Understanding the Influence of Livelihood Features on Cassava Value Chains

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DEDICATION

This work is dedicated to my mother, Adzo Womekalewodzio.

ABSTRACT

More than 70% of Ghanaian farmers depend on cassava farming and processing as part of their livelihood activities. The study sought to identify the actors in the cassava value chains, how their livelihood features influence upgrading in the value chains and also, factors that farmers consider in deciding whether to sell fresh cassava roots to intermediate processors or to process the roots themselves and sell.

The study was conducted in locations in six districts in Ghana. It combined the Value Chain Approach and the Sustainable Livelihoods Approach using qualitative and quantitative data. A stakeholder workshop was held to identify the main actors and their functions in the *fufu, kokonte* and cassava flour value chains. Livelihood analysis was conducted in two parts. First, it was carried out on eighty (80) households in the pounded *fufu* and *kokonte* value chains and the second aspect involved an intermediary flour processor – Amasa Agro Processing Company Limited and 43 individual farmers who supplied cassava roots to the Company. A cost benefit analysis was also carried out to determine whether selling of cassava roots is more profitable than processing the roots into shelf-stable products for sale.

It was observed that farmers and processors, who are the main actors in the identified value chains, did not have adequate access to physical, social, natural, financial and human capital. Livelihood features that enhanced prospects for upgrading in the *fufu* value chain were increased access to energy, water and sanitation, group membership, access to information, and a vibrant enabling environment. Three livelihood constraints, poor access to credit, labour shortage and inadequate transport facilities have however, been found to create circumstances favourable to adoption of the new technology in the *fufu* value chain. In the *kokonte* value chain, it was observed that access to health facilities, improved transportation, group membership, access to information and an enabling environment enhanced prospects for upgrading.

It was also observed that farmers made more profit when they processed their cassava and sold it than when they sell the cassava roots to the intermediary processor. Among the processed products, profits from grits were found to be the highest, followed by *agbelima* and *gari*. However, farmers indicated that they are more comfortable selling cassava roots and grits to the intermediary HQCF processor than

middlemen and other buyers because in addition to bulk and prompt payment, they have their fields ploughed for them on credit basis and also get free cassava planting materials.

To promote the adoption of new cassava-processing technologies in Ghana and elsewhere in Africa, strategies recommended were the provision of financial assistance, improving access to information through extension services, development of manual and cheaper *kokonte* slicing machines and legislation on the use of a percentage of High Quality Cassava Flour as a substitute to wheat flour in the baking industry.

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EXCHANGE RATE

The cedi equivalent to the dollar (2008), 4TH August 2008

GH₵100=US$102.74

ACRONYMS

ABOFAP	Abronu Organic Farmers Project
ADRA	Adventist Development and Relief Agency
AEA	Agricultural Extension Officer
AIS	Agricultural Innovation Systems
ASCo	Ayensu Starch Company
BDCC	Buyer Driven Commodity Chains
C: AVA	Cassava: Adding Value for Africa
CIAT	International Centre for Tropical Agriculture
CIBA	Centre for Indigenous Business Association
CIRAD	Centre Internationale en Recherche Agronomique pour le Developpment
CRI	Crops Research Institute
DA	District Assembly
DANIDA	Danish International Development Association
DFID	Department for International Development
ETP	Extension Test Plot
FAO	Food and Agricultural Organisation
FCUBE	Free Compulsory Universal Basic Education
FDB	Food and Drugs Board
FFGL	Feed and Flour Ghana Limited
FORIG	Forestry Research Institute of Ghana
FRI	Food Research Institute
GCC	Global Commodity Chains
GCSCA	Ghana Cooperative Susu Collectors Association
GHS	Ghana Health Service
GSB	Ghana Standards Board
GTB	Ghana Tourist Board
GWE	Great Woman Enterprise
HEIA	High External Input Agriculture
HPI	Heifer Project International
HQCF	High Quality Cassava Flour
ICT	Information and Communication Technology
IFAD	International Fund for Agricultural Development
IITA	International Institute for Tropical Agriculture
INRA	Institut Nationale de la Recherche Agronomique
IPM	Integrated Pest Management
IRDP	Integrated Rural Development Project, Ethiopia
KVIP	Kumasi Ventilated Improved Pit
LEISA	Low External Input and Sustainable Agriculture
LPG	Liquefied Petroleum Gas
MOFA	Ministry of Food and Agriculture
MOTI	Ministry of Trade and Industry
MVIWATA	*Mtandao wa Vikundi vya Wakulima*
NBSSI	National Board for Small Scale Industries
NHIS	National Health Insurance Scheme
NRI	Natural Resources Institute
NRTCIP	National Root and Tuber Crops Improvement Project
PDCC	Producer Driven Commodity Chains
PPD	Post-harvest Physiological Deterioration

PSI	Presidential Special Initiative
ROSCA	Rotating Savings and Credit Associations
RTIMP	Roots and Tubers Improvement and Marketing Programme
RTIP	Roots and Tubers Improvement Programme
SLA	Sustainable Livelihoods Approach
SLF	Sustainable Livelihoods Framework
SME	Small and Medium Scale Enterprise
SPSS	Statistical Package for the Social Scientist
TCA	Traditional Caterers Association
VCA	Value Chain Analysis
WIAD	Women in Agricultural Development
WIN	Empowerment of Women in Irrigation and Water Resources Management for Household Food Security
WOUGNET	Women in Uganda Network
WTO	World Trade Organization
WVLC	Western Veneer and Lumber Company

CHAPTER 1
BACKGROUND TO THE THESIS

1.0 Introduction

This thesis is an attempt to understand the relationship between value chains and livelihoods and how they may influence each other to the benefit of the participants in the chain. There are various actors in the cassava value chain, from the producer through the middlemen to the consumer. All these actors have livelihood objectives to attain, hence their participation in the chain.

This chapter briefly introduces the characteristics of cassava including its importance and its production worldwide and in Africa. The chapter further introduces the European Union-funded Cassava Project: *„Development of a small and medium scale enterprise sector producing cassava-based products to meet emerging urban demand in West Africa"* and how it contributed to this thesis. Following this is the research context that deals with the research problem, objectives of the study and the research questions. Finally, the chapter unveils the structure of the thesis, showing how the various chapters are organised.

1.1 Cassava and its Characteristics

World production figures show that cassava is the fourth most important staple in the world after rice, wheat and maize. In Africa, it ranks first followed by maize, plantain and rice and in Ghana, it ranks first followed by yam, plantain and maize (FAOSTAT, 2007). There are certain characteristics that make cassava an important crop. These are explained below.

Cassava is regarded as a major food security crop. However, its role in food security has declined in Post-Green Revolution Asia, but continues in Africa as a factor in times of frequent food shortages, political and civil unrest, erratic rainfall, economic stagnation and rapid population growth (IFAD/FAO, 2001; Scott et al., 2000; Hillocks, 2002). Several African countries have become import dependent on cereals in particular, filling the gap created by unsatisfactory growth in the production of domestic staples. Nweke (2004) reported that 95% of the total cassava production, after accounting for waste, is used as food in Africa. In South America and the

Caribbean it has been reported that more than half of the cassava produced is used directly for human food and the remainder for animal feed or industrial uses (Henry and Hershey, 2002). However, FAOSTAT (1997) reported that less than 40% of cassava in Asia is used for human consumption and the rest for industries.

Cassava is a main source of carbohydrates to meet the dietary requirements of low income consumers in most parts of Africa (Nweke, 2004; Berry, 1993). For example, Nweke (2004) indicated that in the Democratic Republic of Congo, cassava contributes more than 1,000 calories per person per day to the diet and many families eat cassava for breakfast, lunch and dinner. In Ghana, MOFA (2006) estimated levels of per capita consumption of cassava as rising from 146 kg/head/yr in 1985 to 152 kg/head/yr in 2005. Over the same period, per capita consumption of yam actually declined from 44 kg/head/yr to 42 kg/head/yr (MOFA, 2006). This shows that cassava is really the major root crop and is more widely consumed than any other root crop.

Cassava provides employment, food and cash income to farmers, processors and distributors along the value chain. Worldwide, a large number of households produce cassava for the markets. For example, MOFA (2006) estimated that 1,998,184 farming households are engaged in cassava cultivation in Ghana. The availability of markets for the very high number of cassava products enhances the role of cassava in poverty alleviation through income security and stability for the poorest farmers (IFAD, 2000). In the national economy, roots and tuber crops contribute about 46% of the Agricultural Gross Domestic Product and cassava alone accounts for 22%.

In industry, cassava flour is used in the food manufacturing sector for improved traditional foods such as instant *fufu*; and in paper board and plywood industries. Cassava starch is used for textiles, biodegradable plastics and pharmaceuticals and cassava-derived glucose syrup is also used in the pharmaceutical industry (Balagopalan, 2002; Henry and Hershey, 2002; Westby, 2002; Dziedzoave et al., 2000).

Leaves, pellets, chips and dried roots are increasingly being used by the livestock industry (Balagopalan, 2002; Henry and Hershey, 2002; Westby, 2002). This is

because many feeding experiments show that cassava provides a good quality carbohydrate which may be substituted for maize or barley. But cassava needs to be supplemented by other feeds that are rich in protein and vitamins.

One of the desirable qualities of cassava is its adaptability to relatively marginal soils with pH from 4 to 9, erratic rainfed conditions and the certainty of yielding even under the most adverse conditions such as eroded and degraded lands (Nweke, 2004; Howeler, 2000). It is therefore grown by poor farmers who live in these marginal areas. Cassava‟s resistance to drought was experienced in Ghana in 1982/83 when all crops, apart from cassava, failed and it was that time that cassava became firmly established in the country (Korang-Amoako et al., 1987). Cassava can be grown on sloping land because of its minimal requirement for land preparation (Putthacharoen et al., 1998). However, Howeler (1994) observed that this can result in severe erosion with high soil nutrient losses and recommended that there should be adequate cultural and soil conservation practices to minimize erosion on the slopes.

Cassava is highly perishable. It is subject to a rapid deterioration process if no preservation measures are adopted within 48 hours. The roots suffer from an abiotic stress-response referred to as Post-harvest Physiological Deterioration (PPD) by Beeching et al. (2000). PPD leaves the roots unpalatable and unmarketable. It does not present a serious problem to locations where cassava roots are harvested, consumed or processed immediately. With the entry of rural farmers into the cash economy and processing on a larger industrial scale, times and distance between field and consumer or processor have increased, and PPD has become a major constraint to long distance transportation to markets and processing centres (Westby, 2002; Balagopalan, 2002). PPD is observed as a blue-black discolouration of the vascular tissues that spread from the wound sites due to harvesting or handling. Secondary deterioration occurs at a latter stage when the roots are attacked by micro-organisms. The roots start to rot and fermentation occurs making the roots unusable. Thus processing into more stable traditional or industrial products avoids the PPD problem and has been highly recommended (Reilly et al., 2004; Beeching et al., 2000).

Cassava planting materials are very difficult to transport or store because of the bulkiness. There is the need therefore, to plant large sticks to ensure survival (Kenyon

et al., 2006; IFAD, 2004). It was observed that the bulkiness of the roots also puts more stress on farmers because they do not have appropriate transport means to haul the roots from the fields. They therefore depend on head porterage which is inefficient and inappropriate for this bulky and perishable commodity (Addy et al., 2004; Nweke, 2004). Thus improved processing and food preparation methods make it possible for cassava products to be transported at reduced costs over poor roads to distant urban markets. Siriprachai (1988) indicated that sun-dried chips make the fresh roots to lose about 60% of the weight and pelleting of the chips also results in a further 4% loss of weight.

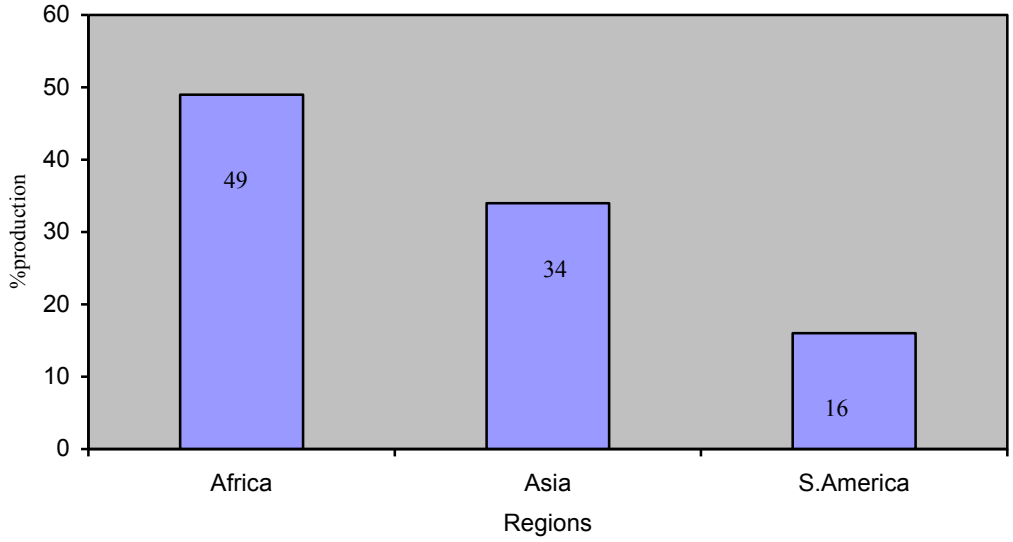
There is a high content of hydrogen cyanide found in some varieties and this is found to be toxic to humans and animals (Kordylas, 1991; Oyewole et al., 1996; Westby, 2002). High levels of hydrogen cyanide in cassava can lead to health problems such as acute intoxication, manifested as vomiting and dizziness and even death can occur under very rare conditions (Westby, 2002). Bokanga et al. (1994) also established that thiocyanate resulting from dietary cyanide exposure can aggravate iodine exposure deficiency expressed as goitre and cretinism. Cassava fermentation by lactic acid bacteria, e.g. in *gari* and *agbelima*, improves safety of the products against pathogens, reduces cyanide content and improves nutritional value (Adjekum, 2006). It is therefore necessary to process cassava into various forms in order to increase the shelf life of the products. Processing also reduces food losses and stabilises seasonal fluctuations in the supply of the crop.

Cassava requires very high labour inputs. A lot of manual operations are carried out from harvesting through processing. IITA (1996) established that one hectare of cassava containing 10 MT of roots needs approximately 721 person hours to harvest and process. Out of this, 212 person hours are needed for harvesting, 156 hours for handling and 353 hours for processing. Most of these activities are carried out by women (Nweke, 2004; Addy et al., 2004). Men get involved in these activities more as opportunities for commercialisation increase and the handling of machines such as the grater or the presser are required (Adebayo et al., 2004).

1.2 World Production of Cassava

Cassava is produced mainly in the tropical zone covering Asia, Latin America and the Caribbean and Africa. In 2007, the area planted to cassava was highest in Africa with 12 million ha (64.1% of the world total), followed by Asia with 3.8 million ha (21%) and South America with 2.5 million ha (14%). Africa accounted for 49% of the world production while Asia produced 34% and South America, 16% (Fig. 1.1). Nigeria is the leading producer of cassava in the world followed by Thailand and Brazil (FAOSTAT, 2007).

Figure 1.1 World Cassava Production



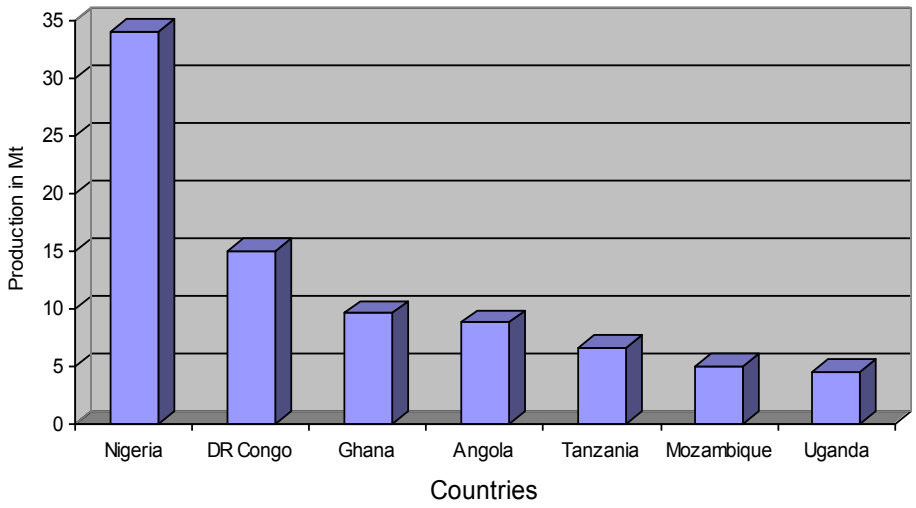
Source: FAOSTAT, 2007

Annual production of cassava in Africa is about 104 million MT with Nigeria being the leading producer (Fig. 1.2) followed by Democratic Republic of Congo, Ghana, Angola and Tanzania (FAOSTAT, 2007). In the early 1960s, Ghana was the seventh largest producer in Africa with an annual production of 1.2 million MT. By 2007 Ghana produced 9.7 million MT and advanced to the position of the third largest producer in Africa.

The area planted to cassava increased to almost four fold in Nigeria and Ghana from early 1960s to the early 2000. Nweke (2004:46) attributed this expansion to the use of

the mechanised grater, the planting of the new high-yielding Tropical Manioc Selection varieties and the use of a predator wasp to control the cassava mealybug.

Figure 1.2 Cassava Production in Africa (MT'000,000)



Source: FAOSTAT, 2007

1.3 The Cassava Small and Medium-Scale (SME) Enterprise Project in West Africa

The researcher was a collaborator in the Cassava SME Project which resulted in the writing of this thesis. This section deals with the background to the Project, its objectives and work packages that were implemented to achieve the objectives.

1.3.1 Background to the Project

The European Union funded project "Development of the small and medium scale enterprise sector producing cassava-based products to meet emerging urban demand in West Africa" {INCO-DEV (ICA4-CT2002-10006)} was carried out from 2003-2006 in Ghana and Nigeria. The project was coordinated by the Natural Resources Institute (NRI) of the University of Greenwich in the UK. The overall aim of this project was to develop selected cassava-based foods (fermented *fufu*, pounded *fufu*, *kokonte*, cassava grits and local starch) to meet the changing and growing urban

demand through the manufacture of products that are convenient, of high quality and are safe. The specific project objectives were:

i. To develop and promote best practice guidelines for the commercialisation of traditional food products using cassava products as a model.
ii. To develop and test specific technologies for the commercialisation of cassava based products.
iii. To understand and optimise the impacts of commercialisation, specifically that based on SMEs, on the livelihoods of traditional processors.
iv. To assess the potential of traditional processors to produce high quality products that meet urban demand.
v. Development of appropriate quality assurance systems for SMEs engaged in commercial processing of traditional foods products.
vi. To develop more cost-effective and environmentally sensitive processes that will make commercial manufactured cassava products more affordable
vii. To establish „„best practices"" for the establishment, support and promotion of SMEs producing traditional food products.

1.3.2 The Researcher's Participation

The researcher was a partner in Work Package 1 – **Social development and livelihood assessment.** This work package was tasked to gather baseline data to identify the existing contribution of cassava processing (into *fufu, kokonte* and cassava flour/grits) to household livelihood systems. The baseline data was conducted in the six selected districts in 2003. The researcher was also involved in assisting cassava processors to upgrade the *fufu* and *kokonte* value chains. After the selection of study locations and the collection of baseline data in 2003, the project suffered a set-back when in 2004 the EU had problems with financial administration and could not remit funds to project partners. Funds were later released in 2005 for work to continue and the project was extended for a one year period and finally ended in December 2006. An assessment of the contribution of cassava processing to the livelihood systems of processing households was carried out in six districts in the country from 2003 to 2004 (see chapters 6,7 and 8).

Working in collaboration with the Food Research Institute (FRI) and Feed and Flour Ghana Limited (FFGL), a technology transfer programme aimed at upgrading the *fufu* and *kokonte* value chains was conducted between January and April 2006. This involved training of processors on the use of the improved instant *fufu* powder and the *kokonte* mini chip technique, all developed by the FRI.

Two important issues came up after the upgrading exercise. First, the instant *fufu* appeared anecdotally to be being adopted, but because of delays in the project start, large-scale adoption was not apparent during the lifetime of the project. After the initial meetings with processors in 2004, tentative dates were agreed upon by the researchers and the processors for the training program to start. This was not done because of the delays in the release of funds stated above and the training was actually carried out in 2006. Secondly, the diesel engine cassava slicer was too costly, (as discussed in Chapter 7); therefore large-scale adoption did not take place. In both cases, but for the different reasons above, the researcher was therefore unable to carry out systematic studies of adoption, or of impacts on livelihoods, during the lifetime of the project. This was coupled with inadequate research funding for the thesis. The focus of the thesis therefore changed to the way in which features of livelihoods influence, positively or negatively, the prospects for value chain upgrading.

During the assessment of the livelihoods of farmers who supply cassava roots and grits to an intermediate High Quality Cassava Flour (HQCF) processor, an analysis of the decision to sell the cassava roots direct or process them before sale, was carried out. This was done to determine if it is more profitable to sell the cassava roots direct than to process into other products such as grits, *agbelima* and *gari*. This analysis was done after the project was completed and the focus of the thesis changed. It was carried out between 2007 and 2008 from personal funds.

1.4 Statement of the Problem

Cassava processing is a widespread livelihood strategy carried out by traditional cassava processors and small-scale commercial processing units. The traditional cassava processing methods produce shelf-stable, semi shelf-stable and non shelf-stable products such as grits, *agbelima*, *kokonte*, *gari* and pounded *fufu*. Processing of

cassava involves peeling, boiling, pounding, grating, dehydration, sifting, fermentation, milling and roasting. Some of these processes for example, grating and fermentation operations have been found to reduce the level of cyanide in cassava, improve safety of the products against pathogens, and improve nutritional value (Adjekum, 2006; Westby, 2002; Ofori et al., 1997).

The main problem area identified is: upgrading of value chains of selected cassava processed products (pounded *fufu, kokonte* and HQCF) within the context of livelihoods of the key actors.

