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Value Chain Analysis of Sesame in Magway Township

Thuzar Linn

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List of Abbreviations

BCR	:	Benefit-Cost Ratio
CSO	:	Central Statistical Organization
DOA	:	Department of Agriculture
FAO	:	Food and Agriculture Organization
FAOSTAT	:	Statistics of Food and Agriculture Organization
GDP	:	Gross Domestic Product
Ha	:	Hectare
Kg	:	Kilogram
Ks	:	Kyat
MADB	:	Myanmar Agricultural Development Bank
MOAI	:	Ministry of Agriculture and Irrigation
MT	:	Metric Ton
NGOs	:	Non Government Organization
R&D	:	Research and Development

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Abstract

Sesame is economically important not only for producing edible oil but also for export crops in Myanmar. The objectives of this study are to map actors and to analyze the value chain of sesame, to identify the issues and constraints in the value chain of sesame in Magway Township and to look for necessary conditions in order to promote the sesame value chain in Magway Township. The research questions are (1) what are the challenges and constraints at each level of the sesame's value chain in Magway Township? and (2) what are the necessary conditions to improve the value chain as well as the sesame production to reach its potential capacity in Magway Township? Qualitative methods were applied by using in-depth interviews and semi-structure interviews to collect the primary data, while the quantitative method was used to estimate the cost and margin, and profits of actors at each level of the value chain. Marketing margin analysis and SWOT analysis were used in this study. It was found that there were many actors in the sesame value chain such as input providers, farmers, wholesalers, millers, processor and exporter. Among the actors in the value chain for sesame seed, the sample wholesalers received the highest percentage of profit (70.66%). The percentage of marketing margin of farmers (71.48%) was the highest among actors. The wholesalers received the largest profit because they bought the sesame directly from the farmers and store the product for approximately 6 months before selling to the exporters. For sesame oil, the sample wholesalers also received the highest percentage of profit (66.84%) and the farmers again occupied the highest percentage of margin (64.94%). In this case, if the millers could buy the raw sesame seed directly from the farmers, more profit could be allocated to farmers and millers. For sesame brittle, the sample processor gained the highest percentage of profit (84.99%) and the farmers received the lowest percentage of profit (3.94%). Therefore, there is need to improve the efficiency of sesame value chain in the study area. It was also found that there was unequal marketing margin among actors along the value chains. The major constraints for sesame farmers were a lack of technology, low access to credit, lack of knowledge concerning quality of inputs and products. The major constraint for wholesalers, millers, processors and exporter was low access to financial possibilities. Therefore, financial constraints need to be simultaneously solved at all levels of the value chain. There needs to be promotion of farmer organizations (cooperatives) which can play a very important role in improving the bargaining position of the producers. It is also necessary to adopt standardization for the production, processing, marketing and exporting in order to improve the competitiveness of sesame in Myanmar.

1. Introduction

1.1 Overview of the Agriculture Sector

The agriculture sector plays a key role in economic development in Myanmar. The majority of the population (69.32%) depends directly or indirectly on income streams generated by the agricultural sector. It contributes 30% of GDP and 13.7% of the total export earnings in 2010-2011 (MOAI, 2012). The agriculture sector will continue to be essential for food production with the growing population as well as for the country and will continue to occupy a large part of the export earnings. The percentage share of sown area in Myanmar can be seen in Figure 1.1. In 2011-2012, Cereal crops achieved 38.61% of the total crop sown area followed by pulses (19.63%) and oilseed crops (15.46%) sown areas. In order to increase crop production, expansion of area and technology of oilseed crops is needed for local consumption and to generate more surpluses for increased export earnings. There are numerous kinds of oilseed crops such as groundnut, sesame, sunflower, mustard and niger. Among them, sesame occupies the largest sown area (approximately 45.86% of total oilseed crop area), followed by the groundnut, 25.5% (Figure 1.2) (MOAI 2012).

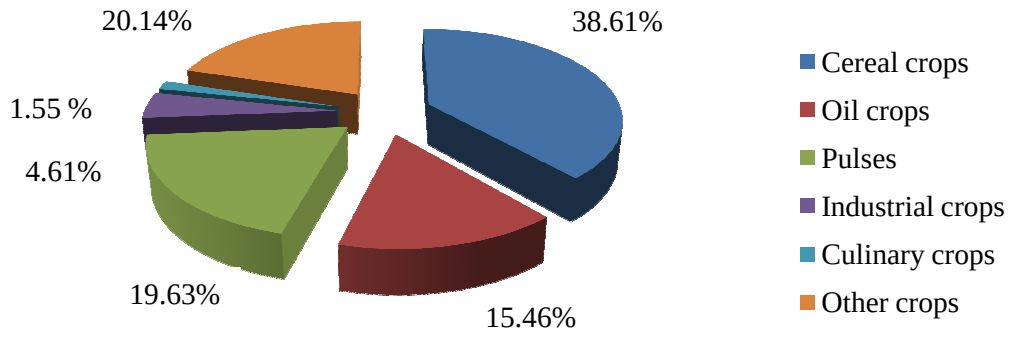

Figure 1.1 Percentage shares of major crops sown areas in 2011-2012

Source: MOAI (2012)

Sesame (*Sesamum indicum*), an ancient oilseed, is one of the oldest cultivated plants in the world. Sesame is economically important not only for producing edible oil but also for export crops. Worldwide, India occupied the highest sesame harvested area of 26.85% with

Myanmar second. The world's sesame production was 6,628.28 thousand MT of which Asia's sesame production accounted for 4,355.60 thousand MT which was 63.21% of the world total sesame production with a yield of 0.59 MT per hectare in 2011. Myanmar produced the highest sesame production (861.57 thousand MT) in Asia with a sesame yield of 0.54 MT per hectare. In terms of sesame production, Myanmar occupied 21.05% of the total world production and 36.37% in Asia (Table 1.1) (FAO 2013).

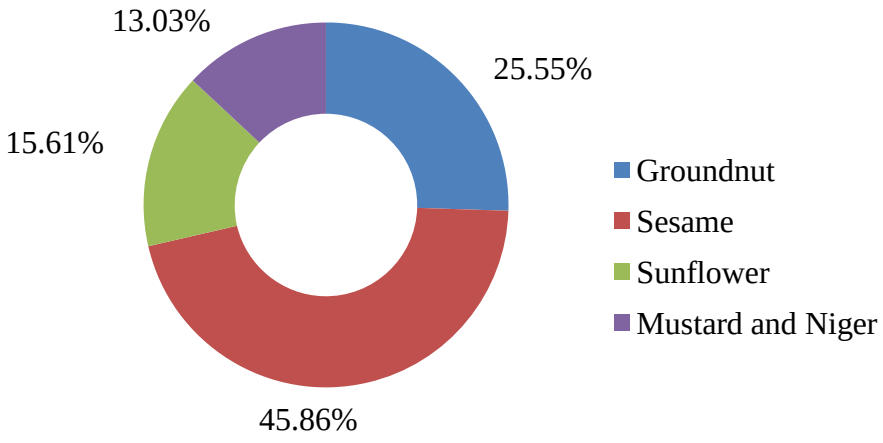

Figure 1.2 Percentage shares of sown area for oilseed crops in 2011-2012

Source: MOAI (2012)

Table 1.1 Sesame production in Myanmar and neighboring countries (2011)

Country	**Harvested area ('000 ha)**	**Yield (MT/ha)**	**Production ('000 MT)**
World	6,628.28	0.62	4092.30
Asia	4,355.60	0.59	2586.79
India	1,780.00	0.43	768.96
Myanmar	1,584.00	0.54	861.54
China	481.1	1.26	605.75
Thailand	66.21	0.74	48.84
Viet Nam	47	0.49	23.00
Cambodia	42.6	0.79	33.48
Bangladesh	37	0.89	33.00
Lao PDR	13.93	0.86	12.03

Source: FAO (2013)

1.2 Research Rationale

Sesame is an economically important not only for producing edible oil but also for exporting raw and roasted seeds. The large proportion of farmers is engaged in sesame production in Magway Township. There is a lack of information with regard to productivity and value chain of sesame in Magway Township. Benefit sharing distribution among actors is also not clearly known. The newly elected government policy promotes sesame production in Myanmar for export. The degree of vulnerable farmers integrated in the value chain of sesame production in Magway Township is unclear, i.e. to what extent smallholder farmers take any stage in the value chains is not well understood. There is a lack of information on how actors of the sesame value chain coordinate and interact with each other within the horizontal and vertical chains. Therefore, this study will be carried out to analyze the value chain of sesame for improving this value chain in each segment in Magway Township, Magway Region.

