

**International Conference in honor of the 60<sup>th</sup> Anniversary**

**24-25<sup>th</sup> May, 2007**

**Ulaanbaatar, Mongolia**

***Market performance of selected pulses in Myanmar***

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### **Abstract**

*This paper shows to investigate the performance and efficiency of marketing system of chick pea, green gram and pigeon pea in each selected townships. This study assessed the marketing channel, distributed marketing margins and spatial market price integration to evaluate the performance of pulses marketing in Myanmar. The result showed that producer received the largest net margin followed by the exporter, town wholesaler, wholesaler in Bayintnaung market and finally by the primary collector, pigeon pea marketing channel for Myittha contained primary collector, town wholesaler, Myingyan town wholesaler, Yangon and Mandalay wholesaler and exporter. MAPT also served as intermediate is for export. In this channel, the largest share of net margin kept by producers while the exporter had the share. However, wholesaler in Bayintnaung market, town wholesaler and primary collector reaped small amount of net margin. Among the all intermediateries, the exporters margin was highest for these selected pulses although the other margins were reasonable. The marketing inefficiency exists at the exporters level. It can be concluded that the lower marketing margin is the indicator of competitive and efficient market. The analysis of the two markets integration was to know the degree of co-movement of prices in spatially separated market. The assumption was that Mandalay current wholesale price depend upon the Yangon current wholesale price and taking one to five lags weekly wholesale price of both Yangon and Mandalay markets. The percentages of co-integrated can be seen 57% for chick pea, 65% for green gram and 85% for pigeon pea. It can be concluded that there exist the long-run co-integration for pigeon pea price correlation and moderately co-integration for both chick pea and green gram within the Yangon and Mandalay markets.*

*Keyword: Myanmar pulses market, market integration, marketing margin, marketing channel*

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## Introduction

Myanmar is an agri-based country and agricultural sector remains important to economy of the country. The agricultural sector will continue to be essential for food production with the growing population as well as for the country to occupy a large part of the export earnings. Therefore, growth in agricultural sector is necessary to increase food availability and sustain the economic development process continuously. The Ministry of Agriculture and Irrigation (MOAI) has laid down the three main objectives with a view to improve the agriculture sector, among these, the third objective emphasized on production of exportable pulses. To fulfill this objective, it is necessary not only to increase the production but also to improve the performance of pulse marketing system and marketing efficiency. In the area of pulses marketing, the Government has also become less involved and is encouraged to adopt the marketing oriented policy.

Major exportable varieties of pulses are, green gram, chick pea, pigeon pea, black gram, soybean, cow pea and kidney bean. At the time being, pulses are one of the most important crops for the export. Twenty percent of total cultivated area covered with pulses and contributed 64% of the total agricultural product export's income.

Growing pulses can render profit during the short time period. Pulses are cultivated as a whole country basis including lower and upper Myanmar where the soil is sandy and soft. But most of the cultivated area is concentrated in the rainy and cool season either as a main crop or as a mixed crop together with groundnut or sesame. In the rainy season, green gram, chick pea (mostly in cool season) and pigeon pea are widely sown in the central dry zone and it amounted to 37% of total pulse sown area and the rest of 63% is cultivated in the cool season. Among South and South East Asia countries, Myanmar stands leading country for export of pulses. Canada is leading the leading exporter of pulses among the world pulses exporting countries. Myanmar and France hold the third largest exporters after Australia. Major buyer of Myanmar export pulse is Indian accounted for nearly 75% of the total export. Therefore, domestic market price is greatly influenced by India market. Then the other export markets were Bangladesh, Pakistan, Indonesia, Sri Lanka, Singapore, Malaysia, Japan, some Middle East countries and E.U.

## Problem Statements

For almost a quarter of the century, the agricultural marketing system was controlled by the State under the centrally planned economy system. The centrally planned economy mainly focused on self-sufficiency so that it leads to low level of productivity. In

addition, Government procurement of major farm produce with fixed priced directed to a lack of price incentive to farmers. However, in 1998 market-oriented economic system was adopted so that Government's involvement was gradually reduced in the economy and the private sector played an active role in exportable of pulses.

If the price obtained by farmers were high, they had increased their production rapidly. Understanding the operation of the existing system of domestic pulses distribution and channels could aid in identifying possible constraints in the efficient movement of pulses from it production points to consumption points. Poor market knowledge and other structural imperfections have been caused inefficiently in markets. The role of information in prices, the dynamic process of information transmission between markets in price discovery, and its implication for market efficiency are not well understood.

Price analysis is an indirect approach for determining market efficiency. Price information which contains up to date knowledge is crucial for maximizing the returns to production and marketing investments. At planting time, a farmer's decision depends on expected on expected profit on the anticipated price that would prevail in the market at the time of sale and on the farmer's interpretation of this price. A trader in search of profitable arbitrage translates price signals in deciding what crops to buy, where to buy and when to sell. Therefore the accuracy, reliability and promptness of market information are crucial in attaining pricing efficiency. However, there is no details study on pulses marketing efficiency in Myanmar. This study will have to identify the importance of price and market efficiency.

