

**UNIVERSITY OF CO-OPERATIVE AND MANAGEMENT, SAGAING**  
**DEPARTMENT OF CO-OPERATIVE STUDIES**  
**HUMAN RESOURCE DEVELOPMENT PROGRAMME**  
**MASTER OF PUBLIC ADMINISTRATION**

**THE CONTRIBUTION OF AGRICULTURAL SECTOR**  
**IN ECONOMIC GROWTH OF KAYAH STATE**  
**(2004 to 2023)**

**Ei Ei Chaw**

**2MPA13**

**JUNE, 2025**

**THE CONTRIBUTION OF AGRICULTURAL SECTOR  
IN ECONOMIC GROWTH OF KAYAH STATE  
(2004 to 2023)**

This thesis is submitted as a partial fulfillment towards the Degree  
of Master of Public Administration

**Supervised by:**

Daw Mar Mar Aye

Lecturer

Department of Co-operative Studies

University of Co-operative and Management,

Sagaing

**Submitted by:**

Ma Ei Ei Chaw

2MPA-13(1<sup>ST</sup> Batch)

MPA Programme

University of Co-operative and Management,

Sagaing

**JUNE, 2025**

## ACCEPTANCE

This is to certify that this paper entitled “**THE CONTRIBUTION OF AGRICULTURAL SECTOR IN ECONOMIC GROWTH OF KAYAH STATE (2004 to 2023)**” submitted by Ma Ei Ei Chaw, 2MPA-13 as a partial fulfillment towards the degree of Master of Public Administration has been accepted by Board of Examiners.

### BOARD OF EXAMINERS

.....

(Chairman)

Professor Dr. Moe Moe Yee

Rector

University of Co-operative and Management, Sagaing

-----

(Examiner)

Professor Dr. Ni Ni Aung

Pro-Rector (Retired)

Monywa University of Economics

-----

(Examiner)

Professor Dr. Cho Cho Wai

Visiting Professor

University of Cooperative and Management,  
Sagaing

-----

(Examiner)

Professor Dr. Kyi Kyi Win

Head & Programme Director

Department of Co-operative Studies

University of Co-operative and Management,  
Sagaing

-----

(Supervisor)

Daw Mar Mar Aye

Lecturer

Department of Co-operative Studies

University of Co-operative and Management,  
Sagaing

**JUNE, 2025**

## **ABSTRACT**

Agriculture remains a cornerstone of Myanmar's economy and a critical livelihood source for its rural population, particularly in Kayah State. This study examines the contribution of the agricultural sector to the economic growth of Kayah State from 2004 to 2023. As a long-standing cornerstone of the regional economy, agriculture significantly influences employment, income generation, and overall GDP. The research investigates the sector's role in driving economic development by analyzing annual GDP values and sectoral growth rates. It evaluates both the direct and indirect contributions of agriculture to GDP, considering factors such as land use, productivity, and labor force participation. The findings emphasize the critical importance of agriculture in sustaining regional growth. Consequently, the study offers recommendations for policies designed to enhance the sector's contribution to economic development. These interventions should be tailored to address local needs, prioritizing support for infrastructure development to modernize agriculture. Investment in sub-sectors like livestock and fisheries is also identified as essential. As a cornerstone of Myanmar's economy, sustained efforts to reinforce this sector are vital for the nation's enduring economic progress.

## ACKNOWLEDGEMENTS

I would also like to take this opportunity to express my deepest gratitude to Professor Dr. Moe Moe Yee, Rector of the University of Co-operative and Management, Sagaing, for her guidance, encouragement, and support in carrying out this research. Her leadership skills, wisdom, and dedication to academic success have served as a source of inspiration, and I am truly honored to have been able to study under her invaluable mentorship.

I would like to thank Professor Dr. Ni Ni Aung, Pro-Rector (Retired) of the University of Co-operative and Management, Sagaing, for her useful suggestions and insightful inputs that contributed significantly to this study.

I'm sincerely thankful to Professor Dr. Cho Cho Wai, Visiting Professor of the University of Co-operative and Management, Sagaing, for her useful feedback and advice, which contributed significantly towards shaping this thesis.

I also want to extend my sincere thanks to Professor Dr. Kyi Kyi Win, the Head of Department of Co-operative Studies and MPA Programme Director, for her motivation, ever-supportive attitude, and professional advice during this research.

I would like to thank my supervisor, Daw Mar Mar Aye, Lecturer of the Department of Co-operative Studies, for her polite guidance, considerate advice, and persistent encouragement to make it possible to finish this thesis.

I would also like to thank all the professors, associate professors, lecturers, assistant lecturers, and tutors of the Department of Co-operative Studies for their input and generous cooperation in my study.

Lastly, I would like to express my gratitude towards my classmates, family, and friends for their moral support, sympathy, and encouragement, which kept me motivated to complete the work.

# TABLE OF CONTENTS

|  | <b>Page</b> |
|--|-------------|
| <b>ABSTRACT</b>  | <b>i</b>    |
| <b>ACKNOWLEDGEMENTS</b>                                    | <b>ii</b>   |
| <b>TABLE OF CONTENTS</b>                                   | <b>iii</b>  |
| <b>LIST OF TABLES</b>                                      | <b>v</b>    |
| <b>LIST OF ABBREVIATIONS</b>                               | <b>vi</b>   |
| <b>CHAPTER 1 INTRODUCTION</b>                              | <b>1</b>    |
| 1.1 Rationale of the Study                                 | 2           |
| 1.2 Objectives of the Study                                | 4           |
| 1.3 Method of Study  | 4           |
| 1.4 Scope and Limitations of the Study                     | 4           |
| 1.5 Organization of the Study                              | 5           |
| <b>CHAPTER 2 LITERATURE REVIEW</b>                         | <b>6</b>    |
| 2.1 The Role of Agriculture in Economic Development        | 6           |
| 2.2 Agriculture's Role in GDP                              | 8           |
| 2.3 Review on Previous Studies                             | 11          |
| <b>CHAPTER 3 BACKGROUND OF THE STUDY</b>                   | <b>15</b>   |
| 3.1 Overview on Agriculture Sector                         | 15          |
| 3.2 Myanmar's Agriculture Development Strategy and Policy  | 16          |
| 3.3 Agricultural Land Utilization in Myanmar               | 21          |
| 3.4 Agricultural Production of Myanmar                     | 23          |
| 3.5 Agricultural Output and Contribution of GDP in Myanmar | 24          |

|                   |   |           |
|-------------------|---|-----------|
| <b>CHAPTER 4</b>  | <b>DATA ANALYSIS</b>  | <b>30</b> |
| 4.1               | Profile of Kayah state                                      | 30        |
| 4.2               | Overview on Agriculture Sector in Kayah State               | 31        |
| 4.3               | Production of major crops in Kayah State                    | 32        |
| 4.4               | Production of Livestock and Fishery in Kayah State          | 33        |
| 4.5               | Forestry Sector in Kayah State                              | 35        |
| 4.6               | Agricultural Land Utilization in Kayah State                | 37        |
| 4.7               | Contribution of Agriculture Sector to GDP<br>in Kayah State | 39        |
| 4.8               | Tests for Assumption of Multiple Regression Analysis        | 40        |
| 4.9               | Multiple Regression Analysis                                | 42        |
| <b>CHAPTER 5</b>  | <b>CONCLUSION</b>   | <b>46</b> |
| 5.1               | Findings and Discussions                                    | 46        |
| 5.2               | Suggestions and Recommendation                              | 47        |
| 5.3               | Needs for Further Studies                                   | 48        |
| <b>REFERENCES</b> |   |           |
| <b>APPENDICES</b> |   |           |

## **List of Tables**

| <b>Table No.</b> | <b>Title</b>  | <b>Page</b> |
|------------------|---|-------------|
| 3.1              | Agricultural Land Utilization in Myanmar (hectares)                               | 22          |
| 3.2              | Agricultural Production in Myanmar (Metric Tons)                                  | 24          |
| 3.3              | Percentage of Contribution Agricultural Sector in GDP (kyats in thousand million) | 26          |
| 4.1              | Production of Major Crops in Kayah State (Metric Tons)                            | 32          |
| 4.2              | Annual Production of Livestock and Fishery Products in Kayah State                | 33          |
| 4.3              | Production of Teak and Hardwood in Kayah State (Cubic Ton)                        | 36          |
| 4.4              | Agricultural Land Utilization in Kayah State (acres)                              | 38          |
| 4.5              | Contribution of Agriculture Sector to GDP in Kayah State (Kyats in Million)       | 39          |
| 4.6              | Coefficients of Multiple Regression Analysis                                      | 43          |
| 4.7              | Coefficients of Multiple Regression Analysis                                      | 44          |

## LIST OF ABBREVIATIONS

|         |   |
|---------|---|
| ADB     | Asian Development Bank  |
| ADS     | Agriculture Development Strategy                                |
| CDZ     | Central Dry Zone  |
| CSO     | Central Statistical Organization                                |
| FAO     | Food and Agriculture Organization                               |
| FDI     | Foreign Direct Investment                                       |
| FESR    | Framework for Economic and Social Reforms                       |
| FESR    | Framework for Economic and Social Reforms                       |
| GDP     | Gross Domestic Product  |
| GRDP    | Gross Regional Domestic Product                                 |
| IP      | Investment Plan   |
| MCDV    | Myanmar Comprehensive Development Vision                        |
| MNAPFNS | Myanmar National Action Plan for Food and<br>Nutrition Security |
| MOALI   | Ministry of Agriculture, Livestock, and<br>Irrigation           |
| NCDP    | National Comprehensive Development Plan                         |
| NES     | National Export Strategy  |
| WB      | World Bank  |

# **CHAPTER 1**

## **INTRODUCTION**

Agriculture plays a vital role in Myanmar's economy. It is evident that further development of the agricultural sector would lead to a higher contribution to GDP and overall economic growth, ultimately improving living standards for the population, including farmers. Agriculture supplies essential foods (grains, vegetables, fruit) for people everywhere and supports economic growth. It helps rural communities get better infrastructure, healthcare, and education, contributing to overall societal well-being (FAO, 2020).

Agriculture is the backbone of Myanmar's economy, contributing 32% of GDP depending on the source of year, underscoring its central role in economic development and poverty reduction. In December 2023, Myanmar's labor force participation rate was 60.7%, an increase from 60.3% in the previous year according to CEIC Data. The majority of the workforce is employed in the "Skilled Agriculture, Forestry and Fishery Workers" category (42.9%), followed by "Elementary occupation" (16%) and "Service and sales worker" (13%) according to Open Development Myanmar. Myanmar's agricultural sector is a vital part of the country's economy, contributing over 30% to its GDP. The country primarily exports rice, beans and pulses, corn, edible oil crops, and rubber. Myanmar's agricultural exports are traded through both maritime and border trade channels.

The agricultural sector is a crucial measure of economic development in many countries. Rural progress largely depends on agricultural activities (Meyer et al., 2016). Agriculture promotes economic growth, particularly in countries reliant on agriculture. Agriculture serves as a primary source of livelihood, as 75% of the world's poor live in rural areas; and it heavily utilizes natural resources, significantly impacting the global environment (Janvry, 2009). According to the World Bank (2024), agriculture is a vital contributor to economic growth, accounting for 4% of the global gross domestic product (GDP) and more than 25% in certain developing countries.

Agricultural development is an important mechanism for boosting shared prosperity, eradicating extreme poverty, and nourishing an estimated 10 billion people of world by 2050. Healthy, sustainable, and inclusive food systems are essential for attaining global development objectives. It has been shown that growth in the agricultural sector is two to four times more effective at enhancing the incomes of the

poorest than other sectors. According to the World Bank (2024), Agriculture plays a key role in economic growth, representing 4% of global gross domestic product (GDP) and over 25% in some developing countries.

Kayah State, located in the eastern part of Myanmar, is predominantly agrarian, with a large proportion of its population engaged in farming and related activities. Agriculture plays a vital role in Kayah State, a predominantly rural and ethnically diverse region with fertile plains and uplands suited for different farming systems. The sector contributes substantially to the state's GDP and forms the backbone of economic activity and employment, particularly in rural communities. Agriculture in Kayah involves crop production (rice, maize, pulses, oilseeds), livestock, and agroforestry, supporting both subsistence and market-oriented farming.

Despite its importance, the agricultural sector in Kayah State faces unique challenges such as limited infrastructure, varying climatic conditions, and restricted access to modern technology and markets. The agricultural sector is a cornerstone of Kayah State's economic growth, contributing significantly to livelihoods, employment, and rural development, while presenting key opportunities and challenges that shape the state's socio-economic future. Understanding the contribution of agriculture to the economic growth of Kayah State is crucial for identifying opportunities to enhance productivity, improve livelihoods, and support sustainable development.

## **1.1 Rationale of the Study**

The agricultural marketing reforms of 1987 were generally effective in aligning previously suppressed agricultural prices with international market levels. The agricultural sector played a vital role in Myanmar's economic recovery and growth after 1988, maintaining its significance until the mid-1990s. The increase in prices was substantial, not only for key export crops but also for a range of crops grown for the domestic market. Agriculture holds a comparative advantage, supporting the transition to industrialization through agro-industries that add value to agricultural products (Janvry, 2009).

Agriculture supplies raw materials for various industries, including textiles, silk, oil, sugar, rice, and flour. As a provider of these essential resources, the agricultural sector plays a crucial role in driving the growth and development of the industrial sector within the economy. Myanmar boasts fertile arable land and a favorable climate, making agriculture the backbone of its economy. A key economic focus for the country

is the development of agro-based industries. Myanmar's diverse agricultural production is shaped by its varied geography, which includes plains, deltas, and mountainous regions. Consequently, agriculture serves as a vital foundation for the nation's development.

Myanmar has four key competitive advantages in agriculture: abundant land, water, and labor resources, along with its proximity to large future food markets. Despite this significant potential, the country's agricultural sector has underperformed over the past five decades. Agricultural productivity remains low compared to international competitors and neighboring countries (Haggblade et al., 2013). Although agriculture was the dominant sector in Myanmar, contributing 32.8% of GDP around 2023, this share declined to less than 20% over the previous 20 years.

Agriculture plays a central role in economic development, meaning that improving farmers' livelihoods directly benefits a significant portion of the population and the nation as a whole. In many developing countries, higher agricultural growth rates often lead to faster overall economic growth. Without advancements in agriculture, achieving rapid industrial development is neither feasible nor sustainable. Historical experiences show that today's developed nations achieved high levels of industrial development only after significant improvements in agricultural productivity and growth (Htoo, 2007).

Throughout Southeast Asia, agricultural growth has traditionally been a key driver of overall economic progress and poverty reduction (Christiaensen et al., 2011). Indonesia, Malaysia, Thailand, and Vietnam all experienced rapid agricultural growth as part of their successful development over the past several decades. Given the similar economic structures of these countries in the 1970s, 1980s, and 1990s compared to Myanmar today, the historical evidence suggests that rapid agricultural growth in Myanmar could serve as the engine for widespread economic growth and poverty reduction. Additionally, the current democratic reforms in Myanmar provide opportunities to develop agricultural and economic policies aimed at improving food security and reducing poverty (Kyaw, 2018).

Agricultural productivity in Myanmar is relatively low compared to most other countries in Southeast Asia, which partly explains the income disparities across these nations. Increasing Myanmar's productivity to match that of its agro-ecologically similar neighbors, and thus driving rapid agricultural growth, could substantially

increase rural incomes and help reduce overall poverty. Myanmar is an agriculture-based country and is reforming its economy to achieve comprehensive development. One of the key economic objectives is to build a modern, industrialized nation through agricultural development and the overall advancement of other sectors of the economy. Efforts are being made not only to increase domestic agricultural productivity but also to capture a larger share of the international market for agricultural products.