1.3 Objectives of the Research

1. To map actors and analyze the value chain of sesame;
2. To identify the issues and constraints in the value chain of sesame in Magway Township; and
3. To look for necessary conditions in order to promote the value chain of sesame in Magway Township.

1.4 Research Questions

1. What are the challenges and constraints at each level of the sesame's value chain in Magway Township?
2. What are the necessary conditions to improve the value chain to reach its potential capacity in Magway Township?

1.5 Scope and Limitation of the Study

This study aims at improving the various stakeholders' performance along the value chain of sesame in Magway Township. Due to time and financial constraints, the study is limited in

its depth and coverage of the study area to Magway Township to fully address the aforementioned objectives of the study. It will emphasize only the sesame production value chain. The result of the study may have some limitations such as sample size and therefore may not be generalized and applied to the whole of Myanmar. However, it will be useful for areas with a similar context to the study area.

2. Review of Literature

2.1 What is a Value Chain?

A value chain is often defined as the sequence of value-added activities, from production to consumption, through processing and commercialization. Value chains, or supply chains, in agriculture can be thought of as a "farm to folk" set of processes and flows from the inputs to production to processing, marketing and ultimately the consumer. Each segment of a chain has one or more backward and forward linkages. Chains operate within a complex environment of policies, regulations, institutions and support services. In order to receive chain competitiveness, it requires operational efficiency in each of its segments, coordination of transactions among chain actors and insertion within a supportive business environment (APO 2007).

2.2 Why Value Chain Analysis?

Value chain analysis is a useful analytical tool that helps understand overall trends of industrial reorganization and identify change agents and leverage points for policy and technical interventions. Value chain analysis is the process of breaking a chain into its constituent parts in order to better understand its structure and functioning. The analysis consists of identifying chain actors at each stage and discerning their functions and relationships; determining the chain governance, or leadership, to facilitate chain formation and strengthening; and identifying value added activities in the chain and assigning costs and added value to each of those activities. The flows of goods, information and finance through the various stages of these are evaluated in order to detect problems or identify opportunities to improve the contribution of specific actors and the overall performance of the chain. (UNIDO 2009)

2.3 Review of Previous Studies of the Value Chain

Asyheshm (2007) analysed the sesame marketing chain particularly the case of Metemaworeda, North Gondar Zone, Amhara Region. This study revealed that 94% of the sesame production was supplied to the market. The major determinant factors for market supply were estimated by OLS regression. The sesame market performance was also measured using indicators of marketing margins and the level of market integration. Critical periods for sesame purchase were identified and 78% of the total marketed supply was transacted during the month of November, December and January, 2006. Purchases sharply declined after January and no sales were observed during July, August and September. Transport costs were identified as the major cost component of marketing costs which accounted for 31.52% and 60.20% of the total cost of wholesalers and exporters, respectively. The integration analysis indicated that there existed market integration between Metema, Mekele and Addis Ababa markets, showing relative market efficiency in these markets.

3. Research Methodology

3.1 Data Collection

3.1.1 Measurements (or) Indicators

To access the current performance of the sesame market in Magway Township, field survey for primary data collection was undertaken in May 2013. Data were collected for the investigation of marketing cost, marketing margin of various stakeholders, marketing channels and constraints and challenges and possible solutions for sesame production.

A Farmers questionnaire was used to collect farmer's socio-economic data such as age, education, family size, farm ownership, farm size, sesame sown area, harvested area, yield, crop production, output prices, labor costs, transportation costs, marketing costs, extension service, credit taken, loan for money lender, amount of surplus, production cost of sesame and constraints etc. The market related questionnaire was used to collect farm level detailed measures of prices and quantity, purchased and sold system, marketing costs of various stakeholders', storage facilities, transport facilities, access to market information. Both primary and secondary data were also considered in this study. Secondary data were taken

from published and official records of the Ministry of Agriculture and Irrigation (MOAI), various government organizations, the Food and Agriculture Organization (FAO), Central Statistical Organization (CSO) and other related publications.

3.1.2 Sampling Frame and Sample Size

For this study, the number of respondents from the different stakeholders is shown in Table 3.1. For each stakeholder, personal interviews were implemented with different structured questionnaires. Twenty sesame farmers, 4 wholesalers, 4 millers, 1 processor and 1 exporter were interviewed with different sets of structured questionnaires to obtain a clearer understanding of the current marketing channel for the sesame sector.

Table 3.1 Number of respondents in the study area

Market Participants	Number of sample respondents
Farmers	20
Wholesalers	4
Millers	4
Processor	1
Exporter	1
Total	30

Source: Field survey (2013)

3.2 Method and Technique of Data Analysis

Qualitative methods was applied by using in-depth interviews and semi-structure interviews to collect the primary data, while the quantitative method was used to estimate the cost and margin, and profits of actors at each level of the value chain.

3.2.1 Marketing Cost and Marketing Margin Analysis

When marketing margins at different levels of the marketing chain are compared, it is common to use the consumer price as the common denominator for all margins. The following are some commonly used indicators in the analysis.

(a) Total Gross Marketing Margin (TGMM)

TGMM = (Consumer Price – Farmer's Price)/Consumer Price x 100

Margin of Wholesaler = (Consumer Price – Wholesaler's Price)/Consumer Price x 100

Margin of Miller = (Consumer Price – Miller's Price)/Consumer Price x 100

Margin of Processor = (Consumer Price – Processor's Price)/Consumer Price x 100

Margin of Exporter = (Consumer Price – Exporter's Price)/Consumer Price x 100

(b) Farmer's Portion of Producer's Gross Marketing Margin (PGMM)

PGMM = (Consumer Price – Gross Marketing Margin)/Consumer Price×100

(c) Gross Marketing Margin= Average Selling price – Average Buying price

(d) Profit= Gross Marketing Margin-Total Marketing cost

When marketing margins at different levels of the marketing chain are compared, the formulae included in Table 3.2 were used in this study.

Table 3.2 Formulae for calculation of marketing costs, profits and margins

Actors	Costs			Revenues	Profits		Margins
	Unit Total cost	Unit Added Cost	% Added cost	Unit Price	Unit profit	% Total Profit	Unit Margin
Farmers	A	-	A/D	E	E-A	(E-A)/(G-D)	E
Wholesalers	E	B	B/D	F	F-B-E	(F-B-E)/(G-D)	F-E
Millers/ Processor/ Exporter	F+C	C	C/D	G	G-C-F	(G-C-F)/(G-D)	G-F
Total		D=A+B+C	100		G-D	100	G

Source: M4P (2008)

3.3 Selection of the Study Area

The study area, Magway Township, is situated on the east bank of the Ayeyarwaddy River. It is bordered by Natmouk Township on the east, Minbu, Sagu and Min Hla Townships on the

west, Taungdwingyi and Sinpaungwe Townships on the south, and Yenanchaung Township on the north. Magway Township is made up of 15 quarters, 61 village tracts and 216 villages. Magway Township possesses a tropical climate condition and produces a large quantity of groundnut and sesame for edible oil, it is also known as the oil pot of Myanmar. The Map of Myanmar and Study area is shown in Figure 3.1 and Figure 3.2, respectively.