### **Objective of this study**

The overall objective of this study is to gather information of domestic pulses markets in order to provide a basis for improving the performance of the pulses marketing system. The specific objectives are;

- to understand the operation of existing marketing channels, which consists of producer to exporter in some important pulses
- to determine the marketing margin along the marketing channels of those selected pulses
- to measure the communication of price information among the center markets by evaluating the degree of spatial market integration.

### **Marketing channel**

A general knowledge of the commonly used marketing channel is valuable to understand the marketing system, and the relation of markets and market agencies to

one another. Market performance is a function of the number of scale and role of market intermediaries who provide services involving the transfer of producer to end user. The marketing channel showed the flow of pulses from the production site (producer) to intermediaries and on to the exporters. To understand how the commodities move through the various channels, it is necessary to identify the role of various market places and marketing agents involved. By knowing the marketing channel one can estimate where is the deficit area or surplus area. Traders can realize the channel and they can choose the appropriate markets and analysis will make the different shares of specific intermediaries who participates at the marketing channels.

### **Marketing margin**

Marketing margins are differences between prices at different level in the marketing channel. It captures the proportion of the final selling price to each particular agent in the marketing channel. Thus, it provides linkages between prices at various levels in the distribution system. Margins that vary widely among participants refer inefficiency at that level. Response of marketing margins to price changes is also indicates the efficiency of the channel.

In This study, marketing margins were calculated by “concurrent method”. Prices at consecutive levels of the marketing channels were compared at the same point in time. Data included representative costs and returns from the main participants in transportation, processing and storage. Analysis estimates the costs of all inputs, subtracting these costs from returns then gives profits at each level of the system. Hence, a marketing margin was specified as follows.

$$M_t = P_t^l - P_t^{(l-1)}$$

Where,

$M_t$  = Marketing margin between level(L) and its preceding level (L-1)

$P_t^l$  = Price at market level (L),  $P_t^{(l-1)}$  = Price at market level (L-1)

### **Spatial market integration and empirical model**

Market integration is to study the degree of co-movement of prices in spatially separated markets. A high degree of market integration suggests that the markets are connected. Therefore, the co-movement of prices gives an indication of degree of market integration. Spatial market integration is an aspect of market performance by shifting a product from areas of abundance and low prices to areas of scarcity and high prices. Knowledge of the structure of market integration enables the policy makers to predict the price effect of a shock in one regional market on other regional market to

which it is connected. One simple way to study market integration is to consider correlation of price series at different markets and price correlation is the measure of co-movement. This is intuitively related to idea that integrated markets exhibit prices that move together. However, the traditional tests of market integration focused on correlation coefficients of spatial prices ignore the presence of other factors, such as general price inflation, seasonality, population growth, and procurements policy (Lele 1972 for India, Farruk 1970 for Bangladesh, Jones 1972 for Nigeria).

The other approach is to study the co-integration of price series. Co-integration analysis is only concerned with the existence of a long-run equilibrium between markets and cannot predict the pertaining to the price adjustment process overtime. Co-integration between two contemporaneous price series will indicate that the corresponding markets are spatially integrated when a long-run linear relation exist among different series. These series are said to be co-integrated (Engle and Granger 1987). The empirical model in this study was described as follow.

$$P_{i,t} = \sum_{k=1}^{k=m_i} \alpha_{i,k} P_{i,t-k} + \sum_{h=0}^{h=n_j} \beta_{i,h} P_{j,t-h} + X_{i,t} \gamma_i + \varepsilon_{i,t}$$

Where,

$P_{i,t}$  = Price of pulses in Mandalay market at time t,

$P_{j,t}$  = Price of pulse in Yangon Market at time t,

$X_{i,t}$  = Vector of exogenous variables as time trend,

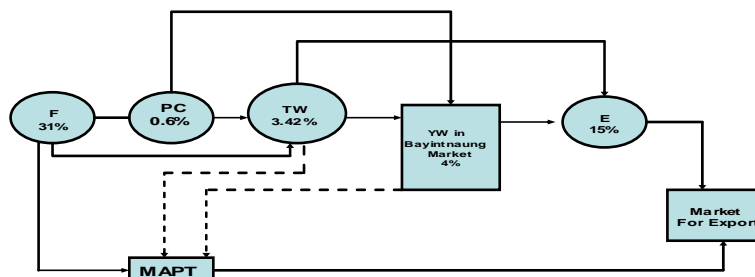
$\varepsilon_{i,t}$  = error term,  $\alpha_{i,k}$ ,  $\beta_{i,h}$  and  $\gamma_i$  = coefficients to be estimated and,  $m_i$  and  $n_j$  = number of lags of prices in markets i and j, respectively,

