SUPPLY CHAIN MANAGEMENT OF GROUNDNUT PRODUCTION IN MAGWAY TOWNSHIP

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The thesis attached here to, entitled **"Supply Chain Management of Groundnut Production in Magway Township"** was prepared and submitted by Htet Htet Htun under the direction of the chairperson of the candidate supervisory committee and has been approved by all members of that committee and the board of examiners as a partial fulfillment of the requirements for the degree of **Master of Agricultural Science (Agricultural Economics)**.

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DECLARATION OF ORIGINALITY

This thesis represents the original work of the author, except where otherwise stated. It has not been submitted previously for a degree at any other University.

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DEDICATED TO MY BELOVED PARENTS,

U KHIN MG LAY AND DAW KHIN HLA MYINT

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SUPPLY CHAIN MANAGEMENT OF GROUNDNUT PRODUCTION IN MAGWAY TOWNSHIP

ABSTRACT

Groundnut is economically important for edible oil and other processing (such as roasted, salted, flavored, brittle etc). This study was mainly conducted to analyze the factors affecting groundnut supply and profit at farm level in Magway township, to study the operation of existing marketing channels of groundnut, to analyze marketing costs and margin along the marketing channels of groundnut and to identify major constraints and opportunities of groundnut marketing. The survey was conducted at 3 villages (Magyigan, Phoelaylone and Tapauktaw) in Magway Township from December 2012 to January 2013. The selected sample sizes were 90 farmers, 5 wholesalers, 5 huller owners, 5 millers and 1 processor.

In Groundnut supply chain, market participants including local wholesalers, huller owners and processors (edible oil miller and groundnut brittle processor) are well composed. Average yield of groundnut in the study area (80 bsk/acre) was higher than the national target yield (50 bsk/ac). Among groundnut varieties, "Tontarni" variety was the most popular because of its high yield and resistant to disease and pest. In the influencing factor analysis, groundnut yield was positively and significantly influenced by seed rate, price of groundnut, total labor and access to credit. Groundnut profit was positively and significantly influenced by yield and negatively influenced by total material cost.

In the marketing margin analysis, among the market participants, marketing margin of township wholesalers got the lowest margin and processors got the highest profit. The major constraints for the farmers were the insufficient of capital investment, insufficient of availability of credit and lack of contact with extension worker. The major constraints for the huller owners faced were concerned with the problem of environment pollution such as dirt, dust and noise from the groundnut hulling process. The major constraints for the millers were the problem of power supply, lack of technology and capital investment.

Improvement of local specific adaptable varieties such as Tontarni should be developed more to enhance the land productivity. Major constraints on credit availability for farmers should be explored and the effective rural financing system collaborating with INGOs and government organizations such as MADB will be highly demanded. More effective extension service and training programs were recommended for groundnut farmers in the study area.

Efficiency of market participants including local wholesalers, huller owners and processors can be improved by reducing constraints on marketing facilities, market information, and credit, etc. High profit per unit cost in processors shows the key indicator for the development of agro-food industry in each production area concerned. As the groundnut price was the most effective variables for yield, good macro environment is necessary to increase crop price which can increase farm income. As the total material cost negatively influenced on profit of groundnut production, favorable policy environment for production and marketing of groundnut sector will be demanded for the development of small farmers.

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LIST OF ABBREVIATIONS

BCR	= Benefit-Cost Ratio
DOA	= Department of Agriculture
FAO	= Food and Agriculture Organization
FAOSTAT	= Statistics of Food and Agriculture Organization
Ha	= Hectare
HH	= Household
Kg	= Kilogram
MOAI	= Ministry of Agriculture and Irrigation
MT	= Metric Ton
OLS	= Ordinary Least Square
CSO	= Central Statistical Organization
GDP	= Gross Domestic Product
SLRD	= Settlement and Land Record Department

LIST OF CONVERSION FACTORS

1 Basket of groundnut with shell	=	11.34 kilograms
1 Ton	=	1000 kilograms
1 Ton of cow dung	=	2 cartloads of cow dung
1 Hectare	=	2.471 acres

CHAPTER I
INTRODUCTION

1.1 Background

Myanmar is an agricultural country, and agriculture sector is the back bone of its economy. For food production with the growing population, agriculture sector will continue to be essential for the country as well as to occupy a large share of the export earnings. Therefore, the agriculture sector needs to expand the production of food. Agriculture sector contributed 27.5% of GDP (Appendix 2), 17.5% of total export earnings, and employs 61.2% of the labor force (MOAI 2012)**.** About 70% of the population works in agriculture and forestry, and rice accounts for about half of the agricultural output. In Myanmar, more than 60 different crops are grown based on the prevalence of different agro-ecological zones. The crops are generally classified into eight groups: cereals, pulses, oilseeds, industrial crops, fruits, vegetables, culinary crops and other crops. Other important crops are pulses, sesame, groundnuts and sugarcane. The country's cropping intensity had increased from 119.6% in 1988-1989 to 171.4% in 2010-2011 but in 2011-2012, the cropping intensity was decreased 165.6% (SLRD 2012) (Appendix 3).

Growth in the agricultural sector is necessary to increase food availability and sustain the economic development process continuously. The main objective of the Ministry of Agriculture and Irrigation (MOAI) with a view to improve the agriculture sector is to increase the incomes of the farmers through the increase of crop production. Sufficiency of edible oil is one of the important goals of the country. To be fulfilling this goal, it is necessary to increase the production of oilseed crops. The three major edible oilseeds produced in Myanmar are groundnut, sesame and sunflower.

Until the early 1990, the production of crops was heavily influenced by state control and regulations. These control dictated which crops could be grown and in many cases, included compulsory procurement of output for sale at price below market levels. This system started to change in the 1990s. However, not all market policies have been liberalized. Although no compulsory purchasing exists for oilseed crops, the oilseed crops and edible oil sub-sectors are among those for which state controls are still in place.

These include outright bans or controls of export and import of oilseed crops, oil meals and edible oils.

There are essentially two major government policy objectives for the oilseed crops subsector:

1. Achieve self-sufficiency in edible oil
2. Maintain edible oil price control to avoid fluctuation

These two policies are self-defeating. Through the implementation of these policies, Myanmar has adopted restrictive measure on import and export of oilseeds and oilseed products.

1.2 The Role of Oilseed Crop in Myanmar

The percentage shares of the total sown area for the major crops in 2011- 2012 are shown in Appendix 4. In Myanmar's agriculture, cereal crops remain the important crop group with its area constituted around 39% of the total crop sown area. It is followed by pulses which is the second most important crop next to cereal. The 15% of the total crop sown area is covered with oilseeds in Myanmar. Oilseed crops are the third important crop because of essential food grains with respect to area. Culinary, industrial and other crops covered 1%, 5% and 20% of the total crop sown area.

In many parts of central Myanmar, oilseeds, particularly sesame and groundnut, along with pulse crops, play an important part in ensuring food security and providing cash income for education, health and other social necessities. Oilseed crops also play a vital role accordingly to Myanmar high consumption of cooking oil compared to other neighboring countries. Major oilseed crops include groundnut, sesame, sunflower, mustard and niger. Oilseed crops cultivation is shown in Appendix 6. The percentage share of oilseed crops area cultivated in 2011-2012 is shown in Appendix 5. Sesame was the largest sown area nearly about 46% of the total oilseed crops sown area. In addition, 26% of the total oilseed crops sown area was covered with groundnut when sunflower was 16% and mustard and niger occupied 13%.

Among them, groundnut cultivation increased from 479,000 hectares in 1996-1997 to 877,000 hectares in 2010-2011.

1.3 The Role of Groundnut in Myanmar

In growing oilseed crops, groundnut production has reached its productivity potential defined by the country itself. In the world, India occupied the highest harvested area which was 22.84% of the world groundnut harvested area and China occupied 18.36%. Myanmar occupied the third largest groundnut harvested area which accounted for 3.66%. World's groundnut production was 36,457 thousand MT and Asia's groundnut production was 23,351 thousand MT which was 64.05% in world total groundnut production and yield was 1,966 kilogram per hectare (kg/ha) in 2009. In 2010-2011, Myanmar occupied the third highest groundnut production (1,392 thousand MT) of Asia and groundnut yield was 1,587 kilogram per hectare. In terms of groundnut production, Myanmar occupied 3.81% in the world and 5.96% in Asia. Groundnut production in Myanmar and neighboring countries is shown in Appendix 7 (MOAI 2012).

Major oilseed exporting countries are Argentina, Australia, Brazil, Canada, Paraguay, Ukraine and USA. Most of the exporters are western developed countries. Major oilseed importing countries are China, Egypt, Indonesia, South Korea, Taiwan, Thailand, EU-27 and Mexico. Much of the imports are made by developing and middle income countries (Kyaw and Raphy 2009).

1.4 Production Trend of Groundnut in Myanmar

The oilseed crop production increased from 1.6 million MT in 2000 to 8.33 million MT in 2008 mainly through area expansion, but the domestic demand for edible oil was noted to grow at a faster rate. Among the oilseed crops, the sown area and production of groundnut from 1995-1996 to 2010-2011 is shown in Appendix 8. The production of groundnut increased significantly from 1995 to 2011. And, the sown area of groundnut slightly increased from 1995 to 2011. In 2011-2012, the total sown area of groundnut is 877,000 hectares and the production of groundnut is 1,392,000 MT.

The oilseed crop production is concentrated in the central dry zone area, which encompasses the regions of Magway, Mandalay, Sagaing and parts of Bago. The 75% of the groundnut production comes from Central Myanmar, mainly Sagaing, Mandalay and Magway in both rainy and winter seasons. Sesame and groundnut are traditional crops

within the region and remain dominant, although sunflower and cotton are recently introduced as a main crop.

Percentage share of sown area for rain-fed groundnut and winter groundnut are shown in Appendix 9 and 10. In Magway Township, groundnut was grown in the rainy season and winter. In the sown area for rain-fed groundnut, Magway region was the main growing area and it occupied 27% of sown area. In the sown area for winter groundnut, Magway region follows the third in growing winter groundnut areas and it occupied 11% of the sown area. Sagaing region is the main growing area for winter groundnut and it achieved 35% of the sown area. In rainy season, the sown area of groundnut increased from 17.95 thousand hectares in 2008-2009 to 21.18 thousand hectares in 2012-2013. In winter season, the sown area of groundnut increased from 0.61 thousand hectares in 2008-2009 to 0.85 thousand hectares in 2012-2013. But in 2011-12, the sown area of winter groundnut decreased 0.81 thousand hectares. In the comparison of rain-fed groundnut sown area and winter groundnut sown area, the farmer was significantly higher than the latter. The comparison of rain-fed groundnut sown area and winter groundnut sown area of Magway Township are shown in Appendix 11 (DOA Magway).

1.5 Processing of Groundnut

The groundnut is used not only as a source of oil but also for direct consumption which forms an important part of the diet. Groundnut is marketed for two different purposes: (1) to be consumed as groundnut oil and, (2) to be used as traditional snack. Groundnuts are mainly sold as edible groundnuts, crushed groundnuts, seeds and for the animal feed industry. Raw groundnuts are basically used as seed, transformed into 'prepared' groundnuts (roasted, salted, flavored, etc.) used in food industries to produce peanut butter/paste and groundnut intensive goods such as snacks and sweets, or crushed for oil and groundnut meal. Groundnut butter is one such product consumed in large quantities especially in western countries since many years.

Food processing constitutes a major economic sector in developing countries, especially in urban areas where low-income families are not equipped to carry out the basic processing of agricultural and animal products. Food processing also allows the consumption of seasonal agricultural products over the whole year. In Myanmar,

groundnuts are sold mainly as a groundnut brittle. Brittle is a type of confection consisting of flat broken pieces of hard sugar embedded with groundnut seed (lone san). It has many variations around the world. Groundnut brittle widely produced in Magway Township by the name of Kaung – Mon on the domestic market.

Edible oil processing has an important role in transforming oilseed crops into edible oil products for consumers. In Myanmar, the private sector plays a major position in the milling of oilseed crops such as sesame, groundnut and sunflower. Edible oil processing is a peak activity after harvesting the oilseed crop. The millers collect the crops and distribute the processed edible oil by using their own investment or sometimes the loan from private banks. Normally groundnut oil is the most expensive edible oil while palm oil is the cheapest on the market. However, prices of edible oils in general fluctuate widely. This is closely related to domestic production level of oilseed crops and import volume of palm oil (Kyaw and Raphy 2009).

Myanmar is currently a deficit producer of edible oil and oilcake, and significant quantities of palm oil are imported to partially meet domestic demand. Outright bans on imports or exports cannot be fully enforced. Informal imports allow the country to meet domestic demand of oil and oilcake, while informal exports of groundnuts for the snacks market allowed groundnut prices to be sustained on the domestic market.

1.6 Rationale of the Study

Oilseed crops stand third position in term of sown area in Myanmar. The major oilseed crops are groundnut, sesame and sunflower. Oilseeds and oilseed products are economically crucial for livelihood of Myanmar farmers, processors and consumers. The contribution of those products plays a vital role in Myanmar agricultural sector and agricultural product markets as well as on international markets. In Myanmar, increase in oilseed crop production depends totally on area expansion. Self-sufficiency in edible oil is the second of the three objectives which was laid down by the Ministry of Agriculture and Irrigation. Policy reforms in the oilseed crops sub-sector should aim at ‘increasing national welfare’ by increasing the profitability of private sector operations along the chain as opposed to ‘self sufficiency’ and ‘price control’ policies.

Among the oilseed crops, groundnut is the focus of this study. In groundnut production, most of the farmers are insufficient of capital investment for purchasing inputs and storage facilities. And they also have credit problem. In growing groundnut, labor sources and land resources are the strength to increase the productivity. Improvement of land productivity can enhance the yield and profit. And, Tschering (2002) observed that influencing factors that were found to be influenced profitability were the farmer's characteristics, input use, labor use, costs, whether the farmers produced for sale or for home consumption as well as the methods of production. Therefore, the information concerning about the groundnut supply and pofit are important consideration for farmers in growing groundnut. Therefore, this study will point out the factors affecting the groundnut supply and profit at farm level in Magway Township. The groundnut production might be constraints by many factors such as insufficient extension service, high inputs cost, high transportation cost and access to credit etc. Therefore, it will be needed to find out the constraints in groundnut production.

In the groundnut marketing channel, the wholesalers handle the commodity as crops, the processor handle the commodity as groundnut brittle and the millers handle the commodity as edible oil. And the hullers handle the commodity as the groundnut seed. Therefore, the commodity types handled by the middlemen are different. So this study will be needed to understand how the commodities move through the various channels and to identify the marketing agents involved. For raising the efficiency of marketing system, the behavior of market participants, costs and margins of marketing channels are essential tools. Magway is a leading township with respect to groundnut growing and processing. Therefore, the descriptive analysis of this study can help to explore the current situation of groundnut marketing system of the study area.

Finally, this study has to identify market efficiency and marketing channel of groundnut. The volume of marketing margins generally reflects the marketing efficiency. More specifically, this study will focus on the factor affecting groundnut supply and profit at the farm level, different market levels, roles of marketing actors in the marketing channel and major constraints of groundnut production.

1.7 Objectives of the Study

The overall objective of the study is to understand the market performance in terms of marketing margin and cost of various stakeholders (farmers, millers, wholesalers, hullers and processor) to investigate the groundnut distribution system in Magway Township, Magway Region.

1. To analyze the factors affecting groundnut supply and profit at the farm level
2. To study the operation of existing marketing channels of groundnut
3. To analyze marketing costs and margin along the marketing channels of groundnut
4. To identify major constraints of groundnut production and marketing in Magway Township

1.8 Hypotheses

Based on the objectives, the hypotheses for this study were formulated.

(1) Farmers are profitable from rain-fed groundnut production in the study area.

(2) Efficient oilseed crop and edible oil marketing system together with well-organized marketing channels can give required quality and enough quantity at reasonable price to consumers, maximize returns to producers and provide both producers and consumers satisfaction.

(3) The marketing margin should equal or be very close to the level of marketing cost. The oilseed crop farmers should gain the largest share of price in current market situation in Myanmar.

CHAPTER II
LITERATURE REVIEW

2.1 The Concept of Supply Chain and Marketing

2.1.1The concept of supply chain

The supply chain refers to all those activities associated with the transformation and flow of goods and services, including their attendant information flows, from the sources of raw materials to end users. Management refers to the integration of all these activities, both internal and external to the firm (Ronald et al 2000).

Agri-food supply chain is divided into two types: a fresh-food product supply chain, such as those for fresh vegetables and fruits; and a processed-food product supply chain such as those for canned products. The members of a food supply chain are farmers, processors, distributors and retailer, while NGOs, governments and shareholders are stakeholders in the chain (Aramyan 2006).

Chopra, Sunil and Peter (2004) defined a supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers, and customers themselves. Within each organization, such as manufacturer, the supply chain includes all functions involved in receiving and filling a customer request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance, and customer serve.

A typical supply chain may involve a variety of stages. These supply chain stages include:

- Customers
- Retailers
- Wholesalers/Distributors
- Manufacturers
- Component/Raw material suppliers.

Fearne and Hughes (1999) mentioned on success factors in the fresh produce supply chain: insights from the UK, found that power of retailer increases along with their interest on own label products. So they became increasingly dependent on fewer

larger suppliers who can deliver safe products on a large scale at a competitive price. He suggested that farmers and growers should directly link with other sectors of the marketing chain in order to supply the right and consistent quantity and quality of different products. The producer of raw material needs to accept the fact that the financial benefit, which comes from partnership will invariably distributed in relation to value added.

