

Chapter 4

Myanmar's fresh fruit export to China via cross-border trade

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Abstract

Myanmar's export of watermelons and melons to China via cross-border trade have exhibited a tremendous growth in the past decade. It can be interpreted as diversification into high value horticultural production from extensive cultivation of low value crops. We ascribe this growth to two emerging rural and market institutions. One is rural land rental practice that altered resource allocation between farmers toward more profitable one. The other is the brokers and the wholesale market in the border area that interface producers with Chinese buyers, making producers' access to the export market as easy as the domestic market. This paper illustrates how these emerging institutions underpinned the growth in production and exports of watermelons and melons.

Keywords: fresh fruits, diversification into horticulture, land rental market, cross-border trade, Myanmar

1. Introduction

Extensive cultivation of low value traditional crops such as paddy has been dominant in Myanmar's agricultural sector. Rural economic institutions including the underdeveloped rural financial market have been compatible with family-based extensive cultivation.

Against this backdrop, we observe a surge in fresh fruit exports to China via cross-border trade. In 2016, the export value of watermelons to China is estimated USD 169 million, which amounts to nearly half of that of rice, the country's traditional export crop. Reardon (2014) calls for attention to the emerging horticultural production and its potential in Myanmar by describing the trunk road connecting Myanmar to China as "a massive river of watermelons."

We aim to explore what rural and marketing institutions have enabled diversification into export-oriented horticultural production in Myanmar. We focus on

watermelons and melons of which nontraditional cultivars have been produced and exported to China. We present an analytical narrative on the structure of their supply chains. The analysis is based on our field work and interviews with farmers in the production areas, merchants engaged in cross-border trade with China, and the Myanmar Fruit, Flower, and Vegetable Producer and Exporter Association (MFVP). In-depth interviews with farmers using semi-structured questionnaires were conducted in Monywa District of Sagaing Region, a major production area of melons in Myanmar, in November 2017 and February 2018.

This paper is structured as follows. In Section 2, we present the review of the related literature. In Section 3, we present the trade data and general background of watermelon/ melon production. In Section 4, we outline the supply chain of watermelon/ melon. The next two sections constitute main analyses of this paper, looking into development of two institutions that underpin the growth in watermelon/ melon production and exports. Section 5 analyzes rural institutions with a particular focus on the development of land rental market. Section 6 examines the marketing system and clarify the functions of the wholesale market and brokers in the Myanmar-China border. Section 7 summarizes the paper and concludes.

2. Literature review

2.1 Diversification to horticulture

As argued by Weinberger and Lumpkin (2007) among others, diversification into horticulture from traditional grain cropping can be a driver of rural development in several channels. First, it brings in higher income to farmers. Revenues from horticulture per unit of land can be several times higher than those of grain. Second, horticulture is more labor intensive than traditional grain production, requiring more agricultural laborers. It generates employment opportunities of agricultural laborers and raise their wages in the rural labor market (Maertens et al. 2012).

For cultivation of horticultural crops, producers need resources to finance intensive uses of agricultural laborers and input material such as chemical fertilizers and pesticides. One of obstacles for farmers to diversify their production into horticulture is a lack of financial resources.

In such a context of rural economies, horticultural production is often initiated by supermarket chains and food processing firms from advanced economies for their

procurement of fresh fruits and vegetables which are nontraditional crops in the host countries (Masakure and Henson 2005). Procurement of horticultural produce by these firms takes the form of contract farming. Contract farming is compatible with horticultural production in developing countries as they perform functions to provide growers in developing countries with credit, production input and knowledge, and access to lucrative markets in advanced countries (Key and Runsten 1999).

2.2 Background in Myanmar

As documented in Matsuda (2013), indigenous farming in the Central Dry Zone of Myanmar had been extensive cultivation of low value crops such as chickpeas, and the typical unit of production had been family-based. Except the labor market, rural market institutions have been underdeveloped. As the land market is not liquid, family-based farming of own farmland prevails. Farmers rely on self-financing, which would constrain them from use of agricultural inputs such as chemical fertilizer. Such circumstances are compatible with extensive family-based cultivation.