### Testing the autocorrelation

Autocorrelation values may be observed for many reasons. They are omitted explanatory variables, mis-specification of the mathematical from the model, interpolations in the statistical observation and mis-specification the true random term. The existence and the pattern of auto correlation may be gained the recession residual either against their own lagged value or against time. However, there are more accurate tests or the incidence of autocorrelation. The traditional applied test is the Durbin-Watson test. If the  $d=2$  or  $d\sim 2$ , there is no autocorrelation in the function. If  $d=0$  or  $0 < d < 2$ , there is some degree of positive autocorrelation. If  $d=4$  or  $2 < d < 4$ , there is some degree of negative autocorrelation in the function.

## Marketing Channel for Selected Pulses

Figure 1..G eneral commodity flow of Chick pea for Myaungmya



Where,

F= Farmers/ Producer

PC= Primary Collector (Agent from town wholesaler and from exporter)

TW=Town Wholesaler

YW=Wholesaler in Yangon

E= Exporter (Companies)

MAPT= Myanmar Agricultural Produce Trading

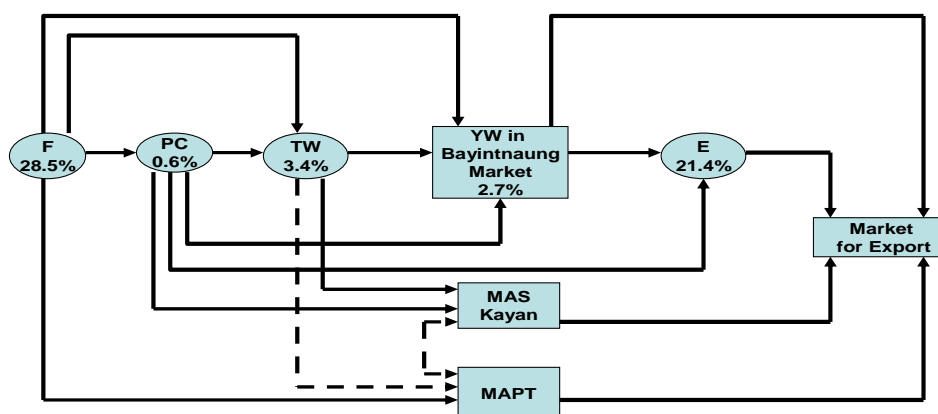
The channel of Chick pea in Myaungmya was shown in Figure 1. In this channel, sometimes, primary collector sent the broker to the production points as an agent on the basis of commission payment, which was about 2 to 3%. For most pulses, selling the crop before harvest is common. Some farmers had directly contact with town wholesaler. The primary collector would not buy the products if the crop were mixed with foreign matter (dust, sand etc.) because the town wholesaler wanted to purchase only good quality. Before going out to the village, agent made an agreement with town wholesaler to negotiate the price. After that agent bought the crop and delivered to the town wholesaler who paid the transport charges.

The town wholesaler received the daily price information from Bayinnaung wholesale market in Yangon and then they gave the buying price to their agent in the region. Bayinnaung market is a kind of wholesale market. Most town wholesalers sold their crop to this market. It supplies Yangon area and is a point to transit for export. The town wholesaler collected the crop from their agents as well as from farmers. The products were sorted, cleaned, packed and then transported to Yangon trader in Bayinnaung market during the time at the need of demand for the export companies who provided

the 1% of the total purchasing value as a commission basis.

Private exporter bought the crops from Bayintnaung wholesale market and also from the town wholesaler who had specific contact with exporter. The exporter used cleaning devices and hand-labor to sort out the export standard quality according to the requirement of the demand. Most of the export demand was arising from India, Singapore and China. MAPT (Myanmar Agriculture Produce Trading) serves as an exporter for the government and made an advanced payment of (2000 Ks/bsk) to farmers based on their area growing during the period of 2006. At the end of growing season, MAPT started to collect the delivery quota (1 to 2 bask/ac) from each farmer. Sometimes, the state enterprise was purchased Chick pea from the town wholesaler and Yangon wholesaler as the need of demand.

