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The Activities of Rice Specialized Companies in the Supply Chain of Rice in Myanmar

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The government of Myanmar had laid down the policy of giving export licenses to RSCs which has contract farming records for overcoming the problems of un-pure seeds, lower quality agro-chemical, lack of improved technologies and credit and underdeveloped agricultural infrastructure. So, RSCs have endeavored in Myanmar rice supply chain in 2008. However, the activities of RSCs have been decreased due to change in the above policy and poor repayment rate of contract farmers since 2011–2012. It is said that the decline in RSCs is negatively affected supply chain activities. Therefore, it is required to determine how to contribute RSCs in Myanmar rice supply chain. The objective of this study is to investigate the activities of RSCs on the rice supply chain in Myanmar. We make a comparison between traditional supply chain and RSCs supply chain with descriptive analysis. The results of this study indicate that RSCs supply chain is superior to traditional supply chain by supporting better quality agricultural-inputs to farmers, producing high quality milled rice and competing in international market by exporting it.

Key words: Descriptive analysis, Myanmar, Rice supply chain, RSCs, Superior

INTRODUCTION

Myanmar is an agricultural country. Rice production plays a major role not only for consumption of country population but also for exporting surplus production as a source of foreign earning. In 2010–11, the total sown land area was 23.57 million ha, of which 34.15% was used for cultivation of rice. Rice accounts for an estimated 13% of the country's GDP (Ministry of Agriculture and Irrigation, 2012). Moreover, it comprises 25% of the food consumed by wealthier households and 50% of the food consumed by poorer households (World Bank, 2014).

Although rice is an important crop of Myanmar, there is still a problem in low yield and income level of rice farmers due to unsure quality seeds, inappropriate market assessment, un-standardized agricultural inputs, lack of high agricultural technologies and capital investment and poor infrastructure development faced in rice production. For overcoming these challenges, the government of Myanmar established a policy of granting export licenses to Rice Specialized Companies (RSCs) that had contract farming records in 2008 (Wong and Wai, 2013). Therefore, RSCs have been involved in Myanmar rice supply chain by participating in rice production, processing and marketing since 2008.

However, the contributions of RSCs have decreased since 2012 as the result of a change in government policy, poor repayment rate and unclear agreement system between farmers and RSCs. It is said that the decrease in activities of RSCs give negative effect on supply chain activities of rice in Myanmar. The Myanmar government

hopes to continue the participation of RSCs in the rice industry, as the announcement of Myanmar Rice Federation (MRF) website that the Myanmar government had a plan to support RSCs in 2015.

It is required to determine whether the activities of RSCs can actually improve rice industry or not. Therefore, the objective of this study is to investigate the activities of RSCs on the rice supply chain in Myanmar; comparing traditional supply chain and RSCs supply chain in rice industry. No comprehensive analysis of the contribution of RSCs and the rice contract farming system in Myanmar rice supply chain has been conducted. In analyzing the participation of RSCs in Myanmar rice supply chain, we make a comparison between traditional supply chain and RSCs supply chain with descriptive analysis.

The remainder of this study is organized as follows: in section 2, we describe the rice policy intervention in Myanmar and the situation of RSCs. In section 3, generalized rice supply chain in Myanmar is explained. In section 4, we present the comparison between traditional rice supply chain and RSCs supply chain by the various sites of chain. In section 5, we summarize the conclusion and recommendations.

RICE POLICY INTERVENTION AND RSCS' SITUATION IN MYANMAR

Rice policy intervention

There are various policies intervened in different eras, the similar objectives of successive governments were to upgrade farmers' livelihood, secure self-sufficiency and promote rice export. After independence in 1948, Myanmar farmers have been allowed to grow their desired crop; additionally, between 1948 and 1961, private traders were free to partake in rice marketing. In 1962–1987, the government monopolized rice marketing and set a fixed domestic rice price for the whole country, regard-

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less of where the surplus or deficit regions. Farmers were forced to sell the procurement quota of rice at that fixed price. For this reason, Myanmar's "black market" for rice formed at that time.

Although market liberalization was initiated in September 1987, the state-owned public co-operative, Myanmar Agricultural Produce Trading (MAPT) was still responsible for marketing rice; it was authorized to purchase 10% of farmers' paddy production at the fixed seasonal price, which was lower than the prevailing market price. Rice export was solely held by MAPT. Given the degree to which MAPT's purchase price of paddy was discounted, the resulting rice was very competitive in the international market. That policy was maintained until 2002.

