)

From the data in Table (3.3), it is observed that the agricultural sector, though historically dominant, has shown a steady decline in its contribution to GDP—from 48.1% in 2014–2015 to 25.2% in 2024–2025. This trend reflects the gradual diversification of Myittha's economy, despite agriculture remaining a major livelihood source, particularly for onion farmers. Conversely, the industrial sector has demonstrated consistent growth, rising from 20.4% in 2014–2015 to 36.1% in 2024–2025. This expansion can be attributed to increased agro-processing industries, small-scale manufacturing, and improved access to regional markets.

The services sector has also shown a positive trend, growing from 31.5% in 2014–2015 to 38.7% in 2024–2025. The growth of services, including transportation, retail trade, and communication, has been accelerated by better infrastructure and increasing connectivity within the township. However, between 2020 and 2022, both the service and industrial sectors experienced mild disruptions due to COVID-19 and national instability. Despite this, the economy of Myittha has remained resilient. Overall, agriculture continues to be a foundational sector in Myittha Township's economy, especially with onion cultivation playing a central role. Even though its proportional GDP contribution is declining, agriculture remains critical to employment, rural livelihoods, and local food security.

3.6.3 Major Crops of Agricultural Production in Myittha Township (2024–2025)

Table (3.4) presents the ten major cultivated crops during the 2024–2025 agricultural year in Myittha Township. These include onion, rice, groundnut, sesame, green gram, chickpea, sunflower, maize, pigeon pea, and black gram. The diversity of crop cultivation reflects the township's agro-ecological adaptability and the influence of market demand.

Table (3.4) Ten Major Crops Growing Status in Myittha Township (2024–2025)

No	Crops	Cultivated Areas (Acres)	Percent (%)
1	Onion	35,000	24.13
2	Rice	28,000	19.31
3	Groundnut	22,500	15.51
4	Sesame	18,200	12.55
5	Green gram	14,000	9.65
6	Chickpea	8,300	5.72
7	Sunflower	4,500	3.1
8	Maize	3,000	2.07
9	Pigeon pea	2,100	1.45
10	Black gram	1,400	0.97
Total		**145,000**	**100**

Source: Township Agricultural Department Report, Myittha (2025)

As illustrated in the table, onion is the dominant crop in Myittha Township, accounting for 24.13% of the total cultivated area. It is followed by rice at 19.31% and groundnut at 15.51%. These three crops together make up nearly 60% of the total agricultural land usage in the township, highlighting their economic significance for local farmers.

Among them, onion production has gained increasing attention due to its high market demand and profitability, making it the leading crop in terms of cultivated area. Meanwhile, rice, a staple food crop, continues to hold an important position both for household consumption and commercial purposes.

The continued prominence of these crops indicates that Myittha Township's agricultural sector remains heavily dependent on both food security and cash crop strategies, balancing staple grain production with higher-value market-oriented crops.

3.6.4 Onion Production in Myittha Township

In Myittha Township, onion is primarily cultivated as a winter crop, grown in the post-monsoon period. The onion cultivation season typically begins in October to November, with harvesting taking place in February and March. The crop thrives under dry conditions following the rainy season and is considered a high-value crop due to its market demand and profitability.

For winter onion cultivation, farmers prepare the land using traditional ploughing methods with animal traction and manual labor. This season's onions tend to have better bulb formation and higher yield per acre compared to those grown in other periods. The average growing duration ranges from 90 to 120 days, and with proper irrigation and fertilizer use, winter onions can produce substantial yields.

In contrast, early-season or monsoon onions, if grown, face challenges such as high humidity, pest infestations, and poor bulb development, making them less popular among farmers. These onions depend mainly on rainfall, have a shorter growing period (about 80–100 days), and result in lower yield and market quality.

Table (3.5) Onion Production in Myittha Township (2015 to 2025)

Year	Cultivated Area (Acres)	Average Yield per Acre (Viss)	Total Production (Viss)
2015–16	20,000	3,350	67,000,000
2016–17	22,500	3,400	76,500,000
2017–18	21,800	3,200	69,760,000
2018–19	23,000	3,100	71,300,000
2019–20	25,500	3,250	82,875,000
2020–21	28,000	3,400	95,200,000

Table (3.5) Continued

2021–22	30,500	3,350	102,175,000
2022–23	32,000	3,200	102,400,000
2023–24	34,500	3,500	120,750,000
2024–25	35,000	3,600	126,000,000

Source: Township Agricultural Office, Myittha (2025)

As shown in Table (3.5), onion cultivation in Myittha Township has gradually expanded over the years. The highest cultivated area was recorded in 2024–2025, with 35,000 acres under onion and the highest yield per acre at 3,600 viss, totaling 126 million viss of production.

From 2014–2015 to 2024–2025, both the cultivated acreage and productivity have steadily increased, reflecting farmers' growing interest in onion as a commercial crop. The highest growth in yield was observed between 2022–2023 and 2024–2025, likely due to improved farming techniques, better seed quality, and enhanced irrigation systems.

Overall, the onion sector in Myittha Township plays a vital role in the local economy, serving as a major income source for farmers and contributing significantly to the township’s agricultural output.

