VALUE ADDITION OF TRADITIONAL VEGETABLES: AN IMPACT ASSESSMENT ON WOMEN FARMERS IN LUGARI, KENYA

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DECLARATION

This project paper is my original work and has not been presented to any other university or institution for an award of a degree.

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This project paper has been submitted for examination with my approval as the university supervisor.

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Dr. Owuor Olungah

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I dedicate this research paper to my parents who provided me with the foundation for becoming a gender studies graduate and my daughter Ayira, nephew, Trevor and niece, Vanessa who I pray will value and embrace every opportunity to gain a wider breadth of knowledge and education.

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LIST OF ABBREVIATIONS

AC-NL	Amaranthus cruentus
AH-TL	A. Hypochondriacus
AIDS	Acquired Immune Deficiency Syndrome
ALVs	African Leafy Vegetables
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
AVRDC	The World Vegetable Centre
CARE	Care International
ECA	Economic Commission for Africa
FAO	Food and Agricultural Organization
GTZ	German Technical Cooperation Agency
HA	Hectares
HIV	Human Immunodeficiency Virus
IK	Indigenous Knowledge
ILRI	International Livestock Research Institute
IOM	International Organization for Migration
IPGRI	International Plant Genetic Resources Institute
IVs	Indigenous vegetables
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KSHS	Kenya Shillings
MDGs	Millennium Development Goals
NCAPD	National Council for Population and Development

SPSS	Statistical Package for Social Sciences
TLVs	Traditional leafy vegetables
UNIDO	United Nations Industrial Development Organization
USA	United States of America

ABSTRACT

The study sought to assess the impact of value addition on traditional vegetables grown by women farmers in Lugari, western Kenya. The objectives were to explore whether value addition has had an impact on women's ability to market traditional leafy vegetables there. The research assessed whether value added agriculture has increased the women's income and how this can be enhanced further.

The study was guided by the pathways theory of change which addresses causes of poverty and women's exclusion in agriculture. The theory aims to advance women's empowerment and promote their food security.

Cross sectional data was collected and analyzed. This included observing and comparing differences among subjects who were included in the survey as well as key informant interviews. Narratives were included as well as information from secondary sources.

The study found that value addition of traditional vegetables has seen women farmers market their produce better and has significantly increased their income. Value added agriculture has also increased their skills in farming, empowered them and helped improve food security for the farmers' households. In addition value addition has helped farmers preserve traditional vegetables which are often ignored.

The study recommends a value chain analysis and review be conducted on the marketing strategies that are currently in place, as part of proposals to help farmers produce and sell their crops better, so that can fully enjoy the economic benefits of traditional vegetables.

1.0 CHAPTER ONE: BACKGROUND TO THE STUDY

1.1 Introduction

Traditional vegetables are a common household food and make a substantial, though rarely appreciated contribution to the food security of rural people in many African countries. Therefore, extensive education about their importance as a nutritionally balanced food and as a direct and indirect source of income, particularly for the resource poor families, must be undertaken by African governments (World Bank, 2002).

Traditional leafy vegetables are those plants whose leaves or aerial parts have been integrated in a community's culture for use as food over a long span of time. These vegetables are highly recommended due to their relatively high nutritional value compared to the introduced varieties, and are also important in food security (Orech et al., 2005).

Various African traditional vegetables offer a variety of benefits when consumed but they are not always well marketed, packaged or readily available to consumers, especially those living in urban areas. The vegetables have largely been ignored over the years, yet they are said to be highly nutritious crops that have potential to boost income of both women farmers and traders who usually produce and sell them. Poor infrastructure for transporting and handling indigenous vegetables is now a greater constraint than market demand or price in urban areas (Biodiversity for Food and Nutrition Project, 2012).

The result of this, is loss of knowledge (of names, uses, etc.), genetic erosion and in some instances loss of species. From the early 1980s, however, there has been a deliberate move by both government and non-governmental organizations to increase the growing of indigenous and traditional vegetables. Awareness of their nutritional value and importance in alleviating malnutrition also has been on the increase (Maundu, 1997).

As women often grow food crops and have more access in selling vegetables compared to cash crops sold by men, they have a chance to turn their produce into a profitable business. African leafy vegetables play an important role in helping fight hunger among other benefits. There is empirical evidence that traditional leafy vegetables (TLVs) have several advantages and value that include high micronutrient content, medicinal properties, several agronomic advantages and contribute to food and nutrition security and income generation (Abukutsa-Onyango, 2007).

Abukutsa-Onyango (2007) notes that African leafy vegetables (ALVS) have been used by communities in western Kenya, for example for a long time. There has been a renewed interest in ALVs by the policy makers and the international community on the realization that these vegetables have a potential that is yet to be exploited.

Value chain analysis offers a great opportunity to be able to assess the efficiency of value-added operations/services as well as systemic competitiveness along the supply chain to increase production, trade and the income generating potential of farmers and other actors in the indigenous vegetable supply chain. Value chain describes the full

range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final customers, and final disposal after use (Kaplinsky and Morris, 2001).

In general, adding value is the process of changing or transforming a product from its original state to a more valuable state. Many raw commodities have intrinsic value in their original state. The value of a changed product is added value, such as processing of wheat into floor (Singh & Singh, 2014). This study will examine the impact value addition of traditional vegetables has had on the lives of women farmers in Lugari, Kakamega country, Western Kenya.

1.2 Statement of the Problem

The importance of indigenous knowledge and traditional crops in the survival strategies of rural people have only recently been recognized by research. The traditional leafy vegetables are still mostly treated as weeds by many research and extension personnel who criticize farmers for not keeping this weed population under control, thus labeling this important food as not worthy of the space it occupies (Voster et al., 2007).

A report by the International Plant Genetic Resources Institute reveals that the primary producers, transformers and sellers of indigenous vegetables are members of a group that has all too often been overlooked by scientists and development workers namely, women. Yet taken as a category, traditional vegetables are extremely important for nutrition and

farm income throughout Africa. For example, they often supply most of the daily requirements for vitamins A, B complex and C to poor rural people (Attere & Chweya, 1998).

Women farmers in Kakamega, for example harvest, pack and transfer the vegetables to the buying points nearest to their farms, usually by the roadside. Women vendors from urban centers buy and transport vegetables to strategic wholesale urban markets. Their counterparts in the retail sector purchase and transfer the vegetables to strategic retail points. At each vegetable exchange point, a profit of well over 75% is made (Nekesa & Meso, 1995).

However, Mnzava (2012) says that lack of proper knowledge on the vegetables, especially of their nutritive value, methods of production, preservation and utilization, is an important deterrent to their wider utilization. Information about traditional vegetables is no longer systematically transferred from one generation to the next so that the knowledge gap between the older generation in the rural areas and urban youth in particular is widening. As a consequence of 'modernization', rural lifestyles are also gradually changing. Further, as agricultural curricula in school and colleges have not addressed local species to any appreciable extent, and the local food service systems usually do not include local recipes in their menu, general awareness of traditional species is not being emphasized.

More programs that push for traditional vegetables are needed such as strong advocacy to obtain political commitment and government support to long-term programmes of promotion of the crops. A well-planned research and extension programme as well as the development of appropriate technologies can also help in increasing production and income generation.

High priority should be given to the development of new industrial processing of various vegetable products like amaranth flour, or pre-packed selected vegetables (Biodiversity for Food and Nutrition Project, 2012).

A study by Biodiversity International (2013) reveals that poor infrastructure for transporting and handling indigenous vegetables is now a greater constraint than market demand or price in urban areas. This study seeks to examine how value addition, that enable women deliver quality products can help farmers and traders fully exploit the business potential traditional vegetables have to offer. At the same time it aims at exploring how traditional vegetables can help fight poverty among women farmers and help improve their households' quality of life.

This study therefore, sought answers to the following set of research questions:

1. Have women farmers taken up production of traditional leafy vegetables as a result of the value addition necessitated by the nearby Lugari vegetable processing factory?

2. Have profits of women farmers increased as a result of value addition by the new factory?
3. What can be done in the view of women farmers to help them benefit from production and marketing of the vegetables, to attract increased profits?

1.3 Research Objectives

1.3.1 Overall Objective

To explore whether value addition has had an impact on women's ability to market traditional leafy vegetables in Lugari.

1.3.2 Specific Objectives

1. To investigate whether more women are engaging in quality vegetable production as a result of the value addition by the new processing factory.
2. To establish whether women have increased their earnings as a result of value addition by the new factory and its marketing strategies.
3. To examine what needs to be done to increase production and profitability of traditional leafy vegetables.

1.4 Assumptions of the Study

- Production has been positively impacted on by the value addition factory
- Creation of the processing factory has eased marketing challenges and increased the earnings for farmers.

- Women themselves are aware of what needs to be done to increase productivity and profitability of traditional leafy vegetables.

1.5 Justification of the Study

The study aims at un-packaging the increasing benefits for women farmers of the traditional leafy vegetables and advocating for ways of enhancing production and marketing of the same as part of the agricultural value chain. The recommendations emanating from the study may help policy makers improve on programs that can create better opportunities for women farmers in rural areas, increase the value of their produce and improve on the quality of vegetables they grow and sell. The outcome of the study will be of importance to the county government's poverty eradication exercise since it is the utilization of local resources to enhance food security and increase income for the women. In addition, the results can be used for advocacy for the increased consumption of traditional leafy vegetables and enhanced investment in the production of the same. It will also form good reading and a nutritional advice to those who are misguided on the quality of the local vegetables.

1.6 Scope and Limitations of the Study

1.6.1 Scope of the Study

This study was conducted in Lugari sub county, western Kenya and was based on women traditional vegetable farmers. It was guided by the Pathways Theory of Change. The study was conducted in three zones in the area.

1.6.2 Limitations of the Study

First, the study was confined geographically to Lugari sub-county and cannot be generalized to represent what happens elsewhere in the country. Secondly, the coding process of open ended questions left room for subjectivity by the researcher when analyzing data. Data collection through use of questionnaires limited some respondents especially those who were illiterate due to their inability to fully understand questions asked. It was also difficult for the researcher to establish whether the respondents' answers were sincere.

1.7 Definition of Terms

African leafy vegetables (ALVs): These are crops that originate or occur naturally in a given region, and are used or consumed by the local population to meet their nutritional and medicinal needs. They were originally domesticated or cultivated in Africa.

Traditional leafy vegetables (TLVs): These are plants whose leaves or aerial parts have been integrated in a community's culture for use as food over a long span of time.

Indigenous knowledge (IK): The local knowledge – knowledge that is unique to a given culture or society. IK contrasts with the international knowledge system generated by universities, research institutions and private firms. It is the basis for local-level decision making in agriculture, health care and food preparation among other things in rural communities.

Food Security: State when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life. It includes both physical and

economic access to food that meets people's dietary needs as well as their food preferences.

Household: Consists of one or more people who live in the same dwelling and also share at meals or living accommodation, and may consist of a single family or some other grouping of people.

2.0 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Women produce between 60 and 80 per cent of the food in most developing countries and are responsible for half of the world's food production, yet their key role as food producers and providers, and their critical contribution to household food security, is only recently becoming recognized (FAO, 2001).

As farmers struggle to find ways to increase farm income, interest in “adding value” to raw agricultural products has grown tremendously. The value of farm products can be increased in endless ways: by cleaning and cooling, packaging, processing, distributing, cooking, combining, churning, culturing, grinding, hulling, extracting, drying, smoking, handcrafting, spinning, weaving, labeling, or packaging (Born & Bachmann, 2006).

Adding value to agricultural products is a worthwhile endeavor because of the higher returns that come with the investment, the opportunity to open new markets and extend the producer’s marketing season as well as the ability to create new recognition for the farm (Matthewson, 2007).