The government eliminated the compulsory paddy quota system in 2003 and started a second liberalization of rice for hoping a better paddy price for farmers and a fair price for consumers. An export tax of 10% was imposed, and investors were encouraged to develop uncultivated land, especially in deep-water areas, to grow rice; they were also promised the right to export 50% of production from such large developed farms. MAPT was abolished in that period, and many new rice export companies entered the international market. In May 2008, a major food crisis occurred, and the price of rice increased three-fold. However, the farm gate price received by rice farmers did not match this increase.

However, the successive government had laid down many policies for overcoming the problems faced in rice production, rice farmers still facing the problems in rice production and marketing. Limited market access, the use of poor-quality seeds and agricultural inputs, low levels of technology and investment, and underdeveloped infrastructure are the major bottleneck factors in Myanmar rice production. More than 90% of exported rice is of low quality (World Bank, 2014). The export of low-quality rice does not generate sufficient income for farmers and other participants in the rice value chain.

In 2008, the government of Myanmar had laid down the policy of granting export licenses to RSCs conducting contract farming with rice farmers to surpass these

challenges.¹ The government's intent in licensing RSCs was to expand production by encouraging the private sector to provide the inputs and expertise needed by the country's rice farmers, who were not performing well on their own; the endpoints in this initiative were to increase productivity, increase farmer income, improve the supply chain overall, and facilitate the exportation of Myanmar's rice products (Wong and Wai, 2013).

RSCs' situation

RSCs have involved in contract farming and the provision of seeds and fertilizers as well as mechanization services on credit. To execute contract farming between RSCs and farmers, RSCs conduct meetings in the appropriate village tracts and explain their activities, contract rules, guarantees, and procedures in contract farming. Negotiations are sometimes made between farmers and companies. Details regarding support materials, amount of credit per acre, quality assurance procedures, buying procedures, guaranteed price, and the payment system are determined before the contracts are concluded, and these details are cited in the contract agreement itself. Contract farmers are compelled to sell rice of a certain assured level of quality to the RSCs, or they can pay the RSCs back in cash. RSCs also endeavored in processing by investing modern mill and renewed mills for producing high quality rice and exporting it.

In 2011–2012, the policy of prioritizing export licenses for RSCs was abolished; from that point, any rice trader could obtain an export license, regardless of whether he or she had a contract farming record. As such, RSCs lost their preferential access (Wong and Wai, 2013). It is said that, Myanmar was becoming to transform a democratic country, in line with that there is an argument from normal traders to its government to cancel-out such unfair policies. RSCs also faced the problem of a poor repayment rate among contract farmers with respect to their contract farming schemes due to adverse weather effect, poor storage facilities and underdeveloped infrastructure. Moreover, there was no clear agreement system between the contract farmers and the RSCs, making it impossible for RSCs to punish through the legal system

Table 1. Trend in contract farming and exports via RSCs

| Years | Number of RSCs | Contract farming land area (acres) | RSCs' share of Myanmar's rice exports | RSCs' share of Myanmar's rice production |
|---------|----------------|------------------------------------|---------------------------------------|--|
| 2009–10 | 41 | 598,971 | 13.57% | 3.01% |
| 2010–11 | 47 | 683,366 | 51.00% | 3.47% |
| 2011–12 | 57 | 922,706 | 82.90% | 4.97% |
| 2012–13 | 27 | 336,349 | 11.31% | 1.90% |
| 2013–14 | 13 | 196,410 | 14.05% | 1.06% |

Source: Calculations based on data gathered by interviewing RSCs and the Department of Trade Development in Myanmar's Ministry of Commerce.

¹ RSCs are the companies which contribute to rice supply chain from production through marketing. RSCs constitute one of the categories of rice traders; they were formerly normal traders that became RSCs on account of the new policy. They have been involved in rice production via contract farming, processing and distribution of rice in both domestic and international market since 2008 according to government policy.

any contract farmer who did not keep his or her promises. For all these reasons, some RSCs have been transformed into regular traders; only a few RSCs are still involved in contract farming in Myanmar. It is not surprising, then, that the contributions of RSCs for Myanmar rice industry have decreased since 2012. Table 1 shows the decline in Myanmar in the number of RSCs, from 57 in 2011–2012 to only 13 in 2013–2014; in line with this decline, RSCs' shares of production and exports also decreased. It is said that the decline in RSCs and the activities they performed negatively affected farmers' livelihood and also supply chain activities in Myanmar rice industry. For this reason, it is important to determine the impact of RSCs contribution on the supply chain of rice in Myanmar.

