

Fertilizer supply chain and market structure: A case study in Tatkon Township, Nay Pyi Taw

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Abstract

This study was attempted to observe marketing activities of fertilizer market structure such as marketing channel, marketing cost and marketing margin in Tatkon Township. Totally 33 market intermediaries were interviewed in which 6 local wholesalers, 5 village retailers, 2 company agents and 20 farmers in 3 sample villages were included. Based on the research findings, it was found that imported registered urea fertilizer from China was the main fertilizer supply in Tatkon Township, followed by registered and unregistered compound fertilizers. Among many fertilizers, urea fertilizer was largely utilized by farmers. Supply of domestically produced urea fertilizer did not influence well in the fertilizer market. Several registered compound fertilizers such as Awba, Armo, Golden Cock and Mahkota were the most popular brands. The fertilizer supply chain was well composed of four main market intermediaries; local wholesalers, village retailers, company agents and farmers. In fertilizer market structure, Mandalay was the major fertilizers supply to Tatkon Township. There were three main fertilizer marketing channels in Tatkon Township. The marketing channel (1) was the major channel which sold the largest amount of fertilizers in the study area. In this channel, marketing links were existed among all market participants and local wholesalers were the main players.

Key words: Fertilizer, supply chain and market structure

Introduction

Increased productivity and profitability of farming is an important pathway to reduce poverty in rural area of Myanmar. After land, water and human resources, fertilizer is one of the agricultural inputs to increase the yield undoubtedly when used in proper time and proper nutrient balance. It is one of the agricultural technologies that have huge potential for raising the productivity of poor smallholders, enabling them to increase income, accumulate assets, and set themselves economically on a pathway out of poverty.

Chemical fertilizers were first introduced to Myanmar in 1956, but widespread use did not occur until 1978 when the government encouraged fertilizer use by subsidizing fertilizer prices. Therefore, fertilizer prices were heavily subsidized by the government before 1990s. Since then, the government had removed the subsidies on all. Subsequently, the market prices have risen to international level and the government has also allowed the private sector to import and distribute fertilizers. Despite the increases in prices, few private companies were will-

ing to import and distribute fertilizer because of uncertain domestic demand and unclear importing procedures. Therefore, the fertilizer price was totally free market price based on the international fertilizer price, transportation cost and exchange rate between currency of Myanmar and trade partners after 2003 (Hnin Yu Lwin et al. 2013).

In 2012 and 2013 years 208,615 and 156,586 MT of urea fertilizer were produced (MOAI, 2014). In 2012, fertilizer imports in Myanmar were 35,858 tons in nitrogen fertilizer, 21,750 tons in phosphate fertilizer, and 16,547 tons in potassium fertilizer (FAO, online database). The distribution of fertilizer by MOAI was 13,612 MT in 2006-07, and it was decreased to 5,707 metric ton in 2010-11 (CSO, 2011).

Background of the Study

In Nay Pyi Taw Council area, Tatkon Township is situated between latitude 20°20' north and east longitudes 96° 30'. The area of Tatkon Township was 180,237 hectares and the cultivated areas were 43,780 hectares, 24.3% of total areas. The area of paddy land (Le) was about 21,145 hectares and

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dry land (Ya) was about 22,627 hectares (DoA, 2014). Paddy and various kinds of vegetables were grown by most of the farmers in Tatkon Township. The study area is one of the largest agricultural production areas and income from agricultural sector mainly influenced the households' income. In order to improve agricultural sector, well-functioning fertilizer market is are needed to carry out in Tatkon Township. This Township is one of the most fertilizer marketing Townships in Mandalay region. Thus, investigating fertilizer supply chain and market structure to develop well fertilizer marketing system is crucial in this township. There are two main objectives in this study.

- To identify marketing activities of market participants along the fertilizer supply chain including end users (farmers) in Tatkon Township, and
- To examine fertilizer market structure including marketing channel, marketing cost and marketing margin in Tatkon Township.

