UNIVERSITY OF ICELAND

Gendered value chain analysis of mangoes in Malawi

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Final assignment submitted to United Nations University Gender Equality Studies and Training (UNU-GEST) Programme

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May 2016

UNITED NATIONS UNIVERSITY

UNU-GEST

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List of acronyms

DAES	Department of agriculture extension services
FAO	Food and agriculture organisation
FIDP	Farm income diversification programme
GDP	Gross Domestic Product
GoM	Government of Malawi
ITC	International trade centre
LUANAR	Lilongwe university of agriculture and natural resources
MBS	Malawi bureau of standards
NGO	Non-governmental Organisation
NSO	National statistics office
USAID	United States agency for international development

Acknowledgements

I wish to express my profound gratitude to God Almighty for always being there for me and for taking me this far. I wish to express my appreciation to a number of people who contributed in various ways in coming up with this paper. I am extremely thankful to my supervisor, Dr. Pétur Skúlason Waldorff for his extraordinary supervision, help, constructive criticism, encouragement and untiring support in bringing this paper to its current form.

I also greatly thank the Icelandic Government and the UNU- GEST Programme for giving me an opportunity to study in one of the best Universities in the world, University of Iceland. I deeply value the timely and useful administrative, technical and moral support I received from staff at the University of Iceland, UNU-GEST team. Furthermore, I thank the Principal Secretary for the Ministry of Agriculture, Irrigation and water development (Malawi) for allowing me to study in Iceland.

I also express my heartfelt gratitude to my family and relatives for their support, encouragement, care and love during my stay in Iceland. Special thanks go to my Fiancée Brown C. Diwa; my parents, Jockely G. Mbeye and Juliet Lwinga; my sisters, Queen, Olive, Ndusyeghe, Moureen and Rose; my brothers, Gilder and Ndositwe.

I am very thankful to my friends Roselyn Makhambera, Madalitso Makondi and all the UNU-GEST fellows for 2016 for their support and help in coming up with this paper.

On a personal note, I wish to dedicate this paper to my Son, Eugene Nethanel Diwa who has survived staying without me for all the five months I have been away from home.

God bless you all!!!!

Abstract

Malawi has a favourable climate for fruit production and yet the fruit sub-sector receives little support from both the government and private sector. The production of mangoes has been increasing through the years, however, of all harvested mangoes 60% are lost due to poor harvest and post-harvest handling techniques. These high levels of post-harvest losses and spoilage represent wasted income generating opportunities for mango farmers that could be improved with the introduction of enhanced processing techniques for increased storage capacity and control of the product within the value chain.

It is important to take note that the mango value chain in Malawi is not gender neutral i.e. women and men are affected by, and benefit differently from, the value chain. Regrettably, research on gender and mango value chains in Malawi have been insignificant and remain unpublished. Thus, this paper sets a foundation for future investment and interventions in the mango sub-sector. The purpose of this paper is to provide a gendered analysis of the mango value chain in Malawi. The paper identifies a variety of gender related issues at each stage of the mango value chain and strategies that need to be taken into consideration when improving and upgrading a mango value chain. The paper emphasizes the importance of understanding gender roles and relations for a dynamic mango value chain that benefits both men and women in Malawian society. The paper tackles issues of household division of labour and the triple roles of women (reproductive, productive and community roles) and how these affect the mango value chain. The paper reveals that although women take part in all stages of the mango value chain, they are mainly concentrated in the production and processing stages, while men are concentrated in the stages where money is involved such as the business and marketing stages. Furthermore, the paper reveals that women face many challenges that affect men less. These challenges include access to, and control over, resources, as well as access to financial and agricultural extension services.

Lastly, the paper provides a number of recommendations that needs to be taken into consideration when developing a gender responsive mango value chain in Malawi. The most critical recommendations among others, are the formulation of a gender responsive horticultural policy; formation of women mango farmer groups (associations and cooperatives); implementation of household approach methodologies to tackle issues of gender inequality that affect the operations of the mango value chain at household level; and provision of gender and horticultural (e.g. mango value chain) trainings to agriculture staff and farmers.

Key words: Mango, value chain, value chain analysis, gender, gender analysis

INTRODUCTION

Moving the nation from a predominantly consuming and importing country to producing and exporting country is the main goal for the development of Malawi. Historically, Malawi has been an importing country when it comes to fruits and fruit products though most of the imported fruits such as mangoes and bananas are produced or grown locally (Faulkner et al 2009). Most of the fruits are imported from neighbouring countries e.g. South Africa; this shows that there is a local fruit market for Malawi. Though the local fruit market is small, there is an opportunity for international market if fruit processing procedures are up to standard.

The climate in Malawi is ideal for fruit production with the northern part being the coolest with lots of rain; the central part has the warmest and driest weather patterns while the weather pattern in the southern part falls between that of the northern and central parts of the country. Despite the ideal climate, the fruit industry has not been fully established as compared to cash crops such as cotton, tobacco, sugar, tea and groundnuts. Lack of specialised personnel and limited support from the government and the private sector are some of the factors that have contributed to the underdevelopment of the fruit industry in Malawi (Kachule and Franzel, 2009).

Mangoes, just like many fruits, have a short life span as such it is mostly difficult to store and sell in their fresh form. According to a study by Faulkner et al (2009), 60% of all the harvested mangoes in Malawi are wasted due to underutilization and improper care during the harvesting process as well as postharvest handling techniques (poor transportation and storage infrastructure). Mangoes are also wasted because of the seasonality effect i.e. mangoes are seasonal fruits as such they are found in abundancy at the same time where consumers fail to consume all the fruits available leading to some mangoes wasted. The seasonality effect for mangoes provides an opportunity for the small scale farmers to process the mangoes when they are in abundance into different fruit products such as fruit juices, Mango achaar (Mango pickle), Jams and dried mango fruit (could be taken as a snack).

To address the issue of mango wastage and processing, in 2009, a company called Malawi mangoes was established in the central region, Salima district. The company sources mangoes from its own anchor farm and from smallholder farmers through a smallholder outreach programme. The mangoes are then processed into a single strength pulp or puree, and double strength concentrate in an international class facility and then the resulting product is exported to regional and international fruit juice manufacturers. The market entrance of the company has shown the potential that Malawi has in mango production and processing. It has strongly demonstrated the importance of promoting future investment in the agricultural sector by the private sector in Malawi. The company has helped farmers to shift from the usual mango production towards a high value added mango production by the use of irrigation and use of improved mango varieties. The company is also contributing to the national economy through the income from the exports and employing people.

Value addition to mangoes as well as other horticultural crops can make significant contribution to the country´s development goal, economic growth and prosperity. As mangoes grow in all the districts of Malawi, it clearly shows that the mango sector has a huge potential in

contributing to Malawi's economy if it can be prioritised. However, there is limited scope of literature on mango value chain analysis in Malawi. For the scarce literature and information or data that exists, fruits are taken or lumped together with other horticultural crops especially vegetables. This poses a challenge when it comes to determining the contributions of different fruit species to the national or household economy, leading to difficulties in identifying specific interventions for those specific fruit species.

Mango value chains in Malawi are not gender neutral, but exist and operate within a given social context that affects the distribution of resources, benefits, and opportunities. The mango value chain in Malawi is at both small and large scale and there are many gender issues that need to be addressed at each level. It is important to consider these gender issues when coming up with mango value chain interventions in Malawi as this will help in developing inclusive value chains that will benefit all gender categories both in rural and urban areas. Despite this importance, there is no published research on gender analysis and mango value chains in Malawi because very little research has been on Malawian mangoes and gender. There is limited knowledge on mango value chains and gender among policy makers, business entities, practitioners as well as the private sector in Malawi. However, it is important to know the gender roles and relations and how they impact the mango value chains in Malawi. This is important because it will help policy makers to come up with interventions that will promote future investments in the mango sector thereby contributing to the economy of the country.

Due to scanty and limited scope of literature for gender and mango value chain in Malawi, it is important to do a gender analysis of the mango value chain in order to create a baseline for future interventions or investments in the mango industry in Malawi. Above all this paper will help the government to make mango production and value addition a priority area in its policies and plans by developing appropriate policy measures and strategies for a sustainable mango industry. This paper will present the importance of involving a gender analysis of the mango value chain in Malawi. As already stated, no such analysis has been done in Malawi to my knowledge. I will in this essay describe the mango production in Malawi as at present and then go through the various links of the mango value chain in Malawi. Finally, the essay will emphasize the importance of understanding gender roles and relations within the Malawian farming context for investments within the mango value chain to be as successful and sustainable as possible and eventually, for making the development of a Malawian fruit processing industry a reality.

The essay is organized into five chapters. Chapter 1 gives an overview of agriculture, horticulture and the Malawian economy. Chapter 2 introduces fruit production in Malawi, mango production in Malawi, major mango varieties and the uses and importance of mangoes in Malawian society. Chapter 3 presents a mango value chain analysis in Malawi, mango value chain actors and main mango value chain links and stages in Malawi. Chapter 4 explains linkages between gender and the mango value chain in Malawi. Chapter 5 provides a gender analysis of mango value chain stages.