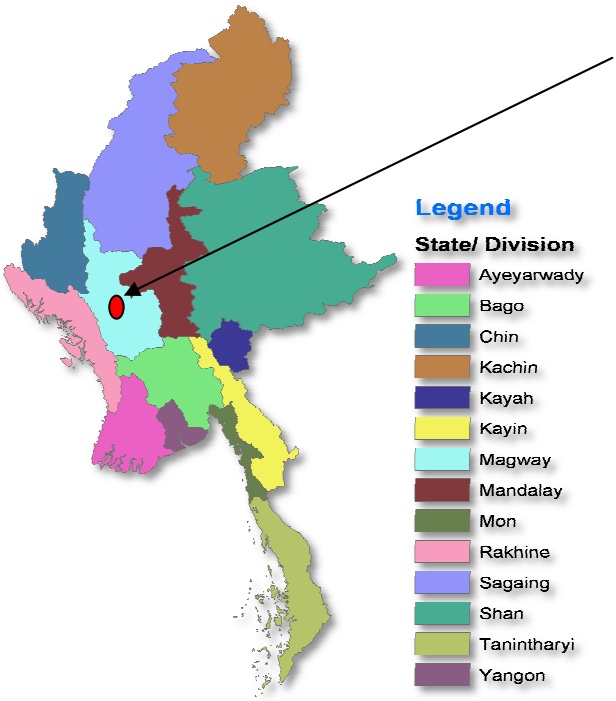

Figure 3.1 Map of Myanmar showing the location of Magway Township

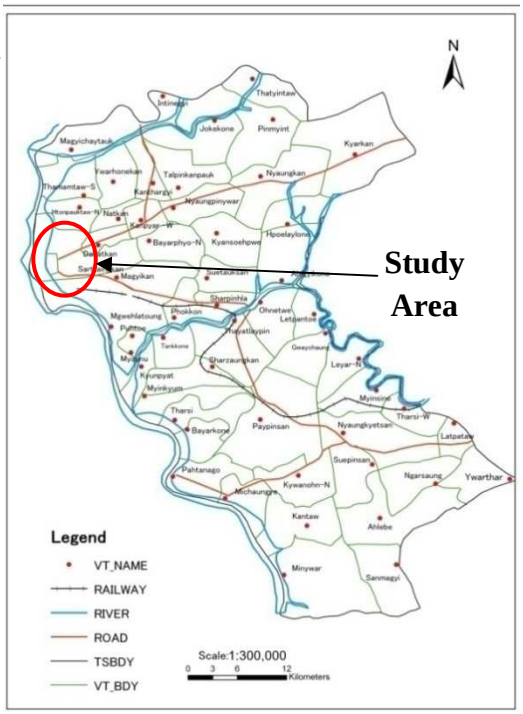

Figure 3.2 Map of Magway Township showing the location of the study area

3.3.1 Crop Calendar and Cropping Pattern

In Magway Township, groundnut and sesame are grown as the main crops during the monsoon season. Farmers prepare their land and grow groundnut or sesame at the end of April and harvest at the end of August for sesame and in the end of September for groundnut as shown in Table 3.3. After harvesting the groundnut or sesame, some farmers grow winter groundnut while most farmers grew pulses including green gram, pigeon pea, cow pea and mung-bean and sorghum. Winter season crops are harvested at the end of December.

Table 3.3 Crop calendar of different crops grown in the study area

Crops	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Groundnut (monsoon)												
Sesame												
Groundnut (winter)												
Pulses												
Sorghum												

Source; DOA, Township Office, Magway (2012)

4. Results and Discussion

4.1 Mapping the Value Chain

4.1.1 Core Process

The core process of sesame value chain is shown in Figure 4.1. Sesame seeds flow started from input providers-farmers-wholesalers-exporters-consumers in other countries. Sesame edible oil and sesame brittle (snack) are processed from sesame seed. The sesame edible oil flow is input providers-farmers-wholesalers-millers-retailers-consumers. The sesame brittle (snack) flow is input providers-farmers-wholesalers-processors-retailers-consumers.

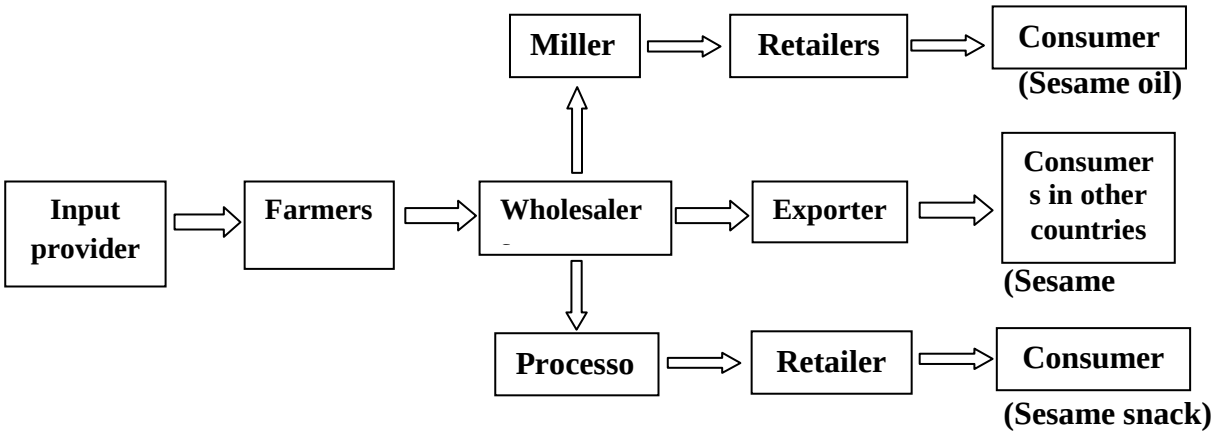

Figure 4.1 Core process for sesame value chain in the study area

4.1.2 Input Providers, Actors and Supporters

4.1.2.1 Input Providers

Farmers produce their products using various inputs. Sesame farmers in the study area used the inputs to produce sesame seed. Table 4.1 shows the inputs used by sesame farmers and the input providers. The distance from the selected villages to the market in Magway Town is around seven miles each. Most farmers buy inputs from the market in Magway Town by Tuk Tuk (tricycle). About 10% of the sample farmers bought sesame seed from the market in Magway Town and 20% of the sample farmers bought sesame seed from neighboring farmers who had reserved seeds. About 70% of the sample farmers used the sesame seed by reserving their own seed which was yielded from the previous crop season.

There are many shops namely, Thin Thin Swe, Win, Myat Taw Win shop, Romeo, Pyay Phyo Aung, Aung Myat, Shwe Pyo Thar and Zewa Dana, etc. which all sell chemical fertilizers, pesticides, and foliar fertilizers in Magway Town. About 35% of the sample farmers bought urea and compound fertilizers from Thin Thin Swe fertilizer and pesticide shop and followed by other shops (30%), Win (15%), Myat Taw Win (5%), Romeo (5%) and Pyay Phyo Aung shops (15%) respectively. Based on the interviews with farmers, Thin Thin Swe shop sold the inputs at a reasonable price for different qualities of fertilizers and pesticides.

In the study area, there were five farmers who used T-super in sesame production. Among them, 60% of the sample farmers bought T-super from the shops in Magway Town, 20% of the farmers bought T-super from Thin Thin Swe shop and another 20% of the farmers bought T-super from Romeo shop in Magway Town. There are eight farmers who used gypsum in sesame cultivation. About 25% of the farmers bought gypsum from the Thin Thin Swe shop followed by Myat Taw Win (12.5%), AungMyat (12.5%), Romeo (12.5%) and other shops (37.5%). Most of the sample farmers (61.11%) in the study area bought pesticides and foliar fertilizers from their village sub-dealers. About 16.67% of the sample farmers bought pesticides and foliar fertilizers from Thin Thin Swe shop and also 16.67% bought from Shwe Pyo Thar shop in Magway. Only 5.56% of the sample farmers bought these inputs from Zewa Dana shop in Magway.

4.1.2.2 Farmers and Their Specific Activities

Socioeconomic characteristics of sample farmers in the study area are shown in Table 4.2. In the study area, the average age of the sample farmer was 46.25 years. The oldest of sample farmers was 68 years of age and the youngest was 30 years of age. Average schooling years of the sample farmers were 9.55 years (or high school level). The maximum schooling years of the sample farmers were 14 years and the minimum schooling year was 1 year.

In the study area, education level of the sample farmers was categorized into five groups. "Monastery education level"; informal schooling although they could read and write. "Primary school level" ;formal schooling up to 5 years; "Secondary school level"; intended formal schooling up to 9 years and "High school level" ;formal schooling up to 11 years. The last "Higher education level" refers to those who had an educational degree from college or university. The education level of farmers was assumed to determine the decision making of their farming system.