Pounded *fufu* is a major diet for most Ghanaians especially in the Southern sector where the bulk of the *fufu* is prepared and consumed by households (Onumah, 2007) and Jumah et al. (2008) estimated that about 80% of the Ghanaian population eats it. *Fufu* is prepared by peeling cassava, washing, boiling and pounding in a mortar before serving with soup. Processing of *fufu* has been found to be time consuming as much time is spent on peeling, washing, boiling and pounding; and pounding is labour intensive as it is carried out manually (Adjekum, 2006; Collinson et al., 2001; Ofori et al., 1997). Furthermore, there is the perception that in areas where men are engaged in the pounding exercise and are not well dressed before pounding, their sweat somehow drips into the *fufu* making it unhygienic a situation that is distasteful to consumers.

Growing urban populations and changing food preferences, have led to the demand for convenient, safe and ready-to-eat foods (Onumah, 2007; Collinson et al., 2001). Jumah et al. (2008) observed that in urban areas where both spouses in a household are usually in paid employment, traditional *fufu* is seldom eaten because of the time consuming nature and drudgery involved. It is therefore eaten mainly at weekends.

Efforts to reduce the unhygienic practice and drudgery in *fufu* preparation were more focussed on *fufu*-pounding machines which were too large and too expensive for households and chop bar operators (Onumah, 2007). Later, the instant *fufu* powder which is safe, less time-consuming and more convenient to prepare was introduced into the market. Studies were carried out by authors on market testing of the product. Collinson et al. (2001) observed about 90% of the people interviewed indicated that

they were likely to purchase the product depending on price, hygienic nature and packaging. Jumah et al. (2008) found that although the instant *fufu* powder has been on the market for some time, patronage of the product is still very low, given that over 80% of Ghana‟s population eat *fufu.* According to Jumah et al. (2008), respondents took into consideration; sensory factors such as taste, odour, texture, colour, hand feel, smoothness, mouth feel elasticity and stickiness. They also consider price while making decisions to buy the instant *fufu* powder. The instant *fufu* powder is thus being used by few individuals, especially the urban middle-income group. Preliminary investigations for this research showed that none of the commercial *fufu* processors at the chop bars (local restaurants) is using the instant *fufu* powder to prepare *fufu*. Instead, they all prepare the traditional *fufu* for consumers.

Similarly, there is low uptake of the cassava mini-chip technique for processing cassava into *kokonte.* Traditional *kokonte* is prepared by peeling and washing cassava chips and then dried. The size of a chip of *kokonte* is usually large and takes as long as two weeks to dry. The drying of *kokonte* has been observed to be unhygienic as the chips are dried either on raised platforms or by road sides. Since the chips are large and do not dry quickly, they are usually left overnight at the drying places, uncovered. This method of *kokonte* processing has been found to be undesirable as fungal growth has been observed widely on the dried cassava chips (Wareing et al., 2001). The presence of these fungi results in the release of secondary metabolites such as aflatoxin and other mycotoxins into the cassava chips making them unsafe for human consumption. Packaging of *kokonte* is also another problematic issue. The product is stored in jute sacks which are exposed to insect infestation, especially the Larger Grain Borer. *Kokonte* therefore has a reputation for being a low-priced, low quality staple and usually patronised by lower income consumer groups (Wareing et al., 2001; Ofori et al., 1997). However, Westby et al. (2003), observed that *kokonte* is well-liked by a significant proportion of urban based, higher income consumers, who, however, do not eat it because of its unhygienic method of production and food safety.

A new product, the cassava mini-chip, which is more hygienically prepared, was developed as an improvement to the traditionally prepared *kokonte*. The technique uses a cassava slicer which slices the peeled cassava into thin flakes that dry within

two to three days as opposed to the two weeks drying period of the traditional *kokonte*. Alsthul (1999) observed that the shorter drying period of the mini-chip leads to a higher starch content than in traditional *kokonte*. Other advantages identified were that mini-chips are storable for a period of up to eight months without any deterioration in quality and workloads are also reduced for the women (main processors) because the mini-chips can be milled directly into cassava flour whereas traditional *kokonte* first needs to be pounded (Alsthul, 1999). A market assessment of the product by Collinson et al. (2001) showed that out of the 350 people interviewed, only 7% were aware of the hygienically prepared kokonte. From their findings, Collinson et al. speculated that about 50% of the respondents would be likely to try the product if they become aware of it. Similarly, Westby et al. (2003), also observed that majority of processing households were not aware of the product and even those who were aware of it, did not adopt it, citing pricing of the product as a reason for non- adoption.

All individuals face their own innovation-decision when the awareness is created in them about a technology. They may be persuaded to form a favourable attitude towards it, attempt to try it on a small scale, evaluate it and then they will be able to finally accept or reject the innovation (Rogers, 1995). Cassava farmers and processors also go through all these innovation-decision processes before accepting or rejecting innovations. Rogers (1995) indicated that there are five main characteristics that are taken into consideration by people adopting innovations. The technology should be perceived as better than the idea it supersedes; consistent with existing values, past experiences and needs of potential adopters; should not be difficult to understand; could be experimented with on a limited basis and results should be visible to others. However, Leeuwis and van den Ban (2004) preferred to look at these factors as characteristics of learning areas that help to understand why learning occurs easily or not. Also, in some areas of learning, the processes involved can be easily observed with the help of human senses. In the case of triability, it can facilitate or hinder learning because small trials allow people to make the best out of new practices and technologies before applying them on a bigger scale, thus reducing risks and large-scale failures. Leeuwis and van den Ban (2004) however believed that some devices or treatments are difficult to incorporate in a small-scale learning trial.

It is assumed that if pounded *fufu* and *kokonte* are widely consumed, then they will offer an opportunity for improving livelihoods of all actors if the value chains are upgraded. But if the new products are not expanding and uptake is still low, it raises an issue: some aspects of the decision making process as well as value chain linkages may be hampering the natural upgrading of the value chain. For a major diet like *fufu*, one would suspect that people would accept innovation in that sector. Despite the perception that sweat drips into the *fufu* (which is distasteful to consumers) from men engaged in the pounding of *fufu*, the long hours spent on its preparation and the drudgery involved, many people have not yet adopted the flour or the machine.

With adopter categories, Rogers (1995) identified the first people to adopt a technology as innovators followed by early adopters, early majority, late majority and the last being the laggards. Leeuwis and van den Ban (2004) indicated that such adoption rates and categories were calculated on the basis of individual responses even though they believe that virtually all innovations require changing patterns of co-ordination between interdependent actors. Leeuwis and van den Ban (2004) wondered whether the assumption of a normally distributed diffusion curve by Rogers (1995) is always correct since little attention has been paid to the changing patterns of co-ordination between the interdependent actors by conventional adoption and diffusion research.

Spielman (2005) indicated that innovation systems perspectives on agricultural research and technological change are becoming a popular approach to the study of how society generates, disseminates, and utilises knowledge and how such systems can be strengthened for greater social benefit. To identify what types of indicators to be used to measure innovation inputs, processes and outcomes, Spielman and Birner (2008) indicated that it is necessary to develop a conceptual framework that captures the essential elements of a national agricultural innovation system, the linkages between its components, and the institutions and policies that constitute the enabling environment for innovation. The framework, known as Agricultural Innovation System (AIS) framework, was developed by Arnold and Bell (2001) and adapted by Spielman and Birner (2008). It represents a move away from a more linear interpretation of innovation as a sequence of research, development, and dissemination, to an interpretation that recognises innovation as a complex triangle

that also includes agricultural extension and education, and placed the farmer in the middle of the triangle (Spielman and Birner, 2008). The AIS framework, according to Clark (2002), was introduced mainly as a critique of the linear model of agricultural research that was prominent in the National Agricultural Research Systems (NARS) framework.

An AIS framework, according to Spielman and Birner, (2008) is made up of:

- ***A knowledge and education domain***: this is composed of agricultural research and education systems
- ***A business enterprise domain***: this comprises the set of value chain actors and activities that both use outputs from the knowledge and education domain and innovate independently
- ***Bridging institutions that link these two domains***: these are extension services, political channels and stakeholder platforms that facilitate the transfer of knowledge and information between the domains.

The framework also includes reference to the frame conditions that foster or impede innovation, including public policies on innovation and agriculture; informal institutions that establish the rules, norms, and cultural attributes of a society; and the behaviours, practices, and attitudes that condition the ways in which individuals and organisations within each domain interact (Spielman and Birner, 2008). Embedded in the system are farmers (a) both as consumers and producers of knowledge and information (b) as producers and consumers of agricultural goods and services (c) as bridging institutions between various components (d) as value chain actors. Thus the study draws lessons from the linear model of agricultural research and the AIS framework to assess livelihood features of farmers and processors, who are actors in the cassava value chains, and also on how they adopt the technologies introduced to them as part of the upgrading process of the cassava value chains.

Spielman (2005) observed that the innovations systems framework demonstrates the importance of studying innovation as a process in which knowledge is accumulated and applied by heterogeneous agents through complex interactions that are being conditioned by social and economic institutions. An advantage of the framework is

that it can help policy makers, researchers, research managers, entrepreneurs, and others identify and analyse new ways of encouraging innovation. It is particularly promising for agricultural development because it can help identify where the most binding constraints to agricultural innovation are located and how better to target interventions to remove such constraints. Spielman (2005) however indicated that while the framework is playing such important roles, several methodological and analytical shortcomings are limiting its relevance to policy and policy making processes, and thus to social welfare improvement in developing countries. To date, the applications of the AIS framework have been primarily used to describe innovation processes that underlie the introduction of a given technology (Spielman and Birner, 2008). The potential offered by the AIS is still not fully utilised in the study of developing country agriculture because efforts to describe and access entire national agricultural innovation systems have been scarce in literature. According to Spielman and Birner, (2008) an exception is the study by Temel, Jansen and Karimov (2002) on Azerbaijan‟s agricultural innovation system.

One important issue in the upgrading of the selected value chains is the farmer‟s decision making process on their market outlets and which of the processed products give maximum profits. Day to day decisions on farms can and often have strategic results. According to Miller et al. (1998), the role of strategic thinking during planning and decision making is to keep management focused on what is really important when making decisions that will influence business success and long term survival. It was also observed that the adoption of management functions will contribute to increase farmers‟ profits (Phillips and Peterson, 1999; Miller et al., 1998).

Some of the key decisions made at household or farm level include choice of agricultural enterprises, allocation of land, labour, and inputs and also, marketing. French (1995), pointed out that people do not use a linear decision making process. Rather, farmers consider many factors simultaneously. French (1995), observed that farm decisions are usually influenced by on-farm and off-farm factors. On-farm factors include socio-economic conditions (such as land tenure, access to credit, social networks, physical conditions of the farm household) and biophysical conditions (such as climate, soils and vegetation). Off-farm factors include (a)

markets and market channels, (b) policies, rules and regulations (c) support services and (d) technical information. The Sustainable Livelihoods Approach (SLA) is one way of discussing these factors.

One of the off-farm factors, markets and market channels, form a major aspect of this thesis. It has been realised that farmers need outside information for making investment and marketing decisions. Farmers therefore seek information from middlemen, wholesalers, retailers, processors, manufacturers and other farmers. Farmers produce cassava and sell the roots directly in the market. The market is made up of middlemen, processors and consumers. Value Chain analysis is an important way of conceptualising these actors.

Some farmers sell the cassava roots, some process the cassava roots into other products before selling and some carry out both activities. Meanwhile these farmers do not usually keep farm records or carry out cost-benefit analysis. French (1995), observed that even though not all farmers do detailed cost-benefit analyses, they usually make a budget "in their heads". An issue that arises is that since they have not been carrying out any cost-benefit analysis, they do not know the actual product that gives them more profit. They are therefore unable to determine which of the enterprises are more profitable in order to concentrate on them. An analysis of the household decision making process is therefore necessary to explain why the farmers would like to sell their cassava roots or would like to process them for sale.

1.5 Objectives of the study

The main objective of the study derived from the above issues is: "To assess the influence of livelihood features on cassava value chains".

In order to achieve this objective, the following specific objectives have been set:

i. To identify the different actors in the cassava value chain.
ii. To undertake a livelihoods analysis of cassava producers and processors
iii. To identify the various technological options available and adopted by cassava producers and processors and whether they have been taken up.

iv. To examine factors that farmers consider in deciding whether to sell fresh cassava roots to consumers and intermediary processors or to process the cassava roots into other products.

1.6. Research Questions

To enable the researcher to achieve the main objective, four questions which led to setting of specific objectives, were posed. These are as follows:

Research Question One

In any value chain, there are different actors from inception of the product through production and distribution to the consumer. The main market chain actors were identified as producers, processors, distributors (middlemen and transport operators) and the final consumer (Kaplinsky, 2000; Hellin et al., 2005). These actors have different functions that allow for the physical transformation of inputs into outputs. As the product market grows and more product and money flows up and down the chain, demand is generated for services (Kula et al., 2006). There is therefore the need for service providers which could be financial, haulage or extension. The chain also operates in a business enabling environment which could be global, national or local. The enabling environment factors are generated by structures such as national and local authorities and research agencies; and institutions (policies, regulations and practices) that are beyond the direct control of economic actors in the market chain (Hellin et al., 2005). Thus the map is made up of these three inter-linked components. In a cassava value chain, there exists a relationship between the value chain operators at all the three levels, with each operator having his/her interests. Some may have power over others and some can influence the flow of goods in either direction. The question that arises therefore is:

Who are the actors in the cassava value chains? What are the relationships between them?

Research Question Two

The Sustainable Livelihoods Approach (SLA) centres on individual households and seeks to understand the various capabilities available to them. Households have assets which are defined as physical, human, social, natural and financial capital which they combine with their strategies to achieve their livelihood objectives. They operate in a context in which they live, including external trends, shocks and seasonality. However, there are institutions, policies and organisations that determine the people"s access to assets, opportunities and the returns they can achieve (Ashley and Carney, 1999; Scoones, 1998).

The Value Chain Approach identifies households and enterprises as part of a market system and the performance of this system determines whether individuals within it can benefit and grow from their business activities. Actors in the chain need resources for production, processing or distribution along the chain in order to improve on their livelihoods. A question that is arising is:

What are the features of their livelihoods that influence their participation in the value chains?

Research Question Three

Post harvest value addition to cassava is hindered by high cost of producing and assembling fresh roots (Onumah and Coulter, 2000). The cost of assembling the bulky roots is high because farms are small and widely scattered, farmers are not well organised into groups; and rural road infrastructure is poor. There are also seasonal variations in producer prices of cassava. According to Seini (2002), in the 1980s and 1990s producer prices varied on the average by over 30%, with annual price variation of over 40% in every 6 out of 15 years. The high price instability tends to bring about cyclical changes in cassava production, which in turn discourages investment in processing.

In Ghana, there is the technical and commercial potential for producing new and improved cassava products such as instant *fufu*, instant *agbelima*, bakery flour and industrial alcohol. High Quality Cassava Flour has been identified as the main raw material used in producing these products (Adjekum, 2006). It can therefore provide

processing households and intermediaries with alternate marketing options. Farmers and village level processors are attracted by competitive prices as well as relatively stable markets for the intermediate products such as cassava grits. For the intermediaries it represents new business opportunities while end-users are attracted by the prospects of significantly reducing their cost of production and/or enhancing their capacity to supply new food products.

In the cassava processing industry, some farmers

i. process their own cassava roots into grits and sell to intermediary processors who finally process into HQCF
ii. sell fresh cassava roots to village processing units who process into grits and sell to the intermediary processor
iii. either sell the cassava roots or process them into other products such as *agbelima*, *kokonte* and *gari*.

The use of an intermediary processor has become very important in the cassava processing industry because of value addition. Another group of intermediaries are the market women who buy the cassava roots or products like *agbelima* and *gari* to go and sell. They add value by providing services in buying and selling. The question that arises is:

What are the factors influencing farmers" decisions on whether to sell fresh cassava or become involved in processing?

Research Question Four

It has been observed that livelihood analysis identifies how people‟s assets affect strategies that they develop and their role is undoubtedly important in understanding access to markets. Few livelihood studies have addressed the functioning of markets but the approach does not provide well-developed tools to think about the vertical linkages between local, national and global markets (Kanji et al., 2005). The Value Chain Approach (VCA) has been a useful methodology for understanding how markets operate for a particular good (Kaplinsky, 2000). For example, in buyer-driven value chains, buyers can directly influence production activities, including the type of good produced, the timing and quantity of supply and the standards that suppliers have to observe (Gereffi, 1999).

Kula et al. (2006) noted that as competitive advantage evolves around the market place, there is constant market pressure for improved efficiency, innovation and redefinition of consumer demand by producers. These call for firm-level upgrading which requires access to information, technology and capital or finance. Thus for small producers to compete and upgrade in response to market opportunities, they must have access to knowledge and new skills which must be disseminated to them by service providers in the chain.

Livelihoods and Value Chain analyses are complementary and if the two of them are combined, there would be a more comprehensive understanding of both the structure of markets and the way in which markets of goods interact with livelihood strategies. Kanji et al. (2005) posited that the development of a common analytical framework using both methods could bring out social and political factors influencing the livelihoods, the workings of particular supply chains, choices made by firms and their effects on the livelihoods of low income producers and workers.

Therefore, the question is:
What does a combined use of Sustainable Livelihoods Approach and Value Chain Analysis tell us about the prospects for promotion of new technologies?

1.7 Thesis Structure

The thesis is composed of nine chapters. Chapter one is the introductory chapter and deals with characteristics of cassava and its production world wide. It also identified the research problem, objectives and the research questions. Chapter two is a review of cassava production and processing worldwide and in Ghana in particular. Chapter three reviews literature on the sustainable livelihoods approach and chapter four is on the concept of value chain analysis in the cassava sub-sector. Chapter five addresses the methodology used for the study. Chapters six, seven and eight are the findings of the thesis and chapter nine presents the final discussions on the findings, drew conclusions and suggested recommendations.

CHAPTER 2
CASSAVA PRODUCTION AND PROCESSING IN GHANA

2.0 Introduction

Cassava is important in the economy of Ghana with regards to its role as a food reserve and food security crop, its contribution to the Gross Domestic Product and also to the livelihoods of actors in the cassava value chain. Owing to the importance attached to cassava, governments over the years initiated moves to improve on its production. This chapter looks at the origin and spread of cassava, its production in Ghana, processing activities, marketing and utilization of the crop and its processed products. The chapter also reviews Government policy and support for the cassava sub-sector in terms of initiatives such as the National Root and Tuber Crops Improvement Project (NRTCIP), The National Roots and Tubers Improvement Programme (RTIP) which later became National Root and Tuber Improvement and Marketing Programme (RTIMP) and the Presidential Special Initiative on Cassava.

2.1 Origin and Spread of Cassava

There is archaeological evidence of two major centres of origin of cassava (*Manihot esculenta* Crantz); one in Mexico in Central America and the other in north-eastern Brazil (Grace, 1977). The first Portuguese settlers found native Indians in Brazil growing the cassava plant. It is believed that cassava was introduced to the western coast of Africa in about the sixteenth century by slave merchants (Jones, 1959). The Portuguese brought it later to their stations around the mouth of the Congo River, and then it spread to other areas. Purseglove (1968) reported that cassava was taken to Reunion off the East African Coast in 1736 and was recorded in Zanzibar in 1799. Cultivation increased after 1850 in the East African territories as a result of the efforts of Europeans and Arabs who were pushing into the interior and who recognised its value as a safeguard against frequent periods of famine. The crop is cultivated in almost forty African countries, stretching through a wide belt from Madagascar in the Southeast to Senegal and Cape Verde in the Northwest (Nweke, 2004).

In the Gold Coast (now Ghana), the Portuguese grew cassava around their trading ports, forts and castles and it was a principal food eaten by them and their slaves. By

the second half of the 18th century, cassava had become the most widely grown and used crop of the people of the coastal plains (Adams, 1957). The spread of cassava from the coast into the hinterland was very slow. It reached Ashanti, Brong Ahafo and Northern Ghana, mainly around Tamale, in 1930. Korang-Amoakoh et al. (1987) reported that cassava became firmly established in most areas in Ghana after the serious drought of 1982/83 when all other crops failed completely.

2.2 Cassava Production in Ghana

Cassava production has increased over the years due to the importance attached to the crop. According to MOFA (2007), the total cropped area rose from 726,000 ha in 2001 to 800,531 ha in 2007. Over the same period, production increased from 8,966,000MT to 10, 217, 929 MT (MOFA, 2007). In 2007, The Eastern and Brong Ahafo regions cropped 22.1% and 21.6% each of the total cropped area; Ashanti region cropped 14.6%; Central region, 14.4%; Volta region, 10.7% and Greater Accra region 1% (Table. 2.1). The cropped area in the Upper regions is very negligible.