CHAPTER 1: Agriculture, Horticulture and the Malawian Economy

1.1. The Agriculture sector

Malawi is predominantly an agro-based economy; as such, agriculture is the most important sector in the national economy in terms of its contribution to food security and external trade. It contributes 39% of the Gross Domestic Product (GDP), provides about 80% of the total employment, provides 64% of total income for rural people and accounts for over 80% of the foreign exchange earnings. Agriculture supports the manufacturing industry by supplying 65% of the raw materials needed. Women provide 70% of the workforce for the cash crops and produce 80% of food for home consumption (GoM, 2012; Kachule and Franzel, 2009). While they provide most of the productive labour, they rarely control the productive resources or produce, nor benefit from the proceeds/income earned as men make all decisions in the households. This further limits their ability to make investment decisions, which in turn reduces their capacity to attain food, income and nutrition security (GoM, 2010). This is an important point for this paper and for any agricultural project to take into consideration the gender inequalities and issues that currently exist and find possible ways of addressing them within the project framework.

> ''*Women are the backbone of farming in Africa, just as in most of the world. They plant the seeds, they till the fields, they harvest the crops, they bring them to market, they prepare the meals for their families. So to succeed in this work, we must work with women. And so we need a good collaboration to make sure that women are equal partners with the men farmers all the way through the process…. To enable… farmers who are women to make a contribution that will transform agriculture, add to the gross domestic product of their country, give them more income to educate their children to have a better life.*'' US Secretary of state Hillary Clinton in Kenya, August 5, 2009

Agricultural production in Malawi is done at smallholder and estate levels. The main staple crops (maize, cassava, sweet potatoes, rice, sorghum, groundnuts and pulses) is grown by smallholder farmers at subsistence level. Smallholder farmers produce 75% of food that is consumed in Malawi. These farmers cultivate on 5.3 million hectares of land (Manda and Makowa, 2012) but most of these farmers i.e. 55% of farmers own less than one hectare of arable land (GoM, 2002). Most of the small scale farmers use traditional farming systems (use of a hoe and use of family labour) which contributes to low agricultural productivity. Considering this challenge, the government developed a strategies that (a) recognises that intensifying and commercialising the small scale sector is one of the options to increase productivity and profitability of the smallholder sector (GoM, 2006) (b) recognises that expanding horticultural production for agro-processing is one of the strategies that needs to be implemented. Commercial farming is done at estate level with main cash crops being the main focus e.g. tobacco, tea, sugar and cotton (Chirwa and Matita 2012).

1.2. The horticulture sector and its contribution to the national economy

The horticulture sector in Malawi comprises of fruits (tangerines, mangoes, bananas etc.), tree nuts (Macadamia), vegetables (Chinese cabbage, Rape, leaf mustard etc.) spices and herbs. The sector has a potential to contribute to the national economy in the same way cash crops such as Tobacco, cotton, tea, Groundnuts, Sugar and other pulses do contribute to the economy i.e. 22% to the national GDP. Fruit production provides an alternative source of income to other cash crops grown in Malawi. Due to increase in food (maize) insecurity levels, production of fruits can contribute to household food and nutrition security. Despite the importance of fruit production in Malawi, the sector has been receiving little technical and financial assistance as compared to cash crops. The strong focus on traditional cash crop cultivation has also led to the unavailability of statistics on the various components of horticulture in Malawi which makes informed decision making on the specific sub-sectors of horticulture, for example fruit and legume production, difficult (Kachule and Franzel, 2009).

"Horticulture industry is a serious sector that can help the country both economically and nutritionally…. The standards of horticulture in Malawi are indeed dwindling" (Dr. Godfrey Ching´oma, director of crops department, Malawi, September, 2013)

"it is a worrisome development to see most of local chain stores importing small things like mangoes from outside when they can be produced locally by us" farmers in Malawi (September 2013)

1.2.1. The horticulture policy in Malawi

In order to have a vibrant horticulture sector in Malawi, the government emphasizes the importance of developing skills in marketing and agri-business management in the sector. These skills will help in the development of horticultural marketing and food processing programs in Malawi. However, Malawi does not have a horticultural policy, legislative and institutional frameworks in place, and consequently has no horticultural marketing policy. The absence of policies is one of the contributory factors to the underdevelopment of the horticulture sector (especially fruit sub-sector) when it comes to production, processing and marketing of the fruits. Currently, the development of the horticulture industry is guided by the Malawi horticultural development strategy of 1999 which is not supported by any legislative framework and it gives little attention to fruit export and foreign marketing.

"It is my dream that something needs to be done, there are so many challenges and as I am talking we do not have even any regulatory body to monitor all horticulture farmers in order to improve the quality of seeds as well as fruits and vegetables produce…. There is so little, almost no funding towards horticulture farming in Malawi, this automatically shows that the government does not prioritize horticulture farming but ends up spending billions on other programmes like the Farm input subsidy programme which is a long term thing… Together with fellow horticulture farmers' fight to make sure that a guideline and introduction of nursery certification commence soon" (Lobin Lowe, MP, September, 2013)

CHAPTER 2: MANGO PRODUCTION IN MALAWI

2.1. Mango production

Mango is one of the commonly consumed fruit in Malawi. It originated from south East Asia (China and India) and was introduced in Malawi by Arab traders and early Christian missionaries. It is a popular fresh fruit that people enjoy eating when in season. Mangoes grow in all districts of Malawi though its quality is higher in the most northern and southern parts of Malawi. A lot of Mangoes are produced in areas near Lake Malawi and in south west of Malawi because of favourable conditions for Mango production i.e. water and temperature. Mango trees requires high amounts of water and bear fruits in the rainy and summer seasons which starts from October to May. The production figures of Mangoes (table 1) show that Malawi produces large volumes of mangoes every year and the potential that Malawi has in mango production. This clearly means that there is an easy fulfilment of fresh mango fruit demand at local level when mangoes are in season. The mangoes are always available to be purchased by different consumers in the local and urban markets as well as free picking by individuals, although such behaviour drives down mango prices at the markets (Faulkner et al 2009).

Table 1: Mango production (2011 to 2015)

Year (growing season)	Production (MT)
2011/2012	1,062,069
2012/2013	812,528
2013/2014	1,177,439
2014/2015	1,195,640

Source: GoM (2015)

Mango should be a high priority fruit because through history it has been an important source of nutrition and income in Malawi. Even when out of its fruiting season, mangoes have a potential to generate more income although there are challenges such as requirements for proper storage, processing, preservation and handling facilities, which is costly and unaffordable to many small scale farmers. There are potential international market opportunities for fresh mango and mango processed products if processing plants, storage facilities and transportation meets international quality standards. Investments at this stage is very important for mango production in Malawi.

Pests and diseases are a major challenge to mango production in Malawi. The mango is attacked by various insect pests causing both flowers and fruit to drop. The common mango pests found in Malawi include the fruit fly, the mango stone weevil, the gall midge, scales and mealybugs. Disease such as powdery mildew (see figure 1) and anthracnose are also known to affect mango crops (FIDP, undated).

Figure 1: Mango fruit attacked by powdery Mildew- Malawi

2.1.1. Major mango Varieties

There are two types of mango varieties i.e. local and improved mangoes as discussed below.

a. **Local mango varieties**: The local fibrous mangoes exist countrywide. They include the *Boloma or dudu or Domasi* mango which is oval, high yielding, medium sized, weighing between 0.3-0.54 kgs and the peach or *Kalisele* mango which is round, high yielding, small in size, with a weight of less than 0.3 kgs per fruit. Both these mango cultivars are popular for consumption on the local market, processing and grafting (see figure 2) besides their wide adaptation, they are being promoted alongside the improved varieties by government and few NGOs in the fruit tree industry.

Figure 2: Mango grafting in Malawi

b. **Improved varieties:** Improved, fibreless mango varieties that are also for export were introduced in Malawi by the agricultural research and technical services department. The improved mango varieties are preferred for their large size and good internal qualities which include flesh absent of fibres, a melting flesh and the typical mango flavour. Production of the improved varieties in Malawi is currently negligible, largely because of the prevalence of cheap local mangoes, the non-availability of improved planting materials and the poor management of planted materials (FIDP, undated). The improved mango varieties are very important for the mango industry in Malawi because of the less fibre content which makes it easy to process the mangoes into various products that could be exported (Faulkner et al 2009). The improved mango varieties found in Malawi include Tommy Atkins, Zill, Irwin, Kensington, Kent, Heidi, Keitt, Sensation and Haden.

2.1.2. Uses and importance of mangoes

The mango fruit in Malawi improves the nutritional status of people as it is mostly eaten fresh. It is good source of dietary fibre, sugars, vitamin C and provitamin A (Elias, 2007). The fruit also has industrial uses: e.g. in the production of biogas and starch. Depending on the stages of maturity mangoes can be processed into different products, i.e. ripe mangoes are used in juice extraction and drying while unripe fruits can be made into achaar (pickles) and other preserves (Gor et al, 2012). As pointed out by Faulkner et al (2009), the mango fruit has the potential to contribute immensely to economic growth in Malawi, source of income to smallholders and the improved fibreless varieties can be exported to generate foreign exchange (FIDP undated).

CHAPTER 3: MANGO VALUE CHAIN ANALYSIS IN MALAWI

This chapter will analyse the mango value chain in Malawi and the importance of having a mango value chain in Malawi. The chapter will look into the main mango value chain actors and stages and highlight some of the challenges faced within the value chain and how these challenges can be addressed.