We characterize the underdeveloped rural market institutions as below. First, the marketing system for agricultural produce is traditional; farmers rely on collectors who visit farmyards during the harvest season, and offer cash payments at spot transactions. Alternatively, farmers store their harvest aiming at higher prices, and they carry the produce to wholesalers in towns and large cities who resell it in commodity markets. The coordination between farmers and intermediaries is scarce.

Second, land deals is rare as in many other developing countries. As Ray (1998) and Deininger and Feder (2001) argue, land tenure has multiple economic values. Its pecuniary value cannot be easily agreed between buyers and sellers, which deters land deals.

Third, the rural financial market is underdeveloped as in many other developing countries (Kaino 2005). Rural financial institutions include the government-owned Myanma Agricultural Development Bank (MADB) and non-governmental microfinance institutions. The financial support of the MADB is biased toward promotion of paddy production: while paddy farmers are granted loans of Ks. 100,000 per acre¹, those growing other crops get only the one fifth. Borrowing from relatives and moneylenders remain popular financing sources.

In contrast, rural labor market has been active (Fujita 2009). Due to uneven

¹ This is approximately USD 200 per hectare.

distribution of land, there is a large stock of landless households in rural areas including the Central Dry Zone. They are often hired as temporary agricultural laborers for harvesting as well as permanent agricultural laborers.

These circumstances as a whole are not compatible with intensive horticultural production. We address the question how growers of watermelons/ melons have overcome the adverse conditions.

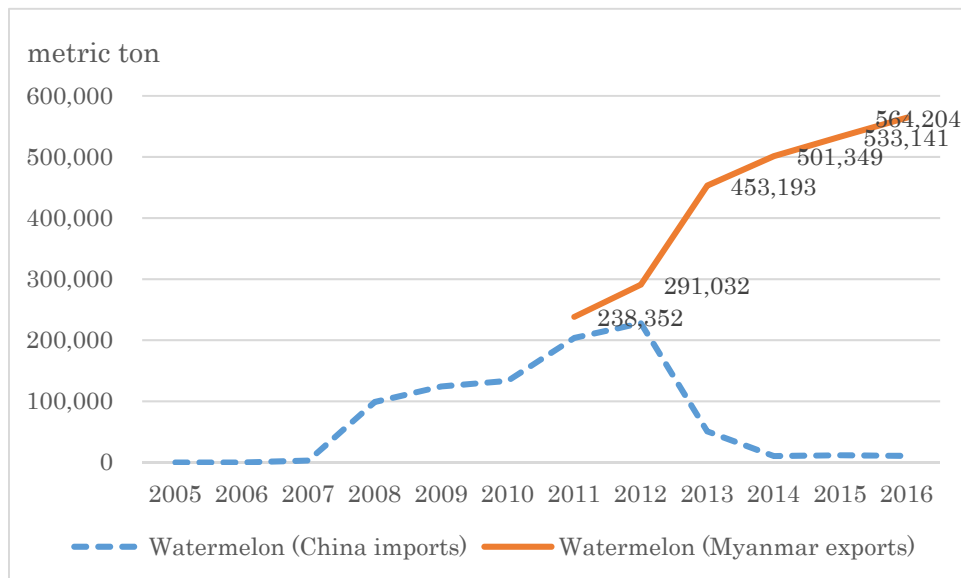
3. Fresh fruit export and production in figures

3.1 Trend of exports

Myanmar's fresh fruit exports to China by cross-border trade registered tremendous growth in the late 2000s. Figure 1 illustrates the trend of watermelon exports in terms of metric ton.² In this figure, Myanmar exports refer to the export volume recorded by the MFVP. China's imports are based on the data from the China Customs. Myanmar export data are available only for the period from 2011. In 2016, an average import price of watermelons at the Myanmar=China border was approximately 2 Chinese Yuan (USD 0.3) per kilogram, so that the total import value for 2016 is estimated around USD 169 million.

² The data from the China Customs does not include musk melon.