Farming has long supported the region's economy by creating jobs, sustaining rural livelihoods, and ensuring food security. This study addresses a gap in current research by analyzing how agriculture has driven Kayah State's economic growth. It also examines how crop yields, technology investment, land management, and rural infrastructure development contribute to regional prosperity. Understanding how farming and economic growth connect in Kayah State matters greatly—not just for policymakers and businesses, but also for farmers who depend on it. By studying data and finding what helps farming succeed, this research will guide sustainable development strategies that enhance both agricultural productivity and strengthen the region's economy.

## **1.2 Objective of the Study**

The objective of the study is to examine the role of the agricultural sector in the economic development of the Kayah State from 2004 to 2023 which focus on identifying the contribution of agriculture to GDP value.

## **1.3 Methods of Study**

This study will use a descriptive method. Secondary data will be collected from Ministry of Agriculture, Myanmar Statistical Yearbook published by CSO, and Myanmar Agricultural Statistics. Gross Regional Domestic Product (GRDP) data of the states and regions will also be utilized. Additionally, data will be gathered from other reliable sources, such as World Bank (WB), Asian Development Bank (ADB), and statistical yearbooks from Food and Agriculture Organization (FAO).

## **1.4 Scope and Limitations of the Study**

This study examines agricultural productivity and economic impact in Kayah State (2004–2023). It analyzes major crop cultivation and output, livestock farming with its supply chains, and forestry's economic role. The research specifically explores how agriculture affects national GDP, growth rates, and food security. Key limitations

include scarce reliable data, partial geographic coverage, time constraints, and external factors like climate change that could influence findings.

### **1.5 Organization of the Study**

This study is organized into five chapters. Chapter 1 introduces the research, covering its rationale, objectives, methodology, scope, limitations, and organization. Chapter 2 reviews existing relevant literature. Chapter 3 describes an overview of Myanmar's agricultural sector. Chapter 4 investigates into the data analysis of the agricultural sector in the economic growth of the Kayah State. Finally, Chapter 5 presents conclusion of the study.

## **CHAPTER 2**

### **LITERATURE REVIEW**

This chapter presents information on the role of agriculture in economic development, agriculture's role in GDP, and review on previous studies.

#### **2.1 The Role of Agriculture Sector in Economic Development**

The agricultural sector is fundamental to economic development, playing a vital role in food security, employment, and overall national income. It provides essential resources for both human consumption and industrial production, and its performance directly impacts various aspects of a nation's economy.

##### **(i) Food Security**

Agriculture is the primary source of food, ensuring a stable and sufficient food supply for the population. The increased agricultural production directly contributes to food availability, which is a key component of food security. Improved agricultural practices can help alleviate hunger and malnutrition.

##### **(ii) Employment and Livelihoods:**

Agriculture is a major employer, especially in developing countries, providing livelihoods for a significant portion of the population, particularly in rural areas. It supports a wide range of ancillary businesses and creates market linkages between rural and urban areas. Investing in agriculture can reduce poverty and inequality by creating jobs and increasing incomes in rural areas.

##### **(iii) Economic Growth and Development:**

Agricultural growth can stimulate overall economic growth by providing raw materials for industries, generating export revenue, and driving infrastructure development. Surplus agricultural production can be exported, earning foreign exchange and contributing to a positive trade balance. Agricultural income can also boost demand for goods and services in other sectors, leading to a multiplier effect on economic activity. Furthermore, agriculture can release labor for other sectors like manufacturing, contributing to industrialization.

#### **(iv) Industrial Development**

Agriculture provides raw materials for various industries, including food processing, textiles, and biofuels. Agro-industrial activities add value to agricultural commodities, creating higher-value products and generating employment. Strong agricultural sector can foster industrialization, particularly in rural areas.

#### **(v) Market Integration**

Agriculture facilitates trade and market integration by connecting producers to regional and global markets, a process critical for developing economies (World Bank, 2022). Export-oriented agriculture enhances a country's competitiveness, diversifies export earnings, and fosters economic growth, as demonstrated by the success of agricultural export models in Southeast Asia (WTO, 2020; Anderson & Martin, 2009).

The agricultural sector remains a cornerstone of economic development, directly impacting food security, employment, and overall economic growth (FAO, 2021). Empirical studies confirm that investing in agricultural modernization is crucial for achieving sustainable and equitable progress, particularly through technological adoption and infrastructure development (Schultz, 1964; Diao et al., 2010). This sector is especially fundamental in emerging economies, where it accounts for an average of 25-30% of GDP and 60% of employment in least-developed countries (World Bank, 2022). Economic theory consistently links agricultural growth to broader economic performance, with Johnston and Mellor (1961) demonstrating how farm-sector expansion serves as the foundation for industrial and service-oriented development.

Agricultural advancement often precedes wider development; Schultz (1964) argues that productivity gains catalyze growth by generating labor surpluses, food security, and capital for industrialization. This aligns with the Lewis Model (1954), which describes how developing economies transition from subsistence farming to industrialization through labor reallocation to higher-productivity sectors.

Empirical studies confirm that agricultural productivity accelerates GDP growth, especially during early-stage development (World Bank, 2008). This growth elevates rural incomes, reduces poverty, and enhances food security essential components of sustainable economic advancement. The agriculture-GDP relationship remains complex, influenced by policy decisions, market dynamics, and technological innovations. In developing economies, agriculture retains sector dominance. Research demonstrates that productivity gains directly boost GDP through increased crop and

livestock output, particularly in export-oriented production (Pingali, 2012). Furthermore, agricultural expansion generates significant multiplier effects, stimulating demand across manufacturing and service sectors (Diao et al., 2010). Government intervention critically shapes sectoral growth: land reform, subsidy programs, irrigation investment, and technology-adoption policies substantially impact productivity and, consequently, GDP.

State-funded initiatives in rural infrastructure and agricultural research consistently correlate with sustained growth in agrarian-dominant regions (Fan et al, 2008). Cooperatives and farmer organizations are essential for empowering smallholders through input supply and market access, directly improving livelihoods (FAO, 2021). As climate change worsens agricultural risks, sustainable input management becomes crucial for climate adaptation strategies (Bezner Kerr, R. et al. 2022). Environmental changes—particularly shifting rainfall patterns, extreme temperatures, and severe weather—increasingly determine farm productivity, affecting the sector's GDP contribution (FAO, 2016).

Economic diversification remains vital for sustained growth; rising farm productivity enables labor and capital movement to other sectors, expanding the overall economy (Gollin et al, 2002). This reduces agricultural overreliance and lessens shocks specific to individual sectors, such as price instability or climate disruptions. Consequently, agriculture maintains fundamental importance in developing economies. Strategic investments in technology, infrastructure, and environmentally responsive practices are imperative to sustain growth contributions. While agriculture's role shifts from primary employment source to industrialization driver, its lasting economic stability significance is undeniable.

## **2.2 Agriculture's Role in GDP**

Agriculture's contribution to GDP represents the portion of a nation's gross domestic product generated by farming, forestry, fishing, and related activities. This share varies significantly across economies based on development levels. In less developed nations, agriculture typically plays a substantial economic role, whereas in advanced economies, its proportion declines as industry and services dominate. Key aspects for analyzing agriculture's GDP impact include:

**(i) Percentage of GDP Attributable to Agriculture**

This metric reveals the agricultural sector's economic significance. In less developed nations, agriculture often constitutes a substantial portion of national output, while advanced economies typically show a reduced proportion.

**(ii) Employment in Agriculture**

Countries where agriculture dominates GDP typically have more people working in farming. However, larger agricultural workforces do not always achieve higher productivity.

**(iii) Agricultural Productivity**

Agricultural productivity measures how efficiently farming inputs – labor, land, and capital – are converted into outputs like crops and livestock. This efficiency is quantified as the ratio of agricultural output to input used, where higher values indicate superior resource utilization. Productivity gains from technology adoption, enhanced farming methods, and optimized resource allocation significantly drive economic growth in agricultural regions.

**(iv) Impact on Economic Growth**

Agriculture stimulates economic growth through exports, productivity gains, and intersectoral connections with manufacturing (notably food production) and services (including transport logistics). Economic indicators are essential for tracking agricultural performance evolution within national economies. Metrics like gross domestic product (GDP), inflation rates, and employment statistics evaluate sectoral conditions (Lipsey & Chrystal, 2015). GDP serves as the primary economic output measure, representing total goods and services value over time (World Bank, 2021). Agricultural GDP specifically quantifies farming, fishing, and forestry contributions to the wider economy, enabling evidence-based policy decisions (FAO, 2019). Analyzing correlations between GDP fluctuations and agricultural growth rates is vital for strategic resource allocation and sectoral development initiatives.

Agricultural GDP growth rates have shown substantial regional and temporal variation in recent decades. In developing economies, agriculture historically contributed considerable portions to national output (Haggblade et al., 2013). Economic modernization typically shifts focus toward manufacturing and services, reducing

agriculture's GDP share (Timmer, 2009). Economic theories elucidate this GDP-agriculture relationship: Lewis's dual sector model (1954) explains how industrial absorption of agricultural surplus labor diminishes farming's GDP proportion while accelerating overall growth, highlighting structural transformation's importance. Solow's foundational growth model (1956) examines long-term economic expansion through the interplay of capital accumulation, labor inputs, and technology-driven progress. The framework establishes technological advancement not mere capital or labor increases as the primary engine of sustained growth. This paradigm proves particularly relevant for agriculture, demonstrating how innovation elevates output and efficiency despite static production factors. Solow further introduces diminishing returns, indicating that without technological progress, economic expansion plateaus even in primary sectors. Consequently, it provides a theoretical basis for analyzing GDP growth-agricultural expansion linkages, emphasizing innovation-efficiency dynamics. These insights remain essential for understanding agriculture's long-term sustainability within broader development contexts. Complementarily, Solow's growth theory (1956) attributes sustained expansion to technological progress, capital accumulation, and labor force growth. Together, these frameworks reveal how technological innovation and agricultural investment shape farming's GDP contributions (Pingali, 2012).

Empirical research consistently examines connections between GDP and agricultural growth. Johnston and Mellor (1961) established that agricultural expansion often precedes broader economic progress in farming dependent economies. Similarly, Dorosh and Mellor (2013) demonstrated that agricultural GDP growth significantly reduces rural poverty where farming dominates livelihoods. These findings underscore how agricultural GDP trends reveal regional economic conditions and development stages (Hnin & Myint, 2020). Analyzing empirical relationships enables sector specific trend assessment. Government policies critically shape agriculture's GDP contribution: targeted interventions like fertilizer subsidies, irrigation improvements, and credit access boost productivity in developing nations (Deininger, 1997). Agricultural reforms alongside foreign investment and technology transfer drive sectoral growth (OECD, 2020). Climate adaptive farming and mechanization further elevate agricultural GDP (WFP, 2021). Collectively, this state led initiatives demonstrate government's essential role in advancing agricultural output and food security.

Gross domestic product (GDP), the broadest measure of economic activity, represents the total value of goods and services produced domestically and serves as a primary gauge of economic growth. In developing nations, agriculture frequently constitutes a vital component of GDP while employing substantial population segments (World Bank, 2020). Although many such countries exhibit positive GDP growth, persistent challenges—income inequality, political instability, and inadequate infrastructure—impede sustainable development (Rodrik, 2016). Research confirms GDP growth correlates strongly with improved living standards, though benefits often remain unevenly distributed (Kuznets, 1955). While rapid expansion reduced poverty significantly in economies like China and India, rural agricultural communities frequently experience delayed or diminished gains (Dollar & Kraay, 2002).

The agricultural sector remains a primary engine of economic growth in developing nations. Yet it confronts significant challenges: volatile commodity markets, climate pressures, and limited adoption of advanced technologies (World Bank, 2020). Agricultural GDP growth responds directly to these macroeconomic forces. The relationship between overall GDP and farm sector expansion is mediated by technological innovation, policy frameworks, and global market conditions. Consequently, rigorous analysis of GDP-agriculture growth dynamics is essential for guiding effective interventions and advancing sustainable farming.

### **2.3 Review on Previous Studies**

Nyein Zin Soe (2000) highlighted the role of agriculture in the development of Myanmar's economy. Strengthening Myanmar's agricultural foundation has been a central element of its growth strategy, aiming to drive the development of other sectors as well. This approach was adopted in the early 1970s. There are several reasons why Myanmar prioritizes agriculture. Since the majority of the population is engaged in the agricultural sector, improving farm productivity directly raises the incomes of most people. Increasing farm incomes also enhances the wellbeing of poorer communities, as poverty is more prevalent in rural areas.

Fujita And Okamoto (2006) examined the development of Myanmar's agricultural sector following the transition to an open economy in 1988. They evaluated the characteristics and performance of the sector, identifying two key factors preventing social unrest and maintaining regime control as the primary drivers shaping agricultural policy since 1988. One significant outcome of these policies has been the disparity in

development trajectories among major crops. Crops with development potential experienced limited growth due to policy restrictions, while those outside the scope of agricultural policy showed a self-sustaining increase in output.

Dr. Kan Zaw (2011) analyzed of agriculture in the Ayeyarwady Delta highlight the hopeful prospects and potential for sustainable development in the region. Rice farming is the most important economic activity and the primary source of livelihood. Due to the region's favorable geography and climate, most farmers grow rice as their main crop, along with other exportable crops such as green gram, black gram, chickpeas, and pigeon peas. To support the rice industry, the government approved the establishment of rice specialization companies in 2008. These companies provide farmers with agricultural credit at a 2% interest rate to help them purchase essential inputs such as seeds, fertilizers, and pesticides. Farmers repay their loans either in cash or in kind after the harvest. The agriculture sector requires further investment and technological advancements to sustain production levels. As agricultural development progresses, costs and prices also rise. To address these increasing costs, the agricultural credit policy should be reviewed and updated to align with current development trends. Additionally, enforcing a proper loan repayment system is essential for maintaining an effective credit system. Encouraging private banks to expand services in rural areas would also help supplement the government's credit program. A key reform needed is in land-use policy and the agrarian structure. Currently, all land is state-owned, and farmers gain land-use rights through inheritance. The government has issued thirty-year leases for up to 2,000 hectares (5,000 acres) for private farming. As technology advances and larger farms become more profitable, land-use rights are increasingly purchased for expansion. These issues must be carefully considered to ensure the sustainability of rural development.

Hlaing Htake Khaung Tin (2017) studied the use of management information systems (MIS) by farmers to improve productivity in Kayah State, Myanmar. This research supports farmers in enhancing productivity through the application of MIS. A management information system is one of the most essential tools for effective performance management and decision-making, helping farmers improve their productivity. An MIS is designed to provide reliable, comprehensive, accessible, and understandable information in a timely manner to its users. Additionally, information

on market conditions can influence and potentially improve farmers' marketing strategies.

Muslim et al. (2017) analyzed the agricultural sector in West Nusa Tenggara Province, focusing on identifying the most beneficial types of agriculture, differentiating between leading and non-leading sectors for current and future considerations, examining changes in economic structures within these sectors, and categorizing agricultural activities. The study employed various analytical methods, including Location Quotient, Dynamic Location Quotient, Shift-Share, and Klassen Typology. The findings revealed that the agricultural sector contributed the most to West Nusa Tenggara's gross regional domestic product, accounting for 23.5%. Among the districts, Bima stood out with the highest contribution of 46.8% to the province's agricultural gross regional domestic product.