Research Methodology

Primary data were collected in Tatkon Township from the last week of January to the first week of February 2015. A total of 33 market intermediaries were personally interviewed. The primary sources included interviews with marketing intermediaries such as local wholesalers, village retailers, company agents and farmers. Types of fertilizers in the market (registered and unregistered products), fertilizer distribution system, transport facilities, types of buying fertilizers, constraints associated with marketing of fertilizer, marketing channel, cost and margin, and profit were investigated by using structured questionnaires.

Marketing Channel Analysis and Total Gross Marketing Margin (TGMM)

$$\text{TGMM} = (\text{Farm Gate Price} - \text{Wholesale Price}) / \text{Farm Gate Price} * 100$$

$$\text{TGMM} = (\text{Farm Gate Price} - \text{Retail Price}) / \text{Farm Gate Price} * 100$$

$$\text{Margin of wholesaler} = (\text{Wholesale Selling Price} - \text{Wholesale Buying Price}) / \text{Farm Gate Price} * 100$$

$$\text{Margin of retailer} = (\text{Retail Selling Price} - \text{Retail Buying Price}) / \text{Farm Gate Price} * 100$$

Results and Discussion

In this study, attempts were endeavored to determine the marketing functions and channels of fertilizer market in the study area.

Marketing Functions of Local Wholesalers

The local wholesalers were the main intermediaries and usually operated large - scale business activities in the study area. Marketing activities of local wholesalers developed a market or demand for fertilizer, and then sold to the potential buyers such as village retailers, retailers in Tatkon Township and farmers. The following Table 1 showed annual sale of registered urea fertilizers in terms of trading brands by local wholesalers in Tatkon Township. All local wholesalers sold registered urea fertilizers imported from China and domestically produced urea. In the urea fertilizer market, there were four trading brands sold by local wholesalers Shwe Taung (97%), Shwe Nagar-1 (2%), Shwe Nagar-2 (0.8%) and domestically produced urea (0.2%). Therefore, the most popular brand Shwe Taung urea fertilizer occupied the largest amounts of total annual sale 1,766.04 MT.

Table 1. Annual sale of registered urea fertilizers by local wholesalers in Tatkon Township

Local wholesalers	Registered urea fertilizers(MT)				Total (MT)
	Shwe Taung	Shwe Nagar-1	Shwe Nagar-2	Domestic urea	
LW ₁	1,000 (99)	7 (0.7)	-	3 (0.3)	1,010 (100)
LW ₂	500 (97)	-	13 (3)	-	513 (100)
LW ₃	135 (85)	24 (15)	-	-	159 (100)
LW ₄	38 (100)	-	-	-	38 (100)
LW ₅	25 (96)	-	1 (3.8)	0.04 (0.2)	26.04 (100)
LW ₆	20 (100)	-	-	-	20 (100)
Total	1,718 (97)	31 (2)	14 (0.8)	3.04 (0.2)	1,766.04 (100)

Note: Figures in the parentheses represent percentage.

The marketing of registered compound fertilizers by the sample local wholesalers in Tatkon Township was investigated as shown in Table 2. The local wholesaler (LW₁) was a dealer of Awba products therefore mainly sold products of Awba (65.7% of total annual sale). And local wholesaler (LW₃) was a dealer of products of Golden Cock (53%) and Zar Ma Ni (31%). The top sales of local wholesaler (LW₂) were products of Armo, Golden Key and Golden Lion which were 29%, 20% and 15% of total annual sale respectively. Local wholesalers (LW₄ and LW₅) mostly sold Awba and Armo

products which were almost one third of total sales. Products from Awba were again occupied a big share of 62% of total annual sale by the smallest local wholesaler (LW₆).

In the case of selling of unregistered compound fertilizers, there were only two trading brands (local name), Butterfly and Lu Yine Khaung compound fertilizers. All local wholesalers except local wholesaler (LW₃) sold unregistered compound fertilizers. According to the survey data, Butterfly was the top sale (51%) followed by Lu Yine Khaung (49%) of total sale of unregistered compound fertilizers (Table 3).