Ricks et al. (1999) revealed that the appropriate combination of vertical coordination arrangements like contracts, informal agreement and joint venture improved supply chain performance by providing adequate supplies to the shippers from packers and growers, aiding standardization and packaging of fruit products and risk sharing between the shippers, packers and growers.

Julie et al. (1998) mentioned a case study from the U.S. milling wheat industry, it focused on supply chain management in the grain industry by investigating the effects of wheat quality on marketing arrangements between producers, grain handling companies and processors, wheat quality is defined by many different characteristics, broadly categorized into physical and intrinsic quality attributes.

2.2 The Definition of Marketing

Market as an "an arena for organizing and facilitating business activities and for answering the basic economic questions: what to produce, how much to produce, how to produce, and how to distribute production" (Kohls and Uhl 1985). Market can be defined as an area in which one or more sellers of given products/services and their close substitutes exchange with and compete for the patronage of a group of buyers. Originally, the term market stood for the place where buyers and sellers are gathered to exchange their goods, such as village square. A market is a point, or a place or sphere within which price making force operates and in which exchanges of title tend to be accompanied by the actual movement of the goods affected (Backman and Davidson 1962).

Marketing is a ''system'', which comprises several and usually stable and interrelated structures that along with production, distribution and consumption, strengthen the economic process (Mendoza 1995).

Marketing as a societal process by which individuals and groups obtain what they need and want through creating, offering, and freely exchanging products and services of value with others. He also defined marketing as a managerial definition; marketing has often been described as the art of selling products (Kotler 2003).

Marketing is widely known as "the 21 century definition of marketing" which runs as follows a social and managerial process by which individuals and groups obtain what they need and want through creating and exchanging products and values with others (Kotler 2003).

Food marketing can be defined as the performance of all business activities involved in the flow of goods and services from the point of initial agricultural production until they are in the hands of the consumers. This definition of marketing also suggests a mutual interdependence between farmers and food marketing middlemen (Kohls and Uhl 2002).

Varnet and Vincent (1967) explained, a good marketing system is not limited to stimulation of consumption, but also generates increased production by seeking out extra supplies. If the production system works efficiently, it produces suitable incentives to meet consumer's needs more accurately in terms of type, quality and quantity of supply. Production is thus adopted to the need of consumers in response to price signals transmitted by the marketing system.

2.2.1 Approaches to the study of marketing

Economists take three major approaches to analyzing the marketing sector of the national economy. These include; the functional approach, the system or institutional approach and the individual or commodity approaches (Mendoza 1995).

(a) Functional approach

Functional approach involves classifying and studying specialized activities performed as marketing works. A marketing function is a fundamental or basic physical process or service required to give a product the form, time, place, and possession utility consumers' desire. In this approach, the performed activities in marketing agricultural production are taken and analyzed. The chief marketing activities are selling, buying,

transporting, ware housing, financing, risk-taking and carrying out market-intelligence (Branson and Norvell 1983).

(b) Institutional approach

It is concerned with the number and kind of business firms that perform the marketing task .That means, it covers all market participants (producer, assembler, transporter, wholesaler, retailer and consumer). This approach includes market stabilization agencies boards of foreign trade, supermarket chains, wholesaler or retailer networks, a town's central market, or agreements between producers and millers. The effectiveness of marketing institutions depends on the involvement of the relevant people (Branson and Norvell 1983).

(c) Commodity approach

This approach involves studying problems encountered while marketing particular products. These products could be consumers, industrial or agricultural product. This approach is used to deal with list of products and this detail analysis includes the classification of products, characteristics of products, source of supply, persons engaged in the exchange process, transportation of the product, its financing, storage, and advertisement. Institutional analysis in this approach involves identifying major marketing channels, analysis of marketing costs and margins (Branson and Norvell 1983).

2.3 Factors that Affect the Productivity

Monsiapile et al. (2010) studied the sunflower production situation in the central corridor of Tazinia. In the sunflower production, improved varieties, number of crops in farm, distance from homestead to the largest plot, and the age of household head were found to have most significant contribution to productivity of sunflower farmers. Decrease of age of head of household was associated with increase of sunflower yield by 0.33, with concentration of many crops in the farm it was likely to decrease sunflower yield by 0.047. Household with farms that were long distance from their house were 2.0% less likely to have higher sunflower yield. The use of local seed varieties was also likely to decrease sunflower yield by 26%.

Govereh and Jayne (2002) studied the determinants of cotton production in Gokwe North district and found out that cotton production was positively associated with farm size, education of the household head, the value of farm capital, the number of cotton sprayers and a relatively early clearing of tests from the village in question. This study brought about the importance of education as one of the factors affecting cotton production, but there was also need to look at other factors which affect cotton production from a historical perspective for policy evaluation purposes.

Thirtle (1990) showed that in general agricultural production in Zimbabwe was affected by the adoption of new technology, generated by R&D expenditures, or imported from abroad, and spread to the farmers by the extension service. They concluded that the determining variables that shift the production function were assumed to be R&D and extension expenditures, and the weather. In their study they did not disaggregate to individual crops. The problems which may arise from conclusions based on such research was that, different crops respond differently to various factors in the production process, so they was need to specifically study how individual crops respond to different factors.

Abdelaziz (2010) revealed that the significant factors affecting groundnuts production were the total cultivated area of groundnuts, crop rotation and period of cropping. In order to improve the agricultural production in the study area, the study recommended that the supply of the farmers with agricultural inputs especially seeds through repayment in kind after harvesting and support agricultural extension to be more efficient and effective in transferring the recommended improved technologies. Resolution of Darfur security problems in addition to solution of other problems facing agricultural production such as pests, marketing, desertification, drinking water, grazing etc were also essential.

Oury (1965) focused primarily on yield effects of precipitation, temperature and technological progress with findings suggesting a positive relationship between crop yields and precipitation and a negative relationship between yields and temperature.

2.4 Factors that Affect Profitability

Bagamba (1998) studied that the profitability of bananas found that the total farm size, total farm income, off-farm income, age of the farmer, weevil damage, interaction with government extension agents, gender of the farmer, distance from the farm to the tarmac, years spent in school and number of cattle owned had a significant effect on the profitability of banana production.

Increasing the area planted was expected to increase yield which should lead to increased gross margin. However this negative relationship between area and gross margin may be attributed to the fact that the area was not used efficiently thus increasing area of cowpeas planted would not actually lead to increased production. Quantity harvested also has a positive influence on gross margin at 95% confidence. An increase in yield had a positive relationship to gross margin because increasing the quantity harvested increases the number of kg's that can be valued (Warr 1999).

Erbaugh (2008) stated that the profitability of sorghum in Tanzania found that the farm size, production costs, farm location, interaction between production costs and farm gate price as well as the interaction between the varieties used and fertilizer applied were significant. Surprisingly, farm size was negatively influencing the gross margin contrary to the literature. However, the interaction between Production cost and farm gate price was positive and significant while farm gate price alone was not significant. In addition, the variety used, 7 application of fertilizer and tillage method were not significant but the interaction between variety used and fertilizer application was positive and significant.

Rearden (1997) revealed that several factors have been identified to influence agricultural profitability at farm level. These include; the farm gate price, government price policies, farm location, production costs, variety of seed used, yield, farm size, tillage practices, land tenure which also influences yield, experience in production of crop which impacts on yield, education level of the household head, age of household head, gender of household head, household size, off-farm income received, extension services, and distance to market.

2.5 The Marketing Channel/Chain and Marketing Margin

Kotler and Armstrong (2003) revealed that a marketing channel is a business structure of interdependent organizations that reach from the point of product or origin to the consumer with the purpose of moving products to their final consumption or destination. This channel may be short or long depending on kind and quality of the product marketed, available marketing services, and prevailing social and physical environment (Islam et al. 2001).

Mendoza (1995) defined that marketing channel as the path the goods follow from their sources of original production to their ultimate destination for final use. Hence, the analysis of marketing channels is intended to provide a systematic knowledge of the flow of goods and services from their origin (producer) to their final destination (consumer).

Olukosi and Isitor (1990) stated that marketing margin is studied to measure efficiency of markets. It is an attempt to evaluate economic or price efficiency. Generally, it refers to the difference between the retail price and the producer price. The marketing margin showed the fraction of the consumer expenditure on a commodity that is received by the producer and each of the marketing agents.

Tomek and Robison (1990) stated that there are two basic ways in which to view marketing margin. The first way is that marketing margin is simply the difference in price paid by consumers and the price received by producers. In the second way marketing margin can be explained as the price of a collection of services that are performed in getting the product from the producer to the consumer. The marketing margin is the cost of collection of services to move and transform the farm product into a product for the final consumer.

Guvheya (1998) defined that marketing margin is examined for a common means of measuring market efficiency. The overall marketing margin is simply the difference between the farm-gate price and the price received on retail sale. That difference can then be considered to be the cost of marketing and all that is entailed in getting the product from the producer to the consumer in the desired form. Therefore, marketing margins are differences between different levels of marketing channels. They capture the proportion of final selling price that marketing agent provides services for getting the added value in

various levels. Response of marketing margins to price changes at any level is also indicative of the efficiency of the channel or supply chain.

2.6 Review of the Studies on Marketing Channel and Marketing Cost

Achrol and Louis (1988) revealed that success or failure was determined by how effectively and efficiently their products were sold through their marketing channel members (e.g., agents, wholesalers, distributors, and retailers). Given this situation, considerable marketing channel research focused on organizational responsibility for managing channel how interrelationships among a firm and its channel members can be managed better.

Sidhu and Kahalon (1967) identified three marketing channels for apple in Kullu valley, namely, (a) contract system (b) sales in market through agents (c) directly to consumers and their shares in the market were 62.2% contract basis. 34.14% to commission agents in the market and only 3.65% through direct sold to consumers.

Satihal (1993) reported that a single marketing channel was observed in Bijapur district for bean crop. The per-quintal marketing cost of producer was the highest in Bangalore market (Rs. 119.73) followed by Hubli market (Rs. 114.35) and Bijapur market (99.88). The net returns realized per quintal was the highest in Hubli market Rs. (379.25) followed by Bijapur market (Rs. 356.61) and Bangalore market (Rs. 247) because of the price received by producer in Bangalore market was high as compared to other markets.

Singh and Kahalon (1968) observed that commission agents and retailers were important channels for selling grapes. About 41% and 40% of produce was marketed through commission agents and retailers respectively. Further analysis showed that grading and packing formed 72.6% of total marketing costs. In the primary markets transportation cost accounted for 10.96% and 34% in these markets respectively.

Lutz and Herman (1994) stated that the governance structure within a marketing channel depended largely on three variables: the frequency of interaction among channel members, the degree of uncertainty facing both actors (i.e. the sellers and the buyers), and the extent to which channel members had incurred transaction (specific expenses to do business with one another).The performance of marketing channel was related to its

structure and strategies (conduct) of the actors operating in these channels. A major distinction with respect to its structure concerned whether the organization functions in conventional or vertical marketing channels.

Patil (1989) identified four channels on marketing of Alphanso mangoes in Maharashtra viz. producer- consumer (direct sale) producer - cooperative - consumer (cooperative sale), producer - commission agents - wholesalers - retailers -consumer (middle men sales) and producer - pre-harvest contractor - commission agents wholesalers - retailers -consumer (pre-harvest contract sale). The study revealed that when the contract was made at the time of flowering stage, the price received by the growers was the lowest (Rs. 28.50/crate) though the crate size was big. The average price of Alphanso mangoes received by the growers was only Rs. 29.40 per crate. Finally, he concluded that the direct sale to consumer was the most profitable and sale through pre harvest contractor was the least profitable.

Cramers and Jensen (1982) defined that a marketing margin was the percentage of the final weighted average selling price taken by each stage of the marketing chain. The total marketing margin was the difference between what the consumer pays and what the producer/farmer receives for his product. In other words, it was the difference between retail price and farm price.

Olukosi and Isitor (1990) observed that marketing margin was studied to measure efficiency of markets. It was an attempt to evaluate economic or price efficiency. Generally, it referred to the difference between the retail price and the producer price. The marketing margin showed the fraction of the consumer expenditure on a commodity that was received by the producer and each of the marketing agents.

Dhar (1976) stated that the marketing costs when sold through commission agent at the markets of Jammu, Amritsar and Delhi came to Rs. 11.88, Rs. 14.58 and Rs. 17.37 respectively. The major items of marketing costs were packing, transportation and commission charges. Further analysis showed that commission agents accounted for more than 41 per cent of total marketing margins followed by transportation and handling charges.

Vedini (1997) conducted the study on cost and margins in Jasmine flower marketing. The study was conducted in Mysore city. It was interesting to note that all the

sample farmers sold their produce at their nearest markets in Mysore district. It was significant to note that the trader's commission agents were playing a very crucial role in Jasmine flower marketing than the direct sale to consumer. The study results explicitly indicated that Jasmine flower trade was a profitable venture with a price spread of nearly 49% among all the intermediaries the net return per kg of flower trade was the highest in case of retailers due to creation of form utility. The constraints called for orderly marketing by establishing co-operative for flower marketing.

Biradar (1996) studied the marketing costs, margins and price spread of selected agricultural commodities in Kolhapur district of Maharashtra during 1990-92. The study revealed that marketing margins, cost and price spread of different commodities in the two common channels under study was followed, it was found that the maximum average share of the farmer in the consumer's rupee is found in two commodities i.e., jaggery and groundnut, being 80% and 72% respectively, as compared to the food grain commodities, i.e., paddy and wheat, being about 68% and 56% respectively. The average cost of marketing and margin were to be the lowest in jaggery as compared to other commodities under study by and large, the cost of marketing was found uniform in all the selected commodities, whereas the market margin was varying from commodity to commodity and from market to market. The highest margin was claimed by the traders in wheat and paddy that was 32% and 21% respectively while in groundnut and jaggery their margin being 17% and 10.12% respectively.

Mohammed and Namasivayam (2005) conducted marketing cost of banana in Theni district of Tamilnadu. For the study banana growers of Theni district was selected and also the different functionaries which the farmers followed. The study concluded that cutting, loading and unloading commission, transportation and the like were the marketing costs of the banana growers, which amounted to Rs 805, Rs 760 and Rs 734 in the case of small, medium and large growers, respectively. The pre-harvest contractors incurred a marketing cost of Rs 775 per ton. Transport cost dominated other costs. The marketing cost, excluding interest on working capital was less to pre-harvest contractors than to the growers. Commission agents had to pay Rs 116.67 per ton towards the marketing cost. The wholesalers incurred a marketing cost of Rs 417.09 per acre. More

than 60% of the marketing cost of the retailers was due to wastage. The total marketing cost of retailers was worked out to be Rs 336.67 per ton.

Kasana (2003) carried out study on distributive marketing margins of three most commonly grown vegetables, i.e. potato, peas and marrow and the shares of different marketing functionaries involved in the marketing margins. He observed that total marketing margins for potato was 38.86%, for peas 54.89% and for marrow 62.89%. The net margins for potato, peas and marrow were 19.04%, 27.25% and 30.50% respectively. The producer received 61.14%, 45.11% and 37.11% of the price paid by the consumer for potato, peas, and marrow respectively. The difference in marketing margins for various vegetables is due to high marketing and picking costs. It was observed that 30 % of the potato fields were sold to pre harvest contractors. The highest marketing margins were observed for marrow followed by peas and potato respectively. The highest net margins for producers were observed for potato followed by peas and marrow. The highest net margin for wholesales was found in marrow followed by peas and potato. The retailer's highest net margins were observed for marrow followed by peas and potato.

2.7 Major Constraints and Opportunities for Marketing

Kherallah et al. (2000) defined that market liberalization opened up new opportunities for the local entrepreneurs to enter the market, increased competition among traders, and allowed for more cost effective trading and thus lower marketing margins. However, official market liberalization had not removed informal barriers, such as poor access to credit, insufficient market information, and inability to enforce contracts in impersonal trade, which were still serious impediments for trade.

Sonar et al. (2012) observed that sunflower value chain analysis in Tanzania was constrained by factors such as: poor farming tools and methods, insects and pests, inadequate knowledge by sunflower farmers, fluctuating market prices, poor infrastructure, poor linkages among stakeholders and inadequate market information.

Lokesha (2007) observed that groundnut production constraints in Raichur district of Karnataka. Low yield was the major production constraint in groundnut with a score of 65. This was followed by high pest incidence, high disease incidence, low shelling percentage and low market price with a score of 59, 51, 33 and 14 respectively. Similar

results were also observed in control villages. Low yield was the major production constraint in groundnut with a score of 67. This was followed by high pest incidence, high disease incidence, low shelling percentage and low market price with a score of 56, 53, 35 and 16 respectively.

Shanthasheela (2007) indicated that inadequate knowledge, practice of recommended agronomic practices and access to credit were the constraints found in sesame production. Specific constraints identified were availability of quality seed materials for sowing low yield, pest and diseases, labour availability, lack of awareness of suitable management practices to ensure good yield, high yield variation within the field, vagaries of nature, and lack of good returns from sale.

Tegegene (2008) identified cotton marketing constraints in the chain were not identified in detail through formal survey. Therefore, detailed formal survey analysis of marketing constraints in the chain was essential to know currently prevailing problems in the cotton marketing chain and their extent of prevalence.

Wolday (1994) observed that the performance of agricultural marketing system in Ethiopia was constrained by many factors such as: poor quality of agricultural produce, lack of market facilitates, weak extension services which ignored marketing development, poor linkage of research and extension, absence of market information and intelligent services, excessive price and supply fluctuations, limited access to credit, inefficient handling including, storage, packaging and transportation problems.

Hiremath (1993) expressed that the absence of processing facility, absence of cold storage facility, fluctuations in prices were the major problems expressed by farmer's, and other problems were absence of cooperative marketing of lime, non-availability of packing material at reasonable price and difficulty in transportation.