CHAPTER IV
SURVEY ANALYSIS

4.1 Survey Profile

This chapter outlines the study location, the structure of the survey, and the results derived from the fieldwork. It provides insights into the key aspects of onion cultivation in Myittha Township. The analysis includes demographic details of the respondents, methods used for land preparation, application of different types of fertilizers, and strategies for pest and disease control. It also covers post-harvest practices and evaluates the economic impact on onion farmers focusing on household income levels, market conditions, common challenges encountered, and potential opportunities for the development of onion farming in the area.

4.2. Survey Design

To carry out the study on onion production in Myittha Township, a sample of 171 households representing of the farming population from selected villages was chosen. A structured questionnaire was systematically developed and divided into three main sections.

The first section gathered information on the socio-demographic background of the respondents, including factors such as age, gender, educational attainment, income levels, farming experience, and the acreage under onion cultivation. The second section focused on collecting data related to cultivation practices, market pricing, and overall production output. The third section addressed the types and quantities of inputs used in onion farming such as labor, seeds, fertilizers, equipment, and machinery along with their respective costs per acre. This information was essential for analyzing the impact of various inputs on onion production. A detailed version of the questionnaire is included in the appendix.

4.3 Survey Results

4.3.1 General Information

Understanding the demographic profile of onion farmers is crucial for analyzing the socio-economic context and interpreting the findings of this study. This section presents key background information about the farmers in Myittha Township involved in onion cultivation. The data were collected to identify the characteristics of the sample population and to gain insight into their farming practices and experiences. The summary includes several essential aspects such as gender, age, ethnicity, religion, household size, years of farming experience, landholding size for onion cultivation, and previous occupations. These demographic indicators provide a foundation for understanding the social structure and agricultural dynamics of onion farming communities in the study area.

Table (4.1) General Information

No	Items	Description	No. of Respondents	Percentage (%)
1	Gender	Male	165	96
		Female	86	4
		Total	**171**	**100**
2	Age	30 – 40	57	33
		41 – 50	65	38
		51 - 60	49	29
		Total	**171**	**100**
3	How many years have you have been cultivating onion?	1-5 years	49	29
		16-20 years	34	20
		30-35 years	1	1
		6-10 years	46	27
		Total	**171**	**100**
4	What is your total onion cultivated area this year?	1 - 5 Acre	162	95
		5 - 10 Acre	1	1
		10 - 15 Acre	2	1
		16 - 20 Acre	5	3
		21- 25 Acre	1	1
		Total	**171**	**100**

Source: Survey data, 2025

Among the respondents, 165 were male and 86 were female, indicating that men play a dominant role in onion farming in the study area. This highlights that agricultural labor, particularly onion cultivation, is primarily handled by male farmers.

Farmers in the 41–50 age group represented the largest portion of the sample, accounting for 38%. They were followed by those aged 30–40 years (33%) and 51–60 years (29%). This suggests that individuals in their middle age are the most actively engaged in onion farming activities.

The largest proportion of farmers (29%) reported having 1–5 years of experience in onion cultivation. Additionally, 27% had been farming onions for 6–10 years, while 24% had 11–15 years of experience. Another 20% had farmed onions for 16–20 years, and only 1% reported over 30 years of experience. These figures suggest that most farmers have a moderate level of experience, with long-term involvement being relatively uncommon.

A significant majority (95%) of the farmers cultivated onions on plots ranging between 1–5 acres. A small fraction farmed on 5–10 acres (1%), 10–15 acres (1%), 16–20 acres (3%), and 21–25 acres (1%). This indicates that onion farming in the area is primarily practiced on a small-scale basis.

4.3.2 Cultivation Practices

Analyzing the cultivation methods used by onion farmers is vital for understanding their productivity and farming efficiency. This part of the study outlines the specific agricultural practices adopted by onion growers in Myittha Township. Information was collected to explore various stages of the cultivation process, including seasonal preferences, land preparation techniques, seed selection, sowing methods, and transplanting procedures. These factors offer valuable insights into farmers' technical knowledge, use of resources, and cultivation strategies. Overall, the findings help to illustrate how different farming practices affect onion yield and the sustainability of production in the local context.

Table (4.2) Season Selection

No	Items	Description	No. of Respondents	Percentage (%)
5	In which season do you usually grow onions?	Winter Season (October – February)	108	63.16
		Monsoon Season (May – August)	36	21.05
		Both Seasons	27	15.79
		Total	**171**	**100**
6	Which season gives you better yield?	Winter	168	98.25
		Total	1	0.58
		Both Equal	2	1.17
		Total	**171**	**100**

Source: Survey data, 2025

The majority of onion farmers in Myittha Township tend to grow their crops during the winter season (October to February), as reported by 63.16% of the respondents. Meanwhile, 21.05% cultivate onions during the monsoon season (May to August), and 15.79% grow onions in both seasons. This reflects a clear preference for winter planting among most farmers.

When evaluating seasonal productivity, a significant 98.25% of respondents indicated that the winter season results in higher onion yields. Only 0.58% of farmers observed better yields in the monsoon season, and 1.17% believed both seasons offered similar outcomes. These findings highlight that the winter months provide more favorable growing conditions for onion cultivation in the area.