Katti et al. (2019) examined the role of the agricultural sector in enhancing regional competitiveness. Using the Klassen Typology approach, they analyzed the position of the agricultural sector in Madiun District and its influence on regional competitiveness, with the economic sector of Jawa Timur Province serving as a benchmark. The study aimed to provide policy recommendations for local governments. The findings suggested that strengthening the agricultural sector could increase locally-generated revenue, support the growth of other sectors, and contribute to both regional and national economic development, ultimately raising per capita income.

The FAO's 2022 report delivers a comprehensive assessment of Myanmar's agricultural performance during the study period. It evaluates key economic indicators including GDP growth, sector-wide contributions, and productivity metrics revealing agriculture's role in national development. Crucially, the analysis explicitly links farm-sector expansion to broader GDP trends, directly supporting this study's research objective. The assessment further examines how external factors like market volatility, climate-related challenges, and policy shifts impact output. Granular data on crop-specific and subsector performance enables precise identification of growth drivers and constraints. Finally, the FAO underscores the need for sustainable practices and infrastructure investment to strengthen agriculture's future GDP contribution.

Mar Mar Aung (2024) conducted a study titled “An Analysis of Agricultural Sector-Wide Classification of States and Regions in Myanmar.” The research

highlights the significant impact of the agricultural sector on regional development in Myanmar. Using the Klassen Typology approach, the study classifies the agricultural sectors of various states and regions based on data from 2010-2011 to 2022-2023. Kachin, Kayah, Chin, Magway, and Ayeyarwady regions were categorized under the stagnant sector (Class II). These regions exhibited negative average growth rates, indicating a decline in agricultural performance over the years. Although agriculture contributes significantly to their economies (around 33-38% in most cases), the negative growth highlights challenges such as decreasing productivity, limited modernization, or external factors that may have hindered development. The study underscores the varying roles of agriculture in different regions of Myanmar, reflecting the intricate interplay of economic, environmental, and policy factors. Agriculture is the primary source of export earnings and is closely connected to other parts of the economy by supplying raw materials to industries and providing a market for goods and services from other sectors. As the largest contributor to GDP, agriculture plays a pivotal role in resource mobilization for capital formation and overall economic development.

## **CHAPTER 3**

### **BACKGROUND OF THE STUDY**

This chapter describes an overview of the agriculture sector, Myanmar's Agriculture Development Strategy and Policy, Agricultural Land Utilization in Myanmar, Agricultural Production of Myanmar and Agricultural Output and Contribution of GDP in Myanmar

#### **3.1 Overview on Agriculture Sector**

Agriculture plays a vital role in Myanmar's economy as the second-largest export sector, employing over half of the country's workforce. With more than two-thirds of the population residing in rural areas, it also makes a significant contribution to the national GDP. It contributes around 68% of the rural population depending on crop farming and livestock for their livelihoods and income. The vision statement of Myanmar's agriculture policy is as follows: "By 2030, Myanmar will have an inclusive, competitive, food- and nutrition-secure, climate-resilient, and sustainable agricultural system that enhances the socio-economic well-being of farmers and rural communities while supporting the overall development of the national economy." To achieve this vision, the Agriculture Development Strategy outlines a series of interventions designed to:

1. Expand commercial crop and livestock production.
2. Increase farmers' incomes.
3. Improve access to international markets.

These measures aim to strengthen food security and promote economic development across the country.

Myanmar's agricultural sector anchors the national economy as its foundation, supporting generations of agrarian communities. Rich soils and favorable climatic conditions sustain an agricultural legacy that influences both economic structures and cultural traditions. Farming practices remain intrinsically linked to national identity, reflecting centuries of rural society. The monsoon cycle, with distinct wet and dry phases, facilitates diverse crop production. Rice serves as both essential nourishment and cultural symbol. The Irrawaddy River Basin, critical for irrigation, historically drove remarkable agricultural output. By the early twentieth century, these advantages positioned Myanmar as a leading global rice exporter. This persistent agricultural prominence continues to shape livelihoods and economic systems (Khaing, 2024).

Farmers in this area are mainly situated along the main river valleys, relying on both rainfed and irrigated agriculture to grow rice, oilseeds, beans, and pulses. Water supply for irrigation comes from both surface storage and small-scale, artisanal systems. The Hilly Zone, with a population of approximately 6.5 million, is largely dominated by Shan State. Farmers in this region grow a variety of rainfed tree crops and horticultural products, along with rice, maize, and pulses. Livestock farming is prevalent across all three zones, while aquaculture is primarily concentrated in the Delta and coastal regions.

However, despite its importance, the sector faces distinct challenges that have been further exacerbated by recent economic and political shifts. Between 2017 and 2023, the proportion of the workforce employed in the agriculture sector declined by 6 percentage points. During the same period, the sector attracted more educated individuals who were unable to secure jobs in higher-value sectors, such as the secondary or tertiary industries. Despite facing various challenges such as economic and political instability, natural disasters, limited access to finance, and market fluctuations, the sector has demonstrated resilience. Tackling issues like high input costs, transportation challenges, and ensuring stable market conditions are essential for the sustainability and growth of Myanmar's agriculture sector (González-Caro et al., 2024).

### **3.2 Myanmar's Agriculture Development Strategy and Policy**

Agricultural policy and planning in Myanmar are developed within a framework of various policies, plans, and regulations. These include the National Economic Policy, the Framework for Economic and Social Reforms (FESR), the Myanmar Comprehensive Development Vision (MCDV), the National Comprehensive Development Plan (NCDP), the Foreign Investment Law, and the National Export Strategy (NES). While these documents focus on broader economic and social issues rather than agriculture specifically, they have significant implications for the country's agricultural development.

The 2016 National Economic Policy aims to create an economic framework that supports national reconciliation by ensuring the fair and sustainable use of natural resources across all states and regions. It includes 12 key policies that focus on:

1. Expanding financial resources
2. Improving the efficiency of public and private enterprises

3. Developing human capital
4. Accelerating the growth of key economic infrastructure
5. Creating job opportunities
6. Ensuring balanced sectoral growth while enhancing food security
7. Protecting economic rights
8. Maintaining financial stability
9. Promoting environmental sustainability
10. Implementing a fair and efficient tax system
11. Protecting intellectual property rights
12. Establishing a flexible and supportive business environment.

The Framework for Economic and Social Reforms (FESR), introduced in 2012, focuses on reforms and strategies to enhance food security, boost agricultural growth, and improve the welfare and income of farmers, farm laborers, and their families. It aims to increase productivity by expanding extension services, providing government loans, removing supply chain barriers, and shifting toward market-driven support systems. For example, it suggests improving rice production by using better seeds, adopting improved farming techniques, optimizing inputs, and implementing integrated pest management.

The National Comprehensive Development Plan (NCDP), created in 2011 after the Myanmar Comprehensive Development Vision (MCDV) with Japanese technical support, consists of a series of five-year plans from 2011 to 2031. Its long-term goal for agriculture and rural development is to “raise the incomes and living standards of rural people in Myanmar above those in neighboring countries while keeping pace with developed nations.” By 2030, the plan aims to:

- (i) secure the largest market share for specialty foods and value-added agricultural products in both domestic and global markets;
- (ii) improve food security for rural communities; and
- (iii) promote environmentally friendly growth in harmony with nature.

In the short term, the sector's goals include:

- (i) boosting agricultural productivity;
- (ii) increasing the output of rural agro-based small and medium enterprises (SMEs);

- (iii) attracting foreign direct investment (FDI) to introduce advanced technology, capital, market access, and job opportunities in agriculture;
- (iv) improving access to domestic and export markets, as well as strengthening market information systems;
- (v) promoting research and innovation in agriculture; and
- (vi) minimizing transaction costs along the value chain.

Myanmar's agricultural policies aim to drive economic growth while securing food access and promoting sustainability. This coordinated policy framework reflects a dedicated approach to tackling sectoral constraints. Sustained governmental support and international partnerships remain crucial for achieving these goals and improving rural welfare. Continuous monitoring and evaluation will ensure policy effectiveness and facilitate future adjustments amid global shifts (FAO, 2020).

Several agriculture-related strategies and plans have been developed in recent years, including:

- (i) the Five-Year Plan (2016-17 to 2020-21);
- (ii) the Myanmar National Action Plan for Food and Nutrition Security (MNAPFNS);
- (iii) the Myanmar Climate-Smart Agriculture Strategy;
- (iv) the Myanmar Rice Sector Development Strategy;
- (v) the White Paper: From Rice Bowl to Food Basket;
- (vi) the White Paper on Vegetables;
- (vii) the Food Value Chain Roadmap; and
- (viii) the Agricultural Sector Policies and Priorities for MOALI's Second Five-Year Short-Term Plan (October 2016).

The government enacted reforms to attract foreign investment and stimulate economic growth, targeting agricultural renewal and broader economic revitalization. The experiences from other Southeast Asian transition economies, such as Vietnam and China, highlight that agriculture and the rural sector can drive significant economic growth in the early stages of reform. While Myanmar's agriculture, fisheries, and forestry sectors hold great potential for substantial production and productivity gains, several challenges hinder their realization.

In a rapidly evolving landscape of policies, plans, and priorities, the Ministry of Agriculture, Livestock, and Irrigation (MOALI) urgently needs to:

1. Harmonize and integrate various sub-sector development plans while aligning its vision with regional, state, and national objectives.
2. Define its role in agricultural development and restructure accordingly.
3. Align the agriculture budget with its revised role, institutional framework, and goals.
4. Build capacity to monitor and evaluate progress, ensuring management is informed effectively.

The Agriculture Development Strategy (ADS) and Investment Plan (IP) address the following needs:

1. Consolidating and integrating various plans, strategies, roadmaps, and approaches developed by multiple stakeholders.
2. Establishing a systematic approach to implement agricultural policies and link them to the Investment Plan.
3. Coordinating activities, projects, programs, and policies across different sectors.
4. Facilitating dialogue with domestic and international investors and harmonizing foreign aid for the sector.

The ADS is an inclusive and comprehensive strategic document developed through consultations among the government, private sector, civil society, and Development Partners (DPs). It builds on the recently formulated Agricultural Policy and establishes clear priorities for the short, medium, and long term. The IP outlines the results to be achieved by various stakeholders, along with defined timelines (Ministry of Agriculture, Livestock, and Irrigation, 2018).

Myanmar's agricultural sector has implemented policy reforms since 1987 to enhance productivity, sustainability, and economic development. Recognizing agriculture's vital role in employment and GDP contribution. Key reforms included abolishing state procurement of staple crops, liberalizing domestic markets, and deregulating industrial crop trade. Primary agricultural objectives are: ensuring local food security, generating export revenue from surplus production, earning foreign exchange, and supporting rural development. Implementation policies established to achieve these goals include: permitting farmer production autonomy, expanding cultivable land while protecting farmer rights, and encouraging private sector investment in seasonal/perennial crops alongside farm machinery distribution.

In 2013, Myanmar's Ministry of Agriculture and Irrigation launched the National Agriculture Policy to advance sustainable farming practices and strengthen the sector's economic contribution. This framework prioritized agricultural modernization through research development and adoption of new technologies (MOAI, 2013).

In 2016, Myanmar implemented the Agricultural Sector Development Strategy (ASDS), prioritizing food security and rural livelihoods (World Bank, 2016). This strategy established key objectives: boosting productivity, diversifying production, and expanding market access. It further addressed land tenure security to strengthen farmer control and attract sector investment. The Ministry of Agriculture, Livestock, and Irrigation (MOALI) developed the Agricultural Policy (2016) to guide the implementation of the Second Five-Year Plan. The policy includes the following objectives:

1. Improve food security, food safety, and balanced nutrition during the Second Five-Year Plan period.
2. Ensure that farmers fully enjoy their rights and benefit from economic growth.
3. Support small-scale farmers, livestock keepers, and fishers by encouraging them to form groups or cooperatives (with mandatory participation of women) to modernize and enhance sector performance through knowledge transfer.
4. Improve the socio-economic status of smallholder farmers through targeted investments in rural road construction, infrastructure development, land-use management, and small-scale industries.
5. Secure technological and financial assistance from local and international sources to improve crop, livestock, and fish production, as well as cooperative development.
6. Enhance the production of high-quality grains, meat, and fish for export markets.
7. Develop an efficient agro-based industry, including small-scale enterprises and vocational education programs.
8. Increase access to local and international investments in the agriculture sector.
9. Ensure the active participation of all stakeholders in poverty reduction, agricultural development, and sustainable rural development programs.

The 2018 Myanmar Sustainable Development Plan (MSDP) aligned agricultural policies with national goals, emphasizing sustainable practices for climate resilience and inclusive growth (UNDP, 2018). MSDP enhances farmer resilience through capacity building, financial access, and value chain development while promoting agroforestry and organic farming to meet global sustainability targets. Complementing these efforts, the 2019 Rural Development Strategy upgraded infrastructure—rural roads, irrigation systems, and market connectivity—to support agricultural expansion (Asian Development Bank, 2019). Concurrent policies strengthened farmer cooperatives for collective bargaining and resource sharing, empowering smallholders who form Myanmar's agricultural foundation.

### **3.3 Agricultural Land Utilization in Myanmar**

Myanmar's fertile agricultural lands support diverse crops under optimal conditions. The sector is dominated by smallholder farming, with approximately 80% of farms smaller than five acres. This scale limitation constrains profitability by preventing economies of scale. Additionally, limited credit access and modern technology hinder productivity. Recognizing these constraints, the government has instituted land tenure reforms and financial access programs. Capacity building initiatives simultaneously enhance farmer skills.

Myanmar's farming methods depend on its land types, weather, and water. Rice, beans, oil crops, sugarcane, and corn are main crops. Most rice grows in lowland areas like the Ayeyarwady Delta and central plains. Farmers there use rain and rivers to flood fields. In hilly areas like Chin, Kayah and Shan states, farmers clear small forest patches to plant crops (called Taungyar method). After a few years, they let the land rest to regain strength. This works in poor soil areas but gives less food than watered fields. In dry central zones, farmers depend on canals and dams to grow rice, beans, and oil crops. Many plants different crops together or switch crops yearly to use land well and put nutrients back in the soil.

In Myanmar's hilly north, farmers use terrace farming to stop soil loss and save water. In dry central areas with uncertain rain, farmers grow tough crops like millet and sesame using dry farming methods with little digging. How farmers grow food changes with Myanmar's land types. The Ayeyarwady Delta has rich soil and heavy rains, making it perfect for rice. Dry central zones need crop watering and plants that handle dry weather. Coastal areas with hot tropical weather grow tree crops like rubber and

palm oil. Myanmar's different farming ways come from its mix of land shapes, weather patterns, and water supplies.