THE SUPPLY CHAIN OF RICE IN MYANMAR

Overview of rice supply chain

Myanmar is generally divided into two parts, lower Myanmar and upper Myanmar. Lower Myanmar comprises delta region and coastal region and upper Myanmar consists of central dry zone and hilly regions. Most of the surplus of rice in Myanmar is produced mainly by delta region (triangle area in figure 1) for both domestic consumption and export. In the upper Myanmar, Shwebo

region (the square area in figure 1) in central dry zone region is also important for rice market of middle and upper Myanmar. The most rice deficit regions in Myanmar are Chain State (star area in figure 1) and Tanintharyi region (circle area in figure 1). The supply of rice was flowed from surplus to deficit regions and the surpluses are traded to export via border and oversea market (Ministry of Commerce, 2013). In general, Myanmar rice supply chain can be divided into three dimensions; production, processing and distribution (marketing).

Production

Myanmar paddy production is classified two types depend upon time of sowing as follow; first, monsoon paddy or wet season paddy which is sown from May to September and it is also known as first rice. Second is summer paddy or dry season paddy which is sown from October to April and is also recognized as second rice.

In lower Myanmar, southwest monsoon enter the southernmost part of the country and it passes the whole country and moves to the northernmost part of the country again. Lower Myanmar always receives that monsoon earlier than middle and upper Myanmar. As a result, farmers in lower Myanmar can start their rice production in May or June and farmers, those who live in central Myanmar can start later. As a regards of summer paddy, time of sowing is evenly the same in all over Myanmar where water from dams are available and it can start from October. Newly harvested monsoon paddy enters in the market from November to December in market. In the case of summer paddy, newly harvested summer paddy market can start May to June.

The country paddy production in 2011–12 was 32.6 million ton. There are 2,146,000 farm families are participated in Myanmar paddy production in 2011–2012 (Wong and Wai, 2013). There were 57 RSCs in 2011–2012 and reduced 13 RSCs in 2013–2014. They engaged 922,706 acre of contract rice farming in 2011–2012 and 196,410 acres in 2013–2014.

Processing

At the processing level, there are 15,477 small huller mills (less than 2 tons/day capacity); 1,220 medium sized commercial mills (less than 15 tons/day capacity); 224 modern mills are operating Myanmar rice supply chain in 2011–2012 (Wong and Wai, 2013). There are also six new parboiled rice mills which are planned to enter as a new segment in the global rice market. There exists many cottage industry type operations producing vermicelli and mohingar (a local popular noodle made from rice) and rice flour. There are also small operations producing snacks and biscuits from rice bran. However, a high proportion of usage of bran currently is for animal and fish feed. Some RSCs have a plan to build up to five rice-processing complexes, involving the production of rice bran oil, parboiled rice, animal feed, and other rice products besides high quality rice and selected varieties of rice which is expected to further transform Myanmar's rice value chain.



Fig. 1. Rice surplus and deficit regions of Myanmar
Source: Prepared by author.

Distribution

Domestic distribution

Myanmar rice is distributed both domestically and internationally. The distribution of domestic market involves the trade flow of un-branded rice from surplus region to deficit region. It also includes packed and branded rice being sold in an increasing number of supermarkets. These supermarkets are largely local owned. Similar developments are being observed in big city. The sale of packed and branded rice has developed in the supermarkets as well as traditional rice retail shops.

The major rice trading and marketing hubs are Patheingyi and Yangon in delta region and Mandalay in the middle Myanmar. Rice which flows from various surplus regions to Yangon and Mandalay are then redistributed to the surrounding deficit regions. There are two sub-chains under domestic rice distribution.

First, the most traditional rice value chain where the farmers milled the bulk of their harvest for their own consumption through custom milling (using huller mills) with the excess sold to local small mills or collectors. This form is prevalent in both surplus and deficit regions, especially where far away from district and state/division capitals as well as where infrastructure is still poor. Here, the antiquated and small mills are used to supply to the local community and surrounding areas. This chain is still quite large in Myanmar rice supply chain for farmers' home consumption.

Second, the sub-chain involved in spatial arbitrage, by linking rural to urban and/or surplus to deficit areas. This is also a traditional rice value chain involving small and medium size mills and traders involved in both spatial and temporal arbitrage, as well as larger mills dealing with bigger volumes linking or operating in distribution hubs to channel rice from surplus to deficit areas. This chain is probably the largest in terms of number of farmers, millers, wholesalers, and retailers involved as well as volume of rice involved.

