# Identifying Characteristics and Drivers of the Maize Value Chain in Shan State, Myanmar

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# Abstract

As an agrarian country, Myanmar's economy largely relies on the agriculture sector. Maize is the second most important cereal crop after rice in Myanmar in terms of growing area and export volume and value. Maize is not a staple food crop, but is grown primarily for export and domestic poultry production. Shan State is the most important region for maize in Myanmar, and about 50% of the total maize growing area is in this State. It was expected that the maize-growing areas continue to increase as there were no better alternative crops for maize farmers in Southern Shan State, despite challenges such as the unpredictable dominant export market and price fluctuations. However, there had been little knowledge of why there was a robust growth of maize amid the challenges.

A single case study approach was applied to explore the characteristics of the maize value chain and the factors influencing the chain. In this study, the qualitative method was used to learn how and why the maize value chain in Shan State was performing as it did. In this respect, semi-structured interviews were used to explore the answers to those questions. Taunggyi township, a major maize township in Southern Shan State, was selected as the primary research area, whereas other types of actors from other townships throughout the chain were also selected to be interviewed as research participants. For example, exporters from Muse in Northern Shan State exporting maize to China via cross-border trade, key informants from Muse Commodity Exchange Centre, an exporter from Yangon who dealt with overseas exports, and an exporter from Yangon who exports maize to Thailand via cross-border trade were interviewed. Purposive and snowballing sampling methods were applied to select participants. The thematic analysis method was used to analyse the collected data.

Despite price fluctuations, maize farmers were willing to continue to grow and increase the area of maize grown because of the certainty of the market for maize and the relative uncertainty of markets for other potential alternative crops. In addition, maize had a relatively low labour demand, easy access to improved varieties of maize and limited access to improved varieties of other alternative crops, easy access to credit, mechanization, and suitability for large-scale production. Therefore, the growth of maize production is likely to continue in the foreseeable future.

The price farmers received for maize fluctuated significantly, yet remained relatively high compared to other crops, and remained certain. The Shan State maize market relied strongly on an unstable dominant export market which accounted for close to 90% of Myanmar maize exported to the Chinese market. In the 2018-2019 season (at the time of data collection) the border trade with China stalled in large part due to policies of the Chinese Government, and there was an expectation that market access would resume.

During the period when access to the dominant export market was stopped, the demand for maize was stabilised through domestic maize buyers buffering the stock of maize and because of the emergence of an alternative export market. This provided maize farmers with the certainty of market. Furthermore, an international company, which has a significant stake in the maize value chain in Myanmar influenced the access to the alternative export market.

Informal relationships were dominant between the actors throughout the maize value chain in Shan State. Most transactions between the actors were informal and based on reciprocity. Local wholesalers provided credit to farmers who sold their maize to the wholesaler. Most large-scale farmers stored maize at their wholesalers' storage houses. Both informal and formal agreements existed between wholesalers and feed factories and/or exporters. However, if there was a risk associated with a formal contract, particularly due to price fluctuation, wholesalers helped each other to mitigate the risk in an informal way based on their social relationships. Even the transactions between foreign buyers and the exporters from cross-border trade were made mainly through informal agreements. Only formal agreements were used for the transactions between foreign buyers and the exporters from the emerging and relatively small overseas trade. Informal relationships reduced risks, transaction costs, and the amount of investment capital in trading maize.

There was a tremendous growth of maize in Myanmar over a couple of decades despite a lack of Government support. There was no Government policy specific to the maize sector, whereas there were general policies or rules and regulations for the whole agriculture sector, which probably had impacts on the maize industry. This was probably because maize is not a staple food crop in Myanmar like rice. Moreover, there were no formal quality standards for maize. However, despite some issues, transactions of maize were carried out quite smoothly because the domestic and international cross-border markets, which were major markets for Myanmar maize, did not necessarily require it, except for overseas export markets.

This study identified some important potential areas to be improved by policy interventions. First, formal quality standards should be set for the stable market access of the maize sector. Second, the formal banking sector should practice flexible repayment schedules for better convenience for the farmers. Moreover, the formal banking sector should focus on small-scale farmers as they had more difficult access to informal credit than large-scale farmers. Third, the Myanmar Government should take account of a policy, which facilitates the improvement of infrastructures such as roads, drying machines, and storage facilities for reducing transaction costs and improving the quality of maize. In this way, the Government policy will support the sustainable development of the maize sector.

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# Chapter 1

## General Introduction

## 1.1 Introduction and Research Problem

Myanmar is an agrarian country. The agriculture sector, including livestock and fisheries, contributed 28.6% of total GDP, generated 25% of total exports, and employed 61.2% of the total labour force in 2015-16 (Ministry of Agriculture Livestock and Irrigation, 2016a). In addition, the agriculture sector contributed 29% of value addition in Myanmar, and value addition was projected to increase 4% in 2016-2017, compared with a 3% increase in 2015-16 (European Chambers of Commerce in Myanmar, 2018).

However, the development of agriculture in Myanmar had been stagnant due to poor policy management. Myanmar practiced a closed economy, or socialist economic system, from 1962 to 1988 (Tin, S., 2008). Moreover, according to Myanmar agricultural policies, land ownership, input supply, and choice of crops were centrally controlled until 1988. Further, until 1988, the Government took the role of monopolist in exporting all agricultural products. Even inter-regional trade was controlled exclusively by the Government. However, the prices offered by the Government were lower than market prices; for example, a private wholesaler paid 150 MMK (NZD 0.15) per basket of rice while the Government paid 50 MMK (NZD 0.05) per basket. Accordingly, there was no incentive for farmers for increasing productivity (Pingali, P. & Siamwalla, A., 1993). Therefore, the Myanmar agriculture sector still struggled along on revitalization.

There was some progress in the agriculture sector after the transition from a closed economy to a market-oriented economy in 1988. For example, after liberalization of the production of beans and pulses in 1988, production rose twelvefold over the following two decades, despite a dearth of agricultural credit and poor rural infrastructure (Nehru, V., 2012). However, the price of pulses was highly volatile because of heavy dependence on a single market – India (Boughton, D., Haggblade, S., Kham, L., Kongabaugh, S., & Thaung, M., 2015). Even though open market economics had been practiced since 1988, the Myanmar agriculture sector was problematic with limited access to markets because the USA (1991) and the EU (1997) imposed economic sanctions against Myanmar due to human rights' violations of the Myanmar military regime. Since 2011, when the first democratically elected government came to power in five decades,

the Myanmar Government has initiated major economic and political reforms. Accordingly, the United States (US) (2013) and the European Union (EU) (2016) decided to suspend those sanctions, with the exception of arms' trading (Giumelli, F. & Ivan, P., 2013; O'Driscoll, D., 2017). Sanctions had an influence on the post-sanction era such as requirements for development of technologies and standards, which hindered the industries to reach their full potential for exports after sanctions had been lifted (Grabo, L., 2016). Therefore, the actual economic transition started in 2011, even though the market-oriented economy was introduced in 1988 (Lim, H. & Yamada, Y., 2012).

Myanmar agriculture policy has focused on the rice sector throughout history. Therefore, most of the major policy changes in the agriculture sector have taken place in the rice industry. Rice farmers were provided with a larger amount of government credit than non-rice farmers throughout history as the policymakers wanted to encourage farmers to grow rice. Rice farmers were provided with 8,000 Myanmar Kyats (MMK) (equivalent to $NZ8.2) per acre from 2005-06 to 2010-11 (during the military Government's rule), 40,000 MMK ($NZ41) in 2011-12, 100,000 MMK ($NZ102.5) from 2013-14 to 2015-16 (during U Thein Sein's Government's rule) and 150,000 MMK ($NZ153.8) from 2016-17 to 2017-18 (during NLD Government's rule). Meanwhile, non-rice farmers were provided with 4000 MMK ($NZ4.1) from 2005-06 to 2010-11, 10,000 MMK ($NZ10.25) in 2011-12, 20,000 MMK ($NZ 20.5) from 2013-14 to 2015-16 and 20,000 MMK ($NZ20.5) per acre in 2016-17, 50,000 MMK ($NZ51.3)[1] in 2017-18 (during NLD Government's rule) respectively by the Myanmar Agricultural Development Bank (Oo, 2018). Since rice is the staple food of Myanmar, it is very important for the food security of the population. Other crops such as vegetables, beans, and pulses, which are also vital for nutrition security and income of the people, are almost totally neglected, whereas much emphasis is put on the rice as a political or national crop. For instance, most government research farms, and seed production farms mainly work on rice. In this context, government policy plays an important role to induce balanced agricultural growth in Myanmar through crop diversification (Tun, Kennedy, & Nischan, 2015).

Myanmar policymakers were not familiar with formulating and implementing an evidence-based policy. Generally speaking, the Myanmar Government leaders tended to improvise policy

[1] $NZ 1 is equivalent to 975.26 MMK as of 27 March 2018 reference exchange rate from Money Travel NZ.

with limited research or evidence throughout history (The Asia Foundation, 2016b). No exception is present in the policy-making process for the Myanmar's agriculture sector as well. Accordingly, Myanmar agriculture has lagged behind those of neighbouring countries, even though agriculture is regarded as the most important sector driving Myanmar's economy (Rosario, T.C.-d., 2014). In fact, even though there may be different reasons why Myanmar's agriculture has fallen off, a lack of strong policy is one of the main culprits of the poor agriculture sector (Fujita, K. & Okamoto, I., 2006).

In the past, there was much evidence of policy failures in the agriculture sector. These failures were mainly because policies were formulated and implemented without any research and based on their personal interest. For instance, the Myanmar Government issued an announcement to implement an initiative for *Jatropha curcas* production in 2005 without any reliable data or feasibility study (Aung, 2012). The Government pushed different levels of people to plant Jatropha so that the project would cover about half a million acres within a few years because the State leaders had high ambitions for Jatropha as a promising source of biofuel and, accordingly, local government officials, schoolteachers, students, and rural people were forced to grow Jatropha all over the country (Luoma, 2009). Even though a lot of resources were poured into the project, it ended with failure. This shed light on the poor policy formulation process of the Myanmar agriculture sector. Lessons should be learned from such kinds of experience (Aung, 2012).

Myanmar's agriculture significantly lags behind other ASEAN countries. A Myanmar farmer earned US$1.8-2.5 per day in the monsoon season, which is from one-fifth to one-seventh of Thai farmers (US$10-16.5), and from one-third to one-fourth of Filipino farmers (US$7.8) (European Chambers of Commerce in Myanmar, 2018). In Myanmar, only 16% of total net sown area was supplied with irrigation in 2015-16, while Thailand supplied irrigation to 30% of the total net sown area (Ministry of Agriculture Livestock and Irrigation, 2016a). Furthermore, Myanmar has the lowest paddy yield with 2.7 tons per ha on average, while the average yields per ha in Laos, Philippines, and Vietnam were 2.7 tons, 3.7 tons, and 5.5 tons, respectively (World Bank, 2014).

In Myanmar, the policy-making process was based on assumed need or personal interest, yet not evidence, due to lack of reliable data and information in the past (Schomerus, M. & Seckinelgin, H., 2015; The Asia Foundation, 2016a). In fact, evidence-informed policy can bring larger impacts in developing countries than developed ones, hence, higher possibilities for

change as, generally, evidence-informed policy was less well-established in those countries than developed ones (Sutcliffe, S. & Court, J., 2005; The Asia Foundation, 2016b). However, the history of the policy-making process in Myanmar was almost totally influenced by (former) senior military commanders in the past and, accordingly, the current civilian policy-makers in Myanmar have little experience in policy-making, particularly evidence-based policy-making process (The Asia Foundation, 2016a).

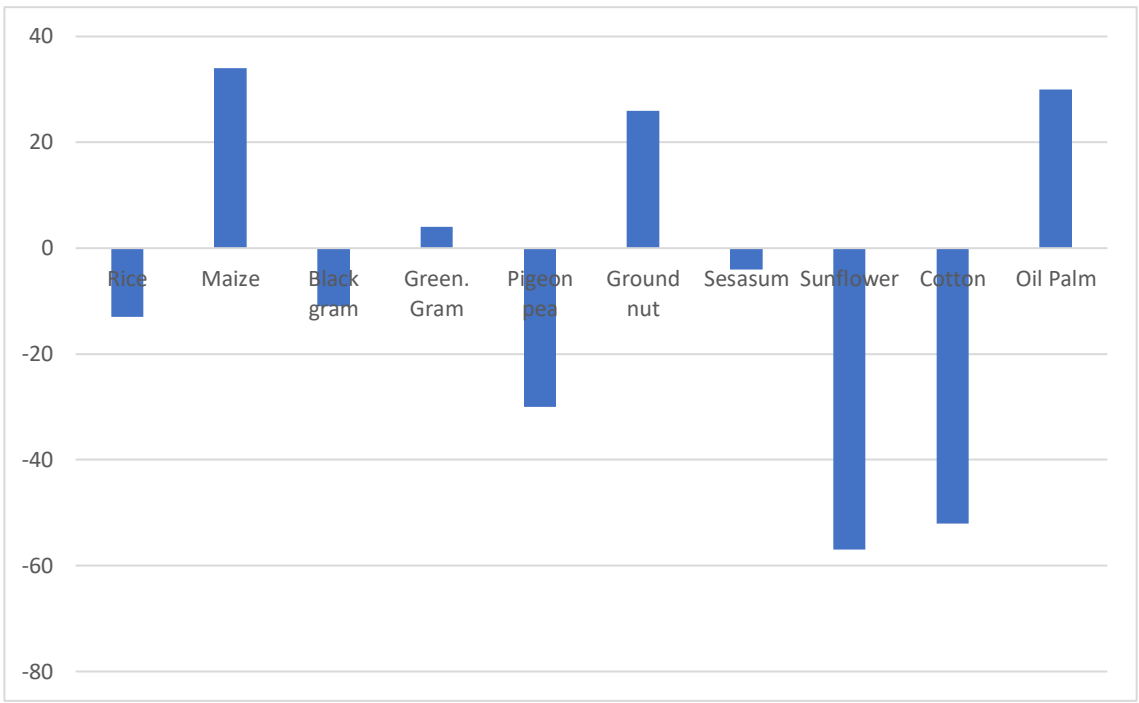
After rice, maize is the second most important cereal crop in Myanmar, in terms of growing area and export volume. The area of maize has more than doubled over 16 years, from 250,000 Ha in 2001 (USDA, 2003) to 530,000 Ha in 2017 (USDA, 2017). Over the same time period, maize export volume rose tenfold, from 120,000 MT in 2001 (USDA, 2003) to 1,200,000 MT in 2017 (USDA, 2017). Therefore, maize is one of the most important crops in Myanmar for foreign exchange earnings. According to this trend, the growing area of the maize in Myanmar will continue to increase in the future.

Myanmar maize exports rely mainly on the Chinese market. Chinese agricultural import policy had a strong impact on the exports of Myanmar agricultural products, including maize. Even though maize grain was formally exported from Myanmar to China through border trade, it was also informally imported by the Chinese wholesalers from the Chinese side because the Chinese Government imposes restrictions on importing agricultural commodities to protect domestic farmers. When Chinese authorities heightened their inspection and seizures of agricultural commodities exported by Myanmar, the price of those commodities usually fell dramatically in Myanmar. In this context, 98% of the maize exports from Myanmar flowed into China and the rest went to other ASEAN countries. Chinese trade policy could highly influence Myanmar's maize export market (USDA, 2017), therefore, a well-informed strategy is urgently required to diversify markets for the stability of maize price.

A stable market will bring prosperity for maize farmers. Even though the growing area and export volume of the maize increased in recent years, the price has widely fluctuated. In 2017, the farm gate price of the maize in Shan State rose to around 250 MMK per Kg ($NZ 0.28), however, in 2016, the average was 150 MMK per Kg ($NZ 0.15) (CESD/MSU, 2018). While farmers planned to expand their maize-growing area, the instability of the market can be one of the largest challenges for them (CESD/MSU, 2018).

Shan State is a major maize-growing area in Myanmar relative to other annual crops, as half of the total sown area of maize is located there. The quiet revolution of maize production in Shan State was initiated around the 1990s with the introduction of CP corn hybrid seed by the Thai-based CP group of agro-food companies, and then the high adoption of the quality seed imported by other companies as well. The CP Company brought commercial production technology together with market opportunities for maize, carrying out contract farming in Shan State. Since then, maize production in Shan State has dramatically transformed from traditional low-input subsistence production to high-input commercial production (Woods, K., 2015). Farmers in Shan State prefer to grow maize. Maize cultivation has lower labour requirements than other crops such as rice, pulses or oilseeds, and a labour shortage and high labour costs are major issues in the agriculture sector. These situations drive farmers to cultivate more maize regardless of market opportunity (CESD/MSU, 2018). In this context, all actors involved in the value chain, particularly the Government, urgently need to explore suitable measures to stabilize the market.

*Figure 1-1 Area increases in percentage from 2010-2011 to 2019-2020*




Maize had robust growth in the past decade. As shown in Figure 1.1, it was one of the fastest growing one of ten major crops in Myanmar, over the last decade (Ministry of Agriculture Livestock and Irrigation, 2016b). While Myanmar is the second largest exporter of pulses in the world, pulses are one of the most important crop groups in Myanmar. However, the production of pulses has decreased 15% from 2015 to 2018 (USDA, 2018), meanwhile, maize production

increased 15% over the same period (Golden Paddy, 2018). It was also estimated that the decrease in pulse production would continue by another 15% in 2019 due to area decrease, as the export of pulses largely relied on the Indian market, and the Indian Government imposed restrictions on the import of pulses. Pulses, therefore, would be substituted for other crops (USDA, 2018). Furthermore, while there had been a 0.5 million acre decrease in the pulses growing area in 2018 (The Republic of the Union of Myanmar President Office, 2018), maize was one of the crops recommended by the Government as a substitute for pigeon pea and green gram (Ko, T.K., 2018). In fact, maize production increased by 100% over the last decade (USDA, 2017). On the other hand, there was huge fluctuation of maize prices. Within a year, the price highly fluctuated as shown in Figure1.2 (Golden Paddy, 2018). The price fluctuation may be due to mainly relying on a single export market - China and having limited access to other export markets while 98% of the maize exports of Myanmar went to China through cross-border trade (USDA, 2017). In addition to market access, there is also another issue – trust in the actors in the maize sector of Kayin State. There was no trust between maize farmers and wholesalers. Farmers did not have trust in the market access, and wholesalers did not have trust in the capacity of farmers probably for two main reasons – maize was a new crop for farmers, and they were in a post-conflict area and, hence, regional stability concerns (Mekong Institute, 2016).Therefore, while maize production dramatically rose and expected to have further increase, well-informed marketing strategies for maize is important for market stability before a market collapse like the pulse sector and building trust among value chain actors.

*Figure 1-2 Maize Prices of Aung Ban Market in Shan State in 2017*


Source: Golden Paddy (2018)

Figure 1.1 shows that there were high price fluctuations in 2017, the lowest price in January and the highest price in September. Moreover, the price difference between the lowest and the highest prices was more than double.

Therefore, it is the time to provide reliable information on the constraints of the maize value chain for changing the policy-making process from anecdotal knowledge-based policy formulation to evidence-based policy formulation in support of all-round development of the agriculture sector. It is crucial to bring together balanced agricultural growth with a favourable agricultural policy, creating an enabling environment for all actors in the respective value chains. In this context, the proposed research can provide evidence of current issues in the proposed value chains for developing well-informed strategy for further development.

## 1.2 Research Questions and Objectives

The research is conducted to answer the following question:

**What influences the maize value chain in Shan State, Myanmar and how and why?**

In the last decade, the maize-growing area had robust growth, particularly in Shan State. Therefore, it is important to understand the current dynamics of the maize value chain in Shan State. Jepsen, Palm and Bruun (2019) argue that the decision for growing annual crops is generally driven by multiple factors such as socio-economic and technical ones. In Southeast Asian countries, land use dynamics for some crops, including maize, are mainly influenced by market demand, research, and development of high-yielding varieties, which are locally suited, and subsidies for input promotion after opening their economies. They also argue that the same diffusion pattern, which first took place in Thailand, then Vietnam, Cambodia, and Laos, would happen in Myanmar. However, they assumed that the changes in agricultural development of Myanmar would be less dynamic due to poor rural infrastructure and uncertain land ownership in armed conflict areas. Nevertheless, during the period 1997 and 2015, the Myanmar maize area tripled, and the yield doubled, reflecting a process of intensification driven by demand, particularly from the Thai CP company and China (Jepsen, M., Palm, M., & Bruun, T., 2019). Therefore, it is worth investigating whether there are any factors similar to their assumptions, and any other factors influencing the process of maize value chain in Shan State.

There are many factors which hinder the development of the Myanmar agriculture sector. In this respect, an FAO report highlights some issues of the Myanmar agriculture sector such as a poor agricultural extension service in ethnic minority areas and more remote border areas, low

investment in agricultural research and development programs, lack of demand-driven production, lack of access to markets and market information, poor trading skills, and inefficient agricultural value chains (FAO, 2016). Therefore, it is interesting to investigate whether such issues exist in the maize value chain in Shan State, and which factors are shaping current status of the maize value chain.

The present study has been underpinned by the following objectives:

(1) To identify the characteristics of the maize value chain and understand the performance of major actors involved in the value chain;

(2) To describe how governance, trust and information exchange among value chain actors influence the processes in the value chain; and

(3) To identify aspects of the value chain, which can be likely addressed by means of public policy measures**.**

My research argues that the value chain analysis method should be used to identify the factors, which are shaping the current situations in the value chain. In this context, the performance of value chain actors and governance of the chains should be understood to identify possible areas of improvement in the chains. Some marketing specialists and economists (Donovan, J., Franzel, S., Cunha, M., Gyau, A., & Mithöfer, D., 2015) point out that improving the performance and relationships in the chain can likely generate tangible profits in economic performance terms.

My research also argues that it is worthy of assessing trust among value chain actors in support of exploring ways of further improvement to value chain for the sake of better market access. The World Bank report clearly states the importance of trust among chain actors is an integral part of value chain development to provide interventions for enhancing beneficial symbiotic linkages among firms in order that they operate together to take competitive advantages for better access to markets, that is, to build trust among actors of the value chain (Webber, C.M. & Labaste, P., 2009).

Many researchers use value chain analysis to identify potential policy interventions throughout the chain. For instance, this analysis was used to identify major issues of policy in need to be tackled. This value chain research identified the potential interventions of government such as setting up required regulations, reviewing land allocation policy, land tenureship, and quota system. Moreover, their research made some recommendations such as improving coordination among relevant government departments and to develop bamboo sector development

strategies at the provincial level (Greijmans, M., Oudomvilay, B., & Banzon, J., 2007). Moreover, other researchers (Chagomoka, T., Afari-Sefab, V., & Pitoroc, R., 2014) also used value chain analysis to identify constraints and opportunities of the traditional vegetable sector of Malawi and Mozambique to provide policy-related recommendations in support of better market access.

There have been some changes affecting the maize industry in Myanmar during the time this research was conducted, from between 2019 and 2022, and in which period this dissertation was to be submitted. First, the General Administration of Customs of China (GACC) announced that they officially allowed the import of Myanmar maize on 18th February 2022. However, according to this announcement, there are some requirements around exporting Myanmar maize to China. For example, Myanmar maize must meet the food safety standards set by GACC, and exporters must be able to submit the certificate granted by GACC. Moreover, Myanmar maize straw silage was also exported to China in 2022 through border trade for the first time (FAO, 2022). Second, the import ban on Myanmar pulses by the Indian Government was also partially lifted. In July 2022, the Indian Government officially announced the importing of at least 0.25 million tons of black gram and 0.1 million tons of pigeon pea from Myanmar for five years (Bhosale, J., 2021). Since maize was a potential alternative crop to beans and pulses when the Indian Government banned the imports of beans and pulses from Myanmar, in future, the Indian import policy changes on beans and pulses may have an impact on the acreage of maize in Myanmar. Third, the military junta made some economic policy changes after staging a coup on 1st February 2021, overturning the elected government. For example, the Central Bank of Myanmar, controlled by the military junta, announced that all foreign earnings must be sold to only authorized dealer (AD) banks within one working day at a fixed exchange rate on 3rd April 2022 - 1850 MMK per USD, while the market exchange rate was about 2150 MMK per USD at that time. It means that the Government fixed exchange rate was about 10% less than the market exchange rate. Moreover, The Central Bank of Myanmar issued another announcement on 5th August 2022 stating that 65% of foreign earnings must be sold to the AD banks at a new fixed exchange rate within one month– 2100 MMK per USD, while the market exchange rate was about 2500 MMK per USD. Another 35% can be sold freely (Burma Associated Press, 2022; Kyaw, K.L., 2022). The exporters offered lower prices to wholesalers and farmers to cover the gap between the parallel exchange rates. The farmgate maize price rose to 1200 MMK per viss when the market exchange rate was 2150 MMK per USD and there was no fixed exchange rate. However, the farmgate price fell to 1050 -1100 MMK per viss when the market exchange rate

was 4500 MMK per USD and the fixed exchange rate was 2100 MMK per USD (Personal contact with an exporter, 2022).

# Chapter 2

## Literature Review

### 2.1 Introduction

The overall objective of this research is to inform the relevant government agency(ies) major issues exist in the maize value chains to be solved with public policy measures. This research will use value chain structure as a framework to identify current issues in the chains. Value chain analysis is very powerful for identifying potential areas of improvement in the value chains, which can be carried out through public policy measures (Bellù, L.G., 2013). Value chain analysis is useful in strategic planning (Porter, M., 1985). Moreover, value chain analysis can help a given sector identify competitive advantages and competitive strategies (Ensign, P.C., 2001).

This chapter describes a theoretical framework for value chain analysis for public policy interventions. In particular, section 2.1 depicts general ideas of the value chains. Afterwards, section 2.2 sets out the importance of policy in improving a value chain, and policy-making process. Section 2.3 then describes the governance of value chain. After that, section 2.4 outlines the concepts of value chain. Section 2.5 describes the performance and efficiency of value chains. Afterwards, the roles of different actors are described in section 2.6. Section 2.7 outlines the role trust between value chains actors, and section 2.8 presents the logistics of value chain. Section 2.9 describes the studies of value chains in other countries and section 2.10 presents the studies of value chains in Myanmar. Finally, section 2.11 summarizes the chapter.

### 2.2 The concepts of value chain

Different scholars have defined value chains from their different perspectives. Among them, some scholars describe value chains as a group of activities. An agricultural value chain can be defined as a group of activities and actors, which takes an agricultural product from sourcing inputs and production on the farm to final consumers creating value at various stages through different activities as cleaning, grading, transporting, marketing, storing, distribution, processing, and packaging of the product (Bolzani, D., de Villard, S., & de Pryck, J.D., 2010; Cuddeford, V., 2014). A value chain is defined as the group of value-creation activities, in which raw materials are made into final products and the institutions that connect these different production stages (Vroegindewey, R. & Hodbod, J., 2018). The World Bank also defines value chains as a set of activities: “The term value chain describes the full range of value-adding activities required to bring a product or service through the different phases of production,

including procurement of raw materials and other inputs" (Webber, C.M. & Labaste, P., 2009, p. 9).

Some other scholars also describe value chains as a group of actors or a group of networks. International Potato Centre (CIP) defines value chains as all actors and the whole range of their productive activities, engaged in the process of creating value for a crop or product at different stages (Bernet, T., Thiele, G., & Zschocke, T., 2006). Similarly, a value chain is defined as "actors connected along a chain producing, transforming, and bringing goods and services to end consumers through a sequenced set of activities"(Riisgaard, L. & Ponte, S., 2011, p. 3). Hobbs et al. (2000) and CIAT (2007) describe value chains as a strategic network established by several independent business institutions, in which members of the network are involved in adding value to a product through an extensive collaboration (Hobbs, J., Cooney, A., & Fulton, M., 2000).

The concept of value chain has evolved since the 1960s. The idea of the Filière approach was first used for studying contract farming and vertically integrated agriculture in France in the 1960s. Its usage was soon extended to analysis of agriculture in developing countries (Raikes, P., Friis Jensen, M., & Ponte, S., 2000). The Filière approach was developed by French Research Institutions as a neutral and value-free technique to study marketing chains of agricultural commodities evaluating how government policies and public investment affected production systems (Tallec, F. & Bockel, L., 2005). The idea of commodity chain was then developed by Terrence Hopkins and Immanuel Wallerstein in an article published in 1977. They presented their research agenda with the orientation of a world-systems programme (Bair, J., 2005). What the term "commodity chain" of Hopkins and Wallerstein (1977) means is study of an ultimate consumable product, tracing back all inputs used along the process – prior transformation, transportation, raw materials, labour involved in different stages (Hopkins, T.K. & Wallerstein, I., 1977). A value chain was framed with nine generic activities. Out of them, five are primary activities such as inbound logistics, operations, outbound logistics, marketing and sales, and service, and four are support activities such as procurement, technology development, human resource management, and infrastructure (Porter, M.E., 1997).

On the other hand, there are many constraints or limitations in value chain studies. Value chains evolve and rapidly change over the time. Thus, all value chain studies have limits in delivering a static picture in time. In this context, development practitioners must recognize the importance of using analytical tools that can capture best the dynamics and tendencies in the chain

(Roduner, D., 2007). Furthermore, in many cases, value chain analyses are only a narrative of the sequence of phases. Even though it is supportive for mapping actors, and understanding processes, it might not be sufficient to lead to actions for policymakers. Besides, most of the studies focused on  a zero sum game rather creating more value in the chain (Webber, C.M. & Labaste, P., 2009).

## 2.3 Policy

As a government, it is of paramount importance to have a set of strong public policies to drive effective and efficient ways to develop and maintain a country's economy, politics, agriculture, education, and so forth. Public policy is defined as *the combination of basic decisions, commitments, and actions made by those who hold or influence government position of authority (Gerston, L.N., 2014, p. 7)*. An agricultural policy often applies more than one instrument simultaneously such as support price, subsidized inputs, or production control (Gardner, B.L., 1987).

Public policy is one of the most important factors for improving the value chain of a product (OECD/WTO, 2013). There may be many issues that cannot be tackled by the private sector or development partners alone throughout different agricultural value chains, such as setting standards for a product, imposing required regulations, and investing in public infrastructure. Therefore, the role of strong policy in a value chain should not be underrated. In creating an enabling environment for a value chain of a product, the laws, policies and regulations plays a vital role (UNIDO, 2009).  For example, the role of the members of parliament is very critical to amending existing laws or to pass a new law for enabling the implementation of a policy. Besides, the enforcement of fertilizer and pesticide laws can be carried out only by the concerned government bodies. However, it is very important that the policymakers are well-equipped with the required information and reliable data to make a policy decision (Eslake, S., 2006). These studies suggested that policy plays an indispensable role in setting standards and creating a favourable environment for a value chain of a commodity, which cannot be done by the other actors from the private sector or development partners alone.

The Myanmar agriculture sector was severely suppressed throughout the Socialist Government Administration and early period of Military regime from 1962 to 2002 by imposing mandatory government procurement system for rice at below-market price and, hence, supplying the procured rice to the consumers at a low price (Soe, T., 2004). Furthermore, private trade of other industrial crops - sugar, rubber, jute, and cotton etc, was restricted, and these crops were

procured by the Myanmar Government at lower than market price (Warr, P.G., 2000). On the other hand, domestic trade of agricultural products, and farmers' choices of crops were seriously restricted in Myanmar due to the rice-centric policy (Raitzer, D.A., Wong, L.C.Y., & Samson, J.N.G., 2015) while private agricultural exports were also banned during the same period with the purpose of controlling the domestic consumer price (Okamoto, I., 2004). This demotivated farmers for producing quality products and improving productivity (Raitzer, D.A. et al., 2015). These scholars highlighted that Myanmar agriculture fell in the status lower than its potential due to the mismanagement of different Government policy controls.

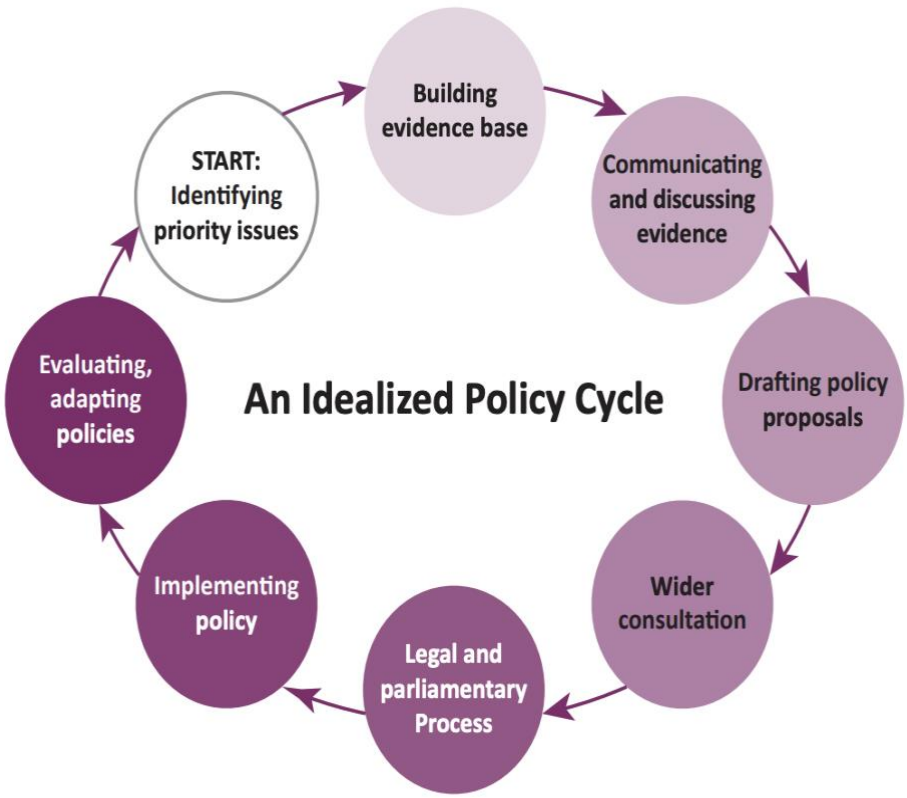
Recently, the Ministry of Agriculture, Livestock, and Irrigation in Myanmar showed interest in evidence-based policy. In the Myanmar Agriculture Strategy and Investment Plan (2018-19 – 2022-23), evidence-based policy was clearly recognized as one of the main functions for enhancing the governance of the agriculture sector (Ministry of Agriculture Livestock and Irrigation, 2017). While it essentially needs to make many changes in policies for reform and revitalization of Myanmar agriculture (Dapice, D.O., Vallely, T.J., Wilkinson, B., McPherson, M., Kennedy, J., & Montesano, M., 2011), aggregate statistics or reliable micro-data is extremely important for making evidence-informed policy decisions (Palangkaraya, A., Webster, E., & Cherastidtham, I., 2012). However, Myanmar lacks reliable data for policy formulation (Filipski, M.J., Nischan, U., Van Asselt, J., Belton, B., Kennedy, A., Hein, A., Htoo, K., Dorosh, P., & Boughton, D., 2016 ; Schomerus, M. & Seckinelgin, H., 2015). The scholars pointed out that availability of reliable data is critical in forming evidence-based policy for the development of the agriculture sector. Therefore, accurate and reliable data is largely and urgently required for policy reform to drive the development of the Myanmar agriculture sector.

Policy is one of the major areas to be improved for the development of the agri-business sector. For private organizations operating in a new country, policy and regulatory atmosphere, and governance are their top-of-mind concerns among different factors such as policy and regulatory environment, governance, human capital, land, information and communication, financing, infrastructure, securing supplies, and competitive environment. The performance of Myanmar in those areas is poorer than Thailand and Vietnam (Rogers McJohn & Business for Development, 2019). Recently, an important trade policy shift was observed in Myanmar, particularly for agricultural commodities. The Myanmar Ministry of Commerce released a notice on 6$^{th}$ June 2019, allowing foreign and joint-venture companies to export rice and other specific food and commodity items including maize. It aimed to improve the quality of the Myanmar exports, increase international demand for local commodities and raise earnings for domestic

producers (Ko, T.K., 2019). These studies regarded the government policy as an important factor in attracting foreign direct investment for the development of agriculture sector. Therefore, a good policy environment will exert a significant influence on the inflow of foreign direct investment and hence the development of agriculture industry while there is lack of sufficient public investment in the required infrastructures.

A sound policy is almost always formulated through strong research, which provides highly reliable data, identifies problems, and develops solutions to the problems (The Asia Foundation, 2016b). Evidence-based policymaking can refer to a policy approach that helps the people make well-informed decisions by using the best reliable evidence in the policy mechanism (Segone, M. & Pron, N., 2008). In the United States, the number of states using cost-benefit analysis for informing policy rose 48% from 2008 to 2011 (Pew-MacArthur Results First Initiative, 2014). Evidence-informed policy needs to put a rational appraisal on the problems and solutions, and the consequences of those solutions (Sutcliffe, S. & Court, J., 2005; The Asia Foundation, 2016b). These studies suggested that the research, which generates strong evidence and reliable data played an important role in policy making process to inform well to the policy makers.