For farmers, value-added has a particular importance in that it offers a strategy for transforming an unprofitable enterprise into a profitable one (Flemming, 2015). The Nebraska Cooperative Development Center (2014) notes that value added agriculture focuses on increasing the economic value and/or consumer appeal of an agricultural product. Often producers have products they can market as both an original and a value

added agricultural product, they simply need the assistance in getting started. This section highlighted past work on traditional vegetables. The literature was reviewed under the following sub headings:

2.2 Production of Traditional Vegetables

The cultivation of African Leafy Vegetables in many western Kenya communities has always been done at a subsistence level and their potential as commercial commodities has not been exploited (Maundu, 1997).

A study by Abukutsa-Onyango (2007) indicates that improving the quality and production of ALVs could be one of the powerful strategies to alleviate hunger, malnutrition and poor health in the region. It is therefore, paramount to know the diversity of the vegetables in the region and collect indigenous knowledge that could be useful in developing agronomic and utilization packages for improved production and utilization.

Production of traditional African vegetables is mainly on a subsistence basis. These vegetables are often intercropped and rarely occupy a significant proportion of the farm. Traditional vegetables often occupy areas around the house, together with bananas, maize, cassava and sorghum (Nekesa & Meso, 1995).

The advantage of growing these vegetables is that they have a short growth period with most of them ready for harvest in 3-4 weeks. They also respond very well to organic

fertilizers. A major hindrance to sustainable production of indigenous vegetables has been the availability of quality seed. However, this is no longer a challenge as seeds are now commercially available in Agrovets around the country (M-Farm, 2013).

Many of these traditional crops grown for food, fiber, fodder, oil and as sources of traditional medicine play a major role in the subsistence of local communities and frequently are of special social, cultural and medicinal value. With good adaptation to often marginal lands, they constitute an important part of the local diet of communities providing valuable nutritional components, which are often lacking in staple crops (Jain & Gupta, 2013).

Production, processing and commercialization of traditional African vegetables are on the rise but the potential remains underdeveloped. The most commonly consumed and fully domesticated traditional vegetables are the Amaranthus spp. (Pig weed), Vigna spp. (Cowpea leaves), Solanum spp. (Black nightshade), Cleome gynandra (Cat's whiskers), Cucurbita spp. (Pumpkin leaves) and Corchorus spp (Jute/Bush okra) (ILRI, 2013).

Apart from their commercial, medicinal and cultural value, traditional vegetables are also considered important for sustainable food production as they reduce the impact of production systems on the environment. Many of these crops are hardy, adapted to specific marginal soil and climatic conditions, and can be grown with minimal external inputs (De la Pena et al., 2011).

Indigenous vegetables are in vogue. They fill shelves at large supermarkets in cities like Nairobi, and seed companies are breeding more of the traditional varieties every year. Kenyan farmers increased the area planted with such greens by 25% between 2011 and 2013. As people throughout East Africa have recognized the vegetables' benefits, demand for the crops has boomed (Cernansky, 2015).

Women are known to be actively involved in the cultivation, processing and marketing of ALVs. In a market survey conducted in two rural and one municipal market in western Kenya, women constituted 95 and 70 percent of the respondents in the rural and municipal markets, respectively. If there is consumer demand of ALVs then production will be sustained to meet the demand and therefore, avoid the threat to their extinction (Abukutsa-Onyango, 2007).

Increasing investments in the farm economy can deliver high-impact development returns such as increasing rural incomes, boosting food security, making cheap and more nutritious food available to Africa’s bustling cities and protecting the environment through innovations such as climate smart agriculture (World Bank, 2013).

The majority of farmers use seeds either saved from a previous crop or obtained from open air markets. These sources tend to have problems of purity, especially the mixing of different varieties and have mean germination rates rarely above 50% (Onim & Mwaniki, 2008).

Farmers need pure seed to meet the requirement of the market, but such clean quality seed is lacking in the market. This undermines the quality of vegetables produced by farmers. Effective seed supply system and an assured market for seed is critical in successfully unleashing the potential of Indigenous vegetable (IVs) such as spider plant to improve food security. Indigenous vegetable production such as that of spider plant is constrained mainly by the poor management practices, lack of improved varieties, seasonality of production, poor road network, poor post-harvest handling, high quality standards required by the market, lack of proper marketing strategies and lack of credit facilities particularly for small scale farmers, which need to be addressed (Onyango et al., 2013). Improved production technologies will lead to increased yields and improved nutrition and economic empowerment of rural communities. Appropriate management, preservation and processing protocols for the priority species are needed and should be driven by research (Abukutsa-Onyango, 2010).

2.3 Marketing Traditional Vegetables

Marketing of indigenous vegetables has been poorly organized leading to great losses of the produce in transit or in markets. The major constraints of marketing include: abundance of vegetables during the rainy season leading to low prices and scarcity during the dry season; exploitation of traders due to lack of market information; lack of inadequate market and transport infrastructure. This calls for identification and creation of markets for indigenous vegetables and possibly linking farmers/farmer groups to appropriate markets (Abukutsa-Onyango, 2010).

Given the fact that the processing and preservation is almost inexistent in the indigenous vegetables marketing chains, the high perishability of the indigenous vegetables poses major challenges in their marketing and distribution. About 20% of indigenous vegetables are dumped in the produce marketing process of the value chain. Yet, simple post-harvest handling practices such as simple bicarbonate wash can help minimize quantity and quality losses and enables availability during the periods when they are in short supply (Acedo and Weinberger, 2010). Value addition by applying appropriate production and postharvest techniques ensures that high quality produce reaches the market and satisfies consumer expectations (Ebert, 2014).

Habwe et al. (2008) suggest that development of well-packaged vegetable products will enable the possibility of exporting African indigenous leafy vegetables to Africans, East Africans or Kenyans living abroad. The study also adds that African traditional vegetables can be processed by blanching and freeze-drying to extend the shelf life of the processed African indigenous vegetables through product development using sesame seeds. Farmers can therefore, benefit from production and value addition of these crops if they effectively supply a ready market with quality produce.

Enhancing quality and shelf life is one way that traditional vegetables can be marketed as shown by Abukutsa-Onyango (2010) Most of the African Leafy vegetables are highly perishable with a shelf life of less than 24 hours at room temperature. This problem could affect quality of the produce at the market and to overcome this problem, preservation and processing technologies need to be developed.

A major challenge in the marketing and distribution of ALVs is their short shelf-lives, like other leafy vegetables, they are made up of more than 90 per cent water and even a slight decrease in moisture content of less than five per cent, renders them unsellable (SciDev.Net, 2015).

Market forces have led to greater opportunities for product differentiation and added value to the raw material because of the increased consumer demands regarding health, nutrition and convenience. There is a large scope for mechanization in post harvest processing of agricultural commodities. The value addition of farm produce through processing is gaining importance. It is important to note that growing and processing are complementary. The growing is futile without processing. Thus, they both need to be promoted together (Yengai, 2009).

Vegetables in general, but also many traditional vegetables such as amaranth (Amaranthus spp.), jute mallow (Corchorus olitorius), African nightshade (Solanum scabrum), Asian (Solanum melongena) and African (Solanum aethiopicum) eggplant, drumstick tree (Moringa oleifera), bitter gourd (Momordica charantia), water spinach (Ipomoea aquatica), Chinese kale (Brassica oleracea var. alboglabra), edible rape (Brassica napus), roselle (Hibiscus sabdariffa), Malabar spinach (Basella alba), slippery cabbage (Abelmoschus manihot), winged bean (Psophocarpus tetragonolobus) and many gourd species are of considerable commercial value and thus can make a significant contribution to household income (Ebert, 2014).

A study by Biodiversity International (2013) in parts of rural Kenya indicates that farmers' incomes had increased, particularly where they had been successfully linked to markets; women, the dominant producers of leafy vegetables, were the main beneficiaries. In almost 80 percent of households surveyed, it was the women exclusively who kept the income from sales of ALVs and decided what it would be spent on. Recognising the role of women is therefore, of critical importance for those promoting ALVs because women are the ones driving the production processes.

A study by Ayua & Omware (2013) recommends that credit facilities should be given to the farmers to explore other techniques such as solar drying which is faster and can preserve more vegetables. Credit can also be used by the farmers to provide transport solutions besides developing infrastructure to market traditional vegetables better. Traditional vegetables offer a significant opportunity for the poorest people to earn a living as producers and/or traders without requiring large capital investments (Schippers, 2000).

It is often asserted that by increasing women's direct access to income, more resources are directed to the family's and in particular the children's wellbeing. Studies have shown that women use almost all their income from the sale of agricultural products and handicrafts to meet household needs. Men use at least 25% of their earning for other purposes (FAO, 2002).

Better educated farmers are more likely to use modern inputs, the key to increasing agricultural productivity may lie in educating women in rural areas and increasing their human and physical capital (Quisumbing, 1995) Farmers usually have better access to information when they work in groups like cooperatives and associations.

2.4 Meeting Demand for Traditional Vegetables

In its 2013 'Agriculture in Africa' report, the World Bank indicates that African farmers have a unique opportunity to tap into growing demand from a burgeoning middle class with more expensive tastes, an increase in supermarkets and higher commodity prices. A country's economic, environmental and social well-being is intricately linked to a healthy, well-performing agricultural sector.

In Africa most farmers grow indigenous vegetables for their own consumption and sell whatever is left. But with the rising market demand, most farmers have learned to grow indigenous vegetables as a commercial crop in East Africa. African indigenous vegetables can be harvested all year round, ensuring regular supply to the market and regular income for farmers (Ojiewo et al., 2010).

Change in lifestyle and an increasing middle class in urban areas has seen the demand for traditional crops go up especially indigenous vegetables such as *managu, terere, kunde* and others in that line. Faced with lifestyle diseases, urban consumers are becoming sensitive to what they eat. They want safe food and better alternatives. This drives up the

demand for traditional crops that are known for their nutritional and medicinal value (M-farm, 2013).

There are potential urban, national, regional and international markets. People in the diaspora in United Kingdom and USA have expressed a desire to get ALVs supplied to them. This would require preserving and some processing, this calls for research in this area (Abukutsa-Onyango, 2010).

A report by Biodiversity for Food and Nutrition Project (2012) indicates that about 34% of people living in urban and peri-urban Nairobi consume traditional leafy vegetables. Major constraints to consumption of the leafy vegetables include cost, lack of time and knowledge in food preparation. Most traditional vegetables require time in order to pluck and prepare them for cooking. By making work easier for consumers through prepackaging and processing, buyers will be more willing to consume the produce.

In Eastern Africa and Southeast Asia, selected traditional vegetables are becoming an increasingly attractive food group for the wealthier segments of the population and are slowly moving out of the underutilized category into the commercial mainstream (Weinberger, 2007).

AVRDC or the world vegetable center's researchers have been working to meet these demands. For example, three improved lines of amaranth, AC-NL (Amaranthus cruentus), AH-TL (A. hypochondriacus) and AM- KONGEI (A. dubius), with leaves that

are softer and sweeter than local landraces, have created a new industry for small peri-urban farmers in East Africa. The new varieties can be harvested in 21-28 days, and cooked in a much shorter time than local landraces (Ojiewo et al., 2010).

Amaranth is a very nutritious leafy vegetable, both in raw and cooked form. The nutritional value of this crop is comparable to spinach, but much higher than cabbage and Chinese cabbage. Amaranth is increasingly gaining importance both for household consumption and commercial production in Africa and Asia. There is a good market potential for this crop, both in the high-price and low-price (Ebert, 2014).