The average farming experience of the sample farm household heads was 23.9 years. The maximum experience was 41 years and the minimum experience was 10 years.

Table 4.1 Inputs and input providers for sesame production in the study area

Kinds of Inputs	Buying place	Input providers	Percentage (%)
Seed (N=20)	Magway Town	Market	10
	Village	Own seed reserved	70
	Village	Other farmers	20
Urea and compound fertilizers (N=20)	Magway Town	Thin ThinSwe	35
	Magway Town	Win	15
	Magway Town	Myat Taw Win	5
	Magway Town	Romeo	5
	Magway Town	PyayPhyoAung	5
	Magway Town	other shops	30
T-Super (N=5)	Magway Town	Thin ThinSwe	20

Kinds of Inputs	Buying place	Input providers	Percentage (%)
	Magway Town	Romeo	20
	Magway Town	Other shops	60
Gypsum (N=8)	Magway Town	Thin ThinSwe	25
	Magway Town	Myat Taw Win	12.5
	Magway Town	AungMyat	12.5
	Magway Town	Romeo	12.5
	Magway Town	Other shops	37.5
Pesticides and foliar (N=20)	Magway Town	Thin ThinSwe	16.67
	Magway Town	ShwePyoThar	16.67
	Magway Town	Zewa Dana	5.56
	Village	Village sub-leaders	61.11

Source: Field Survey (2013)

Table 4.2 Socio-economic characteristics of sample farmers in study area

Items	Measurement	Average	Maximum	Minimum
Household head's Age	Years	46.25	68	30
Schooling years	Years	9.55	14	1
Education Level				
Monastery education	Number		1 (5)	
Primary school level	Number		0 (0)	
secondary school level	Number		7 (35)	
High school level	Number		9 (45)	
Higher education level	Number		3 (15)	
Farming experience	Years	23.9	41	10

Source: Field survey (2013)
Note: Figure in the parentheses represents percentage.

4.1.2.3 Cost and Return Analysis for Sesame Production

The cost and benefit for sesame production can be found in Table 4.3. It was found that the average total variable cost for sesame was 718,986 kyats per hectare. The

average yield obtained by the sample farmers was 652.05 kilogram per hectare. Average price of sesame was 1,308 kyats per kilogram. Therefore, the average total gross benefit for the sample farmers was 852,881 kyats per hectare.

The total material cost was 435,389 kyats per hectare. Total family labor cost was 63,079 kyats per hectare. The sample farmers used on average 171,933 kyats as hired labor cost. In addition, they had to pay average interest cost on cash cost (around 48,585 kyats per hectare). Thus the return above variable cash cost (RAVCC) was 196,974 kyats per hectare and the return above variable cost (RAVC) was 133,895 kyats per hectare. The benefit-cost ratio for sesame production was 1.18. It can be concluded that the sample farmers received a profit of 18 kyats for an investment of 100 kyats in sesame production. The break-even yield can be calculated by dividing the total variable cost by average price per kilogram. The break-even yield of sesame production was 549.68 kg/ha. If the sample farmers received 549.68 kilogram per hectare this will cover their total variable cost. The break-even price can also be calculated by dividing the total variable cost by the average yield per hectare. The break-even price of sesame production was 1,150 kyats per kilogram. The total variable costs for sesame production would be covered if the sampled farmers receive a selling price of sesame of 1150 kyats per kilogram.

4.1.2.4 Marketed Surplus of the Sample Farmers, Their Selling Method and Mode of Transportation

The marketed surplus is calculated by deducting household consumption and reserved seeds from the total production of the sampled farmers. The marketed surplus of sesame is shown in Table 4.4. The average production of sesame per household was 4.36 tons during the rainy season and the average marketed surplus per household was 4.12 tons. The average home consumption was 0.12 tons during the rainy season. Farmers stored around 0.12 tons as reserved seed for the next cropping season. There were various categories of market participants in sesame marketing channels in the study area. First, 100 percent of sesame directly flowed from farmers to wholesalers. In the study area, all of the sampled farmers directly sell to “the wholesalers” in Magway Town because of inexpensive transportation costs and convenient road infrastructure. All of the sampled farmers transported their sesame by Tuk Tuk (tricycle).

Table 4.3 Benefit and cost of sesame production for sampled farmers

Items	Units	Value
Average yield	Kg/ha	625.05
Average product price	Ks/kg	1308
Total Gross Benefits (GB)	**Ks/ha**	**852,881**
Total Material Cost	Ks/ha	435,389
Total Family labor Cost	Ks/ha	63,079
Total Hired labor Cost	Ks/ha	171,933
Total Interest Cost	Ks/ha	48,585
Total Variable Cost (TVC)	**Ks/ha**	**718,986**
Total Variable Cash Cost (TVCC)	**Ks/ha**	**655,907**
Return above cash cost (GB-TVCC)	Ks/ha	196,974
Return above variable cost (GB-TVC)	Ks/ha	133,895
Return per unit of cash expensed (GB/TVCC)	Ks/ha	1.3
Return per unit of capital invested (GB/TVC)	Ks/ha	1.18
Break even yield (TVC/price per unit)	kg/ha	549.68
Break even price (TVC/yield per unit)	ks/kg	1,150.29

Source: Field survey (2013)

Table 4.4 Sesame production, consumption and marketed surplus of per sampled household

Item	Unit	Mean	Maximum	Minimum	Standard deviation
		(N=20)	(N=20)	(N=20)	(N=20)
Total production	Ton	4.36	9.18	0.88	2.41
Household consumption	Ton	0.12	0.73	0	0.2
Reserved seed	Ton	0.12	0.61	0	0.15
Marketed surplus	Ton	4.12	9.18	0.88	2.32

Source: Field survey (2013)

4.1.2.5 General Characteristics and Marketing Activities of Wholesalers, Millers, Processor and Exporter

In the study area, the wholesaler plays as a key role in the distribution of sesame from producers to millers, processors and exporters. Millers process the sesame seeds into sesame oil and processors process the sesame seeds into sesame brittle as a snack. The exporters

export the sesame seeds to other countries. In Magway Township, the town wholesalers are the main intermediaries from whom the farmers acquire the price information. Farmers also have connections with wholesalers in other townships and food processors and they receive price information from them as well.

In general, average age of wholesalers was 54.5 years, ranging from 45 years to 69 years with farming experience ranging from 9-23 years. The education level of wholesalers was higher than farmers with half of them at the high school level and the other half at the graduate level. All wholesalers employed a cash-down system in sesame marketing (buying sesame as well as selling sesame). All of the wholesalers used trucks in the transportation of their crops as shown in Table 4.6.

The average age of the millers was 58.25 years old ranging from 50-71 years with an average experience of 14 years, ranging from 6-30 years of experiences. Among the sampled millers, 25 % of them had secondary school level education, 25% high school level education and 50% graduate level education in the study area. Purchasing type of millers used one hundred percent cash down system. On the other hand, seventy five percent of the millers used cash down system in selling sesame edible oil. Only twenty five percent of the millers sold their sesame edible oil while receiving half with cash down and half with credit system. All of the sampled millers used trucks or cars in transportation when they send sesame edible oil to other townships if the distance is far. If the distance is nearby (within town), they will use the Tuk Tuk (tricycle).

The sesame processor will buy sesame from the wholesalers. The age of the processor was 43 years. The market experience of the processor was nearly 10 years; this processor is a university graduate. The sesame processor used only cash down system in purchasing sesame seed. In selling of sesame brittle, the processor used both types of selling (cash down system and credit system). With regard to transportation, the processor used truck and cars if the distance between buying and selling is far.

The sesame exporter cooperated with the town wholesalers in purchasing sesame from them. The age of the exporter was 53 years. The exporter has 9 year of experience and he is a university graduate. The sesame exporter employed cash down system in purchasing and

selling sesame seeds. The exporter used trucks for transportation of sesame seeds within the country and used ships to export sesame seeds to Japan.