Figure 1 Myanmar's exports of watermelons to China

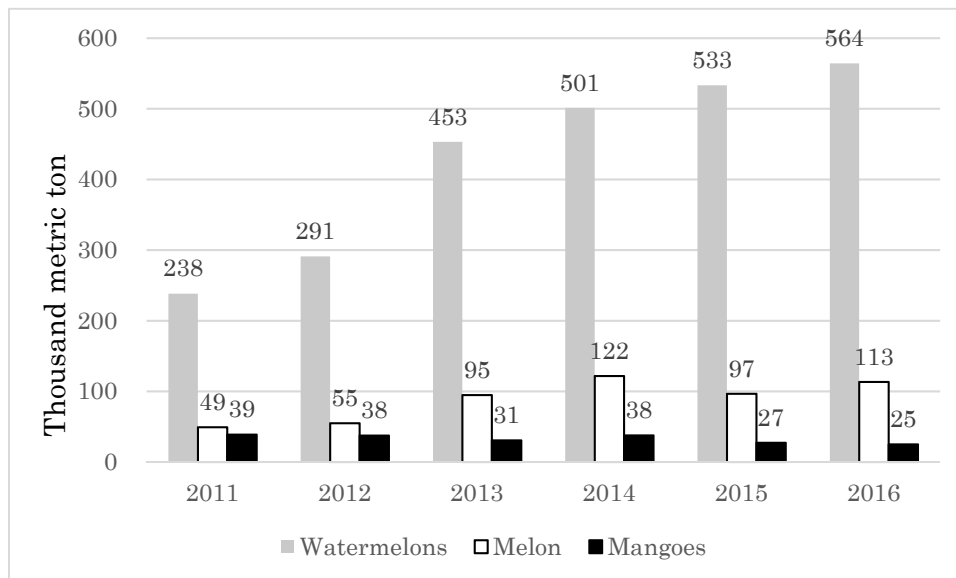


Sources: MFVP; China Customs

There are considerable discrepancies between the figures of Myanmar's exports and corresponding China's imports. China's recorded imports dropped to nearly zero in 2014. Chinese authorities permit imports of fresh fruits from Myanmar. China's General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ), the governmental agency in charge of import-export food safety and plant quarantine, posts the positive list of fruits to be imported to China, and there are eight items that can be imported from Myanmar including watermelons, melons and mangoes. However, the bulk of watermelon imports have not appeared in China's import statistics since 2014.

Figure 2 shows the trend of export volume of three fruits to China reported by MFVP. The exports of watermelons exhibit a steady growth. By contrast, the exports of mangoes shows a declining trend. The average export prices per kilogram in 2016 are 2 Chinese yuan for watermelons, 3 yuan for melons, and 9 yuan for mangoes. With these average prices, the export values are estimated at USD 169 million (watermelons), USD 51 million (melons), and USD 34 million (mangoes) in 2016.

Figure 2 Export volume of Three major fruits from Myanmar to China



Source: MFVP

3.2 General background of production

While the Myanmar authorities do not publish statistics about production of watermelons and melons, MFVP estimates that roughly 90 percent of the production are exported to China; Myanmar growers cultivate Chinese varieties using imported seeds from China. Harvested produce is exported to China except non-standard fruits such as small or damaged ones. The trends of production of watermelons and melons are in parallel with their exports.

The main cultivation areas of watermelons and melons are the Central Dry Zone of Mandalay and Sagaing Regions, where the annual rainfall is below 1000 mm, not suitable for rain-fed paddy cultivation. Double cropping is common in the regions. Major traditional cropping pattern is pigeon peas, ground nuts, cotton, and sorghum as monsoon crops, and chickpeas, chili, onions and sunflower as winter crops. During the winter season, the climate in the Central Dry Zone is scarce rain, long duration of sunlight and high temperature, which are all suitable for growing watermelons and melons. The production of these nontraditional crops have increased rapidly by replacing the traditional crops such as chickpeas. The planting duration of watermelons and melons is 100 days, and the harvest periods spans from November to April, with the peak season around February. These correspond to China's off-crop season.

MFVP estimates the total planted areas and number of households cultivating watermelons and melons in 2016 as follows. In Mandalay Region, the number of

households growing watermelons and the sown areas are 18,907 acres and 3,374 households, and figures for melons are 823 acres and 145 households. In Sagaing Region, 3,790 households cultivate 15,790 acres of watermelons, and 1,612 households and 12,310 acres as to melons.

Compared with traditional crops, watermelons and melons are highly profitable. Table 1 compares profitability of watermelons with traditional crops. Depending on the selling price and yield, profits from watermelons can be more than 10 times higher than chickpeas. At the same time, cultivation costs of watermelons are much higher compared with traditional crops. In fact, watermelon cultivation requires larger expenditures in agricultural laborers and input materials including chemical fertilizers. We examine in more detail how growers manage financing of large expenditure.