Gummagolmath (1994) identified the problems through the opinion survey revealed that the problem of orchardists expressed in all categories of farmers. Problem of non-availability of labour was expressed by most of the medium orchardists 66.67% followed by small orchardists 40% and large orchardists 33.37%. Among the marketing problems, the problem of price fluctuation was expressed by 44.44 % of small, 36.80% of medium and 50% of large orchardists and other problems were high commission and existence of mutual understanding between wholesaler and commission agents.

Senthilnathan and Srinivasan (1994) studied the problems in poovan banana cultivation in Trichy, Lalgudi and Kulithali taluks of Rrichirapalli district of Tamil Nadu. They reported that, in Trichy taluk 20 farmers expressed high initial investment, 16 wind damages, 12 price fluctuations and 10 disease problems. In Lalgudi taluk, 17 farmers expressed high initial investment, 11 price fluctuations, 13 diseases incidence and nine wind damage. In Kulithali, disease incidence expressed by 2, wind damage by 20, initial investment by 18 and price factor by 14 farmers.

2.8 Oilseed Crops Marketing Channel in Myanmar

Kyaw and Raphy (2009) revealed that the marketing channel of oil crops in Myanmar differ from place to place. For transferring agricultural produce from farmers to consumers, various intermediaries played important role in domestic marketing system. The private marketing system had the main role of transferring groundnut from producers to consumers through transport, storage, and processing activities.

Win (2009) stated that the marketing of oilseed crop was a business activity interaction between the farmers and marketing intermediaries throughout the whole process. The oilseed crop flow started from the farmers and finally to the consumers through the oil millers.

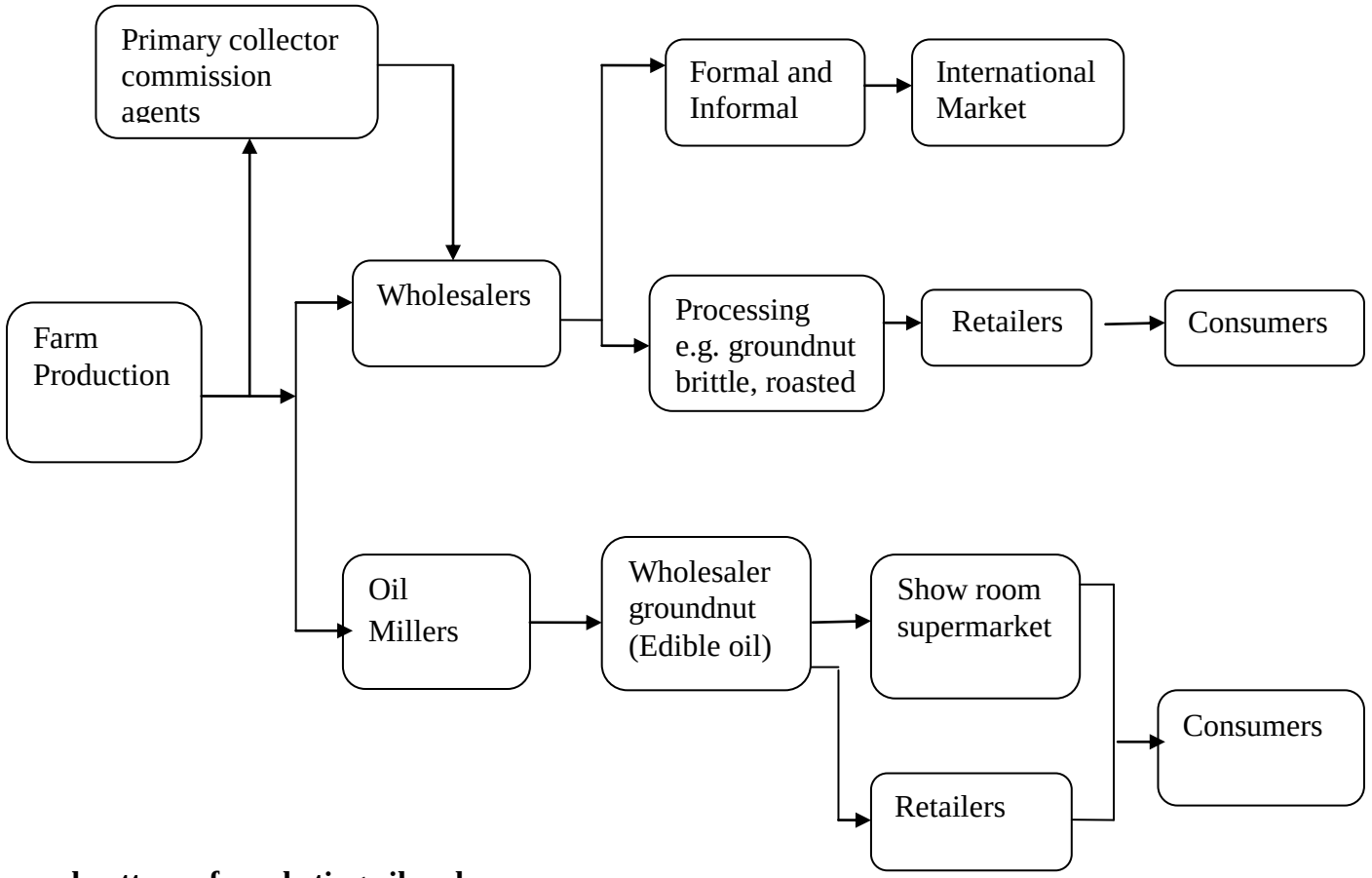

Figure 2.1 General pattern of marketing oilseed crops

Source: Food and Agricultural Organization of the United Nations, 2009

CHAPTER III
METHODOLOGY

3.1 Study Area

3.1.1 Description of the study area

Magway Region is located in central part of Myanmar. Its major parts fall in the dry zone. Magway Region is situated between North Latitude from 18˙ 50′ and 22˙ 47′ and East Longitude between 93˙ 47′ and 95˙ 55′, and has an area of 44,820 square kilometer (km^2). Magway Region covers 25 townships. Ya land occupies 0.65 million hectares of total arable land (1.01 million hectares) in the region and the rest lands are paddy land, silt land (Kaing-kyun myay), hill-side cultivated land (Taungya-myay) and vegetable land. Multiple cropping is practiced in the paddy land and farm land. 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 possesses tropical climatic condition and produces a large quantity of groundnut and sesame for edible oil, it is also known as an oil pot of Myanmar.

3.1.2 Climate

There are three seasons in Myanmar; namely the hot season, rainy season and cool season. Average temperatures of the central region are between 37˙C and 40˙ C in summer, especially April which is the hottest month. In cool season, the average temperature is 21˙C and the lowest temperature is 18˙C. Magway Township is situated 56.66 meter above sea level (maximum sea level is 250 meter and minimum sea level is 50 meter). The average monthly temperature ranges from a minimum of 10˙C (in January) to a maximum of 43˙C (in May). A maximum precipitation of 174.24 mm was found in June and minimum precipitation of 0 mm was found in January, February and March. Precipitation (mm) and temperature (˙C) of Magway township are shown in Figure 3.1 and Figure 3.2. The range of the total rainfall of the central region is from

812.8 mm to 863.6 mm. The average relative humidity is about 72.2 % in Magway Region.

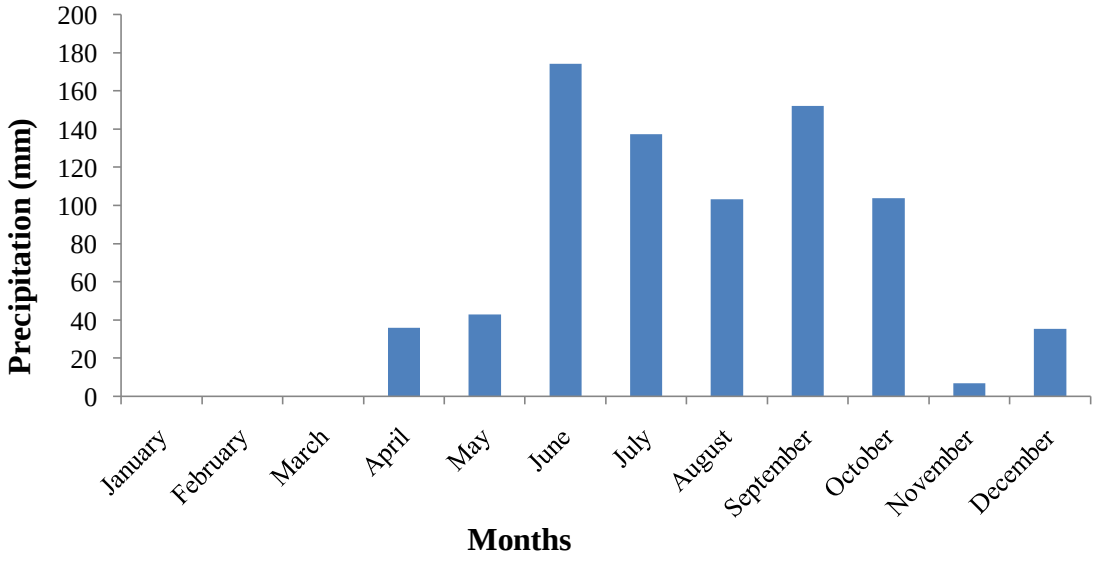

Figure 3.1 Precipitations (mm) of Magway Township in 2012

Source: DOA (Magway), 2012

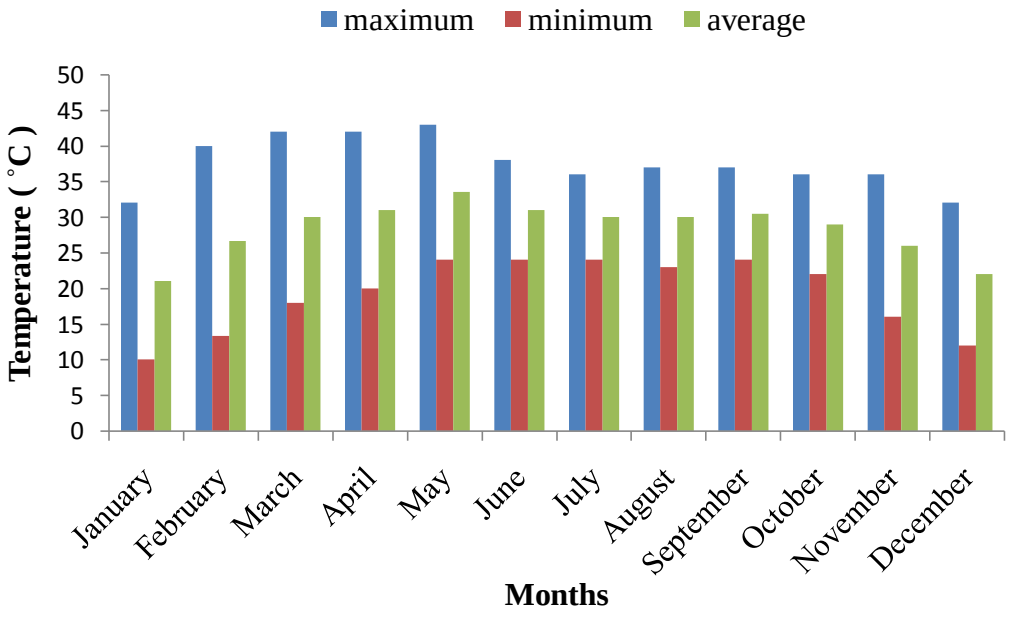

Figure 3.2 Temperature (˚C) in Magway Township (2012)

Source: DOA (Magway), 2012

3.1.3 Sown area and crop production in the study area

Magway Township occupied a land area of about 176 thousand hectares in which the cultivable area covered 81.41 thousand hectares (46.08%), wild land covered 0.87 thousand hectares (0.49%), reserved and other forests covered 2.27 thousand hectares (1.28%) and others occupied 92.15 thousand hectares (52.15%). Total cultivable areas was divided into 1.71 thousand hectares of lowland (2.11% in total net sown area), 77.61 thousand hectares of upland (95.33%), 2.09 thousand hectares of alluvial soil (2.57%), 0.002 thousand hectares of orchard (0.003%) (Table 3.1).

The sown area, harvested area, yield and production of rain-fed groundnut and winter groundnut in Magway township from 2008-2009 to 2012-2013 are shown in Table 3.2 and Table 3.3. The sown area of rain-fed groundnut significantly increased from 17.95 thousand hectares in 2008-2009 to 21.18 thousand hectares in 2012-2013. Production of rain-fed groundnut also increased from 29,569.11 MT in 2008-2009 to 40, 161.46 MT in 2012-13. The sown area of winter groundnut recorded an increase from 0.61 thousand hectares in 2008-2009 to 0.81 thousand hectares in 2012-2013. Production of winter groundnut slightly increased from 1,249.72 MT in 2008-2009 to 1,780.86 MT in 2012-2013.The sown area, harvested area and production of rain-fed groundnut significantly increased than the winter groundnut.

Table 3.1 Land utilization in Magway Township (2011-2012)

S.N	Type of Land	Area ('000 hectare)	Percent in total sown area
(1)	Net sown	81.41	46.08
	(a) Lowland	1.71	(2.11)
	(b) Upland	77.61	(95.33)
	(c) Alluvial soil	2.09	(2.57)
	(d) Orchard	0.002	(0.003)
(2)	Wild land	0.87	0.49
(3)	Reserved and other forest	2.27	1.28
(4)	Others	92.15	52.15
Total		176.70	100

Source: DOA (Magway), 2012

Note: Figures in the parenthesis are percentage in total net sown area

Table 3.2 Rain-fed groundnut sown area, harvested area, yield and production in Magway Township from 2008-2009 to 2012- 2013

Year	Sown area ('000 hectare)	Harvested area ('000 hectare)	Yield (MT/ha)	Production (MT)
2008-2009	17.95	17.95	1.64	29,569.11
2009-2010	17.97	17.97	1.85	33,170.30
2010-2011	18.05	18.05	1.85	33,321.76
2011-2012	21.04	21.04	1.89	39,831.14
2012-2013	21.18	21.18	1.89	40,161.46

Source: DOA (Magway), 2012

Table 3.3 Winter groundnut sown area, harvested area, yield and production in Magway Township from 2008-2009 to 2012- 2013

Year	Sown area ('000 hectare)	Harvested area ('000 hectare)	Yield (MT/ha)	Production (MT)
2008-2009	0.61	0.61	2.05	1,249.72
2009-2010	0.68	0.68	2.09	1,422.19
2010-2011	0.77	0.77	2.09	1,608.37
2011-2012	0.85	0.85	2.09	1,791.14
2012-2013	0.81	0.81	2.20	1,780.86

Source: DOA (Magway), 2012

3.1.4 General information of surveyed villages

Magway Township is made up of 15 quarters, 61 village tracts and 216 villages. To represent the groundnut growers, Tapauktaw, Phoelaylone and Magyigan villages were selected in this study. Tapauktaw, Phoelaylone and Magyigan are situated 4, 10 and 5 miles away from Magway Township.

In Tapauktaw village, there was 110.52 hectares of groundnut sown area. Harvested area was 110.52 hectares and produced 244.61 metric ton of rain-fed groundnut in 2012-2013. In Phoelaylone village, farmers grew 111.34 hectares of groundnut, the harvested area was 111.34 hectares and produced 277.2 metric ton of rainy-fed groundnut in 2012-2013. In Magyigan village, farmers grew 70.85 hectares of groundnut, the harvested area was 70.85 hectares and produced 166.66 metric ton per rain-fed groundnut in 2012-2013. The general information of those villages were shown in Table 3.4.

3.2 Data Collection and Sampling Method

Both primary and secondary data were collected during the crop season of 2012-2013.

3.2.1 Primary data collection

The primary information was collected by personal interview with structured questionnaire. Field survey for primary data collection was done from December 2012 to January 2013. The household level survey in Magway Township was carried out in 3 villages (Tapauktaw, Phoelaylone and Magyigan). A total of 90 sample farmers composed of 30 sample farmers each from the selected three village tracts were interviewed by using a structured questionnaire. The diagram of study area is shown in Figure 3.3.

The questionnaire was structured in details on rain-fed groundnut production at the farm level. Socio-economic characteristics of groundnut farmers such as age, education, family size, farm ownership, farm size, groundnut sown area, harvested area, yield, crop production, output prices, labor costs, transportation costs, marketing costs, extension service, credit taken, loan from agricultural development bank, amount of marketed surplus, production cost of groundnut and constraints etc. The market related

questionnaires were used to collect farm level detailed measures of prices and quantity, marketing system, marketing costs of various stakeholders, storage facilities, transport facilities and access to market information.

Then, to access the market performance of the stakeholders of groundnut market in Magway Township were surveyed. In each market, the numbers of respondents from the different stage are shown in Table 3.5. For this study, 5 wholesalers, 5 millers, 5 hullers and 1 processor were interviewed with different set of structured questionnaires to obtain clear understanding of the current marketing channel of groundnut sector. The data were collected for the investigation of marketing cost, marketing margin of various stakeholders and marketing channels.

3.2.2 Secondary data collection

Secondary data were gathered from published and official records of Ministry of Agriculture and Irrigation (MOAI), the Department of Agricultural Planning (DAP), Department of Agriculture (DOA), Department of Agriculture, Magway Township Office, the various other government organizations, Food and Agriculture Organization (FAO), Central Statistical Organization (CSO) and the other related publications.