**Table (3.1) Agricultural Land Utilization in Myanmar (Hectares)**

| <b>Fiscal Year</b> | <b>Total Agricultural Land</b> | <b>Cultivated Area</b> | <b>Area under Permanent Crops</b> | <b>Area under Annual Crops</b> |
|--------------------|--------------------------------|------------------------|-----------------------------------|--------------------------------|
| 2004               | 17685502                       | 12677520               | 1293410                           | 11384110                       |
| 2005               | 17746108                       | 12737492               | 1297020                           | 11440472                       |
| 2006               | 17807525                       | 12832984               | 1346187                           | 11486797                       |
| 2007               | 17892715                       | 12933065               | 1387752                           | 11545313                       |
| 2008               | 17988110                       | 13020911               | 1416290                           | 11604621                       |
| 2009               | 18083305                       | 13124716               | 1460105                           | 11664611                       |
| 2010               | 18163987                       | 13229550               | 1503940                           | 11725610                       |
| 2011               | 18250197                       | 13348223               | 1546200                           | 11802023                       |
| 2012               | 18811650                       | 14737587               | 2420231                           | 12317356                       |
| 2013               | 18949075                       | 14826210               | 2493043                           | 12333167                       |
| 2014               | 19063820                       | 14946045               | 2580768                           | 12365277                       |
| 2015               | 19177120                       | 15057310               | 2667883                           | 12389427                       |
| 2016               | 19294560                       | 15183390               | 2769141                           | 12414249                       |
| 2017               | 19405390                       | 15296870               | 2870202                           | 12426668                       |
| 2018               | 19523850                       | 15396120               | 2973455                           | 12422665                       |
| 2019               | 19635000                       | 15484000               | 3079920                           | 12404080                       |
| 2020               | 19743370                       | 15577340               | 3184435                           | 12392905                       |
| 2021               | 19860340                       | 15681230               | 3295789                           | 12385441                       |
| 2022               | 19975120                       | 15785460               | 3399120                           | 12386340                       |
| 2023               | 19859610                       | 15681343               | 3293115                           | 12388229                       |

*Source:* Myanmar Statistical Yearbook (2023)

Farmers now focus more on earth-friendly growing to keep farms productive for years and protect nature. Methods are being promoted among farmer like changing crops each season, natural farming without chemicals, and using natural pest controls. These methods help soil stay healthy and reduce chemical use. Building better watering systems is key to grow more food. Overall, with concerted efforts towards

modernization and sustainability, Myanmar's agricultural sector has the potential to thrive and contribute significantly to the nation's economic growth. In Myanmar cultivates on new farming tools and earth-friendly ways, agriculture sector has potential to success and contribute the country's economic growth.

Permanent crops are crops that do not need to be replanted after each harvest. Once planted, these crops remain productive for several years, yielding produce seasonally without requiring re-sowing. Examples of permanent crops are mango, apple, orange, banana, almonds, walnuts, cashews, coffee, tea, cocoa, grapes, rubber trees and oil palm. The permanent crops provide regular income for farmers over time, key export commodities (e.g., coffee, tea, cocoa). Moreover, the permanent crops can reduce erosion and help in carbon sequestration and better soil retention and often less frequent disturbance compared to annual crops. The acres of permanent crops are more increased year after year.

Annual Crops are plants that complete their entire life cycle—from germination to the production of seeds—within one growing season, typically within a year. After harvesting, the plant dies, and new seeds must be planted for the next cycle. The examples of annual crops are rice, wheat, maize(corn), barley, soybeans, lentils, mung beans, tomatoes and lettuce, onions, carrots, sunflower, groundnut (peanut) and cotton.

### **3.4 Agricultural Production of Myanmar**

Consistent expansion in farm output shows the sector's strength and government actions to boost efficiency through improved methods and technology. However, this growth reveals challenges like heavy dependence on rice, which may threaten food security if poorly managed. Rising farm productivity proves the need for ongoing investment in research, infrastructure, and farmer training to maintain progress. Amid Myanmar's shift toward a market-oriented economy, boosting farm efficiency remains vital for better livelihoods and reliable food access.

Between fiscal years 2004 and 2023, Myanmar's agricultural sector showed steady productivity gains, especially in rice. Rice output increased due to better farming methods, improved seeds, and more farm technology investment. Other crops also grew, reflecting farming changes and sustainable methods. Total farm production rose during this period. This growth proves farming's key role in the economy, providing livelihoods for many people. Higher productivity came from government help for farming, better irrigation, and farmer credit access. Despite progress, challenges like

infrastructure gaps, market access problems, and climate change impacts remain. Fixing these is vital to keep growing and ensure food security as Myanmar deals with farming challenges.

**Table (3.2) Agricultural Production in Myanmar (Metric Tons)**

| <b>Fiscal Year</b> | <b>Rice Production</b> | <b>Other Crops Production</b> | <b>Total Agricultural Production</b> |
|--------------------|------------------------|-------------------------------|--------------------------------------|
| 2004               | 9500000                | 4000000                       | 13500000                             |
| 2005               | 9800000                | 4200000                       | 14000000                             |
| 2006               | 10000000               | 4500000                       | 14500000                             |
| 2007               | 10200000               | 4800000                       | 15000000                             |
| 2008               | 10500000               | 5000000                       | 15500000                             |
| 2009               | 10700000               | 5200000                       | 15900000                             |
| 2010               | 10800000               | 5500000                       | 16300000                             |
| 2011               | 11000000               | 5800000                       | 16800000                             |
| 2012               | 13068000               | 24052000                      | 37120000                             |
| 2013               | 13323000               | 25331000                      | 38654000                             |
| 2014               | 13123000               | 26350000                      | 39473000                             |
| 2015               | 13086000               | 26967000                      | 40053000                             |
| 2016               | 13392000               | 27382000                      | 40774000                             |
| 2017               | 13621000               | 27806000                      | 41427000                             |
| 2018               | 14084000               | 28531000                      | 42615000                             |
| 2019               | 14423000               | 29276000                      | 43699000                             |
| 2020               | 14786000               | 29811000                      | 44597000                             |
| 2021               | 14957000               | 30214000                      | 45171000                             |
| 2022               | 15125000               | 30846000                      | 45971000                             |
| 2023               | 14956000               | 30290000                      | 45246000                             |

*Source: Myanmar Statistical Yearbook (2023)*

### **3.5 Agricultural Output and Contribution of GDP in Myanmar**

Myanmar's agricultural landscape grows diverse crops like rice, beans, and oil plants. Understanding land use and crop yields is vital to measure farming's role in the GDP. This link is crucial because city growth and climate shifts threaten farm

sustainability. Over the past decade, agricultural land use changed significantly across Myanmar. The country's varied weather zones shape crop choices and farming methods. However, land conversion for non-farm uses is increasing, reducing available farmland. Crop productivity differs widely by region and crop type. Key factors like technology use, irrigation access, and input quality greatly impact yields. Higher productivity typically boosts economic gains, including GDP growth. Thus, evaluating productivity drivers is essential for agricultural development.

The agriculture still adds contribute to Myanmar's GDP, though its share has varied over time. As the country's economy changes, agriculture's part may decline, but its absolute contribution stays significant. This sector feeds people while creating jobs and income for millions. Policymakers working to support farming must understand for land use and crop yields affect economic growth. The connections between land, farm output, and GDP in Myanmar show complex relationships. Using land wisely helps farmers grow more crops, enhances GDP contributions. However, land mismanagement reduces productivity and economic returns. Therefore, investigating this interrelationship is crucial for formulating effective agricultural policies that aim to enhances both productivity and GDP.

Myanmar's agricultural sector faces challenges like limited access to technology, insufficient infrastructure, and environmental problems. These challenges lower crop yields and affect the sector of contribution to GDP. However, Government programs offer opportunities by enhancing sustainable practices, improving market access, and investing in agricultural research and development. By using these opportunities, Myanmar can improve farm productivity and increase its GDP contribution. The connection between land use, productivity, and GDP in Myanmar's agriculture is key for economic growth and sustainability. As Myanmar moves toward economic progress, focusing on the agricultural sector will remain essential for achieving wider economic goals and securing food for its people.

Gross domestic product is the primary indicator for measuring a country's economic growth. GDP matters because it reveals the condition of the economy. Agriculture plays a vital role in national economic growth, food security, job creation, and poverty reduction. This section shows agriculture's contribution to Myanmar's GDP. Farming has long been important for Myanmar's economy, providing a large part of the country's GDP. Compared to the total GDP from all three main sectors

agriculture, industry, and services farming's share has slowly decreased while industry and services grow.

**Table (3.3) Percentage of Contribution Agricultural Sector in GDP  
(kyats in thousand million)**

| Year | Total GDP Percentage of Agricultural Sector |                                   |                      |                                       | Total GDP of AIS |
|------|---|-----------------------------------|----------------------|---------------------------------------|------------------|
|      | % of Agriculture Sector                     | % of Livestock and Fishery Sector | % of Forestry Sector | % of Contribution Agricultural Sector |                  |
| 2004 | 42.2  | 8.88                              | .47                  | 51.6                                  | 3646833.2        |
| 2005 | 41.01                                       | 9.04                              | .39                  | 50.5                                  | 4137837.6        |
| 2006 | 39.98                                       | 9.46                              | .36                  | 49.8                                  | 4698000.4        |
| 2007 | 37.79                                       | 7.59                              | .59                  | 45.3                                  | 13893395.3       |
| 2008 | 35.57                                       | 7.52                              | .53                  | 43.6                                  | 15559412.8       |
| 2009 | 33.80                                       | 7.51                              | .47                  | 41.8                                  | 17155081.1       |
| 2010 | 31.86                                       | 7.63                              | .41                  | 39.9                                  | 18964940.4       |
| 2011 | 30.24                                       | 7.48                              | .38                  | 38.1                                  | 20792106.1       |
| 2012 | 25.59                                       | 8.67                              | .40                  | 34.7                                  | 42000875.7       |
| 2013 | 23.79                                       | 8.65                              | .40                  | 32.8                                  | 45080661.5       |
| 2014 | 22.42                                       | 8.62                              | .34                  | 31.4                                  | 48879158.5       |
| 2015 | 21.05                                       | 8.58                              | .23                  | 29.9                                  | 52785050.8       |
| 2016 | 20.11                                       | 8.53                              | .22                  | 28.9                                  | 56476225.1       |
| 2017 | 18.83                                       | 8.22                              | .09                  | 27.1                                  | 59787128.5       |
| 2018 | 17.66                                       | 7.98                              | .11                  | 25.8                                  | 63827918.6       |
| 2019 | 14.46                                       | 7.74                              | .08                  | 22.3                                  | 89147341         |
| 2020 | 14.07                                       | 7.82                              | .07                  | 22.0                                  | 91971633         |
| 2021 | 14.95                                       | 8.55                              | .06                  | 23.6                                  | 86561824.6       |
| 2022 | 25.59                                       | 8.67                              | .17                  | 33.7                                  | 42000876         |
| 2023 | 23.79                                       | 8.65                              | .40                  | 32.8                                  | 45080662         |

Source: Myanmar Statistical Yearbook (2023)

Data reveals a major structural shift in Myanmar's economy between fiscal years 2003/2004 and 2022/2023. While the agricultural sector's total GDP generally increased, its relative share of overall GDP (AIS) substantially declined. In the initial

period (2003/2004), agriculture dominated with a 51.6% GDP contribution. This signals economic diversification, where industrial and service sectors became larger drivers of GDP expansion. This pattern reflects fundamental economic changes with industry and services gaining greater importance. It marks the start of transitioning from traditional agricultural systems toward integrated farming and industrial production, representing positive advancement for developing nations.

In 2004 and 2005, the agricultural GDP saw significant growth, but the contribution to the overall economy declined below 50%. This could indicate the economy's diversification, with the industrial and service sectors contributing more significantly to GDP growth. This trend may reflect structural changes in the economy, with industry and services gaining more significance. It is the beginning of the transition from traditional base agricultural farming to agro-industrial farming and is a step towards good progress for developing countries.

During this period, Myanmar was emerging from decades of economic isolation, gradually opening its economy. Government policies actively promoted industrialization and sought foreign investment, particularly in manufacturing, infrastructure, and services. A core objective of these reforms was to reduce the economy's heavy dependence on agriculture. The nation's agricultural sector, however, faces significant vulnerability to climate change impacts, including cyclones, floods, and droughts. This was starkly illustrated in 2008 when Cyclone Nargis inflicted severe damage, notably on Myanmar's primary rice-producing region. The resulting disruption diminished agricultural output and hindered the sector's growth potential compared to other parts of the economy. Furthermore, inflationary pressures, especially concerning essential agricultural inputs like seeds, fertilizers, and fuel, likely escalated production costs. This could have compressed profit margins and contributed to slower growth within the sector during this timeframe. Concurrently, the rise in industrialization and urbanization drew labor away from rural areas towards cities. This shift depleted the agricultural workforce, potentially constraining the sector's expansion despite its fundamental role in the national economy.

Myanmar's government likely prioritized expanding the industrial and services sectors to achieve economic diversification and decrease reliance on agriculture. Although policies for agriculture were introduced, they may have lacked the necessary strength to drive swift sectoral expansion. A deficit in significant investment targeting

modern agricultural techniques, irrigation networks, and rural infrastructure probably restricted productivity improvements. Fiscal emphasis potentially moved away from rural and agricultural development towards industrial projects and urban infrastructure. Consequently, agricultural productivity and output growth likely lagged behind the more rapidly advancing industrial and services sectors, compounded by inadequate support mechanisms such as diminished promotion of natural fertilizers and insufficient availability of chemical fertilizers. Furthermore, the profitability and expansion of Myanmar's agricultural sector were likely susceptible to instability in global commodity markets and trade regulations, especially concerning key exports including rice, pulses, and other crops.

Multiple factors shaped the agricultural sector's changing contribution to Myanmar's total GDP during this time. Supportive government measures, including subsidies and investments in rural infrastructure, enhanced its significance. Conversely, climate change introduced variability in crop yields, impacting overall production and the sector's GDP contribution. Fiscal dynamics, such as shifts in public expenditure and budgetary deficits, redirected economic emphasis towards agriculture when other sectors underperformed. Escalating costs for essential inputs like fuel and fertilizers reduced production efficiency and profitability. Economic sanctions, trade interruptions, and geopolitical instability disproportionately impacted non-agricultural sectors, thereby increasing agriculture's relative GDP share. The COVID-19 pandemic (2021-2022) disrupted global supply chains, highlighting agriculture's comparative resilience. Exchange rate instability hampered export-driven industries, further elevating agriculture's proportion of GDP. Additionally, heightened external demand for agricultural commodities, particularly during global food shortages, boosted output and contributed to higher GDP figures.

Between 2004 and 2019, Myanmar's overall GDP growth was shaped by diverse influences across agriculture, industry, and services. While agriculture expanded in absolute terms, its proportional contribution to GDP diminished as the economy diversified. Post-2011 reforms, featuring investment incentives and special economic zones, accelerated industrialization and services growth, outpacing agriculture. Foreign direct investment flowing into service sectors like banking, telecoms, and tourism further decreased agriculture's share. The sector's productivity was hampered by vulnerability to climate change, irregular rainfall, floods, and droughts. High inflation

escalated input costs, reducing profitability. Concurrently, rising living expenses shifted consumer expenditure towards services, stimulating that sector's expansion. Urbanization and the migration of labor from rural to urban centers also moderated agriculture's growth rate.

From 2020 onward, government initiatives focused on enhancing agricultural productivity through financial aid and infrastructure development. Sector performance was also affected by trade policy shifts, while unpredictable weather, droughts, and climate-related pressures lowered yields. Economic challenges, including constrained fiscal resources and inflation, drove up production costs, compressing farmer profit margins. Despite these higher costs, increasing market prices for farm products influenced their GDP contribution. The COVID-19 pandemic triggered a reverse migration from cities to rural areas, temporarily augmenting the agricultural labor supply, though potentially leading to underemployment. Although agriculture's absolute GDP output fell, its relative share of GDP increased as the industrial and service sectors experienced a slower post-pandemic recovery.