International distribution

The amount of rice export was 791,087 ton in 2011–2012 of which 17.2% was from border trade and 82.8% was from overseas trade. Myanmar exported 986,474 ton of rice in which 69.4% by border trade and 30.6% are shipped by overseas trade in 2013–2014.² The international rice supply chain includes two different sub-chains. These are; the international rice supply chain (white rice, broken rice, and parboiled rice) that is exported almost exclusively from Yangon. This supply chain has been developed since 2003, after liberalization of rice. The next sub-chain is the supply chain of rice via border trade of China, India, Bangladesh and Thailand involves in this sub-chain. It is a new but fast developing chain which supports the border trade via border posts to the neighboring countries. The most significant is that via Muse to Shweli (Ruili) in China, Myawaddy to Thailand, Tamu to India and Kyaukphyu to Bangladesh. This chain can become higher potential in the future.

Since 2008, RSCs has been involved in all dimensions of Myanmar rice supply by contract farming, operating large modern mills and participating in domestic and international trade of rice. They compete with local traders along the whole supply chain. Therefore, we need to know how effect the RSCs' participation in Myanmar rice supply chain. In this study, we describe the impact of RSCs' participation in Myanmar rice supply chain by making comparison between traditional rice supply chain and the supply chain which involve RSCs participation.

COMPARISON BETWEEN THE STRUCTURE OF TRADITIONAL SUPPLY CHAIN AND RSCS SUPPLY CHAIN OF RICE IN MYANMAR

Overview of comparison

For comparing the differences between RSCs supply chain and traditional supply chain, we utilize the data that

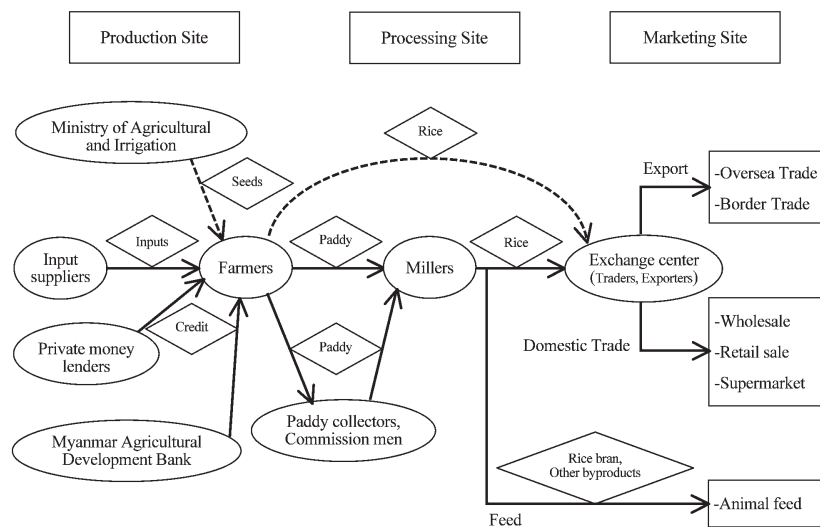


Fig. 2. The generalized traditional supply chain of rice
Source: Interview data and refereeing to Wong and Wai (2013).

² The data are collected from Ministry of Commerce and processed by author.

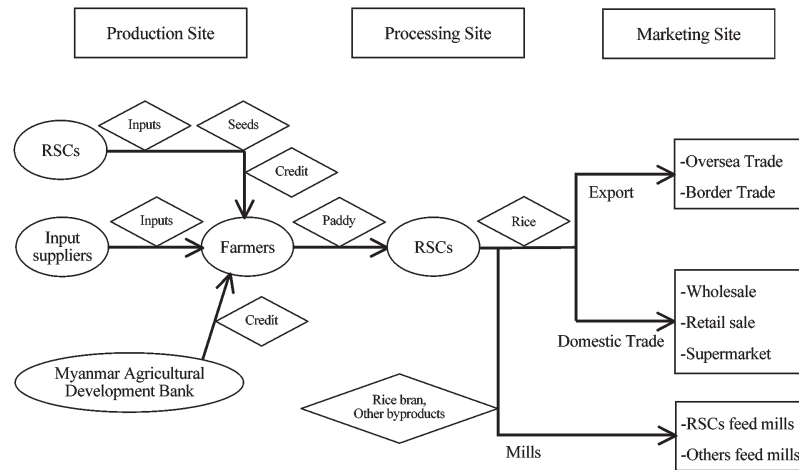


Fig. 3. The generalized RSCs supply chain of rice
 Source: Interview data and refereeing Wong and Wai (2013).

obtained by interviewing with 70 contract farmers, 70 non-contract farmers, 13 remaining RSCs, 20 old RSCs, some millers, MRF and Myanmar Rice Traders Association from a survey conducted between September 3, 2014 and October 28, 2014 in Ayeerwaddy, Yangon and Bago regions of Myanmar. Rice is grown throughout the country, but half of it is grown in those three Ayeerwaddy Delta regions in which approximately one-third of Myanmar's population resides. For that reason, those three regions were selected for the study. From the above data of survey, RSCs and traditional supply chain can be written generally as figure 2 and figure 3.