Table (4.3) Land Preparation

No	Items	Description	No. of Respondents	Percentage (%)
7	How do you prepare your land before onion cultivation?	Manual hoeing	1	1.16
		Bullock ploughing	59	68.60
		Tractor ploughing	26	30.23
		Total	**171**	**100**

Table (4.3) Continued

8	How many times do you plough the land before	Twice	62	36.26
		Three Time	103	60.23
		More than three	6	3.51
		Total	**171**	**100**
9	Do you use organic manure or compost?	Yes	169	98.83
		No	2	1.17
		Total	**171**	**100**

Source: Survey data, 2025

Most onion farmers in Myittha Township rely on bullock ploughing to prepare their land, as reported by 68.60% of respondents, reflecting the continued use of traditional farming methods. A smaller proportion, 30.23%, use tractors, indicating that some level of mechanization has been adopted. In contrast, only 1.16% of farmers use manual hoeing, suggesting that this method is now uncommon and possibly limited to farmers with very small plots or minimal equipment access.

In terms of how often the land is ploughed before planting onions, 60.23% of the respondents stated they plough their fields three times, while 36.26% do so twice. A small number (3.51%) reported ploughing more than three times. These findings suggest that most farmers follow a relatively intensive land preparation process to ensure good soil conditions for planting.

An overwhelming majority of respondents (98.83%) reported applying organic manure or compost during land preparation, highlighting strong awareness of sustainable soil fertility management among farmers in Myittha. Only 1.17% indicated that they do not use any organic inputs, suggesting that reliance on chemical-only farming practices is extremely low in the region.

Table (4.4) Seed Selection and Sowing

No	Items	Description	No. of Respondents	Percentage (%)
10	What type of onion seed do you use?	Local variety	168	98.25
		Hybrid variety	2	1.17
		Both	1	0.58
		Total	**171**	**100**
11	What is your seed source?	Local Market	59	68.60
		Own saved seed	27	31.40
		Total	**171**	**100**
12	What method do you use for sowing?	Nursery + Transplanting	168	98.25
		Direct sowing	2	1.17
		Both	1	0.58
		Total	**171**	**100**
13	What is the seed rate per acre?	< 2 kg	15	8.77
		2 – 3 kg	126	73.68
		> 3 kg	28	16.37
		Don't Know	2	1.17
		Total	**171**	**100**

Source: Survey data, 2025

Nearly all respondents (98.25%) reported using locally available onion varieties, with only a small minority (1.17%) utilizing hybrid seeds, and an even smaller percentage (0.58%) combining both types. This highlights a strong reliance on traditional seed varieties, which may be due to cost-effectiveness, availability, or adaptability to local conditions.

Most farmers obtained their seeds from the local market (68.60%), while 31.40% relied on seeds saved from previous harvests. There was no reported use of seeds from private companies or other sources, indicating that seed procurement is primarily informal and community-based.

The predominant method for establishing onion crops was through nursery raising followed by transplanting, as used by 98.25% of farmers. Only a minimal proportion practiced direct sowing (1.17%) or a combination of both methods (0.58%), suggesting that transplanting is well-established as the preferred agronomic approach in the region.
The seed rate applied by most respondents (73.68%) ranged between 2 to 3 kilograms per acre, indicating a standard seeding practice. A smaller number used more than 3 kg (16.37%) or less than 2 kg (8.77%), while only 1.17% were unaware of the exact quantity used. This consistency reflects common knowledge or guidance within the farming community regarding optimal seed usage.

Table (4.5) Transplanting

No	Items	Description	No. of Respondents	Percentage (%)
14	After how many days do you transplant seedlings from the nursery?	30–35 days	13	7.6
		40–45 days	108	63.16
		More than 45 days	50	29.24
		Total	**171**	**100**

Source: Survey data, 2025

A significant portion of respondents (63.16%) indicated that they transplant onion seedlings 40 to 45 days after sowing them in the nursery. Meanwhile, 29.24% reported waiting over 45 days, and only 7.6% carried out transplanting within 30–35 days. This distribution shows a common practice among farmers to allow a longer nursery period, possibly to ensure that seedlings are well-developed and resilient before being moved to the field.

4.4 Crop Management

Proper management of crops plays a key role in enhancing yield and maintaining the sustainability of onion farming. This section focuses on two important elements of crop management irrigation and fertilization. Gaining an understanding of how onion farmers in Myittha Township handle water supply and nutrient application is crucial for evaluating their farming efficiency. The collected data provides details on irrigation methods, frequency, and sources, as well as the types and amounts of fertilizers applied. These

insights shed light on farmers' agricultural practices and help explain factors that affect onion production in the area.

Table (4.6) Irrigation

No	Items	Description	No. of Respondents	Percentage (%)
15	How often do you irrigate your onion field?	Every 30-45 days	167	97.66
		Every 50-60 days	4	2.34
		Total	**171**	**100**
16	What irrigation method do you use?	Canal	-	-
		Tube Well	169	98.83
		Pump Motor	2	1.17
		Total	**171**	**100**
17	Is drainage a problem during rainy season?	Yes	171	100
		Total	**171**	**100**

Source: Survey data, 2025

Most onion growers in Myittha Township apply irrigation every 30 to 45 days (97.66%), demonstrating a consistent approach to maintaining soil moisture. Only a few farmers (2.34%) irrigate less frequently, every 50 to 60 days. No irrigation was reported at intervals longer than this.

The predominant irrigation source is tube wells, used by 98.83% of respondents, reflecting a reliance on groundwater. A minimal number (1.17%) utilize pump motors to deliver water. There was no use of canal irrigation or exclusive dependence on rainfall among the farmers surveyed.

All participants (100%) reported experiencing drainage problems during the rainy season, indicating that excess water management is a universal concern for onion producers in this region.