Currently there is an upsurge of interest in traditional vegetables owing to increased awareness of their nutritional and nutraceutical benefits and improvements to traditional recipes. This has raised demand for high quality seed and improved lines and cultivars. Rural families have traditionally made conscious efforts to preserve these plants around their homesteads, in crop fields and communal lands. A number of ongoing efforts by development practitioners are also underway to promote production and consumption of indigenous vegetables across sub-Saharan Africa as part of efforts towards attainment of several of the Millennium Development Goals (MDGs). Such developments have contributed immensely to a rise in demand for indigenous vegetables, especially in major urban and peri-urban centers (Chadha et al., 1997).

Research clearly shows that the culture of growing ALVs is spreading to even areas where growing had stopped in Africa or where they were not being grown in the past.

The main reason given for this trend is increased knowledge of the nutritional value that led to demand in the urban markets and increased home consumption (Gotor & Irungu, 2012).

The market demand for ALVs in East Africa is higher than the supply due to intense consumer campaigns resulting in the need for continued promotion and production of ALVs, which meets less than 60 per cent of current demand (Muhanji et al., 2011). Attracted by the strong market demand, seed companies are beginning to explore and develop these popular crops, thus strengthening the formal seed sector (AVRDC, 2008).

2.5 Theoretical Framework

The study was guided by the pathways theory of change. This approach is based on a global theory of change that addresses the underlying causes of poverty and women's exclusion in agriculture in various African countries. It aims at advancing women's empowerment and food security.

Aid agency - CARE has identified five common and closely inter-related domains of change namely: capacity, access, productivity, household influence, and an enabling environment, all of which must be impacted to achieve the goal of Pathways (CARE, 2013).

The model applies a push/pull strategy, pairing efforts to build the capacity, skills and knowledge of poor women farmers with efforts to realign or enhance public, private, civil

society and community resources and behaviors. Combined, these efforts aim to improve the productivity of women farmers and women's equitable participation in sustainable agricultural systems (CARE, 2013).

Capacity – knowledge, skills, and self confidence are required for women to succeed in agriculture, business and their roles as individuals and members of their households and communities.

Access - Women need access to and control over productive assets and services including land, water, tools, inputs and both financial and extension services. Through training and farmers groups, women farmers are able to market and sell their traditional vegetables on a larger scale and earn better profits.

Productivity - Women need the opportunity, knowledge and skills required to enhance the productivity of their land through sustainable agricultural practices.

Household Influence - Women farmers need enhanced influence over household decision making, particularly decisions related to the household division of labour, the use of household income and decisions affecting the food women and their families prepare and consume. The farmer will now be better placed to make informed dietary decisions for their families while at the same time contribute significantly towards the household income.

Enabling Environment - Both formal policies and informal cultural norms and expectations have significant impact on women's potential. Both must be acknowledged and effected to achieve household resilience and women's empowerment.

The pathways theory of change is relevant in this study because it helps bring out the priorities and challenges being faced by farmers and other stakeholders in the geographical context. The theory has been used in studies focusing on farming communities in Mali, Ghana, Tanzania, Malawi and India among others. The theory establishes the available links to development and the impact made on the farmers group in the long term.

The theory also helps highlight the opportunities available in helping farmers market their traditional leafy vegetables like identifying ready markets after value addition, which will help inform the research design. The framework helps measure whether the farmers are achieving the developmental change they expect to come about after processing their vegetables. The pathways theory also establishes influencing factors that are relevant such as training workshops, extension services and group programs, and will investigate whether they have supported development.

The theory also investigates whether women farmers are able to reach their full productivity potential or whether they face gender barriers when trying to further their business. The research will also aim to establish whether the farmer's program has improved the quality of life for women farmers and whether their role in business is acknowledged and supported by culture and the community as a whole. It will inform the study on whether women farmers feel empowered by the traditional vegetable farming program. The theory encourages equal opportunities for men and women and champions women's progress.

3.0 CHAPTER THREE: METHODOLOGY

3.1 Introduction

This section details the methods that were used to generate data. It includes the site description, the study design, study population, the methods of sampling, data collection methods as well as data analysis and concludes with the ethical concerns that were observed in the study.

Lugari had a population of about167, 014 in 2009 according to the national census. About half of the population lives in poverty, which is influenced by the poor state of roads, poor marketing systems, illiteracy, large family sizes, and high cost of farm inputs and low prices of farm produce among others. The vulnerable groups include the landless, female headed households, subsistence farmers, unemployed youth, street children, the elderly and HIV and AIDS orphans (NCAPD, 2005).

3.2 Research Site

3.2.1 Physical Features

The study was conducted in Lugari Sub-County, located in Kakamega County, which borders Kakamega town and Nandi County to the south, Bungoma to the west, Uasin Gishu to the east and Trans Nzoia to the north (NCAPD, 2005) as shown in map 3.1 below.

The annual rainfall here ranges between 500 and 900 mm and the average temperature varies between 22 and 23 degrees centigrade. The region is situated in the Rift Valley

highland zone and receives sufficient rain showers during the months of March, April, July and August. The rest of the months are very dry (Life Bridge, 2008).

Kakamega County is predominantly a crop farming economy with livestock farming taking a small portion of the available arable land. The total acreage under food crops is 114,053.6 Ha while the land under cash crops is 141,429.7 Ha. The main cash crop is sugarcane while the main food crop is maize. The total hecterage under food crops and cash crops is over 250,000. The usage of land among the sub-counties is mainly driven by the land fertility and the need to make land an enterprise for generating family household incomes (County government of Kakamega, 2013).

3.2.2 The Community

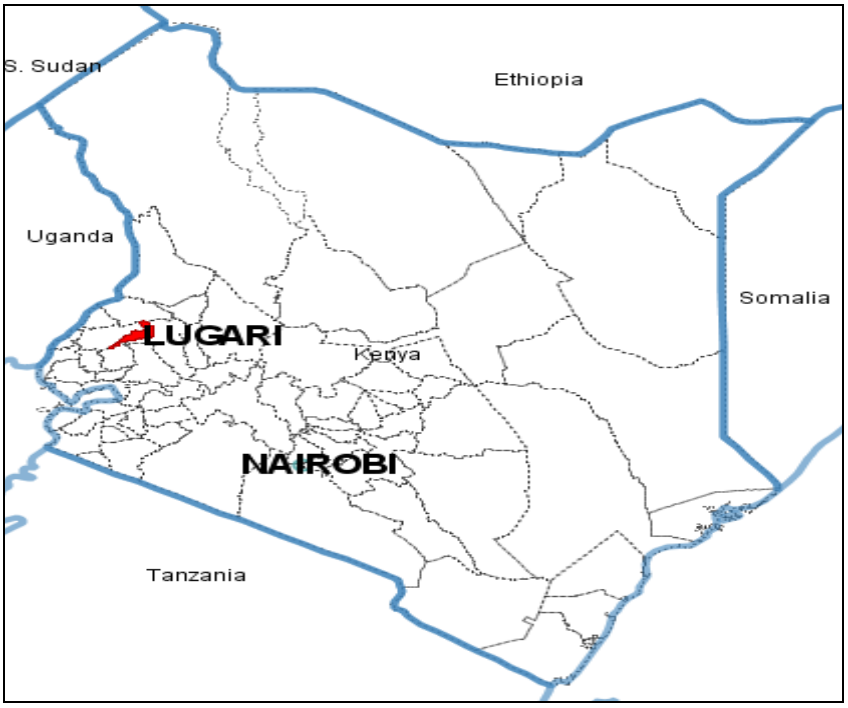
Lugari Constituency is a settlement area with migrants from different communities among them the Abaluyia, Luo, Agikuyu, and Kalenjin communities. The Luyia community though is the dominant group, with the Maragoli and Bukusu groups having a substantial presence, and the Tachoni and Banyala groups being the smaller groups (IOM, 2009).

3.2.3 Economy

The main crops grown in Kakamega County are sugarcane, maize, beans, cassava, finger millet, sweet potatoes, bananas, tomatoes, tea and sorghum. Maize meal forms the staple food for the county. Maize and sugarcane are generally grown in large scale while beans, millets and sorghum are grown on small scale. On the other hand maize, tea and

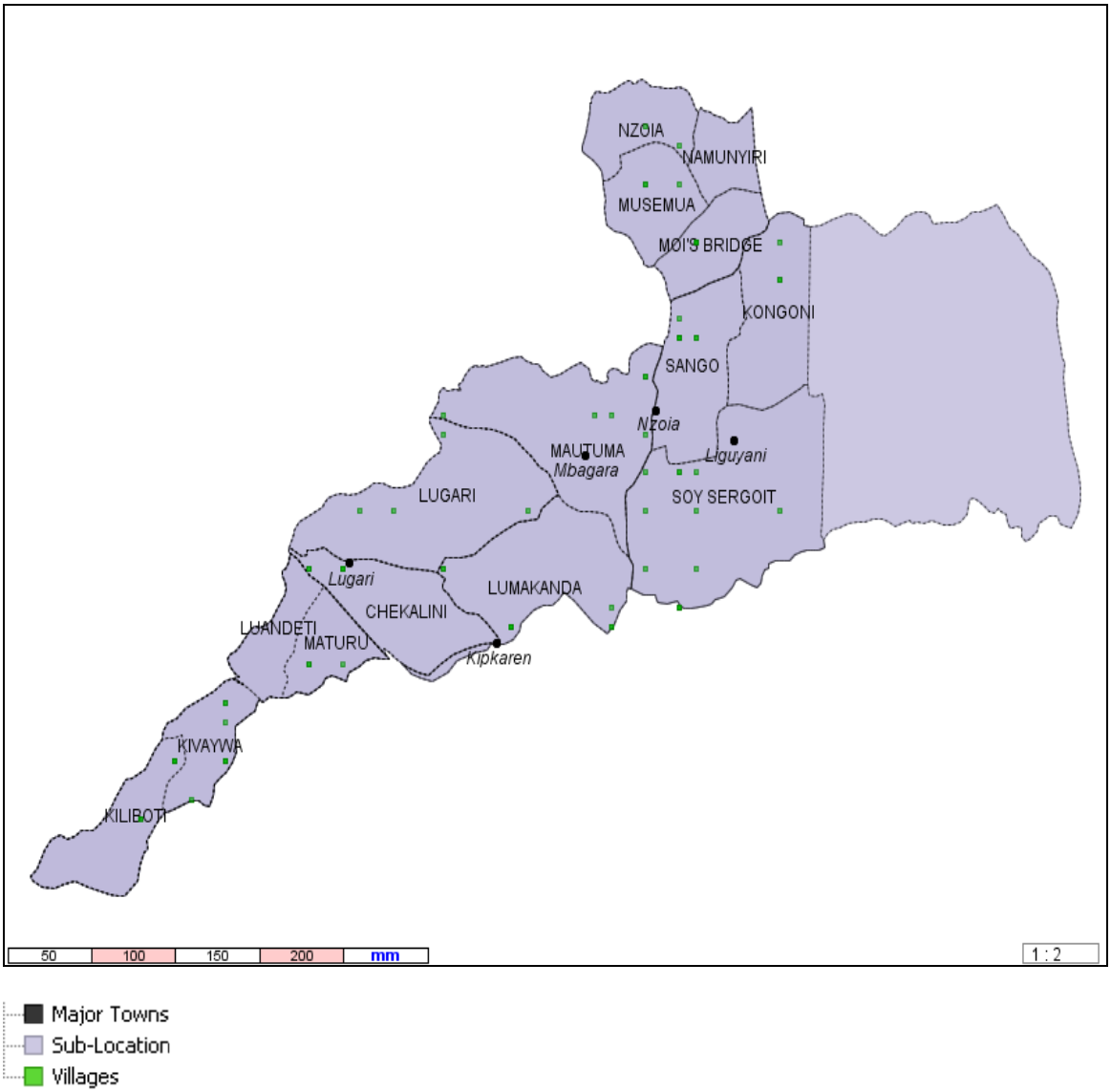
sugarcane are the main cash crops grown in the County (County government of Kakamega, 2013). Farmers mainly practice small scale agriculture; food crops grown include maize, beans, sorghum and millet among others (Life bridge, 2008). There is need to diversify agriculture, grow high value crops and engage in value addition to boost incomes (County government of Kakamega, 2013).