**Figure 2. General commodity flow of Green gram for Kayan**



Where,

F= Farmers/ producer

PC=Primary collector

TW=Town wholesaler

YW=Wholesaler in Yangon

E=Exporter (Companies)

MAPT= Myanmar Agriculture Produce Trading

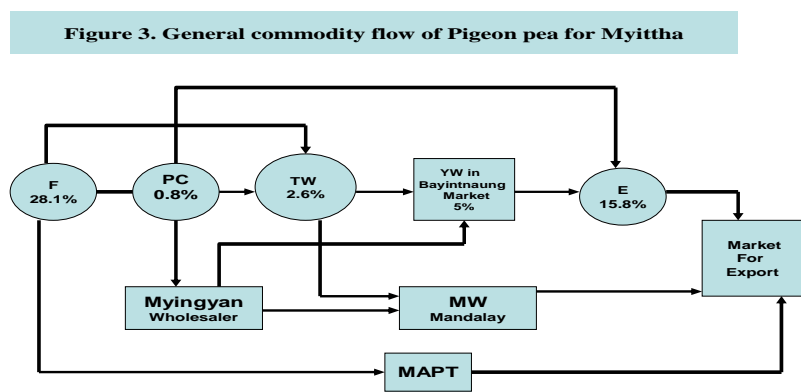
MAS= Myanmar Agriculture Service

Green gram marketing channel in Khayan was presented in Figure 2. In this area, some farmers had direct contact with primary collectors (PC), town wholesaler (TW) and also wholesaler in Yangon. This channel was more complex than other channels because Khayan was situated only 30 miles distance from Yangon so that it is easy to transport



by means of vehicles or by boats. Most of the primary collector collected the crops from the farms who were the agent of the town wholesalers, those of Yangon wholesaler and exporters. They got a fixed commission rate. Sometimes they received a margin when the price fluctuated. However, some farmers in Khayan went to Yangon wholesale market to obtain the higher price. Then the town wholesaler collected the crops and sent to the Yangon wholesale market. Some town wholesalers stored their crop for a period of 3 to 6 months to obtained higher price at a later season. They also had direct contact with exporters. The other steps in this channel were the same as in Chick pea..

In this study period, traders as well as export companies competitively purchased Green gram for the increase demand of oversea trade. As in Chick pea, the two government export instructions were MAPT and MAS (Myanmar Agriculture Service) under MOAI (Ministry of Agriculture and irrigation). They had different procurement forms. Advanced payment from MAPT was (2200 Ks/bsk) for Green gram farmers in Khayan during 2006. Toward the end of the season, they collected the crop from farmers on delivery quota of about two basket per acre. MAS in Khayan collected the crops by paying with the average market price of 5200 Ks/bsk during 2006. In some years, there exist relationship among the town wholesaler, MAS and MAPT. It was shown as dotted line. Town wholesalers delivered their crop to Yangon wholesaler market ( Bayintnaung market) by vehicles and boats. According to the study, nearly 90% of town wholesaler had no access to export market price information.



Where,

F= Farmers/ Producer

PC=Primary collector

TW=Town wholesaler

YW=Wholesaler in Yangon

MW= Wholesaler in Mandalay

E=Exporter (Companies)

MAPT= Myanmar Agriculture Produce Trading

In Myittha, the marketing channel for Pigeon pea was present in Figure 5. Most of the farmers carried their crop by exact or other means to the town wholesaler in Myittha. At that time of harvest, the primary collectors (agents from town wholesaler) started to buy at the farms. Some large farmers purchased Pigeon pea from other farmers during the harvest time to make a profit. These farmers stored the crop for round about 5 months, to get the good price in out of the season, However, small farmer cannot store longer because of their finical situation. During the harvest season of 2006, MAPT started their pulses quota buying from farmers.

The primary collector who worked on a commission basis transported their crop to Myittha town wholesaler, Myaingyan town wholesaler and also exporters. The average price offered by their town wholesaler or bosses was about 2803 Ks/bsk during the period of 2006. Myittha trader obtained the prevailing price information of Yangon market from Myittha traders association at 8 to 9 a.m every morning. They got this information from Bayintnaung market in Yangon. The Myittha and Myingyan town wholesaler transported their crop to both Yangon and Mandalay wholesale markets according to the need of the export demand. Sometimes, the town wholesalers stored their crop like other channels. The commodities from Mandalay market passed through Muse and exported to China. The other steps in this channel were the same as in the previous channels.

#### **4. Empirical Result and discussion**

##### **Average Marketing Margin for Selected Pulses**

Price of all selected pulses was collected during the main harvesting season in the production areas. Table1,showed the average marketing margin for Chick pea in Myaungmya. The average price received by farmers was about 5390 Ks/ac in 2006, which can be interpreted that 66% of the average export price was received by farmers. Actually, because the calculated unit production cost was 2566 Ks/bsk therefore farmers' net margin was about 2824 Ks/bsk which was 31% of the export price. Most of the farmers sold to primary collectors (village brokers/assemblers) or to small town wholesalers who operated as a commission agent and obtained the commission rate of

50Ks to 75 Ks/bsk in net. The price given by the Myaungmya town wholesaler was set up based on Bayintnaung wholesale market in Yangon which was about 200-500 Ks/bsk differences. Sometime, town wholesaler operated as independent traders or as a commission agent for the Yangon exporters. The average price received by town wholesaler was 5940 Ks/bsk in which the calculated gross margin and net margin were 6.7% and 3.4 respectively. However, the margin can be increased if the crops were stored and sold at higher price in the peak season according to the need of demand because most of the speculators bought the crop during the harvest season at the time of low price. The price obtained from the Yangon trader was about 6540 Ks/bsk calculated from the average price series of Bayintnaung market. So, it can be seen that their net margin was 4%. The average export price paid from India export market was 8167 Ks/bsk during that period. Then the calculated exporters gross margin and net margin were 20% and 15% respectively. According to this margin, the exporters get higher profit than the other intermediaries.