Table 4.5 Age, experience and education level of wholesalers, millers, processor and exporter

Characters	Wholesalers (n=4)	Millers (n=4)	Processor (n=1)	Exporter (n=1)
Age (years)				
Mean	54.5	58.25	43	53
Standard Deviation	10.72	9.54		
Range	45-69	50-71		
Experience (years)				
Mean	19.5	14	10	9
Standard Deviation	6.06	10.83		
Range	9-23	6-30		
Education Level (%)				
Monastery	0%	0%		
Primary level	0%	0%		
Secondary level	0%	25%		
High School level	50%	25%		
Graduate level	50%	50%	100%	100%

Source: Field survey (2013)

Table 4.6 Marketing activities of wholesalers, millers, processor and exporter

Activities	Wholesalers (n=4)	Millers (n=4)	Processor (n=1)	Exporter (n=1)
Type of purchasing				
Use cash down system	4 (100)%	4 (100%)	1 (100%)	1 (100%)
Type of selling				
Only cash down system	4 (100)%	3 (75%)	1 (100%)	1 (100%)
Received half of the cash down and credit		1 (25%)		
Mode of transport				
By truck	4 (100%)	4 (100%)	1(100%)	1(100%)

Source: Field survey (2013)

The mean value of the total volume sale of products per season is shown in Table 4.7. The sample wholesalers sold an average amount of sesame seeds of 1,500 tons during the rainy season and the exporter exported sesame seeds of 1,166.67 tons during the rainy season. It was found that the millers produced and sold an average amount of sesame edible oil of 159.71 tons during the rainy season while the processor produced and delivered an average amount of sesame brittle of 8,100 kilograms during the rainy season.

Table 4.7 Mean value of total volume of sales of products per season of sampled actors

Actors	Kinds of product	Unit	Mean value
Wholesalers (n=4)	Sesame seed	Ton	1500
Millers (n=4)	Sesame oil	Ton	159.71
Processor (n=1)	Sesame brittle	Kilogram	8100
Exporter (n=1)	Sesame seed	Ton	1,166.67

Source: Field survey (2013)

4.1.2.6 Credit Providers (Supporters)

There were three credit sources available for the sampled farmers in the study area. The credit received from all sources was for producing all rain-fed crops and for household expenses. The sampled farmers borrowed money from the Myanmar Agriculture Development Bank (MADB) with an average amount of 100,000 kyats per year (9.29% of the total credit amount) with an interest rate of 1.5% per month. In addition, farmers borrowed an average of 885,000 kyats per year (82.49% of the total credit amount) from private money lenders such as shopkeepers in the villages, broker-men and crop traders at an average interest rate of 2.7% per month. Some of the sampled farmers borrowed an average amount 92,307 kyats (8.57% of the total credit amount) per year from the "Shwe Hta Naung Microfinance Association" at an interest rate of 2% per month. Farmers usually borrow money to purchase inputs for sesame production such as seeds, chemical fertilizer and pesticides.

Table 4.8 Situation of credit availability of sampled farmers in the study area

Sources of credit	Amount of credit (Kyat)	Percentage	Interest rate (Kyat per month)
MADB	100,000	9.29	1.5
Private money lender	885,000	82.14	2.7
Shwe Hta Naung microfinance	92,307	8.57	2.0
Total	1,077,307	100	

Source: Field survey (2013)

4.1.3 Marketing Channel

The average marketed surplus of the sampled farm households was 94.50% of their production. Therefore, 5.50% of this was used for household consumption (2.75%) and seed purpose (2.75%), (Table 4.9). The analysis of the marketing channel was intended to demonstrate the sesame flow from farmers to consumers in study area.

Sesame marketing channel in Magway Township is shown in Figure 4.2. According to the field survey, town wholesales had the highest potential for acquiring sesame directly from farmers in the study area. The sampled farmers sold 100% of their marketed surplus to the wholesalers in Magway town. Wholesalers traded 32.65% of their sesame to Mandalay, 40.82% to Magway and 26.53 % to Yangon. Millers and processors in Magway bought sesame from the wholesalers. Millers sold 25.31% of their sesame edible oil to Magway, and traded 3.93% to Mandalay, 0.79% to Yangon and 4.08% to Nay Pyi Taw. On the other hand, the processor in Magway sold 46% of their sesame brittle in Magway, and traded 26% to Mandalay and 28% to Yangon.

Table 4.9 Mean and percentage of sesame production, consumption, reserved seed and marketed surplus of the sampled farmers

Item	Unit	Mean (N=20)	Percent (%)
Total production	Ton	4.36	100
Household consumption	Ton	0.12	2.75
Reserved seed	Ton	0.12	2.75
Marketed surplus	Ton	4.12	94.50

Source: Field survey (2013)

Sesame Marketing Channel in Magway Township

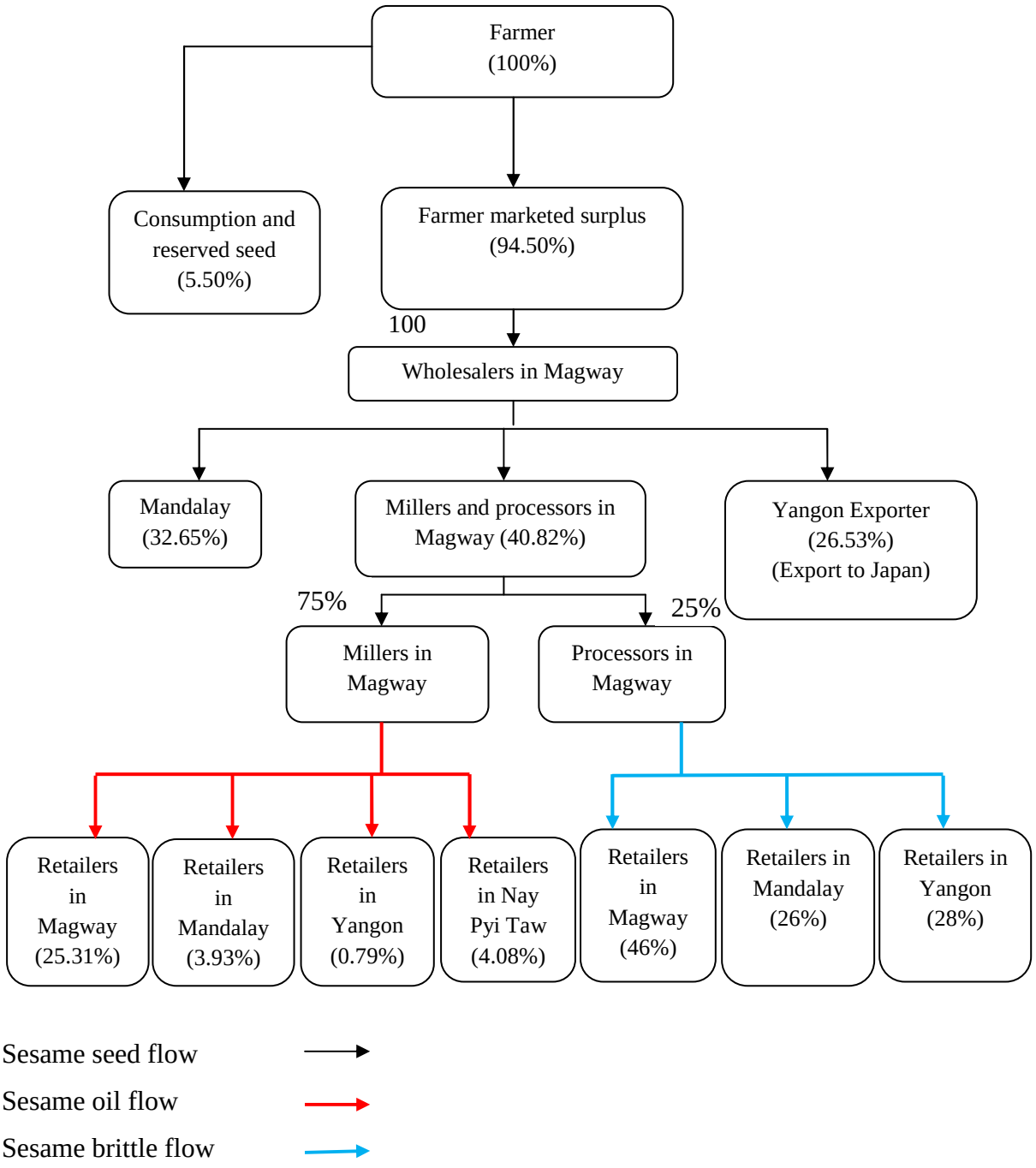

Figure: 4.2 Sesame Marketing Channel in Magway Township

4.1.4 Knowledge and Information Flow

The agricultural extension division is responsible for disseminating information on technical progress to farmers, providing training on crop management and conducting agricultural development programs for hybrid varieties and others. During the field survey, all of the

sampled farmers answered that access to government extension service is absent. However, agricultural information was received through private agro-chemical (fertilizers, pesticides, foliar, plant growth hormone, etc.) dealers and marketing agents. The pesticide and fertilizer company staff would visit villages once or twice within a crop season and hold pesticide and fertilizer market promotion meetings in the villages.