Table 2. Annual sale of registered compound fertilizers by local wholesalers in Tatkon Township

Local wholesalers	Annual sale of registered compound fertilizers (MT)										
	Awba	Armo	Golden Cock	Pender	Kie Mie Yar (MC)	Golden Key	Golden Lion	Zar Ma Ni	Mahkota	Other brands	Total (MT)
LW ₁	285 (65.7)	50 (12)	-	20 (5)	50 (12)	12 (2)	-	-	1.5 (0.3)	15 (4)	433.5 (100)
LW ₂	15 (9)	50 (29)	-	15 (9)	20 (12)	35 (20)	25 (15)	-	-	10 (6)	170 (100)
LW ₃	-	5 (2)	125 (53)	25 (11)	-	8 (3)	-	75 (31)	-	-	238 (100)
LW ₄	14 (27)	10 (20)	-	8 (16)	5 (10)	5 (10)	2 (5)	-	6 (12)	-	50 (100)
LW ₅	10 (29)	10 (29)	-	1 (3)	3 (9)	10 (29)	-	-	0.5 (1)	-	34.5 (100)
LW ₆	4 (62)	1 (15)	-	-	2 (23)	-	-	-	-	-	7 (100)
Total	328 (35)	126 (14)	125 (13)	69 (7)	80 (9)	70 (7)	27 (3)	75 (8)	8 (1)	25 (3)	933 (100)

Note: Figures in the parentheses represent percentage.

Table 3. Annual sale of unregistered compound fertilizers by local wholesalers in Tatkon Township

Local wholesalers	Annual sale of unregistered compound fertilizers (MT)		Total (MT)
	Butterfly	Lu YineKhaung	
LW ₁	63(50)	63(50)	126(100)
LW ₂	25(50)	25(50)	50(100)
LW ₃	-	-	-
LW ₄	25(50)	25(50)	50(100)
LW ₅	3(50)	3(50)	6(100)
LW ₆	3(100)	-	3(100)
Total	119(51)	116(49)	235(100)

Note: Figures in the parentheses represent percentage.

Marketing Functions of Village Retailers

Table 4 presented annual sale of registered urea fertilizers in terms of trading brands by village retailers in Tatkon Township. Only the largest village retailers (VR₁ and VR₂) sold registered urea fertilizers (95 and 30 MT) imported from China, locally named, Shwe Taung. The rest of village retailers did not sell because farmers in those villages purchased mainly from the local wholesalers in Tatkon Township.

The marketing of registered compound fertilizers by the sample retailers in selected villages at Tatkon Township was investigated as shown in Table 5. The largest village retailer (VR₁) mainly sold products of Golden Cock which occupied 69% of total annual sale. The total annual sale 86% was products of Mahkota which was the majority commodity for the second largest village retailers (VR₂). Only the products from Golden Cock and Armo were the majority sale by village retailer (VR₃). Village retailer (VR₄) was a dealer of products of Golden Cock. Furthermore, the smallest village retailer (VR₅) sold Armo because of a dealer of Armo product. Unregistered compound fertilizer was not much deal in the marketing. Only Lu Yine Khaung unregistered compound fertilizer was sold by village retailer (VR₂).

Marketing Activities of Market Participants

The market participants purchased not only China urea but also domestically produced urea fertilizers from Mandalay market by cash down payment transaction. And they also used cash down payment transaction in selling urea fertilizer. In case of imported compound fertilizers market, the registered and unregistered compound fertilizers were available in the local market. About 66% of local wholesalers purchased fertilizers by cash down payment transaction, 17% of them utilized both cash down and credit system and the rest 17% purchased only by credit system. When they purchased by credit system, an interest rate of 3% per month has to be paid. About 50% of local wholesalers sold fertilizer by cash down payment transaction and the rest 50% sold by credit system. Credit-based sales applied an interest rate of 5 percent per month. In case of compound fertilizers market for village retailers, 60% of them used to purchase by credit system. When they purchased by credit system, they had to pay an interest rate of 3% per month. All village retailers utilized credit system to sell fertilizer with an interest rate of 5% per month. They totally used truck in mode of transport in the study area (Table 6).