Map 3.1: Location of Lugari Sub-County



Source: Deschamps-Laporte (2013)

Map 3.2: Detailed Map of Lugari Sub-County



Source: Deschamps-Laporte (2013)

3.3 Research Design

A Cross-sectional study design was used. Both qualitative and quantitative data was collected. Data was collected through questionnaires, key informant interviews and observation. Quantitative data was analyzed using the Statistical Package for Social Sciences (SPSS) while qualitative data was thematically analyzed along the study

objectives. The findings are presented in the form of charts and graphs and where necessary verbatim quotes used to amplify the voices of the informants.

3.4 Study Population

The study consisted of a population of women derived from the Lugari Grain Amaranth Welfare Group who deal in traditional leafy vegetables for sale and are engaged in producing amaranth for processing.

About 100 men and 200 women in the group now grow amaranth for processing at a nearby government mill. The farmers come from seven villages namely: Lulyito, Mufutu, Lugari Station, Kiwanja Ndege, Lumama, Serende Area and Maji Mazuri. The sample studied was drawn from the larger group of 200 women farmers. They were sampled from the members' register.

3.5 Sample Size and Sampling Procedure

Sampling was done through random sampling. The actual sample was based on one-fifth of the total women population and the actual respondents chosen through random sampling of the names in the register. One quarter of 200 is 50 respondents.

The sample was obtained by selecting every fourth name on the register i.e. the 4^{th}, 8^{th}, 12^{th}, till the 200^{th} person. It is envisaged that this process gave each person an equal opportunity to participate in the research and that the outcome was a reflection of the women's experiences without selecting a chosen few with similar characteristics.

The unit of analysis was the individual woman farmer.

The three key informants were purposively sampled. These included the chair of the farmers group, manager of amaranth factory and the ministry of agriculture official.

About three women were chosen for narratives so as to share their lived experiences as farmers who have engaged in the business of African leafy vegetables for a long period.

3.6 Data Collection Methods

Cross sectional data was collected and analyzed. This included observing and comparing differences among subjects who were included in the survey. Key informant interviews were also conducted.

3.6.1 Survey Questionnaire

A survey questionnaire with both open and closed ended questions was administered to the women farmers. It focused on aspects of the study as suggested in the specific objectives. These touched on production, marketing and demand of traditional leafy vegetables.

3.6.2 Key Informant Interviews

Interviews were carried out with 3 key informants selected through purposive sampling. The informants were selected based on their specific knowledge and the office positions they hold in the farmers' project. These included the farmers' group chair to discuss issues regarding vegetable production by the farmers, and an official from the amaranth processing mill to assess impact of amaranth processing.

An interview was also held with an official at the ministry of Agriculture to obtain information on why the program was launched and the impact it has had on production and marketing of amaranth in the Sub County.

3.6.3 Observation

The researcher also used an observation checklist to record crops grown on farms and any other improvement in the lives of the people. Things to be observed include types of traditional vegetables grown on farms, area allocated to traditional vegetables, area allocated to other crops as well as the consumption patterns of the traditional leafy vegetables.

The observation enabled the study to determine whether the women are working towards increasing production of traditional vegetables and whether the marketing strategies currently used are impacting on their business. Observations made also contributed towards determining farmer's patterns of sale and their clients.

3.6.4 Secondary Sources

Books, journals, published articles, electronic and print media sources have been used in the study and were continuously used till the end to highlight issues that concern the study subject.

3.6.5 Narratives

Narratives were included in the study. Narrators were purposively selected to find out impact of engaging in the traditional vegetable trade in their lives. Where necessary, women farmers who have engaged in African Leafy Vegetable farming were called upon to share their lived experiences including the production, marketing and distribution channels.

3.7 Data Processing and Analysis

Qualitative data collected through key informants, narratives and observation were analyzed thematically to identify similarities and differences that answered research questions. Quantitative data collected was analyzed through the Statistical Package for Social Sciences (SPSS) after being coded. The presentation included frequency, percentages, charts, tables and descriptive statistics.

3.8 Ethical Considerations

Informed consent

Consent to collect data was sought from all respondents, relevant government authorities as well as community representatives, before conducting the study. A clear description of the purpose and objectives of the study was also communicated to all participants before being enlisted in the research project. All the participants were only enlisted after informed consent had been received in writing. In addition, pseudonyms were used in the study to protect respondents' identity.

All participants involved in the study contributed and engaged in the study on a voluntary and informed consent basis, they had the right not to respond to questions they were not comfortable with. Respondents also had the right to withdraw at any point in the research process without any adverse consequences. The information collected from respondents was handled with utmost confidentiality and strictly used only for the purposes of the study.

4.0 CHAPTER FOUR: VALUE ADDITION OF TRADITIONAL VEGETABLES: AN IMPACT ASSESSMENT ON WOMEN FARMERS IN LUGARI, KENYA

4.1 Introduction

This chapter illustrates study findings on the impact of value addition on women's ability to market traditional leafy vegetables in Lugari. The section contains the demographic characteristics of respondents and their implications on responses provided. The findings are presented in form of charts, tables and excerpts from qualitative methods. The findings are discussed based on the objectives of the study.

4.2 Demographic Profile of Study Respondents

4.2.1 Age

The age of respondents was a major demographic indicator in the study and enabled the researcher to determine the age group of most respondents who engage in traditional vegetable farming. A total of 50 respondents participated in the survey. As shown in table 4.1 below, majority of the respondents (36%) were aged between 31 to 40 years. The age group 41-50 had the least percentage of participants (14%). 28 % of respondents were between ages 20 to 30 years. Farmers above 50 years made up 22 % of respondents.

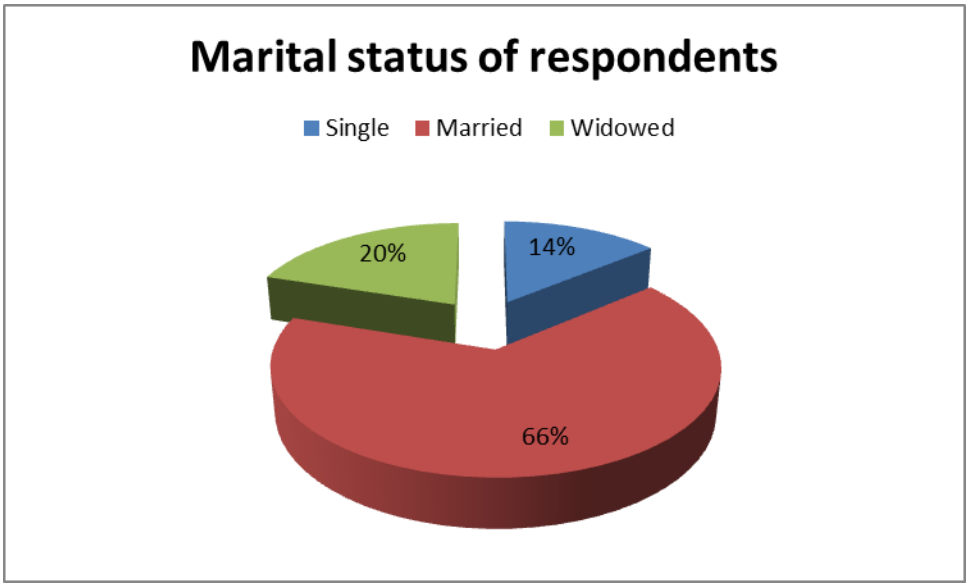
Table 4.1: Showing Age of respondents

Age category	Frequency	Percentage
20 -30	14	28
31 – 40	18	36
41 -50	7	14
50 and above	11	22
Total	**50**	**100**

4.2.2 Marital Status of Respondents

The researcher sought to find out the marital status of respondents. While most of the respondents (66%) were married, 20% were widowed and 14% of them were single women as shown in figure 4.1. Marriage is important in the community and often determines whether a woman has land on which to farm as most of them grow crops on matrimonial land. A good number of respondents (34%) were household heads and breadwinners in their families. They therefore have to ensure that they provide for their households.

Figure 4.1: Marital status of the respondents

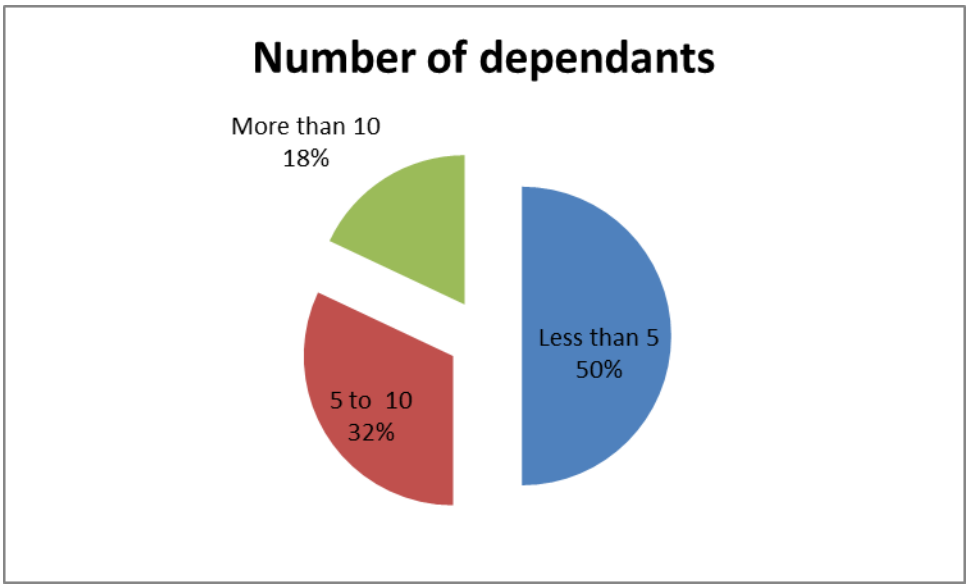


4.2.3 Number of Dependants

Most respondents (50%) had had less than five dependants, 32% had between 5 to 10 dependents and 18% had more than five dependents. This shows that at least half of the respondents (50%) had five dependents or less as shown in Figure 4.2 below and

therefore needed to provide for their families and hence were ready to embrace new opportunities to grow lucrative crops and bring in extra income.