Marketing margin for Kayan (green gram) was presented in Table 2. The margin was calculated based on the export price and the associated costs were deducted. In this margin, farmers received average price of 4900 Ks/bsk which can be calculated as 62.4% of exporters' price. Most of the farmer sold their crop immediately after harvest. However, rich farmers can store about 6-8 months in expectation of higher price. After deduction of associated costs producer reaped the net return of 28.5% and town wholesalers kept that of 3.4%. The percent net margin for Yangon wholesalers was about 2.7% and that for exporters was about 21.4%. Based on the finding, it was clear that the exporters obtained the higher net margin after farmers.

Average marketing margin and percentage of export price for Pigeon pea in Myittha was described in Table 3. According to the price obtained by farmers, total gross margin was 61.6% of the exporters' price. The assemblers who collected the crops from the farmers took their profit as commission based. The average price of town wholesaler was 4100 Ks/bsk in which the net margin kept by town wholesaler was about 2.6%. Sometimes, the intermediaries who stored the crop received more profit if the price is fluctuated. The average price obtained by Yangon wholesalers was 4680 Ks/bsk in which the calculated net margin in percent based on export price was 5%. The net margin for exporter was 15.7% calculated from their average exporter price of 6035 Ks/bsk.

**Table 1. Average marketing margin for Chick pea in Myaungmya**

<i>Item</i>	<i>Kyats per basket</i>	<i>% of export price</i>
<i>Price received by farmer<sup>1</sup></i>	5390	66
<i>Unit production and marketing cost</i>	2566	35
<i>Farmers' net margin</i>	2824	31
<i>Town wholesaler price<sup>1</sup></i>	5940	72.7
<i>Producer price</i>	5390	66
<i>Town wholesalers' gross margin</i>	550	6.7
<i>Commission fees</i>	(50)	(0.6)
<i>Transportation cost</i>	(150)	(1.8)
<i>Handling and storage</i>	(70)	(0.9)
<i>Town wholesalers' net margin</i>	280	3.4
<i>Yangon wholesalers' price<sup>2</sup></i>	6540	80.1
<i>Town wholesaler price</i>	5940	72.7
<i>Yangon wholesalers' gross margin</i>	600	7.4
<i>Loading +Damage</i>	(30)	(0.4)
<i>Processing +Cleaning</i>	(33)	(0.4)
<i>Storage+ Fumigation</i>	(70)	(0.9)
<i>Packing materials</i>	(140)	(1.7)
<i>Yangon wholesalers' net margin</i>	327	4.0
<i>Exporter price<sup>2</sup></i>	8167	100.0
<i>Yangon wholesaler price</i>	6540	80.1
<i>Exporters' gross margin</i>	1627	19.9
<i>Port charge, stevedoring and loading</i>	(107)	(1.3)
<i>Packing, Handling and Processing</i>	(244)	(3.0)
<i>Commission fees</i>	(50)	(0.6)
<i>Exporters' net margin or return</i>	1226	15.0

1. Average chick pea price at the producers and wholesalers level.

2. Average monthly price collected from the Agri-business journals at 2006.

**Table 2. Average marketing margin for Green gram in Kayan**

<i>Item</i>	<i>Kyats per basket</i>	<i>% of export price</i>
<i>Price received by farmer<sup>1</sup></i>	4933	62.4
<i>Unit production and marketing cost</i>	2685	34
<i>Farmers' net margin</i>	2248	28.5
<i>Town wholesaler price<sup>1</sup></i>	5383	68.1
<i>Producer price</i>	4933	62.4
<i>Town wholesalers' gross margin</i>	450	5.7
<i>Transportation cost</i>	(64)	(0.8)
<i>Handling and storage</i>	(58)	(0.7)
<i>Cleaning</i>	(10)	(0.1)
<i>Commission for agent</i>	(50)	(0.6)
<i>Town wholesalers' net margin</i>	268	3.4
<i>Yangon wholesalers' price<sup>2</sup></i>	5860	74.2
<i>Town wholesaler price</i>	5383	68.1
<i>Yangon wholesalers' gross margin</i>	477	6.0
<i>Loading +Damage</i>	(27)	(0.3)
<i>Processing cost</i>	(33)	(0.4)
<i>Storage+ Fumigation</i>	(65)	(0.8)
<i>Packing materials</i>	(137)	(1.7)
<i>Yangon wholesalers' net margin</i>	215	2.7
<i>Exporter price<sup>2</sup></i>	7900	100.0
<i>Yangon wholesaler price</i>	5860	74.2
<i>Exporters' gross margin</i>	2040	25.8
<i>Port charge, stevedoring and loading</i>	(107)	(1.4)
<i>Packing, Handling and Processing</i>	(244)	(3.1)
<i>Exporters' net margin or return</i>	1689	21.4