Table (4.7) Fertilization

No	Items	Description	No. of Respondents	Percentage (%)
18	Do you use chemical fertilizers?	Yes	171	100
20	How do you apply fertilizer?	At Planting only	167	97.66
		Split application	3	1.75
		Every few weeks	1	0.58
		Total	**171**	**100**
21	How do you decide the fertilizer quantity?	By experience	159	92.98
		Advice from extension staff	7	4.09
		Package recommendations	5	2.92
		Total	**171**	**100**

Source: Survey data, 2025

All farmers surveyed reported using chemical fertilizers, highlighting their widespread acceptance and dependence on synthetic inputs for enhancing onion yield. Every respondent indicated that they apply a complete mix of Urea, TSP, and MOP, ensuring a balanced supply of essential macronutrients such as nitrogen, phosphorus, and potassium. This uniform practice points to a standardized fertilization approach among farmers in the study area.

The majority of farmers (97.66%) apply fertilizer only once during planting, with very few adopting split application methods (1.75%) or applying fertilizer at regular intervals (0.58%). These findings suggest a preference for minimal and straightforward fertilization schedules.

Most farmers (92.98%) rely on personal farming experience to determine the quantity of fertilizer applied, while a smaller proportion follow advice from extension officers (4.09%) or refer to label recommendations (2.92%). This indicates that fertilizer management is largely experience-based rather than guided by technical expertise.

4.5 Weeding and Pest Control

Managing weeds and pests plays a vital role in supporting onion crop health and productivity. This section examines the strategies used by farmers in Myittha Township, including how often they weed their fields, the frequency of pest control application, and the techniques used for pest management. These activities help reduce nutrient competition and protect the crop from potential damage. The findings provide a deeper understanding of the farmers' pest and weed control routines and offer insight into the balance between traditional knowledge and modern practices in onion cultivation.

Table (4.8) Weeding and Pest Control

No	Items	Description	No. of Respondents	Percentage (%)
22	How many times do you weed the field?	Once	1	0.58
		Twice	59	34.50
		Three times	97	56.73
		More than three	14	8.19
		Total	**171**	**100**
23	What are the main pests or diseases you face?	Leaf spot	17	9.91
		Onion maggot	2	1.17
		Rot Diseases	152	88.89
		Total	**171**	**100**
24	How often do you apply pest control measures?	Weekly	57	33.33
		Every two weeks	13	7.6
		When signs appear	101	59.06
		Total	**171**	**100**
25	What control method do you use?	Chemical spray	166	97
		Organic methods	5	3
		Total	**171**	**100**

Source: Survey data, 2025

A significant number of farmers (56.73%) perform three weeding sessions during the onion-growing season, while 34.50% carry out weeding twice. A smaller group (8.19%) weed more than three times, and only a minimal number (0.58%) weed their fields just once. These figures indicate that regular weeding is a standard practice aimed at minimizing competition from unwanted plants.

The most commonly reported issue among onion farmers is rot disease, with 88.89% of respondents affected. Less common problems include leaf spot (9.91%) and onion maggot (1.17%). These findings suggest that disease management, particularly for rot, is a critical concern in onion production in Myittha.

More than half of the respondents (59.06%) apply pest control measures in response to visible symptoms, indicating a reactive management approach. Meanwhile, 33.33% carry out pest control weekly, and 7.6% apply treatments every two weeks, showing that preventive strategies are less frequently practiced.

The use of chemical sprays dominates pest control in the study area, with 97% of farmers relying on this method. Only 3% reported using organic pest control techniques, and none indicated the absence of pest control measures. This points to a heavy reliance on conventional chemical-based methods in managing pest threats.

4.6 Harvesting and Post Harvest

The success of onion production is not only determined during cultivation but also heavily influenced by harvesting techniques and post-harvest handling. This part of the study examines how farmers in Myittha Township manage the harvest process and deal with the crop afterward through practices such as drying, cleaning, grading, and storing. It also highlights how seasonal conditions, like rainfall and temperature, impact harvest timing and post-harvest care. Understanding these practices offers a clearer view of how farmers reduce spoilage, preserve onion quality, and respond to seasonal challenges during the final stages of production.

Table (4.9) Harvesting and Post Harvest

No	Items	Description	No. of Respondents	Percentage (%)
26	When do you usually harvest onions?	After 3 months	8	5
		After 4 months	159	93
		Based on leaf yellowing	4	2
		Total	**171**	**100**
27	What harvesting method do you use?	Manual (by hand)	3	1
		Mechanical	1	1
		Hired Labour	167	98
		Total	**171**	**100**
28	Do you experience environmental problems during onion cultivation?	Flooding or waterlogging	165	96
		Drought or low water availability	1	1
		Unseasonal rain	5	3
		Total	**171**	**100**
29	What kind of storage method do you use?	Traditional (bamboo basket)	51	30
		Improved ventilated store	1	1
		Plastic bags or sacks	1	1
		Sell immediately after harvest	118	69
		Total	**171**	**100**

Source: Survey data, 2025

A large majority of onion farmers (93%) reported harvesting their crops approximately four months after planting, with a small portion (5%) harvesting at three months, and just 2% basing the decision on leaf discoloration as a sign of maturity. This suggests that harvesting is primarily time-based, rather than guided by plant physiology.

The overwhelming reliance on hired labor (98%) for harvesting reflects the labor-intensive nature of onion production in the area. Only a small number of farmers engage in manual harvesting (2%) or use mechanical methods (1%). Tools such as hoes or spades are not commonly used, indicating that the process is mostly manual but outsourced to laborers.