Figure 2 tells the generalized traditional supply chain of rice. In figure 2, we can define production site from the suppliers of production to farmers, processing site from farmers to millers and marketing site from millers to final consumers. In the production site of figure 2, a limited amount of pure seeds come from Ministry of Agriculture and Irrigation (MOAI) and the remainder are from own saved seeds, agro-chemical are bought from input suppliers and production credit obtain from Myanmar Agricultural Development Bank (MADB) and private lenders to farmers and farmers produce paddy. In the processing site, the paddy that was produced by traditional farmers goes to rice millers directly (few amount) or indirectly by paddy collectors and commission men. Millers transformed paddy to milled rice. In the marketing site, rice moves to final consumers in domestic and international markets (both overseas and border trade) via rice exchange centers where many traders and exporters are trading. Byproducts are directly gone to local animal livestock rearing as feed.

Figure 3 explains the generalized supply chain of rice in which RSCs participated. We can define the chain from RSCs and input suppliers to farmers as production site, farmers to RSCs' mills as processing site and RSCs to final consumers as marketing site in figure 3. In the production site, RSCs supplies certified seeds and most of agro-chemical, especially fertilizers to their contract farmers. Some of the agro-chemicals are obtained from suppliers and contract farmers produce paddy in this

site. In the processing site, farmers sell their produce to RSCs rice mills and transformed to rice in that mills. In the marketing site, RSCs sell their milled rice directly to the final consumers in the domestic and export market (both overseas and border trade). Byproducts go to RSCs feed mills or livestock feed production factories.

In this section, we compare the traditional supply chain and RSCs supply chain from the view point of three main sites as production site, processing site and marketing site according to those figures. The summary of comparison between the two supply chains is expressed in table 2.

Production site

Input supply

In traditional supply chain, the certified rice seeds are largely produced by MOAI. But it cannot support the sufficient amount of certified seeds for country rice production. Most farmers in Myanmar use their own seeds which was kept from the previous season or bought from neighbor farmers. Very few numbers of rice seed farms are developed recent year. Some farmers use pure quality seeds from those farms. Fertilizers and agro-chemical used in rice production are mostly bought from agro-inputs shops by cash or payment at the harvest time with high interest rate. Those are unsure in quality.

RSCs have tried to produce high-quality seed of the varieties that are high demand in the international market in their own seed farms or RSCs' key farmers, and provide especially for their contract farmers. Some RSCs have been involved in the importation and supply of better-quality fertilizers; they are provided to contract farmers by in kind payments with few or no interest. These are also distributed to the market at large. Some contract farmers buy some agro-chemical from local shop.

Farm power supply, infrastructure and agro-services

Farm animals are the main source of power in rice cultivation for both traditional and contract farmers. Most of machine used in rice production are farmers own