Table 4. Annual sale of registered urea fertilizers by retailers in selected villages

Village retailers	Annual sale of registered urea fertilizer (MT)	Total (MT)
VR ₁	95(100)	95(100)
VR ₂	30(100)	30(100)
Total	125(100)	125(100)

Note: Figures in the parentheses represent percentage.

Table 5. Annual sale of registered and unregistered compound fertilizers by retailers in the selected villages

Village retailers	Annual sale of compound fertilizers (MT)							
	Registered					Unregistered		Total (MT)
	Golden Cock	Mahkota	Armo	Golden Lion	Awba	Lu Yine Khaung		
VR ₁	25(69)	5(14)	0.1(0.3)	5(14)	1(2.7)	-	36.1(100)	
VR ₂	2(11)	15(86)	-	0.1(1)	0.2(1)	0.1(1)	17.4(100)	
VR ₃	4(50)	-	4(50)	-	-	-	8(100)	
VR ₄	3(100)	-	-	-	-	-	3(100)	
VR ₅	-	-	3(100)	-	-	-	3(100)	
Total	34(50.3)	20(29.6)	7.1(10)	5.1(8)	1.2(2)	0.1(0.1)	67.5(100)	

Note: Figures in the parentheses represent percentage.

Table 6. Marketing activities of the market intermediaries for fertilizers market in Tatkon Township

Marketing activities	Urea fertilizers		Compound fertilizers	
	% of local wholesalers	% of village retailers	% of local wholesalers	% of village retailers
<u>Type of transaction</u>				
Purchasing				
-Cash down payment	100	100	66	40
-Cash down and credit	-	-	17	-
-Credit system	-	-	17	60
Selling				
-Cash down payment	100	100	50	-
-Credit system	-	-	50	100
<u>Mode of transport</u>				
-By truck	100	100	100	100
<u>Type of storage</u>				
-At home	-	50	17	20
N	6	2	6	5

Types of Transactions in Purchasing Fertilizers by Farmers

Two types of transactions occurred in purchasing fertilizers by farmers in the study area. In the case of urea fertilizer, 50% of farmers bought in cash down transaction type and the rest 50% purchased by credit system transaction. About 40% of farmers bought compound fertilizers in cash down system and the rest 60% of them used credit system (Figure 1). Credit-based system transaction had an interest rate of 5 % per month. Even though the price of fertilizer in credit system was higher than cash down system, most farmers chose buying fertilizers with credit system probably due to lack of capital for fertilizer demand.

General Constraints of the Market Intermediaries

In this study, some constraints were faced by the market participants. About 83% of local wholesalers and 60% of village retailers faced difficulty in fertilizer marketing because farmers delayed to pay the debt to the market intermediaries when their production output was low. In addition, 67% of local wholesalers met high price fluctuation particularly in urea fertilizer which was depending upon Myanmar and China currency exchange rate. About 50% of wholesalers and 40% of retailers met problems in domestically produced urea because of fertilizer granule inconsistency, dissolved and poor packaging. Problem in soil condition due to fertilizer utilization was faced by 30% of the sample farmers (Table 7).