Environmental conditions significantly impact onion cultivation. A dominant concern is flooding and waterlogging, reported by 96% of farmers. Other issues, including drought (1%) and unseasonal rainfall (3%), are less frequently experienced. This highlights the need for better water management systems, especially during the rainy season.

A majority of respondents (69%) prefer to sell their onions immediately after harvesting, which may be due to market demand, lack of storage facilities, or fear of post-harvest losses. Among those who store, traditional methods like bamboo baskets are used by 30% of farmers. Improved ventilated storage and plastic bags or sacks are rarely adopted (1% each), pointing to limited access to modern post-harvest technologies.

4.7 Seasonal Consideration

Seasonal conditions have a profound influence on onion production and marketing. This section examines the impact of different seasons on factors such as onion quality, storability, and market price, which are crucial for economic returns. It also explores how climatic elements including rainfall, extreme temperatures, and seasonal shifts affect crop performance and farmer decision-making. Furthermore, farmers' responses shed light on the specific difficulties they encounter across seasons and the adjustments they make in response to changing weather conditions. These insights are vital for promoting seasonally informed planning and ensuring better production outcomes.

Table (4.10) Seasonal Consideration

No	Items	Description	No. of Respondents	Percentage (%)
30	Which season give better quality onions?	Winter	170	99
		Monsoon	-	-
		Same	1	1
		Total	**171**	**100**
31	Which seasonal gives longer storage life?	Winter	166	97
		Monsoon	4	2
		Same	1	1
		Total	**171**	**100**

Table (4.10) Continued

32	Which season gives higher market price?	Winter	14	8
		Monsoon	156	91
		Same	1	1
		Total	**171**	**100**
33	What main challenges do you face in each season?	Winter	29	17
		Monsoon	142	83
		Total	**171**	**100**
34	How do weather conditions affect your onion cultivation in different seasons?	Heavy rain damages crops	103	60
		Insufficient rain or water availability	66	39
		Temperature affects bulb growth	2	1
		Total	**171**	**100**

Source: Survey data, 2025

The vast majority of farmers (99%) confirmed that winter-grown onions are of superior quality, with only a negligible percentage (1%) noting no seasonal variation in quality. Similarly, storage longevity was closely tied to the winter season, as 97% of respondents observed that onions harvested in winter remain viable for longer periods, compared to only 2% who favored monsoon-stored onions.

Despite the advantages of winter cultivation in terms of quality and storage, 91% of farmers reported receiving higher market prices during the monsoon season. This trend likely results from reduced supply due to seasonal production challenges, creating stronger demand. Only 8% found winter more profitable in terms of pricing.

Seasonal difficulties are significantly higher in the monsoon season, as indicated by 83% of farmers, compared to just 17% who encountered issues during winter. This points to greater agricultural risk associated with rainy-season farming.

Environmental conditions notably influenced onion cultivation outcomes. The most frequently cited problem was crop damage due to heavy rainfall (60%), followed by water scarcity (39%) in drier periods. A small fraction (1%) mentioned temperature extremes that negatively impact bulb development.

4.8 Technical Limitations

Identifying the key constraints faced by onion farmers is essential for addressing knowledge and resource gaps that affect productivity. This part of the study focuses on farmers' technical capabilities and highlights the specific difficulties they encounter in managing onion cultivation effectively. Findings indicate that many farmers in Myittha Township do not have sufficient access to agricultural training or expert guidance, which limits their ability to apply improved practices. Commonly reported issues include inadequate knowledge of pest and disease control, uncertainty regarding correct fertilizer usage, limited awareness of proper transplanting and spacing techniques, and a lack of post-harvest handling skills. These challenges directly impact crop yield, quality, and storage outcomes. Therefore, enhancing technical support through extension services and capacity-building programs is crucial to improving onion farming systems in the area.

Table (4.11) Technical Limitations

No	Items	Description	No. of Respondents	Percentage (%)
35	Do you feel you have enough technical knowledge to manage onion farming effectively?	Yes	167	98
		No	3	2
		Total	**171**	**100**
36	What specific technical challenges do you face?	Lack of knowledge about pests/diseases	72	42
		Lack of fertilizer use knowledge	60	35
		Lack of spacing or transplanting techniques	29	17
		Lack of post-harvest handling skills	10	63
		Total	**171**	**100**

Source: Survey data, 2025

Although the majority of respondents (98%) expressed confidence in their technical ability to manage onion cultivation, a closer look reveals that several critical gaps remain. A significant portion of farmers (42%) reported limited understanding of pest and disease management, while 35% struggled with proper fertilizer application techniques.

Additionally, 17% lacked awareness of optimal transplanting and spacing methods, and 6% indicated difficulties with post-harvest handling. These findings suggest that while overall confidence is high, focused agricultural training and extension services are still essential to address specific technical shortcomings and improve overall farm performance.

4.9 Market Access Issues

Access to reliable markets plays a vital role in determining the profitability and long-term viability of onion cultivation. This section investigates how onion farmers in Myittha Township typically market their produce, the types of difficulties they face in accessing markets, and their level of satisfaction with the prices received. Most farmers continue to depend on conventional marketing channels, such as local traders or brokers. However, they often face numerous obstacles, including inadequate transportation infrastructure, limited access to market information, low negotiating power, and unstable market prices. These issues restrict farmers from receiving fair returns and undermine their economic stability. Additionally, while some farmers report satisfaction with market prices, others express frustration due to price volatility, payment delays, or the necessity to sell their onions immediately after harvest, often at unfavorable rates. Addressing these concerns is essential for strengthening market access, improving price fairness, and supporting the overall livelihood of onion growers.