3.3 Data Analysis Methods

Both qualitative and quantitative data were firstly complied in the Microsoft Excel program. The study was employed with descriptive method and econometric models were also applied by the help of statistical software packages, SPSS Version16.0. The descriptive statistics analyses were employed using diagrams, charts, percentages, means, variances and standard deviations in examining the groundnut marketing system as well as farmers' demographic, socio-economic characteristics, and role of traders characteristics. The profit per cost price was used to compare the performance of various stakeholders.

Table 3.4 General information of surveyed villages in Magway Township

Item	Unit	Village		
		Tapauktaw	Magyigan	Phoelaylone
Population	No.	1586	2850	1586
Total number of household	No.	358	610	358
Number of farm household	No.	159	200	159
Number of non-farm household	No.	199	410	199

Source: Field survey, 2012

Table 3.5 Number of respondents in the study area

Market participants	Number of sample respondents
Farmers	90
Wholesalers	5
Hullers	5
Millers	5
Processor	1
Total	106

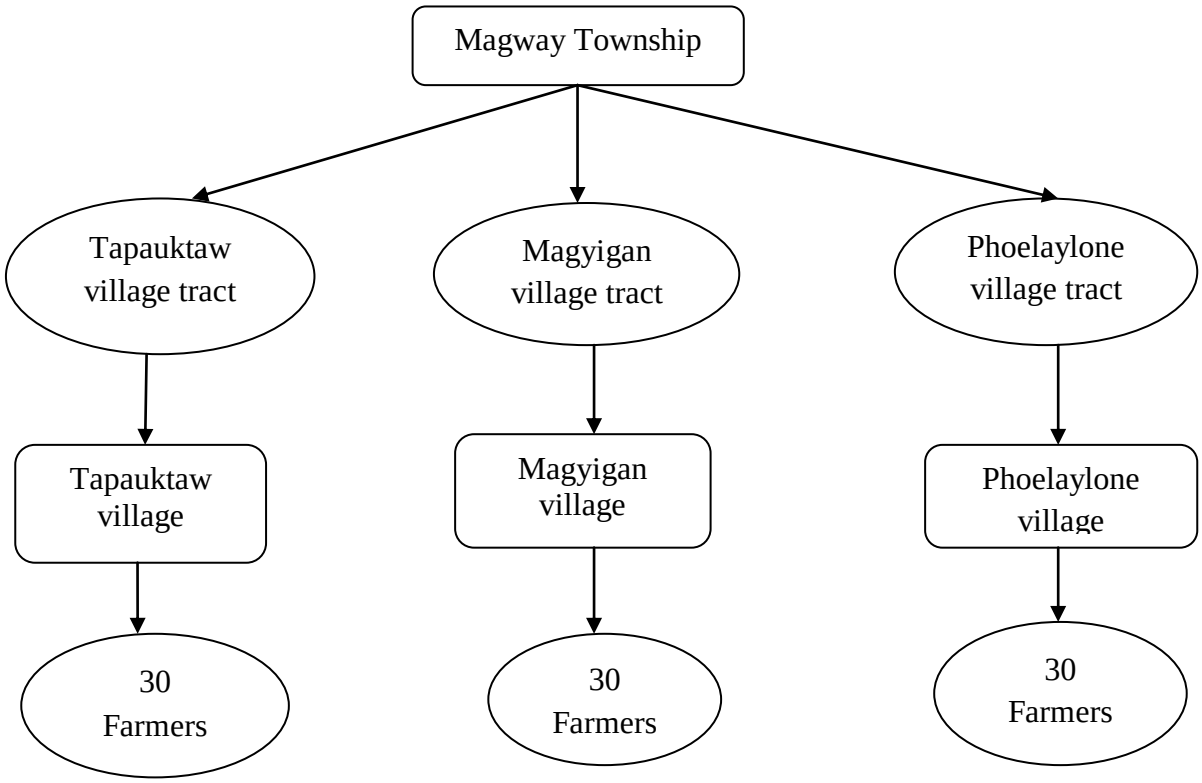

Figure 3.3 Diagram of study areas and sampled farmers

3.3.1 Cost and return analysis

Enterprise budgeting (Olson 2009) was used in the economic analysis. The evaluation and focus on the economic and technical performance of an individual farm enterprise is called an enterprise budget which is used to examine the profitability of specific farm enterprise and to compare the profitability of existing and proposed enterprises. The cost and return analysis was used to determine the profitability of the crop in the study area. Both cash and non-cash items were included in the estimation of material cost and labor cost. Non-cash items for material cost were seeds, working animals, FYM etc kept by farmers at farm. Cash payment for labor included hired labor and payment for land preparation. The first measurement was the difference between total gross benefits or total returns and total variable cash costs, excluding opportunity costs. This value was referred to as "return above variable cash cost". The second measurement was the deduction of the opportunity cost and total variable cash costs from gross benefit. This return was referred to as "return above variable costs" or "gross margin". The return per unit of capital invested could be calculated by gross benefits per total variable costs. The return per unit of cash cost could be calculated by gross benefits per total cash costs. Expressions for estimating returns to various factors were described in Table 3.6.

Table 3.6 Estimating return to factors of production

Factor	Unit	How to calculate
Return above variable cost	Price/ha	RAVC=TR-TVC
Return above variable cash cost	Price/ha	RAVCC=TR-TVCC
Return per unit of cash cost	Price	TR/TVCC
Return per unit of capital	Price	TR/TVC
Break –even yield	MT/ha	TVC/Average price per MT
Break- even price	Price/MT	TVC/Average yield per hectare
Gross Margin	Price/ha	GM=GB-TC
Benefit Cost Ratio		BCR= GB/TC

Source: Olson. K, 2009

Where,

GB	=	Gross Benefit	NB	=	Net Benefit
TR	=	Total Revenue	TVC	=	Total Variable Cost
TLC	=	Total Labor Cost	TVCC	=	Total Variable Cash Cost
Y	=	Output	RAVC	=	Return Above Variable Cost
BCR	=	Benefit Cost Ratio	RAVCC	=	Return Above Variable Cash Cost
GM	=	Gross Margin	TC	=	Total Cost

3.3.2 Method of marketing cost and marketing margin analysis

3.3.2.1 Marketing channel

Marketing channels can be defined as the set of external organizations that a firm uses to achieve its distribution objectives. Essentially, a channel is the route, path, or conduit through which products or things of value flow, as they move from the manufacturer to the ultimate user of the product. Marketing channel showed the flow of oilseed crops from the production site (producers) to intermediaries and on to the exporters. To understand how the commodities move through the various channels, it was necessary to identify the role of various market places and marketing agents involved (Mendoza 1995).

For most manufacturers, success or failure was determined by how effectively and efficiently their products sold through their marketing channel members (e.g., agents, wholesalers, distributors, and retailers). Given this situation, considerable marketing channel research focused on organizational responsibility for managing channel how interrelationships among a firm and its channel members can be managed better (Achrol and Louis 1988).

3.3.2.2 Marketing margin

Agriculture researchers and economists use the term "marketing margin" to summarize the aggregated costs of moving agricultural goods forward along the successive levels of the farm to retail marketing margin chain. The marketing margin or the farm to retail price spread is the difference between farm value and retail price. It represents payment for all assembling, processing, transporting and retailing charges added to farm product (Elitzak 1996).

Cramers and Jensen (1982) defined that a marketing margin is the percentage of the final weighted average selling price taken by each of the marketing chain. The total marketing margin is the difference between what the consumer pays and what the producer/farmer receives for his product. In other words, it is the difference between retail price and farm price.

The total marketing margin may be subdivided into different components; all the cost of marketing service and profit margin or net return. The marketing margin in an

imperfect market is likely to be higher than that in a competitive market because of the expected abnormal profit. But marketing margin can also be high, even in competitive market due to high real market cost (Worlday 1994).

Marketing margin is examined for a common means of measuring market efficiency. This is an attempt to evaluate economic or price efficiency. Marketing margins are differences between different levels of marketing channels. They capture the proportion of final selling price that marketing agents provides services for getting the added value in the various levels. Response of marketing margins to price changes at any levels is also indicative of the efficiency of the channel (Guvheya 1998).

An empirical analysis of marketing margin should be first and foremost an economic analysis of determinant of farm and retail price for a given commodity. The volume of marketing reflects the efficiency of marketing system. The higher marketing margin reflects fewer share of producer and more benefits to marketing middlemen and vice-versa. The number of middlemen involved in various channel of the marketing has a strong effect on the marketing margin.

The marketing margin of groundnut was examined in the analysis. In marketing channel, farmers produced groundnut with shell. And the township wholesalers handled the groundnut with shell, huller owners handled the groundnut seeds such as Si San (low quality seed, used to make oil) and Lone San (good quality seed, used to make groundnut brittle). The millers handled the commodity as edible oil. And the processor handled the commodity as a groundnut brittle. In marketing channel the commodity types handled by the middlemen are different. Therefore, the percentage of profit per cost price was used in this study to compare the performance of intermediaries.

The following indicators are used in the analysis.

(a) Marketing Margin = Selling Price –Buying Price

(b) Profit = Marketing Margin – Total Marketing Cost

(c) Cost Price = Buying Price + Total Marketing Cost

(d) Profit per Cost Price = Profit / Cost price

3.4 The Determinants Factors on Groundnut Yield of the Selected Farm Households

The following model was used to examine the determinants factors of groundnut yields of the selected farm households in Magway Township. To determine the factor affecting groundnut supply at farm level in the study areas, linear regression function was used. The dependent variable was yield of groundnut by sampled farmers and independent variables were sown area, schooling year, seed rate, output price received by farmers, total material costs, total labor and access to credit. The regression function was as follow;

$$Y_i = \beta_0 + \beta_1 LnX_{1i} + \beta_2 LnX_{2i} + \beta_3 LnX_{3i} + \beta_4 LnX_{4i} + \text{-------} + \beta_6 LnX_{6i} + \beta_7 LnX_{7i} + u_i$$

Where;

Y_i = Ln of groundnut with shell yield (kg/ha)

X_1 = Ln of scholling year (yr)

X_2 = Ln of sown area (ha)

X_3 = Ln of seed rate (kg/ha)

X_4 = Ln of total labor on the farm (no.)

X_5 = Ln of total material cost on the farm (kyats/ha)

X_6 = Ln of price of groundnut with shell (kyats/kg)

X_7 = Access to credit (dummy variables, yes=1, no=0)

u_i = Disturbance term

β = Unknown parameter to be estimated

i = 1….n

3.5 The Determinants Factors on Groundnut Profit of the Selected Farm Households

The following model was used to examine the determinant factors of groundnut profit of the selected farm household in Magway Township. To determine the factors affecting groundnut profit at farm level in the study area, linear regression function was used. The dependent variable was profit of groundnut by sampled farmers and independent variables were farm experience, sown area, yield, price of groundnut, total material cost, total labor cost and access to credit. The regression function was as follow;

$$Y_i = \beta_0 + \beta_1 \mathbf{Ln}X_{1i} + \beta_2 \mathbf{Ln}X_{2i} + \beta_3 \mathbf{Ln}X_{3i} + \beta_4 \mathbf{Ln}X_{4i} + \text{-------} + \beta_6 \mathbf{Ln}X_{6i} + \beta_7 \mathbf{Ln}X_{7i} + u_i$$

Where;

Y_i = Ln of groundnut profit (kyat/ha)

X_1 = Ln of farm experience (yr)

X_2 = Ln of sown area (ha)

X_3 = Ln of yield (kg/ha)

X_4 = Ln of total material cost on the farm (kyat/ha)

X_5 = Ln of total labor cost on the farm (kyat/ha)

X_6 = Ln of price of groundnut with shell (kyat/kg)

X_7 = Access to credit (dummy variables, yes=1, no=0)

β = Unknown parameter to be estimated

u_i = Disturbance term

i = 1….n

3.6 Empirical Model for the Factors Influenced the Groundnut Yield

The study expected from the independent variables which affected the factors influencing for groundnut yield in the study area. In this study, the selected variables included are sown area, schooling year of household head, seed rate, output price received by farmers, number of total labor, total material cost and access to credit. A complete decision of the variables specified and types of measures that have been employed is shown in Table 3.7.

3.7 Empirical Model for the Factors Influenced the Groundnut Profit

The study expected from the independent variables which affected the factors influencing for groundnut profit in the study area. In this study, the selected variables included are farm experience of household head, sown area, yield, output price received by farmers, total material cost on the farm, total labor cost on the farm and access to credit. A complete decision of the variables specified and types of measures that have been employed is shown in Table 3.8.

Table 3.7 Expected sign of the independent variables in groundnut yield

Independent Variables	Unit	Expected Sign
Sown area	Hectare	(+,-)
Schooling year	Year	(+,-)
Seed rate	Kg/ha	(+)
Price of groundnut	Ks/kg	(+)
Total labor	Number	(+)
Total material cost	Ks/ha	(+)

Table 3.8 Expected sign of the independent variables in groundnut profit

Independent Variables	Unit	Expected Sign
Farm experience	Year	(+,-)
Sown area	Hectare	(+,-)
Yield	Kg/ha	(+)
Total material cost	Ks/ha	(-)
Total labor cost	Ks/ha	(-)
Price of groundnut	Ks/kg	(+)

CHAPTER IV
RESULTS AND DISCUSSION

4.1 Description of Sample Groundnut Farmers

4.1.1 Socio-economic characteristics of sample groundnut farmers

Socio-economic characteristics of sample farmers collected in the study area using structured questionnaire were showed in Table 4.1. In the study area, the average age of the sample farmer was 52.21 years and the average experience in farming was 28.96 years. The percentage of male and female in the farm household were 60.23% and 39.77% respectively.

Education may have productive value; first, because it enables the manager of a firm to produce larger output quantities from the same measure quantities of inputs and, second, because it helps the manager to allocate the firm's resources in a cost-efficient manner, choosing which outputs to produce, how much of each output to produce, and in what proportions to use inputs in the production of any output. In the study area, education level of the sample farmers was categorized into five groups. "Monastery education" referred to the informal schooling although they could read and write. "Primary level" referred formal schooling up to 5 years; "Secondary level" intended formal schooling up to 9 years and "High school level" referred to the formal schooling up to 11 years. The last "Graduate level" referred to those who had an education of degree from college or university. The education level of farmers was assumed to make a decision in making their farming system.

From the results of the survey, 30% of the sample farmers was in the monastery education and 17.8% of them was in primary, the secondary education level was 33.3% which was the highest percentage among the education level of sampled farmers. High school education level was 15.6% and graduated level was 3.3%. Graduated level was the lowest percentage among the education levels. The education level of sample farmer is shown in Figure 4.1.

Table 4.1 Socio-economic characteristics of groundnut sample farmers (2012)

Item	Unit	Mean Value
Age	Year	52.21
Experience in farming	Year	28.96
Schooling year of household head	Year	4.60
Male	Percent	60.23
Female	Percent	39.77

Source: Field survey, 2012

Number of the sample farmers=90

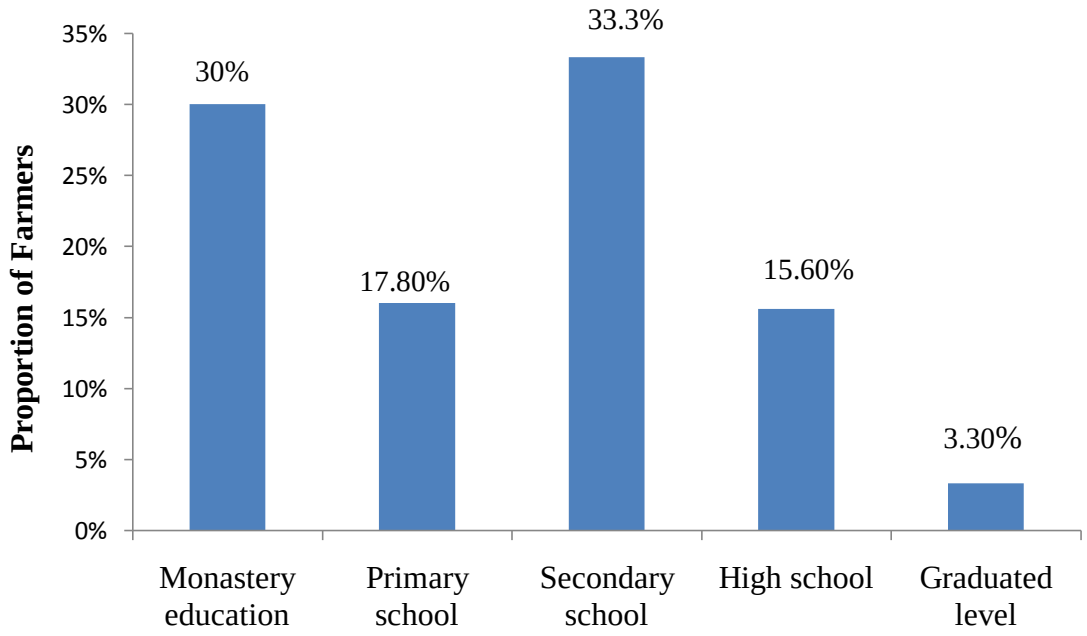

Figure: 4.1 Education levels of sample farmers in the study area

Source: Field survey, 2012

Number of the sample farmers = 90

4.1.2 Farming assets of the sample farmers

The farming assets of the sample farm household are shown in Table 4.2. The sample farm household maximum possessed plough and harrow. The percentage of plough and harrow owned by the sample farm household were 92.22% and 94.21% for land preparation. And, the percentage of cattle and bullock cart were 88.89% and 85.56% for transportation of crops from groundnut field to drying field and for travelling from village to village. Then, the sample farm household owned tractor for land preparation in crop production. The percentage of the tractor was 12.22%. The percentage of sprayer and motorcycle owned by the sample farm household were 71.11% and 72.22%. Moreover, the sample farm household minimum possessed seeder, pump, car, pig and chicken. The percentage of seeder, pump, car, pig and chicken were 1.11%, 5.56%, 2.22%, 3.3%, and 23.33%.