3.1. Mango value chain analysis

A mango value chain (see figure 3) involves a series of activities in which mangoes passes through. The activities range from conception through different levels of production that involves combining physical transformation of the mangoes and the inputs from service providers. It also includes activities of delivering the mango products to the final consumers and the final disposal of wastes from the mangoes (Mutua et al 2014). The value chain involves different actors that are engaged in activities that brings the mango product from its original form to its end use. The actors range from those supplying inputs, to those producing the products and finally to those processing and consuming the products (Gor et al, 2012).

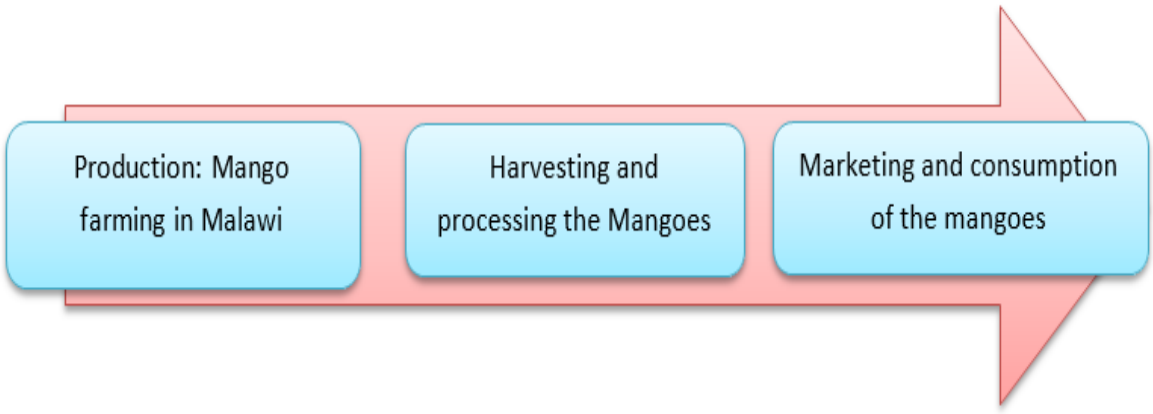

Figure 3: An example of a basic mango value chain

Mango is one of the agricultural enterprises that have the greatest potential to serve as a vehicle for poverty reduction and source of livelihood for a majority of smallholder farmers in Malawi as it is mostly grown in all districts. Thus, investment in the mango value chain could be an investment in poverty reduction among smallholder farmers in the country. Many important products can be derived from mangoes from its skin to the mango stone. Fresh mango fruit has a short life span i.e. they are perishable and as the mangoes are moving from one stage of the chain to another e.g. from production to consumption, disastrous quality losses can take place if care is not taken into consideration. Therefore it is important to precisely time and manage well every activity throughout the mango value chain (Gor et al, 2012).

A mango value chain analysis is a process of documenting and analysing the operation of a mango value chain. The analysis focusses on how goods and services move from producers to consumers and the relationships between the suppliers and the consumers. It usually involves mapping the mango chain actors by describing the role of the each actor and how each actor relates to other actors along the chain. It also involves mapping the opportunities, the cost, the benefits as well as the challenges faced by different actors along the mango value chain (Gor et

al 2012). It is a holistic approach because it pays attention to the complex interactions of income, value added across the chain and how these are distributed within particular points and levels of the chain (Mutua et al 2014).

3.2. Main mango chain actors in Malawi

The main mango chain actors that are available in Malawi include farm input providers, mango farmers, middlemen, processors and other service providers. Details of each actor are provided below:

3.2.1. Agricultural input providers

These actors are responsible for providing inputs such as seeds, farm implements, fertilizers and pesticides for agricultural production (Kastaneda et al 2011). However, in Malawi highly specialized support in terms of inputs for mango farmers is not available. Most farmers use locally available inputs/materials to produce mangoes. There has also been little assistance to local farmers by research stations and agricultural offices in terms of technical support and provision of grafted trees or improved mango varieties. There is a need for government and other stakeholders to take a role in the provision of inputs, directly or indirectly, by training farmers to produce improved mango varieties, either through grafting or direct sowing.

3.2.2. Mango farmers

Mostly mango trees grow naturally and they grow in association with other food crops: e.g. maize, beans, soybeans etc. Some farmers grow mango trees to create a boundary for their fields to avoid encroachment by neighbouring farms. However, there are a few farmers who grow improved and grafted mango trees where there is land allocated for mango trees only. Within local communities there are often many mango trees, so many that almost every household has one or more mango trees around its house. Mango producers frequently face a challenge in accessing finance and credit. The consequence is inadequate access to and use of farming inputs leading to low production and poor quality of mango produce. Thus, there is a necessity for improved access to credit for mango farmers. Mango farmers face challenges of pests and diseases (as pointed out in chapter 2) which reduces the both the quantity and quality of their harvest. Typically the main markets accessible to Malawian mango farmers are the local markets or stalls along the roads that pass near their communities. Harvesting techniques used are rudimentary and include the use of stones, sticks and sometimes they climb the trees to harvest more fruits. Some of these harvesting techniques destroy the fruit in the process making it impossible to sell at the market and thus it ends up being consumed by household members. There are, still, no organised mango associations or cooperatives available to Malawian mango farmers.

3.2.3. Middlemen

Middlemen act as suppliers to main markets in the district and town areas (Kastaneda et al 2011). Most of the middlemen have a network of mango collectors (farmers) but some middlemen purchase mangoes from the roadside where farmers assemble their mangoes for sale. In some cases the middlemen do not go straight to the farmers for mangoes but, rather, the

farmers deliver the mangoes to the middlemen in the town/city markets where the mangoes fetches higher prices as compared to local markets in the districts. The middlemen regardless of where they buy the fruit, normally buy the mangoes at lower prices than their reselling price and make a large profit margin for their business. They buy the mangoes from big baskets (locally known as *dengu*) and prices vary depending on the size of the basket. Bargaining procedures are followed which are often detrimental to the farmer's profits as in many cases farmers just want to sell the mangoes as soon as possible as they do not possess proper storage facilities.

3.2.4. Processors and service providers

Mango processing is not carried out on a large scale in Malawi today. According to Kachule and Franzel (2009) fruit processing (including Mango) in Malawi is categorized as small and medium scale endeavours.

Small-scale fruit processing is more common in Malawi as many processors fall in this category. It is done at individual/household or at farmer group/cooperatives levels. They process various types of fruits into juices, jams, dried fruits, and achaar (Pickles) among others. Small-scale processors frequently receive technical, financial and capital support from NGOs, donor agencies and through government projects. Within the small scale processor category, the infrastructure used for processing is not well developed. In Malawi, there has been very little value to most horticultural crops especially fruits by small scale farmers through processing. One of the reasons for this is that most of the small scale farmers face challenges when it comes to resource availability and for those who have the resources e.g. money, they face a challenge of limited availability of the processing equipment at local level. Yet this reason is not fully sufficient as there are local institutions such as Chitedze research station; Lilongwe university of agriculture and natural resources-LUANAR (as shown in figure 4), and the Malawi industrial research and technology development Centre; that all have developed small-scale fruit processing equipment. Most of the small scale farmers that are in the fruit processing industry are currently using processing tools that are developed by these Malawian institutions. This locally developed processing equipment is often simple in design and mostly operated by hand but has a limited efficiency for a competitive fruit industry.

Figure 4: Fruit processing equipment by LUANAR (Kachule & Franzel, 2009)

Apart from the processing equipment, smallholder farmers in Malawi have also been receiving support in form of processing houses from NGOs and other government projects. The houses are given to few farmer cooperatives that are specialised in the same crop enterprise and are within the project or NGO operating areas. Most of the processing houses are designed in a way that hinders the processing activities (see figure 5) as most of them lack cooling and display cabins facilities. Despite the importance of the locally developed processing premises and equipment for smallholder fruit farmers, the distribution of such facilities has been minimal.

Figure 5: Processing house at Ngolowindo cooperative, Malawi (Kachule & Franzel, 2009)

Medium scale fruit juice manufactures in Malawi, including Dairy board; Lilongwe Dairy; and Suncrest creameries all produce different kinds of fruit juices from fruit concentrates that is imported from South Africa. They simply dilute the concentrates into different brands of fruit juices i.e. they do not process fresh fruits. According to research conducted by Kachule and Franzel (2009) two reasons were given explaining why medium scale fruit juice producers do not process fresh fruits. The first reason provided was that it would require heavy capital investment for the processing equipment which is too heavy for medium scale investors. The second reason provided was the production capacity of the machinery which was estimated at 3,000 kgs of fruits per hour which is on a higher side with the current local supply of fruits in Malawi. Thus, current low supply of fruits in Malawi would make the investors not to take advantage of the economies of scale as they would be operating below capacity.

3.3. Main mango value chain stages in Malawi

There are five main mango value chain stages in Malawi i.e. input supply and production, harvesting and post-harvest marketing, processing and consumption. These five stages are discussed in more details below.