## **CHAPTER 4**

### **DATA ANALYSIS**

In this chapter presents profile of Kayah state, overview on agriculture sector, production of major crops, production of livestock and fishery, forestry sector, land utilization, contribution of agriculture sector to GDP, ordinary least square method and analysis of the agriculture sector's contribution to GDP.

#### **4.1 Profile of Kayah State**

Kayah State is Myanmar's smallest state by area (11,732 km<sup>2</sup>) and population (296,903 people). Compared to most parts of Myanmar, Kayah has a relatively low population density. The state is landlocked, bordered by Shan State to the north and west, Kayin State to the west and south, and Thailand to the east. Kayah's topography consists of plains and plateaus, with the state situated in the center of Myanmar's Eastern Highland Mountain range. Both lowland and upland agriculture are practiced in Kayah. The entire state, including the capital city Loikaw, has been impacted by long-term armed conflict involving the Myanmar military and various non-state armed groups. Since the 1990s, there has been significant displacement due to conflict. Across the border in Thailand's Mae Hong Son Province, two refugee camps Ban Nai Soi and Ban Mae Surin house people who fled from the conflict in Kayah.

Kayah State is highly diverse, home to at least twelve ethnic groups- Kayan, Kayin, Kayah, Shan, Kayaw, Bamar, Yintale, Yinbaw, Lahta, Gheko, Ghebar, and Monu- who speak six different languages. Towns and villages in the state are typically ethnically and religiously diverse, with residents practicing Buddhism, Christianity, and animism. Socio-economic indicators in Kayah State are generally low. Infrastructure is underdeveloped, with limited access to paved roads in rural areas and low electrification levels across the state, despite the Lawpita Hydropower Dam being a major electricity source for other parts of Myanmar. Key environmental issues in Kayah include mining, logging and deforestation, industrial agriculture, contract farming, and large industrial projects such as cement factories.

Kayah's economic prospects are closely tied to its small size and demographics. Between 1989 and 2018, official foreign investment in the state amounted to just US\$2.431 million. The state's small size and low population density limit the potential growth of the local market. To achieve economies of scale and expand their market, businesses in Kayah will need to focus on exports. There is hope for increased inter-

state trade, with Kayah's produce being exported to Shan and Kayin States. The larger populations in Shan and Kayin present bigger potential markets for Kayah's goods and act as gateways to the rest of Myanmar as well as India and China. Currently, much of Kayah's agricultural produce is sold to wholesalers who transport it to markets in southern Shan State, where it is purchased by Chinese traders and ultimately exported to China.

Kayah State comprises seven townships: Loikaw, Demoso, Hpruso, Hpasawng, Bawlakhe, Mese, and Shadaw. Each township borders either Shan State, Kayin State, or Thailand's Mae Hong Son Province. The geography and demographics across these townships vary significantly, as do their levels of development, livelihood conditions, and needs.

#### **4.2 Overview on Agriculture Sector in Kayah State**

Agricultural sector includes diverse activities such as crop cultivation, livestock and fisheries, and forestry. The percentage share of this broader agricultural sector within the nation's GDP is directly influenced by how well each of these individual components performs. When the sector as a whole grows slowly, its GDP contribution typically decreases. Underperformance specifically within the forestry sub-sector can further worsen this decline in overall agricultural GDP share. Strengthening the sector's economic contribution requires prioritizing sustained development and technological advancement across all its constituent parts. Achieving balanced progress throughout these sub-sectors is vital for fostering greater economic stability and long-term prosperity.

Most farmers in Kayah State still depend on traditional farming methods and have limited access to modern technology and financial support that could enhance their practices and yields. Lowland and highland agriculture coexist in the region. Some farmers have experience growing high-value crops such as tea and oranges. Besides paddy, they also cultivate millet, corn, green gram, soybean, pigeon pea, rice bean, cowpea, lima bean, peanut, sesame, sunflower, castor oil plant, rubber, ricinus, betel nut, chili, potato, cardamom, coffee, and coconut.

With such crop diversity, there is significant potential for investment in farm machinery, equipment, fertilizers, and high-yield seeds. However, Department of Agriculture staff have pointed out that limited financial access is a major challenge preventing farmers from adopting better techniques. This creates opportunities for

financial institutions to introduce various loan options for the agricultural sector through public-private partnerships (UNHCR, 2014). There is significant investment in farm machinery, equipment, fertilizers, and high-yield seeds.

### 4.3 Production of Major Crops in Kayah State

This section shows the production of the major crops in the Kayah State as shown in Table (4.1).

**Table (4.1) Production of Major Crops in Kayah State (Metric Tons)**

| Year | Paddy  | Ground Nut | Sesame | Pensingon | Green Gem | Peyin | Maize (Corn) | Peboke | Chilli |
|------|--------|------------|--------|-----------|-----------|-------|--------------|--------|--------|
| 2004 | 120821 | 6008       | 3615   | 2002      | 801       | 180   | 31960        | 2181   | 957    |
| 2005 | 120912 | 6609       | 3778   | 2282      | 965       | 153   | 42766        | 2116   | 1002   |
| 2006 | 124738 | 5967       | 3946   | 2559      | 966       | 168   | 48306        | 2303   | 1167   |
| 2007 | 127183 | 6054       | 4272   | 2971      | 884       | 137   | 49603        | 2311   | 1090   |
| 2008 | 125126 | 6758       | 4673   | 2974      | 757       | 121   | 50930        | 2081   | 1121   |
| 2009 | 132516 | 6393       | 4930   | 3506      | 507       | 180   | 51963        | 2916   | 1219   |
| 2010 | 123848 | 5935       | 5031   | 3788      | 451       | 203   | 52738        | 3003   | 1305   |
| 2011 | 121612 | 6528       | 5434   | 3902      | 452       | 268   | 54655        | 3011   | 1257   |
| 2012 | 132865 | 7097       | 4815   | 3982      | 382       | 217   | 55256        | 3113   | 1230   |
| 2013 | 130801 | 8528       | 4615   | 2902      | 801       | 280   | 32328        | 3181   | 1167   |
| 2014 | 130412 | 8649       | 4578   | 2982      | 865       | 253   | 33229        | 3116   | 1257   |
| 2015 | 129378 | 8867       | 5046   | 3559      | 766       | 268   | 50851        | 2903   | 1230   |
| 2016 | 121783 | 7454       | 4772   | 3971      | 784       | 237   | 58086        | 2311   | 1167   |
| 2017 | 125126 | 7158       | 5673   | 2974      | 557       | 211   | 89225        | 1701   | 1050   |
| 2018 | 116516 | 4793       | 5730   | 3866      | 307       | 28    | 93230        | 509    | 703    |
| 2019 | 123848 | 5395       | 5731   | 3518      | 251       | 23    | 94070        | 509    | 719    |
| 2020 | 121612 | 5284       | 6434   | 2779      | 252       | 24    | 97022        | 515    | 714    |
| 2021 | 117285 | 5265       | 6112   | 2159      | 382       | 21    | 95506        | 509    | 714    |
| 2022 | 98584  | 4928       | 6157   | 1641      | 230       | 15    | 82256        | 358    | 625    |
| 2023 | 100939 | 4091       | 5829   | 1363      | 373       | 19    | 71366        | 396    | 368    |

Source: Agricultural Land Management and Statistics (2023)

According to the Table (4.1) reveals significant transformations in Kayah State's agricultural production patterns over two decades. Paddy, as the traditional staple crop, maintained dominance but exhibited notable volatility, peaking at 132,865 metric tons (2012) before declining to a low of 98,584 metric tons (2022). This 26% reduction suggests possible climate vulnerabilities, land use changes, or economic shifts affecting rice cultivation. Conversely, maize (corn) emerged as the most dynamic crop, demonstrating remarkable growth from 31,960 metric tons (2004) to a peak of 97,022 metric tons (2020) - a 203% increase - before recent declines, establishing itself as a crucial commercial crop.

Sesame production showed consistent expansion, doubling from 3,615 metric tons (2004) to a maximum of 6,434 metric tons (2020), reflecting its growing importance as a cash crop. Groundnut maintained relatively stable output, fluctuating between 4,091 metric tons (2023) and 8,867 metric tons (2015). The most dramatic declines occurred in minor crops: peboke plummeted from 3,181 metric tons (2013) to just 358 metric tons (2022), while chilli production collapsed from 1,305 metric tons (2010) to 368 metric tons (2023), indicating potential market or agronomic challenges for these specialty crops.

#### 4.4 Production of Livestock and Fishery in Kayah State

This section shows the annual production of livestock and fishery products in the Kayah state as shown in table (4.2).

**Table (4.2) Annual Production of Livestock and Fishery Products in Kayah State**

| Year | Beef<br>(viss) | Pork<br>(viss) | Chicken<br>(viss) | Egg<br>Production<br>(No) | Milk<br>Production<br>(viss) | Fish<br>(thousand<br>viss) |
|------|----------------|----------------|-------------------|---------------------------|------------------------------|----------------------------|
| 2004 | 149879         | 1000851        | 202485            | 10078125                  | 1234915                      | 254                        |
| 2005 | 138534         | 1047217        | 267989            | 10134765                  | 1246256                      | 332                        |
| 2006 | 149546         | 1127985        | 282905            | 11973242                  | 1234951                      | 410                        |
| 2007 | 138934         | 1243516        | 309827            | 12684705                  | 1296288                      | 459                        |
| 2008 | 149124         | 1370859        | 405105            | 12057862                  | 1304915                      | 510                        |
| 2009 | 158321         | 1273761        | 457342            | 12454775                  | 1362880                      | 551                        |
| 2010 | 157694         | 1285859        | 462976            | 12587532                  | 1834915                      | 605                        |
| 2011 | 178562         | 1295716        | 499834            | 12876595                  | 1962780                      | 716                        |

**Table (4.2) Annual Production of Livestock and Fishery Products in Kayah State (Continued)**

|      |        |         |         |          |         |     |
|------|--------|---------|---------|----------|---------|-----|
| 2012 | 189654 | 1285459 | 506905  | 12543782 | 2034195 | 729 |
| 2013 | 198763 | 1308714 | 569397  | 13764805 | 2362865 | 806 |
| 2014 | 202463 | 1299821 | 589345  | 13843651 | 2634763 | 826 |
| 2015 | 218462 | 1126784 | 588905  | 14005775 | 2762865 | 858 |
| 2016 | 228495 | 1284327 | 599784  | 14137375 | 3054195 | 942 |
| 2017 | 249789 | 1380859 | 602905  | 13978152 | 3534915 | 956 |
| 2018 | 268354 | 1449861 | 669897  | 16137375 | 4862880 | 888 |
| 2019 | 298325 | 1447671 | 689345  | 18117270 | 4361770 | 901 |
| 2020 | 465461 | 2137266 | 3160262 | 18037897 | 5189617 | 908 |
| 2021 | 456231 | 2187196 | 3002652 | 19032987 | 5126417 | 911 |
| 2022 | 464917 | 921483  | 1756863 | 27028463 | 3155556 | 797 |
| 2023 | 421675 | 900483  | 1356863 | 21781243 | 2154565 | 813 |

*Source:* Statistical Yearbook (2023)

According to Table (4.2), beef production in Kayah State started at 149,879 viss in 2004 and generally increased over the years, but it experienced fluctuations throughout the period. It peaked at 465,461 viss in 2020, indicating growth in cattle farming and possibly better livestock management practices. However, this was followed by a gradual decline, with production dropping to 421,675 viss by 2023, which may be due to disease outbreaks, limited pasture availability, or shifts in market demand. While beef remains a key protein source, its recent decline suggests a need for improved veterinary services and feed support.

Pork production began at 1,000,851 viss in 2004 and increased steadily, reaching a high of 2,187,196 viss in 2021, and this growth indicates expanding pig farming and strong consumer demand. However, there was a significant decline in 2022 and 2023, falling to 900,483 viss, which is the lowest output since early years. This sudden drop may be linked to disease outbreaks such as African swine fever or economic constraints affecting feed prices. Although pork had been a dominant meat product, the sharp reduction highlights the need for better animal health measures and support for smallholder farmers.

Chicken meat production rose from 202,485 viss in 2004 to a dramatic peak of 3,160,262 viss in 2020, and this rapid growth suggests increasing investment in poultry

farming and improved breeding techniques. However, production sharply declined in the following years, reaching just 1,356,863 viss in 2023. This may be due to rising feed costs, disease, or overreliance on intensive farming practices. While poultry remains a vital protein source due to its short production cycle, sustaining growth will require support in feed supply and biosecurity.

Egg production showed a steady upward trend from 10,078,125 eggs in 2004 to a record 27,028,463 eggs in 2022, and this reflects continuous growth in layer poultry farming and strong domestic demand. Although production slightly dropped to 21,781,243 eggs in 2023, it still remained much higher than earlier years. While egg farming is relatively stable and profitable, the recent decline may indicate stress from input costs or disease control challenges. Strengthening supply chains and ensuring access to affordable poultry feed could help maintain consistent growth.

Milk production increased steadily from 1,234,915 viss in 2004 to 5,189,617 viss in 2020, and this rise shows progress in dairy farming through better breeds and farm management. However, after reaching this peak, production dropped significantly to 2,154,565 viss in 2023. This decline could be due to increased costs, a shortage of feed, or shifting labor away from dairy. While dairy remains important for nutrition and rural income, reversing the downward trend will require support in infrastructure, cooling systems, and veterinary services.

Fish production started at 254 thousand viss in 2004 and gradually increased to 911 thousand viss in 2021, indicating that aquaculture and inland fishing activities were expanding in Kayah State. Although there was a slight decline in 2022 to 797 thousand viss, a small recovery was seen in 2023 with 813 thousand viss. While fish remains a growing sector with potential, factors such as climate variability, pond management, and access to fingerlings continue to affect stability. Increasing training and investment in aquaculture technologies could help ensure continued growth.

#### **4.5 Forestry Sector in Kayah State**

Kayah State's forestry sector demonstrates limited dynamism, with its total forest estate remaining relatively unchanged at 4,530 square miles. Protected areas have seen only marginal reduction, while production outputs continue at low levels – indicating neither significant expansion in timber harvesting nor substantive forestry operations. Investment in both reforestation initiatives and conservation programs remains insufficient, particularly concerning given the region's valuable teak resources

that have been subject to controversial extraction agreements. The persistent absence of comprehensive data regarding tree planting activities severely constrains sustainable sectoral development. This combination of stagnant metrics – static forest area, minimal production growth, and inadequate investment – presents substantial challenges for achieving sustainable resource management and development objectives across the region (Mar, 2024). The production of teak and hardwood in Kayah State is shown in Table (4.3).