4.1.3 Average size of land holding, sown area and average yield of groundnut in the study area

The production of groundnut depends on the land holding size. The farmer who possesses the larger sown area can produce more groundnuts. In the survey area, the larger land holding capacity can be found in groundnut farmers with the average size of 5.68 hectares, ranging from 0.61 to 18.22 hectares. The average groundnut sown area of sample farmers was 2.06 hectares ranging from 0.40 hectare to 10.12 hectares. The average yield of groundnut basket per acre was about 80 baskets of groundnut with shell ranging from 55 baskets to 110 baskets and the average yield of groundnut kilogram per hectare was about 2,256 kilograms ranging from 1,541 kilograms to 3,082 kilograms.

Table 4.2 Farm assets of groundnut sample farmers in study area (2012)

Item	Number		Percent
	Maximum	Mean Value	
Plough	8.00	2.41	92.22
Harrow	8.00	3.46	94.21
Cattle	7.00	3.18	88.89
Bullock cart	3.00	1.39	85.56
Tractor	1.00	0.12	12.22
Sprayer	5.00	1.12	71.11
Motorcycle	3.00	1.00	72.22
Pump	1.00	0.06	5.56
Car	1.00	0.02	2.22
Seeder	1.00	0.01	1.11
Pig	2	0.04	3.33
Chicken	20	2.40	23.33

Source: Field survey, 2012

N =90

Table 4.3 Average size of land holding, average sown area and average yield of groundnut in study area

Item	Unit	Minimum	Maximum	Mean Value
Land holding	hectare	0.61	18.22	5.68
Average sown area of groundnut	hectare	0.40	10.12	2.06
Average yield of groundnut	bsk/ac	55	110	80.54
	kg/ha	1,541	3,082	2,256

Note: 1basket (bsk) of groundnut with shell = 25lb = 11.34 kg

Source: Field survey, 2012

N =90

4.1.4 Crop calendar and cropping pattern

In Magway Township, groundnut and sesame are grown as the main crops in monsoon season. Farmers prepared their land and grew groundnut or sesame at the end of April and harvested at the end of August for sesame and at the end of September for groundnut as shown in Table 4.4. After harvesting groundnut or sesame, some of the farmers grew winter groundnut and most of them grew pulses including green gram, pigeon pea, cow pea and mung-bean and sorghum. Winter crops were harvested at the end of December.

Cropping patterns mostly grown in Magway Township are shown in Table 4.5. Among the cropping patterns, only one out of 90 sample farmers grew only rain-fed groundnut. 11.11% of sample farmers grew rain-fed groundnut followed by sorghum and 31.11% followed by pulses. Rain-fed groundnut followed by winter groundnut was mainly grown by 44.44% of sampled farmers. Rain-fed sesame followed by pulses was grown by 27.78% of sample farmer. Twenty percent of sample farmers grew rain-fed sesame followed by sorghum. Rain-fed sesame followed by winter groundnut was grown by 35.56% of sample farmers. This was being the second most cropping pattern. 4.44% of farmers grew rain-fed groundnut intercropped with pigeon pea followed by winter groundnut and 5.56% of farmers grew rain-fed groundnut intercropped with pigeon pea followed by pulses.

Table 4.4 Crop calendar grown different crops in the study area

Crops	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Rainy Groundnut												
Sesame												
Winter Groundnut												
Pulses												
Sorghum												
Pigeon pea												

Source: DOA (Magway), 2012

Table 4.5 Percent of sample farmers for each cropping pattern in the study area

Rainy Season	Winter Season	Frequency	Percent
RGN	-	1	1.11
RGN	SG	10	11.11
RGN	PS	28	31.11
RGN	WGN	40	44.44
RFS	PS	25	27.78
RFS	SG	20	22.22
RFS	WGN	32	35.56
RGN +PP	WGN	4	4.44
RGN +PP	PS	5	5.56
Total		165	183.33

Source: Field survey, 2012

N = 90

RGN= rain-fed groundnut, RFS = rain-fed sesame, PS = pulses, SG = sorghum, WGN = winter groundnut, PP = pigeon pea

4.1.5 Different groundnut varieties grown by sample farmers

Myanmar has many varieties of groundnut; the nomenclature varies from region to region. In the study area, the average groundnut sown area of farmers was 2.06 hectares ranging from 0.40 hectare to 10.12 hectares. Most of the farmers used 56.04 kilograms of seed per hectare. A few farmers used 42.03 kilogram of seed per hectares. The average seed price was 3,531 kyat per kilogram and average seed cost was 195,154 kyats per hectare in Magway Township.

In Magway Township, there are many varieties of groundnut such as Magway (11), Magway (12), Magway (15), Tontarni, Kyaung Kone Pin Pyant, Sinpadaythar (8), Sinpadaythar (7). Among these varieties, most farmers grew Tontarni and Magway (12). In the study area, Tontarni are mostly grown because this variety is favorable for this region and resistance to disease and pest. Moreover Tontarni gets the higher yield than other varieties in this region. The most important point is that there was little effect on climate change. The number and percentage of farm households who grew the different varieties are presented in Table 4.6. Among 90 sampled farmers, 85.56% of farmers grew Tontarni and there was 8.89% of farmers who grew Magway (12). Sinpadaythar (8) was grown by 5.56% of farmers.

4.1.6 Application of fertilizer in groundnut production

It was found that most farmers applied organic or chemical fertilizer in their groundnut production (Table 4.7). They usually put manure in their land during land preparation period and chemical fertilizer in three weeks after planting. Farm yard manure (FYM), especially cow dung was used as the organic fertilizer and compound fertilizer was mainly used as the inorganic fertilizer. All sampled farmers in Magway used FYM as basal application at the time of land preparation. The average rate of FYM application in sample household was 5.05 metric ton per hectare (MT/ha). The maximum rate of FYM was 8.65 metric ton per hectare (MT/ha) and the minimum rate was 2.47 metric ton per hectare (MT/ha). The average cost of FYM was 25,429 kyats per hectare (Ks/ha). The average rate of compound fertilizer in sample household was 74.13 kilogram per hectare (Kg/ha). The maximum rate and minimum rate of compound

fertilizer were 123.55 kilogram per hectare (Kg/ha) and 61.78 kilogram per hectare (Kg/ha). The average cost of compound fertilizer was 44, 983 kyats per hectare (Ks/ha).

Table 4.6 Different groundnut varieties grown by sample farmers

Variety	Number of household	Percentage
Tontarni	77	85.56
Magway (12)	8	8.89
Sinpadaythar (8)	5	5.56
Total	90	100

Source: Field survey, 2012
N =90

Table 4.7 Use of fertilizer in groundnut production

Item	Amount
FYM (ton/ha)	
Minimum	2.47
Maximum	8.65
Mean	5.05
Compound (kg/ha)	
Minimum	61.78
Maximum	123.55
Mean	74.13

Source: Field survey, 2012
N =90

4.1.7 Insecticide, fungicide and foliar application in groundnut production

For crop protection, farmers applied insecticide, fungicide and foliar in crop season by using sprayer for groundnut production in the study area. The maximum and average rates of insecticide were 4.94 liter per hectare (Liter/ha) and 0.94 liter per hectare (Liter/ha). Most of the farmers sprayed foliar fertilizers such as Moralmone, Shwe Tonic, Armo, Comet and W.Tonic. A few farmers used fungicide. The maximum rate of fungicide was 1.24 liter per hectare (Liter/ha). The maximum rates of foliar fertilizer was 2.47 liter per hectare (Liter/ha) (Table 4.8).

4.1.8 Human labor, animal labor and machinery use in groundnut production

There are two types of labor - animal labor and human labor. For groundnut production, there are two sources of labor such as family labor and hired labor. There are a few sample farmers using machine for ploughing.

In the study area, land preparation generally starts at the end of April or early May for the rainy season. Most of the farmers prepare and plough their lands with animal labor before cultivating under rain–fed condition. And then, FYM was applied and spread by harrowing their plots five to six times with a four or five - tooth harrow pulled by a pair of cattle. Land preparation is needed till the soil becomes a smooth and fine structure.

The average man days of land preparation to their plots by family and hired labor were 3.41 man days per hectare and 0.94 man days per hectare. Average number of family labor and hired labor used by groundnut farmers were 1.01 man days per hectare and 3.01 man days per hectare in sowing. Before sowing, farmers did making sowing line. The average man days of making sowing line to their plots by family labor and hired labor were 2.08 man days per hectare and 0.4 man days per hectare respectively. After raking, leveling was done. The average man days of leveling by family labor and hired labor were 1.7 man days per hectare and 0.64 man days per hectare. Average man days of fertilizer application by family labor and hired labor were 3.14 man days per hectare and 3.81man days per hectare. The average man days of intercultivation were 5.19 man days per hectare and 1.48 man days per hectare to their field by using family labor and hired labor. To earth up, the average man days by using family labor and hired labor were 2 man days per hectare and 0.42 man days per hectare respectively. Weeding was started at

one month after sowing in groundnut production. Farmers in the study area cleaned weeds at least two times in groundnut production. In the study area, average man day of weeding were 0.74 man days per hectare and 21.42 man days per hectare in family and hired respectively in first weeding. And in second weeding, 0.64 man days per hectare and 13.52 man days per hectare were done by family and hired labor. Harvesting was differentiated in two parts such as harvest at no mature condition and harvest at over mature condition. In harvest at no mature condition, the average amount of family and hired labor were 9.34 man days per hectare and 49.22man days per hectare respectively. In harvest at over mature condition, 12.7 man days per hectare and 127.75 man days per hectare family and hired labor were used.

Table 4.8 Use of Insecticide, fungicide and foliar application in groundnut production

Item	Amount
Insecticide (liter/ha)	
Minimum	0.00
Maximum	4.94
Mean	0.94
Fungicide (liter/ha)	
Minimum	0.00
Maximum	1.24
Mean	0.15
Foliar (liter/ha)	
Minimum	0.00
Maximum	2.47
Mean	1.06

Source: Field survey, 2012
N =90

4.1.9 Cost and return analysis

In this study, enterprise budget was used to analyze cost and return of groundnut production in Magway Township. Variable cost of production included material input costs, hired labor costs, family labor opportunities costs and interest on cash cost. Return of groundnut production included the yield per acre, return from sale with average current price of groundnut during that period. The data of the enterprise budget for groundnut production in Magway Township was presented in Table 4.9. It was found that total family labor cost was 88,109 kyats per hectare (Ks/ha). It cost 181,316 kyats per hectare (Ks/ha) in farm households for hired labor. The total interest cost on cash cost was 1.5. It was found that average gross revenue was about 1808,764 kyats per hectare (Ks/ha). The total variable cash cost and total variable cost were about 1174,121 kyats per hectare (Ks/ha) and 1262,231 kyats per hectare (Ks/ha). Return above variable cash cost was 634,642 kyats per hectare (Ks/ha). Return above variable cost was 546,533 kyats per hectare (Ks/ha)**.** Return above cash cost, return above variable cost, return per unit of cash cost and return per unit of capital invested were used as the measurement of cost and return analysis. The results showed that the return per unit of cash cost was 1.54 and return per unit of capital invested was 1.4. It can be concluded that if one kyat invests on variable cash cost, net return was about 1.54 kyats per hectare and net return for capital invest was 1.4 kyats per hectare.

Table 4.9 Enterprise Budget for Groundnut Production (N=90)

Item	Level		Effective Price (Kyats/unit)	Total value kyats (Kyats/ha)
	Unit	Amount		
1.Gross Return				
Benefit from groundnut	Ton/ha	2.2	811,105	1808,764
	Ks/ha			1808,764
2.Variable Costs				
(a) Material Cost				
Seed	Kg/ha	55.2	3,531	194,925
FYM	Ton/ha	5.0	5,004	25,022
Compound	Kg/ha	74.1	599	44,475
Insecticide	Liter/ha	0.9	9,970	9,372
Fungicide	Liter/ha	0.1	11,389	1,936
Plant hormone	Liter/ha	1.0	11,887	12,600
Total Material Cost (a)				**288,331**
(b) Family labor cost				
Ploughing (draft)	Amd/ha	3.4	3,700	12,617
Ploughing (machinery)	Mad/ha	0.1	4,666	793.33
Harrowing	Amd/ha	11.0	1,868	20,646
Making sowing line	Md/ha	2.0	2,138	4,447
Seedling	Md/ha	1.0	1,068	1,079
Leveling	Md/ha	1.7	2,614	4,444
Fertilizer application	Md/ha	3.1	1,920	6,029
Intercultivation	Md/ha	5.1	2,091	10,853
Earthing up	Md/ha	2.0	2,063	4,126
First weeding	Md/ha	0.7	831	615
Second weeding	Md/ha	0.6	715	458
Harvest at no mature condition	Md/ha	9.3	729	6,810
Harvest at over mature condition	Md/ha	12.7	700	8,890
Transportation	Md/ha	1.9	1,610	3,059
Sun drying	Md/ha	1.8	1,800	3,240
Total family labor cost (b)				**88,109**
(c) Hired labor cost				
Ploughing (draft)	Amd/ha	0.9	3,500	3,290
Harrowing	Amd/ha	3.0	1,901	5,781
Making sowing line	Md/ha	0.4	2,010	804

Seedling	Md/ha	3.0	1,150	3,463
Leveling	Md/ha	0.6	2,711	1,735
Fertilizer application	Md/ha	3.8	2,003	7,635
Intercultivation	Md/ha	1.4	2,012	2,978
Earthing up	Md/ha	0.4	1,710	718
First weeding	Md/ha	21.4	743	15,934
Second weeding	Md/ha	13.5	692	9,358
Harvest at no mature condition	Md/ha	49.2	712	35,044
Harvest at over mature condition	Md/ha	127.7	679	86,850
Transportation	Md/ha	0.9	1,979	1,860
Sun drying	Md/ha	3.3	1,798	5,861
Total hired labor cost (c)				**181,316**
(d)Interest on Cash Cost				
Material cost	Ks/ha	288331.89	1.5	432,497
Hired labor cost	Ks/ha	181316.77	1.5	271,975
Interest on cash cost (d)	Ks/ha			704,472
Total Gross Benefit	Ks/ha			1808,764
Total variable cost (a+b+c+d)	Ks/ha			1262,231
Total variable cash cost (a+c+d)	Ks/ha			1174,121
Return above variable cash cost	Ks/ha			634,642
Return above variable cost	Ks/ha			546,533
Return per unit of capital invested				1.4
Return per unit of cash expensed				1.5

Source: Field survey, 2012

4.2 Characteristics of Market Participants

The term “middle-men” was applied for the one who handles a commodity between the time it leaves the farm gate and the time it reaches the consumer. In this study, middlemen or market intermediaries include village collectors, township wholesalers, hullers, millers, and processor.

4.2.1 Marketed surplus, selling method and mode of transportation of the sample farmers

Marketed surplus is defined as the groundnut sales by farmers as a proportion of production. The marketed surplus is calculated by deducting the household consumption and reserved seed from the total production of the sample farmers. The marketed surplus of groundnut is shown in Table 4.10. The average production of groundnut per household in rainy season was 4.85 metric ton and the average marketed surplus per household was 4.40 metric ton. The range of marketed surplus in rainy season per household was from 0.34 metric ton to 24.95 metric ton. The average home consumption per household was 0.01 metric ton ranging from 0.00 metric ton to 0.23 metric ton. They stored 0.51 metric ton for reserved seed, ranging from 0.00 to 3.40 metric ton.

In ways of selling method by farmers, 100 percent of groundnut producer directly flowed to wholesalers. In the study area, all sampled farmers directly sold groundnut with shell to wholesalers because of very cheap transportation cost and convenient road infrastructure.

The modes of transport used by the sample farmers were shown as percentage in Table 4.11. The most convenient system for transportation was by truck. About 83.3% of sampled farmers transported their groundnut by truck. But, 16.6% of farmers used bullock cart in transportation because it was the cheapest system. Almost all the sample farmers owned bullock cart and used in farming practices.

Table 4.10 Groundnut production, consumption and marketed surplus per sample household

Per household	MT			
	Minimum	Maximum	Mean	Standard deviation
Total production	0.62	28	4.85	5.22
Household consumption	0.00	0.23	0.01	0.03
Marketed surplus	0.34	24.95	4.40	4.73
Reserved seed	0.00	3.40	0.51	0.72

Source: Field survey, 2012
N = 90

Table 4.11 Selling method and mode of transportation of sample farmers

Selling method and mode of transportation	Percent
Main buyers of groundnut	
Township wholesalers	100%
Mode of transport	
By Truck	75 (83.3%)
By Bullock cart	15 (16.6%)

Source: Field survey, 2012
Nu = 90

4.2.2 General characteristics and marketing activities of township wholesalers

Along the oilseed crop marketing channel, the wholesaler played as key roles in the distribution of crops from producers to hullers. The township wholesalers are the main intermediaries from whom the farmers can get the price information. Township wholesalers also have the connection with the other township wholesalers and owners of Magway hullers and inform about the buying and selling prices. An average age of wholesaler was 46.4 years, ranging from 39 years to 55 years when they had business experience of 15-30 years. The business was led by the household head. The education levels of wholesalers were high as most of them were high school levels (60%) and some were graduate levels (40%). Age, experience and education levels of wholesalers were shown in Table 4.12.

The township wholesaler in Magway has integrated their business with owners of groundnut hullers. The township wholesalers in Magway sold 27.38% of the groundnut with shell to Mandalay market, 71.43% to Magway and 1.19% to Pakokku (Table 4.13). Most of the township wholesalers mainly sold in Magway Township because owners of groundnut huller conducted with the township wholesalers to buy groundnut with shell. The township wholesalers usually get the price information from the central wholesalers in Yangon.