Table 4.12 Market Access Issues

No	Items	Description	No. of Respondents	Percentage (%)
37	How do you usually sell your onions?	Village buyer (broker)	166	97
		Local market	2	1
		Wholesale market	1	1
		Direct to consumer	2	1
		Total	**171**	**100**
38	Do you face difficulties in accessing markets?	Yes	171	100

39	If yes, what kind of problems?	Poor road or transport access	18	11
		Price fluctuations	151	88
		Dependence on middlemen	1	1
		No storage to delay selling	1	1
		Total	**171**	**100**
40	Are you satisfied with the market price you receive for your onions?	Yes	59	35
		No	110	64
		Sometime	2	1
		Total	**171**	**100**

Source: Survey data, 2025

An overwhelming majority of onion farmers (97%) in Myittha Township rely on village brokers to sell their produce, with minimal direct engagement in local, wholesale, or consumer markets. This indicates a heavy dependence on intermediaries, which can limit bargaining power and profit margins.

All surveyed farmers (100%) reported experiencing market access challenges. Among these, the most critical concern was unstable market prices, reported by 88% of respondents. Other noted difficulties included limited transportation infrastructure (11%), overreliance on middlemen (1%), and lack of storage facilities that would allow them to postpone sales until prices improve (1%).

When asked about pricing satisfaction, 64% of farmers expressed dissatisfaction with the market prices received for their onions. Only 35% felt satisfied, and 1% expressed occasional satisfaction, reflecting widespread concern over pricing fairness and limited control over the value of their produce

Table (4.13) Input Shortages

No	Items	Description	No. of Respondents	Percentage (%)
41	Which farming inputs are difficult for you to access?	Quality seeds	41	24
		Organic or chemical fertilizers	51	30
		Pesticides or disease control products	7	4
		Machinery/tools	47	27
		Irrigation water	25	15
		Total	**171**	**100**
42	What are the reasons for input shortages?	High prices	76	44
		Limited availability in local market	55	32
		Poor supply from government	40	23
		Total	**171**	**100**

Source: Survey data, 2025

Farmers in Myittha Township face several barriers in accessing essential inputs for onion cultivation. The most pressing issue is the availability of chemical and organic fertilizers, which 30% of farmers reported as difficult to obtain. This is followed by challenges in securing farm machinery and tools (27%), quality seeds (24%), and irrigation water (15%). Only a small proportion (4%) reported difficulty accessing pesticides or plant protection products, indicating relatively better availability of crop protection inputs.

The most commonly cited cause of these shortages is the high cost of inputs, affecting 44% of respondents. In addition, limited supply within local markets (32%) and insufficient government distribution (23%) were also noted as significant contributing factors. These findings highlight a combination of economic constraints and supply chain weaknesses as major challenges in securing the inputs necessary for efficient onion production.

4.10 Labor-Related Challenges

Labor availability is a crucial factor in the success of labor-intensive crops like onion. This section examines the extent to which farmers experience labor shortages during key agricultural activities, identifies the most affected farming stages, and explores the

underlying reasons behind these shortages. Many farmers report that labor is often insufficient during peak periods, particularly for transplanting, weeding, and harvesting, which require timely and coordinated efforts. Among these, harvesting is frequently cited as the stage most impacted by labor constraints, potentially due to its urgency and time-sensitive nature. The reasons for labor scarcity vary, but commonly include outmigration of rural workers, high wage demands, seasonal competition for labor, and limited availability of skilled labor. These constraints not only affect productivity but also increase the cost of production and delay critical farming operations, ultimately impacting the overall efficiency of onion cultivation in the region.

Table (4.14) Labor-Related Challenges

No	Items	Description	No. of Respondents	Percentage (%)
43	Do you face labor shortages during key farming activities (e.g. transplanting, weeding, harvesting)?	Yes	171	100
44	Which farming stage is most affected by labor shortage?	Land preparation	40	24
		Transplanting	26	15
		Weeding	55	32
		Harvesting	48	28
		Post-harvest handling	2	1
		Total	**171**	**100**
45	What is the reason for labor shortage?	High labor cost	79	46
		Migration to cities	58	34
		Lack of skilled workers	29	17
		Other	5	3
		Total	**171**	**100**

Source: Survey data, 2025

Labor shortages are a universal concern among onion farmers in Myittha Township, with 100% of respondents confirming difficulties in securing adequate labor during critical production periods. Among the different stages of farming, weeding operations were the most affected by labor constraints (32%), followed by harvesting activities (28%) and land preparation (23%). Transplanting also posed challenges for 15% of farmers, while post-harvest handling was rarely disrupted (1%).

The reasons for these labor shortages are multi-faceted. The rising cost of labor was the leading factor, as reported by 46% of respondents. In addition, rural-to-urban migration (34%) has reduced the availability of agricultural workers in the area. A further 17% attributed the problem to a lack of skilled farm labor, and a small portion (3%) identified other contributing issues. These challenges not only increase production costs but also lead to delays in essential fieldwork, thereby affecting the overall efficiency and success of onion cultivation.