1. Average green gram price at the producers and wholesalers level.

2. Average monthly price collected from the Agri-business journals at 2006.

**Table 3. Average marketing margin for Pigeon pea in Myittha**

<i>Item</i>	<i>Kyats per basket</i>	<i>% of export price</i>
<i>Price received by farmer<sup>1</sup></i>	3732	61.6
<i>Unit production and marketing cost</i>	2028	33.5
<i>Farmers' net margin</i>	1704	28.1
<i>Town wholesaler price<sup>1</sup></i>	4100	67.7
<i>Producer price</i>	3732	61.6
<i>Town wholesalers' gross margin</i>	368	6.1
<i>Transportation cost</i>	(120)	(2.0)
<i>Commission fees</i>	(50)	(0.8)
<i>Handling and storage</i>	(40)	(0.7)
<i>Town wholesalers' net margin</i>	158	2.6
<i>Yangon wholesalers' price<sup>2</sup></i>	4680	77.3
<i>Town wholesaler price</i>	4100	67.7
<i>Yangon wholesalers' gross margin</i>	580	9.6
<i>Loading +Damage</i>	(50)	(0.8)
<i>Processing cost + cleaning</i>	(20)	(0.3)
<i>Storage+ Fumigation</i>	(65)	(1.1)
<i>Packing materials</i>	(140)	(2.3)
<i>Yangon wholesalers' net margin</i>	305	5.0
<i>Exporter price<sup>2</sup></i>	6035	100.0
<i>Yangon wholesaler price</i>	4680	77.3
<i>Exporters' gross margin</i>	1355	22.4
<i>Port charge, stevedoring and loading</i>	(107)	(1.8)
<i>Packing, Handling and Processing</i>	(244)	(4.0)
<i>Commission fees</i>	(50)	(0.8)
<i>Exporters' net margin or return</i>	954	15.7

1. Average pigeon pea price at the producers and wholesalers level.

2. Average monthly price collected from the Agri-business journals at 2006.

### Spatial Market Integration in Selected Pulses

The assumption was that the current wholesale prices at Mandalay depend upon the current price at Yangon and taking one to five lags values of Yangon and Mandalay wholesale markets.

**Table 4. Determinants of market integration for Chick pea in Yangon and Mandalay wholesale prices**

<i>Variables for Chick pea</i>	<i>Coefficient</i>	<i>t-value</i>
<i>Exogenous variables (time), <math>X_{i,t}</math></i>	-10.031	-1.163
<i>Current weekly price in Yangon, <math>P_{Y,t}</math></i>	0.663	7.606***
<i>One lag price in Yangon, <math>P_{Y,t-1}</math></i>	-0.222	-1.559
<i>One lag price in Mandalay, <math>P_{M,t-1}</math></i>	0.467	4.312***
<i>Two lags price in Yangon, <math>P_{Y,t-2}</math></i>	-0.137	-0.929
<i>Two lags price in Mandalay, <math>P_{M,t-2}</math></i>	0.132	1.127
<i>Three lags price in Yangon, <math>P_{Y,t-3}</math></i>	0.037	0.248
<i>Three lags price in Mandalay, <math>P_{M,t-3}</math></i>	-0.074	-0.617
<i>Four lags price in Yangon, <math>P_{Y,t-4}</math></i>	-0.232	-1.495
<i>Four lags price in Mandalay, <math>P_{M,t-4}</math></i>	0.313	2.642***
<i>Five lags price in Yangon, <math>P_{Y,t-5}</math></i>	-0.130	-1.056
<i>Five lags price in Mandalay, <math>P_{M,t-5}</math></i>	0.148	1.279
<i>R<sup>2</sup></i>	0.87	-
<i>Durbin-Watson test</i>	d=1.995	-

The result of the relationship between Chick pea wholesaler prices in Mandalay and Yangon were presented in Table 4. It indicated that the coefficients of the current price in Yangon, one week lag price and one month lag price of Mandalay were significantly different at 1% level. However, the coefficients of the two lags wholesale price in Mandalay, three lags wholesale price in Yangon and five lags wholesale price in Mandalay were positively related to the current price in Mandalay but not significant. The coefficients of the exogenous variable, one lag price and two lags price, four lags price and five lags price in Yangon market, and three lag price in Mandalay were found to be negative and insignificant. According to this finding, the current price in Mandalay market and moderately co-integrated in long-run with both Yangon and Mandalay markets. The value of coefficient of determination ( $R^2$ ) was 0.87 in Chick pea. This means that regression of current wholesale price in Mandalay market on the other independent variables explained about 97% of the total variation in current price in

Mandalay. Then the Durbin-Watson value was  $d=1.995$  or  $d\sim 2$ , there is no autocorrelation in the function.