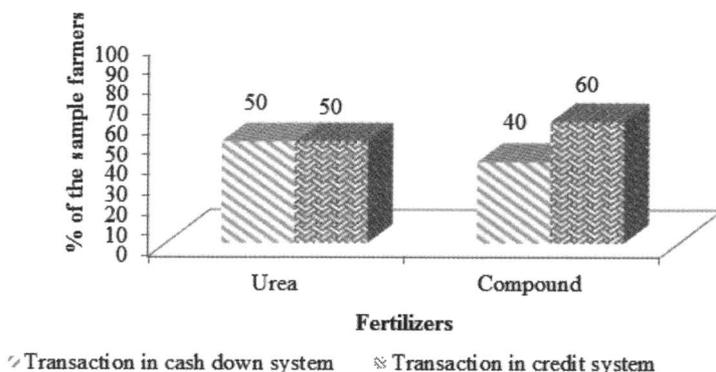


Figure 1. Types of transaction in buying fertilizers by the sample farmers

Table 7. General constraints of market intermediaries in fertilizer marketing

Item	% of local wholesalers (N=6)	% of village retailers (N=5)	% of farmers (N=20)
Delayed payment from farmers	83	60	-
High price fluctuation	67	-	-
Low quality of domestically produced urea	50	40	-
High tax payment	33	-	-
Poor soil condition	-	-	30
High price in purchasing	17	-	25
Not recognized (N,P,K) content	-	-	25
Fertilizer shortage	17	20	-
High transportation cost	17	-	-
No adequate knowledge to apply fertilizer	-	-	10

Marketing Channels of Fertilizer in Tatkon Township

Marketing channels are set of interdependent organizations involved in the process of making a product or service available for use (Kolter, 2003). Fertilizer marketing channels were observed for understanding the commodity flow from other markets or company agents to market intermediaries and to final user farmers. Figure 2 showed the fertilizer marketing channels in the study area. There were three main marketing channels of fertilizer in Tatkon Township. The fertilizer marketing channel (1) was the major channel and marketing the largest

amount of fertilizer which flowed from other markets (Mandalay, Yangon and Myingyan) and company agents to local wholesalers and resold to final user farmers. In addition, local wholesalers sold to village retailers and then to end user farmers. Another way, retailers in Tatkon township also purchased from local wholesalers and then traded to farmers. In this channel local wholesalers were the main players and had market power. In fertilizer marketing channel (2), fertilizer flowed from other markets and company agents directly to village retailers and then sold to the farmers. Compared to channel (1) and (2), the marketing channel (3) was

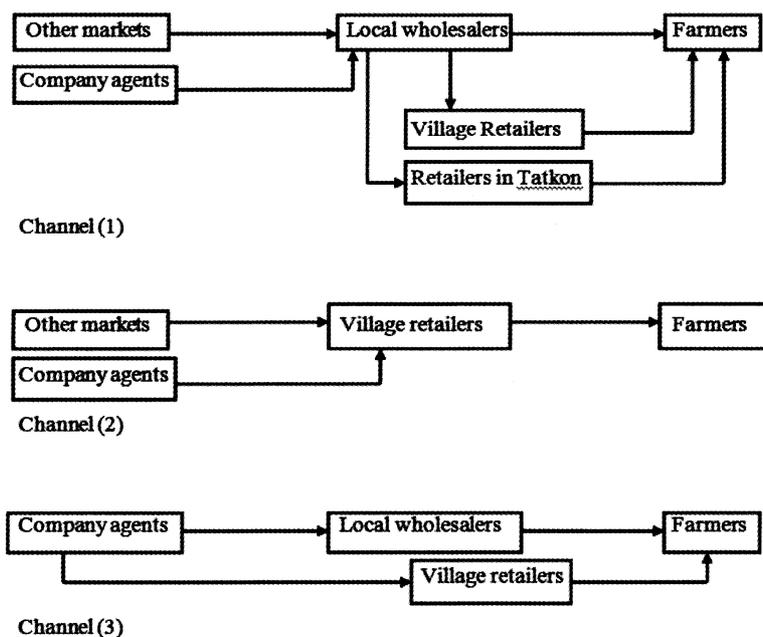


Figure 2. Marketing channels of fertilizers in Tatkon Township

marketing the lowest amounts of fertilizer which reached only directly from company agents and then to local wholesalers and village retailers and afterward finally to farmers. Therefore, among these three marketing channels, channel (1) which had more market participants were selected for calculating the marketing margin, cost and profit of fertilizer marketing in the study area.

Marketing Margin, Cost and Profit of Fertilizer Market

Marketing margins is defined as the price of a collection of marketing services which is the outcome of the demand for and the supply of such services. The amount can be interpreted as the cost of providing a mix of marketing services (Tomek and Robison, 1981).