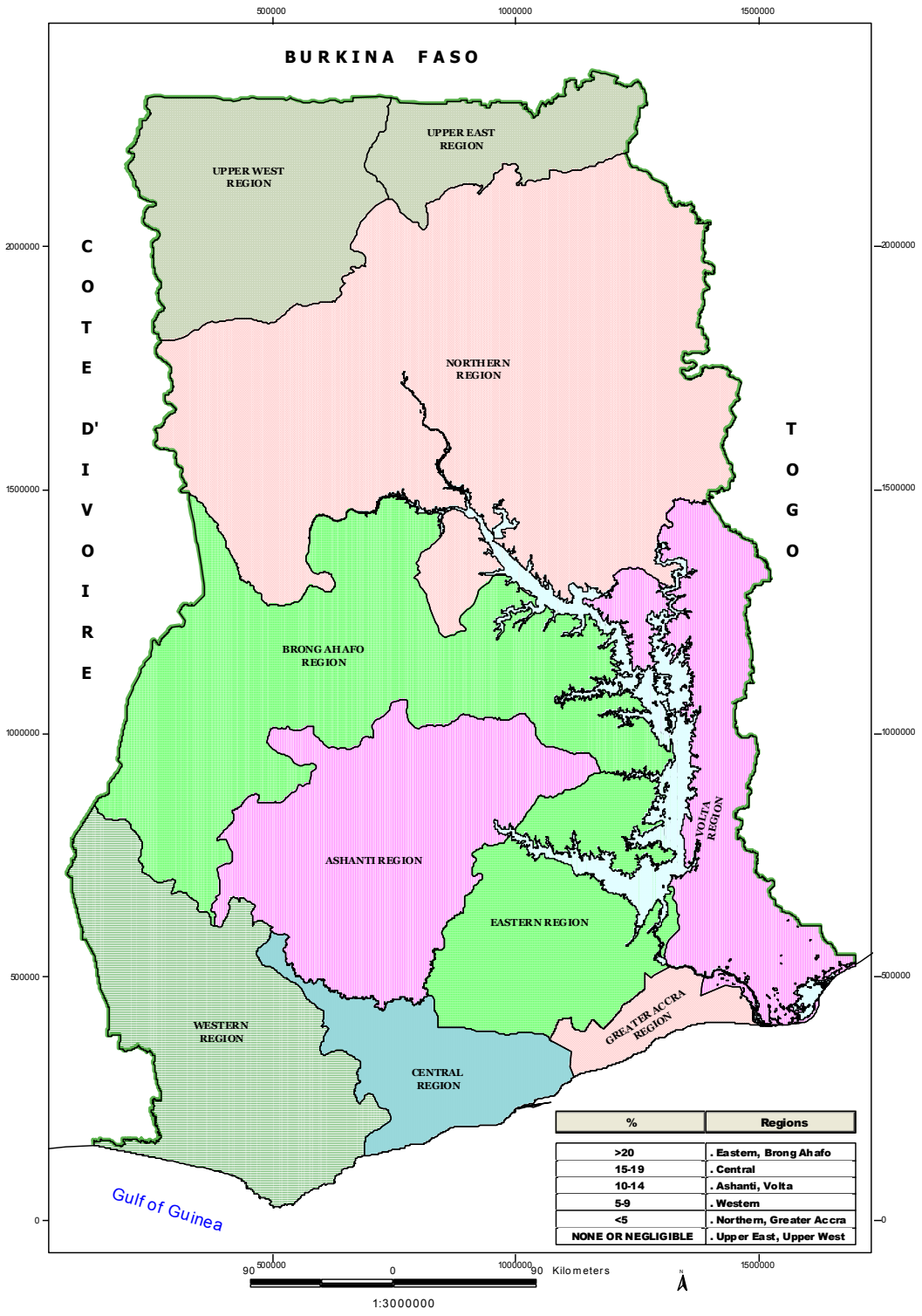
Production figures show that the Eastern Region is the leading producer (Table 2.1) in 2007, producing 25.6 % of the total production, followed by Brong Ahafo with 23.8%. Central region produced 18.2%; Ashanti, 11.3%; Volta regions, 10.2%; Northern region, 3.5% and Greater Accra produced 0.7%. The Upper East and West produced too little to be accounted for. These are also shown in Fig. 2.1. The average yield of cassava produced in 2007 was 12.76 MT/ha.

Table 2.1 Cassava Production in Ghana (2007)

Region	Cropped area (ha)	%	Production (MT)	%
Eastern	177,710	22.1	2,619,247	25.6
Brong Ahafo	173,217	21.6	2,426,982	23.8
Central	115,301	14.4	1,861,160	18.2
Ashanti	116,575	14.6	1,160,603	11.3
Volta	85,550	10.7	1,048,075	10.2
Western	71,226	8.9	690,396	6.7
Northern	54,940	6.9	354,890	3.5
Greater Accra	6,012	0.8	56,576	0.7
Upper West	-	-	-	-
Upper East	-	-	-	-
TOTAL	800,531	100	10,217,929	100

Source: MOFA (2007)

Figure 2.1 Map of Ghana Showing Cassava Producing Areas (2007)



Source: MOFA (2007)

2.3 Agronomy of Cassava

This section looks at the environmental conditions necessary for cassava growth, development of improved varieties in the country, how cassava is cultivated and the incidence of pests and diseases on the crop.

2.3.1 Environmental Requirements for Cassava Production

Cassava is basically a tropical crop which does best with a mean temperature of 25-29°C and a soil temperature of about 30°C. Temperatures below 10°C result in the cessation of growth and it is easily killed by frost. This temperature range is conducive for cassava in Ghana because annual average temperatures range from 26.1°C in places near the coast to 28.9°C in the extreme north. The crop requires an annual well distributed rainfall of 1000-1500mm. Rainfall distribution by agro-ecological zones in Ghana shows that mean annual rainfall ranges from 800mm in the coastal zone to 2,200mm in the rainforest (Meteorological Services Department, 2005) thus making the growth of cassava possible in all the agro-ecological zones. Cassava grows well in semi-arid conditions with rainfall as low as 500mm, but can survive the dry season of 3-4 months and does so by shedding most of its leaves and reducing its growth rate. According to Osiru et al. (1995), the following additional mechanisms ensure that drought does not seriously affect plant growth: (i) a photosensitive mechanism allows cassava leaves to maximise interception of sunlight at times when transpiration is low. For example, in the morning and late afternoon, leaves turn to the direction of the sun; (ii) a drooping mechanism causes leaves to droop when temperature is too high and (iii) increased partitioning of dry matter to the fibrous root system during periods of drought improves access to soil moisture.

Cassava grows on a wide range of soils but does best on light sandy-loam soils. Excessively fertile soils lead to the production of more shoots and less tuber material. The crop is however, adaptable to marginal soils and erratic rain-fed conditions as discussed in chapter 1. Well drained soils permit adequate root penetration and discourage tuber rots. The crop requires an optimum pH of 4.5-6.5. Cassava prefers short day conditions for tuber formation. Day lengths greater than 10-12 hours tend to delay tuber formation.

2.3.2 Development of Improved Varieties

Many local varieties existed and names were given them by farmers to demonstrate major attributes of the varieties (Table 2.2). For example, there was a variety called Bankye-Broni which literally means Whiteman cassava, referring to the aesthetic value of some morphological parts which may be the stem or petiole (Safo-Kantanka, 2004).

During the drought of 1982/83 in Ghana, cassava emerged as the crop that helped Ghana feed its population (Ofori et al., 1997). This led the Government to review its policy emphasis on grain production and to invest in measures to improve on cassava production. In 1988, the Government of Ghana took interest in the Tropical Manioc Selection (TMS) varieties released in Nigeria by importing the stem cuttings from the IITA and turning them over to Ghana researchers for field testing (Nweke, 2004). From 1988 to 1992, the TMS varieties were evaluated on farmers‟ fields under the IITA‟s technical assistance program.

Three varieties (*Afisiafi, Gblemoduade* and *Abasafitaa)* were finally released in 1993 by the Crops Research Institute (CRI) under the National Root and Tuber Crops Improvement Project (NRTCIP). In 1997, the then University of Science and Technology, now Kwame Nkrumah University of Science and Technology in collaboration with the IITA released a variety called *Tekbankye* (Adjekum and Ofori, 2000). In 2005, four new high-yielding and disease resistant varieties of cassava namely: *Agbelifia, Bankyehemaa, Esambankye and Doku Duade* were also released by CRI (Table 2.3) (Adjekum, 2006).

Table 2.2 Ethno-botanical Information on Local Cassava Varieties

Local name	Translation	Implications
Bankye-Broni	Cassava which is like a „whiteman"	It refers to aesthetic value of some morphological parts which may be the stem or petiole
Tu-gyabi-tuntun	Remove some tubers and leave some and the outer surface colour of the tubers/stem is black	High yielding, so harvesting by periodic removal of tubers is recommended. It also indicates that black is the colour of the outer root cortex or stem
Bokentema	Tuber yield of one plant fills a basket	Very high yielding with tubers filling a basket to the brim
Nfiemu-bankye	Two-years cassava	The cultivar takes two years to reach maturity, i.e. a late maturity type
Kowoka	Settle your debt	High yielding which translates to high income for settling debt
Bankye-Nkafoo	Cassava that is like yam (*Dioscorea dumentorum*)	The root flesh is yellowish or tastes like *D. dumentorum*
Bosome Nsia	Six months cassava	This is reference to earliness. Harvesting can be effected six months after planting
Mma-duasa	Thirty children	Yield inclined. Produces many roots
Kronfoo mmpe	The thief does not like it	Does not attract pilfering. This may be attributed to its high cyanide content, poor cooking quality or low yield potential
Bankye-borodee	Cassava plantain	The tuber flesh colour is claimed to be similar to that of plantain, i.e. yellowish
Hani-Bankye	Hunter"s cassava	Refers to the sweetness of the tuber such that it can be consumed raw by the hunter who has no time to cook
Bankye-soja	Cassava resembling a soldier	The plant is erect and probably non branching
Ampe nkyene	Does not like salt	Refers to the sweet taste of the roots and therefore do not require the addition of salt during cooking
Yemma wo	We won"t give you	Because the tubers possess excellent cooking qualities, its planting materials are guarded jealously
Bogyimi	Yields like a fool	The yield is overwhelming
Bankye-Ababawa	Cassava which is like a young lady	Plant/tuber very beautiful
Edabowo	Still wearing the old scarf?	Farmers will keep cultivars with stable cooking qualities
Bankye-Hemaa	Cassava whose beauty equals Queen	It is as beautiful as a Queen. It has an aesthetic value

Source: Safo-Kantanka, (2004)

Table 2.3 Cassava Varieties Released in Ghana Since 1993

Variety	Average yield Tons/ha	Suitable ecological zones	Uses
Afisiafi	27-30	All zones	Kokonte, agbelima, gari
Gblemoduade	33-38	All zones	Starch, flour
Abasafitaa	26-31	All zones	Ampesi, fufu, gari, agbelima, kokonte, starch, flour
Tekbankye	26-31	Forest-Transition	Ampesi, fufu, gari, agbelima, kokonte, starch, flour
Eskamaye	15.822.7	Guinea Savannah	Tuo zaafi, gari, kokonte, starch, flour
Filindiakong	15.5-18.3	Guinea Savannah	Tuo zaafi, gari, kokonte, starch, flour
Nyerikobga	16.7-28.7	Guinea Savannah	Tuo zaafi, gari, kokonte, starch, flour
Bankye botan	---	Coastal Savannah	Gari, kokonte, agbelima starch, flour
Capevars bankye	---	Coastal Savannah	Fufu, ampesi, agbelima, gari, starch, flour
IFAD	30.0-35.0	Forest-savannah transition	Kokonte, fufu, ampesi, starch, flour
Nkabom	28.0-32.0	Forest-savannah transition	Kokonte, fufu, ampesi, agbelima, gari, starch, flour
Agbelifia	29.2	Forest-savannah transition, forest, coastal savannah	Starch, gari
Bankyehemaa	27.1	Forest-savannah transition, forest, coastal savannah	Flour
Esam Bankye	32.8	Forest-savannah transition, forest, coastal savannah	Flour
Doku Duade	28.2	Forest-savannah transition, forest, coastal savannah	Starch

Source: Adjekum (2006), RTIP. (2002)

2.3.3 Cassava Cultivation

Cassava cultivation involves all the cultural practices like land preparation, propagation and growth of the plant, weed control and cropping systems.

a. Land Preparation

Land preparation begins in January in the forest, coastal and transitional zones and continues until April and May (Annor-Frimpong, 1991). This involves clearing of new lands or fallow lands. In the savannah zones, mechanised ploughing is carried out in many places depending on the availability of the tractor. In the forest zones, manual land preparation is done as the tractor cannot be used. Some people use the hoe to make mounds and some plant directly in the soil.

b. Propagation and Growth

Cassava is propagated from stem cuttings, which sprout or produce roots within a week. Propagation by seed is not common but is done in cassava breeding. Plants established from seed are smaller, weaker, and slower in growth than plants from stem cuttings (Osiru et al., 1995). Two other methods of propagation of cassava found to be to be useful in case of rapid multiplication are the use of tender shoot tips and the use of tissue culture (Onwueme and Sinha, 1991).

Out of the four methods of cassava propagation, stem cuttings result in the greatest commercial yields, seeds result in great variability for selection during breeding, shoot tips offer rapid multiplication which even the farmer can practice because it is not sophisticated, and tissue culture gives the most rapid multiplication with the possibility of producing disease-free plants (Onwueme and Sinha, 1991).

Cassava is planted either as a sole crop or intercropped. The recommended planting distance for cassava (Hillocks, 2002) is as follows:

- 90 cm x 90 cm for pure stands
- 120 cm x 80 cm when intercropped with maize

The plant starts flowering at about 6 weeks after planting. Leaf area reaches a maximum in four to five months. The height of a cassava plant ranges from 1-2 m

although some cultivars may reach 4 m. The crop is matured for harvest in 6-12 months depending on the cultivar.

c. Weeds and Weed Control

Weeds compete with cassava for nutrients, light and water, thereby reducing crop growth and yield. Weed control is very necessary during the first three months after planting because the competition is higher at this stage as the young crop plants need adequate amounts of light, nutrients and water for establishment. This is because delayed weeding after planting leads to greater yield loss.

The first weeding is done at about four weeks after planting. The second weeding is done at about 2 months after planting and a third may be done three months after planting. After that, canopy closure occurs and no further weeding is necessary. Weeds can be controlled using preventive, cultural and chemical methods (RTIP, 2000). In preventive weed control, farmers avoid fields with serious problems of „difficult to control" weeds, e.g. spear grass and nut grass. Weeds can also be controlled before they flower and fruit to prevent the dispersal of weed seeds.

In chemical weed control, herbicides are used. These may be pre-planting, pre-emergence or post emergence herbicides. Examples of herbicides on the market are Alachlor, Atrazine, Fluometuron and Glyphosate (Roundup). They also function according to the type of weeds.

d. Cassava Cropping Systems

In Ghana, farmers have evolved cropping systems in the form of rotations and crop mixtures suitable for the various agro-ecological zones in which they operate. Two types of cropping systems seem to dominate in Ghana. These are mono-cropping and intercropping. In mono cropping, cassava is the sole crop grown. In intercropping, cassava is mixed with other crops. For example, in the forest zone, it is either (i) cocoa, cassava, maize and yam or (ii) oil palm, cassava, plantain, maize (Sakyi-Dawson, 2000).

On a farm, not all cassava is harvested at the same time. It is therefore difficult to time the planting of the crop which will follow cassava in rotation. It is only when cassava comes before a fallow that this difficulty is avoided. For these reasons, cassava in shifting cultivation is usually the last crop to occupy the land before it is reverted to bush fallow. Other crops such as yam and maize that require high fertility levels are planted immediately after bush clearing to take full advantage of the high fertility status of the soil.

2.3.4 Pests and Diseases

The most important pests affecting production are the cassava mealybug, cassava green mite and the variegated grasshopper. The major diseases identified are the Cassava Mosaic Virus Disease, and the Cassava Bacterial Blight, Cassava Root Rot and Cassava Anthracnose (Ofori et al., 1997).

Pests and diseases of cassava cause low yields of roots thereby reducing the incomes of farmers. Sometimes they can lead to total crop failure and all these situations can affect food security and therefore hunger and starvation. Not only human beings are affected, but sheep, goats and swine are all affected because they also feed on cassava leaves, peels and roots.

2.3.5 Harvesting

Timing of harvesting is an important factor that affects the yield of cassava. Harvesting too early may result in very low percentage and quality of starch (Kim et al., 2000). This however depends on varietal considerations. In Ghana, for example, the local variety known as *„Bosumnsia"* is ready for harvest at six months. Another local variety *„Fetorwo migbadzi"* (literally – debtors should exercise patience) is also early, yielding at around six months. On average the main improved varieties being grown in Ghana are ready for harvesting in 9-12 months (RTIP, 2000). Onwueme and Sinha (1991) indicated that harvesting too late produces tubers that are fibrous or woody and increases the risk of tuber loss due to rotting and pests.

2.3.6 Storage

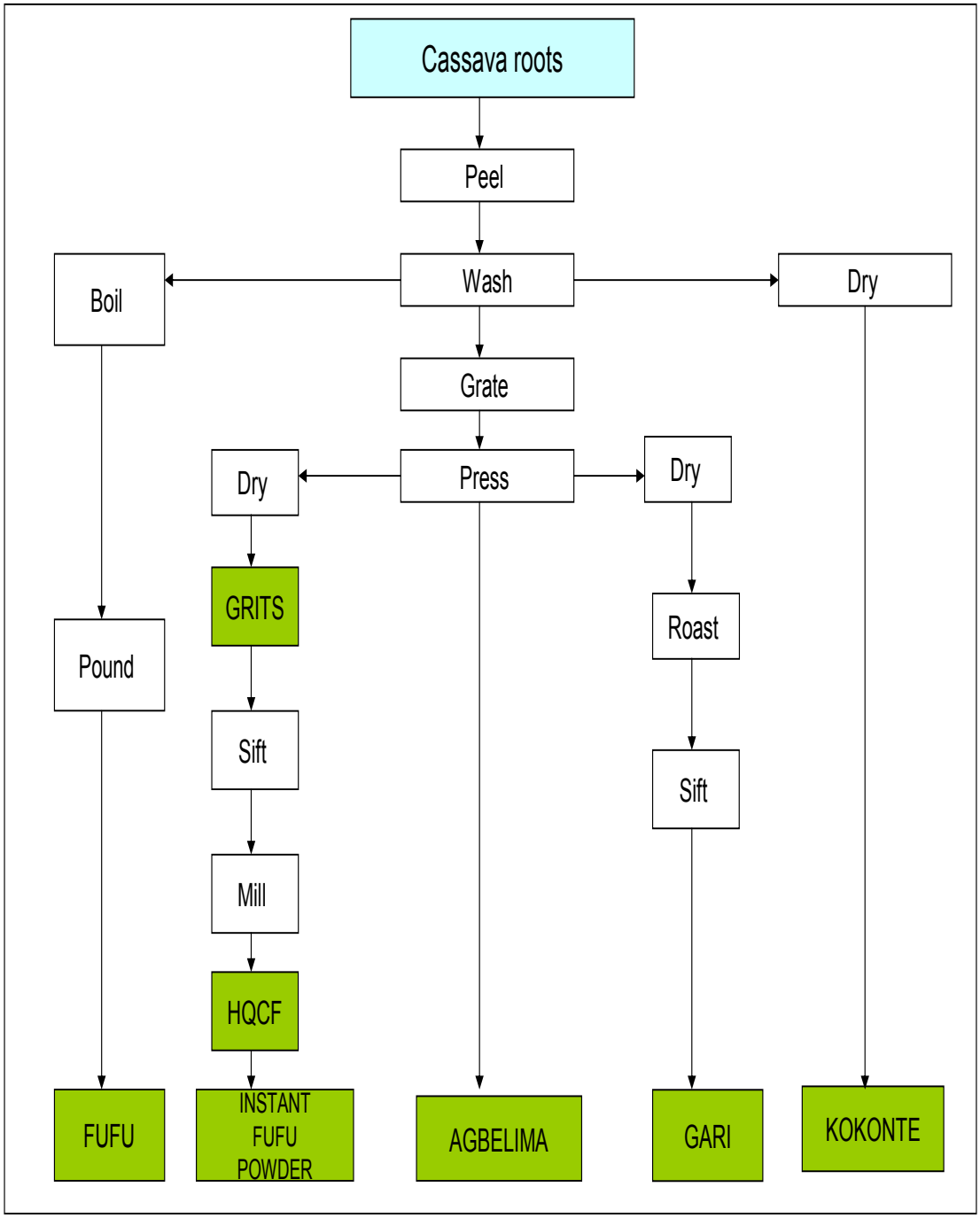
Most cassava farmers prefer to store the roots in the soil by delaying harvesting. This could lead to losses of starch if the storage period is too long (Knoth, 1993). On a

small scale, harvested cassava can be buried in the soil in which case, care is taken not to injure any part of the root as deterioration can set in. There are several traditional structures for cassava storage but cassava is mostly not stored after harvest as it is either consumed or processed into other products. Two improved storage structures were developed by the NRI in collaboration with the International Centre for Tropical Agriculture (CIAT) but adoption was limited due to high labour costs, high cost of crates and skills in management (Rickard and Coursey, 1981). The first one involved the clamp silo in which roots were piled up in a layer of straw and soil with openings for ventilation. This was for a period of four weeks. In the second method, cassava was stored in wooden crates containing damp saw dust for a period of 4-8 weeks. The cassava stored well without weight loss or microbial deterioration. Most people in urban areas that have refrigerators in their homes store very small quantities (peeled) for use, for a few days.

2.4 Processing

The traditional methods for processing cassava involve combinations of different tasks/activities. Processing includes peeling, grating, dehydration, and dewatering, sifting, fermentation, milling and roasting (Ofori et al., 1997). Methods of processing these products are found in Figure 2.2 on page 31. The major processed products in Ghana are: cassava flour, tapioca, *gari, kokonte, fufu, cassava flour, tapioca, agbelikaklo, akyeke, agbelima and yakayake*. Most of the processed products are listed in Table 2.4 on page 32. Cassava processing is carried out mainly by village micro- and small-scale processing units, most of which are family enterprises. Due to lack of capital, processors use mainly basic and locally fabricated equipment. Operations are sometimes uneconomical because the product is not properly costed as there is much reliance on family labour which is not perceived as cost (Ofori et al., 1997). There are medium-scale enterprises also engaged in cassava processing. Some of these include Elsa Foods Limited, Sunny and Sunny, Amasa Agro Processing Company (Amasa) and Neat Foods Limited. Amasa produces mainly HQCF which is sold to the food processing enterprises who process it into improved traditional products such as instant *fufu*, *banku-mix* and improved *kokonte* which are becoming more popular with the urban dwellers who, because of time constraints, prefer these food items which are easier to prepare and are time saving.

Figure 2.2 Stages in the Processing of Cassava into Fermented and Industrial Products



Source: Field Survey, 2004-2008

Table 2.4 Cassava Processed Products

Product	Description	Shelf life
Pounded Fufu	Pounded boiled cassava paste which is commonly served with soup as food. Processing usually is at household level and in the traditional restaurants (*chop bars).*	Very short (one day)
Gari	A light, crisp, free-flowing granular powder which is creamy white in colour. It is prepared from partially dried cassava meal roasted in a hot shallow earthenware bowl placed over open fire.	Long (up to two years)
Kokonte	Sun dried cassava chips usually milled into powder and cooked for food.	Medium (up to one year)
High Quality Cassava Flour	Peeled cassava is grated, de-watered, dried and milled into flour and bagged. Common worldwide.	Long (up to two years)
Pellets	They are obtained from dried and broken roots by hardening into cylindrical shape. Produced worldwide.	Long (up to one year)
Agbelikaklo	Fermented cassava milled into flour, moulded into balls and boiled in oil and served as food.	Very short (3 days)
Atseke	Fermented cassava milled into flour and mixed with oil and served as food. Found in Western Ghana.	Very short (one day)
Yakayake	Fermented cassava milled into flour and steamed before served as food. Found among the Ewes of Southern Ghana	Very short (3 days)
Agbelima	Cassava peeled, grated and pressed to dewater. The product (sometimes mixed with maize) is cooked into a paste called akple.	Short (2 months)
Tapioca	Cassava starch processed into granules and served as food. Found worldwide.	Long (up to one year)
Starch	Fresh roots are washed, peeled and grated into coarse meal, strained through a cloth bag which is squeezed by hand to extract starch milk. This settles at the bottom, is removed and dried in the sun. When it is dry, it is pressed into balls or dried completely and pounded into powder. Now there are mechanical means of producing the starch in commercial quantities. Widespread in all regions.	Long (up to a year)

Sources: Kordylas (1991); UNIFEM (1989).