Table 1 Profitability of watermelons in comparison with traditional crops

	Paddy	Chickpeas	Watermelons
Revenue (Thousand kyats/ acre)	500	255	2,000~6,000
Production cost (Thousand kyats/ acre)	150	150	4,300
Profits (Thousand kyats/ acer)	350	105	-2,300~1,700

Source: Antonio (2015:58), Soe Myint (2016)

Note: The data for paddy and chickpeas are of 2014, whereas the data for watermelons are of 2015.

Furthermore, the prices of watermelons and melons are more volatile compared with traditional crops. Especially bad weather such as shorter sunlight duration and unusual rainfalls deteriorate the fruit quality, leading to lower prices in a particular season. Watermelon growers often report that they face losses in every three to four years. In addition, day-to-day fluctuations in selling prices are also high; excess supply in the market often results in a sudden fall in the prices.

4. Outline of watermelon/ melon export supply chain

4.1 Geographical location

We outline the supply chain of watermelon/ melon exports to China. Production areas are the Central Dry Zone of Mandalay and Sagaing Regions. Fruits are transported by land to Yunnan Province of China via the Myanmar-China border town of Muse (Myanmar side) and Ruili (Yunnan side). The border of the two countries mostly lies in mountainous terrain, and road connections between two countries are sparse. As a result, the flows of cross-border trade concentrate in the trunk road that links Mandalay—the main commercial city in the Central Dry Zone—to Muse/Ruili. From Ruili, fruits are forwarded to all destinations around China through its developed road infrastructure.

By land transport, fruits harvested in the Central Dry Zone can be delivered to Ruili over two nights, which is much shorter than the shipment by sea. The distance between Mandalay to Muse is approximately 450 kilometers. The short transportation time unambiguously fostered China's fruits imports from Myanmar. Furthermore, the Chinese authorities, AQSIQ, restrict the imports of four fresh fruits from Myanmar, namely watermelons, melons, mangoes and Indian jujube, to undergo customs clearance only in two land ports in Yunnan Province.³

As for the Myanmar side, in April 2006, the authorities established the trade zone in the suburb of Muse, called the Muse 105 mile trade zone, to boost cross-border trade with China. It houses the one-stop service center comprising six trade-related government offices including the Ministry of Commerce for export/import license applications, the Customs Department for customs clearance, and the Inland Revenue Department for payments of advance corporate income tax.

Muse is the largest border post of the country, accounting for the highest share of the private sector cross-border trade exports. According to the statistics from the Ministry of Commerce of Myanmar, the total exports of the private sector were USD 8,124 million in 2016/2017, of which USD 3,270 million was by cross-border trade. The major export items to China via Muse include sugar, rice and fresh fruits in 2016/2017.

4.2 Structure of supply chain

We focus on the supply chain of watermelon/ melon exports up to the Chinese border. Marketing and distribution within China are another important issue which deserve a separate study. We restrict our attention to the supply chain of watermelons/ melons from production up to sales to Chinese brokers at the border.

³ Two land ports are Ruili and Daluo. The bulk of fruits go through Ruili.

The main actors in the supply chain are (1) growers in the production areas (2) intermediaries in the Myanmar side of the Myanmar=China border area, and (3) Chinese buyers. The role of the intermediaries in the border area is to link growers with Chinese buyers. Regarding the intermediaries, around 80 brokers in the border town of Muse collectively operate the wholesale market called the North East Gate market. During the harvest seasons, the brokers hold daily auctions at the wholesale market where growers send produce and 40 Chinese buyers visit for purchase. On behalf of the growers, brokers negotiate the prices with Chinese buyers, make settlements with them, and undertake the customs formalities. Apart from these three actors, there are shipping companies who offer transportation of fruits from the production areas to the border area by cargo trucks.

Among the growers, there are three distinctive types. One is indigenous villagers. Although they are farmers who own farmland, most of them also borrow land for cultivation of watermelons/ melons. Another is Myanmar agricultural firms who dispatch production managers to villages to borrow farmland and cultivate watermelons/ melons. The other is Chinese investors who grow watermelons by borrowing farmland. Chinese investors grow watermelons, but they rarely grow melons.