Table 2. Comparison between traditional supply chain and RSCs supply chain

| Site of chain | Characteristics | Traditional supply chain | RSCs supply chain |
|-----------------|--|--|--|
| Production site | Seeds | <ul style="list-style-type: none"> –Few farmers used certified seeds obtained from MOAL. –Most farmers used their farm saved seeds (own seeds). –Traditional framers grow various kinds of variety. | <ul style="list-style-type: none"> –All contract farmers use certified seeds obtained from some RSCs seed farms and RSCs' key contract farmers. –Contract farmers grow few varieties that have high market demand. |
| | Fertilizer and agro-chemical | <ul style="list-style-type: none"> –Farmers buy from suppliers' shop in cash or payment at the harvest time with high interest rate. | <ul style="list-style-type: none"> –Contract farmers buy from RSCs with payment in kind with few or no interest. –Contract farmers also buy some agro-inputs from suppliers' shop. |
| | Machinery service | <ul style="list-style-type: none"> –Farmers use own machine (private service are very limited). | <ul style="list-style-type: none"> –Contract farmers use both own machine and RSCs' mechanization service. |
| | Infrastructure | <ul style="list-style-type: none"> –Infrastructures are provided by government and still underdeveloped. | <ul style="list-style-type: none"> –Infrastructures are provided by government and some RSCs and still underdeveloped. |
| | Technical advice , extension service and research | <ul style="list-style-type: none"> –Traditional farmers get a support from government extension service and research activities. | <ul style="list-style-type: none"> –Contract farmers get a support from both government and RSCs extension service and research team. |
| | Credit | <ul style="list-style-type: none"> –Traditional farmers borrow credit from MADB with low interest rate and some credit from private money lender with high interest rate. | <ul style="list-style-type: none"> –Contract farmers receive credit from both MADB and RSCs with lower or no interest rate. |
| | Comparison | <ul style="list-style-type: none"> –Quality of seeds and agrochemical are uncertain and high risk for rural credit. | <ul style="list-style-type: none"> –More sure in the quality of seeds, agro-chemical and lesser risk for rural credit. |
| Remarks | Decrease the yield gap and increase farmers' income by contract farming (RSCs service). | | |
| Processing site | Delivery point | <ul style="list-style-type: none"> –Big market at city. –Directly sell to paddy collectors. | <ul style="list-style-type: none"> – RSCs buying center. |
| | Payment | <ul style="list-style-type: none"> –On the spot or within a few days or months. | <ul style="list-style-type: none"> –In-kind payment for debt or on the spot. |
| | Storage facilities | <ul style="list-style-type: none"> –Poor storage system. | <ul style="list-style-type: none"> –High capacity storage. |
| | Types of mill | <ul style="list-style-type: none"> –Mostly small scale local mill. | <ul style="list-style-type: none"> –Modern rice mill, renewed mill and integrated rice processing complex. |
| | Channel | <ul style="list-style-type: none"> –Mostly indirect channel. | <ul style="list-style-type: none"> –Direct channel. |
| | Comparison | <ul style="list-style-type: none"> –Poor quality rice. –Low productivity in milling. | <ul style="list-style-type: none"> –Better quality rice. –Higher productivity in milling. |
| Remarks | 224 mills (126 news modern mill + 98 renewed mills) owned by RSCs in 2011–2012. Milling losses were reduced by modern mill and the better quality rice from highly productive mill will be obtained. | | |
| Marketing site | Domestic market (wholesale & retail sale) | <ul style="list-style-type: none"> –Normal traders operate a large part of domestic market via rice wholesale and retail shops and small part in supermarket. | <ul style="list-style-type: none"> –RSCs are now operating a few parts in domestic wholesale and retail market and they can participate mostly in supermarket via high quality branded rice. |
| | Export (oversea & border) | <ul style="list-style-type: none"> –Local export companies can export unsure quality of rice. | <ul style="list-style-type: none"> –RSCs can export more sure quality of rice. |
| | Byproducts | <ul style="list-style-type: none"> –Supply as feed to small scale local animal livestock rearing. | <ul style="list-style-type: none"> –Go to RSCs animal feed mill or others feed mills for supplying feeds for large scale livestock business. |
| | Comparison | <ul style="list-style-type: none"> –Difficult to have better quality because normal traders are difficult to force farmers to cultivate the paddy of pure seeds with high market demand | <ul style="list-style-type: none"> –Easy to get better quality rice from their contract farmers by negotiating farmers for growing high demanded varieties. |
| | Remarks | RSCs' trading in domestic market is very few amounts. RSCs mostly tried to enter international trade. RSCs can reduce marketing cost by shorter supply chain. | |

Source: Data obtained from interviewing with 70 contract farmers, 70 non-contract farmers, some millers, 13 remaining RSCs, 20 old RSCs, MRF, Ministry of Commerce and Department of Agriculture (DOA) during our survey.

machine and very few numbers are hired from neighbor farmers in traditional supply chain. Agro-support services, especially in research, extension and infrastructure such as multi-purpose dams, irrigation, drainage, and farm roads are still provided by government (Shein and Myaint, 2013). It is insufficient for farmers.

In terms of farm machinery, the RSCs have offered contract mechanization services to their contract farmers for land preparation, as well as mechanized threshing and to a lesser extent combined harvesting. It is more sufficient than traditional farmers. Some RSCs have even constructed small infrastructure like standardized plot with efficient farm road in some contract farming area. RSCs have also supported their contract farmers by providing an extension services team and distributing appropriate and advanced rice-farming technologies. So, contract farmers get agro-services not only from government extension service but also from RSCs extension team.

Credit

Both traditional and contract farmers received some credits from MADB with very low interest rate. But it is insufficient for rice production. Therefore, traditional farmers informally borrow credits from local private money lenders with high interest rate. RSCs extend low-interest (or even zero-interest) credit to contract farmers.