**Table 5. Determinants of market integration for Green gram in Yangon and Mandalay wholesale prices**

<i>Variables for Green gram</i>	<i>Coefficient</i>	<i>t-value</i>
<i>Exogenous variables (time), <math>X_{i,t}</math></i>	0.411	0.310
<i>Current weekly price in Yangon, <math>P_{Y,t}</math></i>	0.148	1.804*
<i>One lag price in Yangon, <math>P_{Y,t-1}</math></i>	0.120	1.430
<i>One lag price in Mandalay, <math>P_{M,t-1}</math></i>	0.668	6.010***
<i>Two lags price in Yangon, <math>P_{Y,t-2}</math></i>	-0.118	-1.412
<i>Two lags price in Mandalay, <math>P_{M,t-2}</math></i>	0.031	0.237
<i>Three lags price in Yangon, <math>P_{Y,t-3}</math></i>	0.167	2.000**
<i>Three lags price in Mandalay, <math>P_{M,t-3}</math></i>	-0.091	-0.697
<i>Four lags price in Yangon, <math>P_{Y,t-4}</math></i>	0.167	-1.949**
<i>Four lags price in Mandalay, <math>P_{M,t-4}</math></i>	0.140	0.081
<i>Five lags price in Yangon, <math>P_{Y,t-5}</math></i>	-0.120	-1.641*
<i>Five lags price in Mandalay, <math>P_{M,t-5}</math></i>	-0.233	-2.086**
$R^2$	0.86	-
<i>Durbin-Watson test</i>	$d=1.970$	-

For Green gram wholesale prices the relationship of Yangon and Mandalay markets was shown in Table 5. Among the results, the coefficient of the one lag price of Mandalay was highly co-integrated with the current wholesale price of Mandalay and significantly different at 1% level. The coefficients of the three lags price and four lags price in Yangon market were significant at 5% level. Moreover, the current price in Yangon is co-integrated with the current price in Mandalay and significant at 1% level. It was found that the two lags and five lags prices in Yangon market and also three lags and five lags prices in Mandalay market were segmented with the current wholesale price in Mandalay market. The coefficients of one lag price in Yangon and two lag and four lag prices in Mandalay markets were positively correlated with the current price in Mandalay. It can be concluded that the current wholesale price in Mandalay market was strongly co-integrated in short-run and moderately co-integrated in the long run with both Yangon and Mandalay markets. The value  $R^2 = 0.86$ , this means that 86% of total variation in current wholesale price of Mandalay market can be explained by the independent variables. The Durbin-Watson value was  $d=1.97$  or  $d\sim 2$  and there was no



autocorrelation exists in the function.

The co-integration coefficients of Pigeon pea wholesale price at Yangon and Mandalay markets were reported in Table 6. In this result, the coefficients were significant at 1% level for the current price of Yangon and one lag price of Mandalay wholesale markets. Then, the exogenous coefficients of the one lag price, two lags price, three lags price, four lags price and five lags price at Yangon market and four lags price at Mandalay were positively correlated with the current wholesale price in Mandalay were positively correlated with the current wholesale price in Mandalay. However, the coefficients of the two lags, three lags and five lags prices at Mandalay were negative. According to the result, the current wholesale price of pigeon pea in Mandalay was long-run co-integrated with wholesale price in Yangon but short run co-integrated with Mandalay market. For pigeon pea,  $R^2$  value was 0.94 and the Durbin-Waston value belong to  $d=2$ . This showed that the regression of current wholesale price in Mandalay market on the other independent variables explained about 94% of the total variation in current price in Mandalay and there is also no autocorrelation in the function.

In general, the result pointed out that there exist were strongly short-run co-integrated and moderately long-run co-integrated between Yangon and Mandalay markets for the selected pulses.

**Table 6. Determinants of market integration for Pigeon pea in Yangon and Mandalay wholesale prices**

<i>Variables for Pigeon pea</i>	<i>Coefficient</i>	<i>t-value</i>
<i>Exogenous variables (time), <math>X_{i,t}</math></i>	26.103	1.745*
<i>Current weekly price in Yangon, <math>P_{Y,t}</math></i>	0.262	4.035***
<i>One lag price in Yangon, <math>P_{Y,t-1}</math></i>	0.064	0.788
<i>One lag price in Mandalay, <math>P_{M,t-1}</math></i>	0.537	4.722***
<i>Two lags price in Yangon, <math>P_{Y,t-2}</math></i>	0.031	0.385
<i>Two lags price in Mandalay, <math>P_{M,t-2}</math></i>	-0.151	-1.184
<i>Three lags price in Yangon, <math>P_{Y,t-3}</math></i>	0.049	0.609
<i>Three lags price in Mandalay, <math>P_{M,t-3}</math></i>	-0.015	-0.119
<i>Four lags price in Yangon, <math>P_{Y,t-4}</math></i>	0.051	0.631
<i>Four lags price in Mandalay, <math>P_{M,t-4}</math></i>	0.066	0.515
<i>Five lags price in Yangon, <math>P_{Y,t-5}</math></i>	0.062	0.834
<i>Five lags price in Mandalay, <math>P_{M,t-5}</math></i>	-0.053	-0.52
$R^2$	0.94	-
<i>Durbin-Watson test</i>	$d=2$	-