2.5 Marketing and Utilisation

Cassava is locally consumed in the form of boiled roots or other processed products mentioned above. According to Onumah et al. (2008), there is a substantial un-harvested surplus of cassava roots, representing 30% of total annual output of the fresh roots. The total amount of cassava produced in 2006 was 9,638,000 MT and 6,747,000 MT were available for human consumption. The estimated national consumption was 3,391,000 MT leaving a surplus of 3,356,000 MT (MOFA, 2006). About 50% of the cassava produced is consumed by farm households, leaving the remaining 50% to enter the value chain.

There is a potentially huge market for processed, convenient food products, including improved forms of traditional products such as *agbelima, fufu, gari* and *kokonte*. The size of the market for cassava based food products was estimated at about US$800 million (Jumah et al., 2006). Out of this, *fufu* accounts for 46% of the market, *gari*, 28%, *agbelima*, 17.5% and *kokonte*, 8%. Jumah et al. (2006) estimated that demand for the traditional cassava based products may grow at about 4.9% per annum.

Apart from the domestic market, end markets exist for the improved traditional products in Europe and America. According to Onumah et al. (2008), most of the enterprises for the improved traditional products emerged in the 1990s and 2000s principally to exploit the „Diasporan" market for migrant Ghanaians. According to Onumah et al. (2008) about 80% of these products are still exported to these markets and about 20% goes into the domestic market.

There are also industrial markets for HQCF in the country. It is used as a substitute for wheat in the bakery and confectionery industry and as an adhesive for plywood (Dziedzoave et al., 2000; Addy et al., 2004; Adjekum, 2006). There is a potential demand for HQCF in the country and Onumah et al. (2008) estimated absorption of 2,000 MT of HQCF by the plywood industry and utilisation of 11,400 MT of HQCF for producing improved traditional cassava food products.

2.6 Policy and Support for Cassava

Following the importance attached to cassava in the country, there have been initiatives to improve on its production so that it can continue to play roles in food security, improving livelihoods and contributing to the economy. According to Ofori et al. (1997), some of the initiatives were:

i. Two National Root and Tuber Crops workshops were held in 1992.
ii. The 9th Symposium of the International Society for Tropical Root Crops was hosted on behalf of the Government of Ghana by MOFA in 1991.
iii. The Government declared 1994 as Cassava Year. That year and subsequent years were devoted to the promotion of cassava and its products.
iv. A National Cassava Working Group was convened in 1995 to act as an advisory body for formulation of policy guidelines for the development of the cassava industry.
v. A National Cassava Task Force was convened in 1996 to study all aspects of cassava production, processing and export potential and make recommendations for immediate implementation. The Task Force submitted recommendations to MOFA ranging from policy issues through production, research, extension, processing to marketing in October 1996.

There were two projects funded by the International Fund for Agricultural Development (IFAD). These were the National Root and Tuber Crops Improvement Project (NRTCIP) which was launched in 1988-1995, and the National Root and Tuber Improvement Programme (RTIP) 1999-2005, which focussed mainly on production. The RTIP was later developed into the National Root and Tuber Improvement and Marketing Programme (RTIMP) to create a balance between crop production and downstream activities such as processing and marketing to make sure that farmers take full advantage of higher yields. There was also the Presidential Special Initiative (PSI) on Cassava.

2.6.1 The National Root and Tuber Crops Improvement Project (NRTCIP)

This project started in 1988 and ended in 1995. It was a component of the Ghana Smallholder Rehabilitation and Development Programme funded by IFAD. The aims of the NRTCP, according to Kissiedu and Okoli (1988) were to:

i. Support root crop adaptive trials and root crop based farming systems research;
ii. Introduction of pest and disease tolerant varieties of cassava from IITA from 1989 to 1995, and evaluate for adaptability and acceptability;
iii. Start a programme of biological control of cassava mealybug and cassava green mite;
iv. Conduct a survey of root crop processing technologies at the village level; and
v. Support manpower development for root and tuber crops research and biological control of pests.

Under NRTCIP, three high-yielding, pest and disease resistant varieties were released in 1993 for farmers. These were *Afisiafi, Gblemoduade and Abasafitaa* (Adjekum and Ofori, 2000). The project also concentrated more on the biological control programme for the mealybug and green spider mite, collection and testing of local germplasm alongside improved IITA varieties.

Lessons learnt

Under the NRTCIP, there were crop improvement and biological control programmes which are long term and should be accorded permanent ongoing status to enable problems to be anticipated and tackled on a continuing basis. However, the NRTCIP was of short duration and inadequately funded. For such cassava projects, efforts should be made to secure more funding to make them sustainable.

2.6.2 The Root and Tuber Improvement Programme (RTIP)

Following the acceptance of the RTIP Project Appraisal Report (IFAD, 1997) the Root and Tuber Improvement Programme (RTIP) commenced in January 1999 and was scheduled to close by December 2004 but extended until September 2005. The RTIP Project Appraisal Report (IFAD, 1997) cited four compelling reasons to develop this commodity sector:

i. Root and tuber crops, because they can be grown all year round and grow well on poor soils, can mitigate the vulnerability of resource-poor communities to seasonal food scarcity;
ii. As root and tuber crops are grown largely by the poorest segment of the rural population, improvements in root and tuber crop productivity will positively affect the incomes of those producers;
iii. The development of the root and tuber sector is important to further diversify the agricultural sector; and,
iv. Investments in the root and tuber sector would provide new opportunities to smallholders to increase incomes, thus favouring more equitable income distribution in the rural economy.

a. Goals and Objectives

The main objective of the project, according to the Project Appraisal Report (IFAD, 1997), was to enhance food security and improve the incomes of resource-poor farmers by facilitating access to new but proven locally adapted technologies for root and tuber crops namely: cassava, cocoyam, yam and sweet potatoes. The programme targeted all the ten regions of Ghana with a target of 720,000 resource poor farmers.

To be able to achieve the overall goal, there were five specific objectives:

i. Develop a sustainable system for the multiplication and distribution of improved planting materials for root and tuber crops in order to increase their availability to smallholders;
ii. Develop an integrated pest management system including biological control, to reduce the incidence of diseases and pests and increase the productivity of smallholder root and tuber crop systems;
iii. Strengthen adaptive research for the root and tuber crops in order to increase the flow of new technologies available to farmers, including women;
iv. Collect, evaluate and conserve root and tuber germplasm in order to help conserve the rich plant biodiversity of Ghana;
v. Empower resource-poor farmers, farmer groups and rural communities including women, to ensure unimpeded access to improved root and tuber technology and strengthen sector institutions to ensure effective programme management and sustainability.

b. Programme Achievements

Out of the 720,000 resource-poor farmers targeted in the programme, the mid-term evaluation report showed that almost 120,000 were reached with improved planting materials of cassava and sweet potatoes (IFAD, 2004). The trickle down effect of farmer-farmer extension was not considered even though the evaluation report observed that 80% of the secondary and tertiary multipliers actually distributed planting materials to neighbours, relatives and friends.

A system for the rapid multiplication and distribution of cassava planting materials in 50 selected districts was established. Four varieties of cassava namely *Afisiafi, Abasafitaa, Gblemoduade* and *Tekbankye* were used for the rapid multiplication and distribution. Two improved varieties of sweet potato namely *Faara* and *Sauti* were also distributed to a total of 14,495 resource poor farmers as compared to the target of 15,100 farmers.

More than 60 research projects submitted by Ghanaian scientists were undertaken by the project. One major output of this component was the release of five new cassava varieties in 2002 by the Crops Research Institute with RTIP assistance. These varieties were *Eskamaye, Nyerikobga* and *Filindiakong* (which are specific and more suitable to the drier areas of Northern Ghana), „IFAD" and *Nkabom*. One variety of sweet potatoes, *Teksantom* was released in 2003. There were plans to release more varieties of cassava, sweet potato, yam and cocoyam.

Under the integrated pest management objective, the predatory mite, *Typhlodromalus manihoti* was used to control the Cassava Green Mite, *Mononychellus tanajoa,* successfully in seven regions in the country. There was about 41% reduction of the pest in Brong Ahafo Region and 80% reduction in the Central Region. Grasshoppers were controlled using the Green Muscle *(Metarhizium anisobela)*. There were 17 farmer field schools established in 15 districts and these served as vehicles for Integrated Pest Management (IPM) basic root crop techniques.

c. Impacts on Livelihoods of Beneficiaries

The evaluation team observed that RTIP had a very positive impact with regards to increased knowledge and skills at farmer level and among Agricultural Extension

Agents (AEAs). These were achieved through numerous training sessions for Regional and District Agricultural Officers, and production and processing groups. Much knowledge and skills were acquired in production practices, pest management and to a much lesser degree, on preservation, processing and utilisation of roots and tubers.

Increased incomes were observed among a total of 55% of the beneficiaries due to participation in the project and 44% out of them stated that this additional income helped them to buy some household assets and pay their children‟s school fees.

There were observed impacts on social capital in project areas. A total of 9,280 groups made up of production, processing and marketing groups were formed and/or strengthened. However, the evaluation team found that the institutional capacity and performance level of most groups were rather low. There was an observed stronger cohesion among the small number of processing/marketing groups than among the large number of production groups.

Even though men and women were given equal opportunities to access RTIP support, the project did not monitor changes with regard to women‟s socio-economic position. By mid 2003, women represented 39% of membership in production, processing and marketing groups created by RTIP. However, there were no clear interventions such as gender sensitization campaigns. According to the evaluation team, RTIP could not be considered to have had any impact on gender equity or women‟s conditions.

On food security, the project was designed to improve calorie intake of children by 15% during the lean season but no attempt was made to actively address this issue. Changes in children‟s eating habits, frequency of eating, or other aspects of childcare have not been monitored.

The evaluation team reported that adoption of improved varieties of cassava and sweet potatoes resulted in yield increases of 30% which could go up to 40-80%, where farmers applied recommended agronomic practices. As a result of the increased output, the team considered that about 70-80% of the farmers reached would have substantially improved food security. However, only some 3,000 farmers were likely to have improved food security as a result of increased incomes.

2.6.3 The Root and Tuber Improvement and Marketing Programme (RTIMP)

This programme is a follow up to RTIP as it became clear that a better balance between crop production and the development of downstream activities like processing and marketing were needed in order to assure that farmers would reap the full advantages of higher yields. RTIMP is being sponsored by IFAD and the Government of Ghana for a period of eight years (2007-2014).

The goal of RTIMP is to enhance income and food security to improve livelihoods of the rural poor and to build a market-based system to ensure profitability at all levels of the value chain. The purposes of the programme are:

i. Enhanced market relations within the root and tuber commodity chain to ensure a "pull" factor for increased production; and to facilitate a better balancing of supply and demand;
ii. Sustainable enhancement of farm level productivity of root and tuber crops (cassava, cocoyam, yam, sweet potato and Frafra potato);
iii. Improved root and tuber processing and marketing;
iv. Increased access of the economically active poor to working capital and investment capital by promoting new target-group specific lending instruments.
v. Organizational development including the creation of an Apex Body for the root and tuber commodity chain;
vi. Information dissemination, education and communication campaigns.

The programme has four components as follows:

i. Support to increased commodity chain linkages;
ii. Support to root and tuber production;
iii. Upgrading of small-scale root and tuber processing, business and marketing skills;
iv. Programme coordination, monitoring and evaluation.

The programme, which became effective in November 2006, is expected to be implemented across 60 districts.

Lessons learnt

RTIP/RTIMP is focusing on increasing incomes and food security for the farmers. Components and activities have not been clearly designed to achieve this. It is therefore necessary that this action is taken.

Even though evaluation found that there was increase in farmers‟ incomes, it found no clear evidence that the incomes of poor farmers had increased as a result of increased output levels achieved when using new varieties distributed by RTIP. Designers of future investments that are intended to reduce poverty, should carefully reconsider the programme‟s assumptions about how crop sector development can benefit poor rural households.

Agricultural research and farmer field schools, or other extension activities, should be demand-led, not programmed at project appraisal. Farmer priorities must be periodically determined in a systematic way. Such priorities must then be given greatest weight alongside technical and agricultural policy considerations.

2.6.4 The Presidential Special Initiative on Cassava (PSI)

In August 2001, the President of the Republic of Ghana launched the PSI on job creation and poverty reduction through agribusiness i.e. the Integrated Action Programme for Cassava Starch Production and Export. The programme is designed to develop the cassava starch industry in Ghana as a major vehicle for job creation and poverty reduction in rural communities. The project is expected to create a ready market for some 25,000 farmers in 10 selected districts with comparative advantage in cassava production, creating employment for some 70,000 people in other areas.

The main objectives of the PSI were to:

i. Transform the cassava industry into a major growth pole by the year-end 2006
ii. Establish 10 cassava/starch-processing companies by the year-end 2006
iii. Generate annual export revenue of US$40m
iv. Bring 100,000 peasant farmers into mainstream economic activity
v. Achieve 50% women participation in the project.

a. The Ayensu Starch Company (ASCo)

As part of the objectives to establish 10 cassava processing companies, the first company, ASCo, was established at Bawjiase in the Central Region. There were plans to establish two new cassava processing plants in addition to ASCo. These are the Sika Starch Company in the Ashanti Region and the Densu Starch Company Limited in the Eastern Region. ASCo is jointly owned by the farmers and two banks: The Agricultural Development Bank and the National Investment Bank with a total investment of US$7.0m. The equipment was supplied by the International Starch Institute of Denmark and installed at a cost of approximately US$4 million.

ASCo operates in nine districts which are spread over three regions. These are

i. Central Region (Awutu-Efutu-Senya, Gomoa, Asikuma-Odoben-Brakwa, Ajumako-Enyan-Esiam)
ii. Eastern Region (West Akyem, Akuapem South, Suhum-Kraboa-Coaltar)
iii. Greater Accra Region (Ga)

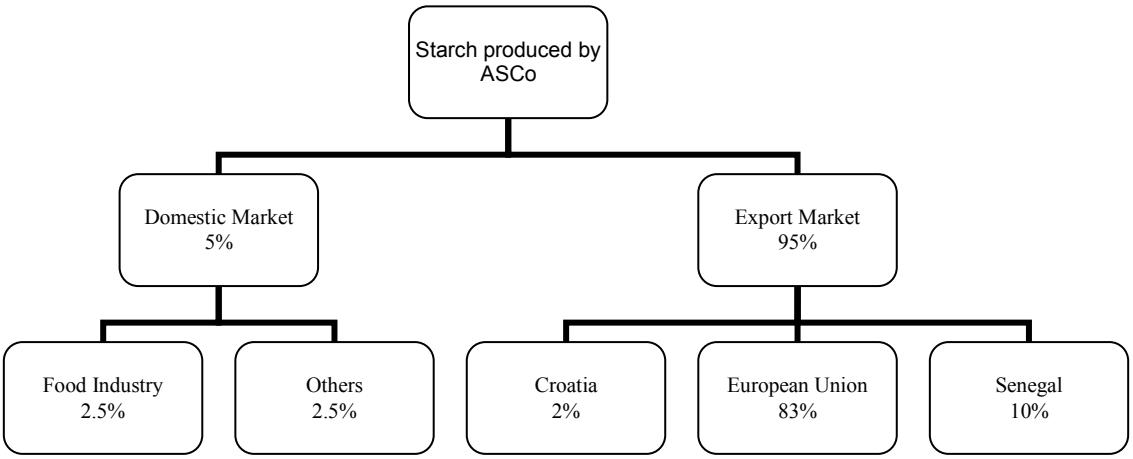
The Company organised about 10,000 farmers (50% women) into an Association called the Ayensu Cassava Farmers Association who have three representatives on the Board of ASCo.

The factory which was projected to operate at 70 % of its installed capacity was operating at 30% capacity in 2005 and this reduced to 20% in early 2006, due to the unavailability of raw materials, falling international starch prices, high perishability and a rising demand for *gari*. The Company, shut down in April 2006.

b. Markets

The starch produced by ASCo was used both domestically and externally. In 2004, only about 5% of the factory‟s output was consumed domestically and 95% exported (Fig. 2.3). The export market covers the EU, Croatia and Senegal (Addy et al., 2004).

Figure 2.3 Ayensu Starch Company: Product destinations



Source: Addy et al., 2004

Lessons leant

The PSI unfortunately, had political dimensions. Even though it was under the Ministry of Trade and Industries, it was operated as a company with the leadership being appointed politically. The starch processing plant which was located at Bawjiase was processing at 20% capacity before closing down. Smaller starch processing units could alternatively have been sited at several districts to make processing more efficient and effective. Transporting cassava from very far distances covering over one day journeys (for example, Brong Ahafo Region) led to setting in of post harvest deterioration in most of the cassava roots, before reaching Bawjiase. Also, the falling world price of starch was not planned for and this affected the project adversely. Planning of cassava projects should therefore be left in the hands of those with technical and market expertise and handled by MOFA instead of setting up a new body to manage such projects.

2.6 Summary

The chapter reviewed the origins of cassava and its cultivation in Ghana, looking at the conditions necessary for its growth. Even though there were diseases and pests, they did not pose major obstacles to cassava production. There is a ready market for all the processed products as they are consumed locally and outside the country. Some of the traditional products like *fufu*, *banku-mix* and *kokonte* now have their improved versions to meet the urban demands for safe and convenient foods. HQCF produced is used in food manufacturing and also in the plywood industry. Little is

used in the bakery and confectioneries. The *banku-mix* and instant *fufu* in particular are exported to Europe and America to meet the demands of Ghanaian migrants in those areas. Government intervention in the cassava sub-sector is seen in establishing projects, some of which are still running and these are expected to boost the cassava industry in the country. To sustain the gains in the cassava sector, emphasis is now being laid on processing and marketing so that farmers can gain full advantage of the higher yields being obtained.

The projects were found to improve cassava production in the country and had impacts on livelihoods of cassava farmers and processors. This is deduced from cassava production figures, which show that cassava production has increased steadily over the years. It was however observed that almost all the policy initiatives on cassava have short term funding whereas the lifespan of these improvements should have been longer to achieve results. Agricultural research and extension activities should be demand-led. Finally, agricultural initiatives even though may have political influences, should be planned and implemented by those with the relevant expertise at the Ministries instead of political appointees.

CHAPTER 3
SUSTAINABLE LIVELIHOODS:

3.0 Introduction

The chapter reviews literature on sustainable livelihoods. It deals with the origins, principles and how it uses the sustainable livelihoods framework as an analytical tool. The framework is composed of assets, strategies and outcomes of activities by people. It also includes the external factors such as vulnerability and policies, institutions and processes that affect the assets and strategies that people use in their daily lives. The chapter also reviews the concept of technology and how its adoption by farmers is affected by the livelihood features. Finally, some of the criticisms of the approach are reviewed.

3.1 The Sustainable Livelihoods Approach

There have been several approaches to rural development in order to reduce poverty among rural dwellers in developing countries. Carney (1999) identified some of these approaches to rural development as the „Green Revolution" of the 1950s-60s; Integrated Rural Development of the 1970s; economic liberalisation and privatisation in the 1980s and the rural development agenda of the early 1990s. With all these programmes, Carney (1999) observed that rural people still suffer from inadequate public services, underdeveloped markets, poor communication infrastructure, poor health and education. Also, civil conflict and war continue to threaten their livelihoods and the old problems were compounded by declining rates of yield growth, increasing conflict over natural resources and accelerating resource degradation.

Another approach, the Sustainable Livelihoods Approach (SLA) which focuses on people, especially the poor in the rural areas, was adopted by the Department for International Development (DFID) in the mid 1990s. It is an approach used for policy development and also intervention to reduce poverty.

3.1.1 Definition of Livelihoods

The issue of livelihoods first came up in the report of the Brundtland Commission in 1987, proposing sustainable livelihood security as an integrating concept and made it central to the report (WECD, 1987). The WECD definition is:

> Livelihood is defined as adequate stocks and flows of food and cash to meet basic needs. Security refers to secure ownership of, or access to, resources and income-earning activities, including reserves and assets to offset risk, ease shocks and meet contingencies. Sustainable refers to the maintenance or enhancement of resource productivity on a long-term basis. A household may be enabled to gain sustainable livelihood security in many ways – through ownership of land, livestock or trees; rights to grazing, fishing, hunting or gathering; through stable employment with adequate remuneration; or through varied repertoires of activities.

Later on Chambers and Conway (1992:6) modified the WECD definitions as

> „A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels in the short and long term".

This definition has been adopted by DFID and is widely used by many authors and agencies for their livelihood work.

3.1.2 Principles of the Sustainable Livelihoods Approach

To be able to achieve the above objectives and reduce poverty, six basic principles were set originally in the SLA. The principles were later modified and classified into two categories as a) normative and b) analytical/operational (Carney 2002; pp14-15). These are:

i. Normative principles

Four normative principles have been identified as follows:

People Centred: People, rather than the resources, facilities or services they use, are the priority concern. This may mean supporting resource management or good

governance, but the underlying motivation of supporting livelihoods should determine the shape and purpose of action.

***Empowering*:** Change should result in amplified voice, opportunities and well-being for the poor.

Responsive and participatory: Poor people must be key actors in identifying and addressing livelihood priorities. Outsiders need processes that enable them to listen and respond to the poor.

Sustainable: There are four key dimensions to sustainability – economic, institutional, social and environmental sustainability. All are important – a balance must be found between them.

ii. Analytical/operational principles

Four analytical principles were identified as follows:

Multi-level and holistic: Micro-level activity and outcomes should inform the development of policy and an effective governance environment. Macro and meso–level structures and processes should support people to build upon their strengths.

Conducted in partnership*:* Partnerships can be formed with poor people and their organisations, as well as with the public and private sector. Partnerships should be transparent agreements based upon shared goals.

Disaggregated: It is vital to understand how assets, vulnerabilities, voice and livelihood strategies differ between disadvantaged groups as well as between men and women in these groups. Stakeholder and gender analysis are key tools.

Long-term and flexible: Poverty reduction requires long-term commitments and a flexible approach to providing support.