*Figure 2-1 Evidenced-based Policy-making Process- Source:(The Asia Foundation, 2016a)*



Realistic policy can be developed through evidence-based information. In today's world, policy makers realized the important role of evidence-based advice, which is not biased but independent, in making policy decisions (Roland, S., 2010). Evidence-lacking policy is like a personal opinion, and the likelihood of success is probably low. However, evidence which does not lead to policy is likely to be just unproductive information (Detrich, R., Keyworth, R., & States, J., 2016). As shown in Figure 2.1, the Asia Foundation (2016a) suggested an idealized policy cycle, featuring the importance of an evidence-based policymaking process. The scholars highlight that the success of a policy is largely influenced by the evidence-based information.

In developing countries, lack of reliable research on current issues is a major constraint for making policy decisions, while the poor linkage between research and policy exacerbates its process (Young, J., 2005). Lack of good useable data, lack of timing, lack of proper evaluation in doing research posed barriers for advocating findings to the policymakers (Rutter, J., 2012). Therefore, it is vitally important to appropriately incorporate evidence into policy, and apply credible research inputs into policy advocacy for the successful process of policymaking and implementation (Gluckman, P., 2013). These scholars recognize that the shortage of reliable data is a challenge for the policymaking mechanism in the developing countries. Therefore, as a developing and nascent democratic country, Myanmar needs reliable research in different areas for the policy-development process.

The public policy played a key part in shaping agricultural value chains in many developing countries. It was observed that many policy changes drove dynamics of the maize value chain in Zambia. For instance, the Zambian Government had imposed the maize export bans in 2016 due to a severe regional maize shortage, despite pressure to open the borders. The Government then had to generate incentives for the private sector by providing irrigation access to maize farms for export. Moreover, the vigorous growth of feed and poultry industries, which sourced maize as a major raw material resulted directly from favourable policies, and an increasing middle income group, the growth of urbanization and population, and changes of preferences and tastes (Samboko, P.C., Zulu-Mbata, O., & Chapoto, A., 2018). During the 1990s, the Mexican Government interventions such as subsidy programs (e.g., ASERCA, which was designed to promote farmers' participation in commercial markets, Procampo, which offered an income subsidy to the farmers of basic staples, and Apoyos a la Comercialización, which incentivized commercializing in formal markets) resulted in a booming growth of maize productions.

Interestingly, regardless of a reduction in maize area due to the accumulated effect of climate change and market liberalization, production of the Mexican maize even increased, but due to intensification of production, mainly resulted from irrigation (Boué, C., Ridaura, S.L., Sánchez, L.M.R., Hellin, J., & Ponce, M.F., 2018). In the aforementioned Zambian and Mexican cases, policy interventions were imposed to promote the availability and affordability of maize, and stability of the market for their people because the maize is one of the staple foods in these countries. They argued that the domestic policies are influential in the evolution of the maize sector in a positive way.

In some cases, an unforecastable policy can bring negative impacts on the concerned sector. It was found that there were four major factors driving uncertainties of high-quality cassava flour (HQCF) value chains in Nigeria among which frequent policy changes was one of those major drivers. The Government policy generated two uncertainty sources – an uncertainty over how much policies encouraging the use of HQCF were enforced and another uncertainty whether the Government changes would abolish or continue policies (Lamboll, R., Martin, A., Sanni, L., Adebayo, K., Graffham, A., Kleih, U., Abayomi, L., & Westby, A., 2018). They argue that a fickle government policy disincentivized investors to invest into the HQCF value chains, therefore, it triggered the uncertainties of the chain in association with other drivers such as the demand and supply of HQCF, availability and price of cassava roots, and supply and costs of energy for processing HQCF.

A policy leverage point has the power to make a big difference in a system. A leverage point is a place in a system where a small change at this point can lead to a large impact on the system (Meadows, D.H., 1997). Therefore, value chain analysis can help to investigate leverage points in the chain – an area where most value can be added or bottlenecks are situated (Roduner, D., 2007; Schmitz, H., 2005). Nowadays, value chain analysis is used more and more widely in making policy amongst state agencies for shaping development strategies (Neilson, J., 2014). These scholars discuss the important roles of the government policy not based on empirical data but based on theories developed.

## 2.4 Governance

Governance is an important aspect of modern value chain growth. There is much evidence of vertical coordination in a high value chain, mostly as an institutional action for solving problems of market imperfection (Swinnen, J., Abbassian, A., Maertens, M., & Vandeplas, A., 2010). “Governance refers to any coordination of economic activities through non-market

relationships" (Humphrey, J. & Schmitz, H., 2000, p. 3). The structure of governance can support a market system to fortify against, adapt to, and overcome shocks such as market instability and price fluctuations, and stresses from an aspect that benefits the target group in the chain (Irwin, B. & Campbell, R., 2015). Moreover, governance is critical for access to infrastructures and services (Little, P.D. & McPeak, J.G., 2014).

In M4P (2008), governance was divided into three forms – coordination, regulations, and controls. In practice, governance covers different areas from contractual agreements between value chain actors to government rules and regulations to unwritten norms, which influences who can participate in the value chain activities (M4P, 2008). The types of interaction or coordination among value chain actors depend on the nature and use of commodities (e.g., frequency of production, extent of perishability, forms of use, and processing technologies). For instance, only a small portion of potato was processed, primarily because it is used as a vegetable, while cooperatives and millers took greater power over the sugar value chain because they have political links, if mills are operated by a cooperative; if privately owned, they handled it via an industry lobby. Moreover, the control in relatively well-organized value chains lies with processors and producers, mostly because of their political links directly or indirectly while non-retailer wholesalers took control over standards and pricing in relatively informal value chains, mainly because the wholesalers often play multi-functions in the agricultural value chains as input suppliers , output buyers and money lenders for producers. (Mishra, P.K. & Dey, K., 2018). Path-breaking work in the area of value chain governance was first described by Gereffi, Humphrey and Sturgeon (2003) with a framework of theory providing better knowledge on the changing governance structures in global markets. In this context, value chains involve a range of governance patterns which affect how the chain works and how it can transform over time. In demand-driven value chains, large merchandizing actors plays a pivotal role in dominating the whole system and, in contrast, large producers determine the rules for regulating the system (Bellù, L.G., 2013). According to these studies, having political links, playing multi-functions, and large-scale merchandising influence the actors' control over the chain.

The value chain can be shaped by lead firms in accessing markets. The theory of governance in global value chain (GVC) is based on the concept that value chains are hardly coordinated spontaneously via market exchange (Gereffi, G., Humphrey, J., & Sturgeon, T., 2005). However, they are driven by decision-making and strategies by specific actors, mostly large farms, which control access to markets at different levels – local, regional, and national. In GVC analysis,

governance highlights the strong practices and forms of organizations, through which the division of labour between the other actors and lead farms is handled. Lead farms are a set of firms, which operate at particularly powerful positions throughout the chain, and which are able to influence who performs what across the chain, at what price, applying what standards, to which particular requirements, and delivering at what time (Tran, N., Bailey, C., Wilson, N., & Phillips, M., 2013). According to these scholars, the lead firms are influential in carrying out different activities of a value chain such as coordination of market exchange, setting price and standards. The scholar discussed this topic based on their theoretical knowledge.

Institutional framework of governance plays a vital role in shaping a value chain. For example, Jespersen at el. (2014) investigated the influence of institutional framework of governance on the aquaculture value chains in four Asia countries – Bangladesh, China, Thailand, and Vietnam. They found three major factors influencing the aquaculture value chains in those countries – (1) forms of coordination, (2) regulations, standards, and certifications, and (3) a whole-chain governance, reflecting on polarity, key drivers, and the main driving mechanisms. First, in their study, they did not mention how the forms of coordination shaped the value chain even though different forms of coordination in different nodes of each aquaculture value chain in the four countries are discussed in detail. Second, the degree of enforcement of domestic regulation, credibility of the certification process and standards, and traceability of the products in the exporting countries are major determinants for raising the reputation of exporting countries in international trade, which is supportive of diversifying markets. Since shrimps and fish are perishable products, it is important to have access to markets in time. Third, diverse dynamics of governance brought different results into the shrimp value chains of different countries. The poor institutional framework of Bangladesh resulted in a lack of general upgrading and, hence, catering their products to low-end buyers, especially, the legal framework. For instance, various agencies are involved in planning, research and development, management, and the regulatory process of seafood sector, which resulted in a lack of enforcement of existing regulations, leading to low quality shrimp. As a result, Bangladesh shrimp had limited access to international markets. In contrast, the Thai shrimp value chain is driven by various types of actors through demands derived from certification, high quality, volume, and consistency. Therefore, the strong institutional framework of Thailand had a positive effect on upgrading, mainly resulting from domestic regulation and institutional support (Jespersen, K.S., Kelling, I., Ponte, S., & Kruijssen, F., 2014). Since shrimp is a high value food product, demand for quality and safety is high. Accordingly, quality standards and certification are critical to have access to markets.

These scholars argue that the enforcement of regulations, standards and certification process influence the access to market. In particular, the strong enforcement is helpful for accessing diverse and high-end markets, and the poor enforcement leads to oligopolistic and low-end market.

### 2.5 Performance and Efficiency of Value Chain

The performance of a value chain is often regarded as the economic outcomes of the practices or production activities of the value chain actors (Dizyee, K., Baker, D., & Omore, A., 2019; Kaplinsky, R. & Morris, M., 2001). Efficiency, flexibility, responsiveness, and quality are used as indicators in measuring the performance of agri-food value chains. In assessing the efficiency of the Dutch tomato supply chain, costs such as production, distribution and transaction costs, and profit such as return on investment and inventory are used as indicators. In measuring flexibility, customer satisfaction, volume flexibility and delivery flexibility are used as major indicators. Responsiveness is evaluated, based on fill rate, product lateness, customer response time, lead time, and shipping errors. There are two types of quality – product quality and process quality. Sensory properties, safety, product reliability and convenience are the main indicators of product quality while production system, environmental aspects and marketing are the main indicators of process quality (Aramyan, L.H., Oude Lansink, A.G., & van Kooten, O., 2005). It was found that both product quality and process quality are focused in measuring the performance of the chain. This is probably for two main reasons - tomato is a short shelf-life food product and it is operated in a developed country such as The Netherlands.

The efficiency of agricultural value chains is influenced by different factors such as mechanization, and IT technology. Many scholars investigated the impact of agricultural machinery on the tillage stage of crop production. Mechanization in the tillage stage significantly saved operational costs (Hormozi, M.A., Asoodar, M.A., & Abdeshahi, A., 2012; Ozpinar, S., 2006). These scholars made technical efficiency comparisons between traditional tillage and machinery tillage. However, Hormozi et al (2012) found that mechanization had a negative impact on the crop yield of rice in Iran due to excessive use of tillage. Moreover, Ozpinar (2006) also states that there was no significant yield difference between traditional and machinery tillage of winter wheat in Turkey (Ozpinar, S., 2006). According to these scholars, there is no positive effect of mechanization on the yield of wheat in Turkey and even a negative impact on the yield of rice in Iran, even though it triggered the lower operation costs.

Many scholars have agreed that the access to mobile phones and internet has positive impacts on the efficiency of agricultural value chains in different ways. In the rural areas of Batati District in Tanzania, the usage of mobile phones improved the efficiency of agricultural value chains at different stages of crop production (Furuholt, B. & Matotay, E., 2011). Access to mobile phone enhances access to timely information about markets, prices, and farm practices in maize marketing in North Central Nigeria and rural areas of Batati District in Tanzania, and Philippines (Ayoola, J. & Ayoola, G., 2015a; Furuholt, B. & Matotay, E., 2011; Mendes, S., Alampay, E., Soriano, E., & Soriano, C., 2007), lowers waste and improves the capacity of small-scale farmers in negotiation with other actors (e.g., service providers and wholesalers) and in linking with distant markets in maize marketing in the rural areas of Tanzania, in the fishing market in Ghana, farmers' decision-making in Ethiopia (Furuholt, B. & Matotay, E., 2011; Salia, M., Nsowah-Nuamah, N.N., & Steel, W.F., 2011; Tadesse, G. & Bahiigwa, G., 2015). It was found that access to mobile phones has positive effects on the efficiency of different types of agricultural value chains such as non-perishable maize and perishable fish in different developing countries.

### 2.6 Trust in Value Chain

Luhmann (1988) said that trust is the reliable inter-personal status gained from previous experience requiring a previous conduct on a person's account, recognizing that there is risk (Luhmann, N., 1988). Trust is a fundamental social fact of everyday life (Jalava, J., 2006).The relationship between farmers and wholesalers plays a critical role to build a reliable market structure. If farmers lack trust in the pricing structures, they are reluctant to produce a quality product of vegetables in Southern Shan and Rakhine States in Myanmar. Market linkages from farmers to different types of actors were categorized - local wholesalers, retailers, agro-processors, exporters, cooperatives, and contract farming companies, and pointed out that the capacity of linking actors, and mutual trust were essential for the success of market linkages. Business relations essentially depend on the presence of mutual trust between different actors involved and, therefore, linkage activities should emphasise building up such trust (Shepherd, A., 2007). The scholars suggest that trust plays an important role in producing quality products and making the effective market linkages.

There are three sources of trust – specifically, institution, meso-level characteristics, and process. The institution as a source of trust includes the application of institutional factors, which can help build trust. It is created by confidence in the formal process of society, and more critically in their ability to take actions against the breach of trust. Trade associations and the legal system are examples of institutional trust. Meso-level characteristics- based trust is derived

from reputation or characteristics of the actors who are involved in a transaction. The trust generated by long-term interactions between two parties can be known as process-based trust. This kind of trust can be built up through repeated transactions (Humphrey, J. & Schmitz, H., 1998). The scholars discussed these based on theories.

Trust is regarded as an economic asset if it is derived from non-contractual, rather than contractual arrangements. Trust has an economic value when it allows two parties to initiate and maintain transactions without any safeguard (Lorenzen, M., 1998). Non-contractual trust removes the need for formal written agreements, which are costly to monitor and enforce and, thereby, reducing transaction costs. For instance, in the event of high trust, the parties who are involved in transactions can save time and resources on formally contracting activities. This is because both transactors have trust in each other that a transactor will not exhibit opportunism towards the other even when there is an opportunity to do so (Dyer, J., 1997; Parkhe, A., 1993). The scholars recognize that trust has an economic value particularly in the non-contractual arrangements of the value chain activities. Trust will especially play a vital role in coordinating the activities of agricultural value chains in Myanmar, where non-contractual arrangements are dominant.

Nowadays, the role of trust becomes more important in commercial transactions. Effective communication and sharing information in a transparent manner can help as a mediator to build trust between two parties of the two food chains – meat and cereal in the six European countries – Germany, UK, Ireland, Finland, Poland and Spain (Fischer, C., 2009). According to Mekong Institute's study on the maize supply chain in Kayin State of Myanmar, maize farmers lack trust in the existing markets, and wholesalers lack trust in the farmers' capacity of production. Therefore, trust is a powerful tool for every single intervention to different stages of value chain (Mekong Institute, 2016). Trust-building is likely to be indispensable for making common ground between value chain actors. Safety and quality assurance is one of the major determinants in bringing stakeholders of the value chain into trusted deals (Drost, S., vanWijk, J., & Mandefro, F., 2012). In both cases, the scholars argue that the social bond of wholesalers with farmers, rather than other actors, is a major determinant of trust which, in turn, leads to the effective coordination of the chain activities.

## 2.7 Supply Response of Farmers

Supply response - how the farmers are responsive to market incentives is one of the most important topics of agricultural development economics. These incentives shape the agricultural contribution to a country's economic development. In Pakistan, the wheat farmers' supply response was influenced by the price of wheat, fertilizers and cotton, whereas the cotton farmers' response was shaped by the real price of cotton and real price of fertilizer (Mushtaq, K. & Dawson, P., 2003). Price plays a vital role in crop choices and marketed surplus generation. Usually, it can be expected that higher prices generate a larger output. Therefore, price is one of the most important factors influencing a crop area. In addition, price is regarded as the vital economic factor which influences farmers' decisions on production. Moreover, consumer demand is also another important element of the structure in which the agricultural sector must engage. The potato demand in Bangladesh positively responded to the potato price fall. For example, if the potato price decreased by ten percent, the demand for potato increased 8.82 percent, even though this food item is price inelastic (Huq, A., Alam, S., & Sabur, S.A., 2004). Quantifying how grain production is influenced by climate, weather, and prices, is of paramount importance for agribusinesses and policymakers. These impacts widely affected the economy and the environment. Measuring supply and understanding grain farmers' production response in Kansas, USA can result in a well-formed market, which can lead to a reduction in volatility. Supply response in agriculture has two elements – (1) allocation of acreage, and (2) the impact of economic and biophysical factors on yields of maize, soybean, wheat, and sorghum. Even though the individual crop acreage and yield analysis are imperative for land utilization and policy analysis, it is not enough to fully understand commodity response (Boussios, D. & Barkley, A.P., 2012). These scholars agreed that the crop price is one of the most important factors influencing the supply response.

Moreover, farmers' decisions in response to price is not based on only a single year's prices or only future prices. Instead, decisions are based on expectation of price, based on past and future events of expectations. Their decisions are based on basic price that is the average price of three years in a row (Boussios, D. & Barkley, A.P., 2012). Boussios and Barkley (2012) studied the supply responses of four crops- maize, soybean, sorghum, and wheat, which are the most important grain crops in Kansas State of USA. They stated that farmers made decisions based on their expectation of price. However, their price expectation is not based on only the last year's price. Instead, their expectation is based on historical price. In their study, a basis price is made of three straight years as a basis price. These scholars argued that the supply response

was not influenced by the current price alone, but by prices in the past and expected price in the future.

In some cases, supply response is shaped not only by price factor, but also non-price ones, even though supply response or elasticity generally results from price variations. Price factors have been regarded as key characteristics of profits and elasticity of supply of several crops (e.g., the rice supply response in Malaysia and Cambodia) whereas supply shifts are external factors (e.g., technology, climate, risks, input prices and production uncertainty) (Mustafa, G., Abbas, A., Alotaibi, B.A., & Aldosri, F.O., 2021; Yu, B., Liu, F., & You, L., 2012). Similarly, other scholars also found that non-price factors are important for crop production. For example, there are both short-run and long-run elasticity of supply of rice in Cambodia in response to land area, availability of labour, and irrigation, but long-run elasticity of supply is larger than that of short-run. It was found that long-run supply elasticity is 1.15 and 1.45 for the wet season and for the dry season rice, respectively. For short-run, supply elasticity ranges from 0.26 for the wet season to 0.33 for the dry season, which means that paddy production would increase 2.6% for the wet season and 3.3% for the dry season if land area, availability of labour, and irrigation are favourable (Yu, B. & Fan, S., 2011). Therefore, non-price factors such as climate, land and labour are also considered as important as price factors in shaping supply response of a crop.

Like other crops, maize grain supply elasticity can be developed from different factors – prices and non-prices such as yields, rainfall, and technology developments. Shoko et al (2014) tested supply response of maize grain production in Ghana. They found that real price positively and significantly influenced the maize acreage, although lagged real price, had no significant impact on short-run supply. This means that price incentives do not work for shifting maize acreage in the short run. However, lagged yield had a negative impact on maize acreage, suggesting that whenever there were high yields in the country, farmers allocated less land to maize production in the next season. This was probably because higher yields led to a lower price, pushing farmers to respond to it by reducing their maize-growing area (Shoko, R., Belete, A., & Chaminuka, P., 2016). Rice farmers in Sierra Leone and sugarcane farmers in Pakistan also responded to lower prices resulting from higher yields by reducing their acreage (Conteh, A.M., Yan, X., Fofana, I., Gegbe, B., & Isaac, T.I., 2014; Saddiq, M., Fayaz, M., Hussain, Z., Shahab, M., & Ullah, I., 2013). Technology development and rainfall have a positive impact on the acreage of maize in South Africa. For instance, farmers increase their acreage when they experienced favourable rainfalls in the past year (Shoko, R. et al., 2016). Similarly, sugarcane farmers in Pakistan made the same response to favourable weather in the past year (Conteh, A.M. et al., 2014). These scholars agree that the supply of response of maize can be also influenced by both price and non-price factors.

Both factors can trigger a negative and a positive response of maize grain supply. Even though it was said that the higher yield negatively affected the maize supply response in these cases, it mainly depends on the price of maize. However, if the maize price is stable or becomes higher, the higher yield of maize might not have a negative influence on the supply response.

### 2.8 Mechanisms of Relationship between Value Chain Actors

Value chains are shaped by the mechanisms of the relationships between value chain actors in one way or another. Firstly, in some value chains, intermediaries such as brokers or middlemen play a vital role in facilitating the relationship between farmers and buyers. However, they often face the criticism of causing ineffective trade and inflated prices (Kumar, V., Patwari, Y., & Ayush, H., 2008). Mostly, it is touted as a panacea for improving a value chain to eliminate middlemen from the value chain. However, it is not always the best solution. In contrast, intermediaries take a transactional role through reductions in search and matching costs and aggregation of demand or supply to obtain economies of scale (Arya, A., Löffler, C., Mittendorf, B., & Pfeiffer, T., 2015). In the pineapple value chain of Uganda, brokers facilitate to ensure effective and timely transactions between farmers and wholesalers. For example, brokers received orders from wholesalers and take responsibility to collect the required amount of pineapples in a short time. The role of brokers is more important for perishable crops such as pineapples in making timely transactions. Brokers can help build trust between farmers and wholesalers because brokers were born in the community of pineapple farmers and have good knowledge about the quality of individual farmers' pineapples, about which the wholesalers may have poor knowledge, and have sufficient information about the reputation of wholesalers. Therefore, the brokers are helpful for the value chain to function effectively (Tröger, K., Lelea, M.A., & Kaufmann, B., 2018). Thus, in this case, the role of middlemen is essentially required for effective and timely coordination of activities between the buyers and sellers even though this may add additional costs to the transaction costs of the chain activities.

In some agricultural value chains, wholesalers perform multiple actions, particularly in informal value chains while different actors of the chain are associated with different functions. For example, in India, wholesalers provide major inputs such as fertilizers, seed, and credit to farmers. As a result, they can procure the outputs from farmers with a lower price. In this way, such kind of actor can have stronger control than other actors. They benefit not only a certain extent of influence over the whole value chain but also the largest share of profits compared to their investment (Mishra, P.K. & Dey, K., 2018). In some value chains, wholesalers took a coordinative role to be able to source continuously specific quantity and quality of a product for

other actors such as processers (Gibbon, P., 2001). Gibbon (2001) discusses this based on different contexts of agricultural value chains in both developed and developing countries but not based on empirical data. These scholars agreed that the wholesalers who play different roles in the chain have greater influence on the chain than other actors.

The relationship form is regarded as the length of relationship between farmers and buyers, which has an effect on risk allocation, and farmers' ability to shift from one buyer to another (Barrett, C.B., Bachke, M.E., Bellemare, M.F., Michelson, H.C., Narayanan, S., & Walker, T.F., 2012). Three types of relationship are specified as spot relationships, long-term, informal relationships, and long-term, formal relationships. Spot relationships have flexibility, in which transactions are made business-to-business between value chain actors. A long-term informal relationship indicates longer transactions between the actors, which are made through informal or oral contracts. Trust plays an indispensable role in this form of relationship because there is no formal enforcement mechanism, which is likely to encourage both parties to hold opportunistic behaviours. A long-term, formal relationship refers to business relationships between the actors. This type of relationship is formally dealt with in written agreements, mostly with a quality monitoring mechanism (Ola, O. & Menapace, L., 2020). Among the three types of relationship, trust is more important in the long-term, informal relationship because of a lack of formal contractual arrangements, especially, in developing countries like Myanmar where the informal relationship is more frequent throughout the chain.

Informal relationships influence a value chain both negatively and positively. Informal relationships provide concerned parties with flexible ways in handling negative shocks and reduce transaction costs (Michler, J.D. & Wu, S.Y., 2020). Social capital can serve as informal mechanisms, which govern value chain relationships because personal relationships enhance trust and discourage opportunistic behaviours in economic contexts (Granovetter, M., 1985; Raub, W. & Weesie, J., 1990). However, from the safeguard point of view, the effectiveness of relational contracts, or informal relationships, will decrease when ambiguity increases, even though it is not affected by volatility. Moreover, informal relationships have limitations on monitoring issues (Carson, S.J., Madhok, A., & Wu, T., 2006). These scholars discussed these based on literature reviews on theoretical developments and others' empirical studies. In these cases, social capital is a major driver for practising the informal relationships between two parties.

Likewise, formal relationships also have both negative and positive impacts on a value chain. In formal relationships, formal contracts are used as a safeguarding measure. Formal contracts lack flexibility and usually cannot be revoked or amended to accommodate unexpected events, eliminating or diminishing their capabilities of safeguards. However, frequent ex post adjustments are required to remedy maladapting to the external environment. The effectiveness of formal contracts will decline when volatility rises, encouraging opportunism (Carson, S.J. et al., 2006). In contrast to informal relationships, from the safeguarding point of view, increase in ambiguity will not have significant impact on the effectiveness of formal relationship. In the literature, little attention was paid to limitations on safeguarding effectiveness of informal relationship even though limitations on that of formal contracts are widely known (Carson, S.J., Madhok, A., Varman, R., & John, G., 2003; Carson, S.J. et al., 2006). They reveal their views based on the theoretical framework. Even though the formal relationships may impose additional costs to the activities of the chain, it can provide a better safeguard in ambiguous conditions.

## 2.9 Studies of Value Chain Analysis in Myanmar

Most value chain studies in Myanmar did not focus on policy issues or entry points despite the recent increase in the number of studies. Among them, Winrock International, an NGO based in USA, conducted five value chain studies - coffee, soybean, and ginger in Shan State, and sesame and melon in the Central Dry Zone of Myanmar from 2015 to 2016. In their study on coffee, it was found that farmers' poor cropping practices and processing methods led to poor quality of coffee and, as a result, they had lower access to domestic and international markets. In the soybean value chain study, they identified three main factors, which limited both quality and quantity of soy in Shan State – dearth of labour, poor knowledge of effective fertilizer application practices, and lack of drying facilities. Labour shortages led to higher labour wages, hence high production costs and limitation of production scale; poor knowledge of fertilizer application practices led to low productivity; and the lack of a drying facility led to poor quality of soybean. In the ginger production study, poor pesticide application practices, hence safety issues, hindered expansion of market opportunities in the EU and the USA. Regarding sesame production in the central dry zone of Myanmar, poor cultivation practices such as improper plant establishment, lack of weed control, improper and erratic applications of fungicides and pesticides, and improper post-harvest practices negatively affected both quality and quantity of sesame. In the melon value chain study in the central dry zone, it was found that poor practices of production, harvest and post-harvest intensified losses of farmers and waste rates (Winrock

International, 2016). These studies highlighted that farmers' poor cropping practices and knowledge, labour shortage, and poor infrastructure influenced the quality and productivity of a crop, affecting access to markets.

At the same time, other INGOs such as Gesellschaft für Internationale Zusammenarbeit (GIZ) and Oxfam carried out agricultural value chain studies. GIZ conducted two agricultural value chains in Shan State – mango and tea from 2015 to 2017. They stressed that climate change and poor knowledge of value chain actors on how to adapt the changing climate negatively affected the production of mango and tea in Shan State, while floods, landslides and droughts jeopardized the people's livelihoods, which are mainly dependent on a limited number of agricultural value chains, including tea and mango (GIZ, 2017). Oxfam also conducted three case studies of fishery value chains in Rakhine State, the western part of Myanmar. They stated that the steady decline of prawn production was mainly driven by damage to prawn ponds by cyclones, high maintenance costs, low market prices, and international sanctions on the exports of Myanmar (Joffre, O. & Aung, U.M., 2014). These studies showed that climate change has negative impacts on the production of different crops and prawn.

In addition, there were also some empirical value chain analyses by Myanmar students as a partial fulfilment for their master's degrees, undertaken from different aspects. Kaung Myat (2012) conducted a value chain study on mango through the exploratory research approach. There were many challenges to access export markets for Myanmar mangoes. They had particular difficulties producing mangoes to comply with the requirements of export markets due to inadequate investment of both private and public sectors and poor infrastructures (Myat, K., 2012). Linn (2013) conducted an analysis of the sesame value chain, exploring entry points of different actors such as public sector, private sector, and civil society organizations. For the farmers, lack of technology, lack of knowledge of input and output quality, and poor access to credit are major factors, which impede the development of sesame production while poor access to financial resources is a major issue for other downstream actors such as wholesalers, processors, and exporters (Linn, T., 2013). The exploratory value chain analysis of pickled tea conducted by So Pyay Thar (2016) through an exploratory research approach provided helpful information to different actors of the chain such as wholesalers, producers, NGOs, and policymakers. She points out that poor information sharing among the actors and their behaviours of undermining others' activities made the value chain underdeveloped and insufficient (Thar, S.P., 2016). These Myanmar scholars highlighted that insufficient public

investment, poor infrastructure, poor access to credit and information impeded the development of different agricultural value chains.

Few agricultural value chain analyses of different agricultural products have been conducted in Myanmar for policy advocacy purposes. For instance, Wong and Wai (2013) assessed the value chain of the rice industry in Myanmar. They note that weaknesses in every segment of the value chain influenced the development of the sector. In the upstream segment, poor input quality is a major constraint for further development of the value chain. For example, it was found that farmers used impure and poor-quality seed, urea fertilizer with 20% of N which is much lower than the standard rate of 46% N, and usage of pesticides, which are banned in the neighbouring countries. In the mid-stream segment, poor harvest practices and lack of drying facilities led to poor quality milled rice. In the upstream segment, lack of access to financial resources and high transportation costs made the sector less competitive in the international markets (Wong, L.C. & Wai, E.M.A., 2013). Boughton et al (2015) identified key factors, which influenced the development of the pulse sector. Inadequate public investment in breeding and agronomic research, insufficient public and private investment in storage and processing facilities hindered the development of the pulse sector and market diversifications (Boughton, D. et al., 2015). Belton et al (2015) conducted the largest aquaculture value chain study in Myanmar, focusing on investigation of policy issues in the sector. These scholars found that difficult access to and a high interest cost of credit for small-scale farmers, restrictions of agricultural land law on the conversion of paddy land into aquaculture land, poor infrastructure (e.g. electricity, roads and water control), inadequate public investment in promising fish species, and concentration on farming a few species, which have just a limited number of export markets are major constraining factors for the further development of aquaculture sector of Myanmar (Belton, B., Hein, A., Htoo, K., Kham, L.S., Nischan, U., Reardon, T.A., & Boughton, D., 2015). These scholars point out that poor input quality, poor harvest practices of farmers, lack of infrastructure, lack of financial resource, and inadequate public investment in research hampered the development of the abovementioned agricultural value chains.

There are few peer-reviewed articles on agricultural value chain analysis in Myanmar, which explored policy issues. Ben and et al (2018) observed that small- and medium-scale fish farms were rapidly developed by informal relaxation of legal restrictions on converting paddy land into other uses. Moreover, farmed fish were mainly sold in domestic markets in contrast to the conventional wisdom that it largely relied on export markets (Belton, B., Hein, A., Htoo, K., Kham, L.S., Phyoe, A.S., & Reardon, T., 2018). Ebata and et al (2019) investigated the role of

governance in controlling pig diseases. It was found that coordination between government agencies and other value chain actors need to be improved for effective pig disease control (Ebata, A., MacGregor, H., Loevinsohn, M., Win, K.S., & Tucker, A.W., 2020). On the other hand, Ebata (2022) identified the gap in policy in the pig value chain in Yangon Myanmar. It was found that the improvement of policies was required to reduce transaction costs for the chain actors and improve the access to public health (Ebata, A., 2022).

### 2.10 The Studies of Value Chain Analysis on maize in other countries

Value chain analysis was widely used in many countries for the development of various crop chains. In Ghana, a value chain analysis was undertaken to identify the factors influencing the production of maize. They identified two major factors influencing maize production, particularly fertilizer and improved seed application. The Government subsidized fertilizers for maize to increase maize production while there is no subsidy programme for improved seeds (Scheiterle, L. & Birner, R., 2016). In this case, the Ghanian Government used the fertilizer subsidy programme for increasing maize production because maize is a staple food crop in Ghana. Moreover, in Bangladesh, maize value chain analysis was conducted to investigate the driving forces for the increase in maize production. They identified three main factors increasing maize production in Bangladesh – regional trade integration throughout the country, higher remunerative price for maize farmers and better access to improved varieties. The greater intra-regional trade encouraged the public and private investment in agricultural research, marketing services and infrastructure, resulting in the higher productivity of maize (Akhter, M. & Hafiz, N., 2015). In both cases, the scholars agreed that access to improved varieties was one of the major drivers for enhancing maize production. However, the Ghanian Government used the fertilizer subsidy program to increase the maize production as it was a staple crop in Ghana, whereas there was no subsidy program used for increasing maize production probably because maize is not a staple crop for Bangladesh, even though maize is an important crop for their food security.

The dynamics of the maize value chains in developing countries was shaped by different factors. In some Asian countries such as China, India, Indonesia, Nepal, Pakistan, Philippines, Thailand, and Vietnam where 98% of the Asian maize was produced, major changes of the maize sector were mainly driven by development and use of technology such as rapid development of hybrids, delivery of technology such as a stronger position of the private sector, and higher demand from a robust growth of livestock sector. Moreover, consumption of non-feed maize stayed almost constant w,hile a surging growth mainly came from consumption of feed maize

in those countries. It was also stressed that the increasing productivity of the Asian maize farmers was also associated with policy (Erenstein, O., 2010). Moreover, Hellin and Erenstein (2009) also stated that a rapidly increasing demand of maize came primarily from development of the poultry sector, while 60-65% of poultry feed was composed of maize and half of the total maize production in India went to the feed factory as a major raw material (Hellin, J. & Erenstein, O., 2009). In Asian countries, the growth of the maize sector was influenced with different factors such as the use of advanced technology and livestock sector development. Moreover, since the demand from the growing livestock sector increased, it was expected that maize production would increase in the future as well.

## 2.11 Summary

There is a huge amount of literature on value chain studies. Many scholars have studied different value chains from various aspects. However, there are still some gaps in value chain studies. (1) Mostly, value chain studies concentrated on mapping actors, comprehending processes, and a zero-sum game rather than adding value to the chain. However, it is not sufficient to enable policymakers to take action. Many scholars seemed to underestimate the importance of understanding the factors shaping these processes, which are critical for policy measures (2) Even if some scholars studied the factors influencing value chains, they focused on those derived from the immediate sector. However, they paid less attention to the influencing factors derived from other sectors. On the other hand, there is limited research which has explored the factors shaping the maize value chain in Shan State. (3) The mainstream literature on efficiency of value chain has focused on monetary benefits, however, many scholars have paid little attention to non-monetary benefits, which are as important as, or more important than, monetary benefits. (4) Most agricultural value chain studies mainly focus on food crops. However, only a few agricultural value chain studies in Myanmar focused on feed crops. (5) There has been a limited number of empirical studies on maize value chain analysis in Myanmar. Above all, there are few cases of empirical maize value chain studies, which provided insights into governance, and trust in the chains and the factors influencing the overall value chain.

# Chapter 3

## Research Design

## 3.1 Introduction

This chapter provides the justifications for the selection of a research methodology, the strategies of research and case study design. It describes the selection of research sites and cases for different value chain actors. This chapter also outlines the selection of interviewees. Data collection methods and data analysis methods are also discussed in separate sections.

## 3.2 Research Design

The overall aim of this research is to better inform policymaking in agriculture which will contribute to the improvement in the performance of the maize value chain in Myanmar. Specifically, this study provides insights into how the maize value chain in Shan State of Myanmar has been operating, and which factors have been influencing the chain. A clearer picture of the influencing factors for the maize value chain can provide appropriate recommendations for improving it in Shan State. In this research, a value chain approach was used.

In this context, value chain analysis is a powerful tool for identifying comparative advantages and policy issues for the stability of market of a given product. The World Bank used a value chain approach to identify the issues of agricultural market facilitations, promotion of export and competitiveness. This was very helpful for assessing current issues of value chain and exploring potential ways of stabilizing markets of agricultural products (Webber, C.M. & Labaste, P., 2008). Qualitative research methodology is used to understand the process, and the why and how of the system. It can then provide a deep insight of the process (Yilmaz, K., 2013).

## 3.3 Strategy of Research and Design of Case Study

In this research, a case study approach was used as the research strategy as it can help to gain a holistic picture of a phenomena or a process (Noor, K.B.M., 2008). A case study provides a comprehensive method for exploring and researching a case. While generalized quantitative data does not examine various factors that shaped the case, case studies help the researchers to draw more satisfying causal interpretations. Moreover, it is important for developing a nuanced aspect of reality and improving the researcher's learning skills required for doing

research (Widdowson, M., 2011). Case study methods provide researchers with comparative advantages relative to formal model or statistical methods. Those consist of the application and measurement of qualitative variables, exploration of potential influencing factors within specific cases or contexts, and a heuristic identification of hypotheses or new variables. Moreover, the case-study method has the advantage of providing a framework through which a researcher with limited time and resources produce what may be appropriate data on a specific case (Collier, D., 1993). On the other hand, there are also disadvantages of a case study. One of the most common disadvantages is that they are susceptible to selection bias (Geddes, B., 1990).

In this research, therefore, single case studies in multiple sites were conducted to collect comprehensive information on a variety of factors influencing the maize value chain in Shan State.

As shown in Table 3.1, there were 69 interviews with different actors across the maize value chain – 33 maize farmers, 11 maize wholesalers, two transportation business owners, ten poultry farmers, one feed factory, one dryer owner, two interviews with four extension officers, two people from commodity exchange centre, five exporters, and one person from Pulses, and Sesame and Maize Association.