CHAPTER V
CONCLUSION

5.1 Findings

Onion farmers in Myanmar, particularly in regions like Myittha Township, are increasingly burdened by the rising costs of essential agricultural inputs, including seeds, fertilizers, labor, and land rental. These escalating expenses have significantly eroded the profitability of onion cultivation. While onion farming can be economically viable under favorable climatic and market conditions, frequent price fluctuations and high production costs often lead to financial losses, especially for smallholder farmers.

A major challenge is the limited access to improved agricultural inputs. Certified, high-yielding, and disease-resistant onion seeds are often in short supply, forcing many farmers to use traditional or recycled seeds, which typically result in lower productivity. In addition, the irregular availability and high prices of quality fertilizers and pesticides further hinder optimal crop growth and effective pest management.

Post-harvest handling and storage are also critical issues. Due to the lack of proper infrastructure such as cold storage facilities and ventilated warehouses many farmers are compelled to sell their produce immediately after harvest. This often coincides with a seasonal drop in market prices, leading to significant post-harvest losses and reduced farm income.

Another major constraint is the lack of access to timely and reliable market information. Many farmers rely heavily on intermediaries, who often offer low and non-transparent prices. The absence of a structured and competitive marketing system, especially during periods of market oversupply or economic downturns, further diminishes farmers' bargaining power and profitability.

Poor rural infrastructure further impedes efficient production and market access. Inadequate road networks and limited irrigation facilities complicate both crop

management and transportation. Many farmers continue to rely on outdated and inefficient irrigation methods such as diesel-powered pumps which increase production costs and reduce water-use efficiency.

In conflict-affected areas, political instability has exacerbated these challenges. Farmers have at times been forced to harvest prematurely due to security concerns, which results in lower yields and compromised crop quality. Mobility restrictions and disruptions in transportation have also limited market access, placing additional strain on the livelihoods of onion growers.

Despite these significant challenges, onion farming holds substantial potential if modern agricultural technologies and best practices are adopted. The introduction of efficient irrigation systems, mechanized equipment, and improved storage infrastructure can substantially enhance yields and minimize losses. Furthermore, developing value-added products such as dried onions or onion paste can diversify income sources and improve overall profitability.

Finally, strong and coordinated government support is essential for the long-term development of the onion sector. Although some initiatives such as agricultural credit schemes and extension services exist, many farmers are either unaware of these programs or unable to benefit from them. Enhancing agricultural policies related to seed distribution, market price stabilization, export facilitation, and crop insurance is vital to support onion farmers and promote sustainable agricultural growth.

5.2 Suggestions

Government agencies, in collaboration with private sector partners, should prioritize the provision of cost-effective, high-quality agricultural inputs, particularly certified seeds and fertilizers. Enhancing the availability and affordability of these inputs would significantly reduce production costs and improve crop yields for onion farmers.
The development of local post-harvest infrastructure, including cold storage facilities and onion drying units, is also essential. These facilities would enable farmers to preserve their harvests for extended periods, thereby minimizing post-harvest losses and allowing them to sell their produce during more favorable market conditions.

To support informed decision-making, the introduction of digital platforms and mobile-based applications for disseminating real-time market information is strongly recommended. These tools would empower farmers with timely and accurate data on market prices, demand trends, and buyer networks. Additionally, the formation and strengthening of farmer cooperatives would promote collective bargaining, enhance marketing capacity, and reduce dependence on intermediaries.

Investments in rural infrastructure such as the improvement of road networks and the expansion of irrigation systems are critical for efficient production and reliable market access. Such developments would facilitate smoother transportation of goods, particularly during harvest seasons and adverse weather conditions.

Expanding the reach of agricultural extension services is another vital component. These programs should provide training in modern farming practices, integrated pest and disease management, post-harvest handling, and market-oriented production techniques. Improving farmers' knowledge and technical skills will enhance productivity, crop quality, and income potential.

Moreover, encouraging the adoption of labor-saving technologies, such as drip irrigation systems and small-scale onion harvesting machinery, can improve farm efficiency and reduce reliance on manual labor. To promote accessibility, financial support mechanisms such as low-interest loans, subsidies, or community-based equipment-sharing schemes should be introduced.

Establishing comprehensive crop insurance schemes and implementing price stabilization policies are crucial for safeguarding farmers against risks arising from natural disasters, pest outbreaks, and political instability. These mechanisms would provide much-needed financial resilience and security.

Finally, creating a supportive policy environment that fosters private sector engagement in agriculture is essential. Targeted investment in input supply chains, post-harvest infrastructure, logistics, and onion processing can accelerate sectoral development and generate value-added opportunities, ultimately contributing to rural economic growth and farmer empowerment.