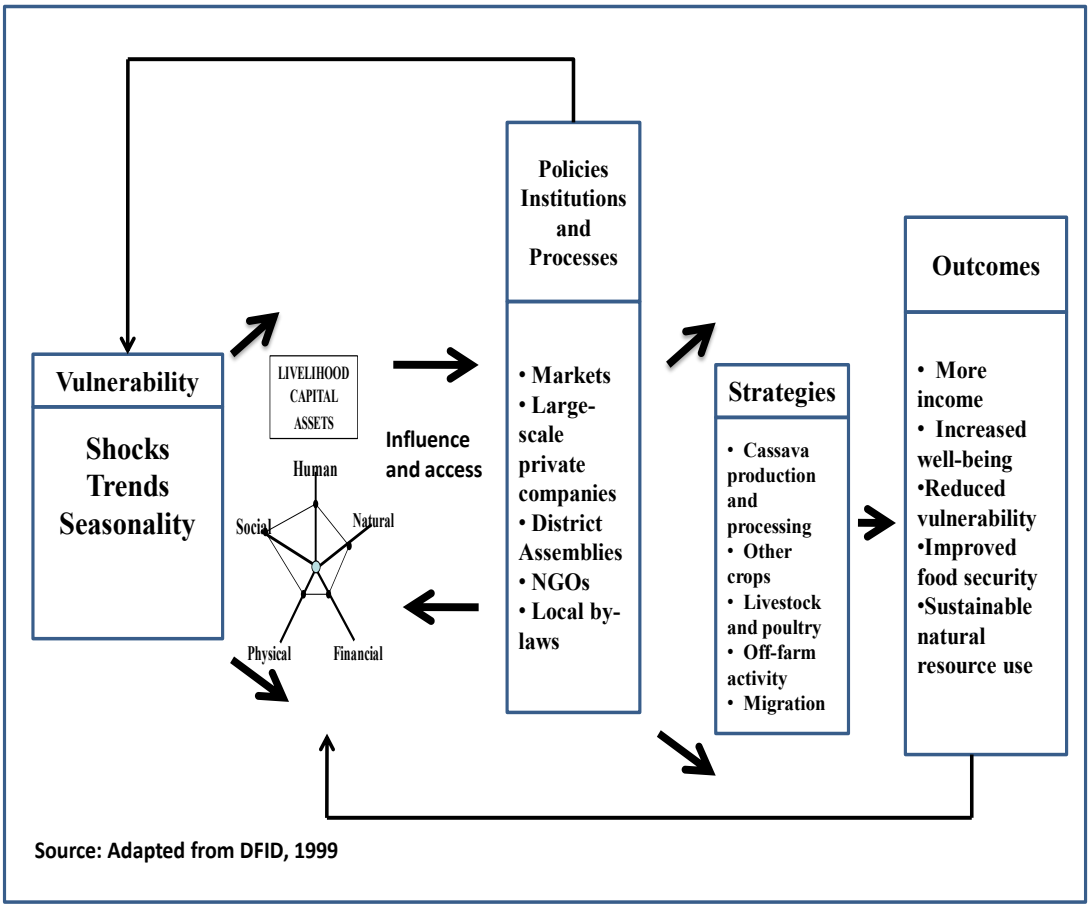
3.2 The Sustainable Livelihoods Framework (SLF)

The SLF (Fig. 4.1), which is a conceptual framework used to analyse the SLA, provides insights into the livelihoods of the poor and emphasises the significance of

supporting them to reduce poverty (Carney, 2002). It is an important tool for identifying the key factors that push people into poverty and the potential factors that lift people out of poverty. An analysis of assets may show how access to them has changed over time, causes of these changes and how access and control of assets differs between individuals, households or social groups (Carney, 2002).

The framework shows that people have assets which they combine with their strategies to achieve their livelihood outcomes. Individuals and households find themselves in a specific context, made up of exposure to risks and opportunities, and also to services, policies, institutions, organisations and processes. These component parts link up to influence the individual or household‟s options that they pursue to achieve their livelihood outcomes (Ashley and Carney, 1999; Scoones, 1998).

Figure 3.1 A Sustainable Livelihoods Framework for Studying Livelihoods of Cassava Farmers and Processors

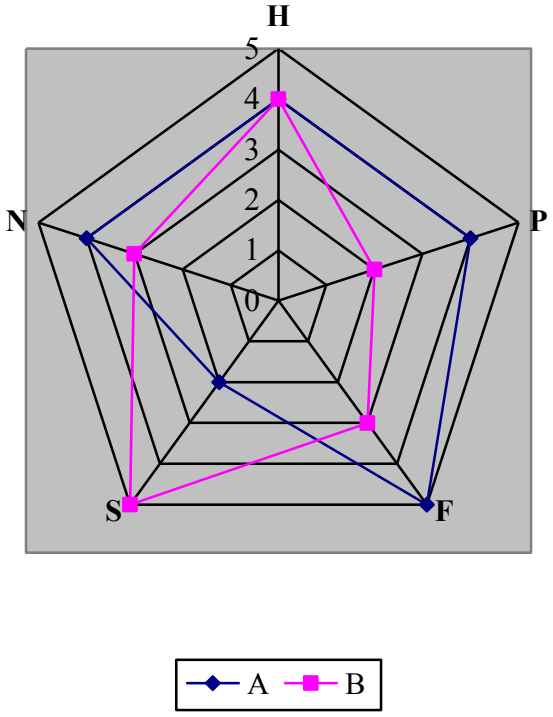


Source: Adapted from DFID, 1999

3.2.1 Livelihood Assets

Five main assets identified by DFID (1999) are human, social, financial, natural and physical capital. Households have individual skills and abilities (human capital), land, savings and equipment (natural, financial and physical capital respectively), while membership of formal groups and/or informal networks (social capital) often assist in effecting livelihood activities (DFID, 1999; Scoones, 1998). The assets pentagon provides an important starting point for household livelihood analysis because it encourages researchers to take into account all the different kinds of assets and resources that may play a key role in household livelihoods (Messer and Townsley, 2003). In a hypothetical case below (Fig 3.2), farmer A has more financial, physical and natural capital than farmer B while Farmer B also has access to social capital more than farmer A. However, both of them have equal access to human capital. This shows that different people have different access to assets resulting in different pentagons for every individual or household. The following sections set out the main categories of assets in general, but with examples drawn from cassava processing households where appropriate.

Figure 3.2 The Assets Pentagon



a. Physical Capital

Physical capital comprises the basic infrastructure and producer goods needed to support livelihoods (DFID, 1999). Infrastructure may consist of houses, roads, energy supplies, markets, hospitals, while producer goods are the tools and equipment with which people work (e.g. such as the hoe and the cutlass; and equipment like ploughs, harrows, spraying machines). The infrastructural facilities do not contribute only to household livelihoods but to the integration of national economies, speeding the flow of information and increasing the mobility of people thereby having an important impact on poverty reduction (Ellis, 1999). Aspects of infrastructure that are usually important to sustainable livelihoods are affordable transport, secure shelter, adequate water supply and sanitation, and clean and affordable energy.

i. Transport and livelihoods

Transport is a vital input to life, providing means of access from home to activity. It is the movement of people and goods by any conceivable means for any conceivable purpose (Howe, 1997). For farmers to reach out to markets, they need an efficient transport system and good road network. However, many rural areas have very poor roads leading to insufficiency of vehicles plying these roads. In some areas transport is available only on periodic market days and during the rainy season, it is worse. The poor state of roads and insufficient means of transport, among others, have also contributed to high transportation cost component of the marketing margin which can be as high as 70% (Aryeetey and Nyanteng, 2006). In the cassava industry, cassava roots are transported from the farm to the market places or processing points. Most farmers remain poor and cannot afford their own means of transport and therefore rely on public transport, head-porterage and sometimes push-trucks to do this job. Wenham (1995), reported that the use of inappropriate means of transporting cassava is one of the factors leading to high transaction costs which in turn result in high consumer prices. Even though most farmers can sell their produce in urban markets which are far away from their villages, they mostly sell to traders and middlemen who travel to the villages to buy the produce.

ii. Shelter

One of the fundamental basic human needs is shelter. It is always the desire of mankind to create comfortable living environments according to taste, culture and

identity. Housing units are not just homes because they are also used for household based enterprises. It has been estimated that about 25% of all households in cities of developing countries may use their home for some economic activity (UNCHS, 1996). Shelter is therefore a valued input to the production process and most cassava processing units, particularly *gari* and flour processing units are found in the homes of processors.

iii. Water and Sanitation

Water has several uses which have generally been grouped into three areas: domestic, agricultural and industrial (Moriarty and Butterworth, 2003). However, uses in these three areas overlap with each other. Domestic water is used for drinking, cooking and washing, and also for informal home-based small scale enterprises. In agriculture, water is used for crops and livestock. It is either rainfed or under irrigation. In industry water is used for most of the activities especially in the agro-processing and alcoholic beverage industries where water forms the major asset used.

Cassava processing methods require a lot of water which must be reliable, sustainable, affordable, clean and safe. This is because after peeling, cassava is washed to remove soil and other dirt to avoid contamination before drying into *kokonte* or boiling for *fufu*. IFAD/FAO (2001) distinguished between processing methods that require a lot of water and those that do not require much water. Most traditional products (e.g. *gari*) have modest water requirements as low as $5m^3$/MT of product while starch production which requires water at all stages needs 2-6 times more than farinha production. Studying *fufu* processing in South-eastern Nigeria, Adebayo et al. (2004) identified inadequate water supply as one of the major constraints that the processors face, underscoring the need for adequate water supply during cassava processing.

Sanitation is the formulation and application of measures to protect public health. It could be in the form of waste disposal or any hygienic means (e.g. hand washing, food washing and household cleaning) of preventing human contact from hazards of wastes to promote health. WaterAid (2007a) reported that almost 2.4 billion people all over the world lack adequate sanitation and over 40% of the world's population also do not have safe, clean or private place to go to toilet. Poor sanitation leads to

health problems including diarrhoea, intestinal worms, bilharzias, hepatitis and scabies. It has been estimated that 88% of global cases of diarrhoea could be attributed to unsatisfactory water, sanitation and hygiene (WHO, 2004).

An important impact of cassava processing on livelihoods is pollution resulting in bad odour, death of small ruminants and obliteration of soil fungi leading to loss of benefit from mycorrhizal association that enhances plant growth (Arimoro et al., 2008; Ehiagbonare et al., 2009). In other cases, problems created by effluent from cassava waste include large quantities of peel, high organic matter content and suspended solids which are sources of pollution to the environment (IFAD/FAO, 2001). But the composition of waste water has been found to vary with different scales of processing activity and is purer from technologically sophisticated processors (IFAD/FAO, 2001). However, Howeler et al. (2000) indicated that most of the negative effects are site-specific and the long-term and broad-based impact on the environment is generally minimal and can be corrected by proper waste treatment, with technologies which are either presently available or are being developed.

iv. Access to Energy

Access to energy is basic to all human beings. This is because it is needed for heating, cooking, cooling and lighting in our homes and also, for transport and industrial processes. Social relations are improved through the provision of lighting and access to forms of communication such as radio, television, internet and mobile phones. Energy sources that are available are petroleum, natural gas, bio gas, electricity, coal, nuclear and renewable and alternative sources such as hydropower, solar, wind, geothermal, biomass (wood, charcoal and cow dung) and ethanol (EIA, 2006).

Worldwide, over 2.5 billion people still rely on traditional biomass for everyday cooking and heating. Biomass is the primary source of energy for most Africans and about 75% of the total population in Sub-Saharan Africa depends on it as their main energy source (Ejigu, 2008). Studies also show that SMEs in Sub-Saharan Africa also depend on biomass for 84% of their energy needs (HELIO, 2007). Even though firewood is a cheaper source of energy and readily accessible, exposure to smoke from the firewood has been observed to cause respiratory infections, cancers, eye disease and low birth weights among women processors (Muchiri, 2008) and is

responsible for close to two million deaths per year (UNDP, 2004). Replacing low quality fuels such as traditional biomass with more efficient fuels can significantly reduce the health impacts from smoke and physical exertion.

Electricity is used by cassava processors, especially for the mechanised grater, the mechanised slicer and also for the production of cassava flour. Access to electricity in the developing countries is a matter of concern. It has been estimated that about 1.6 billion people worldwide, still have no access to electricity and in Africa, only about 25% of the population have access to electricity and in the rural areas, this drops to about 8% (IEA, 2006). Cassava processing households therefore need electricity to carry out their activities effectively.

The use of solar energy in cassava processing is found in the drying of *kokonte*, grated cassava for *gari* processing and also cassava grits. Since the farmers are poor and cannot afford the mechanised systems for drying, they depend on solar energy for their activities. However, insufficient sunshine sometimes becomes an impediment to their drying process. In a study of *kokonte* production in Ghana, Wareing et al. (2001) observed that sun-dried *kokonte* took 7-12 days to dry properly during the dry season and takes 8-14 days during the rainy season, showing the importance of sunshine during the drying process. Improper drying due to unavailability of sunshine leads to the growth of moulds which could cause mycotoxin formation on the product rendering it unacceptable to most consumers (Westby, 2002). Energy and its availability is therefore a contributory factor to efficient cassava processing.

b. Financial Capital

Financial capital includes the financial resources that people use to achieve their livelihood strategies (DFID, 1999). The main sources of financial capital identified by DFID are: savings in the form of available stocks such as livestock, cash, bank deposits and jewellery, access to informal or formal credit and regular inflows of money such as pensions and remittances.

i. Savings

Households usually convert their production into cash to invest in other activities. A major contributor to household financial capital in rural economies is livestock which

is also considered as natural capital and social capital (Morton and Meadows, 2000). As natural capital, livestock provides milk, meat, wool, hides and cash and as social capital, livestock is used to create social relations through stock friendships, traditional restocking loans, bridewealth and other marriage payments. Morton and Meadows (2000) indicated that livestock contributes to financial capital in the form of rapid multiplication of small stocks, acting as easily divisible spare change for everyday needs and small purchases, major terms of investment (especially camel and cattle) and in some societies, they are sold on a regular basis, in others, only in emergencies. Other authors also made similar observations and added that livestock provides draught power or manure and buffering against seasonality in income from other activities (Dorward et al., 2005:5; Shackleton et al., 2000).

ii. Access to credit facilities

Households make use of formal and informal credit to supplement their own financial resources. The sources of credit for farmers and processors include the informal, semi-formal and the formal financial sectors (Jones et al., 2000).

The ***informal financial institutions*** in Ghana carry out saving and lending activities and operate outside the scope of the banking law and other financial sector regulations of government (Aryeetey et al., 1994). They are made up of money lenders, relatives and friends, traders, agricultural processors and input distributors. Within the informal sector, it has been found that money is more readily available, processing is easy and quick, while there is no need for collateral or guarantors. However, they attract very high interest rates (Jones et al., 2000)

The ***semi-formal financial institutions*** are subject to some registration or other regulations but are small freestanding units that are not integrated into the formal banking system. These include credit unions, leasing and hire purchase companies, *Susu* groups, Rotating Savings and Credit Associations (ROSCA). The *Susu* groups and ROSCA have been found to be the most important sources of credit to households. Jones et al. (2000) indicated that there is easy withdrawal of funds, no collateral is needed and they encourage savings habits. However, some of the *susu* operators are not trustworthy, households need a regular source of income to use *susu* groups, there is vulnerability of savings and loans are usually of short-term. Reported

cases of fraud led to the establishment of an apex body, the Ghana Cooperative *Susu* Collectors Association (GCSCA) in 1990 to regulate their activities (Jones et al. 2000).

The ***formal financial sector*** has been found to serve only a minority, often no more than 20-30% of the population in developing countries while in the developed economies, the formal financial sectors serve over 90% of the population (World Savings Banks Institute (2004). The vast majority that has been excluded in the developing countries are usually low-income households in rural areas. Rutherford (2000) argued that the poor need access to financial services much more than the rich simply because the poor have little money to manage risks, smooth consumption, build income earning and other assets and improve standards of living.

In Ghana, the formal financial sector comprises the commercial banks, development banks, merchant banks and rural banks. The Governments of Ghana have over the years embarked on financial sector policies geared towards the agricultural sector. In 1965, the Agricultural Development Bank (ADB) was established by the Bank of Ghana specifically to address the financial needs of the fisheries and agricultural sectors and in the early seventies, Rural and Community Banks were introduced with the idea of encouraging banking habits among rural households and mobilizing rural savings for agriculture, fisheries, forestry and other agro-based industries (Asiama and Osei, 2007).

By March 2009, there were 135 Rural and Community Banks, 18 Savings and Loans Companies, 19 Non-Bank Financial Institutions and 26 Universal and off-shore Banks in Ghana (BoG, 2009). Despite the presence of all these facilities, farmers and processors of farm products still complain of poor, or lack of access to credit facilities (Onumah et al., 2008; MOSF, 2008; Aryeetey and Ahene, 2005; Addy et al., 2004). This was attributed to high transaction costs and the perception of the banks that these enterprises are highly risky. Also, requirements for physical collateral, intimidating form-filling, slow disbursement of funds, un-timeliness of loans and delays in withdrawing funds have made them less attractive to farmers (Onumah et al., 2008; Jones et al., 2000).

iii. Remittances

Remittances also form another source of financial capital to households. Rural people receive remittances from relatives who have migrated to other places in search of jobs as part of their livelihood strategies. The nature and level of remittances vary, depending on the accessibility of the home village, employment opportunities, the cost of living and ease of remitting (McDowell and de Haan, 1997). Remittances can be used to pay for education (human capital) buy a shop (physical capital), land (natural capital), or be invested in farming. Migrants also rely on their networks (social capital) in the home for help in building houses, buying land and other assets. (Cotula et al., 2004). However, once remittances enter the overall income pot, it is difficult to differentiate them from other sources of income.

c. Human Capital

Human capital comprises the skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives (DFID, 1999). Human capital gives people the capability to engage more fruitfully and meaningfully with the other capitals to change their living conditions. The most important aspects of human capital are education and good health.

i. Education

The ability to read and write exposes persons to more information, realise their right to participate in, and access information relating to the decision-making processes and opportunities which affect their lives thus enabling the individual to engage critically with the issues that affect his/her everyday life. On the other hand, to lack or even to have less than adequate education contributes to both exclusion and deprivation (DFID, 2002a).

The role of education in improving farm efficiency and technology adoption has been well established. Seyoun et al. (1998) and Mahmudul et al. (2004) demonstrated the significant role of farmers‟ education in raising farming efficiency in Ethiopia and Bangladesh respectively, although Llewelyn and Williams (1996) did not find any significant impact of farmers‟ education on farming efficiency in Indonesia. However, there is some agreement in literature that education significantly influences

adoption of technological innovations in agriculture (Asadullah, 2005; Asfaw and Admassie, 2004; Doss, 2003). One of the reasons for the differences in the above findings lies in the cross-country variation. Asadullah (2005) citing Lockheed et al. (1980) indicated that an education effect is more likely to prevail in economies where farm production is modernised as opposed to being traditional. Citing Philips, 1994, Asadullah observed that findings from Asian countries tend to find a positive return to education in farm work, while such effect is often lacking for Latin America and Africa.

ii. Health

Access to health care is one key issue in the sustainable livelihoods framework. Even though most governments declared that their citizens should enjoy universal and equitable access to good quality health care, it has been difficult to achieve because there are no internationally recognised standards on how to define and measure equitable access (Oliver and Mossialos, 2004).

There will be little public health impact if health services include the most powerful diagnostic tests, drugs, and vaccines, but do not reach the poor. Obrist et al. (2007) identified five dimensions to access to health services as availability, accessibility, affordability, adequacy and acceptability. Generally, rural populations have less access to health services, often due to poorly developed infrastructure and poverty (Gwatkin et al., 2005). Availability and accessibility depend on physical capital, that is, the presence of health infrastructure such as clinics, health post or hospitals in a locality with all the necessary drugs. They are also influenced by distances of travel to the nearest health facility, scarce public transport and poor roads especially in the rural areas. Adequacy and acceptability in terms of people‟s judgement of quality care are also important. Affordability depends mainly on financial capital (in the form of cash) of farm households and sometimes, social capital, that is, social networks and affiliations. Obrist et al. (2007) observed that poor people sometimes had to resort to short-term coping strategies like selling critical assets to pay for health care, a situation which increases their level of poverty.

Good health is always an indispensable production input in agriculture and the economic development of any nation. The ability to labour depends on good state of

health. This is because good health improves work effectiveness and productivity, thereby affecting farmer‟s income and economic growth (Agulanna, 2006; Hawkes and Ruel, 2006). World Bank (2007) and Ulimgwengu (2009) observed that healthy farmers produce more per unit of inputs, earn more income and supply more labour than farmers affected by sickness. Ajani and Ugwu (2008) confirmed this when they found that poor health results in loss of work days and decreases work capacity and decrease ability and ability to explore diverse farming practices. Similarly, Cole (2006), studying women farmers in mixed cropping systems, found that the vast majority suffered from intense muscular fatigue, heat exhaustion and skin disorders which forced them to take days off from attending to crops.

d. Social Capital

Social capital includes the networks, together with shared norms, values and understandings that facilitate cooperation within or among groups (OECD, 2001). Aspects of social capital that are reviewed here are networks, trust, group membership and access to information.

i. Networks

A social network is the web of relationships among a set of people who are linked together, directly or indirectly, through their various communications and dealings (Calhoun et al., 1994). Some people may have many relationships, ranging from casual to intimate friendships and close family bonds. These acquaintances may in turn relate with others and therefore establish several links which lead to social networks. Networks can be found between individuals, within organisations or groups. Such groups and organisations can also be connected to others both at local, national and international levels (Grootaert, 1998; Krishna, 2002). The Productivity Commission (2003), an independent research and advisory body on a range of economic, social and environmental issues in Australia, observed that well-developed networks are likely to reduce transaction costs in two ways. First, people who are well connected socially are more likely to know someone who possesses the knowledge or skills they need, thus reducing their „search‟ costs. Secondly, networks can reinforce compliance with group norms and level of trust.

ii. Trust

Trust is the faith an individual has in another individual whether they know each other or not. This may arise because of confidence in the social system (Pretty, 2003). Trust takes time to build and can easily be broken. It could also be increased through reciprocity and exchanges. A high level of trust has also been found to be beneficial because informal day-to-day transactions such as accessing small loans or farm equipment from a friend would not be possible without trust. For commercial agreements, a high level of trust between the parties can lessen the need for detailed contracts to cover all possible interpretations and contingencies and for monitoring of the other party to ensure compliance (Productivity Commission, 2003). As observed by Jansen (2007), there was trust at the commercial level in contract farming in which buyers of agricultural products lend funds to producers.

iii. Groups

Groups have been identified as one of the major sources of social capital for farmers. Farmer groups exist in various forms such as formal cooperatives, informal farmer associations or groups, multi purpose groups and national farmers‟ organizations. They have been beneficial to farmers through providing easy access to extension services, credit, cooperative action and addressing market failures.