*Table 3.1 List of interviews by locations and types of actors*

| | Location | Interviewee | Number of Interviews | Remarks |
|---|---|---|---|---|
| 1 | 11 villages in Taunggyi Township | Maize Farmers | 33 | Seven major maize villages four non-major maize villages |
| 2 | Taunggyi | Maize Wholesalers | 11 | Five wholesalers from urban area of Taunggyi and six from rural area |
| | | | | |
| 3 | Taunggyi | Transportation Business Owners | 2 | |
| | | | | |
| 4 | Taunggyi | Poultry Farmers | 10 | Six from outside livestock zone and four from Livestock zone but not from Yangon. |
| | | | | |
| 5 | Taunggyi | Feed Factory | 1 | Other feed factories did not accept my request for interview |
| | | | | |
| 6 | Taung-Lay-lone, Taunggyi | Drier | 1 | One wholesaler with drier was also interviewed in addition to this dryer owner. Therefore, |

| | | | | |
|---|---|---|---|---|
| | | | | in total there were two dryer owners in the interviews. Another one was included in the wholesaler list. |
| | | | | |
| 7 | Taunggyi | Extension Officers (Group) | 2 | Two interviews – two extension officers in one interview |
| | | | | |
| 8 | Muse | Maize Commodity Exchange Centre | 2 | |
| | | | | |
| 9 | Muse, Mandalay, and Yangon | Exporter | 5 | Two from Muse, one (3 exporters in one group) from Mandalay, and two from Yangon |
| | | | | |
| 10 | Yangon | Maize Association | 1 | |
| | | | | |
| 11 | Yangon | CP seed | 1 | |
| | | | 69 | |

## 3.4 Preparing for Interviews

There were two stages in preparing this research. In the first stage, a scoping mission was conducted in December 2018. In this mission, a field visit to Taunggyi and maize-growing villages was made to observe ground situations in support of research design development. In this trip, a male interpreter, and a male driver who had good knowledge of the local context, were hired for this scoping mission. In particular, the driver had good knowledge about maize because he used to be a maize wholesaler. With the help of this driver, several maize wholesalers were contacted and asked some questions about maize trading and maize farmers. The wholesalers provided valuable information about categories of wholesalers such as small-scale wholesalers and large-scale wholesalers, and categories of villages – major maize villages and non-major villages. The driver also knew the locations of maize-growing villages. During this scoping mission, several villages were visited. Some general questions were asked of some farmers in those villages (e.g. nature of major maize villages and non-major maize villages, the flow of information, maize price and markets, productivity, maize-growing practices and so on).

An interpreter was hired because most maize farmers in Taunggyi township speak their own specific dialect. There are also some factors that should be considered in hiring an interpreter. First, an interpreter should be able to speak both Burmese, which is the major language of Myanmar, what the researcher speaks, and Pa-O, which is a local language because the

researcher speaks only Burmese, and the interviewees speak only Pa-O. Second, the interpreter should be well-experienced in the professional interpreting service. Third, the interpreter should also have knowledge about agricultural research so that she/ he can convey the messages from the interviewer to interviewees, or from the interviewees to the interviewer, without deviating from what the interviewer and interviewees mean because the nature of research language is often different from that of daily routine language. Fourth, the interpreter should be female if the interviewer or researcher is male, in order to reduce some adverse psychological effects on the interviewees. For example, if there were only one female household member in the interviewed household, she might not feel comfortable to be interviewed with three male strangers, including the driver. Therefore, the male interpreter in the scoping mission was not hired again in this research trip. Fortunately, an interpreter, who met all the aforementioned criteria, was hired for this research. She was a professional tour guide and had interpreting experience between the English language and Pa-O language which was widely used in Taunggyi rural area. Moreover, she could also speak the Burmese language which was the official language of Myanmar. Above all, she had been trained for an agricultural development survey in Southern Shan State and used to be a supervisor of an enumerator team for that survey. This experience helped her a lot to better understand the nature of the research. The interpreter was trained for one day so that she could comprehend the nature and objectives of this study and gain overall insight into the whole set of semi-structured questions.

The same driver as the scoping mission was re-hired for this research trip for several reasons. Firstly, he had a good connection with the maize wholesalers and good knowledge of locations of maize villages because he used to be a maize wholesaler before working as a professional driver. Moreover, he could also speak both Pa-O and Burmese languages. Therefore, the researcher had to request the car rental in advance to assign the same driver as the scoping mission.

## 3.5 Selecting Research Sites for Different Value Chain Actors

### 3.5.1 Research sites for interviewing farmers

Shan State was selected for the proposed research for two main reasons – (1) it is strategically located in the eastern and north-eastern part of Myanmar, sharing a border with China where more than 90% of maize exports go through cross-border trade, and (2) about 50% of the national maize-growing area is located in Shan State (USDA, 2017).

Taunggyi is one of the major maize townships in Southern Shan State. Therefore, maize farmers, wholesalers, poultry farmers, transporters and public extension agents from Taunggyi were available in one location to be interviewed. According to the nature of the maize value chain, however, other actors were selected from other regions. For instance, exporters from Muse, which is located in Northern Shan State and a major city for border trade with China, the Mandalay Region, and the Yangon Region, which is a major overseas trade point, were also selected for the interviews.

A scoping mission to Taunggyi township was also conducted before doing research in December 2018. During this mission, open interviews/ conversations were conducted with farmers and wholesalers in Taunggyi township. In particular, it was found that there were two types of maize villages - **major maize villages** where most of the farmers grew maize on a major part of their land, and **non-major maize villages** where most maize farmers grew their maize on a small part of their land. Moreover, it was also learned that there were two types of wholesalers. **Large-scale wholesalers** were those who bought their maize from both farmers and other wholesalers and sold it mainly to feed factories and exporters, while **small-scale wholesalers** were those who bought their maize only from farmers directly or via agents/ truck owners and sold it only to large-scale wholesalers. Based on information collected through those interviews, potential research sites and value chain actors were identified.

**Selecting villages for interviewing farmers** - Before conducting interviews with farmers, major maize villages and non-major maize villages were identified with the help of the people who had good knowledge of maize production areas in Taunggyi, particularly from maize wholesalers as a preliminary stage. Moreover, a driver who was a former maize wholesaler in Taunggyi was also intentionally hired for this research trip. He contributed a lot of his knowledge to the selection of major maize villages and non-major maize villages. More information was sought from farmers interviewed earlier in order to validate the information on maize villages provided by maize wholesalers. Farmers from 11 villages – seven major maize villages and four non-major maize villages were interviewed. These villages were selected based on different factors – major maize villages and non-major maize villages, different directions and distances from Taunggyi, and easy and difficult accessibility to villages.

### 3.5.2 Selecting sites for wholesalers

There were three sites of wholesalers for this research – two in rural areas and one in the urban area. All interviewed wholesalers were located in Taunggyi township. In the early years of commercial maize production in Shan State, wholesalers were mainly based in the Taunggyi urban area.

Recently, for different reasons, some trading centres were established in rural areas, particularly major maize villages. First, some wholesalers moved to the rural area to be one jump ahead of other wholesalers from the urban area in organizing maize farmers from whom they purchased maize. That was also one of the advantages in attracting farmers. Second, land prices in rural areas were cheaper than that in urban areas. This enabled them to buy a large area of land, not only for trading centres, but also for warehouses. Third, the car-parking problem became dire in urban areas while many trucks from different villages came to their trading centres to sell and unload their goods. Further, 12-wheeled or 20-wheeled trucks came to their trading centres or warehouses to load goods including maize. If space was too small, it was difficult for those large trucks to park. These factors drove some wholesalers to move to rural areas. Fourth, some new wholesalers had started their business in maize trading and established their trading centres and warehouses in rural areas as well. As a result, farmers could save transportation costs by selling to those based in rural areas and have better access to wholesalers.

On the other hand, some other wholesalers remained in the urban area for different reasons. First, they also traded other crops such as sebesten leaves, garlic, ginger, and pulses, which came from non-major maize villages, most of which were in the opposite direction from Taunggyi to the major maize villages. Second, they did not want to make invest in buying new land and building new facilities for new trading centres and warehouses in rural areas.

### 3.5.3 Selecting sites for interviewing exporters

There are three research sites for interviewing exporters – Muse, Mandalay, and Yangon.

**Muse** – this is a border trade point with China, which is located in Northern Shan State. It was a major outlet for Myanmar maize, and more than 90% of the total maize export went to China if the border trade with China was open for maize. The Muse border trade point was the largest of 17 border trade points in Myanmar with China, Thailand, India, and Bangladesh. In the 2018-

2019 Myanmar fiscal year, total trade value was US$ 4.6 billion (from 1 Oct-2018 to 20 Sept-2019) out of total border trade of US$ 9.9 billion. Therefore, the Muse border accounted for 47% of the total border trade of Myanmar (Ministry of Commerce of Myanmar, 2019).

**Mandalay** – It is the second largest city where the second largest agricultural commodity exchange centre in Myanmar is located. Mandalay exporters exported their maize to China via Muse and Thailand via Myawady. Myawady is a border trade point with Thailand. During the closure of border trade with China, it became a major outlet for Myanmar maize export (about 90%). It was the second largest border trade point in Myanmar. Myawady accounted for about 9.5% of total border trade value (Ministry of Commerce of Myanmar, 2019).

**Yangon** – This is the largest city of Myanmar, and the largest overseas trade point of Myanmar. Myanmar maize was exported to other countries via overseas trade through Yangon international ports. However, the amount of overseas trade of maize through Yangon fluctuated markedly, depending on border trade with China - whether the border trade was open or not.

### 3.5.4 Selecting Research Sites for Extension Workers

**Taunggyi** – There is only one public extension office at the township level. In this context, two group interviews were conducted at the township extension office. One group consisted of two senior extension workers, and another consisted of two junior extension workers. According to the interview with senior extension workers, the extension service was mainly focused on rice.

### 3.5.5 Selecting Research Sites for Poultry Farmers

**Taunggyi** – There were two main sites for poultry farmers. Both sites are located in Taunggyi Township. In particular, one site is the Special Livestock Zone in Taunggyi township and another site consists of the areas outside the Zone. Both layer and broiler farmers were included in the interviews.

The Special Livestock Zone in Taunggyi was opened in 2004. Only layers were allowed to be farmed in this poultry zone. This zone was one of the largest layer populations in Myanmar. According to interviews with poultry farmers in this zone, poultry farm sizes had grown by 2-5 times from 2004 to 2019 (interview time).

There were some villages that had both layers and broilers and were outside the livestock zone. Many farmers converted their broiler farms into layer farms for various reasons. First, broiler prices fluctuated while egg prices were quite stable. Many companies also reared broilers on a large-scale, and poultry farmers cannot compete with them. According to the interviewed farmers from those villages, broiler poultry farms also increased in size by three to five times over the last five years. There were also many Chinese-owned broiler farms around the village where the two poultry farmers were interviewed. However, they could not speak Burmese and did not accept the request for interview. According to the villagers, these Chinese farms were established over the last five years.

### 3.5.6 Selecting Research Sites for Transportation

**Taunggyi** – Only two transporters from Taunggyi were interviewed. Taunggyi is a major trading centre of Southern Shan State for different commodities, including maize. Of two interviews, one transporter mainly focused on maize, and another mainly focused on eggs, minerals, and other agricultural products. The maize transporter started his transportation business in 2005. In the early years, he focused on transportation of wheat and pulses. However, after 2010, he mainly transported maize. Finally, he has been transporting only maize since 2015.

### 3.5.7 Selecting Research Sites for Dryers

Two interviews were conducted with maize dryers. Both dryers were located in Taunggyi township; one in a rural area and another in an urban area. Both dryer owners work both drying and trading maize. One dryer owner focused on trading dry maize, even though he has small-scale dryers, while another mainly focuses on dryers, even though he also buys dry maize.

Although there were more dryers in the rural areas of the township, there was no chance to interview those dryers because it was not the maize-drying season at the time of interview, and the dryer compounds were closed and locked.

### 3.5.8 Selecting research sites for Feed Factories

Even though there are a number of feed factories in Taunggyi, only one factory called Tatchaung accepted the request for an interview. However, there was no chance to

interview senior staff of the factory, only the junior ones. Other factories in Taunggyi refused the request for interview for different reasons, as did other factories in Yangon and Mandalay. Some factories said that the person responsible was too busy to accept an interview and they did not know when those responsible would be available. Some factories said the data about maize were confidential, and they could not share it with others.

## 3.6 Selecting Interviewees

Sixty-nine semi-structured interviews were conducted for this research - 33 with maize farmers, 11 with maize wholesalers, ten with poultry farmers, two interviews with transporters, two group interviews with extension officers, five with exporters, two with transporters, one with a feed factory and three with the Maize Producers and Exporters Association. In selecting interviewees, many factors are considered to enrich data. For example, different locations, different scales of production or trade, and gender were taken into consideration.

In selecting research participants, three sampling methods – convenience, purposive and snowball sampling methods were used. The snowball sampling technique was advanced by Goodman (1961). In this technique, every individual participant in the population can nominate other participants in the same population. In selecting maize farmers, both convenience and snowball methods were used. In particular, the first farmer of a selected village was selected, not randomly, but based on his/her availability, regardless of his/her landholding size even though diverse landholding sizes – small-scale, medium-scale and large-scale farmers were to be selected as much as possible. Only after interviewing the first participant, the other two participants in the same village, who were different from previous participants in terms of landholding size and gender (if possible), were selected with the snowball method, based on the information provided by the first participant. The same procedure was used in selecting wholesalers, exporters, poultry farmers and transportation men. The subsequent participants are requested again to nominate other participants (Eland-Goossensen, M.A., Goor, L.V.D., Vollemans, E., Hendriks, V., & Garretsen, H., 1997). In this sampling procedure, the first interviewee was selected, based on either probability or non-probability methods. After that, the following interviewees were chosen, based on the information obtained from the first interviewee (Taherdoost, H., 2016).

In selecting key informants such as people responsible for Muse Commodity Exchange Centre and agricultural extension officers from Taunggyi township, the purposive sampling method was used because there was no other choice other than those who could provide specific information in their roles. The purposive sampling technique is a technique in which research participants are selected deliberately to collect key information, which cannot be provided by others (Maxwell, J.A., 2012). Furthermore, this method deliberately chooses a respondent because the participant has special qualities to provide important information on research topics (Etikan, I., 2016).

### 3.6.1 Selecting Farmers

In selecting farmers to be interviewed, many factors were considered to ensure a diverse range of farmers in order that data be rich as possible – small-holder, medium-holder and large-holders, female, and male interviewees. Sometimes, both household heads and their spouses were interviewed at the same time for each household to enrich data from each interview. When a visit was paid to a maize village for interviews, a convenient household was first selected. After that, the required information of other households in the village was sought from those respondents such as female-headed households, different landholding sizes of households, and any households with different farming characteristics.

In this study, farm sizes were defined by interviewed farmers. According to the farmers, large holders were those whose total production of maize was over 10,000 visses (16,200 Kg); medium farmers were those whose total production of maize was between 5,000 visses (8100 Kg); and 10,000 visses (16,200), and small holders were those whose total production was below 5,000 visses (8,100 Kg). Accordingly, farmers were selected to be interviewed to cover all farm size holders as much as possible.

As shown in Table 3.2, 33 farmers from 11 villages – seven major maize villages (MMV) and four non-major maize villages (NMV) were selected, and three farmers from each village were interviewed. Of the 33 interviews with farmers, 15 were conducted with female interviewees, eight with male interviewees, and ten interviews with both female and male interviewees. Out of 15 female interviewees, seven were household heads. Even though some were not household heads, they were more confident than their spouses to being interviewed. In some cases, male household heads were away from their home at the time of interviews. All male individual interviewees were household heads. In some cases, their spouses were not confident in being

interview participants and, in some cases, their spouses were away from their home at the time of interview. In some cases, both female and male interviewees participated in the interview because they wanted to fill the gap with each other in answering interview questions.

There were also some cases in which interviews were cancelled for different reasons. Some interviewees came to know amid interview that they did now recall some memories or could not give clear opinions on some situations without their spouses. Therefore, they were not willing to complete the interviews. In some cases, some interviewees could not complete the interviews because they came to have some urgent issues. For example, a village head called them for urgent issues. Sometimes, the religious leader of their village called them away.

There were also some limitations in selecting farmers. According to the research strategy, each land size of holders – small, medium, and large from each village - were to be selected so that the data was rich. However, in some major maize villages, there were no small and/or medium holders. Even though there were a few small and medium holders in some major maize villages, the household members were away from their home at the time of interview. Some were away travelling, and some were staying at their orchards for a couple of months in the high season of their crops, which were located far away from the villages. Likewise, for some instances, there were no medium and/or small holders of maize farmers in some non-major maize villages. On the other hand, even though there were a few medium or small holders in those villages, household members were away from their home at the time of interview for the similar aforementioned reasons. In those cases, all three sizes of holders of maize farmers could not be interviewed from those villages.

In this way, 33 farming households from 11 villages were interviewed until the point where almost no new information could be collected from further interviews.

*Table 3.2 Types and locations of villages and gender of interviewed farmers (NMV = Non-major maize village, MMV = Major maize village, F=Female, and M=Male)*

| | Location/ Village ID | Number of Interviews | Gender | | |
|---|---|---|---|---|---|
| | | | F | M | Couple/F+M |
| 1 | NMV1 | 3 | 1 | 1 | 1 |
| 2 | MMV1 | 3 | - | 2 | 1 |
| 3 | MMV2 | 3 | 1 | 1 | 1 |
| 4 | MMV3 | 3 | 2 | - | 1 |
| 5 | NMV2 | 3 | 1 | 1 | 1 |
| 6 | MMV4 | 3 | 2 | - | 1 |
| 7 | NMV3 | 3 | 1 | 2 | - |
| 8 | MMV5 | 3 | 3 | - | - |
| 9 | NMV4 | 3 | 2 | - | 1 |

| | | | | | |
|---|---|---|---|---|---|
| 10 | MMV6 | 3 | 1 | 1 | 1 |
| 11 | MMV7 | 3 | 1 | - | 2 |

### 3.6.2 Selecting wholesalers

In selecting wholesalers, it is difficult to categorize their size because no wholesaler wanted to tell their trade volume. In Myanmar, it was a transition period from military rule to democracy. During military rule, the tax system was very weak, and people did not need to pay tax directly for their income. However, the tax system had been reformed by democratic governments. Meanwhile, many businessmen did not want to tell their trade volume lest the Government could estimate their profits or income. In this context, there is no exception to maize wholesalers. Even though the background and objectives of this study were well explained, they did not trust the interviewer. Therefore, according to their ways of trading, the size of wholesalers was categorized into two small and large scales. These sizes were categorized by the wholesalers, who were interviewed. Generally, they defined that small-scale maize wholesalers are those who mostly cannot sell their maize directly to feed factories or exporters, only to other wholesalers. A large-scale wholesaler is defined as one who can sell their maize directly to feed factories or exporters. In this way, both small-scale and large-scale wholesalers were selected for this study.

Generally, it was difficult to interview wholesalers as a stranger. Fortunately, the driver hired for this research trip was a former maize wholesaler and was helpful in contacting and interviewing wholesalers. Sometimes, the help of some wholesalers was sought to contact other wholesalers so that they could trustfully accept the request for interviews. This helped a lot to build trust between wholesalers and the interviewer to some extent. In this way, four small-scale maize wholesalers and seven large-scale wholesalers were selected for this study. In this context, the number of small-scale wholesalers was smaller than large-scale ones because the way of trading of small-scale wholesalers were simple. They bought maize directly from farmers and sold it to other large-scale wholesalers. After interviewing four small-scale wholesalers, no new information was collected from them, and it was determined that further information would not be gained from additional interviews.

On the other hand, large-scale wholesalers used different ways of trading. There were some large-scale wholesalers who bought maize only from farmers, while others bought from both farmers and small wholesalers. Sometimes, large-scale wholesalers also bought maize from other large-scale wholesalers, and some large-scale wholesalers sold their maize only to feed

factories. Many large-scale wholesalers sold their maize only to the CP company due to premium prices offered, while others sold their maize to other feed factories rather than CP for different reasons such as flexible quality control, and the inconsistent quality control system of the CP. There were also wholesalers who sold their maize only to exporters. However, there were other wholesalers who sold their maize to different buyers such as feed factories, exporters, dryers, and poultry farmers. There were some wholesalers who integrated the value chain – they sold inputs; they provided credit; they provided services such as tractors, threshers, and transportation; they bought maize; they established dryers; and they sold maize to other buyers. They also provided storage facilities for maize farmers. Most wholesalers did at least four of these activities.

Recently, new trading centres emerged in rural areas. Wholesalers moved their trading centres from urban areas to rural areas, while others established trading centres in the rural areas as a new business. Wholesalers moved their trading centres for different reasons. Wholesalers wanted to take a jump ahead of other wholesalers in urban areas in organizing farmers, on the other hand, they could also provide incentives to farmers because of lower transportation costs from their farms to trading centres. Moreover, they could buy land at a lower price than those in urban areas, while maize is a bulky commodity and needs a large space for transactions and storage. In addition, there is limited space for parking their trucks in the urban area. This parking problem can be solved by establishing their trading centres in the rural areas. As shown in Table 3.3, this study involved wholesalers from three trading zones in Taunggyi township covering both rural and urban areas.

*Table 3.3 Zones and gender of interviewed wholesalers*

| | Location | Number of Interviews | Gender | | | Remark |
|---|---|---|---|---|---|---|
| | | | Female | Male | Couple/F+M | |
| 1 | Rural Trading Zone1 | 3 | 1 | 2 | - | |
| 2 | Rural Trading Zone 2 | 3 | - | 2 | 1 | mum + son |
| 3 | Urban Trading Zone 3 | 5 | - | 4 | 1 | |

### 3.6.3 Selecting Poultry Farmers

There are two types of poultry farmers – broilers and layers. Recently, most farmers converted from broilers to layers for different reasons, such as high fluctuations of broiler price and stable price of eggs. Therefore, only two out of ten interviewed poultry farmers were broiler farmers; the rest were layer farmers. As shown in Table 3.4, this study involved poultry farmers from three different zones covering both broiler and layer farmers.

Broiler farmers bought all types of feed from the feed company while layer farmers need to buy only starter feed from the feed companies. According to a layer farmer, generally, the layer farmers who owned more than 3000 hens, have their own feed mixers. They bought maize from maize wholesalers and/or farmers, which constitute 55-60% of feed and other ingredients from others. However, there were also some layer farmers who did not use their own feed mixer, even though they owned more than 10,000 hens. Instead, they bought feed directly from the feed companies.

*Table 3.4 Zones and gender of interviewed poultry farmers. (PV= Poultry village and SLZ = Special Livestock Zone)*

| Day | Location | Number of Interviews | Gender | | | Remark |
|---|---|---|---|---|---|---|
| | | | Female | Male | Couple/ 2 family members | |
| 1 | Taunggyi + PV1 | 3 | - | 3 | - | |
| 2 | PV1+PV2 | 3 | 2 | - | 1 | |
| 3 | SLZ | 4 | 2 | 1 | 1 | One male interview – Uncle + nephew |

### 3.6.4 Selecting Transporters, Dryers, and Extension Officers

**Transporters** - Only two transporters were interviewed for this study. Most of the transporters were not based in Taunggyi. Both selected transporters transported maize. However, one transporter mainly transported eggs, and another transported only maize. The transporter who transported only maize also moved other goods in the early years of their transportation business; after 2010, maize became his major produce, then, maize became the only goods transported after 2015.

**Dryers** – two dryers were interviewed for this study. Even though there were some other dryers, there was no chance to interview them because these were closed since it was off-season.

**Extension Officers** – two group interviews with public extension officers from Taunggyi Township were conducted. Each group consisted of two officers. One group interview was conducted with junior officers and another with senior officers.

## 3.7 Data Collection

Data was collected through interviews with different actors in maize value chains such as maize farmers, wholesalers, exporters, transporters, feed factories and poultry farmers, public extension officers, and key informants from Trade Associations.

### 3.7.1 Semi-structured Interviews

Semi-structured interviews were conducted to explore the practical experiences and influencing factors behind the practices of value chain actors through the maize value chain in Shan State, Myanmar. As one of the obvious advantages, semi-structured interviews provide the researcher with the opportunity for previously undiscovered information to come to light. Participants in the research can be viewed as experts by experience. Accordingly, new and unusual information can emerge if they are provided with adequate opportunity to express their experiences and views freely (O'Keeffe, J., Buytaert, W., Mijic, A., Brozović, N., & Sinha, R., 2016). The semi-structured interviews are designed to explore subjective responses from respondents in the context of a specific situation or phenomena, in which they have experience. The interview questions focused on the responses of respondents (Merton, R.K. & Kendall, P.L., 1946). Respondents are allowed to respond freely to open-ended questions, and the researcher can further explore their responses. This makes the semi-structured interview unique amid different interview methods for the extent of relevancy as it remains responsive to the respondent (Bartholomew, K., Henderson, A., & Marcia, J., 2000). Therefore, in this research, the semi-structured interview questions were designed to go through the experience and perspectives of each participant – what, how and why they were practicing. Follow-up questions were then asked based on their responses.

### 3.7.2 Document analysis

In this study, document analysis was also conducted to assess relevant documents, which cover the maize sector in Myanmar. Those relevant documents were analysed to get information on

revealed respective roles of different actors in the maize value chain and its background and process in Shan State. Documents were collected from both public and private organizations. The following documents were compiled in this study.

(a) Some documents were collected from the Extension Division of Ministry of Agriculture, Irrigation and Livestock. (e.g., extension programmes and techniques, cropping areas by village/village tracts in Taunggyi township.)

(b) Some documents were collected from Muse Pulses, Sesame and Maize Association. (e.g., daily, and monthly maize prices and trade volume, and some official documents for trade negotiations between China and Myanmar.)

### 3.7.3 Data analysis

Thematic analysis was used in this study. Thematic analysis is a data analysis method, which is used for qualitative data analysis for identifying, analysing, and reporting themes within data (Braun, V. & Clarke, V., 2006). In this method, the data set is organized and described in detail (Boyatzis, R.E., 1998). It is an effective, but flexible method for qualitative data analysis which can be applied in several paradigmatic orientations (Kiger, M.E. & Varpio, L., 2020). Thematic analysis should be regarded as a foundational method for analysing qualitative data even though qualitative methods were varied, complex and nuanced. It is the basic method a researcher should know because it provides crucial skills helpful for carrying out many other methods of qualitative analysis. Flexibility is one of the advantages of thematic analysis (Holloway, I. & Todres, L., 2003). Researchers have advised that thematic analysis is appropriate for qualitative researchers from beginner to master in qualitative research (Braun, V. & Clarke, V., 2006, 2012; Terry, G., Hayfield, N., Clarke, V., & Braun, V., 2017).

A theme covers something which is important about the data with respect to the research question, and captures some degree of patterned response with the data set (Kiger, M.E. & Varpio, L., 2020). In conducting thematic analysis, themes can be identified regardless of the frequency of a specific idea regarding the theme found in a data set. Moreover, the essence of a theme does not necessarily reflect the number of times it appears in the data set (Nowell, L.S., Norris, J.M., White, D.E., & Moules, N.J., 2017). Basically, there might be several examples of a theme throughout the data set. However, more examples do not essentially mean that the theme is more important (Kiger, M.E. & Varpio, L., 2020).

Firstly, all interviews in this research were transcribed by transforming audio records into word processing. Transcription is a crucial practice in qualitative research (Davidson, C., 2009). As suggested by Ashmore & Reed (2005), during transcription, records were played back and forth to have a clear message. Transcription involves a translation of sound/ picture from recording to text (Slembrouck, S., 2007).

According to Kiger and Varpio (2020), there are six steps in the most widely used framework for undertaking thematic analysis – (1) familiarizing yourself with the data, (2) creating initial codes, (3) exploring themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report. Accordingly, in the first step, the researcher often listened to audio records of interviews and reviewed notes taken during or after interviews at the end of each research day, or before transcription. After transcription, texts were also repeatedly read to gain a thorough insight into the data. Even though transcribing audio data is time-consuming, it serves as the best way to be familiar with the data (Kiger, M.E. & Varpio, L., 2020). Therefore, the researcher, himself, transcribed all audio records of interviews to get a better familiarity with the data set. In the second step, the researcher took notes on key points and preliminary ideas that could be potential codes. A code can be defined as "the most basic segment, or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon" (Boyatzis, R.E., 1998, p. 61). After defining the coding template, the same codes were applied to the whole data set by naming data extracts with related codes and taking notes on potential connections between ideas or items which might be useful for developing subsequent themes. In the third step, coded data extracts were thoroughly examined for developing themes. Themes were then established by analysing, combining, and comparing codes. In the fourth step, the entire data set was reread to review themes to reflect coded data. In the fifth step, the researcher polished up each theme and screened the most potentially important themes to be included in the report. In the final step, the researcher wrote up a description of findings.

### 3.7.4 Reflections on field work

There were two parts to the field work – conducting the scoping mission and the field research. Before conducting research, a scoping mission was conducted for two weeks in December 2018. During the scoping mission, the researcher visited both rural and urban areas in Taunggyi township and Hopong township. Open interviews with maize farmers and wholesalers were made based on three main processes – how to buy, how to make and how to sell. During these open interviews, farmers and wholesalers were asked about roles in the maize value chain.

Moreover, questions about the nature and background of farmers and maize villages were also given to farmers. Similarly, in addition to the three main processes, wholesalers were also asked about the nature of wholesalers and maize villages. During this scoping trip, public agencies such as the Department of Agriculture and Department of Agriculture Land and Statistics in respective townships, were also met. During the meeting with the officers of these departments, the documents related to village data on cropping areas by crops were also collected.

For field research, it took almost three months from late June to mid-September 2019. Before the research rolled out, the research areas, or the places where interviews were to be conducted, were roughly selected based on the information gained from the scoping mission. There were four research areas in the study – Taunggyi for maize farmers, maize wholesalers, maize transportation businesses, poultry farmers, and extension officers, Muse for maize exporters and Muse Commodity Exchange Centre for maize, Mandalay for maize exporters, and Yangon for maize exporters and Head Office of Pulses, Sesame and Maize Association. A decision was then made on which areas, or which actors, should be interviewed first in line with the local context.

The researcher decided in which month the interviews with farmers should be conducted to avoid their peak season. Generally, according to information collected during the scoping mission, farmers were extremely busy with their farming activities in the first months of the monsoon season (May and June). Fortunately, the onset of the monsoon in 2019 was later than normal years in many villages of Taunggyi township. Therefore, the researcher started interviews with farmers before the onset of the monsoon. Even though some of the selected villages already had monsoon rainfalls, farmers had not finished growing maize on all their parcels and were waiting for the forthcoming rainfalls for growing maize on the rest of the parcels and doing other activities. There was no more rainfall in the selected villages until all interviews with farmers had been finished. Therefore, it was the right decision to start interviews with farmers.

After interviewing farmers, maize wholesalers were interviewed in three places in Taunggyi township – two in rural areas and one in the urban area. In this study, wholesalers in rural areas were interviewed first as, according to the experience in the scoping mission, it was easier to approach rural people to interview than those in urban areas. As a result, before knowing the context of wholesalers well, the researcher had a more comfortable and longer time to

interview wholesalers in rural areas. Finally, 11 wholesalers were successfully interviewed, including those in urban areas.

Two people from different transportation business in Taunggyi were also interviewed. They were not on the interview list in preparing a research plan because the important role of transportation in the maize value chain was known only after interviewing wholesalers. After interviewing farmers, poultry farmers in Taunggyi township were also interviewed. In terms of location, poultry farmers were selected from two main areas – special livestock zone and non-special livestock zone. In terms of types of poultry, both layer and broiler farmers were interviewed. Two employees of a feed factory in Taunggyi were then interviewed. Even though there were four to five feed factories in Taunggyi township, the research had access to only one feed factory to interview because other feed factories did not accept the researcher's request for an interview for different reasons. The interview with the feed factory was followed by those with extension officers from the Extension Division of Department of Agriculture in Taunggyi township. Two interviews with extension officers were conducted while the first interview was carried out with two female officers and the second one was with two male officers. The two female officers did not want to be interviewed individually due to their embarrassment, whereas two male officers did not want to be interviewed individually due to their limited confidence. Like transportation businesses, a dryer owner was also interviewed even though it was included in the planned interview list because, after interviewing farmers and wholesalers, the researcher learned that the dryer also played a vital role in the maize value chain. Therefore, farmers, wholesalers, transportation businesses, poultry farmers, feed factory, dryer and extension officers were interviewed in Taunggyi, Sothern Shan State.

After interviewing different actors of the maize value chain in Taunggyi, the researcher proceeded to Muse, which is a city famous for a border trade with China, to interview exporters and responsible people from Muse Commodity Exchange Centre for maize. In Muse, two responsible people from the Commodity Exchange Centre were interviewed to understand the process of border trade of maize with China and their organization's role. There were not many choices of exporters in Muse for interviewing for different reasons. Most maize exporters in Muse were away travelling while the researcher visited Muse because border trade with China was closed for maize. Some exporters were not willing to be interviewed as they were in hard times due to border closure. Therefore, for the first day in Muse, only one exporter was interviewed. However, the researcher had to wait for two days to have a chance to interview another exporter. Therefore, only two exporters could be interviewed in Muse.

The researcher proceeded to Mandalay to interview maize exporters and feed factories. However, no feed factory accepted the request for interview, and they said they must keep trading processes, procedures, and information confidential and were not allowed to share such kinds of information with others. The researcher then visited Mandalay Commodity Exchange Centre to interview maize exporters. Again, most of the maize exporters did not visit the centre because they mainly exported their maize to China via border trade and border trade with China was closed for maize. It was the low season for maize when the researcher visited their centre. However, a couple of exporters could be interviewed in the same interview.

Yangon was the last research place where two exporters, one adviser to Pulses, Sesame and Maize Association, and one person from CP company were interviewed. When the researcher visited Bayintnaung Commodity Exchange Centre to interview exporters, most of the exporters were not in the Centre and away from Yangon because it was the low season for maize. Among interviewed exporters, one mainly exported to Thailand via border trade, which was a new destination for Myanmar maize while the Chinese border trade was closed.

After interviewing all potential actors, the researcher conducted a preliminary analysis to check missing data for one week. Some interviewees were then contacted via phone or Facebook messenger to collect missing information or clarify confusing information.

# Chapter 4

## Case Descriptions

### 4.1 Background of Shan State

**Geography** - Shan State is located in the eastern part of Myanmar. It is the largest by land area in 14 administrative zones - seven States and seven Regions in Myanmar. Shan State covers almost a quarter of the whole country with a similar size to Nepal and Bangladesh, or about 58% of New Zealand. Taunggyi is at the elevation of 1436 m above sea level. Despite some plains, it is a hilly region. It also shares a border with China in the northern part, and Lao PDR and Thailand in the eastern part. It is located next to Yunnan Province which is a landlocked province of China and economically important for Shan State (UNDP Myanmar, 2015).

*Figure 4-1 Shan State (source – International Crisis Group)*

**Administration** – There are three administrative regions in Shan State – Southern Shan State, Northern Shan State and Eastern Shan State. Among these, Southern Shan State is the most accessible region and is relatively more secure than the other regions. Taunggyi is the capital city of Shan State, which is located in Southern Shan State and is the most secure township in the State. There is almost no conflict with ethnic armed organizations (EAOs) in Southern Shan State even though there are some active EAOs in some areas, sharing a border with Eastern Shan State. There are ten townships and three sub-townships in Taunggyi District, including Taunggyi township. Out of these, three townships are located in Pa'O self-administered zone, and two in Danu self-administered zone. However, there is no conflict with EAOs in Taunggyi District. Therefore, no conflict between EAOs and government military in the district favours the region for the development of agriculture (UNDP Myanmar, 2015).

**Agriculture** - Historically, Shan State is well-known in Myanmar for its diverse agricultural products, particularly fruits and vegetables. It is the only region in Myanmar in which orange, apple and pear are commercially and widely grown. Moreover, it is a major supply region of different vegetables. However, recently, many farmers had reduced the growing area of various crops, including vegetables, fruits, pulses, rice, wheat, and kitchen crops for various reasons. Instead, they substituted those crops with other marketable crops such as maize and soybean. Over the last two decades, Shan State became a major maize region, occupying more than a half of the total maize area of Myanmar (Interviews with farmers).

Most rural households in southern Shan State had access to agricultural land. Of the rural households, 85% with access to the land was much higher than other major agricultural regions in Myanmar such as Central Dry Zone (60%) and Delta (20%), even though the average landholding size was smaller than those regions (6.5 ac in Dry Zone and 10 ac in Delta regions). It was distributed more evenly than those regions (Belton, B., Win, K.Z., Myintzu, A., Aung, Z.W., Win, H.E., Naing, Z.M., Lin, S.T., Soe, K.W., Kyaw, S., Thu, E.T.T., Thun, K.M., & Fang, P., 2019).