Figure 4.2: Number of dependants



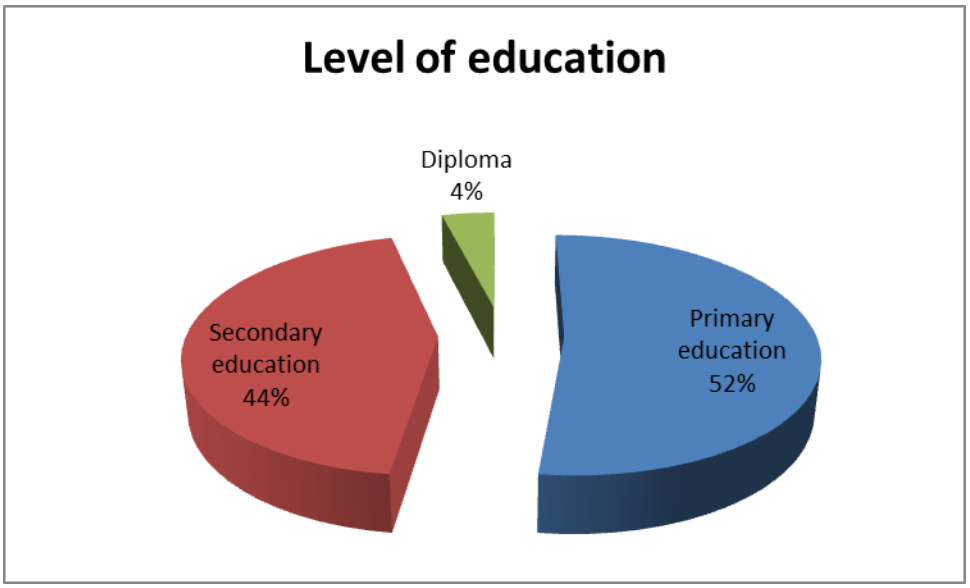
Women with many dependents have to work extra hard to meet their families needs. This calls for more coping strategies hence the need to engage in extra income generating activities like farming maize, sugarcane, and keeping livestock alongside traditional vegetables.

4.2.4 Level of Education of Respondents

Most respondents (52%) had completed primary education while (44%) had completed secondary education. There were 4% of women farmers who had diplomas as shown in Figure 4.3 below. Education is important for development of the society as it helps people make rational decisions both in the family and community. At least half of the

respondents have basic education which has contributed towards social and economic benefits in their lives.

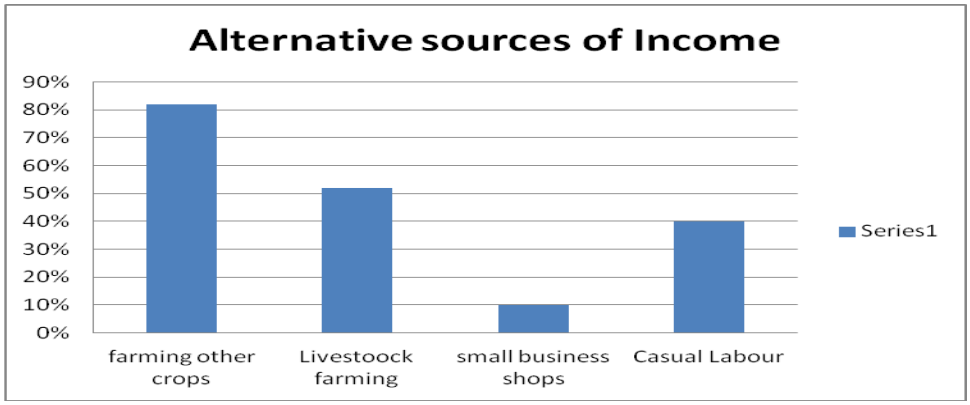
Figure 4.3: Level of education of respondents



4.2.5 Alternative Sources of Income

Focusing on the alternative sources of income of the respondents, all the respondents interviewed, reported to be engaging in other income generating activities apart from traditional vegetable farming to supplement their income. The alternative sources of income help the respondents meet their family's needs.

Figure 4.4: Alternative sources of income



As shown in figure 4.5 above, all the respondents did some kind of farming activity to earn a living. As per the findings in the figure above, the women do different activities to supplement traditional vegetable farming. Such activities include casual labour, livestock keeping, small businesses and farming other crops. 52% supplemented with livestock farming, 82% supplemented income by growing other crops. 10% of respondents run small businesses like grocery shops, while 40% engage in casual labour as shown in figure 4.5 above. Respondents engaged in alternative farming showing they are yet to fully depend on growing traditional vegetables as a sole income provider.

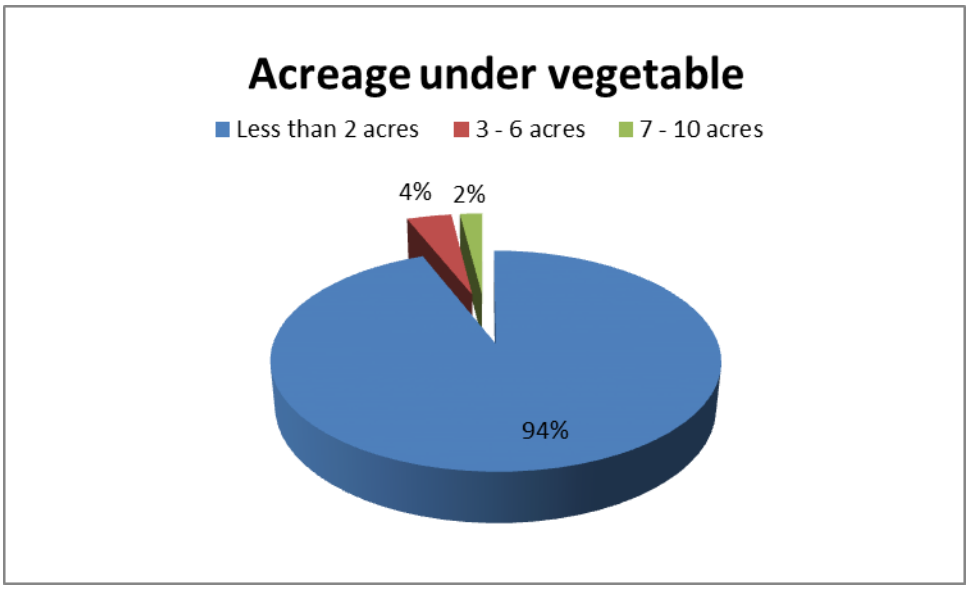
4.3 Level of Women's Engagement in Quality Vegetable Production as a Result of the New Processing Factory

This section looks at the level of women's engagement in quality vegetable production by focusing on the types of traditional vegetables grown, the number of acreage under vegetable farming, amount of time taken in vegetable farming versus other income generating activities and the challenges associated with traditional vegetable farming in Lugari.

4.3.1 Acreage under Traditional Vegetable Farming

Most farmers practice small scale farming; 94% indicated having less than two acres under traditional vegetables. There are 4% who have three to six acres under traditional vegetable farming and another 2% had between seven and ten acres of traditional vegetables. All respondents indicated that they grow traditional vegetables for family consumption and for sale.

Figure 4.5: Acreage under traditional vegetable farming



The women generally do small scale vegetable farming and hence have the need to combine their effort in groups to enable them attract better markets. The existence of the factory has strengthened the groups to enable them engage in profitable farming. The processing factory is yet to full impact the lives of most women farmers.

The farmers are also restricted in terms of land ownership. Land in Lugari is predominantly owned by men though the main users are women. This was alluded to by the response from a key informant, in the women farmers group.

> "Most women do not own land, they have to ask for patches of land from their partners to grow the vegetables and most men do not value the traditional vegetables that women prefer to grow."

4.3.2 Milling Capacity and Patterns

Lugari grain amaranth mill is currently processing about 200kgs of amaranth seeds per week as reported by one of the key informants – at Lugari grain amaranth mill. The mill capacity is however, 8 tons a day which is still way far above the production capacity. There is therefore, need to provide farmers with more incentive to increase the acreage under amaranth.

> "Farmers are still way below the expected production capacity, while they produce 200kgs of seeds in a week; our mill has capacity to process 8 tons per day."

Technical challenges at the factory like proper storage facilities, transportation facilities for farmers' crop and financing has prevented the factory from running efficiently.

4.4 Impact of Factory on Women's Income in Lugari

4.4.1 Introduction

This section focuses on the impact of the factory on women farmers in Lugari, what they have experienced in terms of income as a result of value chain addition. The section also

includes impact on production, quantity, profitability and household food security among others.

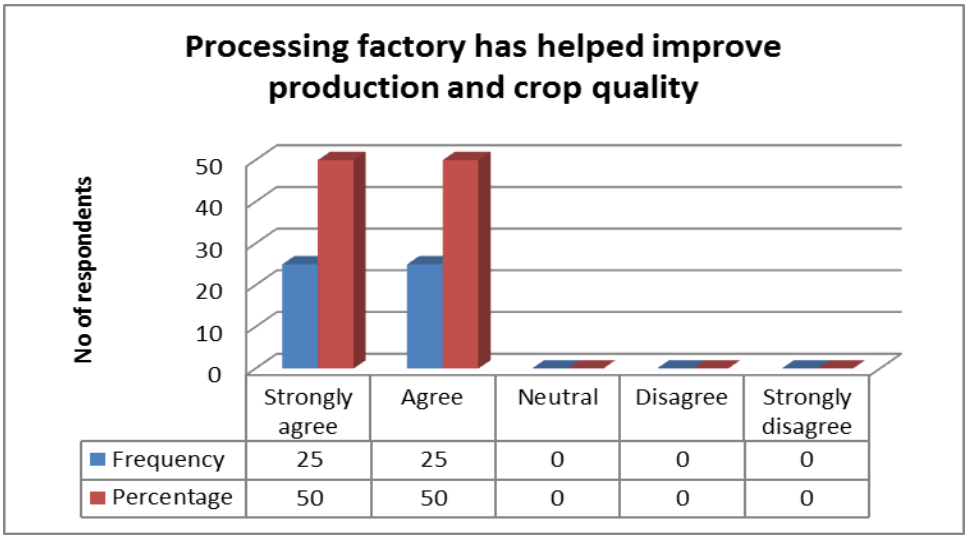
Based on the study findings, generally the processing factory has helped to improve production and crop quality. This is because many farmers have been motivated by the availability of a ready market and are now willing to expand their farms to meet the market requirements of the factory. The factory has also conducted training for farmers on improved farm practices and how to increase their crop yields as reported by a key informant in the farmer's women group.

> "The mill has directly benefited farmers financially in recent years. Farmers on the program bought more cows, children are in school, and many have improved their standard of living – furnished houses and renovated their homes."

4.4.2 Impact of Factory on Crop Production and Quality

When trying to find out if the processing factory has helped the farmers improve the quality and quantity of production of traditional vegetables, they were asked to respond to the statement "The factory has helped improved production and quality of traditional vegetable production" Most of the farmers agreed to the statement. Based on respondents' perceptions, n= 25 (50%) strongly agreed that vegetable factory has improved crop production and quality. Another n= 25 (50%) agreed to the statement as shown in the figure 4.7 below.

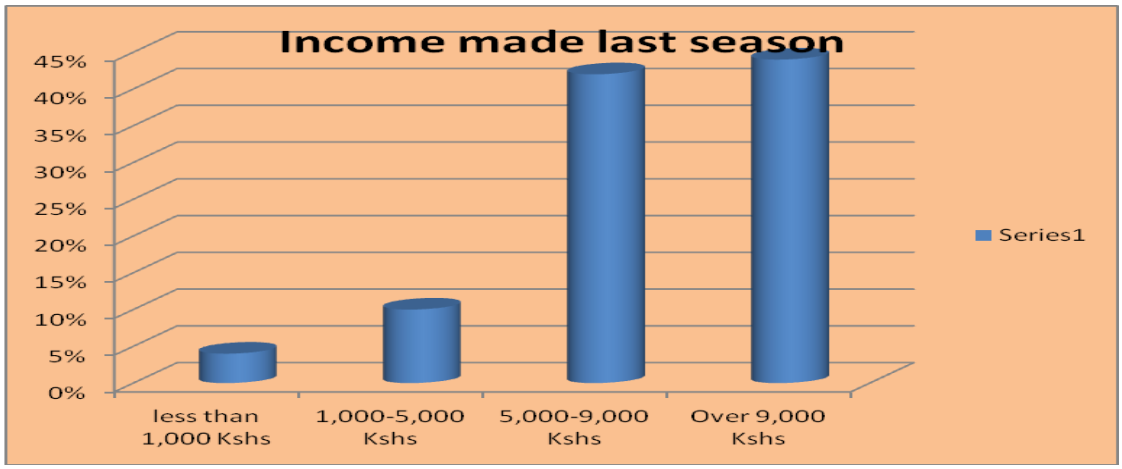
Figure 4.6: Showing impact of the vegetable processing factory on quality and production



4.4.3 Income Made Last Season from Traditional Vegetable Farming

Considering income made from vegetable farming in the last season, most women farmers (44%) made more than 9,000 Kshs. 42% of the respondents got between Kshs 5,000 – 9,000, 10% earned between 1,000 – 5,000 Kshs. and 4% got less than Kshs 1,000.