It has been observed that the practice of extension-farmer contact on one-to-one basis, though very effective, is expensive and unsustainable as the sole means of reaching farmers with agricultural information (Madukwe, 2006). New extension methods have stressed the need for technology dissemination to farmers in organised groups.

One very successful use of the group approach to extension is the National Network of Farmer‟s Groups in Tanzania *Mtandao wa Vikundi vya Wakulima* (MVIWATA) which was created for communication, information exchange and sharing of experiences (Kaburire and Ruvuga, 2006). MVIWATA uses a bottom-up participatory approach in which farmers fully participate in designing and implementing innovative technologies and approaches for enhanced agricultural productivity. It also has its own radio programme called „Ijue Mvita‟ and various television programmes in Tanzania.

Farmer groups usually facilitate easy access to credit for members. The rural poor lack the collateral normally required to qualify for bank loans. Banks also have difficulty in servicing large numbers of scattered and unorganised rural people because it is time-consuming and the volume of their individual savings and loan preparation is low. Rouse (1997) observed that delivery of financial services to participatory groups, rather than individuals, carries cost advantages for both the banks and the poor. This is because, for example, a joint application submitted by a group of 10 farmers reduces the bank‟s loan administration costs by a factor of 10. Transaction costs are also lower for group members because they need to prepare only one loan application and make a single trip to the bank. The banks also relax requirements for physical collateral and use the group as „social collateral‟ (Rouse, 1997).

iv. Access to Information

Rural people are predominantly engaged in agriculture and therefore need more information on agricultural technologies. They however do not have adequate information to carry out their livelihood activities to achieve good results. Chambers (1983: 110) described the rural household access to information as follows:

> *The household is isolated from the outside world. Its location is peripheral, either in an area remote from town and communications, or removed within the village from the centres of trading, discussion and information. Often illiterate without a radio, its members are not well informed about events beyond their neighbourhood. Its children do not go to school, or they go and drop out early. Its members do not go to public meetings, or go and do not speak. They do not receive advice from extension workers in agriculture and health.*

Access to information is vital to farmers. Chapman and Slaymaker (2002) indicated that access to information by farmers could contribute to capacity building for decision making for appropriate livelihood strategies, maximise the potential of a particular asset at any given time, reduce vulnerability to shocks and also improve understanding of systems and processes. Access to information is discussed under extension services and Information and Communication Technology (ICT).

- ***Extension services***

Agricultural extension is the conscious provision of information and communication support to rural users of renewable natural resources (Garforth and Lawrence, 1997). This includes offering advice, helping farmers to analyse their problems and identify opportunities, sharing information and facilitating collective action. Provision of extension services to farmers helps them to improve on their production and incomes and have access to institutions dealing with natural resource management, support and strengthening of local financial institutions such as loans and savings schemes (Chapman et al., 2003).

Access to extension services has been predetermined by several factors. These include gender, farming systems, wealth status, land ownership, farm size and group membership (Mulhall and Garforth, 2000). However, access to agricultural extension services by farmers has generally been insufficient (DFID/FAO/ODI, 2001; Rivera, 2008). In cases where agricultural information systems are dominated by government research and extension organisations, the resource poor who are often more in need than others are least likely to gain access to it (Garforth and Lawrence, 1997). To improve farmers access to extension, decentralization of extension and improved social capital have been recommended (Mulhall and Garforth, 2000; Nambiro et al., 2006).

- ***The use of Information and Communication Technology***

ICT is one of the areas in which technological advances are dramatically influencing people‟s lives. ICTs include personal computers, radio, TV and communication equipments such as telephones and their communication networks (Michiels and Van Crowder, 2001). Technology advances in ICT have reduced cost and increased the quality and spread of information transfer in recent years. However, rural areas have limited access to ICT because of relatively high costs coupled with inadequate infrastructure especially roads and electricity (Chapman and Slaymaker, 2002). Typical examples of the use of ICT by farmers is provided by TradeNet in Ghana (Box 3.1) (Bartlett, 2008), Women in Uganda Network (WOUGNET) and the SMS Sokoni Project in Kenya (Nasikye, 2009).

Box 3.1. Use of ICT by Farmers in Ghana

The use of ICT by farmers is provided by TradeNet and operated by a Ghanaian Software Company, Busy Lab. On the TradeNet website there are more than 800,000 prices of commodities from hundreds of markets, spanning a range of time periods and countries. The price offers are available to search and compare over time, and across markets and countries. But because only a small percentage of its users are active on the internet, TradeNet has an SMS service at its core. Users can sign up to receive weekly automatic SMS alerts on certain commodities in particular markets; upload offers to buy and sell products via mobile phone; request current prices for a commodity in a country and receive an SMS with the information.
Source: Bartlett, 2008.

Another use of ICT is seen in radio and television broadcasting to farmers. IIboudo, (2001) observed that most of these programmes resulted in an increase in cash crops in the 1970s in most African countries. Even though TV broadcasting which combines picture and sound makes broadcasting more interesting and attractive, the radio remained the most popular as it is comparatively cheap and can operate easily on ordinary dry cell batteries even where there is no electricity. However, there has been low access to radio and TV by the rural people. In Africa, it was estimated that there are about 100 radio receivers per 1,000 people, whereas there are no more than 10 TV receivers for the same number and even these are concentrated in the urban areas (Abbey-Mensah, 2001).

e. Natural Capital

Natural capital includes the natural resource stocks from which resource flows and services (e.g. nutrient cycling, erosion protection) useful for livelihoods are derived. It includes the land, forests, marine and wild resources, water, and air quality (DFID, 1999). Access to these resources is basic as land for example, is a fundamental basis for human shelter, food production and other economic activities, including business and other natural resource uses of all kinds.

Land as a resource

Access to land depends on types of tenurial arrangements that exist in most societies. Land tenure is the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land (FAO, 2002a). The Food and

Agricultural Organisation (FAO) categorises land generally into private, communal, open access and state owned.

- **Private**: Land is assigned to a private party such as an individual, a group of people or a corporate body such as a commercial entity or non-profit organization.
- **Communal**: This ensures a right of commons within the community where each member has a right to use independently the holdings of the community. This, for example could involve the right to graze on a common pasture.
- **Open access**: Specific rights are not assigned to anyone and no-one can be excluded. It may include rangelands and forests where there may be free access to the resources for all.
- **State owned:** In this case, property rights are assigned to some authority in the public sector or land is held by the central government.

These arrangements, however, differ from country to country depending on the laws of each country. Access to land in the rural areas is often based on custom. Land is inherited, purchased, leased or acquired through share-cropping arrangements between the landlord and the tenant (FAO, 2002a; Nukunya, 2003). In Sub-Saharan Africa, gender disparity in access to land has been observed to be influenced by inheritance systems and marital relations (Whitehead and Tsikata, 2003). Thus the hierarchical nature of rights and responsibilities favour men over women. Access to land can also be provided to poor farmers through land reform interventions by national governments, often as a result of policies to correct historic injustices and to distribute land more equitably (FAO, 2002a).

Secure land tenure is extremely important due to the fact that agriculture remains a fundamental source of livelihood, subsistence and food security for rural people (UN-HABITAT, 2008). Enhanced tenure security generates individual, household and community benefits by encouraging savings and investments in the improvement of land, homes and neighbourhood. This, according to UN-HABITAT (2008), in turn, improves livelihoods and living standards. In rural areas, insecurity is increasing poverty and driving people off the land. This is because land in the rural areas is coming under multiple pressures including population growth, increasing fragmentation, land use conversion, commercial investments, environmental

degradation as well as natural disasters and conflicts (UN-HABITAT, 2008). To address these issues, it has been suggested that pro-poor land policies be implemented to enable the poor to share in the benefits. Even though ultimate ownership rights are vested in government or a customary land holding group, it has been observed that there are restrictions on the land users‟ freedom to transfer land, to exclude others or to use it in particular ways. However, these restrictions do not necessarily compromise the tenure security of the land holder (UN-HABITAT, 2008).

3.2.2 Vulnerability

Cannon et al. (2003) described vulnerability as a situation where an event affects a population that is not well prepared and unable to recover without external assistance. Such a situation may impact on individuals or groups of people at different levels of preparedness, resilience and with varying capacities.

In general, it has been observed that there is a relationship between vulnerability and poverty. That is, people with adequate assets are less vulnerable. Benoit-Cattin et al. (2000) assert that poverty can easily turn into threatening vulnerability and that the poor, who are least able to deal with risk, are most exposed to it. This is because they have little savings, usually live in dangerous locations, are unable to afford safe buildings, engage in dangerous livelihood activities, have few income or production options and reduced access to resources. However, Twigg (2001) observed that the vulnerability of the poor depends on their access to assets. This is because access to financial capital may help to improve the incomes of a household and enable it to acquire more assets that will help the household to be more resilient to disasters. But if the acquired assets are not adequately protected against natural hazards and are destroyed during a disaster, the household may be found in a worse position than ever before. Individuals and households are subject to various vulnerability factors, which in the SLF are characterised in terms of trends, shocks and seasonality.

a. Trends

Trends are long term changes which may affect different aspects of people‟s livelihoods (Messer and Townsley, 2003). They may happen by chance and they may be positive or negative. Trends could be in the form of changes in population, environmental conditions, and patterns of governance, economic conditions and

technology (DFID, 1999). For example, changes in population have led to land re-distribution in some farming communities, resulting in land fragmentation and therefore reduced land holdings of family members (Ayivor, 2001; UN HABITAT, 2008). There could also be rapid economic growth resulting in new opportunities to start up enterprises or declining international prices for some important export crops (Carney, 2002).

b. Shocks

Shocks are sudden events that have a significant impact on livelihoods (DFID, 1999). There can also be one-off shocks that can destroy assets or even members of households and communities. Gallipoli and Turner (2009) referred to shocks that are experienced at the individual level as idiosyncratic shocks, but responses to such shocks can encompass the whole household. This could either be illness or death of a prominent member of the household. Such shocks may not necessarily require outside intervention if societal mechanisms work well.

Another form of shock identified by Gallipoli and Turner (2009) is the community shock (covariant). These are shocks that affect the entire community. They could be in the form of natural disasters, for example, the earthquake that triggered a Tsunami that hit the coasts of Indonesia, Sri Lanka, India and Thailand in December 2004 (Oxfam International, 2005). Such hazards could affect every member of the community and may require outside intervention.

c. Seasonality

Seasonality refers to changes that may reduce or increase the availability of different resources at different times of the year (Messer and Townsley, 2003). Its severity and duration vary across households over time. Communities most vulnerable to seasonality are usually rural and mostly depend on farming for their livelihoods. Seasonal changes may affect for example; assets, prices, production, health and employment opportunities. A major seasonal factor affecting farming households is rainfall, particularly in some parts of Sub-Saharan Africa where most crops are dependent on natural rainfall. FAO (2004) reported that though Africa has the highest agricultural area per capita in the developing world, it has the lowest irrigated area. Following a heavier rainy season, supply of most crops is higher than demand,

creating reduction in market prices and farmers will have no option than to dispose of their produce at give-away prices (Devereux, 2009; Oluwatayo, 2009). This situation is very common with cassava which is very perishable and regularly experiences gluts (Tewe, 2004; Nweke, 2004; IFAD, 2004; Sanni et al., 2007).

Agricultural seasonality could also arise from the production of food crops dependent on one or sometimes two harvests each year. According to Devereux (2009) this situation has two implications for rural livelihoods:

i. Annual household income depends on the size of harvest, and a single failed harvest can make a poor family with limited savings and assets destitute.
ii. Families with undiversified livelihoods must survive from one harvest to the next on produce harvested only once or twice each year.

The result of these seasonal factors is that farmers may turn to engage in risk-reducing strategies such as diversification into lower value but more stable products, not using purchased inputs, and not trading in remote locations. It is therefore an important challenge for poor households in sustaining food consumption under such circumstances. Paxson (1993) and Alderman (1996) showed the importance of consumption seasonality in developing countries, and also of the way households respond in the face of extreme fluctuations in income due to the agricultural cycle.

3.2.3 Policies, Institutions and Processes (PIPs)

Policies, Institutions and Processes are closely inter-related factors that have a great influence on the livelihoods of people. They refer to the levels of government institutions and public policies, as well as private sector practices, and civic, cultural and economic institutions that operate in society, which together help to determine and set parameters for livelihood strategies for the poor (Farrington et al., 2002). Institutions and organisations can support or constrain livelihoods by affecting people‟s resources, their ability to pursue certain activities and the returns they can expect from those activities (Shankland, 2000). Policies, Institutions and Processes are outlined below.

a. Policies

Policy may be defined as a course or principle of action designed to achieve a particular goal or target (DFID, 1999). Policy operates through specific institutions

and organisations to influence people‟s choice of livelihood strategies. They therefore change people‟s perception of the opportunities and constraints which they face in pursuing different strategies and the returns which they expect from them (Shankland, 2000).

Policies may operate at the macro-, meso- and micro-levels of any economy. At the macro level, policies affect the whole country, for example, government could decide to increase the production of maize for export or soybeans to increase the nutritional status of infants. At the meso level, policies may be designed to create long term frameworks for action while at the micro level, policies are either short term or temporary and they may affect particular sectors, districts or groups. Policies therefore provide the link between all the three levels and may help to identify areas where restrictions, barriers or constraints occur and explain social processes that could impact on livelihood sustainability (Scoones, 1998; Ellis, 1999).

Policies may have positive or negative effects on the people; for example, policies may protect the environment by controlling natural resource use or make it more difficult for poor people to gain access to resources they normally use to support livelihoods (Messer and Townsley, 2003). To effectively realise the policy priorities of the poor, it is necessary that they form part of the policy formulation process. Also, such policies should be guided by the principles of the sustainable livelihoods approach (Pasteur, 2001). Since not everybody can be involved in the policy making process, Karl (2002) recommended that a stakeholder analysis would be necessary to help identify those who should be involved in the participatory policy making process.

b. Institutions

Institutions are broadly referred to as societal norms, that is, they establish what sort of behaviour „normal‟ in any given society. According to North (1993), institutions are the humanly devised constraints that structure human interaction. They are made up of formal constraints (rules, laws, constitutions), informal constraints (norms of behaviour, conventions, and self imposed codes of conduct), and their enforcement characteristics. While institutions are regarded as „the rules of the game‟, organisations are the structures or mechanisms through which the rules are observed

and are therefore referred to as „the players of the game" (Messer and Townsley, 2003; DFID, 1999). In some cases, a given organisation may or may not be an institution and a given institution may or may not be an organisation. For example, a local bank branch is also an organisation but not an institution; a central bank is an organisation and also an institution, while money is an institution but not an organisation (Uphoff, 1997). Institutions are dynamic, continually being shaped and reshaped over time.

Messer and Townsley (2003) observed that some institutions are very visible while others are less visible. Institutions that are more visible than others tend to be formal and have a clear structure with clearly defined rules and regulations. An example is formal financial institutions and their conditions for granting credit facilities as opposed to the informal financial sector like *susu* operators who do not have clearly defined rules and regulations (Jones et al., 2000).

Some of the institutions that are central to agricultural growth are the state, community level institutions and markets (Shankland, 2000). It has been observed that most African states have been able to promote many successful agricultural development programmes such as the RTIP/RTIMP in Ghana (IFAD, 2004) and Plan for Accelerated and Sustained Development to end Poverty in Ethiopia (IFAD, 2006).

Community level institutions such as the family/clan have been found to be important in establishing rules on land ownership and management, especially common property resources (Sarpong, 2006). This is because most lands in Africa are still being held under customary land tenure systems. Community level institutions can therefore be used as important vehicles for agricultural development and poverty eradication.

Markets play a central role in pro-poor livelihood development and poverty reduction. Dorward et al. (2003) observed that livelihoods of most poor people are directly dependent on their involvement in a range of markets; markets provide a highly efficient mechanism for exchange, coordination and allocation of many resources, goods and services and poor people themselves often identify problems

with markets as critical to their livelihoods. Improved market is therefore a critical driver of sustained broad based poverty reducing development.

c. Processes

Processes are the way things are done rather than what is done. They also refer to how policies and institutions change and/or interact with broader processes of change. A policy process refers to how policies are made, how decisions are taken and ways of putting issues on the agenda as matters of public concern (Keeley, 2001). According to Keeley, a policy process may be made of

i. Formulation, involving information gathering, analysis and decision-making,
ii. Implementation, generally involving a set of rules, regulations and institutions to achieve the goals of the policy and
iii. Monitoring and evaluation of the formulation and implementation of policy

Policy processes are usually not linear. This is because they are affected by political, social and economic circumstances and models found not to be universally applicable (Keeley, 2001).

The importance of processes to every aspect of livelihoods has been outlined by (DFID, 1999) as follows:

i. They provide incentives that stimulate people to make choices
ii. They grant or deny access to assets
iii. They enable people to transform one type of asset into another and
iv. They have a strong influence on inter-personal relations.

3.2.4 Livelihood Strategies

Livelihood strategies are composed of activities that generate the means of household survival (Ellis, 1999). They include the types of assets that people are more interested to have, how they use these assets and how they are able to deal with vulnerability factors. A key goal of livelihood strategies is to ensure household economic and social security (Koczberski et al., 2001). However, unsatisfactory livelihood strategies may result in poverty because these strategies are based on insufficient livelihood assets, are vulnerable to shocks and also changes in policies (Messer and Townsley, 2003).

It has been assumed that people generally aspire to maintain their current welfare and to advance it. Thus they may expand their current activities or move into new ones. Following these assumptions, Dorward et al. (2005:5) identified three ways in which assets and activities contribute to livelihood strategies:

- „Hanging In": activities are engaged in to maintain livelihood levels, often in the face of adverse socio-economic circumstances;
- „Stepping Up": where current activities are engaged in, with investments to expand these activities, in order to increase production and income to improve livelihoods and
- „Stepping Out": where existing activities are engaged in to accumulate assets which in time can then provide a base for moving into different activities that have initial investment requirements leading to higher/and or more stable returns.

A separate threefold classification has been identified by Scoones (1998): agricultural intensification, livelihood diversification and migration. These strategies may be alternatives, or households may combine them. However, McDowell and de Haan (1997) indicated that migration is likely to affect the possibilities of intensification and diversification but could not predict the way in which the broader livelihood strategies will be affected.

a. Agricultural Intensification

Agricultural intensification is the increase in agricultural production per unit of inputs (FAO, 2004). This involves cultivation of land where there are very high inputs of labour, fertilizers, pesticides, herbicides and fungicides to obtain the maximum output. Agricultural intensification has been essential over the years in meeting the increasing demand of growing world population for food. According to Matson et al. (1997) intensification in developing countries was generally referred to as the „Green Revolution" which began in the 1960s with the transfer and dissemination of high-yielding varieties. This resulted in higher yields for maize, wheat, cotton and rice in many countries.

Apart from the short-term increase in production, and cash income, several disadvantages of the intensification have been observed. Agriculture intensification based on intensive use of modern inputs has easily lent itself to mismanagement with dire consequences for the environment, had limited applicability to dry and risk-prone farming areas, negative impacts on water, air and human health and tended to erode soils, genetic resources and local knowledge (Hazell, 1995; Matson et al., 1997; Veldhuizen et al., 1997). Hazell (1995) recommended that intensification strategies must lay more emphasis on management of soil fertility and organic matter, moisture conservation, erosion control, and nutrient cycling.

b. Livelihood Diversification

Some households carry out different types of activities in their struggle to earn a living. It has been observed that livelihood diversification represents a failure of the structural adjustment projects of 1980 and 1990s to deliver improving economic conditions for agricultural production that were promised in the countless policy documents of that period (Bryceson, 2002; Ellis and Allison, 2004). The result is that farming became more of a part-time, residual and fall-back activity and livelihoods are now being oriented towards non-farm and non-rural activities (Bryceson, 2002). Livelihoods may be diversified as a result of crisis or opportunity. In Sub-Saharan Africa, a range of 30-50% reliance on non-farm income sources is common; but it may be up to 80-90% in Southern Africa and in South Asia, on average, about 60% of rural household income is from non-farm sources (Ellis, 1999).

Livelihood diversification generally aims at rural poverty reduction. It helps to lessen the vulnerability of the poor to food insecurity and livelihood collapse; it can provide the basis for building assets that permit individuals and households to construct their own exit routes out of poverty; and it can improve the quality and sustainability of natural resources that constitute key assets in rural livelihoods (Ellis and Allison, 2004). Diversification contributes positively to sustainability because it reduces proneness to stress and shocks and can contribute to reducing adverse effects of seasonality by utilising labour and generating alternative sources of income in off-peak periods (Ellis, 1999). On the other hand, the better-off are able to diversify in more advantageous labour markets than the poor, and this in turn reflects asset poverty especially with respect to human capital. Also, where male labour is

predominantly taking advantage of diversification opportunities, women may be even more relegated to the domestic sphere and to subsistence production.

c. Migration

Migration is the movement of people from one place to another. Such movements, according to McDowell and de Haan (1997) could be rural-rural, rural-urban, urban-rural, regional or international. Such a process could be voluntary or involuntary. Voluntary migration comes out of the desire to go places while involuntary migration could be due to extreme economic, social or political situations where there are civil unrests and wars. Migration is usually found to be undertaken by landless or land-poor, unskilled and illiterate poor labourers in situations such as the worsening situation of dry land agriculture created by drought, crop failure and poor terms of trade (Rao, 1994; Hazell, 1995; McDowell and de Haan, 1997). But other studies also show that in non-disaster situations, it is rather those who have access to resources that migrate (Skeldon, 2002).

One main reason why people migrate is to improve on their incomes or on livelihoods in general. But there have been questions about migration reducing poverty. However, Kothari (2002) reviewing migration studies, found that it can both reduce and perpetuate poverty. While Breman (1993) shows how migration opened the way for labourers to break away from patron-client relationships and change from being semi-free to free, a study of Palamur labourers in India found that they were being exploited by their contractors and thus became powerless and perpetually in debt (Olsen and Ramana, 2000).