3.3.1. Input supply and production

Mango is generally a low input crop as compared to other horticultural crops in Malawi. Most mango trees grow naturally though there are few farmers who plant mango trees with improved varieties. Almost all parts in Malawi grow mangoes because of favourable conditions for mango production. Whilst Malawi has favourable conditions for mango production, many farmers are at subsistence level of production with low or no use of improved technologies and inputs in order to enhance mango production (Ssemwanga et al, 2008). There is a need for inputs that have to be used for organized production of the mangoes e.g. seed and seedling, labour, land, fertilizers and manure. The major sources of these inputs for mango production in Malawi are district agriculture offices, town and local markets, research stations, farmer's individual stock and from other farmers (Honja, 2014).

There are challenges with the availability of land for establishment of mango orchards and farms as most farmers traditionally grow food crops such as Maize, cassava and rice. Mango production in Malawi is considered as an add-on farming practice and is not taken as one of the livelihood activities. This is due to the seasonality nature of the mangoes and the tendency by most farmers of looking at food security as the growing of grain crops only (Honja, 2014). Availability of hybrid or grafted mango trees is still a challenge in Malawi. This is due to the lack of production of the improved varieties by the research stations in Malawi, a lack of agricultural extension support in mango production, as well as lack of commercial nurseries offering improved mango varieties. There is also a lack of organisation amongst mango growers, which is an issue that is restraining the development of the mango industry in Malawi.

Among the few farmers who have orchards, awareness about the spacing of orchards, pruning, fertilizer application, access of new varieties and pest and disease control is very low. In order to increase the production of mango there is need for strengthening farmer training programs on good agronomic practices such as proper spacing, time of pruning, methods and time of fertilizer application, identification of pest and disease and control mechanism, methods and time of harvesting, and packing material use. Government or NGO distribution of pest and disease resistance mechanisms and the introduction of early maturing mango varieties is another method which would increase mango production potential.

3.3.2. Harvesting and post-harvest

Before harvesting, it is important for farmers to know the stages of maturity of the mango i.e. Green (unripe), to partially ripe, then fully ripe, and finally over ripe. Mango is climacteric and it is important to harvest it when it is ripe because if mangoes are harvested when still green they will never attain its optimal flavour which consequently affects its marketability. Furthermore, harvesting mangoes after peak maturity results in shortened shelf life with the fruit deteriorating quickly (Rosals, 2005). Mango ripening is a very specialized activity which most Malawian farmers are not aware of as most farmers ripen their mangoes by storing them in a sack which eventually reduces the quality of the mangoes. Based on their stage of maturity when they arrive, mangoes can be ripened in controlled atmospheric rooms. Mangoes can be ripened for two days at 27°C or for five days at 25°C or even for seven days at 21°C; with or without ethylene and with or without humidity (ITC, 2011). However, controlled atmospheric rooms are not a possibility for most Malawian farmers as it would require electricity (which most of them do not have) to operate and regulate the temperatures. For the smallholder farmers to have the controlled cooling facilities, they would need capital investment which currently is not available for the farmers.

Mangoes are harvested using different methods as adopted by the smallholder farmers in Malawi. Some of the harvesting techniques used to harvest mangoes in Malawi are: hand picking, shaking of trees, stone throwing and using of sticks to fell the mangoes. The hand picking harvesting method maintains the good quality of the fruit and protects it from bruising and damage. Hand picking can be time consuming when few people are involved in the activity hence many turn to sticks and stones to speed up the harvesting process. However, the use of

sticks, stones and shaking of trees results in the fruit dropping (also fruit that has not reached full maturity) leaving it without the stem which facilitates bruising and mechanical damage. A study by FAO (2005) indicated that mango bruises, cuts and punctures increases the production of ethylene which hastens softening of the fruits and ultimately causing mechanical injuries and fruit decay. Technical education on sustainable mango harvesting methods for farmers is therefore important as it leads to immediate improvements in the mango quality which would lead to better prices for the mangoes, making farmers earn more money which eventually improves their livelihoods.

A major loss of mango produce occurs during harvesting and storage because of inappropriate harvesting methods and a lack of proper storage materials and facilities (Honja, 2014). Furthermore, of the harvested mangoes, a significant portion is wasted each year because of inadequate and poor transportation and due to poor road conditions, especially in the rural areas. In rural areas of Malawi, once mangoes have been harvested, they are transported with bicycles or on foot (by carrying it on the head) which not only restricts the quantity of mangoes that can be transported to markets, but the packing techniques (in sacks, baskets or pails) can result in damage to the produce as well.

Proper storage and protection of products from getting spoiled is a critical stage to fresh and processed mangoes. Once mangoes have been harvested, they are often exposed to extreme heat or prolonged sunlight which further damages the fruit. Damaging of unripe mangoes due to post-harvest methods and exposing ripe mangoes to direct sunlight for a long period causes darkening of the mango fruit, which Malawian consumers do not find desirable. There are other issues relating to over ripening of the mangoes before they reach the final market destination. These issues are as a result of lack of expertise on the part of farmers on the right/optimal fruit harvesting time considering the final output and the distance from the place of final sale (Faulkner et al 2009).

3.3.3. Marketing

Most markets in Malawi are informal markets which includes individuals selling products along the roadside and numerous merchants congregating in one marketplace to offer a variety of merchandize and agricultural products. Given the transport and handling inefficiencies of the mango fruit in Malawi, the commercial opportunity for locally produced mangoes is limited to the local informal marketplaces and roadside markets (Faulkner et al, 2009). During the peak mango season, the markets are filled with mangoes and sometimes it reaches the point that prices fall dramatically making many farmers not to bother carrying their mangoes back home at the end of the day (Ssemwanga et al, 2008). Most of the time mango producers sell their mangoes directly to consumers and sometimes to retailers because of the market fluctuation and lack of marketing infrastructures hence a need to invest more in market, processing and storage infrastructure. During marketing of mango, smallholder farmers use various means of transportation e.g. bicycles, wheelbarrows, oxcarts, and carrying on the head, to deliver their produce to customers for final use and consumption.

The absence of policies and clear strategies for the horticulture sector in Malawi has affected the local and export marketing of all forms of Mangoes (either fresh or processed form). It has also contributed to inefficient and unorganised fruit product markets. According to Kachule and Franzel (2009) there are other factors (as discussed below) i.e. in addition to the policy constraint, that contribute to the undeveloped marketing systems for fresh and processed mangoes in Malawi.

a. **Poor marketing and storage infrastructure:** Compared to other countries in the southern African region, the marketing and storage infrastructures at all levels in Malawi are still undeveloped. There are poor storage, processing and transporting infrastructures which poses a challenge when it comes to marketing of fresh mangoes and its processed products. There has been little and to some extent no appropriate storage infrastructure investment at small scale level. In some cases open shades (figures 6 and 7) are constructed by government and other NGOs in market places across the country which are used for marketing of various fruits. These structures expose mangoes to sun/heat, dust, rain, and other harsh conditions that reduces the quality of the mangoes and expose the mangoes to more physical damage and shrinkage. Since mangoes and its processed products such as juices and jams have a short shelf life, it becomes difficult for mango sellers to keep these for a long period of time because of lack of cooling facilities. In most parts of the country especially in rural areas, the transport infrastructure is in poor condition especially during the rainy season (which coincides with the mango season) where most of the roads become impassable. The transport means (e.g. bicycles etc.) that are mostly used by many people are also not suitable for mangoes. The medium fruit manufacturers are at an advantage as they have access to the few refrigerated vehicles that are readily available for them leaving the small scale farmers rely on open vehicles to transport their mangoes to the markets.

Figure 6: Shelter for selling horticultural products (Kachule & Franzel, 2009)

Figure 7: Roadside shelter for selling horticultural products (Kachule &Franzel, 2009)

b. **Certification:** At national level, The Malawi Bureau of Standards (MBS) is the authorized body to certify commodities and very few if any of the small scale produced mango products have been certified by the MBS. Marketing of uncertified mango products is therefore limited by the impossibility of these products finding their way into the main convenience stores because they have not been certified.

c. **Packaging factors:** In most cases, mangoes are sold in heaps and sorted based to their quality and size (where consumers buy in accordance to how many mangoes they want) without any packaging (see figure 8). This is common in most of the markets both in rural and urban areas. Poor packaging does not only apply to fresh mangoes only, it also apply to processed mango products. Some individuals and smallholder groups pack their mango juices, jams and dried fruits in bottles and packets without any labelling or use poorly printed labels.

Figure 8: Mangoes for sale sorted according to quality & size

d. **Limited support:** The Mango fruit sub-sector has received little or no technical and financial assistance whether in production, processing and marketing stages. The technical and financial services are important in order to enhance the performance of mangoes. The current extension workers are not fully skilled in the processing and marketing of mangoes. This leads to offering of little technical support to smallholder farmers when it comes to processing and marketing fresh mangoes and its processed products. The financial sector offers little support i.e. capital investment for mango fruit processing and marketing infrastructures. High interest rates on capital investment by the financial institutions limits those who are capable of getting a loan to invest in processing and marketing of mangoes.