Type of transaction in purchasing groundnut with shell used by the wholesalers was different as shown in Table 4.14. About 60% of the wholesalers applied cash down payment in buying groundnut with shell and 40% used cash down payment system with commission fees. Most of the wholesalers used cash down payment system in purchasing of groundnut. In selling groundnut with shell, 60% of wholesalers used cash down payment system and credit payment system. Only 40% of the wholesalers sold their groundnut with credit payment system. Most of the wholesalers used cash down payment system in the study area. With regard to transportation, all sample wholesalers used the truck.

Table 4.12 Age, experience and education level of wholesalers

Characters	Unit
Age (year)	
Mean	46.4
Standard deviation	6.23
Range	39-55
Experience (year)	
Mean	22.40
Standard deviation	5.73
Range	15-30
Education Level (%)	
High school level	60%
Graduate level	40%

Source: Own survey, 2012

Table 4.13 Selling markets of wholesalers in Magway (%)

Market	Percent
Mandalay	27.38
Magway	71.43
Pakokku	1.19

Source: Own survey, 2012

Table 4.14 Marketing activities of wholesalers

Activities	Wholesalers
Type of transaction in purchasing	
Use cash down payment system	3 (60%)
Use cash down payment system with commission fees	2 (40%)
Type of transaction in selling	
Only cash down payment system	3(60%)
Received half of the cash down and credit	2(40%)
Mode of transport	
By truck	5 (100%)

Source: Own survey, 2012

4.2.3 General characteristics and marketing activities of the huller owners

Most of the owners of the groundnut hullers connected with the township wholesalers to buy groundnut with shell. After buying, groundnut with shell was hulled to differentiate groundnut seeds. In the hulling of groundnut, two types of groundnut were categorized such as 'Si San and Lone San'. Si San recognized as low quality seed mainly used for edible oil. And Lone San recognized as good quality seed. Lone San used to produce groundnut brittle. Most of the groundnut millers bought 'Si San' and processors bought 'Lone San'. Price of Si San was always lower than that of Lone San because it was low quality seed. If there was higher market price difference between Lone San and Si San, huller owners produced more Lone San than Si San. If there was lower market price difference between Lone San and Si San, huller owners produced more Si San than Lone San because the cost of grading of Lone San was high. Table 4.16 showed the characteristics of huller owners.

Average age of huller owners was 31 years, ranging from 26-40 years. The average year of market experience was 10 years, ranged from 5-15 years. Forty percent of huller owners attained high school level and 60% was at graduate level. In the study area, most huller owners were educated persons. Owners of the groundnut hullers in Magway were selling two types of groundnuts such as Si San (38.10%) and Lone San (61.90%). Si San was sold 100% to Magway millers. Lone San was sold to Mandalay (15.38%), Monywa (23.08%), Magway (23.01%) and Muse (38.46%).

Owners of the groundnut hullers were divided into two groups accordingly to their hulling capacity as shown in Table 4.18. The capacity of large huller could hull from 1.68 to 3.36 metric ton of groundnut with shell per day. Therefore, 80.23% of the sample hullers were large hullers. The capacity of small huller could hull less than 1.68 metric ton per day. Only 19.75% of the sample huller was small huller. The working period per year of the large huller ran more than small huller. Large hullers ran for 6 months and small hullers ran for 4 months. The average hulling cost (electricity cost per year) of the large huller was more than that of the small huller. The maintenance cost and diesel cost of the large huller were higher than the small huller depending on hulling period. Huller owners did not employ permanent labor. Large hullers employed daily labor more than small hullers. The tax of the larger huller was more than the small huller.

Most of the huller owners faced with the problem of environment pollution such as dirt, dust and noise coming from the groundnut hulling process. They need attention the adverse effect on the life of many residents and may pose a future threat.

Marketing activities of the huller owners were different (4.19). Forty percent of the huller owners bought with credit payment system. In purchasing type of transaction by owners of groundnut huller, most of the owners employed cash down payment system in Magway Township.

Only 20% of owners of huller sold with credit payment system in selling groundnut seed. In the study area, most of the owners employed cash down payment system. Modes of transportation used by owners of huller were 40% by truck. Most of the owners used mini – truck in buying because the distance between buying place and selling place were not far.

Table 4.15 Age, market experience and education level of huller

Characters	Unit
Age (year)	
Mean	31.8
Standard Deviation	5.67
Range	26-40
Experience (year)	
Mean	10.4
Standard Deviation	3.65
Range	5-15
Education Level (%)	
High School level	40%
Graduate level	60%

Source: Own survey, 2012

Table 4.16 Selling markets of Lone San in Magway

Markets	Percent
Mandalay	15.38
Moneywa	23.08
Magway	23.01
Muse	38.46
Total	100

Source: Own survey, 2012

Table 4.17 Milling capacity of sample groundnut - hullers

Type and capacity	Percent
Large huller	
Capacity (1.68 – 3.36 metric ton/day)	3(80.23%)
Small huller	
Capacity (< 1.68 metric ton/day)	2(19.75%)

Source: Own survey, 2012

Table 4.18 Marketing activities of hullers

Activities	Percent
Type of transaction in purchasing	
Use cash down payment system	3 (60%)
Received half of the cash down and credit	2 (40%)
Type of transaction in selling	
Only cash down payment system	4 (80%)
Received half of the cash down and credit	1 (20%)
Mode of transport	
By turck	2(40%)
By mini-truck	3 (60%)

Source: Own survey, 2012

4.2.4 General characteristics and marketing activities of edible oil millers

Edible oil is the second most important daily diet of Myanmar people. The millers play an important role in the oilseed crop marketing chain by transforming the raw oilseed crop to edible oil. Table 4.19 showed the characteristics of the sample millers. The average age of the miller was 46 years old and the average experience was 6.8 years, ranging from 4-10 years of experience. In the sample millers, 60% of the millers were the high school level and 40% at the graduate level in the study area. Therefore, millers were educated person. The majority of oil millers were household heads. All the oil mills in the study area were family owned and operated. Groundnut millers were connected with groundnut huller owners in Magway Township. Groundnut millers in Magway sold 1.90% of their oil to Magway, 25.94% to Mandalay market, 52.16% to Yangon and 8.80% to Taunggyi and 11.20% to Nay Pyi Taw (Table 4.20).

Groundnut mills were categorized into two groups according to their milling capacity (Table 4.21). The capacity of large mill could mill from 3.73 to 7.46 metric ton of groundnut seed per day. Therefore, 80.23% of the sample mills were large mills. The capacity of small mill could mill less than 3.73 metric ton of groundnut seed per day. Only 28.24% of sample mills were small mills. The working hour of the small mill depended on the availability of electricity and ranged from 10 hours to 15 hours per day. Large millers ran their mills for 24 hour basic and they have their own generator to get the necessary power. Large millers ran their mill for the whole year and small millers ran their mill for 6 months to 8 months per year. Some millers integrated the business like edible oil wholesalers in the other townships. The large and small millers got the price information from the Yangon wholesalers. Generally they sold their products to Yangon wholesale market. The maintenance cost of large mill was higher than that of small mill. Large millers employed more labors than small miller. The average milling cost (electricity per year) of the large mill was more than that of the small mill because it ran the whole day. The tax of the large miller was comparatively larger than the small miller. Most of the millers faced with the problems of power supply, technology and capital investment.

Marketing activities of millers were different as shown in Table 4.22.Types of transaction in purchasing used by millers were 80% cash down payment system and 20%

credit payment system with huller owners. Most of the millers bought cash down payment system. In selling of products, millers used cash down payment system and credit payment system and most of the millers used credit payment system. Only 40% of the millers sold their groundnut oil with only cash down payment system. All sample millers used the truck in transportation because of the far distance between purchasing and selling places.

Table 4.19 Age, experience and education levels of millers

Characters	Unit
Age (year)	
Mean	46.2
Standard deviation	6.76
Range	39-55
Experience (year)	
Mean	6.8
Standard deviation	2.39
Range	4-10
Education Level (%)	
High school level	(3) 60%
Graduate level	(2) 40%

Source: Own survey, 2012

Table 4.20 Selling markets of millers in Magway

Market	Percent
Magway	1.90
Mandalay	25.94
Yangon	52.16
Taungyi	8.80
Nay Pyi Taw	11.20
Total	100

Source: Own survey, 2012

Table 4.21 Milling capacity of sample groundnut - mills

Type and capacity	Percent
Large mill	
Capacity (3.73- 7.46 groundnut seed metric ton /day)	3(84.87%)
Small mill	
Capacity (< 3.73 groundnut seed metric ton/day)	2(28.24%)

Source: Own survey, 2012

Table 4.22 Marketing activities of millers

Activities	Percent
Type of transaction in purchasing	
Use cash down payment system	4 (80%)
Received half of the cash down and credit	1 (20%)
Type of transaction in selling	
Only cash down payment system	2 (40%)
Received half of the cash down and credit	3 (60%)
Mode of transport	
By truck	5 (100%)

Source: Own survey, 2012

4.2.5 General characteristics and marketing activities of the groundnut brittle processor

The general characteristic of manager was shown in Table 4.23. The age of the manager was 43 years. And the market experience was nearly 10 years and the manager was educated. And processing factory was established since last 15 years. Processor sold 50% of total produced groundnut brittle package in Magway, 20% to Mandalay market and 30% to Yangon. Half of the product was sold in Magway Township. Marketing activities of the processor were shown in Table 4.24.

Processing capacity and marketing activities of the groundnut processor was shown in Table 4.25. Groundnut processing factory could produce 4,000 groundnut brittle packages per day. The processing factory ran for the whole year and the working hour was 15 hours per day. In processing factory, there were 5 permanent labors and 40 daily labors. The tax of the processor was comparatively larger than wholesalers, owners of hullers and millers. The groundnut processor employed only cash down payment system in purchasing groundnut seed (Lone San, good quality seed). In selling groundnut brittle, both types of selling (cash down payment system and credit payment system) were used. With regard to transportation, trucks were used because of the far distance between buying and selling places.

Table 4.23 Age, experience and education level of manager

Characters	Unit
Age (year)	43
Establishment (year)	15
Education Level (%)	
Graduate level	100%

Source: Own survey, 2012

Table 4.24 Selling markets of processor in Magway Township

Market	Percent
Magway	50
Mandalay	20
Yangon	30

Source: Own survey, 2012

Table 4.25 Processing capacity and marketing activities of groundnut processor

Activities	Percent
Processing activities	
(groundnut brittle package/day)	4000
Marketing activities	
Type of transaction in purchasing	
Use cash down payment system	(100%)
Type of transaction in selling	
Only cash down system and received half of the cash down and credit	(100%)
Mode of transport	
By truck	(100%)

Source: Own survey, 2012

4.3 Groundnut Marketing Channel in Magway Township

The analysis of groundnut marketing channel was intended to demonstrate the groundnut flow from farmers to ultimate consumers in the study area. Groundnut marketing channel in Magway Township was shown in Figure 4.2. In Magway Township, most of the farmers sold their product (groundnut with shell) to the township wholesalers. The average marketed surplus of sample farm households was 89.41% of their production. Therefore, 10.47% of their production was used for household consumption and seed purpose. According to the farmer survey, township wholesalers had the highest potential for getting groundnut with shell directly from farmers in the study area. Township wholesalers bought groundnut with shell from the villages around Magway Township. The sample farmers sold 100% of their marketed surplus to township wholesalers. Wholesalers traded 27.38% of their groundnut to Mandalay, 71.43% to Magway and 1.19% to Pakokku. Most of the township wholesaler mainly sold groundnut with shell to huller owners in Magway. Huller owners hulled groundnut with shell and sold two types of groundnut seeds such as Si San (38.10%) and Lone San (61.90%). Si san sold 100% to Magway millers to produce groundnut oil. Lone San was traded to Mandalay (15.38%), Monywa (23.08%), Magway (23.01%) and Muse (38.46%). Among them, buyers from Muse were the main. Lone San was used to make processing. Edible oil millers in Magway traded 1.90% of their oil to Magway, 25.94% to Mandalay market, 52.16% to Yangon and 8.80% to Taunggyi and 11.20% to Nay Pyi Taw. Main buyers of edible oil from Yangon market. On the other hand, groundnut brittle processor traded 50% of their groundnut brittle packages in Magway market, 20% to Mandalay market and 30% to Yangon. So, groundnut brittle was mainly sold in Magway Township.

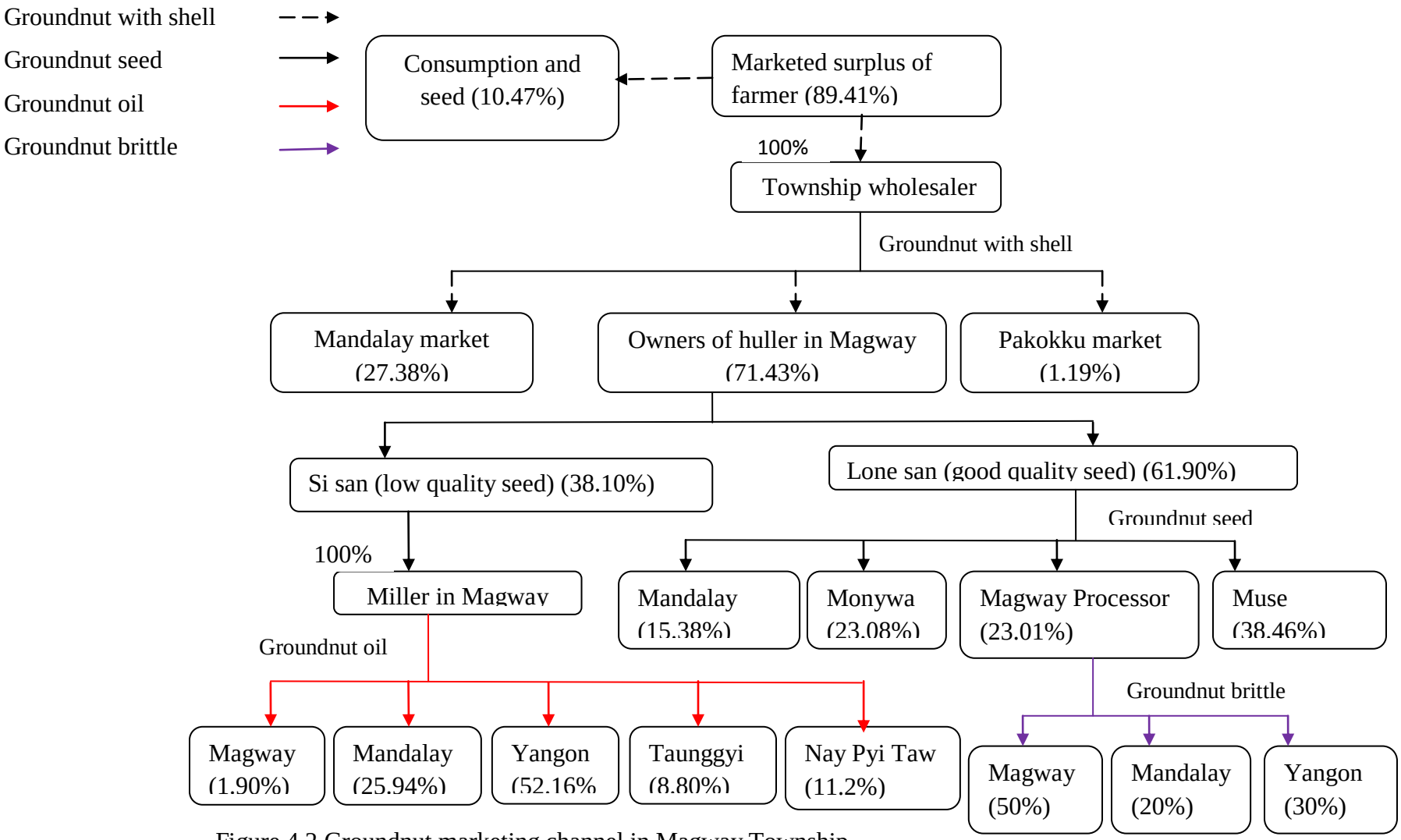

Figure 4.2 Groundnut marketing channel in Magway Township

4.4 Marketing Margin, Cost and Profit of Middlemen

The services of various agencies constituting in a marketing channel are remunerated out of the marketing "margin". This term is used to denote the difference between the price paid to the first seller and that paid by the final buyer (Kohls, 2002).

Trends in commodity prices and domestic marketing margins are important indicators of market performances. In this section the marketing margins of groundnut is examined. The marketing costs and margins are calculated for main agents in marketing channels such as town wholesalers, hullers, millers and processors in the groundnut crop, groundnut seed such as Si San and Lone San, edible oil and groundnut brittle marketing chain.

At this stage of marketing functions, the wholesale's margin was the difference between the price paid by the wholesale trader and selling price to hullers or whoever of market participants. The huller owners margin was the difference between the huller owners paid price and selling price to market participant. The edible oil miller's margin was the deduction of the groundnut seed (Si San) price paid by the miller from obtained value of groundnut oil. The processor's margin was the difference between the prices paid by the processor from obtained value of groundnut brittle.

In the marketing channel, the commodity types handled by the middlemen are different. For example, the wholesalers handle the commodity as crops, the processor handle the commodity as groundnut brittle and the millers handle the commodity as edible oil. And the hullers handle the commodity as the groundnut seed. Groundnut seed are differentiated into two types such as Lone San and Si San. Therefore, the percentage of profit per cost price was used in this study to compare the performance of intermediaries which also means return on investments (Table 4.26 - 4.30). By using percentage of profit per cost price, the one can get the highest profit. The millers do the business of processing and selling the edible oil. The processor does the business of processing and selling the groundnut brittle. When the profit per cost price among the middlemen were calculated and compared, the processor got the percent of profit per cost price about 71.13%. It was the highest achievement in the marketing channel. On the other hand, even the processor got the highest profit in their business; they had to invest

the highest marketing cost in payment for storing, processing and other service costs and taxes.