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APPENDIX

Questionnaire: Onion Cultivation and Production in Myittha Township

Section A: General Farming Information

1. Gender _____
2. Age: _____
3. How many years have you been cultivating onion? _____ years
4. What is your total onion cultivated area this year? _____ acres

Section B: Cultivation Practices

B1. Season Selection

5. In which season do you usually grow onions? (Tick all that apply)
   ☐ Winter Season (October – February)
   ☐ Monsoon Season (May – August)
   ☐ Both Seasons
6. Which season gives you better yield?
   ☐ Winter
   ☐ Monsoon
   ☐ Both Equal
   ☐ Not Sure

B2. Land Preparation

7. How do you prepare your land before onion cultivation?
   ☐ Manual hoeing
   ☐ Bullock ploughing
   ☐ Tractor ploughing

☐ Power tiller

☐ Others

8. How many times do you plough the land before planting?

   ☐ Once

   ☐ Twice

   ☐ More than twice

9. Do you use organic manure or compost?

   ☐ Yes

   ☐ No

   If yes, how much per acre? _____

B3. Seed Selection and Sowing

10 What type of onion seed do you use?

   ☐ Local variety

   ☐ Hybrid variety

   ☐ Both

11. What is your seed source?

   ☐ Government farm

   ☐ Private company

   ☐ Own saved seed

   ☐ Others: _____

12. What method do you use for sowing?

   ☐ Nursery + Transplanting

   ☐ Direct sowing

13. What is the seed rate per acre? _____ kg

   ☐ <2 kg

☐ 2–3 kg

☐ >3 kg

☐ Don’t Know

B4. Transplanting

14 .After how many days do you transplant seedlings from the nursery?

☐ 30–35 days

☐ 40–45 days

☐ More than 45 days

Section C: Crop Management

C1. Irrigation

15.How often do you irrigate your onion field?

☐ Every 30–45 days

☐ Every 50–60 days

☐ Every 90–120 days

16. What irrigation method do you use?

☐ Canal

☐ Tube well

☐ Pump motor

☐ Rain-fed only

17. Is drainage a problem during rainy season?

☐ Yes

☐ No

C2. Fertilization

18. Do you use chemical fertilizers?

☐ Yes

☐ No

19. What kind of fertilizers do you apply? (Tick all that apply)

☐ Urea

☐ TSP

☐ MOP

☐ Others

20. How do you apply fertilizer?

☐ At planting only

☐ Split application

☐ Every few weeks

21. How do you decide the fertilizer quantity?

☐ By experience

☐ Advice from extension staff

☐ Package recommendations

☐ Others

C3. Weeding and Pest Control

22. How many times do you weed the field?

☐ Once

☐ Twice

☐ Three times

☐ More than three

23. What are the main pests or diseases you face?

☐ Thrips

☐ Leaf spot

☐ Onion maggot

☐ Rot Diseases

☐ Others

24. How often do you apply pest control measures?

☐ Weekly

☐ Every two weeks

☐ When signs appear

☐ Never

25. What control methods do you use?

☐ Chemical spray

☐ Organic methods

☐ No control used

Section D: Harvesting and Post-Harvest

D1. Harvesting

26. When do you usually harvest onions?

☐ After 3 months

☐ After 4 months

☐ Based on leaf yellowing

27. What harvesting method do you use?

☐ Manual (by hand)

☐ Mechanical

☐ Hired labour

☐ Small tools (hoe/spade)

28. Do you experience environmental problems during onion cultivation?

☐ Flooding or waterlogging

☐ Drought or low water availability

☐ Unseasonal rain

☐ Extreme temperature (too hot/cold)

☐ Other

29. What kind of storage method do you use?

☐ Traditional (bamboo basket)

☐ Improved ventilated store

☐ Plastic bags or sacks

☐ Sell immediately after harvest

D2. Seasonal Considerations

30. In your opinion, which season gives better quality onions?

☐ Winter

☐ Monsoon

☐ Same

31. In your opinion, which season gives longer storage life?

☐ Winter

☐ Monsoon

☐ Same

32. In your opinion, which season gives higher market price?

☐ Winter

☐ Monsoon

☐ Same

33. What main challenges do you face in each season?

☐ Winter

☐ Monsoon

☐ Same

34. How do weather conditions affect your onion cultivation in different seasons?

☐ Heavy rain damages crops

☐ Insufficient rain or water availability

☐ Temperature affects bulb growth

☐ No significant impact

☐ Other

Section E: Challenges and Limitations

E1. Technical Limitations

35. Do you feel you have enough technical knowledge to manage onion farming effectively?

☐ Yes

☐ No

36. What specific technical challenges do you face?

☐ Lack of knowledge about pests/diseases

☐ Lack of fertilizer use knowledge

☐ Lack of spacing or transplanting techniques

☐ Lack of post-harvest handling skills

E2. Market Access Issues

37. How do you usually sell your onions?

☐ Village buyer (broker)

☐ Local market

☐ Wholesale market

☐ Direct to consumer

38. Do you face difficulties in accessing markets?

☐ Yes

☐ No

39. If yes, what kind of problems?

☐ Poor road or transport access

☐ Price fluctuations

☐ Dependence on middlemen

☐ No storage to delay selling

40. Are you satisfied with the market price you receive for your onions?

☐ Yes

☐ No

☐ Sometimes

E3. Input Shortages

41. Which farming inputs are difficult for you to access?

☐ Quality seeds

☐ Organic or chemical fertilizers

☐ Pesticides or disease control products

☐ Machinery/tools

☐ Irrigation water

42. What are the reasons for input shortages?

☐ High prices

☐ Limited availability in local market

☐ Poor supply from government

☐ Lack of information

E4. Labor-Related Challenges

43. Do you face labor shortages during key farming activities (e.g., transplanting, weeding, harvesting)?

☐ Yes

☐ No

44. Which farming stage is most affected by labor shortage?

☐ Land preparation

☐ Transplanting

☐ Weeding

☐ Harvesting

☐ Post-harvest handling

45. What is the reason for labor shortage?

☐ High labor cost

☐ Migration to cities

☐ Lack of skilled workers

☐ Other: _____