**Characteristics of selected major maize villages** – Selected major maize villages were located in the plains even though Shan State, including Taunggyi, were mountainous areas. Accordingly, it was suitable for large-scale production of field crops such as maize. Among these, five of the selected major maize villages are located in the north of Taunggyi. Two of the major maize villages are located in the north. In these villages, almost every farmer grows maize as their major crop. Even though most maize farmers from those villages are large-scale farmers, there are also a small number of small-scale farmers. These major maize villages are mature maize-

growing areas. These are some pioneer villages in growing maize on a commercial scale using hybrid seeds. Among them, Thanthay village used to produce hybrid seeds of maize through a contract farming system with CP Company in the early years of commercial production of maize in Shan State. Mostly, maize is grown as a monocultural crop in these villages. However, one of the selected major maize villages mixed maize crop with lab lab bean. Moreover, some farmers from the major maize villages grew other horticultural crops - vegetables (e.g., cabbage, cauliflower, eggplants, tomato, and potato), and flowers after harvesting maize, particularly when they had access to irrigation. In one village, farmers grew some oil-seed crops such as sunflower, nijer, or rapeseed after harvesting maize, even though they did not have access to irrigation. These crops could be grown with residual moisture of monsoon rains. However, they need to harvest maize early if they want to grow a second crop and have access to drying facilities such as open ground to dry maize under the sun or dryers because the moisture content of maize was high in early months of maturity of maize. Generally, there was not much land to extend maize-growing areas because most of their land was occupied with maize. However, a farmer from a major maize village bought some virgin land from others, which was far away from his village, for extending his maize-growing area (Interviews with farmers).

Owing to such large-scale production of these villages, some maize-trading centres and input shops had moved to those rural areas (major maize villages) from urban areas (Taunggyi). Some new wholesalers and input shops are also established in those villages. Therefore, farmers from these villages have easy access to maize-trading centres and input shops. If these villages had good road accessibility for 12- or 20-wheeled trucks, some wholesalers would send such trucks directly to these villages (Interviews with wholesalers).

As shown in Table 4.1, landholding size of interviewed farmers from major maize villages (MMV) ranged from 1.25 acres to 25 acres.

*Table 4.1 Interviewed farmers' landholding size for major maize village*

| | **Farmer's ID** | **Landholding Size (ac)** | **Remarks** |
|---|---|---|---|
| 1 | MMV1F1 | 15 | |
| 2 | MMV1F2 | 25 | |
| 3 | MMV1F3 | 8 | |
| 4 | MMV2F1 | 1.25 | |
| 5 | MMV2F2 | 8 | |

| | | | |
|---|---|---|---|
| 6 | MMV2F3 | 8 | |
| 7 | MMV3F1 | 20 | |
| 8 | MMV3F2 | 13 | |
| 9 | MMV3F3 | 8.5 | |
| 10 | MMV4F1 | 6 | |
| 11 | MMV4F2 | 1.9 | |
| 12 | MMV4F3 | - | Missing data |
| 13 | MMV5F1 | 10 | |
| 14 | MMV5F2 | 5 | |
| 15 | MMV5F3 | 9.5 | |
| 16 | MMV6F1 | 10 | |
| 17 | MMV6F2 | 5.5 | |
| 18 | MMV6F3 | 5 | |
| 19 | MMV7F1 | 8 | |
| 20 | MMV7F2 | 5 | |
| 21 | MMV7F3 | 5 | |
| | **Average landholding size** | **9.4** | |

**Characteristics of non-major maize villages** – Selected non-major maize villages were mainly located in mountainous and sloping areas, particularly in the south of Taunggyi. Therefore, there are only a few large-scale farmers in those villages. Most individual farmers grow different crops such as vegetables, sebesten trees, wheat, rice, soybean, and pigeon pea in addition to maize (interviews with farmers).

Growing areas of other crops had decreased over a few years in these villages. Sebesten trees were a dominant crop in those villages, and farmers were still growing this crop constantly. However, they were reducing sebesten crop-growing areas in these villages for different reasons. First, there is a labour shortage problem. As it is a very laborious crop to cultivate, farmers were busy with this crop in 10 out of 12 months. The harvesting season for sebesten trees was also longer than other crops, taking about three months. During the harvest season, farmers had to work for 24 hours to save firewood because they had to fuel a huge amount of wood in the closed fireplace to roast the leaves. The increase in the number of children of farmers who were taking higher education in the cities exacerbates the labour shortage

problem. Second, there was a fuel wood shortage problem. They had to use fuel wood 24 hours a day for three months of the harvesting season for roasting sebesten leaves. On the other hand, most forest areas were converted into agricultural land. Sebesten farmers also found it difficult to extend or maintain growing areas of this crop. Moreover, young people's interest in farming, particularly in such a laborious crop, decreased. Therefore, farmers were becoming more interested in non-laborious crops. Moreover, growing areas of vegetables were also decreasing mainly due to the fluctuations of market and price (Interviews with farmers).

Therefore, growing areas of maize increased in these villages because it was relatively less laborious and had a more stable market.

Landholding size of interviewed maize farmers from non-major maize village (NMV) were small. As shown in Table 4.2, their landholding sizes ranged from 1.25 acres to 25 acres.

*Table 4.2 Interviewed farmers' landholding size for non-major maize village*

| | **Farmer's ID** | **Landholding size (ac)** | **Remarks** |
|---|---|---|---|
| 1 | NMV1F1 | 2 | |
| 2 | NMV1F2 | 4 | |
| 3 | NMV1F3 | 1.5 | |
| 4 | NMV2F1 | 1.5 | |
| 5 | NMV2F2 | 4 | |
| 6 | NMV2F3 | 2 | |
| 7 | NMV3F1 | - | Missing area data |
| 8 | NMV3F2 | 3 | |
| 9 | NMV3F3 | 4 | |
| 10 | NMV4F1 | 6 | |
| 11 | NMV4F2 | 5 | |
| 12 | NMV4F3 | 2 | |
| | **Average landholding size** | **3.2** | |

## 4.2 General Influencing Factors for the Maize Value Chain in Shan State

### 4.2.1 Climate

Myanmar is located in the tropical climate zone and is highly vulnerable to climate change. Frequency of extreme weather cases was higher after the 1980s. Several cases of El Nino and La Nina took place between 1981 and 2010 in Myanmar. For instance, one of the most severe El Nina cases was recorded during 1997-98, followed by La Nina in 1998-99. During the El Nino event in 2010, the recorded highest temperature was observed in Monywa with 45.8 C. In particular, 20 meteorological stations had a newly recorded highest temperature in May and June in 2010. In 2015-16, a strong El Nino was also experienced in Myanmar. Moreover, the rainfall pattern was also dramatically changed after 1981. The onset of monsoon became later, and the withdrawal of monsoon season was earlier. As a result, the number of rainy days in the monsoon season also significantly decreased from 144 days during 1961-1990 to 121 days during 1981-2010. Climate changes affected the cropping systems and patterns (Aung, L.L., Zin, E.E., Theingi, P., Elvera, N., Aung, P.P., Han, T.T., Oo, Y., & Skaland, R.G., 2017).

Even though Myanmar is a tropical country, in general, Shan State has a semi-temperate climate. Favourable climate conditions such as abundant sunshine, moderate temperature (average temperature in Taunggyi- the capital city of Shan State: 18.9 C) and annual rainfall (1010 mm) make Shan State a home to different kinds of crops. The maximum normal monthly temperature of Taunggyi ranged from 22.6 to 29.3 C, while the minimum normal monthly temperature ranged from 8.1 to 17.8. Even though average annual rainfall was about 1010 mm, rainfall distribution was concentrated in the monsoon season from May to October (Aung, L.L. et al., 2017). Maize farmers in Taunggyi often reported their concerns about climate change. Even in the interview year – 2019, the onset date of monsoon season was late in some major maize villages in Taunggyi. Although the normal onset date of monsoon fell in the last week of May, there was no rainfall until the end of June 2019 at the time of interview. Even the villages, which had received rainfalls at the normal date of monsoon onset, had insufficient rainfall to complete the cultivation of their maize until the second week of July 2019. Farmers, who had planned to grow a second crop after harvesting maize, decided not to grow maize in some parts of their land in the 2019 monsoon season. This was because they could not grow second crops, such as the high-value vegetables crops in time if maize was grown late. Their second crops were expected to provide them with higher income than maize. However, there were also farmers

who preferred maize to other crops because they believed that maize was more tolerant to climate change than the crops they used to grow. (Interviews with farmers).

### 4.2.2 Cropping System

Farmers in Shan State grew a variety of crops such as vegetables (cabbage, eggplants, lettuce, cauliflower, long bean, tomato), fruits (orange, apple, pear, mango, avocado , strawberry), pulses (soybean, pigeon pea, lab lab bean, horse gram), cereal crops (rice, wheat, maize), and other perennial crops (tea, sebesten, coffee), oil-seed crops (sunflower, groundnut, nijer, rapeseed), and kitchen crops (turmeric, ginger, garlic, onion, chilli ) in different townships. Traditionally, therefore, agriculture is a major livelihood for rural people in Shan State. Most of these crops were grown on a small-scale, despite large-scale production of some crops such as fruit trees, pigeon pea, tea, and maize. In particular, maize was grown on a large-scale in the plain area, even though it was grown for a small-scale production in the hilly regions (Interview with farmers).

Most maize farmers in Taunggyi township grew maize as a monocultural crop. The majority of large-scale maize farmers grew only maize on their farms for different reasons. First, they did not have access to irrigation to grow a second crop after harvesting maize, while average annual rainfall in Taunggyi was about 1010 mm, and rainfall distribution was mainly concentrated in the monsoon season from June to September. However, there was also a sequential cropping system and a mixed intercropping system. There were two types of sequential cropping system. First, the second crop was grown with residual moisture of monsoon rainfall, but without irrigation. In this system, farmers grew some oilseed crops such as sunflower, rape, and nijer after harvesting maize. Second, farmers grew horticultural crops such as vegetables and flowers after harvesting maize with irrigation. However, if they wanted to grow second crops, they had to harvest maize in the early days of the mature state so that second crops could be grown and harvested in time. In the mixed intercropping system, farmers grew maize with lab lab bean, and both crops were grown at the same time. However, maize was harvested earlier than lab lab bean. Some farmers harvested maize in the early days of maturity of the crop so that lab lab bean could be grown well. However, some could not harvest maize early for reasons such as limited access to the feeder road to their farmers, and drying facilities (Interview with farmers).

### 4.2.3 Social-cultural Context

According to the Myanmar population and housing census-14, the population of Shan State was 5.8 million. Shan State was one of the lowest regions in population density, which was 37.4 persons per square kilometre, while the overall population of Myanmar was 76 persons per square metre. The majority of Shan State population (76%) resided in the rural areas. For Taunggyi district, the total population was 1.7 million. Out of these, 381,639 resided in Taunggyi township. Even though the share of rural population in Taunggyi District was 62.7, it was 30.6% in Taunggyi Township. In general, therefore, Taunggyi District (37.3% urban population) and Taunggyi Township (69.4% urban population) were more urbanized areas, compared to the overall urban population of Shan State (24%) (Department of Population Myanmar, 2015).

Moreover, there are different ethnicities in Shan State such as Shan, Pa-O, Taungyo, Intha, Danu, Ahka, Lahu, Kachin (Jingpo), Lisu, and Shwe Palaung Ngwe Palaung, Burmese, Burmese Chinese, Burmese Gurkha. In Southern Shan State, particularly in the villages surveyed, there were 19 different ethnicities, among which the most common were Pa'O, Shan and Burmese (Bamar). Danu, Taungyoe, Kayan, Innthar, Lahu, Palaung, Kayin, Li Sue, Chinese, South Asian, and mixed ethnicities were also found. In some villages, households were made of a single ethnic group while others included up to 12 different ethnicities. At least one out of three communities hosted households of mixed ethnicity. On average, villages accommodated households from two different ethnicities (Lambrecht, I. & Belton, B., 2019). These different ethnic groups speak their own specific dialects. Pa-O and Shan were the most dominant people in southern Shan State. As a stranger, it was difficult to distinguish between Shan and Pa-O in terms of appearance. However, first names, or the title of the males, were different from each other- Sai for Shan and Khun for Pa-O, while the first name of Shan and Pa-O females were the same – Nang or Nan. In fact, these names were used like 'Mr' and 'Ms' for them, even though it was said as a first name. Each ethnic group speaks their own dialects. However, most people in the urban area of Taunggyi speak Burmese (Observations during this study).

Pa-O was a dominant ethnicity in the maize industry in Taunggyi. The majority of people from both major maize villages and non-major maize villages were Pa-O. Pa-O farmers who were interviewed preferred speaking their own dialect – Pa-O, even if they understood Burmese, the official language of Myanmar. The other interviewed actors – wholesalers, transporters, dryer owners, and poultry farmers were also Pa-O. However, feed factories owners in Taunggyi such as CP and Tatchaung were owned by foreign investors (Observations during this study).

In the rural area of Taunggyi township, there was a labour shortage for the farming sector. According to the farmers interviewed, the young generation did not have an interest in farming. Instead, they migrated to urban areas and abroad. The number of their children who took higher education in the cities had also increased. Therefore, there was a labour shortage problem in their farming sector. As a result, farmers gave up or reduced the areas of labour-intensive crops such as vegetables, and sebesten crops. According to farmers, they could earn the highest income from the sebesten crop among the crops they grew. However, farmers reduced the sebesten-growing area to a large extent because of a labour shortage (Interview with farmers).

### 4.2.4 Policy Environment

Agricultural policies also play a key role in shaping the maize value chain in Shan State. According to farmland management law, there are some restrictions on crop choice. For example, rice fields cannot be used for other purposes, including growing upland crops, and farming fish, rather than rice without permission from the central Government. Farmers must grow rice at least one season per year. On the other hand, upland can be used for other purposes, including non-agricultural commercial activities with permission from the regional government. Furthermore, for the upland, even though farmers are required to get permission from the regional government for changing crops on their upland, farmers have freedom of crop choice for their upland crops on the ground. They changed their upland crops even without permission of the regional government. In this context, maize was grown on the upland in Taunggyi township. Therefore, freedom of choice for upland crops allows farmers in Shan State to easily change their crops from year to year, depending on different situations such as market.

Agricultural financial policy poses restrictions on maize farmers in Shan State to have access to credit. Myanmar Agricultural Development Bank provides farmers with two main types of loan – rice loan and non-rice loan. The loan size of rice is always larger than that of non-rice annual crops. For example, the loan size for rice was 80,000 MMK (NZD 80) per acre for rice and 10,000 MMK (NZD 10) per acre for other annual crops in the 2012-2013 fiscal year, while it was 150,000 MMK (NZD 150) per acre for rice and 50,000 MMK (NZD 50) per acre for other annual crops in the 2017-18 fiscal year. Moreover, farmers must submit the original official land ownership document (form 7) to be entitled for this loan. However, most maize farmers in Taunggyi township did not have their official land-ownership document (form 7). Therefore, they have

limited access to formal credit sources with low interest rates. Accordingly, they mainly rely on informal credit sources with a high interest rate.

On the other hand, the land ownership certificate issuing process was also complicated in Shan State. Some areas in Shan State were under the administration of EAOs. In this case, the Ggovernment rule for issuing the land ownership document did not cover their areas. Even in Taunggyi, some areas used to be under the control of EAOs. In these days, even though the EAOs no longer controls these areas, their influence still existed. There were also arguments between farmers and EAOs about land ownership as the EAOs used to grab or confiscate those lands. Therefore, officials responsible for issuing the ownership documents hesitated to issue the certificates to the farmers. Moreover, the process for applying an ownership certificate was complicated for many farmers. Accordingly, the percentage of farmers who had formal land ownership certificates was also low in Shan State, including Taunggyi township (Interviews with farmers).

The poor quality assurance system impacted input markets. Even though, according to fertilizer and pesticide laws, there is a government mechanism to monitor the quality of agricultural inputs such as fertilizers, pesticides and seeds, these laws were poorly enforced. Maize farmers in Taunggyi believed that there was no significant difference in quality between cheap fertilizers and expensive ones. They even thought that cheap fertilizers were repacked with different packaging designs and brands in order to be sold at a higher price. Lack of their trust in the quality assurance system of inputs led to using cheap fertilizers for most maize farmers (Interviews with farmers).

Lack of a formal quality control system of maize also affected market diversification. Until the time of this study, there was no consistent quality standards of maize in Myanmar. Different quality standards were established by different actors of value chains. Although there were informal general quality standards, there was no formal specific quality standard. Generally, they all accepted that the quality of maize was poor if moisture content, damaged grain content, fungus-affected grain content, and chaff and refuse content were high, whereas the quality was good if grain size was large, and grain colour was bright. However, there was no specific percentage of damaged grain, fungus-affected grain, chaff and refuse contents, and no specific size of grain for different quality grades. Some wholesalers did not sell their maize to some buyers due to their unreliable quality standards, even if they set a price for maize higher than others. Furthermore, the Myanmar maize mainly flowed into border trade where there were no

specific quality requirements like overseas trade. In overseas trade, there were specific quality requirements such as percentage of damaged grain and aflatoxin content, in which an internationally accredited third party inspected the quality of maize to the buyers' requirements. This influenced selecting not only a market channel, but also the buyers.

### 4.2.5 Communications

Prior to 2012, Myanmar had a very poor telecommunication system and, until late 1998, a mobile sim card cost about US$ 7000. Later, the sim card price gradually decreased – US$ 3000 in 2001, US$ 1000 in 2011. Mobile phone usage covered less than ten percent of the population in 2011 (Petulla, S., 2013). Therefore, a mobile phone was a luxury, and only the wealthy could afford to use one. At that time, even at this price, everyone could not afford it because a limited number of sim cards were issued. Moreover, they could not access the internet even if they had a mobile phone. Broadband internet connection was also poor. However, in 2012, the Myanmar ITC sector underwent a major reform, and two foreign telecom operators were awarded with licenses to invest in the telecommunication sector of Myanmar in 2014 after it had been monopolized by a state-owned enterprise for many decades. As a result, mobile phone usage covered most of the rural area over a few years. They also had access to internet connection through their mobile phones. Therefore, internet coverage also increased in a sudden burst of speed - from 0.3% in 2010 to 26% in 2017. Now, they had a target to reach 99% of mobile phone coverage by 2022 (Oxford Business Group, 2019).

The people in Shan State also enjoyed the development of the communication sector. People from both urban and rural areas in Taunggyi township also had easy access to both mobile phone and mobile data. Farmers could communicate with different sources for price information via their mobile phones. Wholesalers also exchange information with other wholesalers, buyers, farmers and other actors through their mobile phones, Facebook, and Viber. Therefore, the information flow between value chain actors became faster and more efficient.

### 4.2.6 Market

Market was a key incentive for maize farmers in Shan State. Until 1988, most Myanmar agricultural products relied solely on the domestic market because of a closed market economic system. Myanmar moved from the closed market economic system to an open system after the

military had staged a coup in September 1988. After that, maize was widely grown in Shan State only, after the 1990s, in connection with export market opportunities. Before that period, it was grown on a small scale mainly for household consumption and sold for a small amount of surplus for food. Since the Myanmar farmers and wholesalers were not used to the new economic system, they had challenges to market their crops to other countries. Meanwhile, a Sino-Thailand company called CP Group, which was the largest Asian agro-food/feed corporation and integrated maize value chain, introduced contract farming system for maize production in Shan State, targeting the Chinese chicken feed market. The contract farming system provided farmers with low risks of both input costs and market accessibility because farmers were provided with cash for input costs, and agricultural produce was bought back by the company with a reasonable market price in a contract farming system. However, input costs were deducted when the company had bought maize from the contract farming farmers. The contracting farming system brought the maize farmers in Shan State into commercial production (Woods, K., 2015).

Maize export sharply increased over the last two decades. The total export volume of maize surged 60 times from 1999 (25,000 tons) to 2018 (1.5 million tons) (Index Mundi, 2019). More than 90% of maize export flowed out via border trade with China, particularly via Muse border trade point. In 2019, Myanmar maize was mainly exported to Thailand via Myawaddy border trade point, which was the second largest border trade point in Myanmar as border trade of maize with China was closed. Meanwhile, maize was also exported to other countries via normal (oversea) trade, particularly via Yangon international seaports (Interviews with exporters).

The domestic market of livestock feed continued to grow owing to livestock industry development. The estimate of livestock feed consumption in Myanmar was 2.5 million MT in 2018. Out of that amount, 48% was commercial feed, and 70% was consumed by the poultry sector, 25% by swine, and the rest by other sectors such as duck, quail, and dairy. Seventy-five percent of total production costs in broiler and layer farms goes to feed costs. Recently, the number of feed mills also increased to fulfil the demand of growing livestock sectors. A Netherland corporate De Heus Myanmar operated a second feed mill with the capacity 0.28 million MT per year in mid-2018. A Korean company CJ feed Myanmar operated at the end of 2018. The Thai agro-feed company, CP, had also established four feed mills in Myanmar. Accordingly, domestic maize demand was expected to increase.

### 4.2.7 Transportation

Road transportation in Southern Shan State was significantly improved, while 92% of the villages in Southern Shan State used road as a major mode of transportation. The number of villages, which had access to a paved road, rose from one-fifth to half over the last four decades. In particular, the increase took place most rapidly since 2011 when the first democratic government of Myanmar in the past five decades came into power (Lambrecht, I. & Belton, B., 2019).

The track of maize transportation was reversed in some villages. In the past, farmers from every village used the trucks from their own villages, or nearby villages, to transport their maize to trading centres. However, wholesalers used their own trucks in different ways. Wholesalers used light trucks to transport the maize from their large-scale client farmers free of charge, or at a lower fee (Interviews with farmers). In some cases, wholesalers used 20-wheeled trailer trucks to transport the maize from major maize villages, in which the amount of maize was available for at least one load of the truck and had access to good roads for such kind of trucks. Transportation became more efficient in terms of saving time and transportation cost (Interviews with wholesalers).

Transportation was a constraint in enhancing border trade with China via Muse. Even though Muse was the largest border trade point in Myanmar, there was a serious traffic jam problem in the high season of trade. During the period between January and March, there were about 600 trucks per day at Muse trade point while roads were not wide enough to provide service for so many trucks. As a result, a truck took about five to seven days to deliver their goods to the border trade point. It was a significant problem, particularly for perishable crops for both wholesalers and truck owners. Even though maize was not a perishable crop, the transportation fee was increased to cover opportunity cost for waste of time (Interviews with transporters and Muse Commodity Exchange Centre).

# Chapter 5

# Results

## 5.1 Introduction

In this chapter, the key findings which have shaped the maize value chain in Shan State of Myanmar are described, as they relate to the research question "What influences the maize value chain Shan State of Myanmar?" In particular, section 5.2 provides a general value chain map of the maize value chain of Shan State, Myanmar. Section 5.3 describes characteristics and practices of the actors, presents farmers' and wholesalers' reasons for choosing maize, and how these influence the value chain. Section 5.4 goes on to illustrate the relationship between different actors and how these shaped their practices and the value chain. Section 5.5 describes the dynamics between exporters and foreign buyers and, in section 5.6, the relationship between the growth of maize sector and poultry sector is presented. Finally, section 5.7 outlines the challenges imposed by transportation for exporters.

## 5.2 Mapping actors along the value chain and their interactions in brief

In this section, the major actors throughout the value chain are described. Moreover, the interactions between the actors are also briefly outlined.

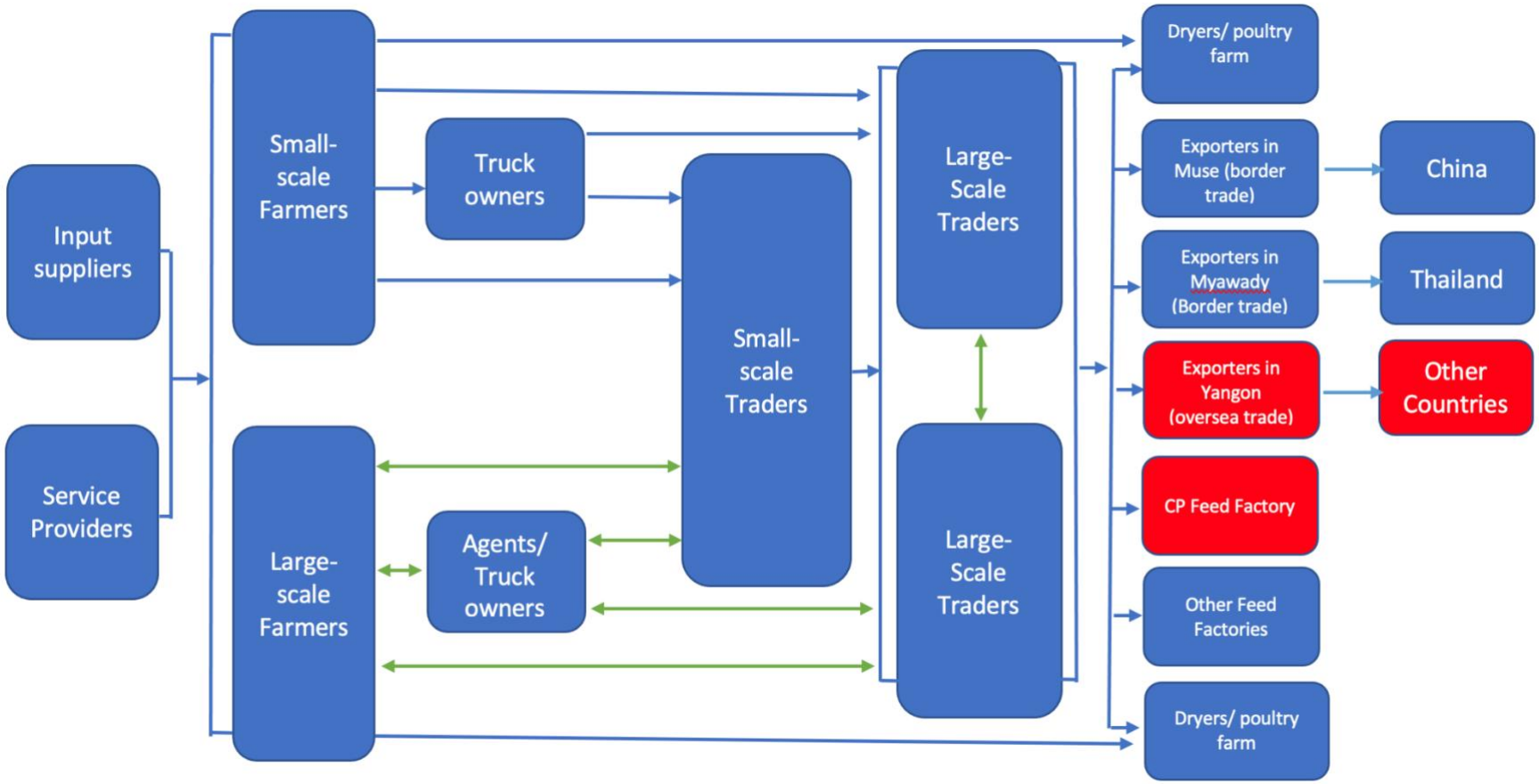
As shown in Figure 5.1, similar to other typical agricultural chains, there are input suppliers, credit providers, and other service providers such as threshing, transportation and drying and farmers in the upstream segment of the maize value chain of Shan State. According to interviewed farmers, input shops are a major source for small-scale farmers because they do not have access to inputs provided on product-tied credit by maize wholesalers like large-scale farmers. Likewise, the credit providers, such as informal money lenders, NGOs, government-funded revolving fund, and micro-finance institutions are major sources for small-scale farmers. Meanwhile, maize wholesalers are a major credit source for large-scale farmers. As a result, the large-scale farmers who take product-credit from wholesalers must sell their maize to the respective wholesalers.

In the mid-stream segment of the value chain, transporters, agents, and wholesalers are major actors in the maize value chain of Shan State. Interviewed wholesalers, transporters and agents take an intermediary role between wholesalers and farmers. In particular, wholesalers provide

large-scale farmers, with whom they do not have a long-term relationship, with inputs on credit and loans through truck owners or agents. Truck owners and agents must take responsibility so that the wholesaler can get back their credit, and farmers who take credit from wholesalers, must sell their maize to their respective wholesalers. Some wholesalers provided truck owners and agents with a commission fee or bonus. In some cases, truck owners are not paid a commission fee or bonus. However, taking an intermediary role between wholesalers and farmers is helpful for them to get goods for their trucks. In this way, truck owners and agents serve as a proxy for the smooth flow of credit and maize between farmers and wholesalers.

Feed factories, exporters, dryers, and poultry farmers are major actors of the downstream segment of the maize value chain. Small-scale wholesalers sell their maize to large-scale wholesalers. Moreover, there is also trading between large-scale wholesalers. Exporters and feed factories buy maize directly from large-scale wholesalers. Among them, CP feed factory and exporters in Yangon, who export their maize to other countries via overseas trade, buy premium quality maize. However, interviewed wholesalers reported that they receive a premium price, and no interviewed wholesalers reported that they received a premium price from exporters from Yangon. Exporters from Muse sell their maize to Chinese buyers through cross-border trade, and those from Myawady sell their maize to Thai buyers through border trade. In cross-border trade, Chinese buyers buy Myanmar maize informally, while Thai buyers buy it formally. Poultry farmers buy maize from both wholesalers and farmers.

*Figure 5-1 Mapping maize value chain actors of Shan State in Myanmar*




Label – **(Blue) single arrow (→)** showed that there was only a one-way flow of goods or services (e.g., small-scale farmers sell their maize to wholesalers who do not provide any service to small-scale farmers such as credits). **(Green) double arrow (⇔)** illustrates a two-way flow of goods or services (e.g., wholesalers provide loans/inputs in credit to large-scale farmers directly or through agents/ truck owners, and farmers sell their maize directly or through truck owners/agents to the wholesalers who provided them inputs on credit). The actors in the **red boxes** bought only premium quality while those in blue boxes buy any quality.

## 5.3 Different actors' characteristics, activities, and reasons for choosing maize

The following section outlines characteristics and activities of the actors of the maize value chain in Shan State, what influences these characteristics and activities, and how these influence the value chain. Moreover, it also describes why farmers and wholesalers choose maize.

### 5.3.1 Input suppliers: their characteristics, activities, and reasons for choosing maize

There are two different types of input suppliers – (1) agricultural inputs' shops which sell fertilizers, seeds, pesticides, and herbicides, and (2) maize wholesale centres, which do both buying maize and selling inputs for maize. However, this section only describes the latter's characteristics and activities because no interview with input shop owners was conducted in this research.

All interviewed local wholesalers supply inputs (e.g., seeds and fertilizers) to farmers for a common reason – to attract farmers to sell their maize to them. Accordingly, all interviewed wholesalers, except the one who was a new entrant to the maize wholesale sector, provided farmers with inputs on product-tied credit.

Large-scale maize wholesaler 2 explains why he provides inputs to farmers:

> *As a wholesaler, I need to be able to buy as much maize as possible. Therefore, I provide 70% of farmers, who sell their maize to me with inputs on credit or loan for other costs, including input costs to attract them to sell their maize to me. Actually, I used to provide all farmers who sold their maize to me with inputs on credit or loan. However, some farmers did not keep their promise, and I decided to provide only selected farmers who are able to be trusted. Providing credit is the most attractive way for farmers. In this way, the number of farmers who sell their maize to me increases every year.*

Most interviewed maize wholesalers collect pre-orders from their regular large-scale farmers such as names and amounts of different maize varieties and fertilizers before sourcing those from input companies, while an interviewed local maize wholesaler supplies only one type of seed variety and fertilizer to his farmers. Moreover, a local small-scale maize wholesaler does

not collect pre-orders from farmers and provides different types of maize varieties to farmers because he is also running an input shop.

Small-scale maize wholesaler 2 who collected pre-orders from farmers explains how pre-orders are collected and inputs are provided to her farmers:

> *I collected pre-orders from my farmers a long time before the monsoon starts: which varieties they want, how many bags of each variety they want, which types of fertilizers they want and so on. Only then, I order these inputs from input companies. However, some farmers changed their preference after I have ordered inputs from the companies. In such cases, I just lend money to those farmers so that they can buy the ones they want from other input shops. However, I provided inputs to only those farmers who have dealt with me at least for three successive years because I provide these on credit and cannot trust others.*

Large-scale maize wholesaler 6 also explains how he provides inputs to his farmers without collecting pre-orders from farmers regarding types of maize varieties:

> *I do not ask farmers which variety of maize and which brands of fertilizers they want. Instead, I provide them only CP808 variety. The reason for providing them only one variety is to get uniform quality of grain from them. I provided inputs to only trusted farmers through truck owners. I assigned one truck owner per client village to deliver inputs on credit to trusted farmers because truck owners have better knowledge of the character of farmers in their respective villages than me. However, I provide them with not only inputs on credit, but also loans for their production costs and living costs.*

Small-scale maize wholesaler 3 also gives details on how he (she) provides the inputs to farmers:

> *I sold different agricultural inputs such as different brands of maize seeds, different types of fertilizers, pesticides, and herbicides because I am also working in an input shop as my own business in addition to trading maize. I sold my inputs to farmers, regardless of their land-holding size because I regularly visit those farmers' villages as a promotion trip for inputs and have good knowledge of them. However, I sell inputs cash down to those whom I do not know very well.*

Moreover, most interviewed wholesalers provided these inputs on product-tied credit to large-scale farmers who have long-term relationships with them. Only one interviewed wholesaler did not provide her inputs on credit to farmers because she is a newer maize wholesaler, so she does not have farmers who have a long-term relationship with her. There are also two types of input-providing maize wholesalers – those who charge interest and those who do not charge interest for the credit inputs.

Large-scale maize wholesaler 3 explains how he provides inputs on credit and charges interest to farmers:

> *I provided inputs on credit to only selected farmers. Before providing inputs to them, I reviewed the landholding sizes of farmers and evaluate whether they could be able to pay back credit and if they are trustworthy to sell back their maize to me. Mostly, the farmers I provide inputs on credit have a long-term relationship with me. Then, I charge them 3% monthly interest rate for the credit inputs.*

Large-scale maize wholesaler 5 explains how he provides inputs to farmers and why he does not charge interest to farmers for credit inputs:

> *I do not charge interest for credit inputs. However, I sell these to farmers by raising the price. I mean I set the selling price higher than buying price. Mostly, we northern maize wholesalers (those from the northern part of Taunggyi) do not charge interest since there is low probability of loss of credit because they tend to pay back credit after selling other crops even if they cannot pay back after harvesting their maize for different reasons such as pest damage, price fall, or extreme weather. However, most southern maize wholesalers charge interest to farmers since there is a relatively higher probability of loss of credit if the maize crop is not successful because the major income of most southern farmers relies on a single maize crop.*

Large-scale wholesaler 1, the only one of interviewed maize wholesalers who does not sell her inputs on credit to farmers explains how she sell her inputs to farmers:

> *I do not sell inputs on credit because I am a new maize wholesaler in this area and do not have maize farmers with whom I have a long-term relationship. It means that I do not*

*have any farmers in whom I have enough trust to provide them with inputs on credit. Instead, I set the price of inputs lower than other sellers so that I can attract maize farmers.*

Interviewed local maize wholesalers provide their inputs to farmers through two channels – direct and indirect. Some interviewed maize wholesalers use both channels while others use only one channel – either direct or indirect. In the indirect channel, an interviewed maize wholesaler provides their inputs on credit to farmers through a truck owner, particularly when the wholesalers do not have good knowledge of those farmers and, hence, low trust in them.

Large-scale maize wholesaler 3 explains why he directly provides inputs to farmers:

*Before selecting farmers to provide inputs on credit, I visited farmers from different villages in person and evaluated whether they can be trustworthy or not. Then, I provide inputs on credit only to those selected farmers. Therefore, I provide my inputs directly to those farmers and need not use truck owners in providing inputs.*

Large-scale maize wholesaler 5 uses both direct and indirect channels and expounds how and why he use these channels in providing inputs:

*I try to attract farmers to sell their maize to me by providing seed and fertilizers to large-scale farmers on credit. I directly provide those inputs to only large-scale farmers with whom I have a long-term relationship. However, I provide other large-scale farmers with inputs on credit through truck owners because there are many farmers who sell their maize to me from a variety of villages; I cannot know all their backgrounds very well and cannot monitor those all the time. If they don't pay back credit, I don't know how to claim the credit from them if I don't know the locations of their villages, therefore, it is the best way to provide those inputs through the truck owners, who have good knowledge of the farmers in their respective village. Otherwise, the probability of loss of credit is very high.*

Large-scale maize wholesaler 6 explains why he uses the indirect channel in providing farmers with inputs on credit.

*I don't provide all the inputs directly to farmers but only through truck owners. I assigned a truck owner per village to provide those to farmers. I don't have time to monitor the farmers who take inputs on credit from me. Truck owners take responsibility to deliver maize to farmers and to collect maize from those farmers after harvesting their maize.*

*There is a win-win situation between me and the truck owners because they also obtain goods for their trucks when those farmers sell back their maize to me.*

### 5.3.2 Farmers' multiple reasons for choosing maize

In major maize villages, it was learned from interviewed farmers that many farmers have been choosing maize as their major crop for many years while most interviewed farmers from non-major maize villages had increased their maize-growing areas recently. Even though the Chinese border trade is closed, and maize price was falling, the farmers interviewed were still willing to continue growing maize and, in some cases, some interviewed farmers still planned to extend their growing area of maize for different reasons. However, there were also some exceptions in which some of the interviewed farmers reduced their maize area.

There are different reasons for interviewed farmers for choosing maize - limited access to improved varieties of non-maize crops, high input costs of vegetable crops, uncertainty of markets for other crops, easy access to credit for maize, access to agricultural machinery, high labour demand of other crops and relatively lower labour demand of maize, peer pressure, easy management of maize, and certainty of market for maize.