Out migration may result in depletion of the labour force required to undertake peak farm production demands on land preparation and harvesting, as occurred in southern Africa in the 1970s and 1980s where many rural households came to depend on remittances from migrants to urban areas in South Africa for their food security. This was attributed mainly to the absence of young men who are likely to have responsibility for important elements of production (McDowell and de Haan, 1997).

3.2.5 Livelihood Objectives and Outcomes

Livelihood outcomes are the results of the combination of assets and activities, and such outcomes are normally expected to be positive gains. Outcomes help us to understand what motivates people to behave the way they do, what their priorities are and how they are likely to respond to new opportunities (DFID, 1999). In the livelihoods framework, outcomes have been indicated as increased income, increased well-being, reduced vulnerability, improved food security and more sustainable use of natural resources. DFID (1999) indicated that it should not be assumed that people are entirely dedicated to maximising their income. Rather, we should recognise and seek to understand the richness of potential livelihood goals. While some people may be aiming at food security and higher income, others may also be thinking of good health, education for their children and themselves. Even though the right to a standard of living adequate for health and well-being is paramount, it is not however, achieved by many of the poor whose primary day to day objective is to continue to secure enough food to eat (DFID, 1999).

a. Increased Incomes

The main objective of household livelihood activities is to earn higher income in order to reduce poverty. This is dependent on their capabilities, improved access to assets and better combinations with activities (Blaikie et al., 1994). But these are also dependent on vulnerability factors such as seasonality of rainfall and market prices. Households therefore do not rely only on farming activities but add non-farm employment, without which rural poverty would be much higher. It has been suggested that access to credit facilities by the rural poor may enable them to increase productivity and thereby improve on their income. Also, security of tenure is also critical and above all, reduced vulnerability and improved access to all other forms of capital are also necessary (Shankland, 2000).

b. Well-being

Well-being is usually defined by individuals based on their perceptions of life. Chambers (1997) described well-being as good quality of life which is open to the whole range of human experiences, social, mental and spiritual as well as material. The opposite of well-being is ill-being. Generally, according to Chambers, most

people would include in well-being, good living standards, access to basic services, security and freedom from fear, health status, and good relations with others, friendship, love, peace of mind, choice, creativity, fulfilment and fun.

An important dimension of well-being is the absence of poverty. It has been observed that extreme poverty and ill-being go together but the link between wealth and well-being could be weak or negative (Chambers, 1997; McGregor, 2008). That is, reducing poverty usually diminishes ill-being but more wealth does not assume that all needs will be met, nor does it automatically guarantee a satisfactory quality of life. However, people with little resources have little chance to achieve well-being and mainly struggle only to escape ill-being. Another dimension of well-being which is debatable is happiness. An individual could be happy but hungry and this does not imply well-being. The reverse is also true; a person who is well fed but living in conditions of servitude means that he/she is not able to act meaningfully in pursuit of his/her goals (McGregor, 2008).

Another important factor which is basic to well-being is livelihood security. Chambers, (1997) indicated that there must be secured rights and reliable resources, food and income, and basic services available to all. This can be maintained and enhanced through sustainable livelihoods. Good governance can also contribute to well-being of nations. McGregor (2008) believes that it is not only systems of governance which should conform to the ideals of multi-party democracy, but leaders should make efforts to improve the well-being of the poor.

c. Food Security

Food security is a situation that exits when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets the dietary needs and food preference for an active and healthy life (FAO, 2002b). Household food security is therefore the application of this concept to the family level, with individuals within households as the focus of concern. Physical access to food means that food is available in sufficient quantities and is constantly available to all individuals and households. Social access is ensured when all people have equal access to food, irrespective of their socio-economic position, sex, race, ethnicity or religion. Economic access to food is the situation in which all people have adequate

financial resources to obtain appropriate food. This depends on income available to the household, the distribution of the income within the household and the price of food.

Food insecurity is the opposite of food security. FAO (2008) estimated that about 907 million people in developing countries are hungry and more than 60% of the chronically hungry people are women. In 2008, the FAO Cereal Price Index doubled and created a global crisis. The world‟s poorest households spent about 60-100% of their incomes on food and had no mechanisms to cope with rising prices other than to reduce the volume or nutritional quality of their consumption. This situation created a new class of urban poor and even led to food riots in 30 countries (FAO, 2008).

There are several causes of food insecurity in the world. The most important ones identified by Hussein (2002) due to the absence of firm governance structures are:

i. The long decline in the scale of investment in agriculture in the developing world,
ii. The exercise of inappropriate rules for trade and investment between rich and poor countries and
iii. The global tolerance of extreme inequality which permits the diversion of valuable food resources

Causes outside the direct control of governance structures are poverty of the household, lack of institutional support in times of crisis, natural disasters such as flood and drought, conflicts and poor utilization of food.

d. Reduced Vulnerability

All the livelihood assets that households have are subjected to vulnerability factors such as trends, shocks and seasonality patterns. Different people are affected in different ways by the vulnerability factors. One important aspect of reducing vulnerability is to identify those trends, shocks and aspects of seasonality that are of particular importance to livelihoods (DFID, 1999). Efforts can then be concentrated on understanding the impact of these factors and how negative aspects can be minimised. This requires a prior understanding of what types of livelihood strategies are employed by local people and what factors constrain them from achieving their objectives.

The ability of a livelihood to be able to cope with and recover from stresses and shocks is central to the definition of sustainable livelihoods (Scoones, 1998). Thus, people, especially the poor, who are not able to cope with such stresses are more vulnerable and cannot achieve sustainable livelihoods. Such people must be helped to become more resilient and better able to capitalise on its positive aspects. Supporting poor people to build up their assets for example, improving access to education and health care or assisting them to improve on their networks and connectedness could lead them to have more access to financial capital and thereby help to reduce their vulnerability.

e. More Sustainable use of Natural Resources

Agriculture has been the major livelihood activity of most rural dwellers. These people depend on the small piece of land that is available to them. As agricultural activities increase; there is pressure on the natural resources. There is therefore the need to practice sustainable agriculture to satisfy human needs while maintaining the quality of environment and conserving natural resources. Veldhuizen et al. (1997) indicated that sustainable agriculture is one that is economically viable, ecologically sound, socially just, humane and adaptable.

- ***Economically viable*** refers to the situation where farmers produce their farm products by minimising costs and maximising profits. In this case, they produce at a very low risk levels and achieving their livelihood outcomes.
- ***Ecologically sound*** natural resource management is the system where farmers produce at a level that they ensure that the quality of the environment is maintained. Some negative practices such as bush burning, excessive overgrazing, destruction and pollution of water bodies and excessive and continuous use of a piece of land without replacing the nutrients should be avoided..
- ***Socially just*** requires that all farmers have equal access to natural resources irrespective of sex, tribe, religion or position. There should not be discrimination in any form whatever against anybody.
- ***Humane management*** requires that all forms of plant, animal or human life must be given the full respect and treated with the dignity it deserves.

- ***Adaptable*** means that individuals, households and communities must be able to adjust to constantly changing conditions such as population growth, new policies and market demands.

According to Veldhuizen et al. (1997) all the above five factors are negatively affected by both traditional agriculture and High External Input Agriculture (HEIA). In traditional agriculture farmers most often expand farming into marginal areas, because of either population pressure or greater need for cash, resulting in risks of over exploitation, erosion and poor soil fertility. In HEIA, there is more emphasis on the use of external inputs such as hybrid seed, fertilisers, biocides, mechanization to increase productivity. For effective and sustainable use of natural resources, Reijntjes et al. (1992) recommended the use of Low External Input and Sustainable Agriculture (LEISA) which encompasses new approaches such as biodynamic, ecological, natural and organic farming. These would help integrate the soil fertility management, arable farming and animal husbandry, make efficient use of nutrients, water and energy.

3.3 Technology and Sustainable Livelihoods

Technology involves how knowledge and skills are used to operate machines and equipment and how these affect people‟s ability to control and adapt to the environment. It has been perceived as having four inter-related parts - technique (machines and equipment), knowledge (know-how and skills), organisation (system, procedures, practices and support structures) and product (design and specification) (Scott, 1996). The use of technology started when people converted natural resources into simple tools and were able to use them to grow crops. The discovery and utilisation of fire, a simple energy source with many profound uses, was a turning point in the technological evolution of humanity. The discovered fire, fuelled with wood and charcoal, allowed early humans to cook food to increase its digestibility, improving its nutrient value and broadening the number of foods that could be eaten (Crump, 2001).

Modern economic thought identified technological innovation as the single most dynamic factor in the growth of national economies (Lartey, 2001). Technology has been found to influence growth through increases in efficiency and improved productivity. It removes drudgery from work, and generally raises the level of

comfort in the working and living conditions of households, brings about a reduction in rural poverty and urban squalor, which in turn produces changes in attitudes and habits, thereby raising the quality of life (Lartey, 2001; Odebode, 2008). Smith et al. (1994) believed that there is good agricultural potential in Africa if a sufficient number of farmers use new and improved technology.

Technology that is to be introduced into a community must meet people‟s needs, help protect the environment, use local skills and materials, help people earn a living and must be affordable. According to Wicklein and Kachnar (2001) an appropriate technology seeks to understand, operate and sustain technological systems to the benefit of humans while having the least negative societal and environmental impact on the communities involved. Wicklein and Kachnar (*ibid*) however cautioned that even if the technology is effective and meets all the design criteria it may fail if it is not acceptable within the customs of the people for which it was designed.

3.3.1 Influence of Livelihood Assets and PIPs on Technology Adoption

All the five capital assets in combination with each other influence the adoption of technologies by farmers. *Physical capital* in the form of good roads is needed to enable farmers transport their produce to markets outside their locations. Adopting a technology such as high yielding varieties of cassava may lead to increased productivity. Without good roads and an efficient transport system, harvested cassava roots may remain in the village and become wasted. The high yielding cassava variety may thus be irrelevant to the farmer because it cannot be transported to outside markets easily.

Farmers need a significant amount of money or *financial capital* to adopt most technological innovations. Resource poor farmers might not adopt a technology due to lack of cash or credit facilities. Henderson (2001), referring to a strategy document by the Association for Strengthening Agricultural Research in East and Central Africa, indicated that resource rich producers are usually the initial people who adopt improved technologies although they were not actually targeted as priority beneficiaries. On the other hand, Adebayo and Sangosima (2005), studying processors‟ perception on five different cassava processing technologies, found that none of the processors adopted three of the technologies and for the others that were

adopted; the highest adoption was 30%. This was attributed to the fact that the farmers could not afford to pay for the cost of the machines.

Provision of credit facilities to resource poor farmers is therefore necessary to enable them adopt improved technologies for production and processing. However, accessing credit from the formal financial institutions is very difficult for the poor farmer (see section 3.2.1b). To solve this problem, the use of credit packages for technologies was practiced by several extension organisations. In Sub-Saharan Africa, Sasakawa Global 2000 distributed several technology packages in Ghana and Benin and this approach resulted in yield improvement in farmers‟ Extension Test Plots (ETP) of maize and sorghum (Nubukpo and Galiba, 1999).

Human capital in the form of knowledge and skills are crucial to the adoption of technologies. Moris et al. (1999) found a link between farmers‟ level of education and their tendency to try new technologies and observed that farmers who adopted modern maize varieties have a better education than the non-adopters. Similarly, higher levels of education were found to increase adoption of cassava processing technologies among women processors in Nigeria (Odebode, 2008; Ogunleye et al., 2008).

The use of human labour leads to drudgery and weakens the human body. It is therefore necessary that labour saving devices are introduced especially in farming. The adoption of the cassava grater in Nigeria and Ghana was observed to have reduced drudgery and saved labour which would otherwise have been used manually (Nweke, 2004). Labour saving technologies may lower the marginal cost of production and provide producers with an incentive to increase total output and employ more inputs. However, Ellis (1998) observed that not all mechanization (e.g. irrigation pumps) nor all biological innovations necessarily save labour.

Social capital, involving group membership, networks and connectedness are necessary elements in the diffusion and adoption of technologies by farmers. The dissemination of information on technology to farmer-groups has been encouraged in extension approaches particularly in the T & V extension approach (Benor and Baxter, 1984). There were indications that T & V approach in Ghana gained some

success in farmer empowerment and their standard of living due to adoption of some recommended technologies from 1992-1996 but it was criticized as being rigid and non-responsive to the needs of farmers nationally and financially unsustainable (MOFA, 2001). Similarly Purcell and Anderson (1997) also observed that the T&V approach, like other World Bank-supported operations faced unlikely or uncertain sustainability. Anderson (2007) indicated that a regrettable experience was the failure of the World Bank to admit that the model was inappropriate for the situation in many client countries. The use of farmer groups for technology dissemination was also evident during the implementation of the Sasakawa Global 2000 project in Ghana and Benin. Nubukpo and Galiba (1999) observed that diffusion of agricultural technologies among farmers on the project was mostly done through social networks and connectedness. Similarly, members of farmer associations are more likely to adopt new agricultural technologies than those who do not belong to associations (Uaiene et al., 2009; Isham 2000).

Policies, institutions and processes also influence technology uptake. Rogers (2005) identified two characteristics of social structures that promote more rapid diffusion of innovations by Rogers (1995). Village homogeneity, which is referred to as the degree to which two or more individuals who interact are similar in certain characteristics, promotes more information sharing. That is, communication sharing is more effective as long as these individuals share some common attributes and beliefs. The second factor is how social norms that favour change can promote consultative decision-making and lead to more rapid diffusion of innovations. Rogers (1995) indicated that villages that have more traditional norms usually view innovators with suspicion and mistrust while villages that encourage collective decision-making innovators are eager to share their new ideas and influence the opinions of others.

Another important factor to be considered is secure access to land. Smucker et al. (2000) studying land tenure and adoption of agricultural technologies in Haiti, observed that informal arrangements based on traditional social capital resources assure affordable and flexible access to land for most people and on adoption, concluded that perceived stability of access to land is a more important determinant of technology adoption than mode of access.

3.4. Concerns regarding the use of the Sustainable Livelihoods Approach

The SLA was viewed to be complex and insufficiently dynamic in the sense that it fails to capture „change" both external and internal to households (Ellis, 2000). On the other hand, Hinshelwood (2003: 254) was of the opinion that an emphasis on institutional design and diverse capitals has made the SLA „merely a confused diagram and a wordy manual" and noted also that community work is not captured in the diagram. The holistic approach to livelihood systems forms part of the complexity found in the SLA. Even though Ashley and Hussein (2000) found out that the framework attempts to manage such complexity by creating „categories" within livelihoods, they realised that this poses the risk of simply adding another level of analysis with artificial distinctions and too much complexity for use by policy-makers.

Ambrose-Oji (2004) observed that language and concepts such as „coping and adaptation", „diversification", „social capital" are open to misunderstanding and need to be examined carefully. Ambrose-Oji was of the view that research outputs and materials need to avoid livelihoods jargon so that there could be improved understanding and credibility to research. Arce (2003) also believed that using words like capitals in uncritical, easily transferred ways may reduce the ability for local people to assert their own values in framing development policy.

Ashley and Hussein (2000) observed that empowerment issues are not clearly addressed in the framework. Increased skills (human capital), stronger community organisation and cohesion (social capital) and ability to influence external force; all face the risk of getting lost within the framework because they are not clearly flagged. An important dimension that appears to be under-emphasised in the SLA is the issue of social differentiation. The SLA does not clearly address the differential conditions, assets and strategies of socially differentiated groups, therefore additional attention must be given to the implication of gender, ethnicity, class, or other types of social differentiation (Ludi and Slater, 2007).

There were other views that culture and political capital should be added to the existing five capital assets. Culture is centrally important in people's lives, choices and well-being, and has economic values as well. Adato and Meinzen-Dick (2002)

suggested that culture should be seen as the sixth capital. Power relationships, politics and historical experience are the other concepts that were not included in the framework even though they help to shape people‟s livelihoods options and strategies including technology choices (Adato and Meinzen-Dick, 2002; Baumann and Subir, 2001, Ashley and Hussein, 2000). These limitations can be addressed by using the SLF in conjunction with concepts drawn from other conceptual frameworks or fields of study. However, Baumann and Subir (2001) suggested that political capital be given equal status with other capital assets and in a recent framework developed by Ludi and Slater (2007), political capital was added as a sixth asset, changing the assets pentagon to a hexagon.

One point of view was that assets cannot be directly compared in the SLF thus making it difficult to use them to evaluate levels of success (Macqueen, 2001). Even though measuring assets could be difficult, Bond and Mukherjee (2001) attempted using aggregated scores for different capital assets in Rajasthan. Davis (2001) in a case study in two provinces in Cameroon also used the SLF in an attempt to quantify capital assets, using a range of indicators such as access to education and health care services although acknowledges that some of these were crude.

3.5 The SLA: Lessons Learnt

The SLA has been found to be a very useful analytical framework for research. According to Clarke and Carney (2008), the SLA provided a way to order information and understand the nature of poverty and also the links between different aspects of people‟s livelihoods. In this way, they assist users to understand complex and changing situations. Clarke and Carney (2008) identified some particular areas where the SLA has been very valuable. These include;

- Understanding the dynamics of the route out of social protection to the production and promotion of more viable livelihoods
- Analysing complex trends such as climate change and conflict situations and linking these to practical action
- Providing a framework for understanding the current food crisis and how and why it affects different groups in different ways

The SLA has helped to build cross-sectoral and cross institutional dialogue as well as drawing in multiple stakeholders and heading off conflict. For example, the Chars Livelihoods Programme in Bangladesh has developed a very successful working relationship with local government and district-level providers of services without having any relationship with the line ministries to which these providers are attached.

In a study of twelve case studies, Neely et al. (2004) observed poverty reduction, enhanced resilience and long term sustainability as positive impacts on the rural poor. On poverty reduction, there was sufficient evidence of increased income as a result of the following:

- Increased agricultural production
- Diversification through additions of crop and livestock or other farming strategy
- Value addition to existing production, non-agricultural enterprises or off-farm employment

Improved incomes in turn, led to improved food security. There was also evidence of improved basic needs, satisfaction through increases in living conditions, nutrition, sanitation and improved access to services such as sanitation, health, education, credit and extension services.

It was also observed that there was increased resilience and the capacity to cope with shocks. For example, the IRDP Project in Ethiopia was found to be successful in improving the livelihoods of the target community members and in ensuring that the majority of target households were able to maintain their status quo against the severity of the drought (Oxfam Canada/REST, 2003). Similarly, increased resilience and capacity to cope with shocks were observed with WIN Project during the internal conflict between government forces and Maoist rebels in Nepal. Also the Lempira Sur region of Honduras was able to withstand the ravages of El Niño and Hurricane Mitch as a direct result of project interventions (Neely et al., 2004).

The case studies also found that there was long-term environmental sustainability (e.g. in the form of mimicking ecosystems in Honduras), natural resource recovery measures and institutional and community sustainability. In financial sustainability, it

was observed that there were high rates of loan repayments made by community development organisations to fund income-generating and community benefit activities.

3.6 The SLA: Current Status

Despite the fact that the SLA and people-centred development had gained important attention globally, DFID decided to move away from this way of working. Clark and Carney (2008) indicated that the SLA was always controversial within the DFID. Even though many partner organisations responded to the use of SLA with much enthusiasm, resistance within the DFID remained strong. A particular concern in the DFID was whether the SLA could contribute to higher level policy dialogue and formulation, notably the first generation of Poverty Reduction Strategy Papers. Following personnel changes and restructuring in 2002/2003, attention was shifted to securing transformation at national scale and providing greater support for domestic processes. However, the SLA has not completely died within DFID, though it was clear that the sustainability aspect, especially environmental sustainability, has largely fallen from view. To make progress with the SLA, Clark and Carney (2008) suggested that it is important to build on its concrete achievements and also to develop a simple narrative for the SLA and to link the narrative with other modes of working and DFID corporate objectives.

3.7 Summary

Approaches to rural development including the green revolution, and integrated rural development were found not to have eliminated poverty among the rural poor. The SLA was also adopted in the 1990s in an attempt to eliminate poverty. Despite the fact that the SLA has been found to be a very useful analytical framework for research, helped to build cross-sectoral and cross institutional dialogue, reduce poverty and enhanced resilience and long term sustainability as positive impacts of the rural poor, it waned in the DFID. Following the restructuring in 2002/2003, attention was shifted to securing transformation at national scale and providing greater support for domestic processes. To make progress with the SLA, it has been suggested that it is important to build on its concrete achievements and also to

develop a simple narrative for the SLA and to link the narrative with other modes of working and DFID corporate objectives.

One important critique which was considered while developing the methodology was the issue of empowerment. During preliminary discussions with the farmers and processors, participatory methods were used so that they were able to identify their problems and suggested solutions which led to the upgrading exercise. In demonstrating the technologies to them, they were encouraged to try their hands on the technologies and those who adopted, especially the *fufu*, were able to prepare it on their own.

CHAPTER 4

THE VALUE CHAIN FRAMEWORK

4.0 Introduction

The chapter reviews ideas around value chains in the global economy. It looks at why and how the chains are governed, and the forms and types of governance that exist. There is also a review of upgrading in value chains, the strengths and limitations of value chain analysis and finally how to combine value chain analysis and sustainable livelihoods approach in the study, giving examples from cassava value chains where necessary.

4.1 The Evolution of Value Chains

Any commodity, be it a farm product or an industrial end product, passes through several stages before reaching the consumer. For example, when cassava is produced from the farm, it can be processed into various products such as *gari*, *agbelima* and composite flour, distributed through middlemen and retailers before reaching the final consumer. At each stage in the process, value is added and this sequence of activities is regarded as a value chain. A value chain has been defined as "the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production, involving a combination of physical transformation and the impact of various producer services, delivery to final consumers and final disposal after use" (Kaplinsky and Morris, 2003:4).

In the value chain literature there are so many concepts with similar ideas. Bair (2005) indicated that Hopkins and Wallerstein (1977) initially used the term commodity chains to describe the complex processes involved in the production of any consumable item involving the raw materials, their transformation, transportation, labour put into production and the final product. According to Bair (2005), later, an article by Wallerstein and Hopkins (1986) defined commodity chain with greater precision as „a network of labour and production processes whose end result is a finished commodity. Sturgeon (2008) explained that as a more dynamic view was adopted to chain governance, the term „commodity" was replaced with „value" because of popular connotations of the word „commodity" with undifferentiated products, especially primary products such as crude oil and bulk

agricultural goods, and because the term „value" captured both the concept of „value added". According to Sturgeon (2008) the concept, „value added" fit well with the chain metaphor, and focussed attention on the main source of economic development: the application of human effort, often amplified by machines, to generate returns on invested capital.