Problems faced in production

Traditional farmers tried to manage for increasing the yields despite all the weaknesses – poor quality seeds, poor quality agro-chemical and equipment, poor infrastructure, lack of formal credit and informal credit with high interest rate and other agro-services like research and extension. Credit is increasingly private sector-led although high interest rates remain a problem for traditional farmers. RSCs have experienced with poor repayment rate of contract farmers as a big problem. Most of RSCs hope the support from government to solve the poor repayment problem. They would like to continue their activities in the whole supply chain if and only if that problem is reduced.

Although there are some problems in RSCs supply chain, it is sure that RSCs supply chain is superior for getting secure quality agro-inputs and credit to traditional supply chain from the perspective farmers.

Processing site

In traditional supply chain, farmers sell their produce directly to local paddy collector with lower price. Some traditional farmers sell to big market in the cities for getting higher price. But they have many risks about transportation and other costs. So, traditional farmers use indirect marketing channel via commission men and brokers for their products. Moreover, the antiquated and small mills which produce poor quality rice are used in that chain. As a result of large percentage of broken rice from outdated mills, a large part of outputs go to lower quality rice and animal feed market. So, the efficient small modern rice mills are required in order to have

better quality rice and higher productivity in milling.

RSCs establish temporary buying centers at the most convenient places for contract farmers and procure their harvested rice by guarantee price which is higher than the price given by normal traders. Contract farmers used direct marketing for their produce. The RSCs have improved rice processing by building modern rice mills and upgrading some traditional rice mills to produce high-quality rice. In addition, there is a small percentage of including broken rice and most of it goes to final consumers as a result of using modern machine. So, RSCs mills and processing plants are actively operated in rice processing. Moreover, some RSCs have a plan to build integrated rice processing plant for future transformation of Myanmar rice supply chain. In 2011–2012, 224 modern rice mills and six new parboiled rice mills are run by RSCs and tried to compete Myanmar' rice in the international market.

Therefore, the comparison tells that RSCs supply chain can produce higher quality rice form modern updated mill which is lesser loss and high productivity than traditional supply chain.

Marketing site

In traditional supply chain, normal traders provide the large proportion of rice for domestic market. But very few of them tried to sell the higher quality rice with brand in the whole sale, retail sale and supermarket. Normal traders turn to normal exporters and tried to export rice in both border and oversea trade. The problem is traditional farmers grow a wide range of rice varieties. It may become a problem of mixed varieties and poor quality rice in the market. This is because normal traders cannot force rice growing farmers to grow a few varieties which have high market demand and also cannot manage local millers to get high quality milled rice. This will enable them to meet consumer preferences in the international market also.

In contrast, RSCs can negotiate and suggest their contract farmers to grow a few varieties or even only one variety that they want to buy. So, RSCs are able to export high-quality rice and thereby increase rice exports and Myanmar's international market share. The export of rice is increasingly involved by RSCs which account for almost all of shipment of oversea trade in 2011–2012. They also participate in border trade of rice export actively in that period. But the RSCs' export decrease adversely and reached very few amount in 2013–2014. Although, RSCs' activities are not so active in domestic market, they participate mostly in the marketing of high quality rice with respective brand in the supermarket and some retail shops.

As a result of comparison, RSCs can export higher quality rice than normal traders in the international market despite RSCs' participation on domestic market are smaller in proportion.

According to all of the results of comparison between traditional supply chain and RSCs supply chain from the view point of production, processing and marketing site, RSCs participation is superior form the perceptive of

Myanmar rice industry.

Margin

To complete the picture of comparison between traditional supply chain and RSCs supply chain of rice, we consider the marketing margins from the farm to domestic sales and rice export (freight on board (FOB) Yangon) of each supply chain. In this case, we choose Emata, the type of rice which is cultivated in contract framing scheme and distributed in domestic and export market a lot.³ The price structure and margins along the two rice supply chains are summarized in table 3.⁴

The average margin from the farmer level to domestic traders' level (excluding transportation cost) is 6,868.1 kyats per basket for traditional supply chain and 6,486.6 kyats per basket for RSCs supply chain. The marketing margin from the farmer level to exporters' level (excluding cargo preparation, transportation, and documentation) is 7,103.6 kyats per basket in traditional supply chain and 7,004.6 kyats per basket in RSCs supply chain. It can be seen that the both marketing margins in RSCs supply chain are smaller than traditional supply chain.

The average price of harvested paddy is 3,828.2 kyats per basket for traditional farmers and 4,314.3 kyats per basket for contract farmers in the survey area. The domestic price of milled rice at the Yangon rice exchange center is 10,696.3 and that of RSCs' market is 10,799.9 kyats per baskets. The Emata 25% FOB Yangon averaged price⁵ is 10,931.8 kyats per basket in traditional supply chain and 11,318.9 kyats per basket in RSCs rice sup-

ply chain. All price levels in the RSCs supply chain are higher than traditional supply chain.