Farmer 1 who is a small-scale farmer from non-major village 1 explains how peer pressure influences her to adopt maize:

*Almost every farmer in this village and in neighbouring villages are growing maize. This exerts pressure on me to grow maize. I came to think that I should grow maize because every farmer around me grows maize and makes a profit from it.*

Farmer 2 who is a small-scale farmer from major maize village 4 gives details on why he chooses maize:

*Sometimes, there was no buyer for other crops. Do you see the pile of disposed garlic (pointing out a pile of garlic, which was disposed of beside the maize field)? In the last season, there was no buyer for my garlic even though I used to gain high profit from this crop in some years. Therefore, I disposed of it in a pile for making compost. For maize, I need not worry about buyers, and there are always buyers throughout the year even if the price fluctuated.*

Limited access to improved seeds of other crops such as soybean, rice, and wheat, and high input costs of other crops (e.g. using a higher rate of fertilizers and chemicals for pest and disease control for vegetables) pushes farmers to substitute those with other crops, while easy access to improved seeds of maize, and low agro-chemical costs of farming maize were pushing farmers to grow maize.

Farmer 3 from major maize village 3 explains how limited access to improved varieties of other crops influence him to choose maize:

> *Even though I prefer rice from the viewpoint of household food security, it was not a good idea to grow rice because there was no improved seed of upland rice, resulting in low yield. Therefore, I decided to grow more maize, which is economically more profitable because I can easily buy high-yielding varieties.*

Farmer 1 from major maize village 1 gives details on how high input costs of other crops force him to choose maize as a replacement for his previously predominant crops.

> *In growing vegetables, input costs are very high. I must use high quality fertilizers to stimulate the quick growth because these are short-term seasonal crops. Moreover, I must apply pesticide every week, but sometimes even twice a week if there is a symptom of disease or insect outbreak because there is high risk of pests and diseases in growing vegetables. For maize, I have never experienced pests and disease until the previous year. However, there was fall army worm outbreak in this township in the past year, but it was not serious, and I did not apply any pesticide.*

According to many interviewed farmers, labour management was also one of the major factors influencing farmers to choose maize. First, regarding human resource, many interviewed farmers faced a labour shortage problem. Meanwhile, high demand for labour for most crops was one of the major problems for many interviewed farmers to grow other crops such as vegetables and sebesten trees, which was recently one of the prominent crops in the region. However, according to many interviewed farmers, low labour demand in growing maize favoured farmers to grow it because most of the activities of maize could be mechanized unlike other crops such as soybean, pulses, sebesten trees, and vegetables.

Farmer 2 who is a large-scale farmer, from the non-major maize village 4, explains how labour management and access to agricultural mechanization drives him to grow maize:

*I need not worry about labour availability if I grow maize. I can use a tractor in different stages of maize cultivations such as land preparation and seeding. I can use selected herbicide for weed control. I can hire a threshing machine. In contrast, the activities of other crops are labour-intensive.*

Amid the labour shortage problem, labour allocation also mattered much for farmers. Farmers had complementary timing of maize activities with those of other crops in which farmers had no activity for maize when they were busy with the activities of other crops and farmers had no activity of other crops when they were busy with maize activities. Moreover, maize has a very flexible harvest time. Farmers also had problems with weed control in other crops such as soybean and vegetables (e.g., Interviewed farmers had no access to selected herbicide for those crops, despite having access to selected herbicides for maize).

Farmer 2 from non-major maize village 4 who grows different crops, also explains how complementary activities of other crops with those of maize influence him to grow maize:

*Maize is very suitable for me while I also grow vegetables and sebesten trees at the same time. The activities of maize have good timing with those of other crops. When I am busy with maize, there is usually no activity of other crops, and vice versa. Moreover, even though I am busy with other crops at the harvest time of maize, the harvest time of maize is very flexible because I can leave it in the field without any care.*

Farmer 1 from major maize village 2, a large-scale farmer, explains how he is encouraged with access agricultural machinery for growing maize.

*I decided to sell five acres of small agricultural land which is located near this village and more valuable than those far away from the village. Then, I bought about 40 acres of virgin land which is far away from the village and cheaper than those nearby the village so that I can do large-scale maize production because I can use different agricultural machinery at different stages of maize cultivation - 4-wheeled tractors for land preparation, an inter-cultivator for weeding and a thresher for threshing my maize. In particular, using the 4-wheeled tractor is very effective in land preparation. If I used draft animals, it took the whole day to prepare land for two acres. However, it takes only an hour to prepare land for one acre. Only my wife and I can work on the farm because my only son is studying. Meanwhile, agricultural machinery is very helpful for large-scale crop production. Therefore, I decided to grow maize on a large-scale.*

### 5.3.3 Farmers' reasons for choosing their current practices

**Using different varieties** - Most interviewed farmers used different varieties in the same season and from one season to another for different reasons – lack of access to full information about the characteristics of each variety, risk management, and anecdotal knowledge. Therefore, most interviewed farmers grow different varieties of maize in the same season so that they could observe which varieties had their preferred characteristics. They then selected the varieties based on their own experience. In some cases, even though some interviewed farmers said they use different varieties in the same season for observing the best variety for the next season, many of them do not use the varieties from the previous season, in the season at interview time, because they believe that using different varieties from one season to another is better than using the same ones in terms of yield.

Farmer 2 from major maize village 5 expounds why she used different varieties in the same season and from one season to another as follows:

> *I used one bag of 029, two bags of 555 and four bags of 621 this year. However, I used CP808 and 555 in the past year. I used different varieties in the same season so that I can make comparisons between different varieties and select the best one for the next season. However, I do not use different varieties in this season from the previous season because if I use the same variety for more than one year in a row, the crop yield is low.*

**Late harvest** – Most interviewed farmers harvested their maize late, particularly between December and March, even though their crop was fully mature between September and November, depending on their sowing time. They left their crop in the field until it was fully dry because they did not have space to dry, did not have access to drying facilities or did not have access to storage facility if harvesting early.

Like many other interviewed farmers, farmer 2 from major maize village 1 explains why he harvests his maize late.

> *I do not harvest my maize soon after full maturity. Instead, I harvested my maize in February and March when my maize was well dry in the field. Normally, my maize matures to harvest in November. If I harvested in October or November, I have a problem to dry my*

*maize because there is no space to dry my maize, and I do not have access to a dryer. If I stored my maize with high moisture content, it will be infected with fungus. I have already faced this problem in the past. Moreover, there is no buyer for maize with high moisture content.*

However, some interviewed farmers harvested their maize late because they were busy with other crops from October to December. Farmer 3 from non-major maize village 3 also describes why he harvests his maize late as follows:

*During November and December, we are busy with other crops such as rice and sebesten trees. On the other hand, the maize could be left in the field without harvesting for a long time, even though it is also mature in November and December. Therefore, we focus on other crops during that time.*

In some cases, family members of interviewed farmers worked on other farmers' farms as waged labour for extra income from November to February without harvesting their maize at early months of the mature stage. Farmer 2 from non-major maize village 3 explains:

*I harvested my maize in February and March because I am working for other farmers as a wage labourer from November to January at which period other crop activities are at peak. Therefore, it is a good opportunity* for me to get off-farm income while there is no problem if I harvested my maize late.

Some interviewed farmers harvest their maize late because there was no road access to their maize fields with their bullock cart or trailer jeep before harvesting other farmers' crops such as maize and rice, even though they wanted to harvest their maize early so that lab lab bean, which was mixed with maize, could grow well. They had to pass through other farmers' fields only after they had harvested their crops. Sometimes, farmers could not have access to their field with their bullock cart or trailer jeep in the monsoon season due to it being muddy. Some farmers also harvested their crops late because they had other crops to take care of in the early months of maturity of maize. Farmer 3 from major maize village 7 explains she does not harvest her maize at early days of maturity as follows:

*Even though my maize is mature enough to be harvested in November, I can harvest it only in January. In fact, I want to harvest my maize as early as possible because I mix my maize with lab lab bean and harvesting maize early allowed the lab lab bean to grow*

*better alone well. However, there is no feeder road to my maize field. In the rainy season, therefore, it is not convenient to even use a bullock cart to go to our fields. Therefore, a bullock cart and trailer jeep can have access to my maize field through a paddy field only after other farmers' paddy fields have been harvested.*

### 5.3.4 Maize wholesalers: characteristics, activities, and their reasons for choosing maize

Interviewed maize wholesalers are characterized in different ways – small-scale and large-scale wholesalers in terms of volume and ways of trading their maize, rural and urban, in terms of locations of trading centres, and single crop wholesalers and multi-crop wholesalers. There are two types of maize wholesalers – small-scale wholesalers and large-scale wholesalers. According to some interviewed wholesalers, small-scale wholesalers are those who buy maize only from farmers and sell their maize to other large-scale wholesalers rather than directly selling to feed factories and exporters due to their small volume of maize. Large-scale wholesalers are those who buy their maize from both farmers and other wholesalers and sell their maize to large-scale buyers such as feed factories and exporters. In this sub-section, the characteristics are described, how both small-scale and large-scale local wholesalers buy and sell their maize and why they choose maize as their business.

Small-scale wholesaler 4 characterizes himself as follows:

*Small-scale wholesalers like me do not sell our maize to the buyers such as feed factories and exporters. Instead, we sell our maize to other local large-scale wholesalers. Even if we want to sell our maize to feed factories or exporters, many truck drivers do not want to load our maize because we cannot provide them with a full load for their trucks at one time, and they must collect maize from different locations to get a full load. Finally, we sold our maize only to large-scale wholesalers.*

Some interviewed wholesalers newly established their maize trading centres in the rural areas for different reasons. Among them, an interviewed wholesaler moved from an urban area to a rural area, while some other interviewed wholesalers established their maize-trading centres near their native villages as their new business. All interviewed wholesalers from newly established trading centres in the rural areas trade no other crops than maize.

Large-scale wholesaler 1 explains why she moved her trading centre to a rural area as follows:

*I moved from Taunggyi to here in this year. Before moving here, I sold rice in Taunggyi. However, since the maize sector is fast-growing in this region, I decided to change my business from trading rice to maize. Moreover, there are different reasons for me for moving my trading centre from the urban area to a rural area. First, I can reduce my asset costs. If I trade maize, I need a large space that can accommodate a big warehouse for storing a huge amount of maize and a large parking area for big trucks. It is too expensive for me to establish such kind of trading centre in the urban area. Second, I believe that I can take one jump ahead of the wholesalers in the urban area in buying maize from farmers. Third, both farmers and wholesalers can save transportation costs."*

Large-scale wholesaler 4 explains why he does not move his trading centre to the rural area and factors shaping his relationship with farmers as follows:

*I have well-established relationships with farmers from this area. Moreover, I trade not only maize but also other crops. If I move to a major maize rural area, I must make new investments and establish new relationships with other farmers. However, recently, farmers from this non-major maize area also extend their maize growing area by substituting other crops. Moreover, there is very low probability to lose our credit provided to farmers for maize because they can pay back selling other crops even if they cannot pay back the credit after harvesting their maize. This is the one advantage for dealing with multi-crop farmers.*

Most interviewed wholesalers chose maize as their business because there is a robust growth of maize production in this region. Large-scale wholesaler 2 from a rural area explains why he chose maize as follows:

*My father was a sebesten leaf wholesaler. However, I chose only maize as my business three years ago because I had observed that the sebesten-growing area is significantly decreasing, and the maize-growing area is sharply increasing in this area. I believe my decision is right. The volume of my maize trade increases 30%-50% every year. Even though I started my business in this village just three years ago, now my business is quite big. In this regard, there is mutual influence - several maize trading centres emerged in this rural area over the past 3-5 years because maize production is increasing; more farmers are willing to grow maize because they can sell their maize easily just in their village.*

There are similarities and differences in buying and selling maize among interviewed wholesalers. Interviewed small-scale and large-scale wholesalers buy their maize from all farmers regardless of maize quality except moisture content. However, interviewed wholesalers' maize comes from most farmers who took inputs from wholesalers on credit. Moreover, only those interviewed wholesalers who have drying facilities, such as drying ground or a dryer buy maize with high moisture content (above 15% -16% of moisture content). All interviewed wholesalers set the same prices for all types of quality of maize (grain size, uniformity of grain, and brightness of grain) with the exceptions of moisture content and fungus-infected grain content. However, interviewed wholesalers reduce the buying price if moisture content is higher than 15-16%.

Large-scale wholesaler 2 from the rural area explains how he buys his maize as follows:

> *I buy maize, both well-dried maize and with high moisture content, because I have my own dryer. 70% of maize comes from my farmers who take inputs from me. In some cases, I buy maize from other wholesalers as well. Most wholesalers do not have a dryer like me. Therefore, the ability to buy moist maize is one of the attractions to farmers to sell their maize to me. 30% of total maize is bought as moist.*

Large-scale wholesaler 6 from an urban area goes into detail about how he buys his maize as follows:

> *Mostly, I do not buy moist maize because I do not have a dryer or sufficient space for drying a large amount of maize. However, if I must buy moist maize from my farmers who take inputs from me on credit, I mostly transfer this maize to a dryer just after buying. Even though I have some space for drying maize, it is labour-intensive to do so. Particularly when there are chances of rain, many of my workers are in a rush to retrieve the maize from the drying ground when it is about to rain and to spread it on the ground again after raining.*

Large-scale wholesaler 3 explains how he buys maize from farmers as follows:

> *I buy any quality of maize from farmers. I set the same price for any quality of maize except for the maize with high moisture content. Normally, I set the buying price 10-15 MMK (NZD0.01-0.015) lower than the selling market price per viss (1.63 Kg). However, if*

*the moisture content of the maize is higher than 15%, I reduce the buying price based on the amount of moisture content. Generally, when I buy maize, different grain colours, and different grain sizes have been mixed because individual farmers grow different varieties of maize in the same season. Moreover, maize bags from different farmers are also mixed in the same truck. Moreover, grain size is also smaller than the normal size. I think this is because they do not use sufficient fertilizers. When good quality maize is found, I keep it separately so that I can sell it for a higher price.*

Different large-scale wholesalers sold their maize to different buyers for their own reasons. The large-scale wholesaler 5 explains how, to whom, and why he sells his maize as follows:

*I sold my maize to different buyers. I sell my premium quality maize to CP feed factory because they pay me premium price for premium quality. The maize which is not suitable for CP is sold to exporters and another feed factory called Tatchaung feed factory, which does not use tight quality controls and offers a price lower than CP. I can still make a profit from selling my maize to those buyers because I set my buying price based on the selling price of normal quality maize.*

Large-scale wholesaler 4 explains why and to whom he sells his maize as follows:

*I don't sell my maize to CP company because I don't have trust in their quality control (QC) system. I sell my maize mainly to other wholesalers and exporters who regularly buy my maize. I dare not sell my maize to strange buyers if they do not pay cash down because I am afraid of fraud. I also sell my maize to a feed factory called Tatchaung. However, only if there are no other buyers, I sell my maize to that factory because their quality control system is complicated even though their QC is not as tight as CP's QC. 20% of my maize sold to Tatchaung was rejected every year. It is not only because of quality but also the relationship between truck drivers and QC team members. For example, they accepted the maize which had been rejected by their QC team when it was sold by a different truck driver who had a good relationship with the QC team. It means that there is no reliable QC system in their company.*

## 5.4 The relationship between the maize value chain actors

This section outlines the relationship between different actors of the maize value chain and the factors influencing their relationship – between maize farmers and maize buyers, between small-scale maize farmers and credit providers, between large-scale wholesalers and feed

factories, between large-scale wholesalers, between exporters and foreign buyers (Chinese buyers, and Thai buyers of border trade and other buyers of overseas trade). In particular, the following sub-sections describe the dynamics – how these actors interact with each other, and which factors are driving those interactions.

### 5.4.1 The Relationship between maize farmers and buyers

This sub-section outlines different types of relationships between farmers and wholesalers. Types of relationship vary, based on the duration of relationship between farmers and wholesalers, farm size, and the locations of farmers.

According to interviews with farmers and wholesalers, there are two main pathways of relationship between farmers and wholesalers - direct connection and indirect connection. Firstly, both small-scale and large-scale farmers directly connect with both small-scale and large-scale wholesalers. Secondly, both small-scale and large-scale farmers connect with both small-scale and large-scale wholesalers through truck-owners or agents.

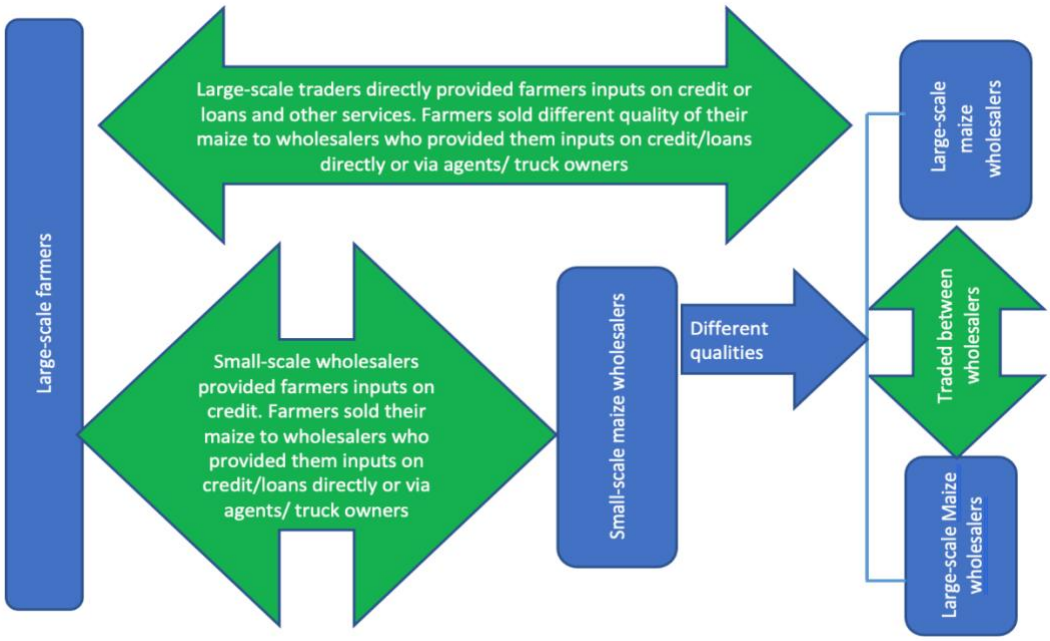
There are direct connections between wholesalers and large-scale farmers who have long-term relationships with them. As shown in Figure 5.2, in the pathway of direct connection, many interviewed wholesalers provided storage facility. All interviewed wholesalers provided loans and/or inputs on credit directly to large-scale farmers who had a long-term relationship with them. Many interviewed wholesalers also provided space to large-scale farmers for storing their maize with whom they had a long-term relationship.

Small-scale wholesaler 2 explains the relationship with large-scale farmers who have long-term relationships with her and how these relationships influence the way of providing service as follows:

> *I can provide only some large-scale farmers whom I have long-term relationships with storage service due to the capacity of my warehouse. I provide them with maize seeds on credit. In some cases, I lend them money so that they can buy required inputs.*

Furthermore, in some cases, large-scale farmers received some other services such as threshing, and transportation from their maize wholesalers with some advantages such as special discount for some service fees. In the interviews, most of the interviewed wholesalers said they used different strategies to attract large-scale farmers for increasing their trade volume as much as possible. In other words, large-scale farmers are favoured by wholesalers due to their production scale, location, and terms of relationship with them.

*Figure 5-2 Direct connection between farmers and local wholesalers*




Therefore, they use different strategies to attract more farmers as much as possible. In this context, wholesalers mainly target large-scale farmers to increase their trade volume in different ways.

**Threshing service** – some of the interviewed wholesalers also provided threshing services to farmers and mainly to large-scale farmers. Sometimes, small-scale farmers can also use their service if their farms are located near those large-scale farmers and their crop is also harvested before large-scale farmers' crops have been threshed. The threshing fee is also different from one farmer to another, or from one village to another, even among large-scale farmers.

Large-scale farmer 1 from major maize village 3 explains how he is favoured in accessing a thresher due to his farm size as follows:

> *I must pay only 10 MMK (0.01 NZD) per viss for threshing while other farmers must pay 12 MMK (NZD0.012) per viss (1.63 Kg) even though the thresher is owned by the same wholesalers because my total production is over 15,000 viss. Moreover, my wholesaler is ready for me to send his thresher to my farm whenever I want to use it because my production amount is larger than other large-scale farmers, and I have a close and long-*

*term relationship with him. Mostly, I thresh my maize when I can get my preferred market price. Otherwise, I keep harvested ears of maize in the field. I just need to give him a call when I want to thresh.*

**Transportation service by maize wholesalers** – According to interviewed farmers, some wholesalers also provide a transportation service to help attract large-scale farmers. These wholesalers provide a transportation service, sometimes even free of charge to the largest-scale farmers, or at least at a lower fee compared to comparatively smaller 'large-scale' farmers and small-scale farmers.

Large-scale farmer 2 from major maize village 1 explains how he can take advantage for his large-scale maize production as follows:

*I requested my wholesaler to send his light truck when trucks in his village are not available and when I want to sell maize. Sometimes, I need not pay for using his truck. Sometimes, I paid his workers some amount of tip money for loading my maize even though I am not required to pay for them.*

Some wholesalers provide transportation for some major maize villages with large trucks (20-22-wheeled truck). In some cases, wholesalers send large trucks to some major maize villages, which are located beside a main road which can be used for such large trucks. In this context, truck owners from those villages play a key role in organizing farmers to harvest and sell their maize at the same time to get enough for one load. When truck owners from such villages guarantee wholesalers to get enough maize for 20-22-wheeled trucks, some wholesalers send their trucks and workers to load maize from those villages.

Large-scale wholesaler 6 explains how farmers from major maize villages, located by a main road, and accessible by a large truck, have an advantage as follows:

*The flow of maize transportation is reversed in these days. In the past, farmers transported their maize directly to the wholesalers in Taunggyi by using the trucks in their villages. These days, maize from the villages, which are far away from Taunggyi, but accessible by big trucks such as 12-wheeled trucks and 22-wheeled trailer trucks, was not sold to me due to higher transportation charge. For example, my native village - Kyauktalone village, was accessible by 12-wheeled truck. Therefore, if they sold their*

*maize to a 12-wheeled truck, transportation fee from their home or fields to the big trucks was 10 MMK (NZ$0.001) per viss (1.63 Kg). However, if they sold their maize to the wholesalers in Taunggyi like me, the transportation fee is 35 MMK per viss, however, the maize price was the same. Under this situation, farmers could save 20 MMK per viss if they sold to a 12- wheeled truck and, accordingly, do not want to sell their maize directly to me.*

**Storage service by maize wholesalers** – Wholesalers provide storage facilities to large-scale farmers who have a long-term relationship with them. All interviewed farmers do not have proper storage facility to store their harvest maize.

Farmer 3 from major maize village 5, and who is a large-scale farmer, details how to manage the sale times of his maize with the access to her wholesaler's storage facility as follows:

*I tended to sell my maize to two wholesalers until last year. However, this year, I sold my maize only to one of them in Paw Mu Village, which is located next to my village. I transported my maize to the wholesaler just after it was threshed. I sold 2000 visses (3,260 Kg) just after I had threshed my maize so that I could pay for threshing and transportation to the wholesaler. However, I stored the rest of my maize at the wholesaler's warehouse to sell only when I can get my preferred market price because usually the maize price goes down in the high season. However, I do not know, how much the wholesaler charged me for their storage service for my maize.*

Even though many interviewed wholesalers reported that they provided storage service only to large-scale farmers, particularly to the ones with whom wholesalers had a long-term relationship, one case was observed in this study where a small-scale farmer stored at her wholesaler's warehouse without a long-term relationship.

Farmer 2 from major maize village 5, who is not a large-scale farmer, explains how she stores her maize at her wholesaler's warehouse as follows:

*My total production from seven seed bags was 8,000 visses (13,040 Kg). I sold to different wholesalers from one year to another, who offered me a higher price. I did not take credit from any wholesalers because I had other income sources. For example, I sell vegetables from my own home garden and other farmers' farms. I have three parcels of maize. When I had harvested maize from the first parcel, I just sold all the maize from that parcel - 3900 visses (6357 Kg) with the price of 370 MMK (NZ$0.37) per viss (1.63Kg). 700 visses from*

*the second parcel were sold with the price 420 MMK per viss. The maize from the third parcel was stored at the wholesaler's warehouse.*

As shown in Figure 5.3, in the pathway of indirect connection, most interviewed wholesalers do not have direct connection with some large-scale farmers in providing inputs on credit and other services because these farmers do not have a long-term relationship with them. Instead, some interviewed wholesalers connect indirectly to these large-scale farmers through agents/truck owners, through which wholesalers provided inputs on credit and who lived in the same villages and had good knowledge of them. Moreover, farmers also sold their maize to the same wholesalers who provided them inputs on credit through agents/truck owners for different reasons.

First, according to most interviewed wholesalers, some farmers do not want to sell their maize to the wholesalers who provide them product-tied credits. Instead, farmers wanted to sell their maize to those who offered a higher price for their maize. From the wholesalers' view of point, the loyalty of farmers to the wholesalers who provided them with inputs on credit or loans was diminished after farmers had better communications with different buyers due to easy access to mobile phones. On the other hand, from the farmers' point of view, they have better choice in selecting buyers after they had easy access to mobile phones.

Small-scale wholesaler 4 from the urban area of Taunggyi explains why some farmers do not want to sell their maize to the wholesaler who provides product-tied credit to them as follows:

*Some farmers called me, asking about the current price of maize before they have decided to sell their maize. At the same time, they also called and asked other buyers about price. If other buyers offered a higher price, they sold their maize to them even though I provided them with product-tied credit without interest. I can offer them just a normal price because I invested my capital in providing inputs on credit without interest for many months, from 6 to 11 months. If they borrowed money for their maize production or their living costs from other sources, they must pay 2-5% monthly interest rate. On the other hand, other wholesalers can offer the price about 1% higher than what I offered because they did not invest any capital in providing credit or loan for those farmers. However, they also offer the same price to me for those farmers whom they provided inputs on credit. For this reason, I am afraid to directly provide such kind of farmers with inputs on credit".*

Second, according to some interviewed wholesalers, some farmers sell part of or all their maize to other buyers rather than their wholesalers who provided them inputs on credit by giving different excuses.

Large-scale wholesaler 2 from a rural area explains why she provides inputs on credit to some large-scale farmers through truck owners as follows:

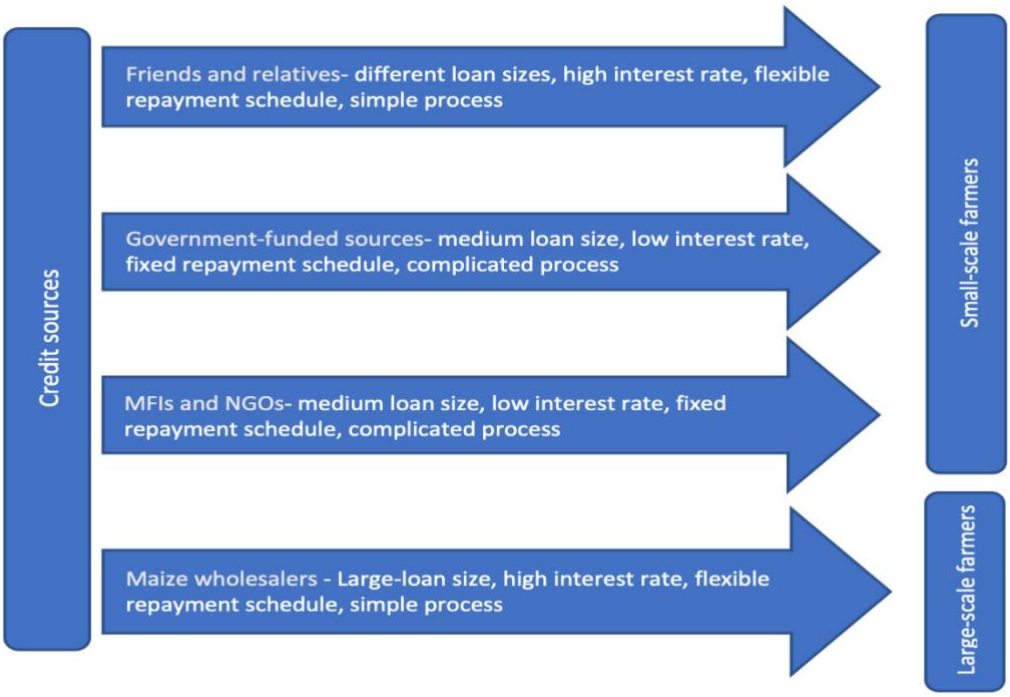
> *There are different kinds of farmers with different characteristics. Some farmers did not pay back their debt and did not sell their maize to me. They sold their maize to other buyers who offered a higher price than me. They never contacted me again after taking inputs on credit from me. Some of those farmers sold their maize to other wholesalers who offered a price higher than me but paid back their debts after selling their maize. Some farmers sell me part of their total production, giving the reason that their crop productivity is low due to different factors – drought, flood, pests, disease and so on, while the rest of the crop was sold to other wholesalers. Of course, there are also many farmers who sell all their production to me. Under these situations, I care a lot about ways of providing credits and selecting farmers to minimize my potential losses. Therefore, I do not provide inputs on credit directly to those large-scale farmers of whom I do not have good knowledge, but through truck owners from their respective villages.*

### 5.4.2 The relationship between small-scale maize farmers and credit providers

According to small-scale interviewed farmers, they have easy access to different sources of credit – Emerald Revolving Fund funded by the Myanmar Government, micro-financing institutes, Samaul Undong (New Village Movement) funded by the Korean Government, NGOs, informal money lenders such as friends, relatives, village-based informal money lenders, and other NGO-supported funds were major sources of credit while they do not have access to credit provided by wholesalers like large-scale farmers.

Farmers varied from whom they sought credit for a variety of reasons. As shown in Figure 5.3, some interviewed farmers prefer informal money lenders because of the flexible repayment schedule, despite high interest rates; some interviewed farmers prefer formal government-funded credit source due to low interest rates, despite a complicated application process and fixed repayment schedule; some interviewed farmers prefer formal micro-finance institutes and NGO-funded credit source due to the simple application process.

*Figure 5-3 Relationship between farmers and credit providers*




Farmer 3 from non-major maize village 3 explains why he took a loan from an informal money lender from his village as follows:

> *I borrowed money from a money lender from my village with 5% monthly interest rate. Even though she charged me with a higher interest rate than other sources, I prefer this source because I can pay back the loan at my convenience while there is a fixed repayment schedule in other sources. Therefore, I can save the costs of interest if I pay back the loan early. Moreover, it is very easy to borrow money from her.*

Farmer 2 from major maize village 4 details why and how she takes a loan from her credit provider as follows:

> *I took a loan from a micro-finance institute called Alliance because the application is very simple. They collected interest every month. For livestock farmers, both interest and principal had to be paid every month. For crop farmers, only interest was paid every month. I borrowed 300,000 MMK (NZ$ 300). I had to pay 7,000 MMK (NZ$ 7) every month (6,000 MMK (NZ$6) for interest and 1,000 MMK (NZ$1) for saving). The whole principal was paid after six months. If I borrow money from other sources, the application is very complicated.*

### 5.4.3 The relationship between wholesalers and feed factories (CP, Tatchaung and others)

As shown in Figure 5.4, most interviewed wholesalers accepted that CP feed factory buys premium quality maize and pays a premium price, while other factories buy different qualities of maize at a lower price. Accordingly, CP uses a tighter quality control system than other factories. This sub-section describes the relationship between wholesalers and CP feed factories and other factories. However, only staff from Tatchaung Company could be interviewed for this study. Other feed factories refused the request to interview. However, this sub-section presents the voice of wholesalers on their interactions with feed factories.

*Figure 5-4 The flow of maize quality and price between wholesalers and feed factories*


There are both formal and informal relationships between wholesalers and feed factories. According to some interviewed wholesalers, in many cases, they had to sign a contract before selling their maize to feed factories. In the contract, price, quality, amount of maize and delivery time were specified. Regardless of market price at the time of delivery, both parties must abide by the agreement. According to the interviewed staff from Tatchaung, some wholesalers did not abide by the terms and conditions of agreement. The factory could not take any legal action against those who broke the agreement. Interviewed wholesalers chose buyers based on the offered price, and degree of quality control.

Two staff from Tatchaung explain how they buy maize from wholesalers through both formal and informal agreements, as follows:

*There are some wholesalers who do not want to sell the contracted amount of their maize as per agreement in the contract when market price goes up at the time of delivery. We would never sign a contract again with such kind of wholesalers because they did not abide by the contract. There are also deals without a contract. For example, if there was high demand and upward trend in price, the factory wanted to buy more maize while wholesalers do not want to sell their maize in the time of up-trend of price, expecting a higher price in the future. Under these situations, the factory request those wholesalers who had a long-term relationship to sell some amount of their maize, despite no contract. In some cases, if there is low demand and downward trend in price, the factory did not want to buy maize while wholesalers wanted to sell their maize before further decreases in price. Under this situation, the factory bought maize from those who have sold their maize without contract upon the request of the factory when the factory was in high demand for maize, however, the factory do not buy the maize from those who have broken the contract agreement or did not sell their maize without contract upon our request.*

Wholesaler 2 explains his decision to sell his maize to CP feed factory:

*I sell all my premium quality maize to CP company because they pay a higher price than other buyers. The rest is sold to other buyers. Even though my poor-quality maize is rejected by CP, it is not that much. In this year, I sold 200 loads of trucks (32 tons per truck) to CP, and only ten truckloads were rejected. However, if my maize is rejected, it incurs additional costs including a transportation fee for return and labour cost for unloading it. Anyhow, I still prefer to sell my premium maize to CP due to higher price."*

Large-scale wholesaler 6 explains how the quality standards of feed factories influenced his decision not to sell their maize to them:

*I do not sell my maize to any feed factory because they are not fair when buying maize. For example, I signed a contract with a feed factory, the amount and price of maize, and delivery time were specified in the contract. However, if the market price is lower than the price specified in the contract at the time of delivery of my maize, and their demand is low, the QC team of the factory rejected a huge amount of my maize due to the quality standard reason, even if the quality is good enough because quality criteria is unreliable and subjective to their demand. On the other hand, if the market price is on an upward*

*trend, and their demand is high, they do not reject my maize even if the quality is poor. This is because there is no set of specific formal quality standards.*

### 5.4.4 The relationship between wholesalers

This subsection will describe the relationship between small-scale wholesalers and large-scale wholesalers and between large-scale wholesalers. This sub-section describes how trust influences small-scale wholesalers' decisions to sell their maize to large-scale wholesalers. Moreover, it also outlines how interviewed large-scale wholesalers interact with each other for the success of their business.

All interviewed small-scale wholesalers sell their maize mainly to their regular large-scale wholesalers because of their trust in their regular large-scale wholesalers and fear of potential fraud being committed by strange buyers. Small-scale wholesaler 2 explains how trust and fear of fraud influence her decision in selecting her buyers.

*I usually sell my maize to my regular large-scale wholesaler. I have dealt with him for many years. In some cases, he paid me for my maize 2-4 weeks after delivering my maize to him. However, I need not worry about his payment for my maize because we have a close relationship with each other. Sometimes, new buyers offered me a higher price. However, I dare not sell them unless they pay cash down because there have been fraud cases of strange buyers in our maize trading sector, in which they did not pay after maize had been delivered even though they offered a higher price. However, we cannot take any action against their fraud because we do not know where they live.*

Large-scale wholesaler 3 from a rural area expounds about the relationship with other wholesalers as follows:

*We must support each other when necessary for the sustainability of our business. Particularly, when we have a problem with fulfilling a contract with buyers due to a sudden increase of price, we need to help each other. For example, we are required to sign a contract agreement with a buyer, in which the amount of maize, price of maize and delivery time of our maize to our buyer are set. In some cases, the price suddenly goes up after signing the contract. Then, it is difficult to buy and deliver maize in time with a reasonable price. In this regard, other wholesalers provide me with the required amount of maize, which they had bought before the price rises with their buying price. I also help them like this when they have such kind of problem. Otherwise, our business will collapse.*

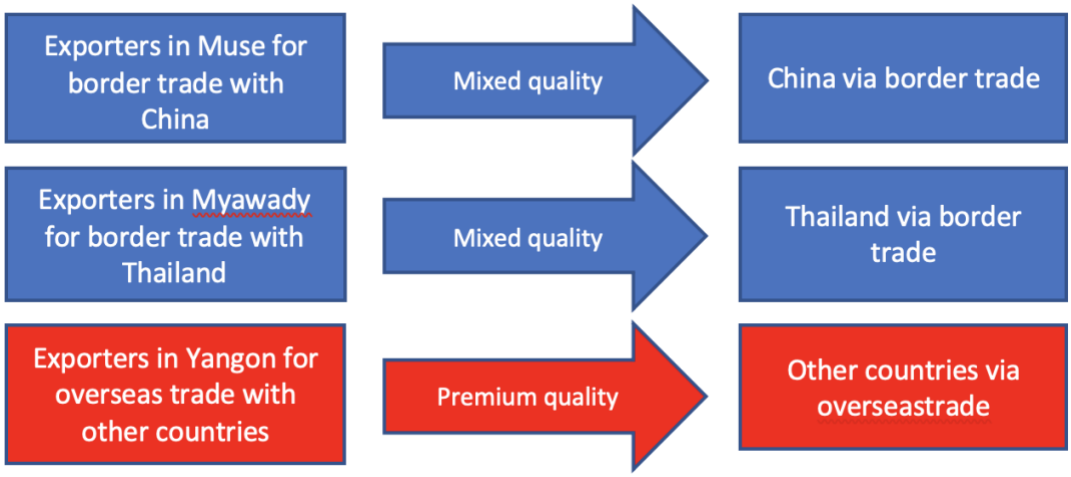
### 5.4.5 Dynamics between exporters and foreign buyers

As shown in Figure 5.5, there are two border outlets – Thailand and China, and one outlet for overseas export for Myanmar maize. Buyers from both border trade outlets buy different qualities of maize, while those from overseas buyers demand premium quality. This sub-section describes the exporters' activities and relationship buyers from export markets.