The groundnut farmers got the percent of profit per cost price about 6.9%. The groundnut wholesalers got the percent of profit per cost price about 7.9%. The groundnut hullers got the profit per cost price about 38.3%. And the groundnut millers got the second largest profit per cost price about 59.8%.

Table 4.26 Cost and profit of groundnut farmers

Farmer	Kyat/kg
(1) Selling price of groundnut	811.09
(2) Unit cost of groundnut	758.49
(3) Average profit of the farmers (1-2)	52.6
(4) Profit per cost price (3/2)	6.9%

Source: Field survey, 2012

Table 4.27 Marketing margin, cost and profit of groundnut wholesalers

Wholesaler	Kyat/kg
(1) Buying price of groundnut	846.56
(2) Selling price of groundnut	925.19
(3) Marketing Margin (2-1)	78.63
(4) Total Marketing Cost	10.51
Cost of transportation	2.29
Cost of Labor	7.22
Tax	1.00
(5) Cost price (1+4)	857.07
(6) Profit per unit of crops (3-4)	68.12
(7) Profit per cost price (6/5)	7.94%

Source: Own survey, 2012

Table 4.28 Marketing margin, cost and profit of groundnut huller owners

Huller	Kyat/kg
(1) Buying price of groundnut with shell	1020.41
(2) Selling price of groundnut seed	1472.66
(3) Marketing Margin(2-1)	452.25
(4) Total Marketing Cost	44.60
Cost of transportation	9.39
Cost of Labor	11.27
Hulling Cost (electricity)	2.21
Maintenance Cost	1.88
Cost of grading	13.13
Diesel Cost	4.81
Tax	1.65
(5) Cost price (1+4)	1064.75
(6) Profit per unit of crops (3-4)	407.91
(7) Profit per cost price (6/5)	38.32%

Source: Own survey, 2012

Table 4.29 Marketing margin, cost and profit of groundnut miller

Miller	Kyat/kg
(1) Buying price of groundnut seed	1212.5
(2) Selling price of groundnut oil	2314.58
(3) Marketing Margin(2-1)	1102.08
(4) Total Marketing Cost	236.15
Cost of transportation	51.88
Cost of Labor	97.65
Milling Cost	54.65
Maintenance Cost	22.82
Tax	9.15
(5) Cost price (1+4)	1448.65
(6) Profit per unit of crops (3-4)	865.94
(7) Profit per cost price (6/5)	59.81%

Source: Own survey, 2012

Table 4.30 Marketing margin, cost and profit of groundnut brittle processor

Processor	**Kyat/kg**
(1) Buying price of groundnut seed	1562.5
(2) Selling price of groundnut brittle	4416.67
(3) Marketing Margin(2-1)	2854.17
(4) Total Marketing Cost	1018.00
Cost of transportation	116.67
Cost of Labor	550.00
Storage Cost	25.00
Processing Cost	300.00
Maintenance Cost	10.00
Tax	16.67
(5) Cost price (1+4)	2580.00
(6) Profit per unit of crops (3-4)	1835.00
(7) Profit per cost price (6/5)	71.13%

Source: Own survey, 2012

4.5 Factors Affecting Groundnut Yield of the Selected Farm Household in Groundnut Production in the Study Area

This section indicated the estimate results of factors affecting the groundnut yield of the selected farm household of groundnut production in the study area. To determine the factors affecting the groundnut yield, log linear regression function was employed. The specific yield functions of groundnut farmers were estimated by using 7 independent variables; sown area, schooling year, seed rate, total labor on the farm, total material cost on the farm, price of groundnut and access to credit.

Table 4.31 showed the mean value of dependent and independent variables of groundnut yield function. According to the descriptive statistics, average yield 2256 kilogram per hectare, mean of the schooling year about 4.64 years, average sown area 2.06 hectares, average seed rate 55.26 kilogram per hectare, average total labor on farm 64 persons and average total material cost 287,885 kyats per hectare and average price of groundnut 3,531 kyats per kilogram were resulted.

According to the groundnut yield regression estimates, the significant influencing factors of groundnut yield were seed rate, total labor quantity, price of groundnut and access to credit. Groundnut yield was positively correlated with seed rate, price of groundnut, total labor quantity and access to credit at 10%, 5% and 1% level. It means that if seed rate one percent increase, groundnut yield will be increased 0.38%. If groundnut price one percent increased, groundnut yield of sample farmers would be increased 1.19%. The result showed that if farmers received higher price, they would pay more attention in groundnut production to get high yield so price indirectly effects on yield. If total labor on farm one percent increased in groundnut production in the study area, groundnut yield would be increased 0.96%. If the credit received by farmers in groundnut production one percent increased, yield of groundnut would be increased 0.19%. The result pointed out that the government should provide credit program to the farmers in groundnut production.

The adjusted R squared points out that the model is significant and it can explain on the variation in groundnut yield by 57 percent (Table 4.32).

Table 4.31 Mean values of dependent and independent variables of groundnut yield function (N=90)

Variables	Unit	Mean	Standard Deviation
Groundnut yield	Kg/ha	2256	404.20
Schooling year	Year	4.64	3.59
Sown area	Hectare	2.06	1.98
Seed rate	Kg/ha	55.26	3.23
Total labor	No.	64.30	6.78
Total material cost	Kyat/ha	287,885.64	33, 498.94
Price of groundnut	Kyat/kg	3, 531.26	104.01

Source: Field survey, 2012

Table 4.32 Determinants of groundnut yield of the sample farm households

Variables	Unstandardized Coefficients		Standardized coefficient	t value	Sig.
	B	Std. Error	Beta		
(Constant)	-9.454**	3.952		-2.392	0.019
Ln sown area (ha)	0.024 ns	0.017	0.109	1.41	0.162
Ln schooling year (yr)	0.016 ns	0.015	0.077	1.02	0.309
Ln seed rate (kg/ha)	0.385*	0.218	0.139	1.77	0.081
Ln price of groundnut (kyats/kg)	1.189**	0.477	0.185	2.494	0.015
Ln total material cost (kyats/ha)	0.148 ns	0.131	0.094	1.124	0.264
Ln total labor (no.)	0.964***	0.135	0.551	7.133	0.000
Access to credit	0.190***	0.057	0.238	3.303	0.001
R^2			0.60		
Adjusted R^2			0.57		

Source: Field survey, 2012

4.6 Factors Affecting Groundnut Profit of the Selected Farm Household in Groundnut Production in the Study Area

This section indicated the estimate results of factors affecting on the groundnut profit of the selected farm household of groundnut production in the study area. To determine the factors affecting the groundnut profit, log linear regression function was employed. The specific profit functions of groundnut farmers were estimated by using 7 independent variables; farm experience, sown area, yield, total labor cost on the farm, total material cost on the farm, price of groundnut and access to credit.

The mean value of dependent and independent variables of groundnut profit function were shown in Table 4.33. According to the descriptive statistics, average profit of the sample farm household 574,720 kyats per hectare, average of the farm experience about 28.96 years, average sown area 2.06 hectare, average yield 2,256 kilogram per hectare, average total labor cost on farm 269,123.19 kyats per hectare and average total material cost 287,885.64 kyats per hectare and average price of groundnut 3,531.25 kyats per kilogram were observed.

According to the groundnut profit regression estimates, groundnut profit of the sample farm households was positively and significantly influenced by yield at 1 percent level. According to the regression estimates, if one percent increased in yield, the groundnut profit will be increased 3.76%. The result showed that the farmers who had got the highest yield can receive more profit because yield greatly affected on profit. The total material cost of the sample farm household negatively and significantly influenced on profit at 5 percent level. It means that if one percent increased in total material cost on the farm in the study area, the groundnut profit will be decreased 2.09%. The result showed that the farmers who had suffered high cost of material inputs in groundnut production can receive low profit.

The adjusted R squared points out that the model is significant and it can explain on the variation in groundnut profit by 45 percent (Table 4.34).

Table 4.33 Mean values of dependent and independent variables of groundnut profit function (N=90)

Variables	Unit	Mean	Standard Deviation
Groundnut profit	Kyat/ha	488974.20	201969.21
Farm experience	Year	28.96	13.52
Sown area	Hectare	2.06	1.98
Yield	Kg/ha	2256	404.20
Price of groundnut	Kyat/kg	3,531.26	104.01
Total labor cost	Kyat//ha	269,123.19	31,544.18
Total material cost	Kyat//ha	287,885.64	33,498.94

Source: Field survey, 2012

Table 4.34 Determinants of groundnut profit of the sample farm households

Variables	Unstandardized Coefficients		Standardized coefficient	t value	Sig.
	B	Std. Error	Beta		
(Constant)	-23.441^{ns}	29.286		-0.800	0.426
Ln farm experience (yr)	-0.185^{ns}	0.160	-0.104	-1.155	0.252
Ln sown area (ha)	0.028^{ns}	0.113	0.022	0.246	0.806
Ln yield(kg/ha)	3.763***	0.797	0.637	4.720	0.000
Ln price of groundnut (kyat/kg)	2.687^{ns}	3.340	0.074	0.805	0.424
Ln total material cost (kyats/ha)	-2.099**	0.845	-0.238	-2.484	0.015
Ln total labor cost (kyats/ha)	0.990^{ns}	1.15	0.111	0.857	0.394
Access to credit	0.284^{ns}	0.396	0.065	0.718	0.475
R^2			0.50		
Adjusted R^2			0.45		

Source: Field survey, 2012

4.7 Constraints of Groundnut Production and Marketing of Sample Farmers

When the farmers were asked about the constraints and problems of groundnut production, they responded to the problems as indicated in Table 4.35. There were seven questions as the constraints concerning with insufficient of availability of credit, insufficient of capital investment, lack of contact with extension worker, serious pest infection, high transportation cost, high input cost and lack of market information. Among seven problems, 83.33% of the total farmers answered that they did not receive adequate credit for growing groundnut crop. About 77.78% of the total farmers expressed that they required capital investment. About 55.56% of the total farmers expressed that they did not receive extension contact for growing groundnut crop. The problems of serious pest infection, high input cost, high transportation cost and lack of market information were faced by 11.11%, 23.31% and 24.42%, 3.33% of the total farmers respectively.

Table 4.35 Constraints of groundnut production and marketing in the study area

No	Description	No of household	Percentage
1	Insufficient of availability of credit	75	83.33
2	Insufficient of capital investment	70	77.78
3	Lack of contact with extension worker	50	55.56
4	High transportation cost	22	24.42
5	High input cost	21	23.31
6	Serious pest infection	10	11.11
7	Lack of market information	3	3.33

Source: Field survey, 2012

N = 90

CHAPTER V
CONCLUSION AND POLICY IMPLICATION

5.1 Conclusion of the Study

5.1.1 Descriptive analysis of the sample farmers

In the study area, most of the farmers had extensive farming experience. Among the education level, the secondary education level was the highest percentage and graduate level was the lowest percentage. Most sampled farm household maximum possessed plough and harrow. Few sampled farm household possessed seeder, pump car, pigs and chicken. In the survey area, the larger land holding capacity was found in groundnut farmers with the average size of 5.68 hectares. The average groundnut sown area of sample farmers was 2.06 hectares. The average yield of groundnut per acre was about 80 baskets. Average yield of groundnut in the study area (80bsk/acre) was higher than the national target yield. Among the cropping patterns, Forty four percent of farmers mostly grew rain-fed groundnut followed by winter groundnut. Rain-fed sesame followed by winter groundnut was grown by 35.56% of sample farmer. This was being the second most cropping pattern. About 77% farmers grew Tontarni because this variety was favorable for this region and resistance to disease and pest. Moreover Tontarni got the highest yield than other varieties in this region.

The use of average rate compound fertilizer was 74.13 kilogram per hectare. And, all of the sampled farmers used pesticide, fungicide and foliar. Enterprise budget was used to compare the cost and return of groundnut growing farmers. Accordingly to the result of cost and return analysis, groundnut farmers received the return per unit of capital invested was 1.4.

5.1.2 General characteristics of market participants

Among the market participants, the mean age of wholesalers, millers and processing manager were above 40 years old. However, the mean age of the huller owners was above 30 years old. Wholesalers had relatively more working experience than huller owners, millers and processors. Mostly, millers and processors had 10 years of experience in groundnut marketing. Most of the market participants obtained high school level education and some of the owners of huller and processors were graduates. Huller owners and millers used different types of purchasing such as cash down payment system and received half of the cash down and credit. In purchasing, processor used only cash down payment system. In selling, wholesalers, hullers, millers and processors used different types of selling such as only cash down payment system and received half of the cash down and credit. Most of the market participants used truck for transportation. Moreover owners of the huller also used mini- truck.

5.1.3 Marketing channel in the study area

There are five types of marketing channel in the study area; (1) farmer, (2) township wholesalers, (3) huller owners, (4) miller and (5) processor. In the supply chain analysis, most of the sampled farmers in the study area sold groundnut with shell directly to township wholesaler. Therefore, groundnut with shell marketing was mainly occurred in the local market. Township wholesalers traded their groundnut with shell to Mandalay, Magway and Pakokku. Most of the township wholesalers mainly traded in Magway market to sell for huller owners. Huller owners made hulling groundnut with shell and sold two types of groundnut seeds such as Lone San (good quality seed) used to make groundnut processing and Si San (low quality seed) used to make groundnut oil**.** Si San was sold 100% to Magway miller. Lone san was sold in Mandalay, Monywa, Magway and Muse. When Lone San was traded, buyers from Muse was the main clients. Miller traded their groundnut oil to Magway, Mandalay, Yangon, Taunggyi and Nay Pyi Taw. There was no local consumption for groundnut oil. Most of the millers mainly sold groundnut oil to Yangon market. Processor traded their groundnut brittle package to Magway, Mandalay market and Yangon. Among these markets, processors mainly distributed their groundnut brittle package to Magway Township.

5.1.4 Marketing margin, cost and profit of market participants

Among the market participants, the wholesalers handled the commodity as crops, the owner of hullers handled the groundnut seeds (Si San and Lone San), the millers handled the commodity as edible oil and the processor handled the commodity as groundnut brittle. Among the market participants, marketing margin of township wholesaler got the lowest margin. When the profit per cost price among the market participants was calculated and compared, the processor got the highest achievement in the marketing channel. On the other hand, even the processors got the highest profit in their business; they had to invest the highest marketing cost in payment for storing, processing and other service costs and taxes. And the groundnut millers got the second largest profit per cost price.

5.1.5 Constraints of groundnut production of the sampled farm households

There were seven major constraints of groundnut production and marketing of the sampled farm households. The most serious constraints of sampled farm households were insufficient of availability of credit, insufficient of capital investment and lack of contact with extension workers in groundnut production. The major constraints for the huller owners faced with environment pollution such as dirt, dust and noise coming from the groundnut hulling process. The major constraints of millers faced with the problem of power supply, technology and capital investment.

5.1.6 Regression analysis

Accordingly to the groundnut yield regression estimates, the significant influencing factors of groundnut yield were seed rate, total labor quantity, price of groundnut and access to credit. Groundnut yield was positive relationship with seed rate, price of groundnut, total labor quantity and access to credit. Other things being equal, if one percent increased in seed rate, total labor quantity, price of groundnut and access to credit, groundnut yield was increased by 0.38%, 0.96%, 1.19% and 0.19% respectively. The adjusted R squared points out that the model is significant and it can explain on the variation in groundnut yield by 57 percent.

Accordingly to the groundnut profit regression estimates, yield was positively and significantly related to the groundnut profit of the sample farm households at 1 percent level. If one percent increases in yield, the groundnut profit will increased 3.76%. The total material cost of the sample farm household negatively and significantly influenced on profit at 5 percent level. If one percent increases in total material cost on the farm in the study area, the groundnut profit will decrease 2.09%. The adjusted R squared points out that the model is significant and it can explain on the variation in groundnut profit by 45 percent.

5.2 Recommendations and Policy Implications

5.2.1 High yielding varieties for farmers

Most of the farmers in the study area recognized the Tontarni as a high yielding variety. Improvement of local specific adaptable varieties such as Tontarni should be more developed which can enhance the land productivity. Hence, improved varieties of good and high yielding seeds are in demand for groundnut growers. Under this condition, it is urgently needed to develop seed industry through public - private partnership to meet the growing demand for quality seed.

The constraint analysis pointed out that effective extension services were needed in production of groundnut. The Government should strengthen its extension service both qualitatively and quantitatively. Adequate funds should be provided for enabling the extension workers. In the short run, programs should be designed to educate rural households through introducing farmers' training and giving proper extension services. It could assist farmers to be better decision makers of their farms. Therefore, more effective extension services and training programs were recommended for groundnut farmers in the study area.

The constraint analysis pointed out that the credit for farmers received from Myanmar agricultural development bank (MADB) are very low. This is necessary to improve access to credit in the study area. Major constraints on credit availability for farmers should be explored and the effective rural financing system collaborating with INGOs and government organizations such as MADB will be highly demanded.

The result of regression model pointed out that groundnut price was the most effective variables for yield. As the groundnut price was the most effective variables for yield, good macro environment is necessary to increase crop price which can increase farm income. As the total material cost negatively influenced on profit of groundnut production, favorable policy environment for production and marketing of groundnut sector will be appreciated for the development of small farmers.