3.3.4. Processing mangoes in Malawi

In order to increase the participation of small scale farmers in the processed mango market, capital should be provided to them to build their own processing facilities or an opportunity should be given to them to provide fresh mangoes to commercial organisations that specialize in processing, such as the Malawi Mangoes Company. There is also need for the local farmers to provide the mangoes and mango concentrates which some fruit manufacturers are currently importing from South Africa and other countries. Currently, at small scale i.e. individual level, farmers are processing mangoes into juices, jams, dried fruits, achaar which are sold within their communities, at local markets, or in shops at the district level. According to Faulkner et al (2009), there are requirements and steps that needs to be followed by farmers in order to achieve a particular final mango processed product (refer to annex 1 for more information)

In 2009, a company called Malawi Mangoes was established in the central region of Malawi which processes mangoes into purées and concentrates that are exported to regional and international fruit drink manufacturers. Malawi Mangoes is thus not a direct retail juice brand but provides the core ingredients to juice brands for use in their retail products.

3.3.5. Mango consumption

Mangoes in Malawi are most commonly consumed as fresh fruit and as processed juice. However, consumption of mangoes in its fresh form far outcompetes processed mango products, such as juice, due to the cost increment from processing and packaging which makes them beyond the purchasing power of the vast majority of Malawian consumers who suffer from very low capital earnings. Furthermore, due to an almost inexistence of cooling and storage infrastructure the majority of the fresh mangoes are consumed when they are in season and not during other seasons. Mango consumption is not considered as a part of the daily nutritional diet in Malawi, which is dominated by daily consumption of *nsima*, the country's staple made from maize meal. There are three main reasons behind this: (a) the awareness of the nutritional value of fruits is low; (b). mangoes are mainly consumed when they are in abundance, overflowing the markets and almost free; and (c) for most Malawian context, fruits do not accompany/complement maize (*nsima)* well as part of the meal which is mostly consumed with meat, vegetables, fish and beans (Faulkner et al 2009).

3.4 Graphic Summary of the Malawian Mango Value Chain

Figure 9, below, demonstrates the mechanisms of the Malawian mango value chain as described in chapter 3, above. The figure illustrates the relationship between the mango value chain actors and the stages of the value chain in which the actors play their roles.

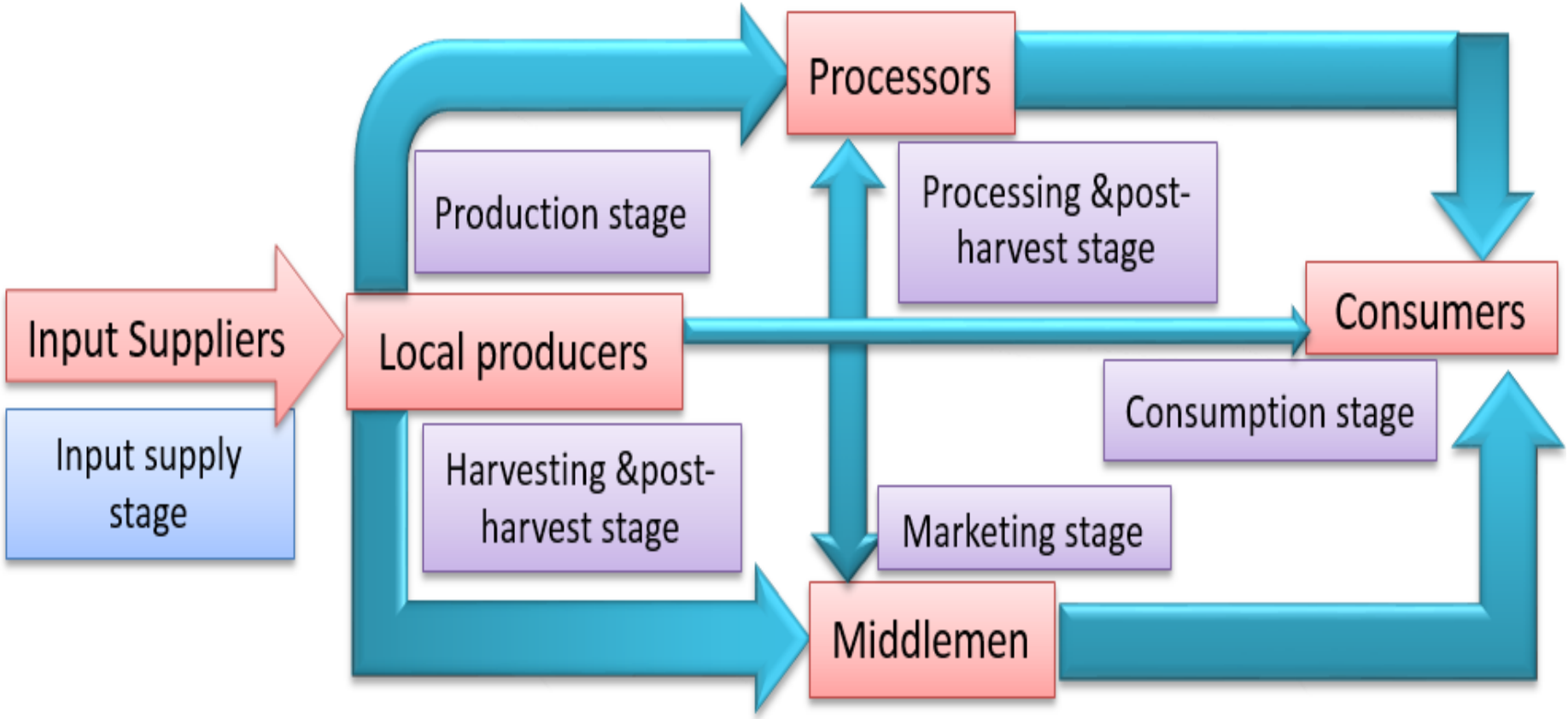

Figure 9: Mango value chain actors and stages in Malawi

CHAPTER 4: GENDER AND MANGO VALUE CHAIN IN MALAWI

This chapter will discuss different gender terminologies used in the mango value chain and the rationale of a gendered approach to mango value chains in Malawi.

Why a gender approach to the mango value chain in Malawi?

In everyday life it is important to consider the universal values and the equality of human beings regardless of race, gender or religion principles (Dulon, 2009). Value chains exist and operate within a given social context that affects the distribution of resources, benefits and opportunities (Rubin et al 2009**,** Mutua et al 2014). Gender relations do affect and they are affected by the way the mango value chain functions in Malawi. Gender relations at the household level play a major role in determining the extent to which men and women interact within the mango value chain. The behaviour of various chain actors (either individual or firms) in the mango value chain is determined and guided by the existing gender roles and relations (Rubin and Manfre, 2014). The consequences of gender relations at the household and business levels can be reflected in the mango value chain. Therefore, for a profound understanding of the roles, functions and operations of various actors within the value chain a critical analysis of gender roles and relations and how these shape and impact different behaviours of the actors in the mango value chain is required (Rubin et al 2009).

Gender: gender is defined as the socially constructed roles and status of women and men, girls and boys. It is a set of culturally specific characteristics defining the social behaviour of women and men, and the relationship between them (Mutua et al 2014). Gender is not about women or men but about the relations between men and women; the significant differences that exist in most societies between the rights and opportunities of men and women, including rights to land, resources, work opportunities and wages, and participation in decision making processes. Ensuring that men and women have equal rights, opportunities and responsibilities (Annecke, 2010).

Value chain analyses provide opportunities for showing how various value chain actors and stakeholders are interconnected and may influence the capabilities of other actors and how they possess different levels of negotiation power which could affect the outcomes of the mango value chain. Power inequalities across various levels of value chains influence value chain governance and the roles and voice of different actors within the chain (Kaplisky and Morris 2000). The differences in power also determines the positioning of people within the chain (who is allocated or who plays what role in the chain), and who makes decisions and has the most information about different aspects of the chain e.g. price information. As a result of these power inequalities, women may have a lower voice in the value chains or have limited access to marketing information thereby reducing their negotiation power. Since the local mango producers are poor smallholder, subsistence farmers, they are often at the bottom of the value chain (regardless of being male or female) and thus with little negotiating power and therefore easy to take advantage of.

Gender relations: The way different societies define rights, responsibilities and the identities of men and women in relation to one another. They are based on power and negotiations (Nelson et al 2012).

The gender concept gives a better understanding of men and women, not as independent elements of the society but an integral part of the society. It also forms an understanding of men and women, by separating biological issues from cultural ones thereby dealing with the unequal power relations that currently exist between different gender categories at household and community levels. There is a need to remove the discriminatory cultural beliefs and practices that increase gender inequalities in the communities. These gender inequalities are a result of discriminatory cultural beliefs, traditions and practices that restrict full participation of men and women in their communities and within the mango value chain as well (Rubin and Manfre, 2014). However, as stated in the universal declaration of human rights, all human beings regardless of their gender, have a right to live a life free from discrimination that would reduce their access to education, employment, skills if they are qualified for such opportunities. Women in Malawi face above average risk of poverty which can directly be traced to the persistence of gender inequalities within Malawian society, such as inequalities in the access to education and employment as well as access to and control over productive resources; the unequal gender division of labour within households and lack of women's empowerment in public and private sectors. These inequalities are important and will affect the operations and sustainability of the mango value chain in Malawi if not taken into consideration and addressed (USAID, 2012) and thus affect the country's possibilities of agricultural diversification as women provide 70% of the work force for the cash crops and produce 80% of food for home consumption (GoM, 2012).