In this regard, there was a limitation to reach many exporters to interview for different reasons. Many maize exporters in Muse, which is a border trade city with China, were travelling as the Chinese border trade was closed at the time of interview. Likewise, many exporters who export to other countries through overseas trade were also travelling because it was low season for maize at the time of interview. Moreover, many exporters who export to Thailand via border trade were not reachable because cross-border trade with Thailand was a new market and not in the research plan of this study. Therefore, there were only four exporters – two from border trade with China, one from border trade with Thailand, and one from overseas trade who were interviewed. However, two people from Muse Commodity Exchange Centre were also interviewed about border trade with China.

Therefore, in this section, the activities of exporters from border trade with China, an exporter from border trade with Thailand, an exporter from overseas trade, and two people from Muse Commodity Exchange Centre, who work on Chinese border trade, are described.

*Figure 5-5 Maize export channels*




This subsection describes the activities of exporters in Muse and their interactions with Chinese buyers. It outlines how they set the price, how they define quality, how they make payment,

how they are trading maize, the advantages, and disadvantages in trading with China through cross-border trade, and why cross-border trade with China is open sporadically.

Exporter 2 in Muse explains about defining the quality of maize in selling their maize to Chinese buyers.

> *The Chinese buyers bought any quality of maize. Before getting agreement on price, they checked the quality of a sample of maize, then the sellers and buyers negotiated about price. There was no specific quality standard. Quality was decided by visual check. The buyers who liked high quality, they bought just high quality by paying a higher price. If buyers wanted low-quality maize, they bought low-quality maize by paying a lower price. The price difference between low- and high-quality maize was 2-10 YMB per bag (50Kg per bag.) The buyer liked big grains, bright colour of grains and low percentage of fungus-affected grains. There were three grades in trading maize. There was no clear-cut difference. Between grades. It depended on individual buyers. Some wholesalers said it would be grade A if the content of black grains (fungus-affected) was 1-2%. Some would say 2-3%. However, another wholesaler would say it was grade B if the content of black grain was 3%.*

He also adds why the Myanmar exporter prefers to sell to China and how the quality influences the maize price:

> *Depending on their definition of grade, price was also different. Moreover, practically, no buyer exactly measures the percentage of fungus-affected grain content but decides it by a visual check. Even if the quality of maize was terribly poor, Chinese buyers buy such poor-quality maize with lower price; that's one of the advantages of selling maize to China. The Chinese buyers never talked about quality specifications in advance. Only when they arrived at the trading zone, they searched for the maize with the quality they wanted by visiting different exporters in the trade zone. Chinese buyers negotiated price with us only after they have checked quality. Different buyers wanted different qualities of maize.*

According to interviewed exporters in Muse, there are different issues in dealing with the Chinese buyers for their grain. Exporter 1 in Muse added how some issues are influenced by lack of formal contract, informal trade, and payment system.

*Even though Myanmar maize was formally exported to China from the Myanmar side, it is informally imported by the Chinese buyers because the Chinese Central Government does not formally permit the import of Myanmar maize. In the first three years of Muse Commodity Exchange Centre, both the Myanmar exporters and the Chinese buyers must sign a formal contract at the centre before trading. However, after that period, the exporters and the buyers have a close relationship and they do not trade at the centre, but at the "105-mile[2] Trading Zone" in Muse without a formal contract. Technically, the Chinese buyers must take responsibility for everything about the maize after we have transferred our maize to them. However, in some cases, the Chinese buyers do not pay for our maize if maize is seized by the Chinese authority. Some buyers requested us to share half of their loss if their maize was seized by their authority. Some Chinese buyers requested us to share just a small amount of loss. Under such situations, the Myanmar exporters got in a fix because we sold our maize on credit without any formal agreement. Nevertheless, we have no formal channel to claim for full payment of our maize because there is no formal agreement between them and the Chinese buyers, and there is no formal permission of the Chinese Government to import the Myanmar maize. In this year, the Chinese Government used more serious restrictions on the border trade with Myanmar. Another reason for this issue is the payment system, in which Chinese buyers do not pay cash down, but only after delivering our maize to them.*

According to the head of the administration office of Commodity Exchange Centre in Muse, the payment system was also complicated in trading maize with the Chinese buyers. She gives details on the payment system as follows:

*Myanmar exporters must open an account at a Chinese bank to receive the money transfer from Chinese buyers because, according to the current financial system of Myanmar, the Myanmar banks cannot directly accept Chinese currency. Then, they must transfer this payment to the Chinese bank account of the informal money exchange centres or formal money exchange centres in Myanmar to exchange the Chinese currency for the Myanmar currency. These money exchange centres have accounts at both the Chinese and Myanmar banks, then, the money changers transfer the Myanmar currency to the Myanmar bank*

[2] 105-mile is a name of the trading zone in Muse, which is a border trade city with China.

*account of the exporter because the Myanmar banks do not accept Chinese Yuan due to the existing financial law of Myanmar.*

Moreover, the head of the administration office adds how the Chinese Government's action makes trouble for Myanmar exporters with their bank accounts, which are opened at Chinese banks and how the Myanmar exporters handle this issue.

*On the other hand, the Chinese Government often blocks the Myanmar exporters' accounts opened at the Chinese banks without giving any official reasons. We informally learned that the Chinese authority suspected that the Chinese buyers who transferred payment to the Myanmar exporters' accounts at the Chinese bank were involved in illegal business activities such as gambling and trade of illegal drugs. When they make enquiry to the concerned banks about it, they replied that they do not know the specific reasons and they are asked by the government authority to block their accounts. Then, when we made enquiry to the Yunnan Regional Government about it, they replied that they did not know the specific reason, and it was directly controlled by the Central Government. In some cases, the Myanmar exporters must pay half of their deposit to the responsible person to unblock their accounts. Under this situation, they tend to lose a lot of money. In 2016, about 200 bank accounts of Myanmar exporters and money exchange centres were blocked by the Chinese Government. Therefore, the Myanmar exporters organized a protest regarding the action of the Chinese Government blocking their bank accounts opened at the Chinese banks. Due to that protest, the Chinese Government unblocked their bank accounts again on the same day. However, even after that, the Chinese Government still block the accounts of some exporters.*

According to interviews with those from the export sector, they often faced fraudulent problems in trading with Chinese buyers. The Secretary of Muse Commodity Exchange Centre also expounds how fraud is happening in the cross-border trade and how he must be involved in solving these problems as follows:

*Sometimes, many truckloads of maize were lost on the way between Myanmar exporters and Chinese buyers. At that time, I needed to investigate such kind of cases in different ways. In some cases, this kind of problem is not intentionally created by someone. For example, the maize exporters do not supervise loading their maize to the Chinese trucks at night. The Myanmar workers do not know onto which trucks they have to load their*

*maize. The Chinese truck drivers also do not know to whom they must deliver this maize. In some cases, however, they intentionally committed this fraud, in which truck drivers did not deliver maize to designated buyers and, instead, they sold the maize to others. In this case, the original buyers also did not take any responsibility for such cases. I must informally investigate such kind of frauds. In most cases, we could not solve these issues. Sometimes, it was found that even Myanmar workers were also involved in this kind of fraud.*

Exporter 1 from Muse also explains about the fraud committed by Chinese buyers as follows:

*Sometimes, Chinese buyers committed frauds, in which they did not make payment for ours? after they had received our maize. According to our payment system, Chinese buyers transfer payment for our maize only after they have received it. There is no formal agreement between Myanmar exporters and Chinese buyers. Therefore, if the buyers do not pay for our maize after the maize has been delivered to them, it is not possible to take formal legal actions against the fraud.*

The secretary of Commodity Exchange Centre in Muse also added why cross-border trade with China is often on and off as follows:

*The Chinese Yunnan Regional Government informally allows their wholesalers to buy the Myanmar agricultural commodities including maize. If their central Government puts pressure on them to shut down the border trade, they shut it down. Otherwise, despite the informal trade, the Myanmar maize flows into China, particularly into Yunnan province like a formal trade. If the border trade is open, and the Chinese buyers can buy Myanmar agricultural commodities, it creates a lot of job opportunities for the local people from Yunnan province and supports their regional development, while Yunnan province is land-locked and very far away from the seaport. Regional development can give an incentive for promotion to regional government leaders. Therefore, the Yunnan Regional Government authority closes one eye to the border trade with Myanmar for their regional development and opens another eye for pressure of their central Government on the border trade.*

According to interviews with exporters in Muse and the people from Muse Commodity Exchange Centre, Chinese buyers do not use quality restrictions and offered the price for Myanmar maize

higher than the international price. The secretary of Muse Commodity Exchange Centre explains the differences between cross-border trade with China and overseas trade with other countries as follows:

> *The Chinese offered a maize price higher than the international price; the average maize price at cross-border trade with China is 45%-86% higher than the international price between 2014 and 2019. The Chinese bought all kinds of quality of maize, depending on quality, they set different prices for different quality. For example, if exported to Japan, our commodity is inspected before leaving the Myanmar port by a company from Singapore. However, they also inspected it again before unloading it at the Japanese port. If they found that the commodity was not qualified to be imported by Japan at the unloading time, it was rejected, even if it was qualified at the loading time. For example, The Myanmar exporters exported sesame to Japan. Before leaving the Myanmar port, it was qualified for exporting to Japan according to a third-party inspection. Due to poor storage system or transportation system on the ship, the sesame quality was degraded, then it was rejected, and this was very awkward for the Myanmar exporters. On the other hand, the Chinese buyers very seldom rejected our maize. They bought any quality but with higher price and fewer quality restrictions. Therefore, according to current situations, it is not easy to diversify markets for maize rather than relying on the Chinese market.*

Administration Office Head of Muse Commodity Exchange Centre added what is needed to make cross-border trade with China formal as follows:

> *We need certification of a Chinese plant quarantine agency called General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) so that the Chinese Central Government officially permits import of Myanmar agricultural commodities including maize. The Plant Protection Division of Ministry of Agriculture of Myanmar, which takes responsibility for plant quarantine, plays an important role in getting the certification. AQSIQ only recognizes this government agency for this process. Generally, it takes at least three years to complete this process. Now, we have submitted the case to the Minister for Agriculture of Myanmar to sign the official request letter to ASQIQ to start the certification process.*

According to interviews with exporters, the Myanmar maize has been formally exported to Thailand since 2019. However, there are two channels through which to export it to Thailand – formal and informal. Exporter 1 Muse explains as follows:

> *Some exporters do not want to pay tax to the Government and use informal channels. In the informal channel, maize is carried with boats across Thaung-yin River which is used as a border line between Myanmar and Thailand. Some wholesalers also use informal channels because they are not used to a formal process and are afraid of the complicated process of formal trade. In the formal channel, maize is transported with trucks through the bridge. We have higher trust in Thailand buyers than the Chinese buyers because exporting maize to Thailand is formal and the Thailand buyers have trading or import licenses. They, therefore, believe that we can officially report to the Thailand Government to take action against Thai buyers even if they cheat us or committed fraud.*

Exporter 1 from Muse explains how the transportation affects the exporters in Northern Shan State for changing export outlets from border trade with China to Thailand.

> *Transportation cost from Lashio, the capital city of Northern Shan State to Myawady which is the border trade point with Thailand is double that from Lashio to Muse (from 65 MMK (0.065 NZD) to 135 MMK (0.135 NZD) per viss while maize price is 380 MMK (0.380 NZD) per viss at the time of interview. An exporter from Mandalay said that Thai market is much smaller or has lower demand than that of China and, accordingly, the price offered by Thai buyers is lower than that offered by the Chinese buyers. Current price at the Thai border is 35% lower than the possible price at the Chinese border.*

Exporter 2 in Yangon explains how Myanmar maize has access to the Thai market as follows:

> *The Chairperson of CP Agro-food Company, which is a Thailand-based multi-national company playing a key role in the maize value chain in Myanmar, mainly helps us so that we can export our maize to Thailand. He lobbied the Thai Government to allow the importing of Myanmar maize and encourage their wholesalers to buy Myanmar maize. In Myanmar, CP Company has a huge amount of investment in Myanmar. It supplies maize seeds and fertilizers, buys maize for its feed factories, produce poultry feeds, and sell poultry feeds, supply day-old chicks (DOCs) - both broilers and layers, buy eggs and grown-up broilers, established grilled chicken shop chains and so on. The chairperson of CP*

*worries that the Myanmar maize farmers would not cultivate maize if there is no market for their maize because there will be an adverse impact on the whole value chain throughout which the CP company is deeply involved. Therefore, he arranged a study tour to Thailand for a group of Myanmar maize exporters, including me, so that we can discuss the perspective of the maize market with Thai wholesalers.*

Maize exporter 1 in Yangon explains how they had limitations in overseas trade of maize limitations, compared to border trade as follows:

*I cannot export maize to other countries via overseas trade if the cross-border trade with China is open because the Chinese buyers pay a higher price than the international market. If I want to export maize to other countries through overseas trade, I must sign a contract in advance, in which the amount and price of maize, and the timeframe, are specified. It is risky to export maize to other countries in such a way. For example, even though the maize price was low due to the Chinese border closure at the time of signing the contract, the price could soar suddenly if the Chinese border trade is opened again. Terms and conditions of overseas trade are more complicated than that of border trade. For example, I must guarantee that my maize must be free from given pests and diseases, and aflatoxin. I must assign an accredited third party to inspect my maize about pests and disease, aflatoxin, moisture content, percentage of damaged grains, percentage of unfilled grains, percentage of mixtures and so on. In border trade, there is no such kind of terms and conditions. The amount of maize required for overseas trade is also higher than that of the border trade. In the border trade, if an exporter has one truckload of maize (28-32 tons per truck), he can export his maize through border trade. However, in the overseas trade, I must have capacity to export at least 1000 tons. If my maize does not meet the quality standards specified by the buyers, it will be rejected, and I will lose a lot.*

## 5.5 The relationship between the growth of maize production and the growth of poultry farms in Taunggyi Township

This sub-section describes the inter-relationship between the growth of maize sector and poultry sector. According to interviewed poultry farmers, the poultry sector, particularly layer poultry farms, has grown significantly over a few years due to the stable price of eggs and the reasonable price of maize in the region.

Poultry farmer 1 also explains how his poultry grows as follows:

*"According to my own estimate, the poultry sector in Taunggyi has grown 20 times since 2005 when I started my poultry farm. It has grown in terms of both size of individual farms and number of farms. For me, I started my poultry farm with 2,000 heads of broilers and now have 21,000 heads of layers. I substitute broilers with layers because chicken meat price is highly fluctuated while egg price is quite stable compared to chicken meat price. Moreover, we can easily grow maize on my farms and feed the harvested maize to my layer chickens. If necessary, I can also easily buy quality maize at a reasonable price in this area."*

## 5.6 Transportation: Challenges faced by exporters

This sub-section outlines how exporters are burdened with the transportation fees for their maize.

Major destinations of maize transporters in Taunggyi are Muse, Myawady and Yangon. Until mid-2018, the most popular destination was Muse, which is a border trade town sharing a border with China. From late 2018 to the time of interview (July 2019), there was no Muse market for maize because the Chinese Government closed the border trade for many agricultural crops, including maize. Myawady then becomes a major transportation channel because Thailand buys Myanmar maize when the Chinese border trade at Muse is closed. Therefore, the channel of transportation is diverted to Yangon, which is the only outlet for overseas export, and Myawady, which is a border trade town and shares a border with Thailand. According to some interviewed wholesalers, they have problems with not only high transportation costs, but also high fluctuations of the transportation fee. This section describes how the transportation fee shaped some activities of the maize value chain.

Large-scale wholesaler 1 explains how the transportation fee affected the market of maize inputs such as seed and fertilizers:

*Since I have not sold any of my maize, the high transportation fee does not significantly affect my maize trading. However, it adversely affects the input markets. When the Chinese border trade was open, transportation fees for maize inputs were lower than now because trucks can get goods for both ways - maize from Taunggyi (which is in Southern Shan State and to Muse (which is located in Northern Shan State and a border trade point*

*with China) and agricultural inputs from Muse to Taunggyi. These days, there is no maize for trucks for the trip from Taunggyi to Muse. Therefore, transportation fees for the goods which are carried from Muse to Taunggyi such as maize seeds, fertilizers and herbicides were increased.*

Large-scale wholesaler 6 explains how transportation cost is a large burden for him as follows:

*The transportation fee is much higher than it should be. If maize is transported to Muse, the truck owner is charged an extra fee because they must wait a few days to unload maize in Muse due to the long queues of trucks. This is because there is insufficient space for parking the truck for unloading. The truck owners are charged an extra fee because there are no goods for their return trip. Moreover, the high fluctuation of the transportation fee is risky for us in trading maize. Mostly, we can make a profit of only 10 MMK (NZD0.01) per viss (1.62 Kg). Then, if the transportation charge increases 10 MMK per viss after signing the contract agreement with a fixed price, there will be no profit for us. If it increases more than 10 MMK per viss, my profit will be negative. Therefore, these days, I set the agreed price in the contract excluding transportation costs.*

## 5.7 Summary

Multiple factors shaped the growth of maize production in Southern Shan State. The majority of interviewed farmers extended their maize-growing area over the last decade and are willing to continue growing maize and were not disincentivized by the downward trend of the maize price. Certainty of market, easy management, easy access to improved varieties, easy access to credit, relatively less labour-intensiveness, complementary activities with other existing crops, and access to agricultural machinery are major factors influencing farmers' decisions to grow maize. On the other hand, lack of more favourable alternative crops forced farmers in Southern Shan State to keep growing maize, even though the maize price highly fluctuated due to the unstable market. This shaped a secure supply of maize in the value chain.

The capacity of domestic buyers, such as wholesalers and feed factories for buffering stock of maize, emergence of an alternative export market and the growth of poultry sector, stabilized the demand and the price of maize. Wholesalers bought maize from farmers and stored it, feed factories extended their buying season, the demand from poultry increased when a dominant export outlet is closed, and before there was no alternative export outlet for the maize. The Thai

market then emerged for Myanmar maize as an alternative export market. These factors shaped the certainty of market for Myanmar maize.

Information asymmetry between value chain actors, lack of formal quality standards, and lack of incentive for farmers to produce quality maize are likely to be important areas to be improved to diversify markets and have access to better markets for Myanmar maize. Information about the quality requirements of final markets was not properly passed on to maize farmers. Moreover, interviewed maize farmers were not paid a higher price for their quality maize. Accordingly, some of their cultural practices affected the quality of maize. Above all, there are no formal quality standards for maize in Myanmar. These are potential hindrances for access to other markets.

# Chapter 6

# Discussion

## 6.1 Introduction

This chapter returns to the research question and discusses the research findings in relation to previous findings in the literature together with their implications. In this study, several factors were identified as influencing the maize value chain in Shan State of Myanmar. These include the main characteristics of the value chain, markets, access to information, governance, profitability, and farm size, and are discussed in the following sections in detail to answer the research question: What influences the value chain of maize in Shan State of Myanmar?

Section 6.2 describes the general characteristics of the maize value chain in Shan State. Following, section 6.3 presents the factors which shaped the supply responses of farmers. Sections 6.4 and 6.5 outline how the export markets and domestic markets shape the maize value chain respectively. Section 6.6 describes how the structure of the governance influences the value chain, and section 6.7 outlines which factors influence the efficiency of the value chain. Finally, section 6.8 describes how farm size shapes the value chain.

As a foundation for the discussion, the maize value chain is diagrammatically illustrated in Figure 6.1 below. The depiction identifies the value chain actors in the two main chains comprising the value chain. The main characteristics of the value chain are the robust growth of maize production, the dominant informal relationship between actors, lack of formal standards, a large reliance on a dominant export market, and price volatility.

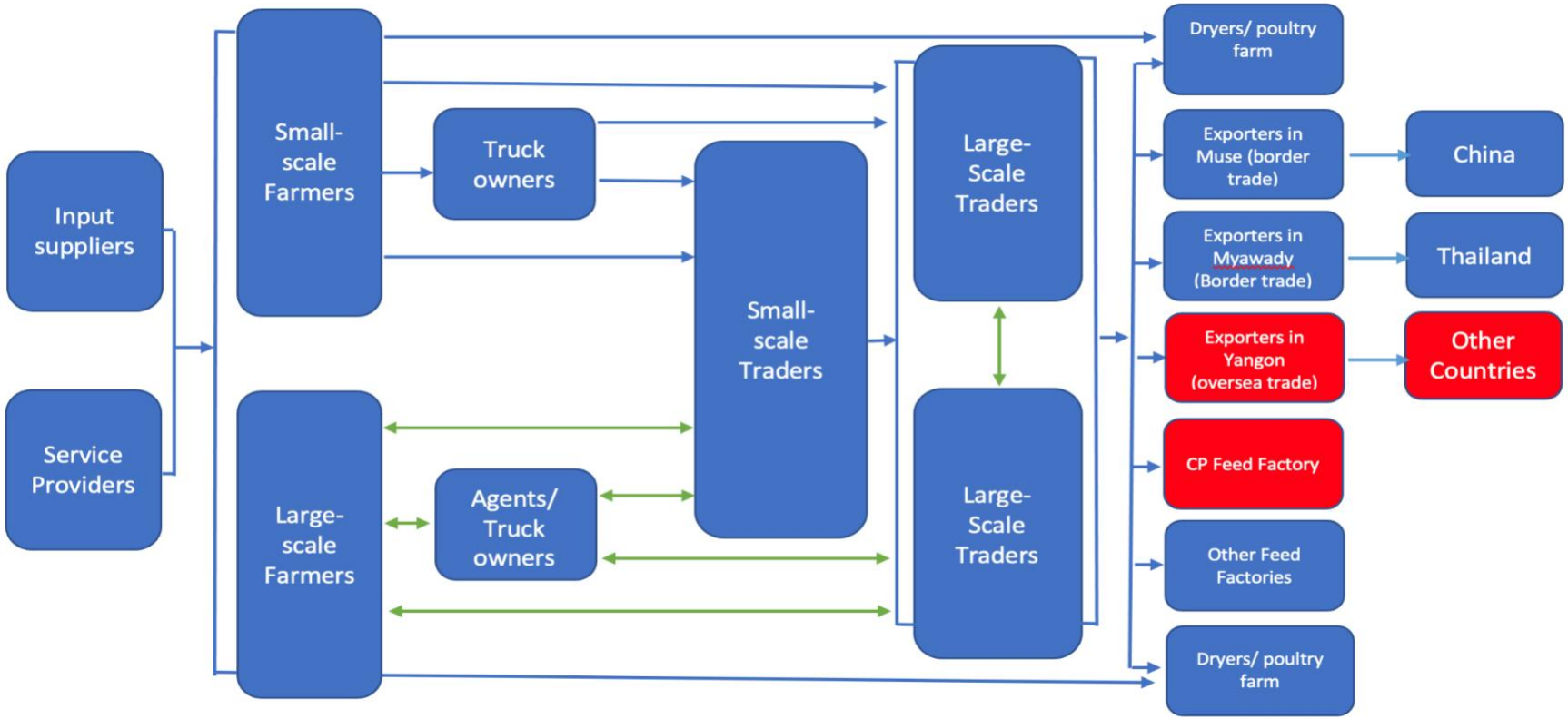
In the maize value chain of Shan State, the major actors were farmers, truck drivers/ agents, wholesalers (large-scale and small-scale wholesalers), the dominant domestic market (feed factories), minor domestic markets (poultry farms, dryers, and distilleries, etc) and exporters (border trade and overseas) as shown in Figure 6.1. Most interviewed maize wholesalers also served as major input suppliers and credit providers to large-scale maize farmers to attract and retain these farmers as suppliers. In return, large-scale farmers, who took tied credit from wholesalers must sell their maize to these wholesalers. Small-scale farmers sold their maize to

local wholesalers through truck owners or agents, while large-scale farmers sold their maize directly to local wholesalers. Local wholesalers sold their maize mainly to the dominant domestic market (feed factories) and exporters, while a small part of their maize was sold to other minor domestic markets such as dryers, distillery mills, or poultry farms. Exporters sold their maize mainly to one dominant export market and when this market was closed, they sold to an alternative export market. There were minor export markets for Myanmar maize, however, less than 10% of total maize export went to these markets.

As shown in Figure 6.1, there was a single dominant export market and a dominant domestic market shaping the maize value chain in Shan State in terms of volume and price. Ninety percent of total maize exports flowed into the dominant export market when it was operating smoothly. The dominant export market offered the highest price for maize in Shan State, compared to either alternative export or domestic markets, however, it was unstable. Consequently, there were high price fluctuations for farmers depending on whether the dominant export market was running smoothly, or if it was closed. The dominant domestic market also significantly influenced the maize value chain of Shan State in terms of volume. More than 90% of total domestic sales of maize went to the single dominant domestic livestock feed market, particularly to CP and Tatchaung feed factories. When the dominant export demand was open or closed, demand from the dominant domestic market was stable, and it operated without major disruptions. As a result, farmers always had a market through which to sell their maize.

Maize is not a staple food for farmers or broader society in Myanmar. Maize is primarily a source of feed for the poultry sector, and chicken and eggs are a major protein source of food for Myanmar people. Of the maize grown in Myanmar, 40-60% of the total production is utilised domestically, although mainly as a source of livestock feed for chickens. Other scholars recognized that chicken and eggs are important sources of protein in Myanmar. Among Myanmar people, the consumption of chicken and eggs sharply increased by 72% and 46%, respectively, between 2010 and 2015, while the consumption of other meats went down in the same period (Fang, P., Belton, B., Zhang, X., & Win, H.E., 2021). In the decade 2008-2018, chicken and eggs became the second and third most important protein source, respectively, after fish in Myanmar (Belton, B., Cho, A., Payongayong, E., Mahrt, K., & Abaidoo, E., 2020). Therefore, the role of maize production in Myanmar became more important as a major source of poultry feed while the consumption of chicken and eggs grew more popular.

*Figure 6-1 Mapping maize value chain actors of Shan State in Myanmar*




Note – The **(blue) single arrow (→)** shows that there was only a one-way flow of goods or service between the actors. The **(green) double arrow (⇔)** shows that there was a two-way flow of goods or services (e.g., wholesalers provided loans/inputs in credit to large-scale farmers directly or through agents/ truck owners, and farmers sold their maize directly or through truck owners/agents to the wholesalers who provided them inputs in credit). More than 90% of total domestic consumption went to the domestic market, feed factories, and more than 90% of total export also went to the dominant market, China.

Maize production in Shan State has been increasing over the last two decades because maize was attractive to farmers in Shan State in different ways despite price fluctuations. Maize cultivation is complementary to the activities of other crops in allocating family labour. Moreover, unlike other crops, they are always able to sell maize whenever they want throughout the year, despite fluctuations in price received by farmers for maize. Even though there are alternative crops to maize, which are not staple food crops, there is less certainty for these crops compared to maize for farmers. In fact, rice, an alternative crop to maize, is a staple food for producer farmers and other people in Myanmar. However, the return from rice is low due to low productivity, which has resulted from a lack of access to improved varieties, compared to maize. As a result, maize has become a dominant crop in Shan State.

Overall, the certainty of market for maize is provided through multiple domestic and international markets. Informal cross-border trade with China is dominant in terms of volume of maize and a relatively high price for maize, particularly when it is open. However, border trade with China is fickle. A cross-border market with Thailand emerged as an alternative market when the border trade with China was closed. This alternative export market is developed and facilitated by a Thai entrepreneur who invested and had a stake in Myanmar in the maize value chain. Moreover, a relatively small formal overseas market for maize also existed. The domestic market also absorbs a significant part of maize production in Myanmar, mainly feed factories, most of which are established with international investment dominant in the domestic market. Domestic buyers of maize play an important role in buffering maize stock when there are no international buyers for maize. In this way, maize farmers are provided with a certain market.

There are few Government interventions in the Myanmar maize industry even though there is robust growth in maize production in Myanmar. No specific policy for maize was found, even though there are some general ones for agriculture which potentially affect the maize sector. This is probably because maize is not a staple food crop like rice, even though it is an important crop for foreign earnings. However, the maize industry is moving forward as driven by markets.

An informal relationship is the dominant form between actors in the maize value chain in Shan State, even though there are a few cases in which formal relationships are practised between some actors. An informal relationship is mainly based on a social relationship or trust existing among those actors who have had a long-term relationship with each other. On the other hand, a formal relationship is used where firm trust has not been built up between actors.

## 6.2 Main Characteristics of Maize Value Chain in Shan State

Maize, compared to rice, is neglected by the Government, even though it is the second most important cereal crop in terms of area, after rice, and one of the top export crops in Myanmar in terms of both volume and value. It is not a staple food crop like rice for Myanmar people. A similar case was observed in African countries. The same degree of investment was not put into the development of the non-staple food crop sector, while a price support program and loan schemes were adopted to support staple food crops such as maize and cassava to improve the affordability and accessibility of their people in Nigeria and Zambia (Bouis, H., Saltzman, A., Low, J., Ball, A., & Covic, N., 2017). Likewise, there is no specific support program for the development of the maize sector, while the rice sector is favoured in different ways as a staple food crop in Myanmar.

The maize value chain activities were coordinated mainly through informal mechanisms, although there were a few examples where formal coordination mechanisms were in place. The transactions between local wholesalers and farmers, such as selling and buying of maize, accessing, and repaying credit, and sourcing and supplying inputs, were conducted based on social relationships and trust. Relationships had been established based on repeated transactions over a period rather than formal mechanisms such as a written contract agreement. However, there were a few cases in which the actors used formal mechanisms. In a small number of instances, the transactions between wholesalers and feed factories and/or exporters, were moderated by a written formal agreement, mainly for large-scale transactions, however, the majority were based on informal arrangements. This is supported by other scholars. Empirical findings suggest that informal arrangements are more common in small-scale transactions, rather than in large-scale transactions in Kosovo, reflecting the findings of other scholars (e.g. Fafchamps, M. & Lund, S., 2003; Gjokaj, E., Halimi, K., Xhabali, V., Imami, D., & Gjonbalaj, M., 2017).

Hybrid varieties were dominantly used by farmers due to easy accessibility of hybrid seeds and credit, so there was a relatively high yield of maize in Shan State. Different brands and varieties of hybrid seeds were easily available in the market, even though CP hybrid varieties were dominant in the seed market of maize in Shan State. Burke and Lobell (2017) also recognized the influence of easy access to improved seeds and credits on the adoption of hybrid seeds in

Kenya. Accessibility played an important role in farmers' adoption of hybrid maize in Kenya. Moreover, it was found that access to credit increased adoption rate of hybrid maize seeds for small-scale farmers (Burke, M. & Lobell, D.B., 2017)

Maize farmers in Shan State gained relatively low profit despite a reasonably high yield due to high transportation costs, high input costs, and high credit costs. High transportation costs for transporting maize from local wholesalers to the exporters was also implicitly shared with farmers because wholesalers reduced the buying price, which was offered to farmers if transportation costs became higher. Moreover, farmers paid 36%-60% of annual interest for their credit. Linn and Maenhout (2019) also identify that high transportation cost had the largest impact on the profit of rice value chain actors in Ayeyarwady Region of Myanmar. The actors, such as farmers, wholesalers, millers, and exporters, suffered from high transportation costs due to poor road infrastructure, high fuel costs and road toll fees. These actors all recognized the high transportation costs as a major problem for their profit. Moreover, the exporters believed that the high transportation cost impeded them from competing with other rice-exporting countries (Linn, T. & Maenhout, B., 2019). However, in this study, there was another reason for the high transportation cost in addition to the reasons Linn and Maenhout (2019) mention in their rice value chain study. In this research, the transportation cost for maize and inputs such as seeds, fertilizers, pesticides, and herbicides, which were imported from the dominant maize export destination, increased because trucks had limited access to goods for return transportation amid closure of the dominant maize export market.

## 6.3 Factors Influencing Supply Responses of Maize Farmers in Shan State

This section describes the factors which influence farmers' decisions on crop choice, and elucidates why farmers keep growing maize despite challenges. Sub-section 6.3.1 describes how the certainty of market access for maize attracts farmers to grow maize. After that, sub-section 6.3.2 outlines how the stable profit of maize and uncertain profit of other potential alternative crops influence farmers in choosing maize as their major crops. Lastly, sub-section 6.3.3 presents how labour requirement patterns of different crops shape farmers' crop choice.

### 6.3.1 Certainty of Market Access for Maize

This sub-section illustrates how the certainty of access to markets for crops influences farmers' decisions on growing maize. There was a robust growth of maize production in Shan State in the last decade. Regardless of price fluctuations, even when prices trended downward, the increase

in maize-growing area in the region seemed to continue. This is partly because there was certain access to a maize market, whereas other crops lacked secure market access.

Certainty of market access for maize and lack of a secure market for non-maize crops were driving factors for farmers to continue growing maize and/or to expand their maize area despite price fluctuations or downward trend of price. In Kenya where maize is a staple food crop, when the maize price went down, farmers were likely to reduce their area under maize, particularly if their production was commercial rather than subsistence (Mose, L.O., Burger, K., & Kuvyenhoven, A., 2007). In contrast, farmers in Southern Shan State were not willing to reduce the area of maize they grew, and even expanded their maize-growing area, despite a decrease in the price and the focuses on commercial production rather than subsistence. This was partly because maize was one of the crops which had the most secure access to market and non-maize crops did not have secure markets. However, in the Kenyan case, another reason for reducing the maize area was that farmers assumed that they had alternative uses for their land if they reduced their maize-growing area (Mose, L.O. et al., 2007). Therefore, another reason for not reducing the maize area in Shan State, despite prices in a down-trend and commercial production, might be lack of alternative crops with secure market access. Other scholars also recognized that secure markets compelled farmers to grow a crop. For example, in Southern Mali, incentives of the secure market for maize drove farmers to choose maize. The basic reason for growing maize in Southern Mali was to gain economic profit, resulting from the secure market – an increase in demand from the domestic market and neighbouring countries (Koné, M., Djouara, H., & Dolo, A., 2000). Like the maize farmers in Southern Mali, demand from domestic and export markets created secure markets which attracted farmers in Southern Shan State to grow maize.

Other scholars also suggest that the secure market for maize and unsecure markets for alternative crops forced farmers to keep growing maize despite lower profits even if they did not wish to do so. In the uplands of the Laos-Vietnam border region, even though the profit margin fell, maize farmers continued growing maize for a couple of reasons. Maize was the only reliable and secure source of income while there were high risks and lack of secure markets for new alternative crops (Hoang, L.T., Roshetko, J.M., Huu, T.P., Pagella, T., & Mai, P.N., 2017; Yadav, L.P., Smith, D., Aziz, A.A., Thuy, C.T.L., Thao, H.X., Le, H.H., Nicetic, O., Quyen, L.N., & Vagneron, I., 2021; Zimmer, H.C., Le Thi, H., Lo, D., Baynes, J., & Nichols, J.D., 2018). According to Zimmer et al (2018), maize farmers in the northwest of Vietnam did not like growing maize because of high input costs and low income. However, they continued growing maize because,

in addition to access to market, it was easy to grow and manage maize, there were no secure markets for alternative crops, and everybody grew maize. The current study also identified some farmers giving the same reasons for both liking and disliking growing maize with Zimmer et al (2018). In the Vietnamese cases, maize is used not only as an animal feed source, but also as a staple food for some ethnic groups in Vietnam. The reasons for low profit of Vietnamese maize farmers and Myanmar maize farmers were different, while both farmers kept growing maize. The Vietnamese maize farmers' low profit resulted from low yield due to monoculture for many decades, while Myanmar maize farmers' low profit mainly resulted from low market price due to lack of access to a major export destination for Myanmar maize. Therefore, Myanmar maize farmers in Shan State were still hoping for a higher market price when the access to the dominant export market was restored. Despite other driving factors, certainty of market was one of the main reasons for the growth of maize production, leading to a secure and growing supply to the markets in return.