4.2 Analysis of Value Chain

4.2.1 Marketing Costs, Profits and Marketing Margins of Actors

Marketing costs, profits and margins were calculated for main agents in the marketing channels such as town wholesalers, exporter, millers and processors. In the marketing channel, the commodity types handled by the middlemen are various. For example, wholesalers handle the commodity as crops while the millers handle the commodity as edible oil and the processor handle the commodity as the sesame brittle (snack).

Percentage share of marketing costs for different actors are shown in Figure 4.3, Figure 4.4, Figure 4.5 and Figure 4.6 for different value-added activities. For sesame wholesalers, the percentage share of miscellaneous costs was the highest, followed by labor cost and packaging cost. (The costs of 'miscellaneous' contain staff salary, interest cost and cost of phone cards). For the sesame exporter, the percentage share of storage costs was the highest. It was found that the exporter must store a large amount of sesame for a long time period before exporting to other countries. The percentage share of labor cost was the highest for sesame millers and the sesame processor because it needed a large amount of labor to process sesame seeds into sesame edible oil and sesame brittle (snack).

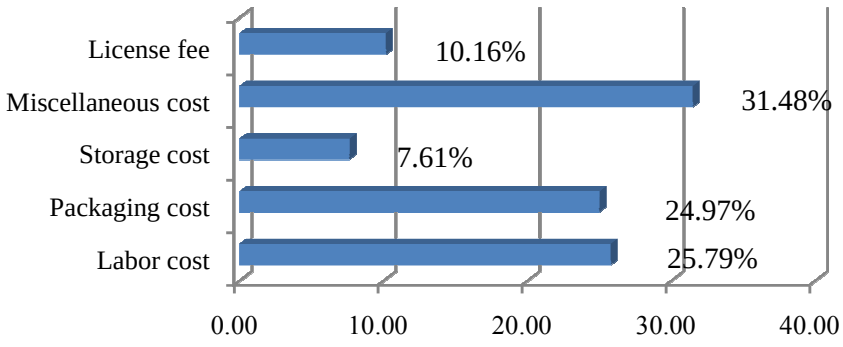

Figure 4.3 Percentage of Marketing costs per unit for sesame wholesalers

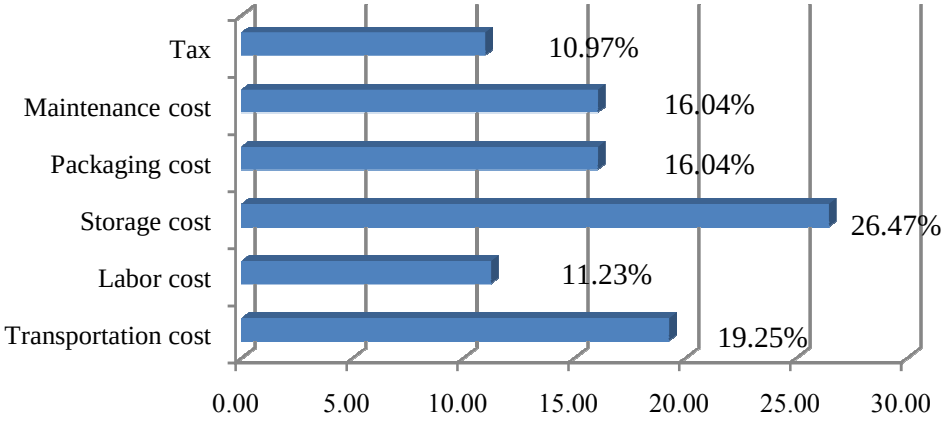

Figure 4.4 Percentage of Marketing costs per unit for sesame exporter

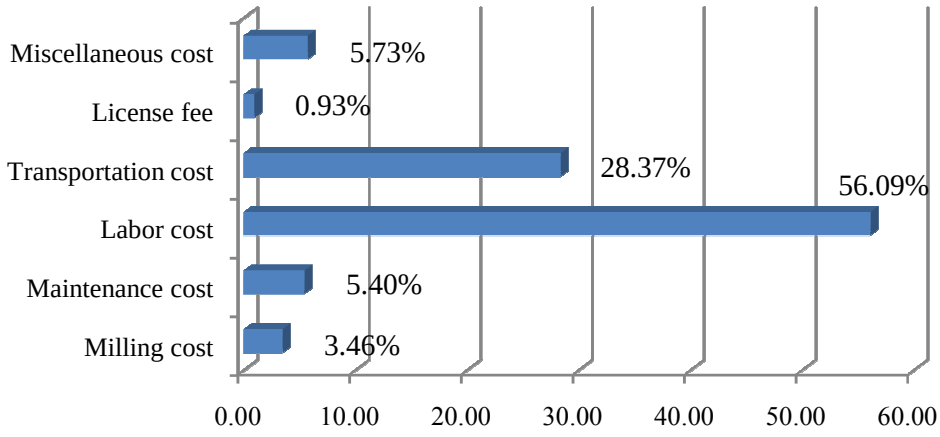

Figure 4.5 Percentage of Marketing costs per unit of sesame for sesame miller

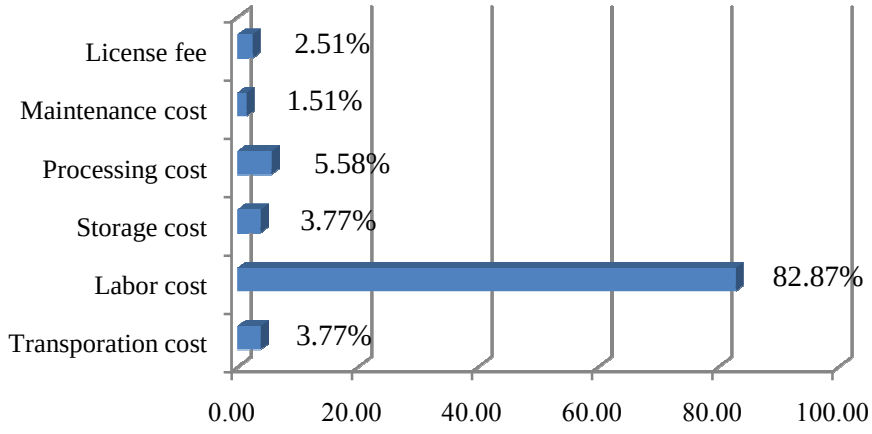

Figure 4.6 Percentage of Marketing costs per unit for sesame processor

Among the actors in the value chain for sesame seeds, it was found that the sample wholesalers received the highest percentage of profit share (70.66%). But the marketing margin share of farmers (71.48%) was the highest among all the actors. The wholesaler received the largest profit due to purchasing the sesame directly from the farmers and storing the product for 6 months before selling to the exporters. How then can farmers reduce their higher cost and increase their profit share? It is obvious that sampled farmers suffer from high crop losses during harvesting time (due to a lack of post-harvest technology), high costs of inputs and high interest rates from money lenders. If farmers could contact directly with the exporter and receive loans at lower interest rates to buy inputs, the received price and profit share of farmers would be increase and cost margins would decrease.

For the sesame oil value chain, the sampled wholesalers received the highest percentage of profit share (66.84%). Actually, the wholesalers received more benefits (than farmers) from the increased demand of sesame seeds to export under the changes in trade policy in 2011 (allowing the private sector to export sesame seeds and set export tax to zero). In this case, if the millers could buy the raw sesame seed directly from the farmers, profit sharing of both farmers and millers would increase. Moreover, the competitiveness of sesame production and edible oil processing should be improved to increase efficiency of the sesame oil value chain.