Figure 4.7: Income made last season from traditional vegetable farming

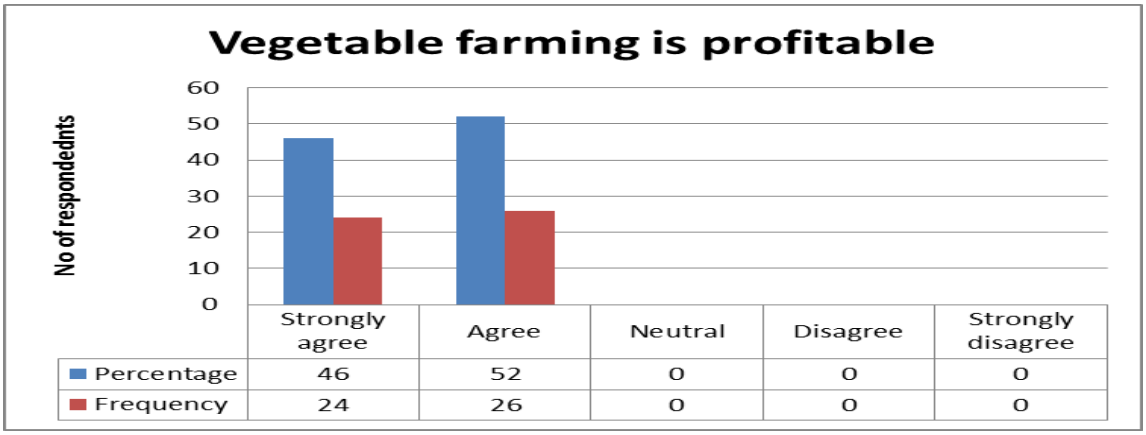


As reported by the women farmers and the mill manager, the mill buys amaranth grain at 60 Kenyan shillings per kilo from farmers. Middlemen used to offer farmers between 30-40 shillings per kilo. The price has therefore, doubled due to the establishment of the amaranth mill. In addition, processed amaranth flour sells at 140 shillings per kilo which is a source of employment since the locals can also invest in amaranth flour sales. Farmers make about 57,000 shilling per acre of amaranth grain per season. This compared to the past when amaranth seeds would be sold to middlemen has seen great improvements in the lives of the farmers.

4.4.4 Respondents' Opinion on Profitability of Traditional Vegetables

Apart from household use, traditional vegetable farming is a highly profitable business in Lugari County. All the respondents were in agreement that traditional vegetable farming has become more profitable since Lugari amaranth mill was established. While n=24 (46%) strongly agreed with the statement, n=26 (52%) agreed with the statement. Figure 4.8 and Table 4.2 below show how the participants responded.

Figure 4.8: Showing opinions on the profitability of traditional vegetables



All the study respondents reported their willingness to encourage others to join traditional vegetable faming since it was not only profitable but also instrumental in boosting the nutritional requirements of the household. The respondents want more members to join to bridge the market gap since there is a wide market that the community members can hardly satisfy.

The researcher noted that various traditional vegetables were grown by the farmers which included *Kunde* (Cow peas) *Miro* (Sunnhemp) Sagaa (Spider plant) *Omurere* (Jute plant) *Lidodo* (amaranth) and *Lisebebe* (Pumpkin leaves) on their plots. Most plots under traditional vegetables are generally weeded and well tended, and the vegetables look healthy.

4.4.5 Famers Level of Satisfaction with the Income from Traditional Vegetables

When asked about their level of satisfaction with the earnings from traditional vegetables, the farmers responded as shown in table 4.2 below. Most farmers (76%) percent were satisfied with the profits while only 10% were extremely satisfied as shown in the table below. Those who were neutral (14%) felt that with proper road network, farmer training and expanded markets, farmers can do better. They felt that the infrastructure network was key in ensuring a stable market of amaranth and in increasing demand of vegetables.

Table 4.2: Level of satisfaction with the income from traditional vegetables

		Frequency	Valid percent	Cumulative percent
Valid	Extremely dissatisfied	0	0	0
	Neutral	7	14	14
	Satisfied	38	76	90
	Extremely satisfied	5	10	100
	Total	**50**	**100.0**	

Respondents noted that the project had contributed towards increased income. Various respondents gave their reasons:

> "The program has enabled me utilize a small parcel of land which yields high, hence the steady source of money," said one respondent.
>
> "The vegetables take a short time to grow which helps bring in regular income,'' reported another respondent.
>
> "The market is readily available, so you get your returns quickly," said another respondent.
>
> "I have a business that is easy to maintain, and I don't have to struggle to get money to maintain my family," added another farmer.

A group official and key informant noted thus:

> "Farmers previously grew sunflower but have now moved on to include growing more amaranth because it gives them better profits."

Majority of the respondents (53.3%) did not have any problem with marketing their produce. They attributed this to the fact that the processing factory has provided a market and it was now easy to sell their products. The factory has also helped in eliminating middlemen who previously bought amaranth seeds at a low price and made huge profits selling processed amaranth in other cities. One key informant, at the Ministry of Agrculture said:

> "Amaranth production is picking up because of the amaranth mill. The factory has saved farmers the problem of finding market opportunities, in the past we sold our amaranth to middlemen who bought them at less than half the current price, today the factory takes the amaranth at a better price and markets on our behalf."

Most respondents (83%) were comfortable with the knowledge and skills they have in growing vegetables, 17% reported that they lack adequate farming skills to enable them produce more yields. While those who felt that they had adequate skills to grow vegetables said traditional vegetables are easy to manage and do not require much training, the ones who fell short of knowledge and skills were geared towards getting more training and increasing yields. They felt that the value chain options would increase profits and enable them reach their full potential.

A Key informant at the mill indicated that they have been receiving new members willing to join the project since it was started in 2012.

> "Women are very involved in the project. They sell the amaranth vegetable leaves in the market and the seeds to the factory for milling. We are receiving requests from more people who want to join the project"

4.4.6 Impact of Value Chain on Food Security

The value chain of amaranth has impacted on food security in two directions as reported by the respondents. First the women have grown amaranth for own consumption and by doing so, they have reduced household food purchases.

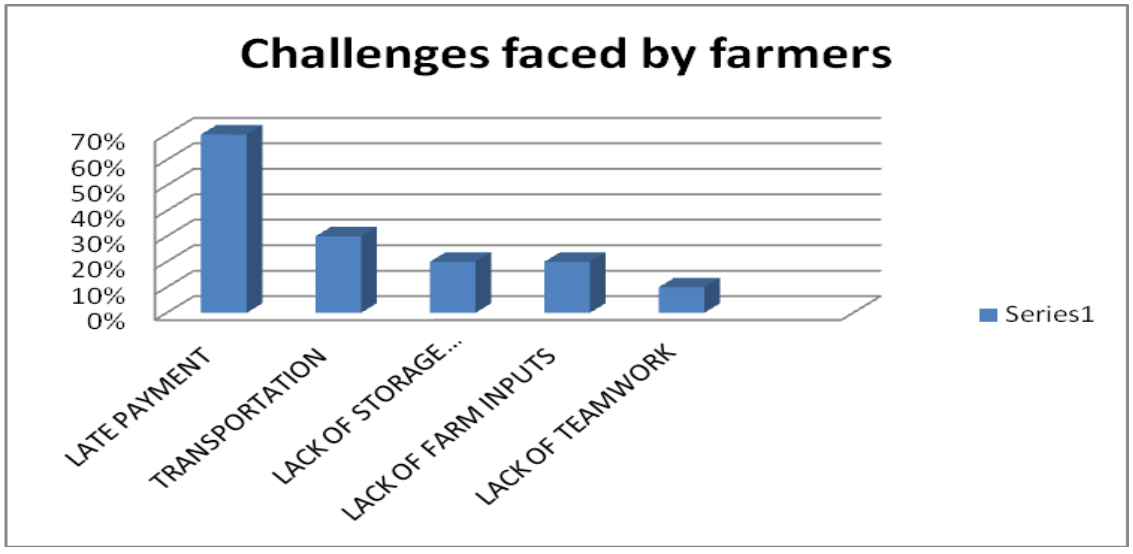
Secondly the increased incomes associated with sales of amaranth seeds, has given women farmers increased purchasing power to afford other types of food. One of the women farmers said:

> "When we want to eat a different dish, I use the money from amaranth sales to buy fish or chicken which my family enjoys."

4.5 Challenges Facing the Vegetable Farmers

The farmers were also asked to list the challenges they face as vegetable farmers. The challenges mentioned include lack of tranport, payment delays, lack of teamwork and lack of farm inputs and related obstacles as shown in figure 4.10 below.

Figure 4.9: Challenges faced by vegetable farmers in Lugari



From the graph above, most farmers (70%) mentioned late payment from the factory for their produce as a challenge to their vegetable farming business while transportation challenges accounted for 30%. Lack of proper storage facilities was cited by 20% of respondents. Lack of farm inputs contributed to 20% while lack of teamwork accounted for 10% of challenges reported.

Delayed payment was the biggest challenge stated by respondents. Many said they were not receiving payment for their produce on time from the factory, which was discouraging and inconvienced them in various ways.

One farmer stated:

> "Delay in payment is a major problem, quick collection of cash is needed for motivation of farmers."
>
> "Being a widow, I need money immediately I deliver because I am the family breadwinner." (Noted another farmer).
>
> "There is lack of prompt payment for farmers, the factory should have adequate capital to pay farmers." (Opined another respondent).

Transportation often hinders movement of produce according to 30 percent of the farmers, which ends up delaying their sales at the factory and eventually results in payment delays. Farmers depend mostly on hired motorbikes to move their produce to the factory which they say is expensive. Farmers suggetsed that the factory should look into providing transport services at a lower cost for them.

Roads are also in a poor state which prevents proper transport networks from expanding in the area. One farmer noted thus:

> "The factory should acquire lorries for cheap transportation of our produce in bulk collected from many farmers."

Another respondent stated:

> "We don't have transportation facilities, the factory should provide cheap transportaion for our produce."

Proper storage facilities and vegetable preservation methods are also a challenge that 20 percent of women farmers stated. When there is a surplus in production in the local market, farmers often count losses because of poor storage of their crop which is highly perishable.

One farmer said:

> "Sometimes delays reduce weight of the produce, so we make a loss. Delivery should be direct from the farm and payment should not take long."

Lack of access to proper farm inputs like seeds, fertilisers and farm equipment was also a challenge noted by 20 percent of the farmers, which they said hindered production.

One farmer noted:

> "Supply of peticides and seeds should be done in good time."

Another farmer stated:

> "Farmers need frequent visits from extension officers they also need proper fertilizer and seeds."

One key informant, the group's chair also said:

> "Lack of advanced farm equipment also prevents farmers from working their land efficiently. They rely on donkeys for example to plough which is time consuming. Farmers also complain about delayed payments from the factory which often sets them back on other projects."

10 percent of farmers indicated lack of teamwork as a challenge that prevented them from growing together and delayed marketin of produce because of low volumes harvested at given times.