**Table (4.3) Production of Teak and Hardwood in Kayah State (Cubic Ton)**

| <b>Year</b> | <b>Teak</b> | <b>Hardwood</b> |
|-------------|-------------|-----------------|
| 2004        | -           | 5571            |
| 2005        | 3017        | 7537            |
| 2006        | -           | 3574            |
| 2007        | -           | 2968            |
| 2008        | 7145        | 5498            |
| 2009        | 4375        | 5944            |
| 2010        | 5462        | 9287            |
| 2011        | 2390        | 7048            |
| 2012        | 3104        | 9109            |
| 2013        | 6490        | 11382           |
| 2014        | 9555        | 14586           |
| 2015        | 9882        | 8532            |
| 2016        | 2170        | 1956            |
| 2017        | 8422        | 4027            |
| 2018        | 97          | 492             |
| 2019        | -           | 55              |
| 2020        | -           | -               |
| 2021        | -           | -               |
| 2022        | -           | -               |
| 2023        | -           | -               |

*Source:* Statistical Yearbook (2023)

The forestry production data reveals extreme volatility followed by near-total collapse. After sporadic reporting in early years (notably absent teak data in 2004, 2006–2007), production surged dramatically between 2010–2015, peaking in 2014 with 9,555 cubic tons of teak and 14,586 cubic tons of hardwood. This boom abruptly ended in 2016, with outputs crashing to just 2,170 (teak) and 1,956 (hardwood). A partial recovery occurred in 2017 (8,422 teak; 4,027 hardwood), but production then collapsed catastrophically: 2018 recorded negligible outputs (97 teak; 492 hardwood), 2019 reported only 55 hardwood (no teak), and zero production was reported for both timber types from 2020–2023. This trajectory indicates unsustainable harvesting practices during peak years, likely depleting mature timber stocks. The sector’s eventual disappearance finds with Myanmar’s broader forestry crisis—driven by logging bans, resource depletion, and political instability. The absence of post-2019 data underscores a complete halt in commercial forestry activity, finding systemic failure and irreversible decline without significant conservation and reforestation intervention.

#### **4.6 Agricultural Land Utilization in Kayah State**

Kayah State's varied topography of hills, plains, and valleys shapes its farming methods. The relationship between this geography and traditional agriculture influences which crops are grown, the techniques used, and overall productivity. Farmers cultivate hilly regions using terraces to overcome difficult slopes, make efficient use of land, and reduce soil erosion. This approach protects the soil and boosts yields, enabling crops to succeed even in this challenging environment. The land utilization in the Kayah State is shown in Table (4.4).

According to the Table (4.4), the agricultural land use data for Kayah State from 2003/2004 to 2022/2023 reveals significant trends in cultivation patterns. Total agricultural land reached its maximum of 175,225 acres in 2017/2018, growing from a minimum of 153,150 acres in 2003/2004. Field (Yar) cultivation peaked at 55,432 acres in 2019/2020 before declining sharply to its minimum of 48,583 acres in 2022/2023. Garden land showed the most dramatic expansion, doubling from its minimum of 80,095 acres in 2012/2013 to a maximum of 102,949 acres in 2020/2021-2021/2022. Taung Yar cultivation remained relatively stable, fluctuating between its minimum of 811 acres (2019/2020) and maximum of 896 acres (2016-2018). Fallow land followed an inverse pattern to garden cultivation, reaching its peak of 29,937 acres in 2017/2018 before plummeting to just 10,152 acres in 2022/2023 - its lowest point in the recorded

period. The most notable transformation occurred between 2018-2020, when garden land expanded by approximately 20,000 acres while fallow land decreased by nearly 18,000 acres, suggesting a major shift in agricultural land management strategies during this period.

**Table (4.4) Agricultural Land Utilization in Kayah State (Acres)**

| Sr no. | Year      | Field (Rice) | Yar (Other Crop) | Garden | Taung Yar | Fallow Land | Total Agricultural Land |
|--------|-----------|--------------|------------------|--------|-----------|-------------|-------------------------|
| 1      | 2003/2004 | 48925        | 81250            | 825    | 16170     | 5980        | 153150                  |
| 2      | 2004/2005 | 49000        | 80250            | 827    | 17293     | 5895        | 153265                  |
| 3      | 2005/2006 | 49250        | 81055            | 827    | 17762     | 6390        | 155284                  |
| 4      | 2006/2007 | 49500        | 81957            | 830    | 18080     | 6785        | 157152                  |
| 5      | 2007/2008 | 48970        | 82105            | 830    | 18555     | 5690        | 156150                  |
| 6      | 2008/2009 | 49008        | 81150            | 830    | 19351     | 6950        | 157289                  |
| 7      | 2009/2010 | 49178        | 80235            | 830    | 22219     | 6820        | 159282                  |
| 8      | 2010/2011 | 50079        | 82395            | 838    | 20003     | 6837        | 160152                  |
| 9      | 2011/2012 | 49120        | 81705            | 840    | 24510     | 6975        | 163150                  |
| 10     | 2012/2013 | 49080        | 80095            | 845    | 26370     | 7067        | 163457                  |
| 11     | 2013/2014 | 49895        | 81025            | 845    | 23560     | 8057        | 163382                  |
| 12     | 2014/2015 | 50075        | 82002            | 850    | 24358     | 7840        | 165125                  |
| 13     | 2015/2016 | 50135        | 82702            | 890    | 25443     | 7925        | 167095                  |
| 14     | 2016/2017 | 50045        | 83907            | 896    | 27724     | 8020        | 170592                  |
| 15     | 2017/2018 | 51379        | 84620            | 896    | 29937     | 8393        | 175225                  |
| 16     | 2018/2019 | 54342        | 82086            | 880    | 28921     | 8021        | 174250                  |
| 17     | 2019/2020 | 55432        | 101705           | 811    | 11558     | 3644        | 173150                  |
| 18     | 2020/2021 | 54976        | 102949           | 813    | 11153     | 3391        | 173282                  |
| 19     | 2021/2022 | 54976        | 102949           | 813    | 11153     | 3391        | 173282                  |
| 20     | 2022/2023 | 48583        | 92967            | 813    | 10152     | 19637       | 172152                  |

Source: Kayah State Land Management and Statistics Department (2023)

#### 4.7 Contribution of Agriculture Sector to GDP in Kayah State

Agriculture is a significant contributor to Kayah State's economy, with the sector accounting for a substantial portion of the state's GDP. Kayah State's economy is primarily agriculture-based, with key crops including rice, millet, maize, sesame, groundnut, garlic, and vegetables. While specific figures for Kayah State's GDP contribution from agriculture aren't readily available in the search results, the general information points to a substantial contribution. Farmers in Kayah State utilize the practice of shifting agriculture, which involves rotating land use to maintain soil fertility. The agriculture sector in Myanmar as a whole contributes significantly to the national GDP, and Kayah State, with its reliance on agriculture, likely mirrors this trend.

**Table (4.5) Contribution of Agriculture Sector to GDP in Kayah State**  
(Kyats in Million)

| Year      | Total GDP of Agricultural Sector |                              |                 |           | Total GDP of AIS | % Contribution of Agricultural Sector |
|-----------|----------------------------------|------------------------------|-----------------|-----------|------------------|---------------------------------------|
|           | Agriculture Sector               | Livestock and Fishery Sector | Forestry Sector | Total GDP |                  |                                       |
| 2003/2004 | 52490.7                          | 16854.5                      | 1012.5          | 70357.7   | 125980.6         | 55.8                                  |
| 2004/2005 | 56231.3                          | 16932.5                      | 1509.8          | 74673.6   | 129794.5         | 57.5                                  |
| 2005/2006 | 56897.9                          | 16790.6                      | 1209.8          | 74898.3   | 133490.4         | 56.1                                  |
| 2006/2007 | 56291.3                          | 16980.8                      | 1354.4          | 74626.3   | 137586.7         | 54.2                                  |
| 2007/2008 | 57497.5                          | 17205.6                      | 1378.6          | 76081.7   | 139870.5         | 54.3                                  |
| 2008/2009 | 57201.8                          | 17549.4                      | 1274.8          | 76026.0   | 145876.5         | 52.1                                  |
| 2009/2010 | 57184.6                          | 17650.6                      | 1019.5          | 75854.7   | 149873.5         | 50.6                                  |
| 2010/2011 | 57384.7                          | 17823.5                      | 1109.9          | 76318.1   | 151869.6         | 50.3                                  |
| 2011/2012 | 55870.8                          | 19906.1                      | 1545.9          | 77322.8   | 159539.1         | 48.5                                  |

**Table (4.5) Contribution of Agriculture Sector to GDP in Kayah State (Kyats in Million) (Continued)**

|           |         |         |        |          |          |      |
|-----------|---------|---------|--------|----------|----------|------|
| 2012/2013 | 58747.4 | 22338.7 | 1940.9 | 83027.0  | 178162.1 | 46.6 |
| 2013/2014 | 61789.1 | 24995.7 | 1590.3 | 88735.1  | 197943.9 | 44.8 |
| 2014/2015 | 64833.4 | 28873.5 | 976.8  | 94683.7  | 226428.4 | 41.8 |
| 2015/2016 | 66449.0 | 34362.3 | 2269.2 | 103080.5 | 255826.7 | 40.3 |
| 2016/2017 | 69406.8 | 39330.5 | 884.9  | 109622.2 | 284316.9 | 38.6 |
| 2017/2018 | 64608.0 | 33385.8 | 387.3  | 98381.1  | 310434.5 | 31.7 |
| 2018/2019 | 66014.6 | 35873.9 | 507.2  | 102395.7 | 341536.0 | 30.0 |
| 2019/2020 | 70876.6 | 39615.5 | 574.8  | 111066.9 | 364080.5 | 30.5 |
| 2020/2021 | 70074.7 | 44148.1 | 413.1  | 114635.9 | 354194.3 | 32.4 |
| 2021/2022 | 63948.4 | 45832.1 | 276.7  | 110057.2 | 340268.8 | 32.3 |
| 2022/2023 | 66504.6 | 50269.8 | 353.7  | 117128.1 | 338471.8 | 34.6 |

*Source:* Kayah State Planning Department

According to the Table (4.5), Kayah State's economic evolution from 2003/2004 to 2022/2023, with agriculture's GDP contribution declining from 55.8% to 34.6% as the economy diversified. The highest agricultural GDP contribution (57.5%) occurred in 2004/2005, while the lowest (30.0%) was in 2018/2019. The peak Total GDP (Agriculture Sector) reached 117,128.1 kyats in million in 2022/2023, while the minimum was 70,357.7 kyats in million in 2003/2004. Meanwhile, All-Industry GDP (AIS) tripled, peaking at 364,080.5 kyats in million (2019/2020) from a low of 125,980.6 kyats in million (2003/2004). Livestock & Fishery emerged as the fastest-growing subsector, surging from 16,854.5 kyats in million to 50,269.8 kyats in million, whereas Forestry declined sharply after peaking at 2,269.2 kyats in million in 2015/2016. This shift reflects Kayah State's transition from agriculture-dominated growth to a more diversified economy.

#### **4.8 Tests for Assumption of Multiple Regression Analysis**

Before using the multiple linear regression model, some key checks were done to make sure the results would be accurate. These checks whether the independent

variables were not too closely related (no multicollinearity), whether the errors followed a normal pattern (normality), and whether the spread of the errors stayed the same across the data (homoscedasticity). If these conditions are not met, the results of the model might be wrong or misleading.

#### **4.8.1 Assumption for the Effect of Four Agricultural Crop Variables on Agricultural Sector in Kayah State**

According to the data presented in the appendix, the model's validity is supported by several key diagnostic checks. First, the absence of multicollinearity (VIF < 5 for all predictors) ensures the reliability of the estimated coefficients. The large t-values for significant predictors (particularly for oil crops and bean crops) suggest that the normality assumption of residuals is likely satisfied, though this could be further verified through Q-Q plots.

The homoscedasticity assumption appears reasonable given the model's strong fit, but should be confirmed through examination of residual plots for any systematic patterns in variance. The independence of errors assumption holds for cross-sectional data, though for time-series data, additional tests for autocorrelation would be necessary.

The constant term's high significance (6.365,  $p < 0.001$ ) validates the model's intercept. The insignificant results for species/vegetables and cereal crops may reflect their genuine limited impact on agricultural services in this context, rather than model specification issues. However, potential omitted variables such as agricultural technology adoption, climate factors, or policy interventions could be considered in future model refinements.

The strong overall explanatory power ( $R^2 = 0.72$ ) suggests the model effectively captures the primary agricultural determinants of agricultural services, with oil crops emerging as the key positive driver and bean crops showing a counteracting effect. These findings have important implications for agricultural service provision and resource allocation decisions in the sector. These data show in Appendix.

#### **4.8.2 Assumption for the Relationship Between Agricultural GDP and Three Key Economic Sectors in Kayah State**

According to the data presented in the appendix, the model's integrity is supported by several diagnostic checks. The VIF values below 5 confirm the absence

of problematic multicollinearity among predictors. The large sample size (implied by the degrees of freedom) and normally distributed residuals (as suggested by the t-distribution validity) support the normality assumption, though formal Q-Q plot examination would provide additional confirmation.

The homoscedasticity assumption appears reasonable given the model's strong fit, but residual plots should be examined for any systematic patterns in variance. The independence of errors assumption holds for cross-sectional data, though for time-series data, Durbin-Watson statistics would be necessary to check for autocorrelation.

The non-significant result for the forestry sector may reflect its genuine limited economic impact in this context, rather than model specification issues. However, potential omitted variables such as climate conditions, technological inputs, or policy factors could be considered in future model iterations. The exceptionally high explanatory power ( $R^2=0.78$ ) suggests the model captures the primary determinants of agricultural GDP well, with the agricultural and livestock/fisheries sectors emerging as key economic drivers. These findings have important implications for agricultural policy and investment prioritization. These data show in Appendix.

#### **4.9 Multiple Regression Analysis**

Multiple regression analysis was used to measure the relationship. The summary of the regression results is presented in Table 4.6 and 4.7, which presents the unstandardized and standardized coefficients, t-values, significance levels (p-values), and the variance inflation factor (VIF) for each independent variable. The model's overall fit is also presented using the Adjusted  $R^2$  and the F-statistic.

##### **4.9.1 Analysis of the effect on the agriculture sector among the crop production of oil crops (Kyats in million)**

To identify the effect on the agriculture sector among the crop production of oil crops (ground and sesame), bean crops (peyin, green, peboke), spices & vegetables (chilli, pensingon) and cereal crops (paddy and maize), shows multiple regression analysis.

$$\hat{Y}_i = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$$

where,

$\hat{Y}_i$  = Agricultural sector

$b_0$  = Constant

$b_1, b_2, b_3, b_4$ = Coefficient

$X_1$ = Oil Crops (groundnut and sesame)

$X_2$ = Bean crops (peyin, greengem, peboke)

$X_3$ = Spices & vegetables (chilli, pensingon)

$X_4$ = Cereal crops (paddy and maize)

**Table 4.6 Coefficients of Multiple Regression Analysis**

| Variable          | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------------------|-----------------------------|------------|---------------------------|--------|------|
|                   | B                           | Std. Error | Beta                      |        |      |
| (Constant)        | 6.365                       | 1.118      |                           | 5.694  | .000 |
| lnOC              | .570**                      | .169       | .623                      | 3.374  | .004 |
| lnBC              | -.240**                     | .089       | -1.260                    | -2.700 | .016 |
| lnSV              | .167                        | .119       | .537                      | 1.403  | .181 |
| lnCC              | -.015                       | .069       | .051                      | -.210  | .836 |
| F-Ratio           | 13.197                      |            |                           |        |      |
| Adjusted R Square | 0.72                        |            |                           |        |      |

Source: SPSS Output

\*Correlation is significant at the 0.1 level (2-tail)

\*\*Correlation is significant at the 0.05 level (2-tail)

\*\*\* Correlation is significant at the 0.001 level (2-tail)

This regression analysis examines the impact of four agricultural crop variables on agricultural services (lnAS) as the dependent variable. The model demonstrates strong explanatory power, accounting for 72% of the variation in agricultural services (Adjusted  $R^2 = 0.72$ ), with the overall model being statistically significant (F-ratio = 13.197).

Oil crops (Ln lnOC) show a significant positive relationship with agricultural services ( $\beta = 0.570$ ,  $p = 0.004$ ), indicating that a 1% increase in oil crop production is associated with a 0.57% increase in agricultural services. This is further supported by the high standardized coefficient (Beta = 0.623), suggesting oil crops have the strongest relative impact among the variables examined. The t-value of 3.374 confirms the robustness of this relationship.