For sesame brittle, the sampled processor gained the highest percentage of profit share (84.99%) while sampled farmers received the lowest percentage of profit share (3.94%). It is noted that the farmers were not involved much within this chain—they only sold directly to the wholesaler and therefore received the lowest profit share.

The percentage shares of marketing margin of farmers, wholesalers and exporter were 71.48%, 25.39% and 3.13% respectively in sesame seed value chain. In sesame oil value chain, farmers received 64.94% of the marketing margin, wholesalers 23.07% and millers 11.99%. For the sesame brittle value chain, the percentage share of the marketing margin was the highest (69.63%) for the processor followed by farmers (22.41%) and wholesalers (7.96%). Therefore, it was found that different value chain actors received unequal marketing margins along the value chains and sesame marketing was ***inefficient*** in the study area.

Table 4.10 Marketing profits and margins of farmers, wholesalers and exporter for sesame seeds

Actors	Costs (Ks/Kg)			Revenues (Ks/Kg)	Profits (Ks/Kg)		Margins (Ks/Kg)	
	Unit Total cost	Unit Added Cost	% Added cost	Unit Price	Unit profit	% Total Profit	Unit Margin	% Total Margin
Farmers	1150.29	-	95.59	1308	157.71	25.17	1308	71.48
Wholesalers	1308	21.95	1.82	1772.67	442.72	70.66	464.67	25.39
Exporter	1803.84	31.17	2.59	1830	26.16	4.17	57.33	3.13
Total		1203.41	100%		626.59	100%	1830	100%

Table 4.11Marketing profits and margins of farmers, wholesalers and millers for sesame oil

Actors	Costs (Ks/Kg)			Revenues (Ks/Kg)	Profits (Ks/Kg)		Margins (Ks/Kg)	
	Unit Total cost	Unit Added Cost	% Added cost	Unit Price	Unit profit	% Total Profit	Unit Margin	% Total Margin
Farmers	1150.29	-	85.09	1308	157.71	23.81	1308	64.94
Wholesalers	1308	21.95	1.62	1772.67	442.72	66.84	464.67	23.07
Millers	1952.35	179.68	13.29	2014.28	61.93	9.35	241.61	11.99
Total		1351.92	100%		662.36	100%	2014.28	100%

Note: 1Kg of sesame = 0.47 Kg of sesame edible oil

Table 4.12 Marketing profits and margins of farmers, wholesalers and processor for sesame brittle

Actors	Costs (Ks/Kg)			Revenues (Ks/Kg)	Profits (Ks/Kg)		Margins (Ks/Kg)	
	Unit Total cost	Unit Added Cost	% Added cost	Unit Price	Unit profit	% Total Profit	Unit Margin	% Total Margin
Farmers	1150.29	-	62.66	1308	157.71	3.94	1308	22.41
Wholesalers	1308	21.95	1.20	1772.67	442.72	11.07	464.67	7.96
Processors	2528.01	663.67	36.15	5836.67	3400.33	84.99	4064	69.63
Total		1835.91	100%		4000.76	100%	5836.67	100%

Note: 1Kg of sesame = 1.03 Kg of sesame brittle (snack)

4.2.2 Challenges and Constraints in the Sesame Value Chain

A SWOT analysis was used to describe the challenges and constraints of the sesame value chain. SWOT analysis is an acronym for “Strengths, Weaknesses, Opportunities and Threats.

The SWOT analysis for the sesame value chain in Magway Township is identified as follows. The analysis of strengths and weaknesses is internal and is usually based on an analysis of facts and assumptions on the market research findings. The opportunities and threats analysis is carried out by examining external factors.

In the light of the stakeholder analysis, a mixed focus in-depth interviews with farmers and traders was used to draw points of interventions and to address constraints by promoting the strengths of the chain. For this purpose, internal weaknesses and strengths of actors and external opportunities and threats are analyzed under categories of economic, social, technological, demographic and institutional themes. The main results of the SWOT analysis for sesame farmers, wholesalers, sesame millers, sesame processor and sesame exporter are listed under Table 4.13, Table 4.14, Table 4.15, Table 4.16 and Table 4.17 respectively.

Table 4.13 SWOT analysis for farmers

Strengths	**Weaknesses**
• Easy to grow and harvest • Women can participate • Expecting good quality seed • Reduced use of chemical fertilizers • Organic input utilization • Accessible to market	• No measurement of the quality of seed • Uncertain quality of chemical fertilizers and pesticides • Low access to high quality seed • Relatively low yield per hectare • Need to harvest timely • No resistance to pests and disease • Few financing possibilities for farmers
Opportunities	**Threats**
• Local and export market • High potential for value addition • Low cost for transportation and easy to transport • Increasing telecom service • Employment	• Climate change • Unstable product price • The prices of labor, fertilizers and pesticides are very high • Need for capital investment in sesame production • Absence or poor post harvest technology

Table 4.14 SWOT Analysis for wholesalers

Strengths	**Weaknesses**
• High supply	• Need capital • Need skilled labor • Higher interest rate on credit • High salary to hire skilled labor.
Opportunities	**Threats**
• Market potential for domestic and export • Increasing telecom service	• Changes in climate • Difficulty for labor control • High competition in sesame marketing

Table 4.15 SWOT analysis for millers

Strengths	**Weaknesses**
• High oil content • Sesame oil is suitable for health	• Poor people cannot consume sesame oil • Lack of high capacity milling machines • High competition with other cooking oils
Opportunities	**Threats**
• Awareness of health and dependence on palm oil • High demand for quality oil • Increasing telecommunication service • Employment	• Little access to quality of raw material • Imported palm oil • International demand on sesame seed

Table 4.16 SWOT Analysis for processors

Strengths	Weaknesses
• High demand for sesame brittle • Participation of women	• Electricity cut offs when processing • Skill labor
Opportunities	**Threats**
• High demand for processed product • Scope for processing industries (cosmetics, pharmaceuticals, food, etc.) • Employment	• Little access to quality of raw material

Table 4.17 SWOT Analysis for exporter

Strengths	Weaknesses
• Few competitors in Myanmar for sesame export	• Low export quality of seeds • Testing the residue in Bangkok • For export of sesame, sea freight is the only option
Opportunities	**Threats**
• High demand of product • Market potential for export • More value added potential	• No access to test Imidacloprid (Chemical residue) to 0.01 ppm • High tax and transaction cost

4.2.2.1 Challenges and Constraints of Sample Farmers in Sesame Production and Marketing

The sampled farmers in the study area want to use good quality seed, good quality chemical fertilizers and pesticides at reasonable prices. The farmers in the study area are faced with the uncertainty or low quality of inputs in sesame production and state that the enforcement of fertilizers and pesticides laws are essential. Currently, a local research firm distributes the quality seeds of sesame, but is insufficient. Therefore the sampled farmers have little access

to high quality seeds. The sesame crop is not resistant to pest and disease and needs to be harvested timely. Sesame yield level is still low and the farmers want pest resistant varieties to increase their yield. In addition, very low access to credit and insufficient amount of credit per unit of land require the farmers to use low levels of input resulting in lower yields.

After permission of exporting sesame legally, the various actors in the sesame value chain received a high demand, for both local and export markets. However, farmers are not confident in producing sesame due to uncertain weather conditions (droughts) as sesame is very sensitive crop. The product price is therefore unstable when farmers sell their crops. The price of labor, fertilizer and pesticides used in sesame production is also very high. Although farmers want to use machinery for solving labor shortages and high cost of labor in sesame production, they have low access to loans to purchase machinery. Farmers also suffer from high post-harvest losses due to low access to post harvest technology.

4.2.2.2 Challenges and Constraints of Sample Wholesalers in Sesame Marketing

The supply of the sesame crop has increased considerably. Farmers now grow sesame more than before due to high international demand. But, the sampled wholesalers need more capital to invest in marketing. The high interest rate for working capital creates inefficiency in sesame marketing in Magway.