In Malawian agricultural value chains, women generally occupy the lowest stages of these chains as informal or home based workers. Despite this, there are women who work as farm managers and wage workers. However, unpaid women workers do contribute more time, labour, skills and knowledge in the production, processing and marketing of mangoes in amounts that equal or surmount the contributions of men (Manfre, undated). Women in Malawi play a key role in the mango value chain and should therefore equally benefit from activities that are undertaken in the chain. According to ITC (2011) women and men are equally active within the mango value chain but are generally confined to different roles along the value chain. However, women are more often involved in a full range of activities which are invisible and not valued or recognised in comparison to the men's activities (Laven et al 2011).

Gender roles: are those behaviours, tasks and responsibilities that a society considers appropriate for men, women, boys and girls (FAO, 2011a). They are socially constructed, learnt, they are dynamic, they differ within and between cultures and they are influenced by class, age, ethnicity and religion. Gender roles are important because gender shapes the opportunities and challenges that men and women face when securing their livelihoods across all cultural, political, economic and environmental settings. Gender influences the roles and relationships of people throughout all their activities, including their labour and decision-making roles (Wilde, 2001).

In Malawi, both men and women take part in the mango value chain, however, women are more engaged in the production, processing and packaging stages while men are more engaged in the marketing of the products. This reflects customary Malawian cultural traditions that stipulate that women grow food while men earn money. Women mainly focus on activities that determine the final quality of the product, including: harvesting; post-harvest handling; transportation; sorting and grading of fresh fruit; peeling, cutting and packaging of processed fruits. In order to generate significant improvements in the productivity and quality within each level of the mango value chain, constraints faced by women and men in these stages must be effectively addressed. Mathiassen et al (2007) have pointed out that encouraging men through awareness raising sessions to share the income from harvest with their wives can lead to obvious improvements in mango production and quality. Continued gender inequalities within the value chain, such as if men keep reaping the monetary benefits of women's work within the mango value chain, may eventually lead to women withdrawing their labour, at all levels of the value chain, which would endanger the supply of vital labour and materials that are required for the full functioning of the Malawian mango value chain. Thus, with women playing such a central role in the value chain, a gender blind approach and policy on the mango sector and initiatives of value chain upgrading will yield limited success, non-sustainable changes, and ultimately a continuation of the status quo in an economic and agricultural environment that would benefit from diversification.

Gender Analysis: A systematic analytical process used to identify, understand and describe gender differences and the relevance of different gender roles, responsibilities and power dynamics in a social context. It examines different rights, roles and opportunities of women and men and the relationship between them. It identifies gender disparities and reasons behind the existence of the disparities. Gender analysis also determines whether they are potential obstructions to achieving best results, and looks at how the obstructions can be addressed (USAID, 2011). The analysis helps in understanding what men and women do, what resources they own and what their needs and priorities are in order to address gender inequalities. Gender analysis is used to address issues in access to and control over resources and decision-making within rural communities and households (FAO, 2011a).

A strong Malawian mango value chain offers the potential for a wide range of opportunities for both men and women, through improved market linkages and employment benefits (Mutua et al 2014). However, at present, barriers such as access to capital, technologies and markets (local, regional and international) restrict people's possibilities to upgrade the value chain, advance their own position within the value chain, and take advantage of its full potential. This especially affects women's participation and benefits from the mango value chain as women's access to capital and technologies is lower as compared to men (FAO 2011b) which seriously decreases their participation level within the links of the value chains with the highest economic returns, confining them to the links with lower profit margins.

In Malawi men are often conceived as the "real" farmers hence giving them an opportunity of receiving more technical support and agricultural extension services even for activities and crops that women manage (Laven et al 2011). This leads to improper flow of information on

new technologies and upgrading techniques within the mango value chains as it does not end up with the appropriate individuals (Rubin and Manfre, 2014). This should be addressed by employing female extension workers and by targeting both men and women for technical support which will eventually increase the impact of technical assistance and improve the quality of goods flowing through the mango value chain (Manfre, undated). Land tenure systems and property ownership practices also dictate which household members have access, control and/or ownership over the means of production. Traditionally, land is owned by men; and women's access to land and its use is determined by the owners' (the men's) decision making. As women in Malawi traditionally execute productive and reproductive roles simultaneously (Bhattarai and Leduc 2009) women are thus mainly engaged in value chain activities that allow them to be closer to the homestead whereas men can freely engage in activities that require them to be away from home which are often more profitable, such as marketing.

CHAPTER 5: GENDER AND MANGO VALUE CHAIN ANALYSIS IN MALAWI

A gendered value chain analysis describes the gender relations that exist in a particular environment i.e. from individual households or organizations to the community or nation. It clarifies the importance of the gender differences from achieving development objectives, by organizing and interpreting gender relations in a systematic manner (Mutua et al 2014). A gendered value chain analysis examines the different levels and categories of performance, participation and access to benefit within the value chain based on gender (Cook et al 2014). This chapter will present a gender focused analysis of each stage (or link) within the mango value chain as discussed earlier in chapter 3. It focuses on:

a. Different gender roles and responsibilities at each stage of the mango value chain
b. Constraints faced by each gender category
c. Access and control over resources by women and men
d. Cultural norms and beliefs and their effects to mango value chains

5.1. Input supply and production stage

In Malawi 90% of the households are described as agricultural households. In most cases, men have the decision making power on what to produce, especially when money is involved. Traditionally men grow the cash crops while women grow the food crops for household consumption (Mathiassen et al in 2007). This is the case because Malawian women are expected to feed the household as per Malawi's culture and tradition and therefore make sure that they produce food crops that will increase the availability of food for the household throughout the year. With such an enormous and vital responsibility on their shoulders women are often less willing to take risks that can contribute to household food shortages. That is, diversifying their existing crops, trying to cultivate new crops, and ultimately to undertake new business ventures such as mango production. Women also face challenges in accessing and controlling factors for production such as farm inputs, land and improved farming technologies. Such greater difficulties (compared to men) in accessing labour and cash to expand mango production or increase mango productivity constrains women's chances of improving their performance and productivity.

a. **Labour and time use:** Access to and efficient use of labour is important for the production of mangoes in Malawi where there is little or no mechanisation. Households (men, women and children) are the main suppliers of this labour, although women participate more in the production stage of mangoes as compared to men (Cook et al 2014). For the farmers with mango orchards, women are more involved in land preparation and weeding while men are involved in the procurement of inputs due to the distance of input markets from the household and the traditional bond(age) between women and the household in Malawi. It should also be noted that while both men and women dedicate a significant amount of time to mango production activities, women spread their time across a wider range of activities, including both productive and domestic activities which results into women having a longer working day than men (Rubin et al 2009). According to a time use analysis research conducted by Mathiassen et al in 2007, Malawian women spend on average 7.7 hours per

day on household chores compared to 1.2 hours for men. This gender inequity in labour and time use is likely to be higher if looking after children, caring for the sick and other traditional women's roles had been included in the research. The longer working hours by women on productive and reproductive activities and responsibilities gives women less time to engage themselves in income generating activities compared to men.

b. **Access to land:** A major issue for small scale farmers is lack of capital to start up a mango production business and procure inputs e.g. improved mango seedlings, fertilizers, pesticides and equipment. Most female farmers in Malawi do not formally own land that can be used for mango production or used as collateral for a loan from a commercial bank (Faulkner et al 2009). Women are disadvantaged compared to men both in access to and control over land, as well as in land size. The FAO gender and land rights database reported that women in Malawi only make up 32% of individual land holders (FAO 2011c). However, few attempts have been done to successfully alter the national land policy in ways that could enhance women's access to land despite the recognition by the policy that there is a failure to protect and uphold the rights of women to land. Access to land in Malawi is guided by customary laws and practices that are associated with matrilineal and patrilineal systems (Cook et al 2014). In both systems, land property rights are given to men which empowers them to make all the decisions pertaining the use of the land**.** Despite perceptions that women are better off in matrilineal communities, research confirms that women in both systems have few, sometimes no, independent rights to any property and land due to the mixture of traditional practices and customs.

> Under patrilineal kinship systems, an individual is considered to belong to the same descent group as his or her father. Upon marriage, a woman would leave her village and reside in her husband's village. In patrilineal societies, a married woman is regarded as a member of the husband's family. She is expected to leave her house, land, any matrimonial property and her children with her husband and return to her birth family in the case of a divorce.
>
> Under matrilineal kinship systems, an individual is considered to belong to the same descent group as her or his mother. In matrilineal societies, the maternal uncle is the legal guardian of the children and the custodian of land owned by his clan. When women marry, their husbands control their land and assets. Upon divorce, husbands take the assets, which they brought into the marriage and leave the land, but take the harvest (Cook et al 2014).