## **Summary, Conclusion**

The main purpose of this study was to improve the performance of pulses marketing and make suggestion for improving the welfare of farmers. Three inter-related aspects of market performance were investigated, namely channel for selected pulses, distributive marketing margins and the degree of spatial market price integration in this study, the major exportable pulses of Chick pea, Green gram and Pigeon pea were analyzed..

Marketing channel was observed based on a series of stages through which the pulses flow from each selected regions. The channel of Chick pea in Myaungmya township included five intermediaries such as village broker, primary collector, town wholesaler, Yangon wholesaler in Bayintnaung market and exporter. The market margin obtained through channels were reasonable in which producer received the largest net share of the exports' price (31%) followed by the exporter (15%) wholesaler in Bayintnaung market (4%), town wholesaler (3.42%) and finally the primary collector (0.61%). In this channel MAPT also served as an intermediately but the margin could not be measured due to lack of data available. Chick pea market in Myaungmya was operated by many small traders so that it may help to increase the market efficiency.

Marketing channel for Green gram in Kayan included four intermediaries such as primary collector at village level, town wholesaler, wholesaler in Bayintnaung market and exporter. Both MAS and MAPT took as intermediaries for state own enterprise for the exporting of pulses. It was evident from the interview that not only farmers but also traders directly contact with Yangon wholesale trader to sell their products. The result showed that producer received the largest net margin (28.5%) followed by the exporter (21.4%) town wholesaler (3.4%) wholesaler in Bayintnaung (2.7%) and finally by the primary collector (0.6%). As mentioned in the Chick pea market, many small traders and some large traders were operating in Green gram market.

Pigeon pea marketing channel for Myittha contained many intermediaries and two export market which directed to China and India. The intermediaries were primary collector, town wholesaler, Myingyan wholesaler, Yangon and Mandalay wholesaler and exporter. MAPT also served as intermediaries for export. In this channel, the largest share of net margin (28.1%) was kept by producers while the exporter had the share of (15.7%). However, wholesaler in Bayinnaung market, town wholesaler and primary collector reaped small amount of net margin. In this channel Mandalay wholesaler exported their pulses to China market passed through the Muse.

The average total gross margins for all of the market participants excluding producers

were found to be 34% for chick pea, 37.5% for green gram and 38.1% for pigeon pea. Among all intermediaries, the exporters' margin was highest for these selected pulses although the other margins were reasonable. The marketing inefficiency exists at the exporters' level. It can be concluded that the lower marketing margin is the indicator of competitive and efficient market.

The analysis of the two markets integration was to know the degree of co-movement of prices in spatially separated market. Two center markets; Yangon and Mandalay were considered in this regard. The assumption was that Mandalay current wholesale price depend upon the Yangon current wholesale price and taking from one to five lags prices of both Yangon and Mandalay wholesale markets. The percentage of co-integration coefficients showed in Table 7. The proportion of co-integrated links occurred 57% for chick pea, 65% green gram and 85% for pigeon pea. Among these three pulses, pigeon pea had the highest co-integration percentage than the other pulses however chick pea and green gram also had more than 50% co-integration for pigeon pea price correlation and moderately co-integration for both chick pea and green gram within the Yangon and Mandalay wholesale markets.

**Table 7. Co-integration percentages in Yangon and Mandalay markets**

<i>Type of analysis</i>	<i>Measure</i>	<i>Green gram</i>	<i>Chick pea</i>	<i>Pigeon pea</i>
<i>Co-integration analysis</i>	% of co-integration market pairs	65	57	85
	% of segmented market pairs	37	46	19

### **Policy Implication**

Marketing cost could be significantly reduced if better roads and market facilities were built. Improvement in methods of collecting and disseminating of market information system could result in more transparent prices to all marketing agents. Knowledge of the structure of market integration enables policy makers to forecast the price effect of a shock in one regional market on the other regional markets to which it is connected. The spatial market reforms to improve long term relationship. The government intervention is necessary;

1. Removing policy restrictions on trade by making fully liberalization of agricultural commodities.
2. Strength the role of government in providing market information services and market in fracture.
3. Supporting research and development to achieve the export quality pulses.
4. Development of the legal and financial in fracture for all market participants need to promote efficient competitive markets.

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