The operational size of growers varies considerably among them. Cultivation acreage of villagers is between 1 to 2 acres to over 100 acres. A farm size of 10 to 50 acres are common. Cultivation acreage of Myanmar firms and Chinese investors is above 100 acres.

It is not always easy to distinguish Chinese investors from Myanmar firms since the former often employ Burmese nominees when they borrow land (Antonio 2015). Chinese investors also often bring in Chinese production managers and laborers from outside of villages who are fluent in the Chinese language.

It is a notable feature of Myanmar's supply chain of watermelon/ melon exports that contract farming is not common. There are some forms of implicit contracts between growers and brokers or Chinese buyers. In one case, Myanmar farmers receive input material such as seeds on credit from a brokers to whom they often sell their harvest. However, it remains farmers' discretion to whom they sell their harvest.

Two market institutions that has underpinned the tremendous growth in watermelon/ melon production and exports are the land rental market in the production areas and the wholesale market in the border town of Muse. We examine functions of these institutions in the subsequent sections.

5. Rural institutions

5.1 Land rental market

A remarkable change in the Central Dry Zone is the rise of land rental practice. There are two patterns of land rental. One is land rental contract between farmers to Myanmar firms and Chinese investors. The other is land rental between farmers. Land rental has accelerated horticultural production. While land rental practice had not been common in rural Myanmar, high profitability of watermelon/ melon cultivation could be ascribed to its rise in the Central Dry Zone.

Land rental practice is also compatible with the cultivation method of watermelons/ melons. The cultivation employs chemical fertilizers and pesticides intensively. Due to damage on soil conditions, continuous cropping of watermelons/ melon leads to a sharp fall in yield. Thus, rotation of fields is common for watermelon/ melon cultivation. Usually, after planting watermelons/ melons, other crops such as chickpeas are planted for two to three years as the winter crop. Growers usually need to borrow different land to continue watermelon/ melon cultivation.

To see the evolution of land rental practice, we compare the land rental market in two townships in Monywa District of Sagaing Region. Table 2 summarizes the characteristics of two townships. Chaung-U is the hub of melon production in Myanmar, accounting for 57 percent of the country's total estimated planted areas to melons. Chaung-U has the fertile floodplain where the Chindwin river—a tributary river of the Ayeyarwady river—causes flood every year during June to August. As floods recover soil conditions, repeated cropping of watermelons/ melons is possible in the floodplain. Budalin is located approximately 60 kilometers north of Chaung-U along the Chindwin river, but this township does not have floodplain. In between Chaung-U and Budalin is Monywa, the capital city of Sagaing Region.

Table 2 Two melon producing township in Monywa District, Sagaing Region

	Chaung-U Township	Budalin Township
Watermelon cultivation (estimate)	<ul style="list-style-type: none"> ▪ 1,800 acres ▪ 300 households 	<ul style="list-style-type: none"> ▪ 100 acres ▪ 25 households
Melon cultivation (estimate)	<ul style="list-style-type: none"> ▪ 7,500 acres ▪ 800 households 	<ul style="list-style-type: none"> ▪ 250 acres ▪ 25 households
Cultivation unit	<ul style="list-style-type: none"> ▪ Small, indigenous farmers 	<ul style="list-style-type: none"> ▪ Large, including Chinese investors
Land characteristics	<ul style="list-style-type: none"> ▪ Flooded area ▪ Fertile land suitable for melon cultivation 	<ul style="list-style-type: none"> ▪ Upland
Repeated cropping	<ul style="list-style-type: none"> ▪ Possible 	<ul style="list-style-type: none"> ▪ Cannot grow watermelon /melons for two years after cropping
Land rental practice	<ul style="list-style-type: none"> ▪ Price quotation in kind ▪ Ks 400,000/acre ▪ Payment after harvest 	<ul style="list-style-type: none"> ▪ Price quotation in money ▪ Ks 600,000/acre ▪ Advance payment

Sources: MFVP; Author's interviews

Cultivation of watermelons/ melons has been saturated in Chaung-U, whereas traditional crops such as chickpeas that can be replaced with watermelons/ melons still remain in Budalin. In both Chaung-U and Budalin, cultivation of watermelons/ melons started about 20 years ago, after the United Nations Development Programme (UNDP) implemented the training programs for farmers in this district to diversify their agricultural production into watermelons, melons and tomatoes in 1997.