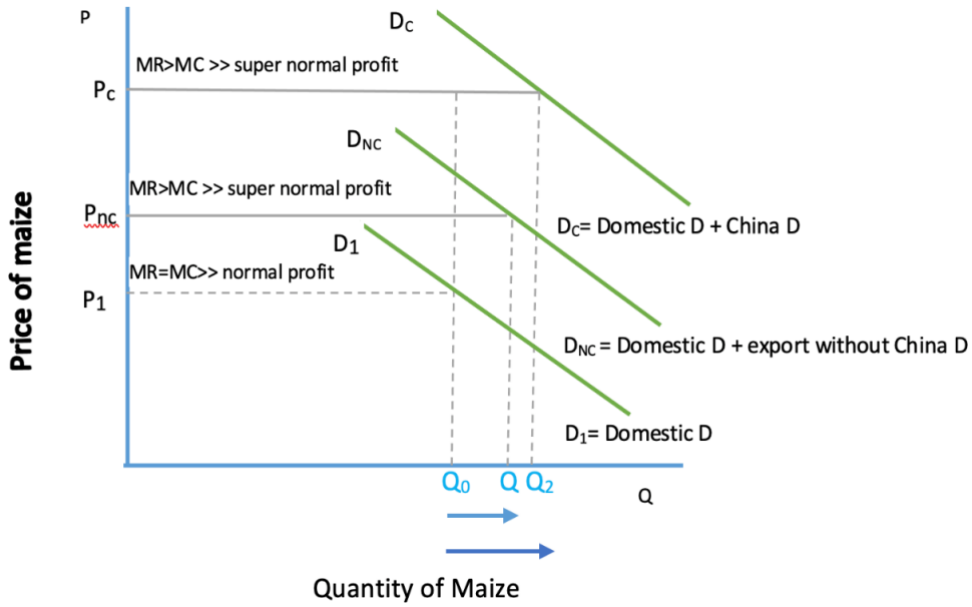
### 6.3.2 Profitability and Price Inelasticity of maize in Shan State

Maize production in Shan State does not seem to respond to price of output due to some advantages of maize such as easier management, easier sales, and relatively more stable profit compared to other annual crops in the region. In some literature on some African countries, it is noted that maize production is price-elastic. For example, Ogundari (2018) suggests that maize supply (a staple food) had significant price elasticity in Nigeria in the long run. He studied the response of maize supply to its own price and the price of other staple foods such as yam and cassava. He found that a 1% rise in the maize price increased supply of maize by 0.91% and 0.96%, respectively, in both ordinary least squares (OLS) and fully modified ordinary least squares (FMOLS) estimators in the long run, even though there were no significant changes in maize supply in response to maize price in the short run. He concludes that farmers had limited ability to respond spontaneously to the price incentives of price due to difficult access to different inputs and high transaction costs (Ogundari, K., 2018). Similarly, as per suggestions of economic theory, staple food crop farmers from Sub-Saharan Africa responded positively to increase in farmgate and wholesale prices. If the farm-gate price of staple food crops increases by 1%, acreage increases by 0.3 and production by 0.6. However, the percentage of increase in acreage and production was less than that of increase in price due to other limitations such as high market transaction costs. They said that the result reflected the farmers' ability to interpret market signals and responded positively to the increase of staple food price (Magrini, E., Balié, J., & Morales-Opazo, C., 2018). The reason for the inelastic response is that, as a staple, they

already tried to grow enough for subsistence, so any increase in price will not lead to a significant supply response as they need another area to grow other food crops.

In contrast to the abovementioned African cases, in the case of Shan State, most of the interviewed farmers had not reduced their growing area and were also unwilling to reduce their maize-growing area in the future, despite price fluctuations in the past years and downward trend of price at the time of interview as shown in Figure 6.2. This might not necessarily mean that farmers do not have the ability to interpret market signals. This is probably because the lowest maize price in the past was still relatively more profitable for farmers than other substitute annual crops. Moreover, maize has other favourable conditions. In some cases, farmers still prefer growing maize to other more economically profitable crops such as sebesten trees due to ease of labour management of maize and labour-intensiveness of the sebesten crop, and scarcity of fuel woods for processing sebesten leaves. Furthermore, it is likely that farmers expected the reopening of the dominant export market which offered a price higher than other markets because, in the past, the closure of the dominant export market has not lasted long. Therefore, it does not look like the maize farmers in Shan State are willing to reduce their maize production in response to the down-trend of maize price.

*Figure 6-2 Inelasticity of maize supply and demand*




(P= price, $P_c$= Price offered with Chinese market, $P_{nc}$= Price offered without non-Chinese market, MC= marginal cost, QR= marginal revenue, $D_1$ = Domestic demand only, DNC = Domestic demand + export without China demand, and Dc = Domestic demand + China demand)

As shown in Figure 6.2, maize farmers in Shan State were not willing to reduce their maize-growing area, even though the price fluctuated or fell when market outlets were not stable because maize production was still above normal profit even at the lowest price in the past, and there is no suitable alternative crop. When Myanmar maize can be exported to China as a dominant export market through cross-border trade, the price received by farmers ($P_c$) is the highest in the market, and farmers also obtained the highest revenue, or super-normal profit. However, due to fickle Chinese policies, cross-border trade with China was on and off. The Myanmar maize must be then sold to non-Chinese markets, and the price falls to $P_{nc}$. However, despite down-trends of price, farmers keep producing their maize and are not willing to reduce their production at the price $P_{nc}$ because their profit is still higher than normal profit, and the markets for other potential alternative crops are much less secure than that of maize. There is also a similar case in the Kenyan dairy industry. In Kenya, dairy farmers keep their production because their profit was above normal profit, even though there was variation in price due to unreliable market outlets (Odero-Waitituh, J., 2017). However, there are also different characteristics between the Kenyan dairy case and the Myanmar maize case. For example, milk is perishable while maize grain is storable. Moreover, dairy cows take many years to be productive and cannot be easily replaced with another crop or livestock, while maize is an annual crop and can be easily replaced with another annual crop if farmers wished. However, most interviewed farmers want to maintain their production, or even to extend their growing areas, although there are a few maize farmers who want to reduce their growing area.

The growth of the domestic market and emergence of an alternative export market enable maize farmers to maintain their super-normal profit, even when they cannot have access to the dominant export market. On the other hand, economic theory suggests that there will be normal profit if there is perfect competition in the market- ease of entry or exit, and there will be super-normal profit when there is an oligopolistic or a monopolistic market. It is accepted that if there is a competitive market, the profit will be normal because new investors or resources will enter the sector if the profit is relatively higher than other economic activities; the supply of goods or services will increase, the price will fall, and the profit will be normal again. Inversely, the enterprises can maintain super-normal profit in an oligopolistic or monopolistic market because new investors or resources cannot easily enter the sector. Apart from effective oligopolistic and barriers to entry, immobility of resources enable enterprises to maintain a super-normal profit (Scarborough, V. & Kydd, J., 1992). However, an oligopolistic, or monopolistic market is not a matter of the maize value chain in Shan State maintaining super-normal profit, resource

immobility might be a matter while land is a limited factor to keep up the production area with the market demand.

### 6.3.3 Effective Labour Management

Complementary activities of other cultivated crops, with those of maize, are also factors which compelled farmers to grow maize while there was a labour shortage problem in Shan State, Myanmar. Many maize farmers, including those from major maize villages grew more than one crop. Most activities of other crops did not coincide with those of maize, providing farmers with flexibility of labour division. Other scholars such as Fleming and Hardaker (1994) also support this scenario. Farmers from the Melanesian region made decisions on crop choices, based on complementary activities of different crops. In particular, they used this strategy in crop diversification to increase the productivity of family labour in idle periods and to avoid family labour shortage in the high season. When farmers diversified their crop production, the farmers selected those crops in which their activities complement each other through the nature of their labour demand seasonality and flexibility in managing their family labour resources across the year (Hardaker, J.B. & Fleming, E., 1994).

Labour intensiveness forced farmers to substitute an economically profitable crop with maize which is relatively less labour-intensive. Many farmers reduced or gave up the growing area of sebesten trees, which provided them with a return five to ten times higher than that of maize due to being labour-intensive while their family labour cannot supply the labour requirement for this crop and there is a labour shortage in the region. Farmers switched over to maize which had less labour intensiveness. This finding is consistent with those of Doss (2003). In Kenya, farmers did not grow the crops which require intensive management practices when the labour market did not work effectively, and there was insufficient family labour to fulfil the labour requirements of these crops (Doss, C.R., 2003). However, in his study, Doss did not mention the profitability of crops. There is little literature that suggests farmers substitute a crop with another crop, solely because the former is significantly more profitable than the latter. As shown in the present study, farmers' decisions as to which crops they grow are based on multiple considerations which include, but are not limited to, price received and profit.

## 6.4 Export markets

In the maize value chain in Shan State, there were two cross-border trade destinations - China and Thailand, and overseas trade destinations. As the largest export destination, the Chinese import market had a strong influence on the Shan State maize value chain in terms of volume and price, even though it was not stable due to the inconsistent policies of the Chinese central Government. However, border trade with Thailand created an outlet for the Myanmar maize, stabilizing the volume of maize that could be exported and, hence, the price to some extent. However, the export volume of overseas trade was small, while overseas trade buyers could offer the price much lower than Chinese buyers.

The Chinese market influenced the price of maize in Shan State because China had capacity to buy all the maize Myanmar wanted to export, and they offered a price higher than both domestic and alternative international market prices and imposed no quality restrictions or conditions on the maize trade along the China-Myanmar border. According to the data from Muse Commodity Exchange Centre collected during an interview with secretary of the Centre, the amount of annual Myanmar maize export to China exceeded one million tons every year after 2014, except the years in which the restrictions on the informal border trade were imposed by the Chinese central Government. The annual maize export price at China-Myanmar border was 45-86% higher than the international price between 2014 and 2018. However, the China-Myanmar informal border trade was erratic; when the informal border trade was operational, the maize price in Myanmar including Shan State, increased. However, when the border was closed, the price fell. In the informal border trade with Myanmar, Chinese buyers avoided paying high tariffs and some regulatory costs; they had relatively cheaper transport costs, compared to that incurred in formal overseas trade. A similar situation was reported by Lesser and Moise-Leeman (2009) in the Uganda maize trade. Informal border trade of agricultural commodities in these countries provided both trade partners with benefits, which were gained through reduction in some costs by avoiding tax and sanitary and phytosanitary measures (Lesser, C. & Moisé-Leeman, E., 2009). However, the nature between the Myanmar maize and the Sub-Saharan African maize differed. Myanmar maize is produced as stock feed grain, whereas in sub-Saharan Africa maize is a staple food for the people. Regardless of a staple food or not, this suggests that informal trade with other countries has advantages due to the lack of costs associated with quality assurance requirements present in formal trade arrangements.

Fickle policies of the Chinese Government brought price instability into the Myanmar maize industry because when the Chinese border trade stopped, prices received in alternative markets were lower than that received from China. The instability in price resulting from uncertain and erratic market access is supported by other scholars. In African countries such as Ethiopia, Kenya, Tanzania, Malawi, and Zambia, government interventions such as short-term export bans, destabilized the prices of maize in both importing and exporting countries (Porteous, O., 2017). However, there are differences between African and Myanmar maize value chains. First, in Africa, maize is cultivated as a staple human food, necessitating the exporting country to control price and the volume of stock for the affordability of their people, whereas in Shan State and across Myanmar, maize is produced for animal feed and export, and not for human consumption within Myanmar. Second, in the African case, government interventions were imposed by exporting countries to protect their consumers while, in the current study, the interventions were imposed by the importing country to protect their domestic farmers. However, the outcome and the ultimate impact on the value chains were similar. Myanmar, as an exporting country, did not intervene in maize exports to any countries as they might have had if maize was a staple food crop. In the African case (Porteous, 2017), the price of maize increased in both the intervening country and its trade partner, whereas the maize price fell in Myanmar, the exporting country. Diao and her colleagues (2020) also highlight that the fickle policies of the Chinese Government destabilized the price of maize in Myanmar. Recurrent interruptions in access to the Chinese informal maize market due to import bans of Chinese government to control illegal trade and the import quota, caused price fluctuations in Myanmar. These policy interventions in China triggered price instability, bringing the potential to crash the entire maize market in Myanmar and squash farmers' incentives to increase maize production (Diao, X., Masias, I., & Lwin, W.Y., 2020). However, in Shan State this price instability did not diminish farmers' motivation to expand their maize-growing areas. Despite price instability, most farmers interviewed in Southern Shan State were still willing to expand their maize area because the market for maize was certain and they did not have an alternative crop with a secure market that could be substituted for maize.

The Thai market helped stabilize the price and export volume of Myanmar maize to some extent as an alternative one to the Chinese market. There was a period in which there was no other export market option which could sufficiently substitute the Chinese market in the early months of the China-Myanmar border trade closure and, as a result, the domestic maize price went down. However, maize prices rose 20-30% after Thailand started buying Myanmar maize

through formal border trade in June 2019 after the closure of Myanmar-China border trade in late 2018. Even though the price offered by Thai buyers was not as high as that offered by Chinese buyers, to some extent the Thai market helped stabilise the maize price in Myanmar. There is little literature about export market options which caused price stability or instability. This is probably because there is no similar case like the one in Myanmar, in which a dominant export market offered a price significantly higher than other international markets. Access to an alternative export market meant the supply of maize was not disrupted and farmers remained confident in the certainty of the market for the maize they produced. This scenario is reflected in the statement by Hirsch and Lev (1971) that export market diversification stabilized sales of firms. The larger the number of markets exporting countries can access, the more stable the sale of these items (Hirsch, S. & Lev, B., 1971). They studied the correlation between export diversification and stability of sales of multiple products, including foods in three countries – Demark, The Netherlands, and Israel. However, they did not discuss in detail a single market and a single product, and recognized that individual export markets were generally unstable, and stability of sale could be achieved by market diversification. Moreover, Lee and Jang (2007) also support this statement. They state that market diversification improved stability of return. In their study, it was found that diversified hotels outrun undiversified hotels in the stability of financial performance (Hirsch, S. & Lev, B., 1971) (Lee, M.J. & Jang, S.S., 2007). However, this is a different product in their study and the current study. The sale product is service in their study, while it was agricultural commodity in the current study. Chaudhary and Saleem (2001) also suggest that lack of market diversification caused instability of trade in Pakistan. Pakistan's exports concentrated on few markets; it was probably a source of instability of Pakistan's export (Chaudhary, M.A. & Saleem, M., 2001). In their study, they analysed trade volumes of four export items – textiles, carpets, leather, and fish. However, they did not discuss markets of individual products.

In the Myanmar case, the existence of an international company, having a significant stake in the Myanmar maize value chain, influenced market access to an alternative export market which, in turn, provided stability to market access for the maize value chain including wholesalers and farmer producers. The previous closures of China-Myanmar border trade lasted a few months. Myanmar wholesalers and exporters had capacity to buffer the stock of maize for that period. However, the China-Myanmar border trade closed in late 2018 and has not, at the time of writing, reopened. As a result, Myanmar wholesalers and exporters had difficulty in buffering the stock of maize for such a long time. Meanwhile, Thailand based multi-national Agro-Industrial and Food Conglomerate, CP, which has invested in a vertically integrated value

chain of Myanmar maize – seed production, fertilizer supply, feed industry, chick production, grilled chicken stalls, and eggs and chicken trading, lobbied the Thai government to import Myanmar maize. This lobbying was successful, and Myanmar had access to Thailand as a new export market for maize. Access to alternative markets, including export markets, has a stabilising effect on a value chain and has been reported by other scholars (Chaudhary, M.A. & Saleem, M., 2001). However, the role of international companies in stabilising market access for a value chain in this way has, to date, not been reported in the literature. In this case, the international company was from a country sharing a border with Myanmar, and the company had enough influence on their Government to encourage to buy Myanmar maize. On the other hand, CP company helped stabilize the maize market of Myanmar to protect its profit for long-term because there would be a serious negative impact on their profit if the Myanmar maize sector collapsed. There is little literature supporting that an international company helped a commodity of a country, in which it invested, have access to a new export market by lobbying another government. Although the Myanmar Government has not formally intervened in the maize value chain, its policies enabling international companies to have a commercial stake in an industry that relies on maize has influenced the maize value chain in Myanmar.

Overseas trade for Myanmar maize was not stable, and total trade volume was small. This was mainly because of the risks from the unstable China-Myanmar border trade while other international buyers could not compete with Chinese buyers, who offered a higher price for the Myanmar maize than the international market price. Unlike the informal cross-border trade, signing a contract with the international buyers 6-12 months in advance for overseas export, imposed risks due to price fluctuation, resulting from the closure and reopening of China-Myanmar border trade. Again, unlike border trade, the amount of a single transaction is large in overseas trade. While an exporter at the cross-border trade can make a transaction with one load of a 20-wheeled truck (30 tons) of maize, an overseas exporter can make a transaction with only at least 1000 tons. This increases the overseas exporter's hesitation to take a risk. As a result, the volume of Myanmar maize in overseas export was small compared to the cross-border trade. Little literature explores how border trade affects the stability and amount of overseas trade of a product.

## 6.5 Domestic Market Stabilizing the Maize Demand

The domestic market appears to have helped to keep up with the increasing supply of maize by expanding buying time and increasing the amount of maize purchased while the dominant

export market was blocked. In particular, while the Myanmar maize could not be exported to China through cross-border trade, and there was no alternative cross-border market, domestic buyers from feed factories increased the volume of maize they purchased by extending the period over which they purchased the maize. Moreover, local wholesalers also had the capacity to buy and store maize for some period when there were no export markets for surplus maize. Both feed factories and local wholesalers were concerned that maize farmers would not cultivate maize if the maize market collapsed. Therefore, they increased their procurement of maize to stabilize the markets until export outlets re-opened or opened. The local wholesalers expected that the closure of China-Myanmar border trade would be temporary and, in this way, the demand for maize was stabilized to some extent, despite price fluctuations. In most cases in the literature, governments intervened in stabilizing markets, based on supply and demand. For example, in 2005, the Malawian Government used an input subsidy programme for maize, the staple food crop, to solve a national food deficit problem (Denning, G., Kabambe, P., Sanchez, P., Malik, A., Flor, R., Harawa, R., Nkhoma, P., Zamba, C., Banda, C., & Magombo, C., 2009), and in 2010 the Ghanian Government stipulated a price support programme to stabilize the maize price (Abokyi, E., Strijker, D., Asiedu, K.F., & Daams, M.N., 2020). However, there is little literature that identifies how the domestic buyers increased their procurement to stabilise the market of a product to buffer against the short-term closure of an export market. In this study, there was no government intervention aimed at stabilizing the Myanmar maize market through the domestic market.

Relying on the domestic market without export outlets put pressure on the domestic price of maize to fall because major domestic buyers such as feed factories reduced the buying price when they did not need to compete with Chinese buyers and, at this time, the maize price went down. The maize price fell to the lowest point before the Myanmar maize had no access to an export market as a substitute for the dominant export market, which was closed. Other scholars (Baffes, J., Kshirsagar, V., & Mitchell, D., 2015; Chapoto, A. & Jayne, T.S., 2009) also recognize that blockage of export markets can exert downward pressure on the domestic price of maize. For example, a short-term export ban was one of the important driving factors causing a fall in maize price in Tanzania in conjunction with other factors such as weather and international or regional prices, which caused fluctuations of the domestic prices of maize. Despite other factors, it was observed that there was a significant fall in domestic maize prices in Tanzania whenever there was an export ban. When domestic production fell, or the regional price of maize rose, the Tanzanian Government imposed a short-term export ban to stabilize the domestic price,

leading to a sharp fall in the domestic price (Baffes, J. et al., 2015). Similarly, the maize price fell when the Malawi Government imposed an export ban in 2007 in response to low domestic production due to a severe drought in the 2005-06 crop season (Chapoto, A. & Jayne, T.S., 2009). However, blockages of maize exports were imposed with an export ban by the exporting country to protect their consumers in Tanzania and Malawi because maize was their staple food. The blockage of maize export in Myanmar was imposed with a ban by the importing country, however, Myanmar, as an exporting country of maize, did not enact any restrictive measures. This is assumed because maize was an export-oriented crop and not a staple food in Myanmar. However, the market actors took steps to stabilise production driven by their commercial interests in maize production and in the belief that the situation was only a short-term glitch. In most literature, lack of export outlets, which led to a downward trend in the price, was intentionally resulted from through the export bans of their respective governments in order that the domestic price was stabilized (Lubos, S., Jindrich, S., Natalia, I., & Richard, S., 2016). Even though there is some literature on import bans, the discussions focused on the impacts of an import ban on the domestic market of importing countries, but not on the market of exporting countries (Geetha, R. & Srivastava, S., 2019). For example, Russia banned imports of agricultural commodities such as fruit and vegetables, meat, and fish from European countries in 2014. In particular, the vegetable sector in European countries was largely affected by the import bans because these sanctions were imposed during the peak harvest season. Producers had to react promptly to prevent these adverse impacts. In turn, that exerted price pressure on markets in European countries (Lubos, S. et al., 2016). Lubos and colleagues (2016) discuss details of impacts of an import ban on Russian domestic markets and how the Russian Government substituted these imports. However, they do not discuss in detail how the Russian import ban affected the domestic markets of European countries, how the European producers reacted to the import ban, and whether there were alternative markets for those crops. In the Myanmar and European cases, the nature of crops differed; the crops in Europe were perishable crops unlike maize grain. Moreover, the fall in export volume forced the domestic price of maize to fall in 2014-15 (Geetha, R. & Srivastava, S., 2019). However, in the Indian case, the factor influencing the fall in export of maize was the fall in the international price, leading to maize surplus in the domestic market. In the current study, a lack of export market for the Myanmar maize in the short-term took place due to an import ban by the country of the largest export destination. However, until the time of this study, no significant intervention of the Myanmar Government was observed in response to the fall of maize price.

The rapid growth of the poultry industry also created demand for increasing the supply of maize. Increase in maize demand from the poultry sector had linkages with the local maize market, while export markets were not stable because maize is a major ingredient of poultry feed for both broilers and layers, and many layer farmers sourced maize directly from maize farmers or local wholesalers. In the past decade, the number and size of poultry farms, particularly the number of layer farms, sharply increased in Taunggyi township. The growth of layer farms had a positive impact on the local market for maize. Unlike broiler farmers, most of the layer farmers who kept more than 3,000 hens made their own feed mixture by sourcing maize from local farmers or local wholesalers. Maize is a major ingredient of poultry feed, comprising 50-60% of layer grown-up feed rather than buying instant feed produced by feed companies. On the other hand, according to the interviews, the size of broiler farms also increased, even though the number of broiler farmers decreased in recent years. Although broiler farmers did not buy maize directly from local farmers or local wholesalers, they used feed produced by feed companies, in which maize was a major ingredient. This is reflected in the maize and poultry industries of India (Hellin, J. & Erenstein, O., 2009). The growth of the poultry sector in India increased the demand of maize. In India, 48-55 percent of the total production of maize went to the poultry feed sector as a major ingredient. However, in the Indian case, it was said that there was no linkage between poultry farmers and the local maize market in Uttar Pradesh, Bihar, West Bengal, and Andhra Pradesh because the poultry farmers in India used only feed produced by feed companies. However, in the Myanmar case, only the feed for broilers and starter feed for day-old layer chicks were bought as feed produced by feed companies. In the Myanmar case, there was linkage between layer farmers and local maize farmers or wholesalers, despite no linkage between broiler farmers and the local maize market. However, the robust growth of the poultry sector increased domestic demand for maize in Shan State of Myanmar.

## 6.6 Governance

This section discusses the governance mechanism in the value chain. Sub-section 6.6.1 describes the institutional governance of the maize value chain, then sub-section 6.6.2 explores the advantages and disadvantages of formal and informal contracts.

### 6.6.1 The Institutional Governance

The maize sector has been growing over the past couple of decades without specific support or subsidy policy of the Government for the development of the industry in Myanmar. The

Myanmar Government did not enact any supportive policies specifically for the maize sector, such as price support system or input subsidy programmes, despite general programmes or rules and regulations for agriculture, which probably affected the maize industry. In some African countries, many governments stipulated supportive policies specifically for the development of their maize industry. For example, the Malawian Government introduced an input subsidy program for maize in 2005 aiming at tackling the national food deficit problem. As a result, maize production in Malawi doubled in 2006 and tripled in 2007 in line with more favourable conditions of rainfall. Then, Malawi also turned from a 43% national food deficit country in 2005 into a 53% surplus one in 2007 while maize is a staple food (Denning, G. et al., 2009).Similarly, the Ghanian Government adopted a price support system through buffer stock operations to reduce price fluctuations of maize and increase the income of smallholder farmers in 2010. Consequently, the income of smallholder farmers was stabilized and increased 12%, helping to alleviate poverty in Ghana (Abokyi, E. et al., 2020). In contrast, the Myanmar Government did not introduce these kinds of interventions in the maize industry, even though a price fluctuation problem existed in the industry like Ghana. This is probably because maize is not a staple food source in Myanmar like rice in Myanmar or maize in African countries.

Transactions of maize are conducted quite smoothly without formal quality standards in Myanmar because, except for the overseas export markets, domestic markets and international cross-border markets do not necessarily require it. In other countries such as Ethiopia, where maize is a staple food for people, there was a problem with the quality of maize, particularly the content of aflatoxin in maize, and there were no formal quality control standards in Ethiopia. However, large buyers like World Food Programme (WFP) set their own standards for food purchases and donations after Kenya cancelled two purchases of WFP maize due to aflatoxin contamination (Rashid, S., Getnet, K., & Lemma, S., 2019). In Myanmar, domestic markets, and cross-border markets, which consumed more than 90% of total maize production, accept all qualities of maize, even though they may offer different prices depending on the quality of maize, which is evaluated, and based on informal visual assessment. There were some disputes between feed factory and wholesalers, or between Myanmar exporters and international buyers from cross-border markets, due to quality issue, however, in most cases, these could be settled through informal negotiations between concerned parties, according to the interview with the secretary of the Muse Agricultural Commodity Exchange Centre. Like the Ethiopian case, some large feed factory buyers used their own quality standards, but these standards were not necessarily clear or transparent for those selling maize to them. In some cases, the feed factory

rejected some maize from local wholesalers due to failure to meet their quality standards. However, this behaviour did not affect demand and supply of maize in Shan State because there were other options for wholesalers to sell their maize such as to other feed factories and cross-border market buyers who did not impose strict quality assurance standards on maize.

Lack of quality standards of maize in Myanmar imposed barriers to diversify markets. While Myanmar had no access to the Chinese maize market, the dominant export market of Myanmar maize, it relied on the Thai market as an alternative major market rather than diversifying market because there are no formal quality standards or quality certification processes, according to an interview with the overseas exporter. This finding is consistent with the statement made by Jespersen et al (2014) who explored the shrimp market in Bangladesh and Thailand, and it was found that there was limited access to high-end markets. Instead, the shrimp producers mainly sold their shrimp to a single low-end market because of poor quality and lack of enforcement of quality standards, resulting from a poor institutional framework. In contrast, Thailand shrimp producers exported their shrimp to diverse markets as there were formal quality standards and a strong quality certification process (Jespersen, K.S. et al., 2014). Despite different product natures – shrimp was for food and maize in Myanmar is for animal feed, and the lack or presence of strong quality assurance schemes on these products appears to be similar.

### 6.6.2 Advantages and Disadvantages of Formal and Informal Contracts

There are two types of contracts between the chain actors – formal and informal. Advantages and disadvantages were identified in both types of contracts. However, it was found that potential risks associated with formal contracts were mitigated in this research through the social capital including social relationships between the actors. However, the situation with informal contracts differed.

#### *6.6.2.1 Advantages of Informal Contract*

The informal relationship reduced negotiation costs in trading by providing flexibility. Informal relationships between Myanmar exporters and Chinese buyers had both advantages and disadvantages for the Myanmar exporters. For instance, as a disadvantage, Myanmar exporters could not take legal action against, what they identified as fraud committed by the Chinese

buyers. As an advantage, Chinese buyers bought all types of quality of maize. Furthermore, there was flexibility with quality requirements. They were not punished by the buyers for delivering maize which did not meet the quality specifications set in the verbal agreement. Instead, the buyers negotiate the price for maize which did not meet the quality requirements set in the verbal agreement. Michler and Wu (2020) suggest in their review on the relational contract theory and associated empirical research in agricultural trading that informal relationships enable the parties involved in trading activity to be flexible in solving problems. The present research illustrates this point. Moreover, informal agreements help the parties save on transactional costs of developing detailed contracts and provide them with flexibility in accommodating unexpected issues. For example, in some cases, buyers did not penalise the suppliers when there were changes in time of deliveries due to market conditions or seasonal factors (Michler, J.D. & Wu, S.Y., 2020). Similarly, the current study identified flexibility provided by verbal agreement. For example, instead of penaltyt for, or rejecting unqualified maize delivered, Chinese buyers negotiated with Myanmar exporters to reset the price in accordance with the quality of delivered maize. Other literature also reflects advantages of informal agreement in trading. In the insurance industry of USA, an informal relationship reduced negotiation costs by allowing flexibility for both parties (Zaheer, A. & Venkatraman, N., 1995). Moreover, informal relationships reduced the negotiation costs, resulting from the unexpected environment in the transactions between smallholder farmers and their trade partners in Sri Lanka (Priyanath, H., Jayasinghe, D., & Premaratne, S., 2016).

Informal contracts provided flexibility to transaction partners and, hence, reduce transaction costs. In the maize value chain of Southern Shan State, informal contracts are dominant in making transactions among different types of the chain actors – between farmers and local wholesalers and between local wholesalers and exporters, or between local wholesalers and feed factories. With respect to the informal contracts in the maize value chain, Southern Shan State provided different types of actors with a flexible payment schedule, reducing financial capital costs. Generally, local wholesalers made deferred payment to farmers for their maize without any specific date. Local wholesalers paid to farmers only after they had received payments from their buyers such as feed factories and exporters. Similarly, exporters from cross-border trade with China paid wholesalers for their maize 10-14 days later, particularly, only after they have received payments from the foreign buyers. In this way, they can reduce financial capital costs. Other scholars, Michler and Wu (2020), Claro et al (2003), and Macchiavello and Morajria (2015), agree that informal contracts allow for flexibility and, hence, reduction in

transaction costs. For example, an informal contract reduced transaction costs by providing quantity flexibility and delivery flexibility in Chinese rice production (Michler, J.D. & Wu, S.Y., 2020). Moreover, informal contracts minimized the transaction costs by reducing risks of unexpected problems in Dutch potted plants and flower production (Claro, D.P., Hagelaar, G., & Omta, O., 2003). In the cut-flower industry in Kenya, informal contracts reduced costs for the transaction partners in responding to unexpected negative shocks by allowing for flexibility (Macchiavello, R. & Morjaria, A., 2015). However, there is little literature suggesting that flexibility in the payment schedule reduced financial capital costs.

In some cases, social capital, including the social relationship between some local maize wholesalers, reduced risks which arose from formal contracts. A local maize wholesaler who had entered a formal contract to supply maize to buyers faced difficulties when the maize price rose suddenly after signing the contract because they had set a price in the contract. Under this situation, another wholesaler, who had a strong social relationship with the one who faced difficulties, helped by supplying his maize on behalf of the wholesaler which was bought at a lower price in the past. Even though there is no formal agreement between them to help each other, their social relationship led to an informal agreement between them. Other scholars also theoretically illustrate that social capital reduces risks (Chen, J., Sohal, A.S., & Prajogo, D.I., 2013; Hughes, M. & Perrons, R.K., 2011; Kilubi, I. & Rogers, H., 2018).Moreover, in rural Tanzania, villagers took high return activities, and risks. However, increase in social capital among the villagers led to sharing risks (Narayan, D. & Pritchett, L., 1999).

#### *6.6.2.2 Disadvantages of Formal and Informal Contracts*

Price fluctuations caused risks for local wholesalers who signed formal contracts with exporters or feed factories. Generally, formal contracts between parties reduced uncertainty, thereby mitigating transaction risks (Poole, N., Seini, A.W., & Heh, V., 2003; Poole, N.D., Gomis, F.J.D.C., Igual, J.F.J., & Giménez, F.V., 1998). In contrast, in the current study, local wholesalers of the maize value chain in Shan State faced the risk of a sudden price rise due to formal contracts. In the African case, Poole, and colleagues (2003; 1998) looked at the contracts from the viewpoint of farmers, particularly fresh produce farmers in Ghana and Spain, respectively. For the perishable crop producers, certainty of market is more important than non-perishable crop producers to be able to market their crops on time. Therefore, formal contracts reduced transaction risks for farmers resulting from market uncertainty in the Spanish and Ghanaian cases. In the current study, maize is not a perishable crop, and a formal contract was signed not

between farmers and buyers, but between wholesalers and exporters or feed factories. There are both opportunities and risks of signing formal contracts for the local wholesalers, both of which resulted from price fluctuations but not due to demand uncertainty. The potential implications of formal and informal contracts operating across actors in the chain and the impact of this mix of contracts shape the overall certainty of market and risk for actors in the chain and the overall performance of the chain. This mix of types of contracts shaping the overall chain is a characteristic of developing countries where value chains are emerging and developing. There is little literature suggesting that formal contracts caused risks to the concerned parties, and the risks of uncertainty of price drove chain actors to informalize transactions rather than formal transactions.

In some cases, informal contracts induced risks or encouraged opportunism (e.g., MacLeod (2007), Ola and Menapace (2020)). Owing to the nature of informal contracts in which deferred payments were used, Myanmar exporters often faced losses resulting from failure of payment by Chinese buyers. Furthermore, some maize farmers did not pay back credit to their local maize wholesalers for different reasons. MacLeod (2007) identified some risks such as opportunism imposed by breach of informal agreement in the market mechanisms. If a party breached a verbal agreement, he or she lost their reputation and access to market (MacLeod, W.B., 2007). However, he discussed only the risks faced by the party who breached the agreement and not those faced by the victim party of the agreement breach. Moreover, Ola & Menapace (2020) also agree that there are disadvantages in informal contracts. When informal contracts existed, or when the enforcement of formal contracts is weak, opportunistic behaviours are often identified in the transactions between the value chain actors. In particular, it is more common when there is no strong social relationship or long-term relationship between the parties (Ola, O. & Menapace, L., 2020). Moreover, in the current study, it is difficult for the wholesalers to take legal action over the failure of farmers to pay back credit because they do not have formal contracts between them for this credit. Furthermore, it is not possible for Myanmar exporters to take legal action when Chinese buyers failed to pay for their maize due to the absence of a formal agreement. Consequently, the costs associated with the failure of payment by the buyers could be shared with other actors as an implicit cost.

## 6.7 Efficiency of the Maize Value Chain

This section describes the factors influencing the efficiency of the maize value chain. Sub-section 7.1.1 depicts the effects of agricultural mechanization, then, sub-section 7.1.2 outlines how the

access to mobile and internet influences the efficiency of the value chain. Sub-section 7.1.3 describes the importance of information access in enhancing the efficiency of the value chain.

### 6.7.1 Agricultural Mechanization

Agricultural mechanization enhances the efficiency of an agricultural value chain. In Shan State, almost every maize farmer used only tractors in land preparation. The rapid growth of agricultural mechanization took place during 2011-2020 because of political and economic reforms. Utilization of machinery for different activities such as land preparation, inter-cultivation, harvesting and threshing was almost scale-neutral in Myanmar, including Shan State, because of the outsourcing services market (Belton, B., Win, M.T., Zhang, X., & Filipski, M., 2021). In this study, it was found that farmers could save one-third to two-thirds of their operational costs. Many scholars agreed that agricultural mechanization reduced operational costs compared to traditional tillage. In Iran and Turkey, mechanization in the tillage stage sharply reduced operational costs (Hormozi, M.A. et al., 2012; Ozpinar, S., 2006). These studies made comparisons of technical efficiency between traditional tillage and machinery tillage. However, Hormozi et al (2012) found that mechanization had a negative impact on the crop yield of rice in Iran due to excessive use of tillage. Moreover, Ozpinar (2006) also expressed that there was little yield difference between traditional and machinery tillage in winter wheat cultivation in Turkey despite reductions in operational costs (Ozpinar, S., 2006). In this study, in addition to economic profits such as saving production costs, agricultural mechanization provided other benefits. For example, it enabled farmers to cultivate maize within the limited time of sufficient moisture where there was high uncertainty of rainfall. Moreover, the mechanization in the tillage stage helped some of the maize farmers in Shan State to scale up their production. This brought additional benefits to the farmers of agricultural mechanization. Therefore, mechanization is one of the factors contributing to the growth of maize production in Shan State.

### 6.7.2 Access to mobile phone and internet

Access to mobile phones has improved the efficiency of farmers in the maize value chain in Shan State as it saves them travelling time and costs for searching information and enhanced their bargaining power in selling their product. After farmers had mobile phone access, they did not necessarily need to visit different maize-trading centres and input shops in person to get price information. They could collect such information from different trading centres and input shops

via the phone in one sitting. In this way, farmers can reduce the search costs for price information and save time. Moreover, farmers' capability of bargaining was enhanced. Consequently, a buyer offered the price as high as possible to be more attractive for farmers than other buyers. Thus, the farmers' profit was maximized through utilization of their mobile phones. Findings of other scholars reflected this. In a study of mobile phone access in the fishery sector of Kerala State of India, Jensen (2007) reports that introduction of mobile phones dramatically reduced dispersion of fish price, helped get timely price information and reduced waste by timely response to demand. The fishermen's profit then rose by 8% on average (Jensen, R., 2007). In this context, the nature of the commodities was different from the Indian case to the current study. In the Indian case, fish is a perishable commodity, and timely demand and price information was more important than in the case of the current study while maize is not a perishable one.