4.2.2.3 Challenges and Constraints of Sample Millers in Sesame Oil Marketing

Sesame oil is suitable for health. Therefore people of higher income purchase sesame oil regardless of its higher price. Millers prefer sesame oil because sesame seeds contain high oil compared to other oil seed crops. But the major challenge is they have to compete with exporters in buying raw sesame seeds. Some uncompetitive millers have shut down their oil mills in the study area. In addition, if the raw sesame seeds are of poor quality, millers are faced with the difficulty in milling.

4.2.2.4 Challenges and Constraints of the Sample Processor in Sesame Brittle Marketing

The demand of sesame brittle becomes high because of good taste and high consumer preference and demand. Women can participate in the processing of sesame brittle and can

become an important job creation for women. The sampled processor needs more capital to invest in sesame processing and is faced with a high interest rate.

4.2.2.5 Challenges and Constraints of the Sample Exporter in Sesame Marketing

There are only six exporters in Myanmar as competitors in sesame export. The quality of Myanmar sesame seed is still relatively low. Therefore the price received is also low compared to other sesame exporting countries. The major constraint for sesame exporter is that there is no access to test for Imidacloprid (Chemical residue) to 0.01 ppm in Myanmar. The pesticide residue in sesame seed can only be tested in Bangkok because of lack of technology in testing the residue in Myanmar.

5. Conclusions and Recommendation

5.1 Conclusions

In this study, it was found that there were many actors in the sesame value chain. The constraints and challenges of all actors were investigated. The major constraints for sesame farmers were a lack of technology, low access to credit, lack of knowledge about the quality of inputs and products. The major constraints for wholesalers, millers, processors and exporter were a low access to financial possibilities. In sesame seeds flow, wholesalers received 70.66% of total profit share. In sesame edible oil flow, wholesalers again received the highest percentage share of total profit (66.84%). In sesame brittle flow, the processor occupied 84.99% of the total profit share. The percentage shares of marketing margin of farmers, wholesalers and exporter were 71.48%, 25.39% and 3.13% respectively in the sesame seed value chain. In the sesame oil value chain, the farmers received 64.94% of the marketing margin, the wholesalers 23.07% and the millers 11.99%. For the sesame brittle value chain, the percentage share of the marketing margin was the highest (69.63%) for the processor followed by the farmers (22.41%) and wholesalers (7.96%). Sesame marketing is very weak in the study area because wholesalers received much of the profit by transacting the sesame without value adding and individual farmers marketed their sesame directly to wholesalers without any negotiating power or organization (farmer cooperatives).

5.2 Recommendation

5.2.1 The Role of the Public Sector, Private Sector and Civil Society in the Value Chain

The formation of a public company is needed for the sesame value chain development in the study area. A public company must consider such factors as domestic and international trade, guaranteed minimum price, contract farming, fertilizer distribution, seed production and distribution, infrastructure and logistical development, agricultural or farmer's bank, and construction and other investment projects. The government (public sector) must lead, setting the direction for the transformation and creating the right environment to achieve the value chain development. As for the private sector, there is a need to establish contract farming by cooperating with the farmers. The role of civil society in the value chain is also very important. Civil society such as NGOs and other organizations, and support communities should manage risk; build local capacity and bridge gaps in value chain of sesame.

5.2.2 Conditions Necessary to Improve the Value Chain

Based on the findings of this study, the following actions are proposed for consideration by the Government of Myanmar:

1. There is a need to raise the profit shares of the farmers, especially small holder farmers in the sesame value chain.
2. Good quality seeds are a necessary condition for the improvement in yields for sesame production apart from other inputs like fertilizer, pesticide, etc. Hence, sesame growers need improved varieties of good and high yielding seeds. The seeds used by most farmers are those produced from their own farms using traditional methods and this has affected the quality of the crops produced and consequently, affects the income and return for sesame farmers. Under this condition, there is an urgent need to develop a seed industry through public-private partnerships to meet the growing demand for quality seed.
3. Public investment should be raised in sesame agronomic research to make it possible for improvements in sesame crop productivity.
4. Farm mechanization should be supported to farmers who are faced with labor scarcity in sesame crop production.

5. Options for improving public and private extension programs should be explored to adopt improved farm technologies by farmers. Training programs should be supported to develop more effective marketing strategies for smallholder farmers and to negotiate more effectively with traders, in order to increase the prices that they receive for their sesame.
6. Promoting farmer organizations (cooperatives), which are assumed to play important role in improving the bargaining position of the producers, should be established.
7. Financial constraints should be simultaneously solved at all levels along the value chain where they are shown to be a constraint.
8. The standards for the production, processing, and export of sesame are urgent needs of Myanmar. These standards should be in conformity with those of the international standards. Achieving higher quality for Myanmar sesame should be a first measure needed to obtain a higher market price.

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- Phase Three: Research Roundtable Meeting
- Phase Four: Publication and Dissemination of Students' Works in 'MI Working Paper Series'

The research cycle involves:

- One month training course on GMS Cooperation and ASEAN Integration, research development and methodology. The students will produce their research designs and action plans as training outputs;
- Technical assistance and advisory support to MINZAS scholars by experienced mentors and academicians in the course of the research process;
- The scholars will present their research papers in a round table meeting attended by subject experts and their peers;
- Scholars will revise their research papers and improve as necessary, based on experts and peer review during the roundtable meeting;
- Publication of reports as MI working paper series.

The Mekong Institute (MI) is an intergovernmental organization with a residential learning facility located on the campus of Khon Kaen University in the northeastern Thailand. It serves the countries of the Greater Mekong Subregion (GMS), namely, Cambodia, Lao P.D.R., Myanmar, Thailand, Vietnam, Yunnan Province and Guangxi Zhuang Autonomous Region of PR. China.

MI is the only GMS-based development learning institute, chartered by the six GMS Governments, offering standard and on-demand capacity development programs focusing on regional cooperation and integration issues.

MI's learning programs services caters to the capacity building needs of current and future GMS leaders and policy makers on issues around rural development, trade and investment facilitation, human migration, with good governance and regional cooperation as cross cutting themes.

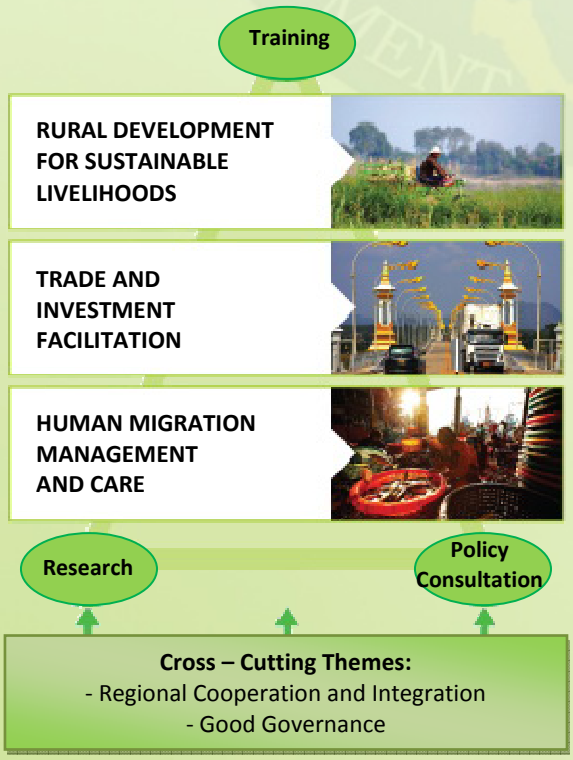
Vision

Capable and committed human resources working together for a more integrated, prosperous, and harmonious GMS.

Mission

Capacity development for regional cooperation and integration.

MI Program Thematic Areas



1. **Rural Development for Sustainable Livelihoods**
   - Agriculture value chains
   - Natural resource management
   - Food security and sufficiency
   - Productivity and post harvest support
2. **Trade and Investment Facilitation**
   - SME clusters, business to business and export networking
   - Trade and investment promotion in Economic Corridors
   - Cross-Border Transport Facilitation Agreement (CBTA) and Logistics
   - Public-Private Partnerships
3. **Human Migration Management and Care**
   - Safe migration
   - Labor migration management
   - Harmonization of migration policies and procedures
   - Mutual recognition arrangement for education, training and skills standard

For more information, visit www.mekonginstitute.org

Mekong Institute

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