We can clearly see that the marketing margin is smaller and the price level given in all marketing stages is higher in RSCs supply chain than those in traditional supply chain. This may be because the length of RSCs supply chain is shorter than that of traditional supply chain. As the results of smaller marketing margin and higher prices in domestic and exporter level, RSCs can offer the higher farm gate price to their contract farmers.

CONCLUSION

In this study, we identified the comparison between the traditional rice supply chain and the RSCs supply chain by using descriptive analysis. All the data we used in this research are collected during our survey. The results of this study point out the following findings:

In the production site, contract farmers can obtain more secure quality production inputs and rural credit in time than that of traditional rice farmers. It can be reduced yield gap and increase farmers' income.

In the processing site, better quality rice can be produced by efficient modern rice mill. RSCs owned and run 126 modern mills and 98 renewed mills in 2011–2012. Milling losses were lower in modern mill than traditional local rice mill. The productivity is higher in RSCs' mills than in traditional mills.

In the marketing site, RSCs have more effort than normal traders in negotiating and forcing farmers to grow the specific variety of rice that have high demand

Table 3. Margins along the two supply chain for rice

| Marketing stage | Traditional chain | | RSCs chain | |
|---------------------------|-----------------------------|--------------------------------|-----------------------------|--------------------------------|
| | Price Obtain (kyats/basket) | Margin | Price Obtain (kyats/basket) | Margin |
| Farm gate price for paddy | 3,828.2 | – | 4,314.3 | – |
| Domestic price | 10,696.3 | 6,868.1 (=10,696.3–3,828.2) | 10,799.9 | 6,486.6 (=10,799.9–4,313.3) |
| Exporter price | 10,931.8 | 7,103.6 (=10,931.8–3,828.2) | 11,318.9 | 7,004.6 (=11,318.9–4,314.3) |

Source: Calculation base on the interview data obtained from 70 contract farmers, 70 non–contract farmers, 13 RSCs and Myanmar Rice Traders Association.

Note: The margin of domestic price means the difference between farm gate price and domestic price. The margin of export price means the difference between farm gate price and export price.

³ RSCs buy Emata type paddy from contract farmers and non–contract farmers. But, very few amounts of paddy are bought from non–contract framers.

⁴ The marketing margin for farmers' level to domestic price level is calculated by subtracting domestic price to farm gate price and that for domestic traders and exporter' level is calculated by exporters price minus farm gate price. Each price are calculated as follow: farm gate price we used in this analysis are the average weighted price of Emata paddy for 70 contract farmers and 70 non–contract farmers in survey area in 2014–2015 monsoon rice season. Domestic price and export price for traditional supply chain is the weighted average daily price in domestic and international market released by Myanmar Rice Traders Association in 2013–2014. Domestic price and export price for RSCs supply chain is the weighted average daily price of 13 RSCs in 2013–2014. All the data used in that calculation are collected during our survey. The export price is expressed by USD and we convert it to Myanmar kyat. In that time, we use 1USD = 948 Myanmar kyats as average yearly exchange rate in 2014–2015 (Central Bank of Myanmar, 2015). The period for data which we use in this study is different. Because the domestic and export price data in 2014–2015 is not available at the time of survey.

⁵ Emata 25% is the mostly exported Emata type which contain 25% of broken rice.

in international market. So it has high possibilities for marketing higher quality rice in RSCs chain. And there is also a high potential to get market share of Myanmar rice in the international market by RSCs supply chain.

Moreover, RSCs supply chain is shorter than the traditional supply chain. Consequently, marketing cost can be reduced in both side of farmers and RSCs by shorter supply chain. It can also reduce the marketing margin. Therefore, RSCs supply chain can give smaller marketing margin and larger price level in all marketing stages as a result of shorter chain.

All of the results of our study pointed that RSCs supply chain is superior to the traditional supply chain in all dimensions.

To be produce quality rice and to upgrade farm household economy, RSCs participation is essential and should be continue in Myanmar rice industry. It is needed for both farmers and RSCs in order to have both mutual benefits in contract farming mechanism. Trusts between farmers and RSCs need to build up for long-term in main rice producing area. Government should support to get trustworthiness between farmers and RSCs.

In this study, we used descriptive analysis to compare the structure of RSCs supply chain and traditional

supply chain. More detail empirical study is necessary to conduct for analyzing the clear understanding of RSCs' participation in production, processing and marketing sites.

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