Moreover, Mittal and Mehar (2012) also supported that access to mobile phones increases the efficiency of farmers in India. Farmers in Maharashtra who had better access to mobile phones, got better price information than those in Uttar Pradesh and Rajasthan. Timely price information helped farmers make better decisions on when and where they would sell their crops in order that their profit was maximized. Furthermore, market information provided ammunition to those farmers to negotiate with local wholesalers for a better price (Mittal, S. & Mehar, M., 2012). However, their study did not focus on specific crops. Other scholars (e.g., Jensen (2007) and Salia et al (2011)) have suggested that use of mobile phones enhanced the efficiency and transparency of input and output markets by providing farmers with timely information. Access to updated information, through mobile phones, helps farmers negotiate better with sellers to get inputs at a lower price and with buyers to get a higher price for their outputs, hence, increase farmers' incomes (Hellström, J., 2010; Jensen, R., 2007; Salia, M. et al., 2011). Access to mobile phones enhances the efficiency through the access to timely and accurate information about markets, prices, and farm practices, enabling farmers to make better decisions for their activities and save time and costs for collecting information (Ayoola, J. & Ayoola, G., 2015b; Furuholt, B. & Matotay, E., 2011; Mendes, S. et al., 2007).

Access to the internet also improves the link between the chain actors because the chain actors have easier access to information, reducing time and costs for information search. Access to the internet was considerably improved after they had access to mobile phones. Many maize wholesalers and exporters sourced information through Viber groups and Messenger groups. In

this way, they could exchange information about price and markets in a cost and time-effective manner. Other scholars agreed with this finding. For example, access to the internet enables tea farms in East Africa to more efficiently manage logistics and share information about the stock of processed tea to retailers in the downstream segment of the value chain (Foster, C., Graham, M., Mann, L., Waema, T., & Friederici, N., 2018; Halewood, N.J. & Surya, P., 2012). Farmers in Kenya and Uganda enjoyed different benefits of the internet in enhancing the efficiency of farming activities. First, internet access enabled farmers to signal to money lenders, input suppliers, and buyers about their potential production and need for other inputs. Second, it provides input suppliers with better convenience to identify and more accurately forecast the demand for the goods and services they provided. Third, credit providers can easily access credit scores, payment profile, and production data through internet usage. In this way, the internet facilitates transactions in the agricultural food value chain by improving access to information, particularly for wholesalers and exporters (Protopop, I. & Shanoyan, A., 2016).

### 6.7.3 Access to Information

There was still an information gap between the maize value chain actors in Shan State, even though access to information was improved due to introduction of mobile phones in rural areas of Myanmar, including Shan State. There were improper practices in the chain due to unequal incentives between actors and, hence, information asymmetry.

The information gap between farmers and wholesalers probably affected the efficiency of the value chain, which led to poor quality of maize and higher transaction costs. Even though exporters and feed factories preferred uniform grain size and colour, and conveyed this message to local wholesalers, it does not seem that farmers were signalled with the message. Farmers grew different varieties of maize and mixed all the grains after harvesting without caring about uniform grain size and colour. This imposed further transaction costs on other actors for further grading and sorting. Rutatola (2018) likewise states that lack of accurate and timely information on quality requirements of buyers was a main source of transaction costs in the maize value chain of Dodoma region in Tanzania. Such information asymmetry caused additional costs to maize farmers in Tanzania when their products did not meet the quality specified by buyers (Rutatola, P.P., 2018). Rutatola (2018) did not discuss how information asymmetry imposed additional transaction costs on farmers in detail. However, in the current study, information

asymmetry did not cause explicit additional costs to farmers but other actors for further grading. However, it may have implicit costs for farmers other than money in lower returns.

Having unequal incentives among the actors such as local wholesalers, exporters, and farmers, had a negative impact on the efficiency of the value chain. Wholesalers did not care about the quality of maize, therefore, wholesalers did not convey the information about the quality requirements of processors or foreign buyers to farmers. Moreover, they did not give a price incentive to farmers for better quality maize. Better-informed parties such as local wholesalers and exporters focused on quantity rather quality because their profit mainly came from the profit margin per unit and their priority was to have the highest trade volume as much as possible while there is a huge amount of both demand and supply of maize in the market. Even though some wholesalers benefited from a premium price for their premium quality maize, they could still make a profit from other qualities of maize because they offered a price to farmers based on the selling price of normal quality maize, and there was always market demand for any quality of maize. Some wholesalers did not care about premium price and sold their maize at a normal price without grading. On the other hand, farmers did not have a price incentive, even if they could produce quality maize. This finding reflects what was found in the apple value chain in Poland, in which wholesalers had no incentive to care about quality, and farmers had no incentive to care about quality. Sharing of information about end-users' expectations between the chain actors failed due to an absence of information and orchestrating incentives. In particular, farmers were not rewarded by markets for their high quality fruit (Pietrzak, M., Chlebicka, A., Kraciński, P., & Malak-Rawlikowska, A., 2020). However, the downstream actors of the apple value chain in Poland focused on quantity rather than quality because their chain is based on price competition in the world market, while the maize value chain in Myanmar is not based on price competition, even though the downstream actors focused on quantity.

### 6.8 The influence of farm size on service fees

Farm size affected the profits of farmers while large-scale farmers had some advantages in accessing services. Ben and Fang (2020) also support this statement. Large-scale farmers in Shan State of Myanmar made relatively higher profit margins because of management of sale-timing (Belton & Fang, 2020). In particular, they note that large-scale farmers did not necessarily need to sell all their production soon after harvesting or at peak season when the maize price generally fell. Instead, they could store part of their production in the peak season and sell it in

the low season potentially at a higher price. Moreover, they pointed out some other potential factors influencing higher average gross margin of large-scale farmers – efficiency of fertilizer use, and improved seed variety use. However, in this study, it was identified that there were other factors shaping the profit margin of large-scale farmers – access to credit with relatively lower interest rate, access to services such as threshing and transportation with relatively lower fees, and access to storage facility of wholesalers, which enabled them to manage their sale time. Moreover, Ben and Fang (2020) did not mention how the large-scale farmers stored their maize to be able to manage selling time. In fact, they would not be able to store their maize unless they had access to storage facilities of the wholesalers.

## 6.9 Summary

The maize production in Shan State has been growing without any specific Government supports. This growth was influenced by multiple factors – certainty of access to market of maize and uncertainty of access to market of other alternative crops, mechanization, access to improved varieties of maize, being less labour-intensive than other alternative crops, the growth of the poultry sector and complementary activities of maize with those of other crops in terms of timing. In terms of access to market of maize, a stable demand of the domestic market and emergence of an alternative export market created the certainty of market for maize even though the dominant export market was not stable. Despite the mix of formal and informal governance, an informal one is dominant in the value chain of this current study probably because of small-scale transactions and high volatility of price. Mechanization helped farmers to improve their time-use efficiency and scale up their production. The linkages between the value chain actors improved due to easy access to mobile phone and internet. There are challenges to diversify export markets or to have access to high-end market due to lack of formal quality standards and the prices offered by Chinese buyers, which are higher than the international price. Overall, the maize supply has been increasing even though external market outlets, especially Chinese border trade, is not stable.

# Chapter 7

# Conclusion

## 7.1 Introduction

This thesis identifies the factors influencing the maize value chain in Shan State of Myanmar to contribute to the evidence-based policy-making process in Myanmar for the development of the agriculture sector, based on a maize value chain study. The study was conducted with the research question "What influences the maize value chain in Shan State of Myanmar?". Factors have been identified which shape the maize value chain in Shan State by analysing interviews of different actors throughout the value chain, based on economic and value chain theories. Moreover, this thesis provides a comprehensive description of characteristics of different segments of the value chain, activities of the major actors in the maize value chain in Shan State, and how these actors are coordinating these activities, together with influencing factors.

This chapter highlights crucial conclusions to the research question and important theoretical contributions. Policy implications and limitations of research are described and, lastly, a way forward is set out.

## 7.2 Conclusions to the Research Question

Maize is an important cereal crop in Myanmar, providing a significant share of foreign earnings and a major secondary source protein for Myanmar. About two-thirds of the total production of maize goes to export. Moreover, maize is a major source of poultry feeds and chicken, and eggs are the second and third largest source of protein in Myanmar. There has been a robust growth of maize production in Shan State over a couple of decades after the introduction of an improved variety in 1990s. However, the value chain of maize in Shan State is not stable in terms of external market outlets and price throughout its commercial production. The market for maize is relatively more secure than that of other crops. There are few empirical studies on which factors are shaping the constant growth of maize production in Shan State, the fickle external market outlets, price fluctuations and secure market. Therefore, to gain a deep insight into what is influencing the value chain of maize in Shan State, an empirical analysis of the value chain of maize in Shan State was conducted. Based on this study, the following conclusions are made.

Despite some unfavourable situations such as unstable external market outlets, and price fluctuations, farmers in Shan State keep producing maize due to both push and pull factors. There are many push factors influencing the growth of maize. For example, hit-and-miss markets for vegetable crops forced farmers to switch their crops to maize. The productivity of other cereal crops, including rice, the staple food crop of Myanmar people is low due to lack of access to improved varieties. The external markets of pulses, which are export-oriented crops and used to be popular crops in Shan State are highly uncertain. Furthermore, other alternative crops are more labour-intensive than maize, and there is a labour shortage problem in the State. These situations push farmers in Shan State to switch from these crops to other ones which have the characteristics of certain markets, high productivity, and less labour intensiveness. Maize attracted farmers in Shan State because it meets all these characteristics as pulling factors to be an appropriate alternative crop for them. Therefore, farmers gave up or reduced the growing area of other crops, including crops, which are economically more profitable, but more labour-intensive, providing more room for maize.

Despite price fluctuations, super-normal profits from maize cultivation attracted farmers to keep growing and, hence, maintain a stable supply of maize. Even though the price of maize went down to the lowest point at the time of interviews over a few years, maize farmers' motivation to keep growing their maize is not reduced. This does not mean that farmers do not have capacity to interpret market signals. However, this is because they still gained super-normal profits, even with this low price, and even though there are other factors such as lack of more favourable alternative crops in terms of profit or crop management. Subsequently, there was no sign of a decrease in maize supply.

The lack of formal quality standards does not significantly affect the demand for Myanmar maize because a majority of buyers do not impose quality restrictions, even though the establishment of formal quality standards or consistent quality of maize can be helpful in diversifying markets and demanding a higher price from the existing markets. Owing to the lack of incentives for farmers to produce high quality or consistent quality of maize in combination with lack of formal quality standards, the quality of Myanmar maize is generally poor or inconsistent. However, this does not diminish the demand for Myanmar maize because most buyers bought any quality of maize, whereas, overseas trade buyers, who procure only a negligible share of the Myanmar maize imposed tight quality restrictions.

Mobile phones improved access to information and increased the marginal profit of farmers and, hence, enhancement of farmers' motivation to expand their production area in maize, increasing the supply of maize to the market. With easier access to mobile phones, farmers had better access to price information from different wholesalers. Accordingly, their bargaining power increased. As a result, wholesalers have to offer the price as high as possible to make sure that there are no significant differences in price between wholesalers. This increased the marginal profit of farmers, motivating them to increase their production, whereas the wholesalers' marginal profit was decreased. However, the profit of wholesalers did not decline because, overall, the amount of maize traded significantly increased, despite a decrease in their profit per unit. Therefore, improvement of mobile phone communication made better profit-sharing among the value chain actors and improved the overall profit of the actors.

Even though there were some discouraging points, a dominant external market promotes Myanmar maize sector in different ways by providing maize growers and wholesalers with encouraging things such as a large capacity to buy Myanmar maize, relatively higher prices, and no quality restrictions. As encouraging characteristics, the dominant external market had the capacity to absorb more than 90% of total Myanmar maize exports, offered the highest price among all market outlets of Myanmar maize, and bought all types of quality of maize without any restrictions. As a most important non-staple cereal crop of Myanmar, the external market outlets provided a secure market for maize. A high price for maize provides incentives to farmers to grow maize even though input costs and market transaction costs such as transportation were high. Moreover, it is encouraging for the Myanmar farmers to cultivate maize while they do not have access to advanced production technologies for high quality maize as there is a market which will accept maize without specific quality restrictions. In this way, the dominant external market helped Myanmar maize value chain get established and developed.

Apart from the encouraging points mentioned above, the fickle policy of the Government of the dominant external market makes the Myanmar maize sector unstable in the short run in the 2018-2019 season. The dominant external market offers relatively higher prices for Myanmar maize and takes a major share of the Myanmar maize export. Moreover, the domestic buyers reduced their offered price when they do not need to compete with the buyers from the dominant external market. As a result, the farm-gate price of Myanmar maize significantly decreased. Furthermore, the price of inputs for maize such as seeds and fertilizers, imported from the country of the dominant market increased due to high transportation costs because

the trucks could not get goods for one way while maize is a major source of goods for those trucks. There was also an excess supply of maize into the domestic market because no reliable alternative external outlet was readily accessible due to an unexpected closure of the dominant external market.

Further, the capacity of buffering the stock of maize by domestic market players and the emergence of an alternative external market, created more secure demand for maize during the closure of the dominant export market. Local wholesalers and feed factories deliberately increased the procurement of maize to aid in the stability of the maize market for a short run while there was no alternative external market, which had the capacity to absorb maize diverted from the dominant export market. Another external outlet, having similar characteristics to the dominant external market, such as large capacity for maize procurement, and minimum quality restrictions, emerged as an alternative market. However, in contrast to the dominant external market, the newly emerged alternative external market offered a price lower than the dominant external market, yet still higher than the domestic market, and their procurement was seasonal, particularly from February to September. However, the buffering stock capacity of domestic buyers complements the seasonality of the procurement of the newly emerged alternative external market, providing more secure demand for Myanmar maize. This shaped the stability of the maize value chain.

Overall, price fluctuations, unstable external market outlets, an inconsistent quality or lack of formal quality standards, and lack of government interventions were not able to make significant shifts in the demand and supply of Myanmar maize. For the supply side, different factors favour maize farmers in Shan State to keep producing their maize and not producing other alternative crops, hence, leading to a steady increase in maize production. From the demand side, even though a dominant external market is unpredictable, the domestic market can keep a buffer stock while there is no external market for a period. Moreover, an alternative external market emerged with the help of an international agro-food company, which has an investment stake in different segments of the maize value chain in Myanmar, while the dominant external market was blocked. These situations made the demand for Myanmar maize reasonably secure. In this way, the demand and supply of the maize is reasonably stable for the long run, despite unstable external market outlets and price fluctuations.

There were significant changes in the maize industry of Myanmar between 2019 and 2022 after data for this research was collected. First, the Chinese Government formally permitted the importing of Myanmar maize in February 2022. However, it is required to meet the requirements set by the General Administration of Customs of China (GACC) (FAO, 2022). Nevertheless, the Myanmar maize could not be exported to China, probably due to the quality requirements (Naing, W.L., 2022). This suggests maize quality standards will have an important impact on the maize value chain in Shan State if the chain remains dependent on the Chinese market. Second, the Indian Government relieved the import quota of Myanmar beans and pulses in 2021 (Bhosale, J., 2021). This is likely to affect the area of maize grown in Shan State and Myanmar more broadly because maize was grown as an alternative to beans and pulses when the Indian Government strictly controlled the import of beans and pulses from Myanmar. Third, after staging a coup on 1st February 2021, the military junta made changes to economic policy, which has implications for the maize industry in Myanmar. For instance, the military junta set a fixed exchange rate, which was from ten per cent to more than 100% less than the market exchange rate and issued an announcement that all exporters must sell their foreign earnings to only the authorized dealer (AD) banks on 3rd April 2022. This had a large impact on the maize sector, particularly on farmers. Even though the exchanged rate doubled after setting a fixed rate, the farmgate maize price decreased lower than before the fixed exchange rates.

## 7.3 Theoretical Contributions to Literature

This study provides many contributions to the literature from different aspects, particularly, factors influencing the value chain. These contributions are described below:

This study elaborates on factors influencing farmers towards adopting or continuing to grow a crop. Even though many of these factors have been identified by other scholars, a factor, what this research confirms is that a complexity of influencing factors shapes the choosing of a crop. Different scholars have observed various influencing factors. For example, secure market (Koné, M. et al., 2000; Van Dam, J.E., de Klerk-Engels, B., Struik, P.C., & Rabbinge, R., 2005), being easy to grow and manage, peer pressure and lack of secure markets for alternative crops (Zimmer, H.C. et al., 2018) had been identified by respective scholars. However, little literature identified that complementary activities with other crops in timing in allocating family labour was a factor influencing farmers' crop choice. Moreover, the main factors for continuing to grow a crop amid a downtrend in price are often argued with respect to economic profit, or lack of an

economically more profitable alternative crop and subsistence production. This study argues that farmers are willing to expand the area of a crop amid a decrease in price, even if there is an economically more profitable alternative crop and it is a commercial production because of the certainty of markets, being less labour-intensiveness and complementary activities with other crops.

This study further contributes to the literature about buffer stock. Many countries used a buffer stock scheme for controlling demand and supply fluctuations. For example, respective governments used the buffer stock model for their staple food such as maize and wheat in Ghana (Anokye, M. & Oduro, F.T., 2015), maize in Zambia (Miura, K., Kanno, H., & Sakurai, T., 2012), rice in Nepal (Bista, D., Amgain, L., & Shrestha, S., 2013), and rice in Taiwan (Chou, K.-W. & Lin, P.-C., 2019) to control the volatility of price of those crops by regulating supply-demand. However, all these crops are staple-food crops in their respective countries, and a buffer stock policy was implemented by their respective governments. However, this study highlights that, as a non-staple grain, maize was stored by local market players as buffer stock while a dominant external market was closed and there was no alternative external market for those maize grains. Therefore, unlike mainstream literature on buffer stock schemes, in this study, a non-staple food grain was stored as a buffer stock by private players to control the surplus of supply while there was no demand from the dominant external market to stabilize the market without government intervention.

The current research expands the view that foreign direct investment (FDI) brings market opportunities for the host country. It has been widely accepted by other scholars that FDI improves access to an external market for the host developing countries (Caves, R.E., 1996; Denisia, V., 2010). However, improvement of access to an external market of a product in a host developing country through FDI is usually dealt with an FDI company's own manufactured products or the products of the supplier in the host country, and under the name of FDI company (Keesing, D.B. & Lall, S., 2011). Based on literature that has been explored, there has been no previous research in which a foreign company helped a country, in which they have an investment stake, to have access to an external market with their influence on the government of an external market. This study highlights that a foreign company helped their host country, in which they have direct investment, to have access to an export market with their influence on the government of the export market for a product, which is neither their own one, nor under their name. This is because there are indirect impacts on their business. For example, the

company had an investment stake in the different segments of the maize value chain; if the farmers do not grow maize due to the lack of access to market, the maize industry would collapse; as a result, this could bring negative impacts on their business. Therefore, it would appear that the company made this effort to protect their own long-term interest.

This research broadens the concept of demand and supply theory, particularly, how farmers respond to the price of a crop. Economic theory asserts that farmers adjust their crop production in line with the trend of their crop price – if the price of their crop falls, they reduce their production and if the price rises, they increase their production (Vianello, F., 1989; Xie, H. & Wang, B., 2017). On the other hand, other scholars suggest that decrease in price does not damage the willingness of farmers to keep producing their current commodity if their profit is an above-normal profit and there is no alternative crop which is more economically profitable (Odero-Waitituh, J., 2017). However, this study argues that the downward trend of price does not dampen the enthusiasm of famers for producing their crop if the profit from their crop is above-normal profit or they gain super-normal profit from their crop, or they do not have more favourable alternative crops in terms of not only economic profit, but also other production factors such as labour management.

This study contributes to the knowledge about the role of social capital between the chain actors in mitigating risks associated with formal contracts, arising from uncertainty in the governance of a value chain. In mainstream literature, it is widely accepted that formal contracts provide contracting parties with a reduction in risks (Monczka, R.M., Handfield, R.B., Giunipero, L.C., & Patterson, J.L., 2015; Wever, M., Wognum, P.M., Trienekens, J.H., & Omta, S.W.F., 2012), and informal contracts provide parties with flexibility in solving problems (Michler, J.D. & Wu, S.Y., 2020). However, there is little literature suggesting that the chain actors, who are not contracting parties, share the risks with each other, arising from the uncertainty and associated factors with the formal contracts between trading partners. In this study, it was observed that chain actors of non-contracting parties shared the risks associated with a formal contract with other chain actors. For example, local wholesalers who have a strong relationship or sufficient social capital between them, shared the risks with each other when a wholesaler could not fulfil the signed contract with exporters or feed factories due to a sudden surge in maize price. Another instance was the wholesaler who had a contract with buyers for supplying maize shared the risk with another wholesaler who had bought maize at a higher price, faced a sudden fall in

selling price, and did not have a contract with buyers sourcing maize from him with a higher price, or no price flexibility in the contract.

It is widely accepted by other scholars (Arunrat, N., Pumijumnong, N., Sereenonchai, S., Chareonwong, U., & Wang, C., 2021; Fang, P. & Belton, B., 2020; Khan, M.A., Roll, K.H., & Guttormsen, A., 2021) that large-scale farmers can gain higher profit in association with higher productivity, better efficiency in using inputs and better management in selling time. This study provides further details on how large-scale farmers obtained higher profit. For example, they could have access to credit with a lower interest rate, threshing and transportation services with lower fees, and access to storage facilities of wholesalers, including free access in some cases.

## 7.4 Policy Recommendations

The theme of this research is to identify policy leverage points in the maize value chain of Shan State in Myanmar and to better inform policy through this study. After comprehensive analysis of the responses of different actors of the value chain, some important potential areas to be improved by policy interventions were identified. Therefore, this study will help policymakers formulate an evidence-based new policy or modify existing policies based on evidence.

It is important to stipulate formal quality control systems because lack of formal quality standards can be a barrier for restoring the dominant export market. The market used to buy all types of maize quality with higher prices than other markets throughout the year until early 2018-2019 harvest season. However, now the dominant export market requires quality certifications after the Chinese Government formally allowed the importing of Myanmar maize in February 2022. On the other hand, Myanmar is not yet able to export maize to China due to these quality requirements, despite the formal permission. In addition, it was also accepted that Myanmar maize has the potential to receive a reasonably high price by penetrating other markets through overseas trade if the domestic price does not highly fluctuate, and there is quality assurance and consistency. In this context, setting formal quality standards is one of the potential policy interventions to improve the maize value chain in Shan State and stabilize the markets while the alternative external market bought Myanmar maize seasonally. However, in addition to adopting formal quality standards, a reliable monitoring mechanism is also equally important for the enforcement of the quality control system.

A robust banking policy is also required to smooth the money transfer process between Myanmar and the country of dominant export market. Currently, it is a complicated process for Myanmar exporters to receive money from the buyers of the dominant export market and they frequently encounter banking issues. For example, Myanmar exporters must open bank accounts in the banks of the country of the dominant export market to receive a payment transfer from the buyers of the dominant market. They then must exchange into Myanmar currency through the informal market. Moreover, bank accounts in the country of the dominant external market have often been blocked by the government without a clear reason. In many cases, exporters have had to pay a significant amount of illegal money to unblock their bank accounts. Therefore, high transaction costs are added to the value chain of maize due to a complicated banking system. Thus, defining an appropriate banking policy could significantly reduce the transaction costs in trading with the dominant external market.

Poor infrastructure required for the maize value chain is another potential area which should be improved through policy intervention. For example, poor transportation and lack of drying and storage facilities have a significant impact on the transaction costs and the quality of maize. Owing to poor road infrastructure, the transportation costs from Southern Shan State to major border trade outlets occupy a major part of the transaction costs of maize, accounting for up to 30% of the value of maize at its lowest price. Furthermore, lack of drying and storage facilities for farmers added subsequent additional transaction costs. Therefore, the Myanmar Government should consider a policy to facilitate the improvement of these types of infrastructure.

The formal financing sector should be enhanced to provide more agricultural loans to farmers and improve the loan repayment system for better flexibility, as most farmers chose informal credit sources with high interest rates and the flexible repayments. Most farmers prefer informal credit sources to formal ones, even though the informal credit providers charged them higher interest rates than formal providers because of the flexible repayment system of informal ones and the fixed term repayment system of formal ones. Moreover, in Southern Shan State, small-scale maize farmers cannot access the credit provided by local wholesalers of maize – a major credit source for maize farmers, while large-scale maize farmers have easier access to credit provided by local wholesalers. Small-scale farmers must explore other credit sources for their maize production, or do not have access to credit. Therefore, a public financing sector should pay more attention to small-scale farmers, while private financing sources might not be able to

take risks by providing credit to small-scale farmers. However, both public and private formal financing institutes should explore an appropriate way to practise a flexible repayment system. In this way, accessible and flexible formal credit sources can help farmers reduce both direct and indirect transaction costs and improve efficiency of input use.

## 7.5 Research Limitations

There are limitations in this research. Even though the actors from different segments of the maize value chain were interviewed, this study interviewed only a small number of certain types of actors including feed factories, and exporters. There was limited access to feed factories. In the export sector of maize, limited knowledge on overseas trade and cross-border trade with Thailand was gained. Moreover, this study could cover the actors such as farmers, wholesalers, feed factory, and dryers in only one township, even though exporters from other regions were interviewed, and there were other maize-growing areas such as other townships in Shan State and other states and regions in the country. Therefore, the findings of this study cannot provide conclusions, nor be generalised to the whole value chain of the country. This study can provide a comprehensive view on factors influencing the maize value chain in Southern Shan State, which is the main purpose of this research. Future research implications are discussed in the following section.

## 7.6 Future Research

Since the completion of data collection for this thesis there have been significant changes in Myanmar that are likely to have impacted on the maize industry in Shan State and across Myanmar. Examples include the Covid-19 pandemic, the military coup, a people's defensive war against the military junta, economic policy changes, and the formal permission of Chinese Government for importing Myanmar maize introduced in February 2022. Therefore, it would be interesting to answer the same research question under new circumstances that exist not only internally in Myanmar but also with respect to the Chinese market, the dominant external market. This would provide further insights on how context shapes the maize value chain in Myanmar and the impact of these changes on maize farmers.

The present study focuses only on one region of maize production, being a township in Southern Shan State where maize is grown on a relatively small scale of individual farmers and rain-fed crops, while there are other maize production regions with different characteristics such as Ayeyarwady Region where it is grown on a relatively large scale of individual farmers and is an irrigated crop in the dry season. Ayeyarwady Region is located a short distance to Yangon – the only place in Myanmar for overseas export and Myawaddy – a cross-border trade point with Thailand. Therefore, it will be worthwhile to conduct further explorations on factors influencing the maize value chain of those regions.

This study could cover only a limited number of respondents from some sectors such as feed factories, and exporters from different regions. For example, the respondents from only one feed factory could be interviewed in a limited time, even though there are many feed factories in Shan State and other regions in Myanmar. Moreover, only a couple of exporters from different regions could be met for different reasons. For example, most of the exporters from Chinese border trade could not be interviewed because the border trade with China was closed at the time of this study. This was the same for exporters from Thai cross-border trade because the Thai market was new to Myanmar maize at the time of this study. Therefore, future research should have a more reasonable cover on these actors than this study.

A qualitative method was used in this study to explore answers on why and how questions of the maize value chain of Southern Shan State. Even though the qualitative method is helpful in finding hidden factors influencing the value chain, these could not be statistically analysed in the study. Therefore, further research, which employs quantitative methods could also be conducted.

New, and broader knowledge on the maize value chain can be gained through further research, which would be conducted with a better cover of respondents and different methods in the same region, and with the same method in different regions, while there are not many empirical studies on maize in Myanmar.

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# Appendices

Appendix A

Guided Questions for Exporter/Wholesaler

| Objective | | Question | Remark |
|---|---|---|---|
| To identify current situations maize value chain | | ❖ When did you start exporting/trading maize?<br>❖ Could you tell me about how your business is running? Why is your business like that?<br>❖ | |
| | | | |
| To understand the performance of value chain actors | | ❖ In relation to maize export/trade, what are your goals? What do you do to achieve your goals? Why? How do you think of overall situations of the achievement of your goals? What are shaping those situations? | |
| | | | |
| To understand the governance and trust between exporters and other actors | | ❖ With whom are you interacting in relation to maize? Why are you interacting with them? How are you interacting with them? What are you doing with them? Why are you doing those? | |
| | | | |
| To identify how the information flow between value chain actors | | ❖ Could you please tell me about information flow among your business partners? With whom do you exchange information? What information do you exchange? How do you exchange it? Why do you exchange that information? How do you think of overall situations of information flow? | |
| | | | |

| | | | |
|---|---|---|---|
| General comments by interviewee | | ❖ Are there any comments you would like to add? | |
| | | | |
| General comments by interviewer | | ❖ | |

Guided Questions for Farmers

| Objective | | Question | Remark |
|---|---|---|---|
| To identify current situations maize value chain | | ❖ Which crops are grown in your household?<br>❖ When did you start growing maize? Why did you decide to grow it? How do you grow maize? Why do you grow it like that?<br>❖ Could you tell me about the overall situations of your maize farming? Why is your maize farming like that? | |
| | | | |
| To understand the performance of value chain actors | | ❖ Could you please tell me about your goals in relation to your maize farming? What do you do to achieve your goals? Why? How do you think of overall situations of the achievement of your goals? What are shaping those situations? | |
| | | | |
| To understand the governance and trust between exporters and other actors | | ❖ Who are involved in the whole process of your maize farming? How are they involved? Why are they involved? What do you do with them? What shapes those? | |
| | | | |
| To identify how the information flow between value chain actors | | ❖ Could you please tell me about information flow in relation to maize? With whom do you exchange information? How do you exchange information with them? Why do you exchange this information with those people? How do you think of overall situations of information flow? | |
| | | | |

| | | | |
|---|---|---|---|
| General comments by interviewee | | ❖ Are there any comments you would like to add? | |
| | | | |
| General comments by interviewer | | ❖ | |

Guided Questions for Feed Factories

| Objective | | Question | Remark |
|---|---|---|---|
| To identify current situations maize value chain | | ❖ When did you establish your factory?<br>❖ Could you tell me about the situations of your factory? Why is your business like that? | |
| | | | |
| To understand the performance of value chain actors | | ❖ Could you please tell me about your goals in relation to maize? What do you do to achieve your goals? Why? Could you please tell me overall situations of the achievement of your goals? What are shaping those situations? | |
| | | | |
| To understand the governance and trust between exporters and other actors | | ❖ With whom are you interacting in relation to maize? Why are you interacting with them? How are you interacting with them? What are you doing with them? Why are you doing those with them? | |
| | | | |
| | | | |

| | | | |
|---|---|---|---|
| To identify how the information flow between value chain actors | | ❖ Could you please tell me about information flow in relation to maize? With whom do you exchange information? How do you exchange it with them? Why do you exchange this information with them? | |
| | | | |
| General comments by interviewee | | ❖ Are there any comments you would like to add? | |
| | | | |
| General comments by interviewer | | ❖ | |

Guided Questions for the Myanmar Maize Producers and Exporters Associations

| **Objective** | | **Question** | **Remark** |
|---|---|---|---|
| To identify current situations maize value chain | | ❖ When was this association established? Why?<br>❖ Could you tell me about how your association is functioning? (Who are involved? How are they involved? Why are they involved? What do they do?) | |
| | | | |
| To understand the performance of value chain actors | | ❖ Could you please tell me about the goals of your association? How do you do to achieve your goals? Could you please tell me overall situations of the association's achievements? What are shaping those situations? | |
| | | | |

| | | | |
|---|---|---|---|
| To understand the governance and trust between exporters and other actors | | ❖ With whom are you interacting? Why are you interacting with them? What are you doing with them? How are you interacting with them? Why are you doing those? | |
| | | | |
| To identify how the information flow between value chain actors | | ❖ Could you please tell me about information flow? With whom do you exchange information? How do you exchange it with them? What information do you exchange? Why do you exchange this information with them? | |
| | | | |
| General comments by interviewee | | ❖ Are there any comments you would like to add? | |
| | | | |
| General comments by interviewer | | ❖ | |

Guided Questions for Extension Officers

| Objective | | Question | Remark |
|---|---|---|---|
| To identify current situations maize value chain | | ❖ When did you start providing extension service?<br>❖ Could you tell me about overall situations of your extension services? What are shaping those situations? | |
| | | | |

| | | | |
|---|---|---|---|
| To understand the performance of value chain actors | | ❖ Could you please tell me about goals of the extension workers or extension department? How do you do to achieve those goals? Could you please tell me overall situations of the achievement of your goals? What are shaping those situations? | |
| | | | |
| To understand the governance and trust between exporters and other actors | | ❖ With whom are you interacting in relation to extension services? Why are you interacting with them? How are you interacting with them? What are you doing? Why are you doing those? | |
| | | | |
| To identify how the information flow between value chain actors | | ❖ Could you please tell me about information flow? With whom do you exchange information? How do you exchange information with them? What information do you exchange? Why do you exchange this information with them? | |
| | | | |
| General comments by interviewee | | ❖ Are there any comments you would like to add? | |
| | | | |
| General comments by interviewer | | ❖ | |

## Appendix B

## Participants' Information Sheet

## Researcher Introduction

My name is Kyan Htoo from a village located in Nyaung Oo Township. I used to work for the Ministry of Agriculture and Irrigation of the Republic of the Union of Myanmar as a Deputy Assistant Programme Officer from 2004 to 2012, Ministry of Information as an Editor from 2012 to 2013, and Centre for Economic and Social Development (CESD), a non-profit-oriented policy think-tank in Myanmar as a Research Team Leader from 2014 to 2018. Currently, I am studying for my doctorate in agri-business at Massey University in New Zealand with the support of NZAID scholarship. As a part of my Ph.D., I am doing my research on "Identifying Policy Leverage Points throughout the Maize Value Chain in Shan State, Myanmar". This research aims to get a deep insight into the value chain of maize for identifying policy entry points. Specifically, I am here to explore current situations of maize sector, and your views on and experiences in those current situations. Semi-structured interview will be used for collecting data. In collecting data from different types of participants involved in the maize value chain, individual interview will be conducted. Data collection will be carried out from June to September 2019.

**Descriptions of study and invitation to participants of this research**

Recently, maize sector also had a robust growth in Myanmar and is expected to grow in the future as well because it is one of the crops recommended by the government to substitute beans and pulses. However, the maize market was also instable due to lack of strong policy. Therefore, this research aims to find evidence on current issues of the maize value chain in Shan State in Myanmar. Particularly, this research will explore opinions and experiences of participants to understand current situations of the maize sector and the factors influencing those situations. This will help to understand how to develop the maize sector throughout the chain.

Therefore, I would like to interview people who have experiences and knowledge of the maize sector to obtain data and information, which are required to understand detailed picture of the sector and aspects for potential interventions in support of further development. Different actors of the maize value chain such as maize farmers, extension officers and poultry farmers

from Taunggyi, exporters from Yangon and Muse, feed factories and poultry farmers from Yangon and feed factory from Mandalay, and Myanmar Maize Producers and Exporters Association in Yangon will be interviewed.

Therefore, I would like to invite you to participate in this research program because you are identified as one of relevant people as mentioned above. The interview will take round about 45 minutes. During interview, I will use Burmese language. If you do not understand it, I will bring an interpreter who speaks your language. Moreover, even if you understand Burmese, I would like to bring a note-taker if you are comfortable with this. Then I also would like to request you for your permission to take audio-record during our face-to-face interview.

**Participant Rights**

However, you are under no obligation to accept this invitation. If you decide to participate in my research, you have the right to –

- Decline to answer any question.
- Withdraw from the study (specify time frame).
- Ask any questions about the study at any time during participation.
- Provide information on the understanding that your name will not be used unless you give permission to the researcher.
- Be given access to a summary of the project findings when it is concluded.
- Ask for the recorder to be turned off at any time during the interview.

**Research Ethics**

"This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Professor Craig Johnson, Director (Research Ethics), email humanethics@massey.ac.nz. "

**Data Management**

In this study, I will mainly take responsibility for the data management from interviewing and transcription to data analysis. Even though I used an interpreter or a notetaker, they will be asked to sign the confidential form. Therefore, the identity of all participants will be kept confidential and will not be identified in relation to any codes or materials used in my thesis. However, it is likely your identity may be able to be ascertained for those who are in the position of responsibilities. All interviews will be safely locked at Massey University, and I can only access it. The data will be kept for 5 years and then destroyed. The published thesis will be available at the Massey University library and can be accessed via the online catalogue.

**Project Contacts**

If any concerns, you can contact the following people through contact details provided.

| Name | Position | Organization | Contact |
|---|---|---|---|
| Kyan Htoo | Researcher | School of Agriculture, and Environment, College of Science, Massey University, Palmerston North, New Zealand | Phone – 0225808375<br>Email – kyan.htoo@gmail.com |
| Dr. Peter Tozer | Main Supervisor | School of Agriculture, and Environment, College of Science, Massey University, Palmerston North, New Zealand | Phone number – (+64) (06) 356 9099\| Extn: 84795<br>Email- P.Tozer@massey.ac.nz |
| Dr. Janet Reid | Co-supervisor | School of Agriculture, and Environment, College of Science, Massey University, Palmerston North, New Zealand | Phone number – (+64) (06) 350 5268<br>Email – J.I.Reid@massey.ac.nz |
| Dr. Duncan Boughton | Co-supervisor | Department of Agricultural, Food and Resources Economics, Michigan State University, East Lansing, Michigan State, USA | Phone number – (+95) (0)925 083 2001<br>Email- boughton@msu.edu |

**Appendix C**

**Participant Consent Form**

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree/do not agree to the interview being sound recorded.
I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: _____ Date: _____

Full Name – printed _____

Appendix D

Confidentiality Agreement

I, _____, the interpreter/note-taker agree to keep confidential all information concerning the project: Identifying Policy Leverage Points for the maize value chain in Shan State, Myanmar.

I will not retain or copy any information involving the project.

Signature Date:

_____ _____