c. **Access Credit:** For both women and men to be able to invest in income generating activities i.e. mango production, access to credit is an important factor to be taken into consideration. Most farmers fail to venture into mango production because they lack start-up capital. As pointed out above, women have less access to capital or savings compared to men and therefore do not possess the resources for the initial investment necessary for opening a farm or processing company, or any other small-scale business. In the smallholder farming sector in particular, the fact that organized mango cultivation does not generate income until after four or five years is also a major constraint, which prevents women from entering into such a business. This is in essence a question of means, and thus poverty, as few women can afford to pay the significant investment and maintenance costs without receiving an income from harvests during the same season. Malawian smallholder farmers are locked

into a cycle of poverty rooted in immediatism as their material comfort and wellbeing is in most cases dependent on their farming successes from season to season. One of the ways to raise capital for such investment is through loans from commercial banks and micro-finance institutions. Mathiassen et al (2007) found out that only 5% of Malawians (one third of them were women) had access to loans in 2004. Data from the Malawi Gender and Development Index (2008) indicates that more men than women farmers got credit, but the percentage of men countrywide who received credit was only 4% (Ngwira 2010). According to the Malawi Third Integrated Household Survey (2010/2011), only about 14% of households attempted to get a loan and interact with the credit market (NSO 2012). Rural Malawian women are more likely to face challenges in obtaining credit due to their poor access to information and marketing structures and lack of viable collateral e.g. land. Land is an important form of collateral for formal credit. The matrilineal and patrilineal land ownership systems override women's claims to land causing the small number of Malawian women land owners (USAID, 2012). Hence, women cannot use land as collateral which considerably restricts their access to financial services compared to the men. Access to financial services is especially critical for women in terms of enhancing their ability to participate in mango value chains beyond their traditional producer roles.

d. **Access to information and extension services:** The agriculture sector in Malawi follows an agriculture extension service system in implementing agricultural activities with Agriculture Extension Development Officers (commonly known as extension workers) providing technical advice and assistance on diverse areas of agriculture to farmers. Extension services play an important role in the dissemination of information and technologies to farmers. Taking into consideration that 90% of the population are farmers, there is a need to intensify extension services in order to increase agricultural productivity of crops and fruits. Agricultural extension workers play a critical role in agricultural development as they ensure that farmers are accessing improved technologies for the sustainable production of crops and livestock. The extension workers also act as sources of agriculture information in the rural areas they work in. However, the ministry of agriculture faces a challenge as there are few extension workers i.e. 1720 staff (of which 21% are female) compared to over 4 million farming households (DAES, 2016). Both men and women experience difficulties in accessing extension and advisory services because of the shortage of extension workers. It is estimated that only 14% of women and 18% of men have access to extension services in Malawi (GoM 2012).

Despite providing more labour in the mango production women still lack access to agricultural extension services. A research by Rubin et al (2009) has shown how greater adoption of inputs and new technologies is directly linked to farmers' frequent interaction with extension workers and the number of on farm demonstrations. According to this, women's considerably lower rates of meetings with extension workers compared to men's is one of the factors hindering women's abilities to improve mango production as it poses a challenge for women to utilize new technologies and methods for improved mango production. According to Mathiassen et al (2007), women farmers in Malawi do not receive extension services on mango production because of the following reasons:

- Most extension workers are male who may have difficulties in working with women farmers due to cultural constraints. This leads to the neglecting of women's need for agriculture advice.
- The mode of providing the extension services is mostly through group meetings and not on an individual basis which poses problems for women farmers to attend such meetings because of the triple roles (productive, reproductive and community roles) associated with them.
- The long distances to extension planning areas in order for farmers to have access to extension services, either through training and demonstrations, limits women's access to such services because of concerns about their safety and limitations on their mobility. The gender roles associated with women e.g. cooking and taking care of children makes it difficult for them to leave their home for long distances and a required length of time.

Taking into consideration that most farmers, especially women, do not receive extension services, the department of agriculture extension services (DAES) through its communication branch developed other modes of extension delivery systems i.e. using radio, television and mobile phones. However, according to the Malawi demographic and health survey of 2010 it was revealed that 53% of the rural population owns a radio, compared to 73% in urban areas; only 7% of the rural population owns a television, compared to 38% in urban areas; 35% of the rural population owns a mobile phone compared to 76% in the urban areas. Although the DAES delivers extension messages through these three modes it does not reach many of the farmers residing in the rural areas. Furthermore, women face challenges in accessing the extension messages through the three modes because of cultural norms that stipulate that men should control all the assets and properties in the household.

e. Access to education services: Education is the most important factor for the development and empowerment of women in Malawi. Access to education increases knowledge and understanding of various issues and concepts in the mango value chain. It is easier for an educated woman or man, compared to illiterate farmers, to adopt new technologies e.g. mango grafting and pest control. Gender equality in education is needed as this will have a positive impact in the mango value chain as education empowers both women and men to take informed decisions on future actions as well as it improves the bargaining and negotiation powers of farmers. However, great disparities between men and women still exist in the education sector of Malawi i.e. illiteracy rates among women are higher compared to men. According to findings of an NSO study from 2011 more women than men have never attended school in Malawi (19% compared with 11%). These disparities emerge because of cultural beliefs and traditional gender roles which dictate that girls are not supposed to be educated because their main role in the society comprises of productive work, reproductive work and community work, all of which they do not need to be educated. This is supported by a study by Mathiassen et al (2007), which revealed that more than a third of all the girls who had dropped out of school did so because they needed to work in their households. Traditionally men are linked to jobs that have to do with money in Malawi, as they are considered to be the head of the household, and as such, they require to provide for their families on a daily basis and are therefore in need of an education.

5.2. Harvesting and post-harvest handling stages

Production and marketing of mangoes in Malawi face immense post-harvest losses (occurring between the harvest and consumption stages) in terms of both quality and quantity of the product. Compared to other fruits, mangoes face storage and transportation challenges. Thus, the quality of fresh mangoes is dependent on the harvesting activities, post-harvest handling techniques, storage facilities and transporting mechanisms **(**Honja, 2014).

Mangoes are harvested using different techniques ranging from hand picking to use of stones (as discussed in chapter 3). In some cases, mango harvesting is largely associated with male child labour that climb the mango trees to harvest the fruits as in Malawi cultural norms dictate that women and girls should not climb trees because of their biological make up and mode of clothing (wrapper-*chitenje,* dresses and skirts). For women and girls in Malawi climbing of trees is considered "too dangerous" and "inappropriate". This has an implication on the harvest as most of the time women and girls harvest the mangoes yielding fewer mangoes as they cannot climb the trees to harvest the mangoes that are higher up and out of reach in the trees. They normally only harvest the mangoes that are at a height that they can reach directly with their hands or with sticks. For the mangoes out of reach they normally use stones damages the fruit rendering it unfit for sale or processing. Once the mangoes have been harvested, the women carry the mangoes on their head using a pail or sack to their households. This limits the amount of mangoes the women can carry because they do not have access to the modes of transport (bicycles or oxcarts) which also, traditionally, are within the domains of men. It is the responsibility of the woman to grade and store the fruit properly. The mangoes are graded according to their size, ripening stage and quality (physical appearance). Mangoes are then stored in baskets (*dengu),* pails or sacks before they are sold or processed. However, women do most of these techniques without the assistance of extension workers and, hence, the need for extension services on mango harvesting and post-harvest handling particularly aimed at women.

5.3. Marketing stage

Once harvested, the mangoes are transported to the available markets for sale. An individual small scale farmer's mango harvest is usually transported by carrying on the head (mostly by women), wheelbarrows, oxcarts or bicycles (mostly by men) to the nearest main road and local markets where consumers, vendors or middlemen can purchase the mangoes (Faulkner et al 2009). Access to transportation means is limited for both men and women as evidenced by an NSO study from 2010 which states that 51% of the rural population owns a bicycle; 3% own animal drawn oxcart; 1.4% own motorcycles; and only 1% own a car. Beyond the production stage, women are less able to reach markets because they lack access to transportation, technology, and price negotiation skills. Women do ride bicycles, but cultural constraints inhibit this means transportation to facilitate significant mango marketing and the public transport system is limited and expensive when compared to the income levels of women.

Women also face mobility limitations enacted by their husbands i.e. for 32% of women it is their spouse who possesses the decision making power regarding their mobility according to NSO (2011). Because of such restrictions on mobility, women rely heavily on vendors and

middlemen who facilitate access to markets by purchasing their produce at the farm-gate (Cook et al 2014). A vendor or middleman (mostly male) buys the mangoes from the farmers and transports the mangoes to urban markets where they are sold by the vendor, or the vendor decides to sell them to other vendors in the urban areas. However, the number of middlemen involved in transporting the mangoes to the markets is linked to the farmer's distance to such markets. It is not common for an individual woman farmer to travel far away from her household/community because of the existing cultural norms that restrict women's mobility while the inability for male farmers to travel far is mostly linked to unavailability of transporting trucks, high travelling costs and sometimes prioritization of farming activities at the household level.

Furthermore, even if the household owns means of transportation, it is men who have access and control of it making it difficult for women to market the mangoes they have harvested or processed. Thus, it is predominantly the men who sell the mangoes once they have reached the main road or local market because it is culturally inscribed that women should not handle issues to do with money as their traditional occupation is to be present within the household, preparing food for the family and perform household chores. This is a severe hindrance for women to upgrade within the mango value chain as any additional income earned from the harvest is out of their control (Laven et al 2011). A survey by NSO in 2011 found that 37% of women make individual decisions on their money usage; 21% of women make decisions with their spouses; and 40% of the women reported that the decisions on how their money should be used is done by their spouse. However, the survey also shows that women's decision making and control over income increases with increased education levels and women in urban areas have more control and decision making power in urban areas compared to rural areas (NSO, 2011).