One farmer said:

> "At times, you are the only one who has harveted vegetables, which causes delays in processing. Farmers should plan to harvest at the same time for bigger volumes."

Another farmer stated:

> "Team work and enhancing high production through modern farm methods is needed."

Other challenges mentioned by a key informant at the milling factory include lack of Kenya Bureau of Standards (KEBS) certification, transportation challenges to the market, inadequate technical training for traditional vegetable processing, packaging for the finished product, lack of proper storage facilities for processed amaranth, and lack of funding to upscale amaranth production among others according to the mill official:

> "We have a number of challenges, while the main one is upscaling the production of amaranth, the mill has a challenge with KEBS certification but apart from the

> mill we have inadequate technical training, poor roads, inadeaquate storage facilities…..on the side of farmers there is inadequate skills, finances, and land for expansion of amaaranth production".

From the above exerpt it is clear that while the farmers face challenges in production, the mill also has challenges when it comes to processing and marketing. These challenges are a bottleneck in upscaling amaranth production in Lugari.

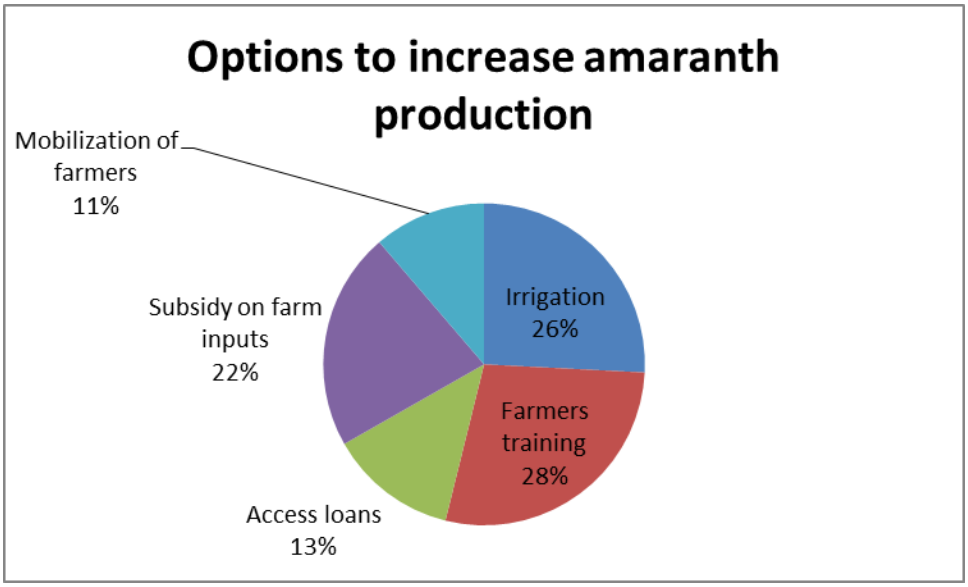
4.6 Alternative Options for Women in Lugari to Increase Production and Marketing of Traditional Vegetables

Both farmers and the milling staff feel that there are alternative options that can help increase production and marketing of traditional vegetables.

4.6.1 Alternative Options to Increase Production of Traditional Vegetables

While production of amaranth remains a challenge, there is need to come up with strategic ways to improve production. When farmers were asked how production of traditional vegetables can be improved especially amaranth, 11% mentioned mobilization of farmers, 22% mentioned subsidy to farm inputs including seeds and fertilizers, 26% mentioned irrigation as a way of ensuring supply throughout. Most respondents (28%) mentioned training of farmers on better farm methods especially through specialized agricultural extension officers as an option and 13% felt that access to loans would enable women expand the acreage under amaranth as shown in figure 4.10 below.

Figure 4.10: Options to increase amaranth production



Key informants felt that training farmers regularly and having more field officers visit farms as well as proper processing and value addition would help attract a bigger market, increase sales and also increase vegetable production.

To increase the market for traditional vegetables especially amaranth, the women suggested coming up with a farmer's group and cooperative to market the products, improving rural access roads for easy mobility/transportation, increasing the acreage under vegetable farming, teaching women on modern farm methods, introducing high yield vegetable varieties and linking women to micro-financial institutions.

Officials at the factory however said that branding and more value addition strategies would expand the local market while KEBS certification would help expand the national and international market. The certification would help the group access supermarkets countrywide and international clients.

On value addition, the women farmers chair suggested that using processed amaranth flour to make value added products like bread, cake and doughnuts among others can be bring in an extra source of income for farmers.

In conclusion while amaranth production has great potential to impact women farmers in Lugari, the options have not been fully exploited and there is need to invest in strategies that can increase production, processing and marketing of amaranth.

5.0 CHAPTER FIVE: DISCUSSIONS

5.1 Introduction

This chapter discusses how the introduction of a vegetable processing factory has contributed towards value addition of traditional leafy vegetables in Lugari and the impact this has had on the lives of women farmers in Lugari. It also highlights how value addition has promoted the local traditional vegetable market.

5.2 Impact of the Factory in Value Addition

In objective one, the study sought to investigate whether more women engage in quality vegetable production as a result of value addition by the new processing factory.

All the women interviewed previously engaged in traditional leafy vegetable farming, this is because the vegetables are popular in the community and have gained value in the market over the years. The vegetables are also a major source of food and income for households.

Production has been positively impacted by value addition because farmers have realized that there are more benefits they can enjoy by improving their produce for the market. This has pushed them to engage in growing more traditional vegetables as noted by (Yengai, 2009) the value addition of farm produce through processing is gaining importance. It is important to note that growing and processing are complementary. The growing is futile without processing. Thus, they both need to be promoted together.

With value addition, new market opportunities that the farmers can take advantage of are created and farmers are able to increase their profits from businesses like vegetable farming.

Value addition through farmer groups brings farmers together to pull resources that would have otherwise been less profitable if marketed in their raw form. This is in line with Nebraska Cooperative Development Center (2014) which states that value added agriculture focuses on increasing the economic value and/or consumer appeal of an agricultural product. Often producers have products they can market as both an original and a value added agricultural product, they simply need the assistance in getting started.
Farmers are willing to increase their acreage under traditional vegetables when they have great market potential. Farmers now grow amaranth three times a year after learning how to plan their planting seasons and manage their crops better.

As stated by UNIDO (2011) the underlying approach behind value addition is the assumption that investments in building stronger linkages between smallholder farmers and buyers or processors in higher-value markets will increase among other things profits, business performance, provide incentives for sustainable resource management and/or reduce poverty—either directly through increased incomes or employment or indirectly through spillover effects in local economies.
Farmers are able to access better markets for their produce and they are also better informed about how to improve quality and quantity of their produce for the target market.

Flemming (2015) also noted that for farmers, value-added has a particular importance in that it offers a strategy for transforming an unprofitable enterprise into a profitable one.

5.3 Increased Earnings as a Result of Factory

In reference to objective two, the researcher purposed to establish whether women have increased their earnings as a result of value addition by the new factory and its marketing strategies.

With more income, women are able to provide better for their families' basic needs. Increased income for women also makes them less dependent on their partners for provision of basic necessities in the household. Farmers are also able to invest in new farm methods and technology like biogas to improve their quality of life.

This is in agreement with World Bank (2013) that increasing investments in the farm economy can deliver high-impact development returns such as increasing rural incomes, boosting food security, making cheap and more nutritious food available to Africa's bustling cities and protecting the environment through innovations such as climate smart agriculture.

In this study, the impact of value addition ranges from economic benefits to improved household food security as stated by Gotor & Irungu (2012) Value addition has contributed to expenditure substitution and production for domestic consumption. This contributes to household food security. In addition, apart from reducing poverty in the

community, value addition also encourages saving by freeing up household resources that could be used for other expenditure.

Increased profits attributed to the value chain also allows women time to venture into other profit making businesses like poultry farming, grocery shops, and livestock farming among others. This is due to the multiplier effect of value addition where a market is created for both supplementary and complementary goods as noted by UNIDO (2011).

Though there are opportunities to expand production on farms producing traditional vegetables, women often do not take up opportunities due to various challenges they face such as lack of credit facilities, lack of prompt payment for their produce, and inadequate access to farm inputs among others.

Increasing knowledge and capacity of women gives them confidence to take on new projects that contribute to their economic development. With more education and knowledge, farmers will be better placed to tend to their crop, knowing exactly what is favorable for farming their vegetables. Being aware also puts them in a better position when it comes to tackling various challenges they face.

As noted by Onyango et al. (2013) Indigenous vegetable production such as that of spider plant is constrained mainly by the poor management practices, lack of improved varieties, seasonality of production, poor road network, poor post-harvest handling, high quality

standards required by the market, lack of proper marketing strategies and lack of credit facilities particularly for small scale farmers, which need to be addressed.

Given that women are consistent users of farm land, there is need to involve financial institutions to provide loans to small scale farmers rather than concentrate on large scale farmers to enable the women grow their business. Women can also look at engaging in communal farm projects to boost income.

5.4 Opportunities to Increase Production and Profitability

Objective three sought to examine what needs to be done to increase production and profitability of traditional leafy vegetables.

The main need lies in effectively meeting the market for traditional vegetables. Challenges like preservation and transportation challenges are barriers that prevent farmers from selling produce efficiently.

A major challenge in the marketing and distribution of ALVs is their short shelf-lives, as noted in SciDev.Net (2015) like other leafy vegetables, ALVs are made up of more than 90 per cent water and even a slight decrease in moisture content of less than five per cent, renders them unsellable.

Farmers need an enabling environment to thrive with formal policies and practices that ensure their efforts are not frustrated by lack of professional standards meant to protect

them. Proper marketing strategies are necessary for farmers to efficiently run their businesses and avoid making loses when it comes to value addition.

Linking farmers to proper markets and using efficient networks can increase production and profitability as noted earlier in a study by Biodiversity International (2013) in parts of rural Kenya farmers' incomes had increased, particularly where they had been successfully linked to markets; women, the dominant producers of leafy vegetables, were the main beneficiaries. In almost 80 percent of households surveyed, it was the women exclusively who kept the income from sales of ALVs and decided what it would be spent on. Recognising the role of women is therefore, of critical importance for those promoting ALVs because women are the ones driving the production processes.

Access to resources and control over them also determines whether or not a farmer can make progressive decisions on the farm. Women farmers need to have more say on the land they till in order for them to be productive.

Women despite being producers of vegetables often lack the right to determine how much acreage is allocated to traditional vegetable farming and have to consult their male partners as noted by FAO (2002).

Despite their role as the backbone of food production and provision for family consumption in developing countries, women remain limited in their access to critical resources and services.

A value chain analysis from production to finished products will also enable the farmers market their product better and reinforce a better partnership between them and their clients.

Value chain analysis offers a great opportunity to be able to assess the efficiency of value-added operations/services as noted previously by Acedo and Weinberger (2010). It offers systemic competitiveness along the supply chain to increase production, trade and the income generating potential of farmers and other actors in the indigenous vegetable supply chain. Value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production.

Farmers should also be encouraged to increase the acreage under vegetable farming and men educated on the economic value of traditional vegetables. There is also need to enhance women's access to land since women are the main producers of traditional vegetables but they lack legal ownership to the pieces of land that they use for the production. Where possible, the factory should consider providing extension services to the farmers so that they have value additional activities that enhances their production.

6.0 CHAPTER SIX: SUMMARY OF FINDINGS, CONCLUSIONS AND RECCOMENDATIONS

6.1 Introduction

This chapter summarizes the key findings based on each of the specific objectives. The chapter also provides the conclusion of the study and finally spells out the recommendations necessary for the different actors in the traditional leafy vegetables production.