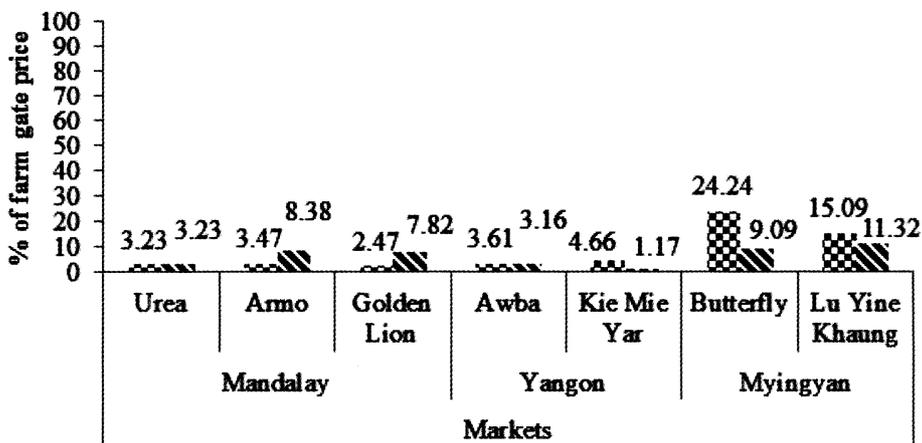
In the first channel, urea, Armo and Golden Lion fertilizers from Mandalay market were calculated to investigate costs and profits of local wholesalers along the fertilizer market in the study area. Total marketing cost (transportation and labor cost) of urea, Armo and Golden Lion were 3.23%, 3.47% and 2.47% of farm gate price respectively. Average profits of local wholesalers were 3.23% in urea, 8.38% in Armo and 7.82% of farm gate price in Golden Lion. Therefore, local wholesalers obtained the average profit for Armo was relatively higher than that profit for urea and Golden Lion fertilizers in the study area. Awba and Kie Mie Yar compound

fertilizers flowed to local wholesalers from Yangon market. According to this figure, average profit for Awba (3.16%) was rather higher than that of Kie Mie Yar (1.17%) which was occupied by local wholesalers. For Myingyan market, the average profit of Lu Yine Khaung (11.32%) was higher than that of Butterfly profit (9.09%) which was occupied by local wholesalers (Figure 3).

Conclusion

The fertilizer supply chain was well composed of four main market intermediaries; local wholesalers, village retailers, company agents and farmers. In the fertilizer market structure, Mandalay market was the key player for the distribution of imported urea fertilizer from China and domestically produced urea as local market participants such as local wholesalers and village retailers were mainly relied on this market. Therefore, the means to promote the commodity (fertilizer) flow of Mandalay market by reducing transportation cost or relaxing some restrictions on trade will enhance the fertilizer market access by the market participants or end users, farmers.

Among the imported (registered) urea fertilizers, local trading brand, Shwe Taung occupied a large share of local wholesaler’s sale. In addition, it was the only brand marketed by village retailers in the selected villages. The most imported popular



◀ Marketing cost of local wholesalers ▶ Average profit of local wholesalers

Figure 3. Marketing cost and profit of local wholesalers in channel (1)

fertilizer brands should be enforced especially in terms of standardized quality. Two unregistered compound fertilizers from Myingyan market namely Butterfly and Lu Yine Khaung were also marketed by most local wholesalers and some village retailers in the study area. The marketed amount of unregistered compound fertilizers was the lowest compared to urea and compound fertilizer in the study area. Marketing of registered and unregistered compound fertilizers in Myanmar and its nutrient content should be regulated.

Although imported compound fertilizers were accessible in the study area, urea fertilizers were largely utilized by farmers. They should be trained to use appropriate and balanced fertilizer application to conserve poor soil condition. In addition, the fertilizer market participants did not have enough capital for fertilizer marketing including the end user, farmers. As the local traders are marketing fertilizers with credit system, it is essential to provide loan which can reduce the transaction cost not only for market intermediaries but also for end users, farmers.

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