After the marketing of the mangoes, it is important for women to make decisions on how the income earned should be used within the household because it is a crucial avenue towards empowerment for them as contributors to the development of the household economy. However, a study by NSO (2011) reported that for 69% of married women it is their husbands who decide on major household purchases, and for 46% of women the husbands decide on purchases for daily households needs. It can then be concluded that the influence of women in their households is largely dependent on the amount of money involved and the importance that is given to different household tasks. This means that, due to stark gender inequalities in Malawian culture, women's influence diminishes when the task at hand is considered of importance and the money involved increases.

5.4. The Processing stage

Traditionally, women in Malawi are involved in collecting and processing mangoes at the small-scale level. They are able to do this because the two activities do not require the women to own land in order for them to have access to the mangoes as most of the mango trees grow everywhere. (Laven et al 2011). In most cases the women farmers do the processing because most of the processing procedures of mangoes involve cooking which men do not engage in as culturally they are not allowed in the kitchen which is strictly a woman's domain in Malawi.

Another critical point to consider when processing mangoes is the availability of cooling facilities e.g. refrigerators for processed mango products such as juices, jams and achaar, as these require temperature control in order to maintain their quality over a period of time. The cooling facilities require availability of electricity which is not widely accessible in Malawi. This severely restricts the availability of areas and locations which could be used to install such cooling equipment. In the few areas that have access to electricity, there is the challenge of higher energy costs and maintenance of the cooling equipment which thereby prohibits their usage by many small scale farmers (Faulkner et al 2009). A study by NSO (2011) shows that only 9% of the total population have electricity with only 4% access among the rural population and 35% among the urban population. In terms of ownership of refrigerators, the study showed that 1.6% of the rural population have refrigerators compared to 19% of the urban population. For those who do own refrigerators, especially in rural areas, it is the men who control the use of the refrigerator. Access to credit would be important for the women to purchase solar power machines and refrigerators in order to increase their processing capacity but this is always limited for women due to their lack of collateral e.g. land.

The production of dried mango is dominated by women because, compared to the production of fresh mango, it can be processed in smaller quantities at a time. Since the dried product can be stored for longer periods, women can accumulate small quantities, and later sell them together in a larger batch (ITC, 2011). As explained above, access to markets for the processed products is also a challenge to women as they do not have access to transportation and their mobility is severely restricted and markets for processed mango products are usually far away from their households. Thus, women process the mangoes and men do the marketing and control the income. Furthermore, most of the packaging materials i.e. bottles and cans are sold in towns far away from where the women live rendering them difficult to buy and/or unavailable. Use of public transport is often preferred but expensive as most of the women do not have access and/or control of the income they earn and hence have to rely on men to purchase the packaging material on their behalf. Finally, most of the processed mango products are not labelled due to high illiteracy levels among women and a lack of labelling materials that are, like the packaging material, mostly found in towns far away from their households. Further, the mango fruit processors cannot sell their products to larger supermarkets due to the lack of certification from the Malawi bureau of standards.

5.5. The Consumption stage

Fresh mangoes are consumed by both men and women. However, the preparation of mangoes ready for consumption is in the majority of cases performed by women as it part of their traditional role as cooks for their households. Furthermore, the lack of nutritional information on mangoes by household members, but especially women, due to their inaccessibility to extension services, higher illiteracy levels and restrictions on mobility, is another challenge that women face when it comes to the consumption of mangoes. Most of the household members do not consume processed mango products as the women prefer to sell them in order to earn money due to the high poverty levels among Malawian women farmers. This affects the nutritional status of the household members when there is an absence of fruits in the community as most of them cannot afford to buy other fruits when they are not in season.

CONCLUSION AND RECOMMENDATIONS

The fruit sub-sector in Malawi faces many challenges because there are no enabling policies and regulatory mechanisms in place to promote, produce, process and market fresh fruits and its processed products. Therefore, a formulation of the national horticultural policy should be prioritized in order to improve the fruit industry in the country. It is important that the policy mainstreams gender in all its strategies and activities because a gender blind policy for the mango sub-sector and initiatives of upgrading the mango value chain will have limited successes and lead to unsustainable changes.

During the peak mango season there is an oversupply of mangoes which creates a challenge for most farmers because of the short life span of the mangoes. Farmers face challenges in acquiring cooling storages and proper transportation facilities. There is a need to construct and improve storage, market, and road (transportation) infrastructures. Physical marketing structures that have all the required facilities for storing fresh fruits and its processed products are also a necessity. The road network between the producers and consumers should also be improved either by maintaining the existing roads or by constructing new roads. This could all be done through public-private partnerships as well as in collaboration with the local communities involved.

The mango sub-sector will increasingly be taken seriously when farmers move away from the traditional production of fresh mangoes that over flood the local markets when in season, to processing mangoes for consumption when the fruit is not in season. This important change in attitude towards the product will only be achieved if farmers are provided with markets (both local and international) for both fresh and processed mangoes. Farmers (especially women farmers) also need training in how they can process and package the mangoes for export as well as on compliance with international food quality standards.

An upgrade of the mango value chain that recognises and addresses the existing gender inequalities has the potential to improve conditions for all gender categories within the value chain; who can participate in, and have access to, the benefits from increased household economic growth as well as increased economic growth at the national level. Elimination of the discriminatory traditional practices and beliefs through awareness and implementation of household approach methodologies, will increase the participation of women in the mango value chain; thereby contributing more to the household and national economic growth. However, increasing women participation does not necessarily mean increase in women decision making powers along the mango value chain and at household level. As such, there is need to recognise and measure the changes in women's allocation of time, decision making, access to and control over income gained, which is as a result of women's increased participation in the mango value chain. Furthermore, improving women's technical skills is not always enough for them to have or gain higher and secure income levels; investing in improving the women's individual skills such as financial planning and literacy is very critical in the mango value chain. On top of that, women need to become active participants in the mango farmer associations and cooperatives in order to make their activities more evident or visible in the mango value chain.

Women are more constrained when it comes to accessing agricultural extension services, education services as well as agricultural (e.g. horticultural) trainings due to cultural beliefs and their traditional roles at household and community level. In order for women to fully participate and increase their knowledge and skills in all the stages of the mango value chain; it is of great importance to increase trainings for both agriculture staff and women farmers. Women are more active in the production, harvesting, postharvest and processing stages of the value chain while men are more involved in the marketing activities. Gender trainings and household approach methodologies should be provided to farmers in order for them to understand the importance of women and men involvement in all the stages of the mango value chain. These trainings should be organised in a way that farmers especially women can attend while taking into consideration the cultural and social norms associated with both men and women.

Both men and women face challenges when it comes to accessing information and financial services in order for them to improve the mango value chain. Thus, improvements in the delivery of information and provision of financial services to both men and women will enhance their participation in, and the upgrading of, the mango value chain. For farmers to have easy access to these two services they need to belong to farmer groups e.g. associations or cooperatives. These farmer groups help farmers to gain more from the economies of scale; increases farmers' bargaining powers, and improves their direct access to formal markets by reducing the involvement of middlemen, thereby increasing the returns from the sales. Capital investment is one of the challenges that most farmers face when it comes to mango processing. When farmers work in groups, it becomes easier for them to pool their resources together and procure required equipments collectively that could be used by all group members. However, in Malawi there is lack of well organised mango farmer cooperatives or associations. One of the factors contributing to this is the lack of awareness and knowledge on the benefits of working in groups. It is therefore, important for the responsible government ministries and departments and other stakeholders from the private sector to help and support in forming and operationalising these mango farmer groups.

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Annex 1: Requirements for processed mango products (Faulkner et al, 2009)

Product	Requirements/steps	Challenges/comments
Packaged mango fruit juice	• Procuring fruit processing equipment • Establishing a sterile area for fruit processing • Fruit sourcing (own production, collecting or buying) • Transporting mangoes to the processing area • Processing the fruit into juice concentrate • Making juice and pasteurising it • Bottling the juice • Transporting, marketing and selling the juice to customers or supermarkets	• The process of producing the juice can be so complicated for smallholder farmers to follow • Initial capital investment is not readily available to farmers • Lack of access to clean running water and electricity by small scale farmers • The linkage between the processed product and the potential market (i.e. the link between demand and supply) • High transportation and delivery costs • Marketing and sales are difficult areas for small scale farmers to master
Mango fruit concentrates and Mango fruit Jam	• Formation of farmer cooperatives • Procuring fruit processing equipment • Establishing a sterile area for fruit processing • Fruit sourcing (own production, collecting or buying) • Transporting mangoes to the processing area • Processing fresh mangoes into concentrates and Jam • Packaging the concentrates and jams into containers • Transporting concentrate to the juice processor and jam to the customers	• Maintaining consistent quality and consistent supply • Existence of other fruit juice manufactures e.g. Dairy board Malawi and Malawi Mangoes who could buy the concentrates for juice processing • The mango jam has an attractive opportunity because of limited competition • Jam is less perishable as compared to concentrates
Mango dried fruit	• Formation of farmer cooperatives • Procuring fruit desiccating equipment • Establishing a sterile area for fruit processing • Fruit sourcing (own production, collecting or buying) • Transporting mangoes to the processing area • Mango fruit drying • Packing the fruits into appropriate packs e.g. containers and bags • Marketing and exporting the product	• Easier to transport • Drying the Mangoes without bacterial attacks requires exposure to heat until the correct level is reached • A need for drying equipment that operate with other sources of energy apart from electricity e.g. use of solar equipment and geothermal power