6.2 Summary of Findings

Majority of the respondents believe that they have been able to improve the quality and quantity through value addition of their crop. They attributed this to the training they received through the vegetable project, farm visits by extension officers, improved farm inputs and availability of a ready market through the factory among other factors.

Women now grow traditional vegetables as a major crop on their plots and some have moved from growing less profitable crops altogether to concentrate on their vegetable farms.

Most farmers are happy to continue working on the project because they feel it has benefitted their production and sales in some ways. They are able to access a ready market; they are able to get training, farmers have also found a way to grow and sell vegetables all year round which allows them make more profits within a short time.

Despite the acknowledged benefits of the leafy vegetables, the women also generally engage in small scale farming. This is because most of them do not own land and have to request for permission from their partners on land use and practices.

Farmers say that they are generally satisfied with the income they make but know that there is an opportunity to do even better. They have also increased food security for their households by growing some vegetables for family consumption and using part of the money made from vegetable sales to purchase other foods.

Income from the sales of amaranth has helped generate household income for the farmers. More income has empowered them and given them a voice in the home. Women have also bought assets such as kitchen utensils, furniture and paid school fees for their children. The availability of an amaranth processing project has created opportunities for investment in other businesses such as grocery shops and livestock farming.

Farmers also suggested that finding new markets would also give them more opportunities to grow the business and increase production of traditional vegetables.
Teamwork and frequent meetings to ensure that the farmers conduct their planting and harvesting at the same time will also enable them discuss more effective ways of production and sales of vegetables in bulk. This was seen by farmers as the best way to have continuous production all year round and satisfy their customers' needs.

Farmers also want to adopt new farm technologies which will lessen work on the farm and improve on efficiency such as use of mechanized farming. They generally need more access to credit to enable them invest in machinery and infrastructure on their farms. They also need effective marketing policies as they are let down sometimes, when produce is not sold to clients in good time or they are not paid promptly for deliveries made.

Although men are increasingly moving to invest in food crops as returns from cash crops like sugarcane fall, women often remain the main drivers of traditional value chains in local markets for fresh or processed foods such as vegetables, fruits, grains, tubers, dairy products in the area. The women engage in production of vegetables, delivery of amaranth seeds to the mill and marketing of amaranth flour through their farmers' group. Farmers also suggested ways of tacking challenges they face through holding more training programmes that can help them discuss and find more effective ways of growing and marketing their crop.

6.3 Conclusion

Traditional vegetables have formed an important part of the dietary needs of communities in Lugari for decades, where they are consumed to improve health and nutrition. It is no wonder that they have grown to become an important part of the region's economy as a result.

By making traditional vegetables a key produce for the region and improving the quality for the market, Women farmers have given traditional vegetables new economic importance. The vegetables have in the meantime contributed to the social welfare of farmers, improved their earnings and elevated the status of women within the community. Women farmers are now in a better position to meet their household needs because they have increased their income and promoted production as well as consumption of these vegetables. Women farmers have also been able to build resources and engage in other economic activities that have helped improve their livelihoods.

Value addition has also seen farmers help preserve traditional vegetables which are often ignored. Growing the crops has contributed to preserving cultural dishes once consumed by various communities in the past giving the vegetables that now face possible extinction a new lease of life. Traditional vegetables have continued to contribute to the dietary and nutritional needs of households both in Lugari and in other parts of the country.

In a world where people are faced with various lifestyle diseases, promoting traditional foods like traditional vegetables has been noted as a way of helping people stay healthy.
There is still a huge gap in production and distribution of traditional vegetables that needs to be filled given that there is huge demand across the country for traditional vegetables which is hardly met. The demand has now extended to foreign countries where immigrants are resorting to their traditional dietary styles.

Value added agriculture is also important for small scale farmers who often cannot find sufficient markets on their own. It has helped them transform unprofitable businesses into profitable ones and given them a reason to grow more traditional vegetables hence increase production.

Value addition is indeed one of the approaches that can be used by women small scale farmers to change their economic status. Value addition increases product demand allowing producers to benefit from increased profits due to increased sales. Value addition has seen farmers in Lugari get more access to training and information as well as learn new skills. It has also boosted confidence among farmers.

Farmers still need further training though in areas like emerging farm technologies and ways to improve their value added business further. Poverty in rural areas can be fought using similar projects that promote use of available resources like land to cultivate lucrative crops rather than grow crops that have been cultivated for years without meaningful returns.

Even though rural communities are generally disadvantaged when it comes to access to resources and services, making use of what is available encourages more farmers to engage in increasing crop production and taking up value addition, thereby increasing profits.

The result of empowering women through value added agriculture has not only improved living standards but has also aided in food security, employment creation and the promotion of gender equality among others.

Farmers' level of participation needs to be improved through education and training to allow the women understand the importance of their crop more and how to best handle it for maximum profits.

Mobilizing farmers for value added agriculture also helps them market their produce together and makes it easier for them to find markets especially when they are based in remote areas and they farm on small plots of land. The Lugari farmers also face various challenges like limited access to inputs like seeds and fertilizer and farm tools which may limit yields of traditional vegetables harvested. Access to credit is a major hindrance as well because one needs capital to invest in a farm.

Most of the challenges farmers face in Lugari can be addressed through strong policy support both at the cooperative and county level. By coming together, farmers are also better placed to pool resources and improve their work conditions and address gaps by starting group funding strategies like SACCOS or table banking facilities that allows them to borrow small loans to buy farm inputs or equipment at affordable interest rates.

The women farmers should also invest in adult literacy classes to increase their awareness and educate themselves better on how to take advantage of resources for their own economic development.

From the findings of this study, there is need to increase food production and expand value chains to allow for more linkages that will help women farmers realize the full impact of value addition and have the capacity to exploit the locally available resources to their benefit.

Further research should be conducted to provide more information on how various traditional vegetables can be processed into various value added products for sale, as well as how farming traditional vegetables impacts the lives of small scale farmers.

6.4 Recommendations

Vegetable value chain activities should be accompanied with more access to training and extension services as well as farm inputs. This will ensure that producers themselves are able to fully reap economic benefits of traditional vegetables.

There should be better program development for the women farmers that include a value chain analysis and review of the marketing strategies in place to help farmers increase their profits.

The vegetable milling factory also needs to partner with companies that can inject more capital to help improve production standards and efficiency at the processing mill.

Other development partners can take up marketing of value added products both locally and abroad to bring in more profits.

Women farmers should be allowed to own land and have decisions over land use so that they can expand acreage under leafy vegetables both for profit and food. This will enhance economic resilience as well as food security. This will equally allow them to engage in activities that will improve the soil fertility and engage in long term investments in the small scale holdings.

More women should be involved in marketing and selling of value added products to enable them get a better understanding of market demands, challenges and benefits of improving their vegetables for sale.

There is need to link women farmers to micro-finance institutions that can help them access cheap loans to purchase or lease land for traditional vegetable farming. This will increase the number of women involved in traditional vegetables farming.

Tax relief for farmers should be promoted to encourage more small scale farmers engage in growing traditional vegetables and other food crops alongside cash crops.

The public also needs to be sensitized more on the nutritional benefits and versatility of traditional vegetables to encourage more people especially those living in urban areas, consume the vegetables and their value added products.

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APPENDICES

Appendix I: Consent letter

Dear Sir/madam,

My name is Donna Omulo. I am a post graduate student at the University of Nairobi. I am carrying out a research project on factors that influence women's potential to commercialize traditional vegetables in Lugari Sub County, as part of my degree course in Gender and Development Studies.

I would like to kindly request for your voluntary participation in this study by responding to the questions asked on the questionnaire attached. The goal of this study is to provide insight on ways to empower small scale women farmers to enable them increase their income.

I assure you that the information you provide will be treated with strict confidentiality and will only be used for the purpose of this study. You will be at liberty to withdraw at any stage or decline to answer any question that you are not comfortable with.

In the write up, pseudonyms and codes will be used to protect your identity and no identifier will be used unless duly authorized by you.

Thank you for your cooperation

Participant's Signature:

……Date…….

Witness's

Signature……..Date……..

Appendix II: Survey Questionnaire

PERSONAL DETAILS

Please tick circle as appropriate

1. Age

a) 20 – 30 ( )

b) 31 - 40 **( )**

c) 41 - 50 **( )**

d) Above 50 **( )**

2. Marital status?

a) Single **( )**

b) Married **( )**

c) Widowed **( )**

3. How many dependents do you have?

a) Less than 5 **( )**

b) 5-10 **( )**

c) More than 10 **( )**

4. What is your highest level of education?

a) Primary education **( )**

b) Secondary education **( )**

c) Diploma **( )**

d) University **( )**

5. Do you have an alternative source of income?

Yes **( )**

No **( )**

6. If yes, please state source of income

……

PRODUCTION DETAILS

7. What farm area did you allocate to grow traditional vegetables last season?

(Please tick circle as appropriate)

a) Less than 2 acres **( )**

b) 3 - 6 acres **( )**

c.) 7 - 10 acres **( )**

d) Over 11 acres **( )**

8. How would you rate your efficiency as a vegetable farmer compared to other crops grown in the past? (Please tick circle as appropriate)

a) Least efficient **( )**

b) Average **( )**

d) Very efficient **( )**

9. Would you recommend production of traditional vegetables to other farmers?

(Please tick circle as appropriate)

a) Yes **( )**

b) No **( )**

10. How much money did you make selling amaranth last season? (Please tick circle as appropriate)

a) Less than 1,000 ksh ( )

b) 1,000-5,000 ksh ( )

c) 5,000-9,000 ksh ( )

d) Over 9,000 ksh ( )

MARKETING DETAILS

11. Traditional vegetable farming is a profitable business (Please tick circle as appropriate)

a) Strongly agree **( )**

b) Agree **( )**

c) Neutral **( )**

d) Disagree **( )**

e) Strongly disagree **( )**

12. The processing factory has helped me improve the production and quality of my crops. (Please tick circle as appropriate)

a) Strongly agree **( )**

b) Agree **( )**

c) Neutral **( )**

d) Disagree **( )**

e) Strongly disagree **( )**

13. State ways in which the processing factory has helped improve your amaranth production

……

……

14. What challenged do you face marketing your vegetables at the factory?

……

……

15. Do you plan to continue marketing your vegetables through the processing factory? (Please tick circle as appropriate)

a) Yes **( )**

b) No **( )**

16. How can production and marketing of traditional leafy vegetables be made more profitable?

……

……

……

Appendix III: Key Informants Interview Guide

CHAIR - Lugari Farmers' Welfare Association

Questions

1) What impact has the factory had on production of traditional vegetables among farmers?

3) What issues/challenges do you face as a group in marketing your crop?

4) How involved are the women farmers?

5) What capacities are needed for improvement?

6) What progress would you like to see made by the group in future?

LUGARI MILL OFFICIAL

Questions

1) What impact has the mill had on production of grain amaranth in the region?

2) What response have you received from customers seeking value added amaranth products?

3) What issues/challenges do you face in marketing processed amaranth?

4) How involved are the women farmers?

5) What capacities are needed for improvement?

6) What are the program's future plans in commercializing traditional vegetables?

MINISTRY OF AGRICULTURE OFFICIAL

Questions

1) Why did the government decide to set up a vegetable factory to process vegetables in Lugari?

2) What response have you received so far from the farmers in taking up the project?

3) What is the ministry doing to help rural women farmers market their vegetables?

4) What issues/challenges do you face in getting the program running?

5) What plans does the ministry have in future to improve the business?

Appendix IV: Observation Checklist

1) Types of traditional vegetables growing in farms

2) Area allocated to amaranth crop in farms

3) Area allocated to other crops

4) General care of amaranth crop in farm for example weeding and spacing