Indigenous farmers have expanded their production of watermelons/ melons gradually by reinvesting their profits. Typically, farmers started production in a small scale around 1 to 2 acres. Some successful farmers have expanded watermelon/ melon cultivation above 100 acres by borrowing land from other farmers. In contrast, those farmers who cannot raise sufficient capital or labor release their land to other farmers.

Land rental practices are distinctively different between Chaung-U and Budalin. Land rental prices are quoted in monetary terms in Chaung-U whereas they are quoted in terms of opportunity costs of growing chickpeas in Budalin. In Chaung-U, the ongoing land rental price in 2017/2018 was Ks. 600,000 (approximately USD 450) per

acre, and a tenant has to make down payment in cash at the time of planting seeds. In Budalin, the prevalent quoted land rental price is 14 baskets of chickpeas, and a tenant shall pay the fee in money after harvesting watermelons/ melons, converting the value of chickpeas at the current market price. The resulting land rental price was around Ks. 400,000 (USD 300) in February 2018.

The price quote of land rental price in terms of chickpeas has some implications. By quoting the land rental price, landowners are compensated by the amount of the opportunity cost of growing chickpeas—the most common alternative crop to watermelons and melons as the winter crop. Actually, pecuniary returns to land lease more than compensate the opportunity cost of cultivating chickpeas. First, landowners can save the cost of chickpeas cultivation. They can use their family labor for other works. Second, the actual average yield of chickpea cultivation is 10 to 12 baskets per acre, which is lower than the quoted 14 baskets. The gap is considered as the land rental premium. Third, most importantly, by leasing out their land, landowners can mitigate the price risk of watermelon/ melon cultivation. In Budalin, landowners who lease out their land face two kinds of risk; one is the fluctuations in chickpea price, and the other is the risk that the tenant defaults on payment of land rental fees. However, the risk they face is much lower than the price risk of watermelons and melons. By leasing out their land, landowners can take a quasi-fixed income of land rental fees.

The difference in land rental practices between two townships can be interpreted as follows. In Chaung-U, the market condition is more favorable for landowners. Because of fertile soil of the floodplain, more farmers in Chaung-U have accumulated capital that allows them to expand cultivation. There are more demand for land than supply. By contrast, the market condition in Budalin is more favorable for tenants. There are less farmers who have accumulated enough capital to expand cultivation of watermelons/ melons.

During the field work in Budalin, farmers reported that their cultivation was constrained by shortage in capital. They reported that they would expand cultivation areas to watermelons/ melons if they could borrow funds at a reasonable interest rate. While the land rental practice has been conducive to the growth in watermelon/ melon cultivation, the underdeveloped rural financial market has constrained the pace of growth.

5.2 Other rural institutions

Apart from land and capital, the other factors indispensable for production include

technical knowledge and labor. As for technical knowledge for production, watermelons and melons are knowledge intensive crops. Cultivation requires knowledge on plant maintenance and pest management. Farmers acquire knowledge through various channels. One is the technical training by the UNDP in 1997. It is considered that technical skills of the UNDP training diffused gradually to many farmers; there are farmers who learned production skills from fellow farmers. Another channel is technological diffusion from Chinese investors. In Budalin, there has been a Chinese invested farm which has been operating 100 to 150 acres of watermelon production. Some farmers worked at the Chinese farm as agricultural laborer to master technical skills for production. Compared with financial resources, technical skills are not a constraint for expansion of watermelon/ melon cultivation.

Watermelon/ melon cultivation employs a large number of agricultural laborers. On average, two agricultural laborers per one acre are employed throughout 100 days of planting period, and they often live in a hut within the farm yard for intensive plant maintenance. Their monthly wage amount to Ks 120,000 to 150,000 (approximately USD 90 to 110). In addition, harvesting usually requires additional 15 to 20 daily workers per acre, whose average daily wage is Ks 4,000 (USD 3). Because of active rural labor market, agricultural laborers are not a major constraint for expansion of watermelon/ melon production. In Chaung-U, while the wages of agricultural laborers have been rising because of the robust demand, seasonal migrant workers from other nearby villages and other regions such as Magway have been filling up the demand for agricultural laborers.