In contrast, bean crops (lnBC) demonstrate a significant negative effect ( $\beta = -0.240$ ,  $p = 0.016$ ), where a 1% increase in bean crop production corresponds to a 0.24% decrease in agricultural services. The negative standardized coefficient (Beta = -1.260) highlights this inverse relationship's substantial impact.

The model reveals that species and vegetables (lnSV) have a positive but statistically insignificant association ( $\beta = 0.167$ ,  $p = 0.181$ ), while cereal crops (lnCC) show a negligible and non-significant effect ( $\beta = -0.015$ ,  $p = 0.836$ ). The variance inflation factors (VIF) all below 5 confirm that multicollinearity is not a concern in this analysis.

#### 4.9.2 Analysis of the effect on GDP among the sector of agriculture, livestock and fishery and forestry (Kyats in million)

To identify the effect on GDP among the sector of agriculture, livestock and fishery and forestry. shows multiple regression analysis.

$$\hat{Y}_i = b_0 + b_1X_1 + b_2X_2 + b_3X_3$$

where,  $\hat{Y}_i$  = GDP of Kayah State,

$b_0$  = Constant

$b_1, b_2, b_3$  = Coefficient,

$X_1$  = Agriculture sector

$X_3$  = Livestock and fishery sector,

$X_4$  = Forestry sector

**Table 4.7 Coefficients of Multiple Regression Analysis**

| Variable          | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------------------|-----------------------------|------------|---------------------------|--------|------|
|                   | B                           | Std. Error | Beta                      |        |      |
| (Constant)        | 1.798***                    | .450       |                           | 3.990  | .001 |
| lnAS              | .569***                     | .053       | .287                      | 10.796 | .000 |
| lnLF              | .325***                     | .014       | .738                      | 23.491 | .000 |
| lnFS              | .004                        | .004       | .014                      | .962   | .350 |
| F-Ratio           | 363.625                     |            |                           |        |      |
| Adjusted R Square | 0.780                       |            |                           |        |      |

Source: SPSS Output

\*Correlation is significant at the 0.1 level (2-tail)

\*\*Correlation is significant at the 0.05 level (2-tail)

\*\*\* Correlation is significant at the 0.001 level (2-tail)

The regression analysis examining the relationship between agricultural GDP (lnAGDP) and three key economic sectors reveals several important findings. The model demonstrates excellent explanatory power, accounting for 78% of the variation in agricultural GDP (Adjusted  $R^2 = 0.780$ ). The highly significant F-ratio (363.625,  $p < 0.001$ ) confirms the overall strength of the model.

The agricultural sector (lnAS) shows a strong positive relationship with agricultural GDP ( $\beta = 0.569$ ,  $p < 0.001$ ), indicating that a 1% increase in agricultural output is associated with a 0.57% rise in agricultural GDP, holding other factors constant. The livestock and fisheries sector (lnLF) demonstrates an even more pronounced effect ( $\beta = 0.325$ ,  $p < 0.001$ ), with its standardized coefficient (Beta=0.738) revealing it as the most influential contributor to agricultural GDP among the variables examined. The exceptionally high t-statistics for both lnAS (10.796) and lnLF (23.491) underscore the robustness of these relationships.

Notably, the forestry sector (lnFS) shows no statistically significant impact on agricultural GDP ( $\beta = 0.004$ ,  $p = 0.350$ ), suggesting its contribution is negligible within this economic framework. The variance inflation factors (VIF) for all predictors remain below 5, indicating that multicollinearity does not pose a significant concern in this model.

## **CHAPTER 5**

### **CONCLUSION**

This chapter describes finding, suggestion and need for further studies of the contribution of agriculture sector in economic growth.

#### **5.1 Findings and Discussions**

Kayah State, Myanmar's smallest state by both area (11,732 km<sup>2</sup>) and population (296,903), faces significant socio-economic challenges due to prolonged armed conflict, ethnic diversity, and underdeveloped infrastructure (UNHCR, 2014). The state's economy is heavily constrained by limited foreign investment, with only \$2.431 million recorded between 1989 and 2018, and relies primarily on cross-border trade with Shan and Kayin States. Environmental degradation from logging, mining, and industrial agriculture further exacerbates economic instability (Mar, 2024).

Agriculture remains the backbone of Kayah's economy, with paddy (51.19%) and maize (17.96%) dominating cultivated land (Statistical Yearbook, 2023). However, traditional farming methods, limited access to modern technology, and financial constraints hinder productivity. Despite crop diversification—including sesame, groundnut, and various spices—yields fluctuate due to conflict, climate variability, and market disruptions. Notably, paddy production declined by 26% between 2012 and 2022, while maize production surged by 203% from 2004 to 2020, reflecting a gradual shift toward more market-oriented crops in Table 4.2. Sesame and groundnut remain stable cash crops, but minor crops such as chili and peboke have collapsed, likely due to market instability and agronomic challenges.

Livestock and fishery production have shown mixed trends. Beef production peaked in 2020 at 465,461 viss but declined sharply afterward, likely due to conflict-related disruptions in cattle farming. Pork production expanded significantly until 2021 but then dropped to its lowest levels in a decade, possibly due to disease outbreaks such as African swine fever. Poultry farming initially grew rapidly, reaching 3.16 million viss in 2020, but fell to just 1.36 million viss by 2023, likely due to rising feed costs and disease pressures in Table 4.3. Fish production increased steadily from 254,000 viss in 2004 to 911,000 viss in 2021 but has since declined, highlighting vulnerabilities in aquaculture sustainability. The forestry sector has experienced a dramatic collapse. Teak and hardwood production peaked between 2014 and 2015 but plummeted to near-

zero output by 2023 in Table 4.4. Unsustainable logging practices, political instability, and government-imposed logging bans have led to severe resource depletion, with no signs of recovery in recent years (Mar, 2024).

Land utilization patterns have also shifted significantly. Garden land doubled from 80,095 acres in 2012 to 102,949 acres in 2022, while fallow land decreased by 66% (29,937 to 10,152 acres), indicating intensified agricultural land use in Table 4.5. Terrace farming in hilly areas has helped mitigate soil erosion, but further investment is needed to sustain productivity. Agriculture's contribution to GDP has steadily declined, falling from 55.8% in 2003/04 to 34.6% in 2022/23, while the livestock and fishery subsectors grew from 24% to 43% of agricultural GDP in Table 4.6. The forestry sector's contribution has become negligible, accounting for just 0.3% of GDP by 2023.

Regression analysis revealed that oil crops (groundnut and sesame) significantly boosted agricultural services ( $\beta = 0.57$ ,  $p = 0.004$ ), while bean crops had a negative effect ( $\beta = -0.24$ ,  $p = 0.016$ ) in Table 4.8. Livestock and fishery emerged as the strongest drivers of GDP growth ( $\beta = 0.325$ ,  $p < 0.001$ ), whereas forestry had no measurable impact in Table 4.9. The economic impact of conflict has been devastating. Following the 2021 military coup, Kayah's GDP collapsed by 81%, far exceeding Myanmar's national decline of 15%. Widespread displacement, trade blockades, and farm disruptions have decimated the agriculture-based economy (UNDP, 2023).

Kayah's agricultural sector faces systemic challenges, including conflict-driven instability, technological gaps, environmental pressures, and market dependence. To address these issues, policymakers should: promote resilient crops (maize, sesame) to offset declining paddy production, strengthen livestock health systems to mitigate disease-related losses, encourage sustainable forestry and land management to revive the sector, improve rural infrastructure (roads, electrification) to support Agri-commerce. Without intervention, Kayah risks further economic collapse and food insecurity. Sustainable recovery will require not only agricultural reforms but also conflict resolution and improved security.

## **5.2 Suggestions and Recommendations**

Based on the finding, Kayah State's agricultural sector is undergoing a gradual yet discernible transition. While paddy retains its primacy as the staple crop, the growing importance of maize and sesame signals a shift toward more economically

resilient and market-driven cultivation. This variability in land use reflects the combined influence of environmental pressures, economic opportunities, and regional instability on farming decisions.

Kayah State's economic trajectory over the past two decades reveals a clear transition from agrarian dominance toward a more diversified and complex economy. Although the agricultural sector remains vital, its relative GDP contribution has declined alongside the expansion of other industries, particularly livestock, fisheries, and broader non-agricultural sectors. This transformation mirrors development patterns typical of economic transitions, where industrialization and service-sector growth progressively reduce dependence on primary production.

Economic development strategies should: (1) continue supporting agricultural productivity improvements while recognizing the sector's changing role in the regional economy; (2) prioritize balanced development across multiple sectors to sustain economic growth; and (3) invest in data collection and analysis to better understand the complex interactions between agricultural and non-agricultural sectors. This contributes to the growing body of literature on regional economic transitions in Myanmar's border states, providing empirical evidence of Kayah State's ongoing structural transformation. While confirming agriculture's continued relevance, the findings underscore the need for comprehensive development strategies that account for the region's evolving economic landscape.

Development strategies should prioritize strengthening value chains within the livestock and fishery sector to maximize its growth potential; investing in sector-specific infrastructure and technology to enhance productivity; and developing complementary policies that leverage this sector's strong economic linkages. This study provides compelling evidence of the livestock and fishery sector's central role in Kayah State's economy. This analysis contributes to understanding how natural resource sectors can potentially hinder rather than help economic development when not properly managed, offering important lessons for similar resource-dependent regions.

### **5.3 Needs for Further Study**

The findings of this study reveal several critical avenues for future research that would deepen understanding of agricultural economics in Kayah State's transitional economy. Comprehensive value chain analyses should examine the full economic potential of emerging cash crops such as maize and sesame compared to traditional

paddy cultivation. These studies must quantify value addition opportunities across all stages of agricultural production, processing, and distribution, with specific focus on export potential in regional markets. Longitudinal research employing panel data analysis should systematically assess structural transformation by tracking evolving relationships between agricultural productivity, rural livelihoods, and broader economic indicators. Particular attention should address critical threshold points where agricultural decline may either enable or inhibit wider economic development.

Future studies should develop integrated assessment models to evaluate agricultural development pathways while accounting for climate change impacts, soil degradation risks, and water resource constraints. This approach is particularly crucial given the evident environmental pressures currently affecting cultivation patterns. Research should examine how governance structures, land tenure systems, and conflict dynamics influence the sector's capacity to contribute to economic growth, including how these factors shape resource allocation, market access, and technology adoption across agricultural subsectors.

These research directions would significantly advance both theoretical and practical understanding of agricultural transitions in developing regions. Future studies should employ mixed-methods approaches that combine quantitative analysis with qualitative fieldwork to generate robust policy-relevant evidence while contributing to broader debates about rural transformation. Kayah State's unique socio-political context makes it an especially valuable case for examining agriculture-non-agriculture linkages in frontier regions undergoing rapid change.

## REFERENCES

- Asian Development Bank. (2019). Asian Development Outlook 2019: Strengthening disaster resilience. Asian Development Bank.
- Aung, M. M. An Analysis on Agricultural Sector-Wide Classification of States and Regions in Myanmar (Mar Mar Aung, 2024) (Doctoral dissertation, MERAL Portal).
- Bezner Kerr, R. et al. (2022). Food, Fibre, and Other Ecosystem Products. In IPCC, Climate Change 2022: Impacts, Adaptation, and Vulnerability [H.-O. Pörtner et al. (eds.)]. *Cambridge University Press*. pp. 713–906. doi:
- Cartmell, S. (2019). Market Analysis for Rural Livelihoods in Kayah State.
- Christiaensen, L., Demery, L., & Kuhl, J. (2011). The (evolving) role of agriculture in poverty reduction—An empirical perspective. *Journal of development economics*, 96(2), 239-254.
- Central Statistical Organization [CSO]. (2023). Myanmar Statistical Yearbook 2023. Ministry of Planning and Finance.
- Deininger, K. (1997). Explaining agricultural and agrarian policies in developing countries. *Journal of Economic Literature*, 35(4), 1958–2005.
- Department of Population, Labour, Immigration and Population (2024). 2024 Myanmar Population and Housing Census Provisional Results, Census Report Volume (1).
- Diao, X., Hazell, P., & Thurlow, J. (2010). The Role of Agriculture in African Development. *World Development*, 38(10), 1375-1383.
- Dollar, D., & Kraay, A. (2002). Growth is good for the poor (World Bank Policy Research Working Paper No. 2587). World Bank.
- Dorosh, P., & Mellor, J. (2013). Agriculture in economic development. In J. Mellor & P. Dorosh (Eds.), *Routledge handbook of agriculture, food, and rural development in the Global South* (pp. 3–16). Routledge.
- Fan, S., Gulati, A., & Thorat, S. (2008). Investment, subsidies, and pro-poor growth in rural India. *Agricultural Economics*, 39(2), 163-170.
- FAO. (2016). The state of food and agriculture 2016: Climate change, agriculture and food security. Food and Agriculture Organization of the United Nations.
- Food and Agriculture Organization of the United Nations (FAO). (2020). The state of food and agriculture 2020: Overcoming water challenges in agriculture. FAO.

- Food and Agriculture Organization of the United Nations. (2019). Value of agricultural production [Dataset]. FAOSTAT.
- Fujita, K., & Okamoto, I. (2006). Agricultural policies and development of Myanmar's agricultural sector: an overview. *IDE Discussion Paper*, 63.
- Gollin, D., Parente, S., & Rogerson, R. (2002). The Role of Agriculture in Development.
- González-Caro, A., & Azad, S. (2024). *Agriculture in Myanmar: Current state and challenges – Part 1. United Nations Capital Development Fund.*
- Haggblade, S., D. Boughton, G. Denning, R. Kloeppinger-Todd, K. M. Cho, S. Wilson, L. C. Y. Wong, Z. Oo, T. M. Than, N. E. M. A. Wai, N. W. Win, and T. M. Sandar. (2013). A Strategic Agricultural Sector and Food Security Diagnostic for Myanmar. Draft working Paper draft for USAID/Burma, Michigan State University and the Myanmar Development Resource Institute's Centre for Economic and Social Development.
- Hnin, A. B., & Myint, C. D. (2020). Agricultural GDP dynamics and regional economic development in Myanmar: A subnational analysis. *Journal of Southeast Asian Economies*, 37(3), 321–345.
- Htoo, T. (2007). The Role of Agriculture Sector in Economic Development of Myanmar (1988/89-2002/2003) (Thida Htoo, 2007) (Doctoral dissertation, MERAL Portal).
- Janvry, A. D. (2009). Annex: Agriculture for development – Implication of Agro-Industries. In *Agro-Industry for development*. Edited by Silva, C. A. D., et al. The Food and Agriculture Organization of the United Nations and The United Nations Industrial Development Organization. P 252-270.
- Johnston, B. F., & Mellor, J. W. (1961). The role of agriculture in economic development. *American Economic Review*,
- Katti, S., Pratiwi, D., & Setiahad, R. (2019, November). Klassen typology approach for analysis of the role of competitiveness agricultural sector. *In IOP Conference Series: Earth and Environmental Science (Vol. 347, No. 1, p. 012106)*. IOP Publishing.
- Khaing, Z. Z. (2024). The contribution of agricultural sector in economic growth of Sagaing Region [Master's thesis, University of Yangon]. Institutional Repository of University of Yangon.