5.2.2 Development of groundnut milling sector

Improvement of groundnut milling is essential for milling industry development. The development of groundnut milling is very important to get the good quality of edible groundnut oil. It needs to establish modern groundnut mills to produce good quality of edible groundnut oil. According to the survey results, the major constraints for the millers were insufficient of power supply and technology, capital investment and low quality of milled oil due to lack of modernized machinery. Millers should modernize their milling machines to get the good quality of edible groundnut oil. If the government and international organizations support loan for up scaling the groundnut mills, quality of edible groundnut oil will be improved in the study area.

5.2.3 Provision of market information

Provision of market information is very important for groundnut market development. In the study area, price information was transmitted from township wholesalers to the farmers. Therefore, government should provide market information in local not only for producers but also for all other market participants in the groundnut marketing channels. Media such as radio and mobile communication should be used for transmission of price information. This could possibly help the farmers to sell their products at reasonable higher prices.

5.2.4 Promoting of groundnut supply chain

In groundnut supply chain, efficiency of market participants including local wholesalers, huller owners and processors (edible oil miller and groundnut brittle processor) can be improved by reducing constraints on marketing facilities, market information, and credit, etc. Both private and public institutions need to provide credit to marketing agents (such as wholesalers, huller owners and processors) in order to facilitate procurement operations, storage activities and investment in processing and transportation. High profit per unit cost in processors should be the key indicator for the development of agro-food industry in each production area concerned. Even the processor got the highest profit in their business; they had to invest the highest marketing cost in payment for storing, processing and other service costs and taxes. So, there is a need to reduce the taxes and fees for the traders, processor and their business activities, which may lead to improve the groundnut supply chain in the study area.

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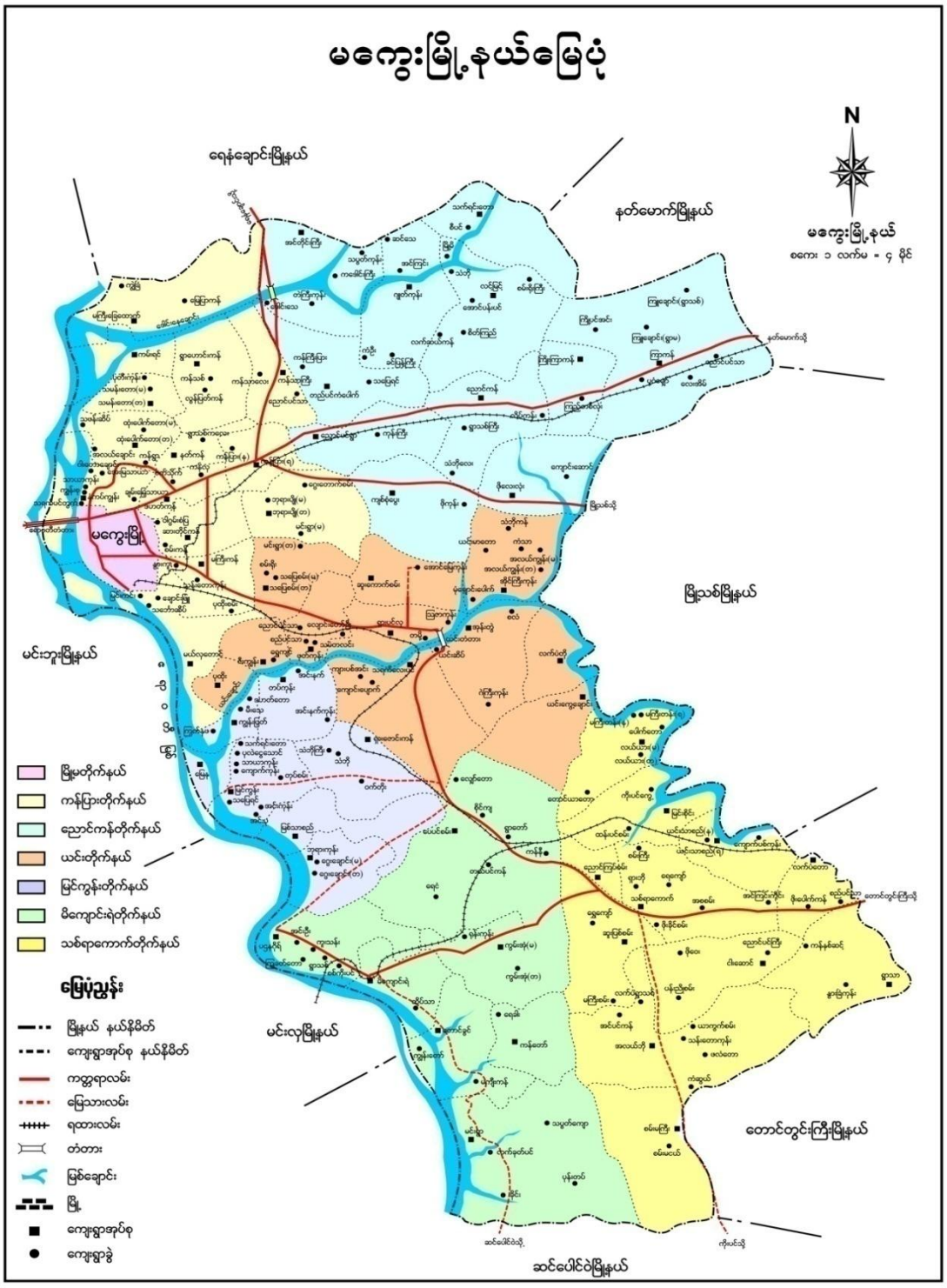
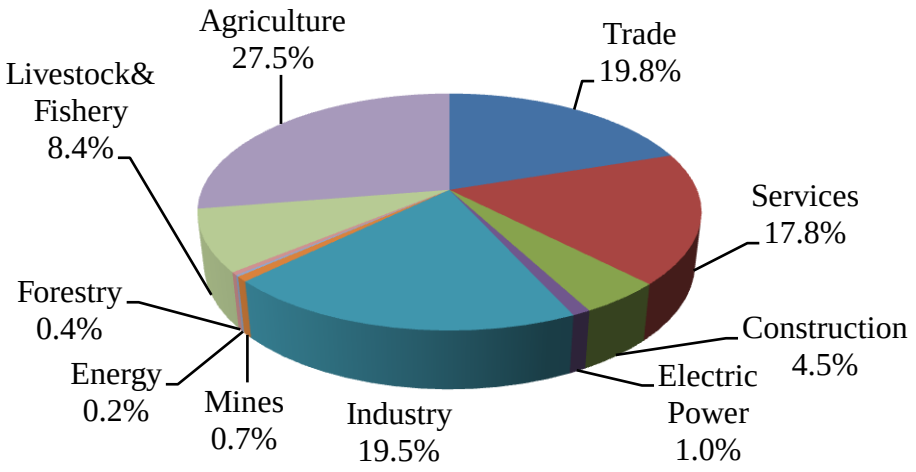
APPENDICES



Appendix 1 Map of Magway Township

Source**:** Department of Agriculture, Township Office, Magway Township, 2012



Appendix 2 Gross domestic product compositions by sector, 2009-2010

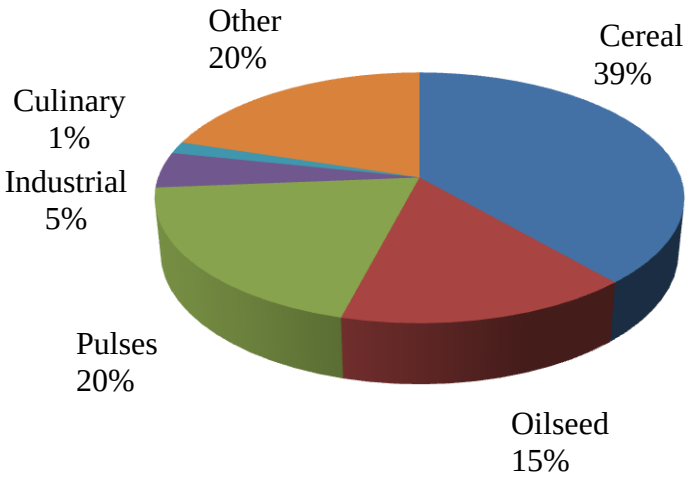
Source: MOAI, 2012

Appendix 3 Areas sown and cropping intensity of Myanmar

(000'hectare)

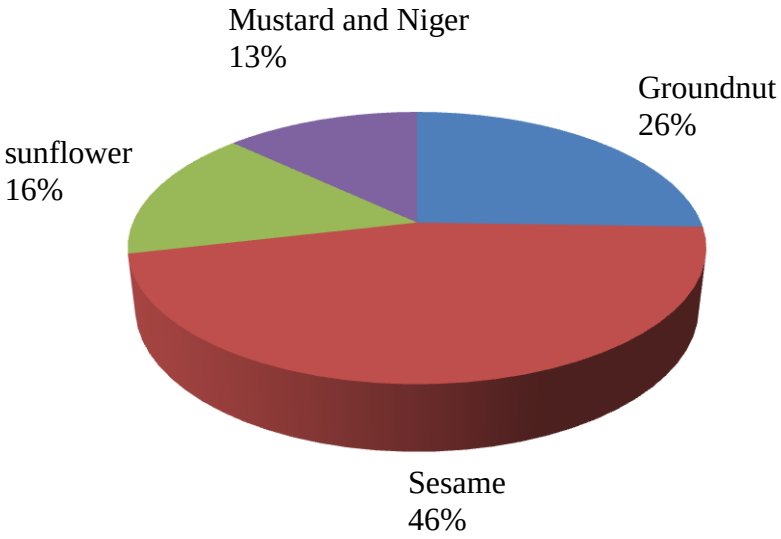
Year	Net Area Sown	Area Sown More than Once	Gross Area Sown	Cropping Intensity (%)
2004-2005	11415	6016	17431	152.7
2005-2006	11938	6816	18754	157.1
2006-2007	12613	7792	20405	161.8
2007-2008	13224	8893	22117	167.3
2008-2009	13489	9472	22961	170.2
2009-2010	13645	9718	23363	171.2
2010-2011	13748	9819	23567	171.4
2011-2012	13582	8915	22497	165.6

Source: SLRD, 2012



Appendix 4 Percentage share of the total sown area for the major crops in Myanmar (2011- 2012)

Source: MOAI, 2012



Appendix 5 Percentage share of the oilseed crop area cultivated in 2011-2012

Source: MOAI, 2012

Appendix 6 Oilseed crops cultivation in Myanmar

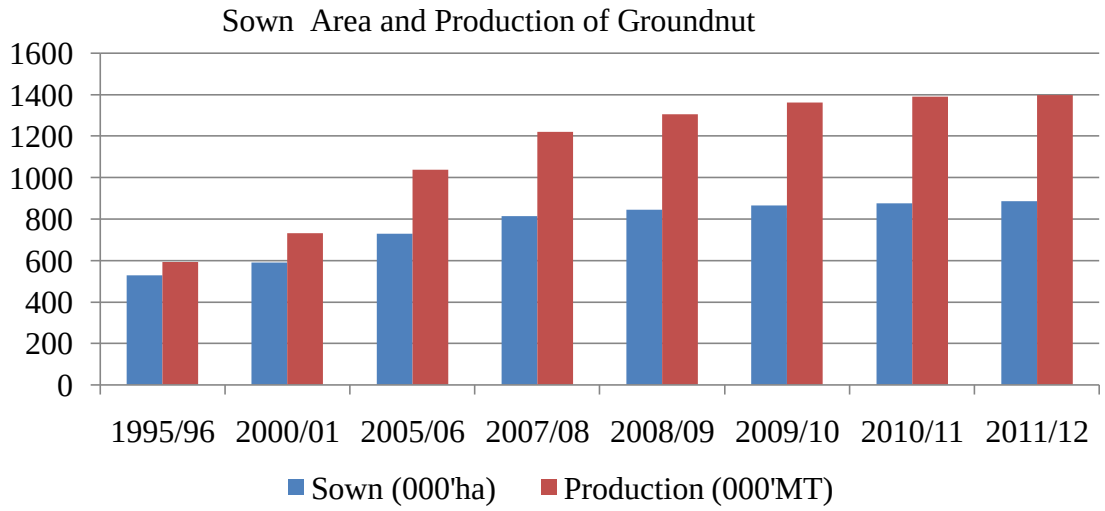
Year	Oilseed crops (Sown area) **(000' hectare)**				
	Groundnut	Sesame	Sunflower	Mustard	Niger
1996-1997	479	1,145	125	18	47
1998-1999	503	1,199	343	30	57
2001-2002	569	1,382	498	55	91
2002-2003	581	1,417	460	69	93
2003-2004	654	1,465	511	64	104
2004-2005	684	1,496	516	67	112
2005-2006	730	1,388	690	71	129
2006-2007	756	1,443	614	75	121
2007-2008	815	1,507	835	92	147
2008-2009	844	1,570	884	98	152
2009-2010	866	1,634	883	100	156
2010-2011	877	1585	859	101	158

Source: MOAI, 2012

Appendix 7 Groundnut production in Myanmar and neighboring countries

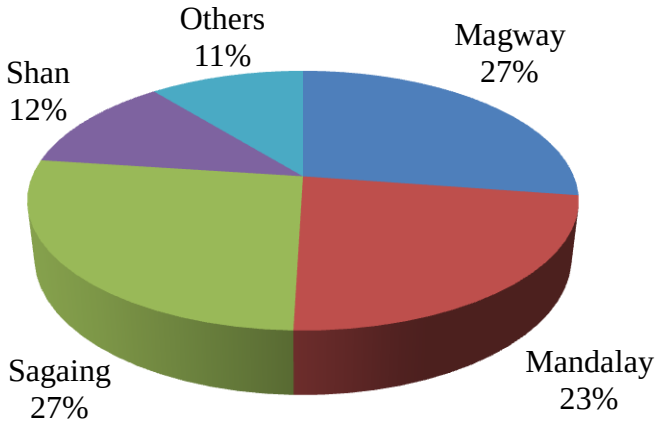
Country	Harvested Area ('000 ha)	Yield (kg/ha)	Production (000'MT)
World	23951	1522	36457
Asia	11879	1966	23351
Myanmar (2010-2011)	877	1587	1392
Thailand	64	2063	132
Vietnam	249	2108	525
Indonesia	623	1249	778
Malaysia	0.2	3500	1
Philippines	28	1107	31
Lao PDR	18	1611	29
Cambodia	22	1364	30
China	4398	3357	14765
Bangladesh	33	1424	47
India	5470	1007	5510

Source: MOAI, 2012



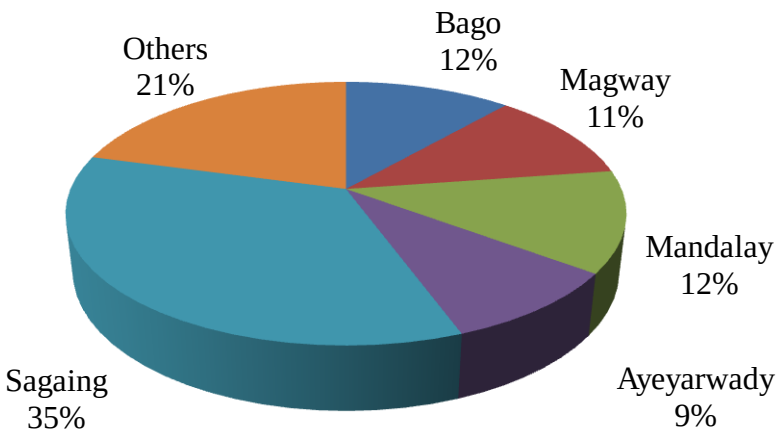
Appendix 8 Sown area and production of groundnut

Source: MOAI, 2012

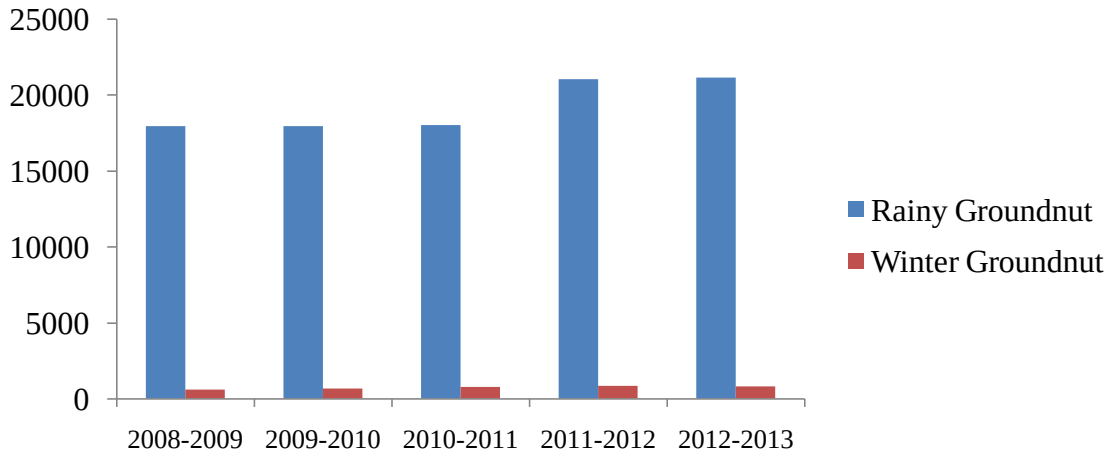


Appendix 9 Percentage share of sown area for groundnut (rain) by state and division in 2010-11

Source: CSO, 2011



Appendix 10 Percentage share of the sown area for groundnut (winter) by state and division in 2010-11



Appendix 11 Comparison of rain-fed groundnut sown area and winter groundnut sown area of Magway Township in 2008-2012