6. Marketing system

One of the most remarkable features of the fresh fruit cross-border trade is that the bulk of commodities are intermediated by the brokers in the border area. The North East Gate wholesale market, located adjunct to the Muse 105 mile trade zone, is operated by a private business organization which comprises approximately 80 brokers who intermediate the fruit growers and Chinese buyers. The wholesale market was established in the early 2000s with the initiative of approximately 30 brokers. The broker membership has been open to new entrants, and some producers also became brokers.

Brokers in the wholesale market are auctioneers. During the harvest season,

they concurrently hold daily auctions at their spaces in the wholesale market where producers send commodities and Chinese buyers make visits for purchasing them. It is the responsibility of the exhibitors (producers) to arrange shipment of commodities from the production areas to Muse on their own account. Brokers themselves do not buy the commodities. Brokers entitle a Chinese buyer who bids the highest price to buy the fruits. Auctions are held in the morning, and fruits are delivered to Ruili within the same day after the customs formalities in both Myanmar and China.

Brokers take 3 to 5 percent of the bid price as commission fees. Payments are made from the Chinese buyers to the exhibitors via the brokers who deduct the commission from them. Usually the Chinese buyers make deferred payments to the brokers, whereas the brokers transfer payments to the exhibitors immediately.

Classification of fruit quality is rather simple in the North East Gate wholesale market. For example, the traded varieties of watermelon are only four, and they are priced according to three standardized sizes: extra-large (AAA), large (AA) and normal (A). However, since the timing of shipments are not coordinated between the producers and brokers, concentrated arrivals of commodities in the market would lead to a fall in the selling prices. Producers reserve discretion to which brokers they entrust their commodities. However, due to the standardization of goods by size, the prices might not vary largely across brokers.

While the brokers arrange export customs clearance at the Muse 105 mile trade zone in the Myanmar, the ownership of commodities is transferred directly from the exhibitors to the Chinese buyers. The terms of export contract are free on board (FOB) in Ruili. Thus, the Chinese buyers often renegotiate the price at the time of delivery as commodities are damaged during transportation from Muse to Ruili in the hot climate during the day time, which incurs losses on the exhibitors (producers).

Although the bulk of fruit exports go through the auctions in the North East Gate wholesale market, this may not be compulsory in export procedures in the Myanmar side. There are reportedly fruit exports that do not go through the auctions. Perhaps the wholesale market might be preferred because of its convenience in customs clearance in the Myanmar side. Another role of the wholesale market is communication with Chinese buyers for price negotiation; auctioneers are fluent in Chinese language.

The wholesale market has made the Chinese market more accessible for producers. First, they do not have to search for buyers. As far as they deliver fruits to the wholesale market, the brokers find buyers, though the price may be low. Second, the hurdle of minimum sales lot may be low. The commodities are transported from

production areas to Muse by cargo trucks that producers arrange. The capacity of trucks varies from 5 to 17 metric tons (MT), and a larger truck gives lower freight charge per weight. Given the average yield of watermelon (10 MT per acer) and musk melon (12-15 MT per acre), smallholders can fill up the capacity of a truck.

7. Conclusion

This paper has investigated how two institutions—rural land rental market and the wholesale market in the border areas—underpinned the growth in watermelon/ melon production and exports in the Central Dry Zone of Myanmar to China. While the existing rural institutions had been compatible with extensive cultivation of low value traditional crops, these emerging institutions facilitated diversification into horticultural production.

The emergence of rural land rental market changed resource allocations between farmers from cultivation of low value traditional crops such as chickpeas toward high value nontraditional watermelons and melons. With high profitability of watermelons and melons, tenants can offer adequate land rental fees which surpass landowners' reservation utility. Those farmers who have accumulated capital from high revenues of watermelon/ melon exports gradually expand their production by borrowing farmland, replacing cultivation of traditional crops such as chickpeas. However, financing remains as a constraint for the tenants to expand their cultivation of watermelons and melons.

The emergence of brokers and the wholesale market in the border area has made the export to China as easy as domestic sales. All farmers have to do is to send their produce to the border, and brokers will find Chinese buyers, though the selling prices are subject to fluctuations. How to reduce the volatility of fruit prices remains as a major concern for the growers, and it can deter growth in watermelon/ melon production and exports.

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