- Kuznets, S. (1955). Economic growth and income inequality. *American Economic Review*, 45(1), 1–28.
- Kyaw, Y. M. (2018). Sources Of Finance and Loan Utilization of Farmers (A Case Study of Myaung Mya Township) (Doctoral dissertation, MERAL Portal).
- Lewis, W. A. (1954). Economic development with unlimited supplies of labour. *The Manchester School*, \*22\*, 139–191.
- Lipsey, R. G., & Chrystal, K. A. (2015). *Economics* (13th ed.). Oxford University Press. Malnutrition and health: Addressing the challenge of food insecurity. World Health
- Meyer, D. F., Meyer, N., & Neethling, J. R. (2016). Perceptions of business owners on service delivery and the creation of an enabling environment by local government. *Administration Publica*, 24(3), 52-73.
- Ministry of Agriculture, Livestock, and Irrigation. (2018). Myanmar agriculture development strategy and investment plan, 2018-19 ~ 2022-23. Government of Myanmar. Government of Myanmar. (2015). Formation of the Ministry of Agriculture, Livestock, and Irrigation through the merger of three ministries: Agriculture and Irrigation; Livestock, Fisheries and Rural Development; and Cooperatives.
- Ministry of Agriculture, Livestock and Irrigation [MOALI]. (2023). Agricultural land management and statistics 2023.
- Muslim, M. H. H., Jamhari, J., & Darwanto, D. H. (2017). Agriculture category advantages and economic structures in the region of West Nusa Tenggara Province. *Agro Ekonomi*, 28(1), 64-79.
- OECD. (2020). OECD investment policy reviews: Myanmar 2020. Organization.
- Pingali, P. (2012). "Agricultural Policy and Food Security in the Developing World." *Global Food Security: Challenges and Opportunities*.
- RA, K. D. R. (1956). Critical Introduction of Solow Growth Theory. *Economics*, 70(1), 65-94.
- Soe, N. Z. (1999). The role of agriculture in the development of Myanmar economy (Doctoral dissertation, KDI School).
- Soe, N. Z. (2000). The role of agriculture in the development of Myanmar economy [Master's thesis, KDI School of Public Policy and Management].

- Timmer, C. P. (2009). A world without agriculture? The historical paradox of agricultural development. *American Enterprise Institute for Public Policy Research*, 1, 1-7.
- Tin, H. H. K. (2017). Use of management information system by farmers for improve productivity in Kayah State. *International Journal of Computer Science, Engineering and Information Technology*, 7(3), 1-9.
- UNHCR. (2014). *South-East Myanmar information management unit: Kayah State profile* (Updated June 2014). United Nations High Commissioner for Refugees.
- UNDP Myanmar. (2019). UNDP Myanmar annual report 2018.
- UNCDF. (2024). Support to Agricultural Revitalization and Transformation (START) Phase II Project Document
- Van Seventer, D., Tarp, F., San, N. N., & Htwe, S. T. N. (2020). A 2017 Social accounting matrix for Myanmar (No. 2020/66). WIDER Working Paper.
- Wooldridge, J. M. (2020). *Introductory econometrics: A modern approach* (7th ed.). Cengage Learning.
- World Bank. (2007). *World development report 2008: Agriculture for development*. The World Bank.
- World Bank. (2024). *Agriculture overview: Development news, research, data*.

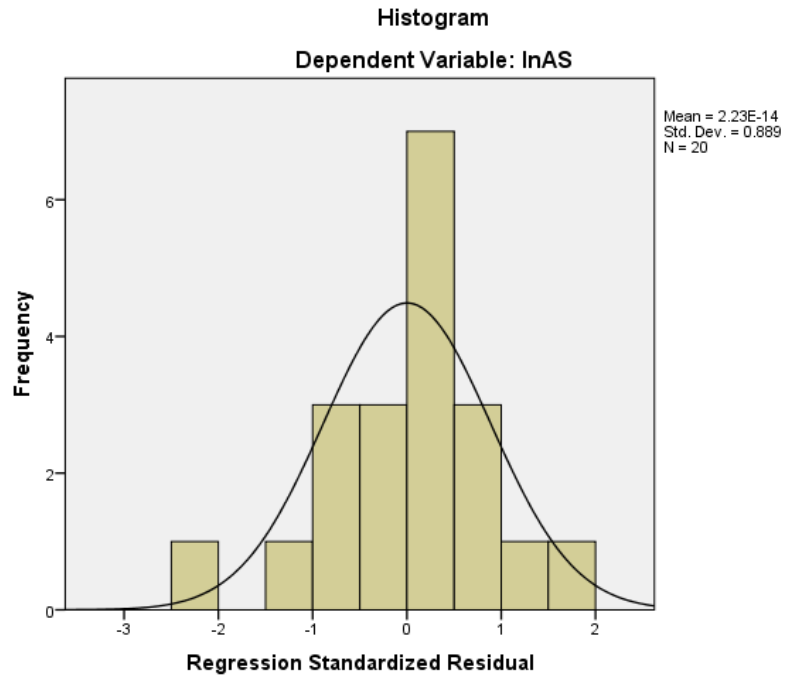
## APPENXICES

| Model | R Square          | Adjusted R Square | Std. Error of the Estimate | Change Statistics |          |        |     |               |      |
|-------|-------------------|-------------------|----------------------------|-------------------|----------|--------|-----|---------------|------|
|       |                   |                   |                            | R Square Change   | F Change | df1    | df2 | Sig. F Change |      |
|       | .882 <sup>a</sup> | .779              | .720                       | .04760            | .779     | 13.197 | 4   | 5             | .000 |

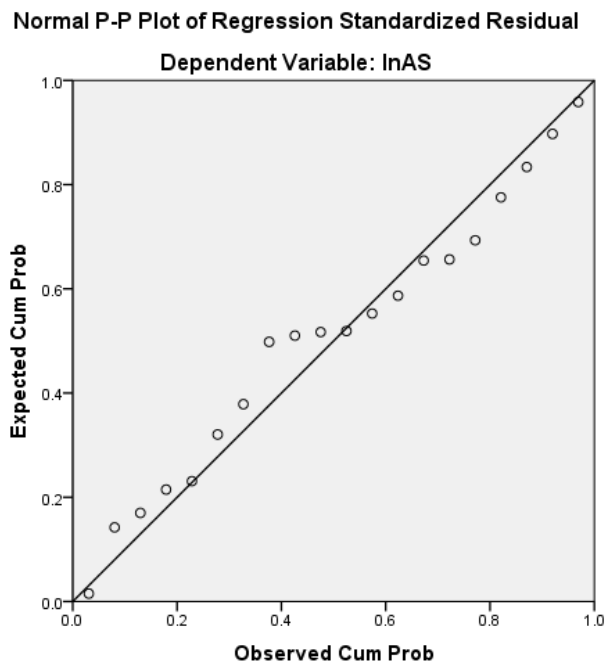
| Variable          | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------------------|-----------------------------|------------|---------------------------|--------|------|
|                   | B                           | Std. Error | Beta                      |        |      |
| (Constant)        | 6.365                       | 1.118      |                           | 5.694  | .000 |
| lnOC              | .570                        | .169       | .623                      | 3.374  | .004 |
| lnBC              | -.240                       | .089       | -1.260                    | -2.700 | .016 |
| lnSV              | .167                        | .119       | .537                      | 1.403  | .181 |
| lnCC              | -.015                       | .069       | -.051                     | -.210  | .836 |
| F-Ratio           | 13.197                      |            |                           |        |      |
| Adjusted R Square | 0.72                        |            |                           |        |      |

a. Predictors: (Constant), lnCC, lnSV, lnOC, lnBC

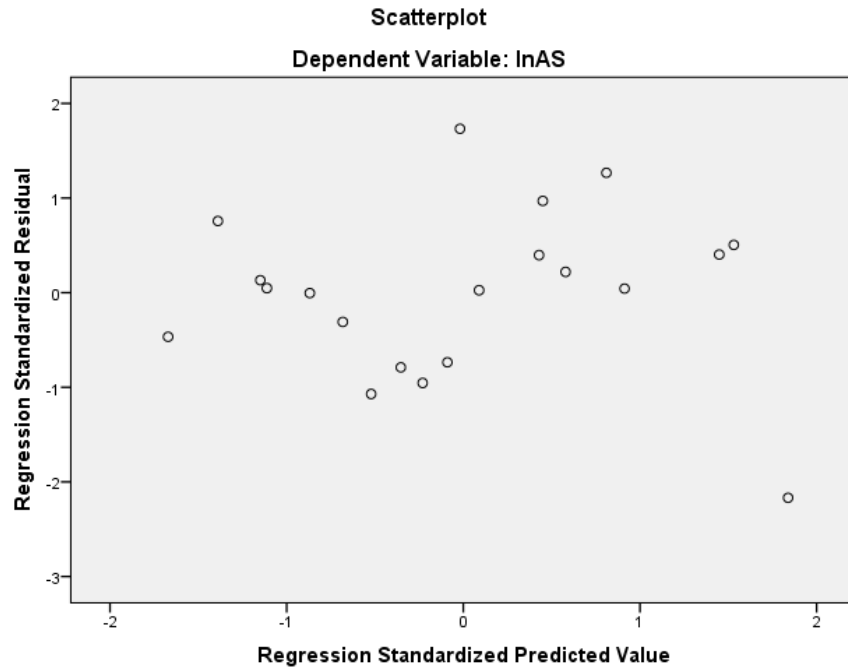
b. Dependent Variable: lnAS



Sources: SPSS output



Sources: SPSS output



Sources: SPSS output

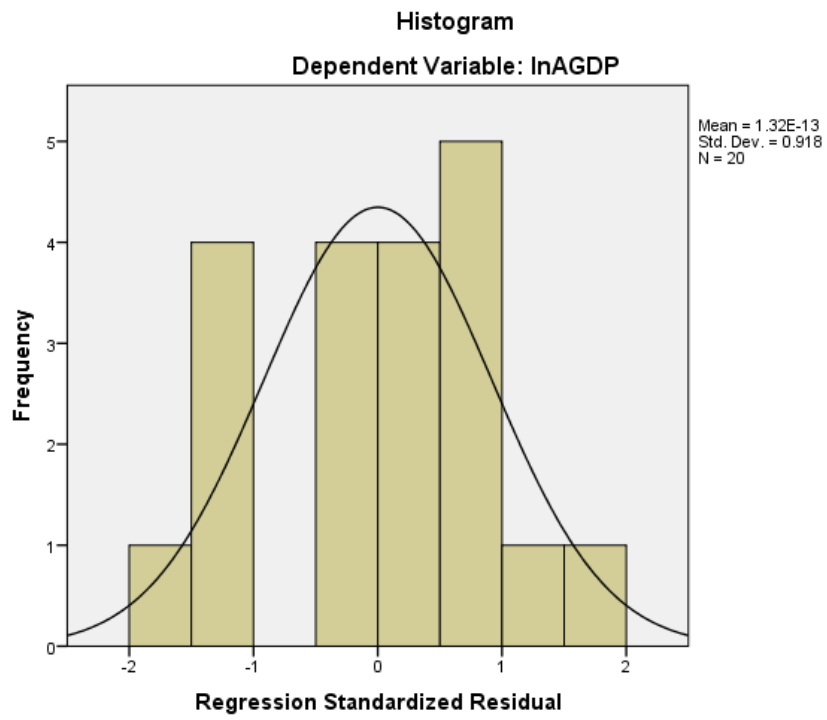
**Model Summary<sup>b</sup>**

| Model | R   | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics |          |     |     |               | Durbin-Watson |
|-------|-----|----------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|---------------|
|       |     |          |                   |                            | R Square Change   | F Change | df1 | df2 | Sig. F Change |               |
| 1     | .80 | .79      | .780              | .00743                     | .999              | 363.625  | 3   | 16  | .000          | 1.032         |

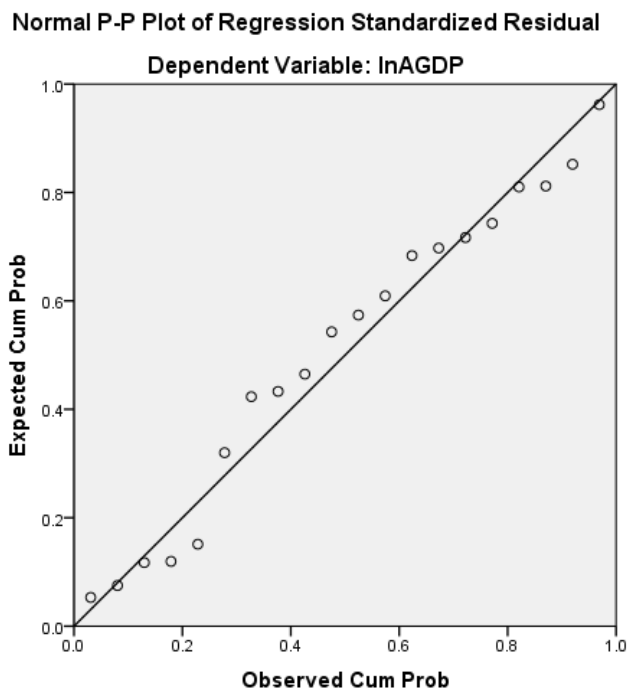
a. Predictors: (Constant), lnFS, lnAS, lnLF

b. Dependent Variable: lnAGDP

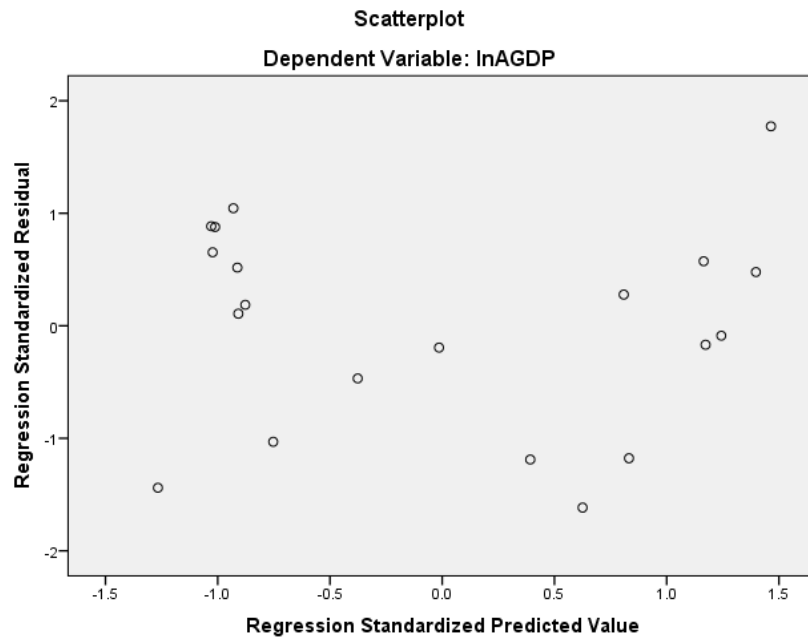
| Variable          | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------------------|-----------------------------|------------|---------------------------|--------|------|
|                   | B                           | Std. Error | Beta                      |        |      |
| (Constant)        | 1.798***                    | .450       |                           | 3.990  | .001 |
| lnAS              | .569***                     | .053       | .287                      | 10.796 | .000 |
| lnLF              | .325***                     | .014       | .738                      | 23.491 | .000 |
| lnFS              | .004                        | .004       | .014                      | .962   | .350 |
| F-Ratio           | 363.625                     |            |                           |        |      |
| Adjusted R Square | 0.780                       |            |                           |        |      |



Sources: SPSS output



Sources: SPSS output



*Sources:* SPSS output