In the late 1970s and 1980s, the French used a similar concept which was referred to as the *filière* which literally means thread. It was used to describe the perceived need for French industrial capability to span the complete thread of a value chain, i.e. the flow of physical inputs and services in the production of a final product (Kaplinsky, 2000). The *filière* tradition was developed by French researchers at the *Institut Nationale de la Recherche Agronomique (INRA) and the Centre Internationale en Recherche Agronimique pour le Developpment* (CIRAD) as an analytical tool for empirical agricultural research. It was used as a technique applied to analysing existing marketing chains for agricultural commodities (Kaplinsky, 2000).

Another source of prominence of the value chain as an analytical tool came from Michael Porter in the mid 1980s. Porter (1985) identified two key issues that were necessary to include in the modern value chain analysis:

i. The various activities which were performed at particular links in the chain such as inbound logistics operations, outbound logistics, marketing and sales and after-sales service.
ii. The support services the firm organises to accomplish this task. These are strategic planning, human resource management, technology development and procurement.

Separately identifying these various functions draws attention away from an exclusive focus on physical transformation. Harmonizing the intra-link functions in the concept of the multi-linked value chain itself, Porter (1985) referred to the concept as a value system which basically extends his idea of a value chain.

Another concept, Global Commodity Chains (GCC), which was introduced by Gereffi et al. (1994), laid emphasis on an internal governance structure of supply and demand which distinguished between Producer Driven Commodity Chains (PDCC)

and Buyer Driven Commodity Chains (BDCC) and on the role of diverse lead firms in setting up global production and sourcing systems.

Apart from the above concepts, there were others such as global production networks, global production systems and international production networks. According to Bair (2005), some researchers argued that it would be useful to agree upon a common terminology of „value chain analysis" as a way of promoting a research community of scholars studying production networks in the global economy. The value chain concept was adopted over several widely used alternatives because it was perceived as being the most inclusive of the full range of possible chain activities and end products (Gereffi et al., 2001).

4.2 Agricultural Value Chains

Increasing agricultural production has been recognised as one of the effective ways of reducing rural poverty. This is because agriculture remains the most likely source of significant economic growth in many developing countries (DFID, 2002b) and most of the world"s rural poor depend on agriculture for their livelihoods (World Bank, 2001) and that agricultural growth is more effective for poverty reduction than growth of mining, manufacturing or services in the developing countries (Eastwood and Lipton, 2000). Agricultural production and marketing strongly depend upon knowledge, human capital and competitiveness in maintaining expanding markets. This can be made possible when all the highly fragmented production and marketing relations are identified and linkages established. Adoption of a value chain approach in practical agricultural activities will help all players improve access to services, information and inputs; reduce transaction costs, assure product quality till it gets to the consumers and increase value addition and income at every step of the value chain (MOAP, 2005).

One major problem that the agricultural sector in developing countries faces is low competitiveness in the domestic, regional and international markets. Humphrey (2006:4) identified three major challenges that must be overcome in order to meet the market requirements for agricultural products. These are:

i. Standards in the global agricultural trade must be satisfied as food safety requirements of importing countries have become more complex.

Demonstrating compliance with standards has also become more complicated because of a shift from product standards towards controls over the way the products are grown, harvested, processed and transported.

ii. Some of the most dynamic sectors in agricultural trade have to satisfy such requirements as large-volume supply, speed and reliability of delivery, customization of products through processing and packaging and guarantees about product safety.

iii. There are opportunities for product differentiation strategies in some of the sectors (e.g. tea and coffee). Strategies for adding value to such products involve certification or closer links with traders, processors or retailers. The process of adding value requires that the identity and distinctiveness of the product is established at the point of origin and maintained as it moves along the value chain.

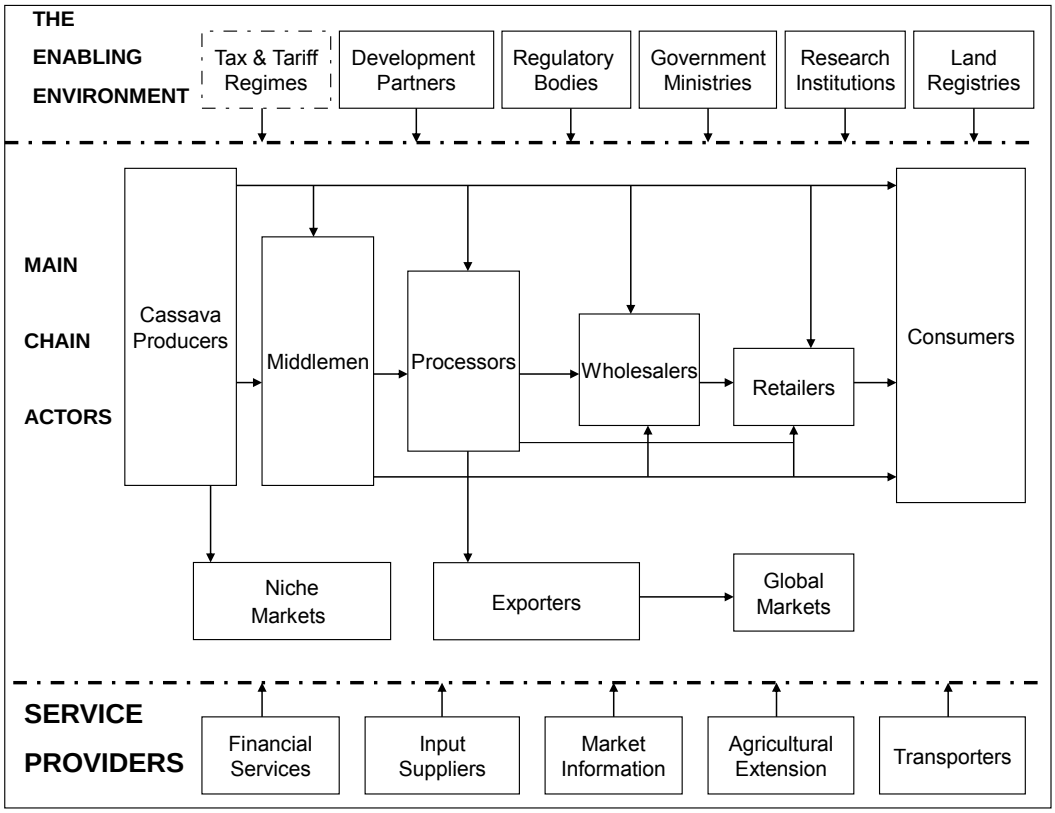
Humphrey (2006) indicated that meeting these challenges means organising agribusiness value chains to be able to deliver what is required by global buyers and food safety regimes and referred to the organisational trend as vertical coordination.

4.3 A Simple Cassava Value Chain

A simple value chain is made up of three components: the main actors, service providers and business and extension services (Hellin et al., 2005; Albu and Griffith, 2005). The value chain (Fig. 4.1) has been adapted from two groups of authors but only the conventional flow was used. Kaplinsky and Moris (2003) used conventional value chain framework in which goods flow from the primary producers through the chain to the consumers. However, in developing market maps, Albu and Griffith (2005) reversed this flow to allow income to flow from markets along the chain to primary producers. The flow was introduced consciously to promote a demand-led perspective and suggests how a greater share of say, urban expenditure on a product may reach the farmers. In the chain developed by Kaplinsky and Moris (2003), chain actors and service providers were clearly shown without an enabling environment, which is found in the chain developed by Albu and Griffith (2005). The two chains were therefore adapted to involve an enabling environment and the flow of goods and services from primary producers to consumers. Understanding the contribution of each actor in the chain helps to identify inefficiencies, unfairness and losses which

could be remedied or added value which could be captured by poor producers in particular (Albu and Griffith, 2005).

Figure 4.1 A Simple Cassava Value Chain



Adapted from Kaplinsky (2000); Albu and Griffith (2005)

The main actors are those who transact a particular product as it moves through the chain. For a simple cassava value chain (Fig. 4.1), the actors may include cassava producers, individual and village processing units, intermediary processors, distributors, exporters and the final consumer (Kleih et al., 2008; Onumah et al., 2008). In this value chain, the producers combine inputs such as planting material, labour, land, manures to produce cassava roots. The roots are either sold to middlemen who transport them to processors or consumers or are sold to consumers direct. Value is added by processors who convert the cassava roots to consumable products such as *fufu* and *agbelima* or shelf stable products such as *gari*, *kokonte* and cassava flour. Market women also add value by providing services in buying and selling the products. For example when gari is bought from the processor, more sieving is done and there is also bagging to improve the quality for markets. To

producers and processors, value addition is expected to improve incomes through improved market access and improved product and access to more reliable and improved raw materials. To the consumers, it is a better value for money through wider choice of better products and healthier food at affordable prices (Will, 2006).

A second component of the chain is the people who provide services to the main actors. The services may include credit provision by formal and informal financial institutions, extension, market information and training by extension organisations, wage labour and transportation. Input suppliers may also provide farm inputs in the form of fertilizers and agro-chemicals while transporters are engaged in carting fresh cassava roots and processed products from the hinterland to the urban areas. Hellin et al. (2005) noted that apart from conventional government extension services and private fee-based services or input providers, there are also embedded services within a commercial transaction for another product. For example, a fabricator who manufactures a cassava slicing machine may advise processors on how to use such a machine.

The third component of the chain is an enabling environment which, according to Hellin et al. (2005), includes structures such as global, national and local authorities, research; and institutions (policies, regulations and practices). At the global level, there could be multi- and bilateral trade agreements and worldwide standards (Kula et al., 2006) for example, the World Trade Organisation (WTO) or development partners giving financial assistance to poorer countries (e.g. IFAD sponsored cassava initiatives in Ghana). At national and local levels, there are regulatory bodies (e.g. The Ghana Standards Board {GSB}, Food and Drugs Board {FDB}), Research Institutions (FRI, CRI) and Ministry of Trade and Industry (MOTI) and MOFA. A study of the enabling environment helps to understand the trends that affect the value chain and examines the powers and interests that are driving change and therefore helps to determine avenues and opportunities for realistic action, lobbying and policy entrepreneurship (Albu and Griffith, 2005).

4.4 Globalization and Value Chains

Globalization is the process by which people, companies, goods and services, capital and information and ideas are exchanged across international boundaries (Kula et al., 2006). Thus, organisation of production, trade and consumption of any commodity could be been found in different parts of the world. According to MOAP (2005), globalization allows firms to get information about sources of inputs, market opportunities and technology that can help producers to meet the demands of the market, creating opportunities for developing a value chain. Globalization has led to competitiveness on a worldwide scale as it is driven by international trade, urged on by market liberalisation and aided by technology. Initially, industries competed against each other in the same country but with globalization, industries in one country now compete with the same industries in other countries.

Smallholders, especially in Africa, need to be linked to global markets to reduce the gaps that exist in many markets and improve their market access. ECA (2009) therefore called for a proactive approach to connect such smallholder producers, who form the majority of farmers in Africa, to consumers who may include processing firms, wholesalers, retailers or individuals at home and abroad. However, market liberalisation which is a key ingredient in globalization makes African products more open to competition and volatility because foreign goods and services also have free access to African markets (ECA, 2009). Altenburg (2007) believes that for such smallholders to harness market opportunities for their agricultural products, they must be in a position to compete with products from other parts of the world in the local, regional and international markets.

The issue of greater consumer awareness with demand for superior and differentiated products has led to increased competition which has resulted in lower returns for actors in African agriculture as they lag behind their competitors in innovation and the ability to set their products apart. This has been seen in the accelerated year-round consumption of fresh fruit and vegetables and the sale of an increasing variety of prepared foods in industrialised countries due to changes in dietary habits stemming from increased health awareness, together with demand for convenience foods (Dolan and Humphrey, 2001).

The proponents of globalization, according to Kaplinsky and Morris (2003) have indicated that poor countries with open economies have enjoyed higher than average growth rates. As with the Chinese economy which grew at an annual rate of 10.2% during the 1980s and 12.8% during the first half of the 1990s, a large number of people have gained through this growth. Also, globalization linked to trade liberalization is opening up so many opportunities for developing countries. Many of the world‟s population have experienced significant improvements in living standards. Kaplinsky and Morris (2003) observed that by 1998, there were 670 million more people living above the absolute poverty line than in 1990. This, according to them, represents a major advance in human welfare. However, Gereffi et al. (2001) observed that gains from globalization are very unevenly distributed within, as well as between societies. While the total proportion of trade emanating from developing countries has grown massively, China and a few oil-producing states account for the lion‟s share of this total and the 49 Least Developed Countries account for just 2% of developing-country exports and 0.5% of global exports (USAID, 2003). Streeten (1998) pointed out that in high income economies in general, income distribution has tended to become more unequal while Wood (1997) observed an increase in inequality between skilled and unskilled wage earners in Latin America and in the industrially advanced countries also.

There are losers and winners in the globalisation process. Sarpong (2004) observed that even though smallholder farmers and industries engaged in import substituting activities, such as rice and poultry farming, have suffered the effect of globalization in Ghana as they have to face cheap imports from the EU and Asia, traditional export crop smallholders in cocoa, coffee and sheanut collection have gained with adjustments in exchange rates and reduction in explicit government taxes on these export commodities.

The opponents of globalization believe that not everybody has gained from it. Casualties include those who have been excluded from globalization, those who have suffered from it and finally, those who have gained but remain poor (Kula et al., 2006). They also observed that:

- The creation of an international free market has benefited multinational corporations in the Western World at the expense of local enterprises, local cultures and the poor.
- Industries and firms with little innovation find it harder to generate positive returns in undifferentiated product markets,
- Where firms are disconnected, competing rather than cooperating, they are unable to contend with linked enterprise that generate collective efficiencies and/or vertically integrated firms.

Globalization, according to Dicken (1998), implies functional integration between internationally dispersed activities and Gereffi et al. (2001) observed that if this were true, then the value chain perspective is an effective means of conceptualizing the forms that this integration takes. This is because the value chain shifts focus from production alone to a range of activities from design to marketing. Thus it can help to answer questions about the winners and losers in the globalization process, how and why the gains from globalization spread, and how the numbers of gainers can be increased.

4.5 Governance in Value Chains

This section explains what governance means in value chain analysis, why there should be governance, forms of governance that exist and the relationships in chain governance.

4.5.1 Why Value Chains are Governed

In value chain analysis, some firms directly or indirectly influence the organisation of production, logistics and marketing systems, thereby creating governance systems. Governance has been defined as the process of specifying, communicating and enforcing compliance with key product and process parameters along the value chain (Humphrey and Schmitz, 2004). Three key parameters in chain governance have been identified by Humphrey and Schmitz as:

- What is to be produced: product design and specifications
- How it is to be produced, process specifications
- How much is to be produced, and when: production scheduling and logistics

The limits of what is to be produced and how it is to be produced are usually set by the buyers. However, the levels of details of each can vary. As buyers pursue a strategy of product differentiation through design and branding, there arises the need to provide suppliers with precise product specifications and to ensure that they are met (Schmitz, 2005). In product definition, the buyer can provide different levels of specification or set a design problem for the producers who solve them by providing the technology and design. In the trade between UK supermarkets and Africa in fresh vegetables, the supermarkets have emphasised fresh, healthy food, ease of preparation and innovation in order to attract high-spending, middle-class consumers (Dolan and Humphrey, 2001). Governance of the fresh vegetables chain has led to a decisive transformation in the structure of the trade and participating firms. Similarly, in the HQCF value chain in Ghana, Feed and Flour Ghana Limited (FFGL) which buys grits from farmers and sells to Amasa for final processing, also specified the minimum standards of dryness, colour and taste that dried grits must meet before they could be purchased (Cassava SMEs, 2007).

When to produce and how much to produce sometimes depends on the producer. An SME might make a product according to its own estimations of the market demand using a design that has no reference to any particular customer and using its own processes. The decision can also be taken by the producer and buyer when the product is scheduled according to „make-to-order" rather than „make-to-forecast" (Humphrey and Schmitz, 2004: 7). This was observed in the case of China increasing the imports of cassava chips from Thailand from 1.96 MT in 2003 to 2.56 MT in 2004 (Sriroth et al., 2006).

As much as possible, parameters set must be monitored and enforced in chain governance. Referring to governance of fresh vegetables chain linking Kenyan producers with UK supermarkets, Humphrey (2005) indicated that the monitoring mechanisms included supplier selection, monitoring of capabilities through supplier audit and regular inspections.

Dolan and Humphrey (2001) identified two factors that are necessary for governance in the chain. First is the increasing use of product differentiation strategies in developed countries. This implies that retailers derive competitive advantage from

selling non-standard products that are not generally available in the market, competing on price, reliability and product variety, product quality and speed of innovation. Secondly, governance requirements increase when developing country producers have difficulty in meeting the requirements of developed country markets. According to Dolan and Humphrey (2001) the need for governance is reinforced in certain markets by increased concern for labour, environment and product safety standards, either through legal obligations or consumers, government and NGO pressures.

4.5.2 Types of Governance

Two types of governance were identified by Gereffi (1994) as the Producer-Driven Commodity Chain (PDCC) and the Buyer-Driven Commodity Chain (BDCC). PDCC refers to those industries in which large, usually transnational manufacturers play central roles in coordinating production networks, including backward and forward linkages, characterised by capital and technology intensive industries such as automobiles, computer, aircraft and electrical machinery (Gereffi, 1999). This shows that the key producers in the chain play the role of coordinating the various links and are more likely to be characterised by foreign direct investment. The BDCC refers to those industries in which large retailers, branded marketers, and branded manufacturers play the pivotal roles in setting up decentralised production networks in a variety of exporting countries, typically located in the Third World (Gereffi, 1999 pp 41-42). This type of chain describes how the critical governing role is played by a buyer at the apex of the chain. It is common with the labour-intensive and consumer goods industries such as garments, footwear and toys. However, Dolan and Humphrey (2001) applied the term buyer-driven when analysing the impact of UK supermarkets on the African horticultural industry where the UK supermarkets, as buyers, were clearly driving the business. Similarly, Tuan and Cuna (2005) observed that markets for cassava-based products are buyer-driven, and price signals come from the world markets to cassava producers and that demand for starch and other cassava-based products is very high, hence their prices are very high in high-income countries yet, the technical specifications and competition of other starch products make it difficult for Vietnamese products to access those markets. Ponte (2001) also observed that the post International Coffee Agreement regime in East Africa exhibited many of the characteristics of the buyer-driven chain. This is because

strategic choices made by roasters have shaped barriers to entry not only in the roaster segment of the chain, but also in other segments upstream and thus labelled it „roaster-driven" chain. Gereffi (1999) indicated that each of the different types of production systems is associated with different types of commodity chains as indicated in Table 4.1 below.

Table 4.1 Producer and Buyer-Driven Commodity Chains Compared

	Producer-driven commodity chains	**Buyer-driven commodity chains**
Drivers of Global Commodity Chains	Industrial capital	Commercial capital
Core Competencies	Research and Development; Production	Design; marketing
Barriers to Entry	Economies of Scale	Economies of scope
Economic Sectors	Consumer durables Intermediate goods Capital goods	Consumer non-durables
Typical Industries	Automobiles; computers Aircraft	Apparel; footwear; toys
Ownership of Manufacturing Firms	Transnational firms	Local firms, predominantly in developing countries
Main Networks Links	Investment-based	Trade-based
Predominant Network Structure	Vertical	Horizontal

Source: Gereffi (1999).

Kaplinsky and Morris (2003) observed that, in some of the value chains, there is very little governance, or at best, very thin forms of governance. Clancy (1998), studying the tourism industry observed that governance structures do not conform to either the buyer-driven or producer-driven commodity chain models as frequently predicted by the Global Commodity Chain analysis. Similar criticisms were made by Gellert (2003) and Henderson et al. (2002) who disputed the applicability of the two governance types.

4.5.3 Relationships in Chain Governance

Gereffi at al. (2005: 83-84) proposed a typology which identifies five basic types of chain governance. They claimed that these are analytical, not empirical although they have been in part derived from empirical observation.

Box 4.1 A Typology of Network Relationships in Value Chain Governance

Market-based: Market linkages do not have to be completely transitory, as is typical of spot markets; they can persist over time, with repeat transactions. The essential point is that the costs of switching to new partners are low for both parties.

Modular value chains: Typically, suppliers in modular value chains make products to a customer‟s specifications, which may be more or less detailed. However, when providing „tum-key services‟ suppliers take full responsibility for competencies surrounding process technology, use generic machinery that limits transaction-specific investments, and make capital outlays for components and materials on behalf of customers.

Relational value chains: In these networks we see complex interactions between buyers and sellers, which often create mutual dependence and high levels of asset specificity. This may be managed through reputations, or family and ethnic ties. The role of spatial proximity in supporting relational value chain linkages is important but the trust and reputation might well function in spatially dispersed networks where relationships are built-up over time or are based on dispersed family and social groups.

Captive value chains: In these networks small suppliers are transactionally dependent on much larger buyers. Suppliers face significant switching costs and are, therefore, „captive‟. Such networks are frequently characterised by a high degree of monitoring and control by lead firms.

Hierarchy: This governance form is characterised by vertical integration. The dominant form of governance is managerial control, flowing from managers to subordinates or from headquarters to subsidiaries and affiliates.

Source: Gereffi et al., 2005

4.6 Upgrading in the Value Chain

This section explains why there should be upgrading by firms, the types of upgrading available and implications for upgrading.

4.6.1 Why Firms Upgrade

Producers need to maintain or increase their incomes as they face competitiveness. Thus they must either increase skill content of their activities or move into market niches (places) which have entry barriers and are therefore somehow protected from these pressures. These shifts in activities which would enable firms to remain in business have been referred to as „upgrading‟ (Humphrey and Schmitz, 2002; Kaplinsky, 2000). Upgrading is a desirable change in value chain participation or

governance that enhances rewards or reduces risks for a defined target group (Bolwig et al., 2008). Most firms in developing countries are faced with improving their performance in order to increase their competitiveness, that is, the ability of a firm or industry to develop and maintain an edge over market rivals (Kula et al., 2006). This can be achieved through producing and delivering goods and services more efficiently, differentiating products or services through quality standards and branding, and/or exploring new product demands.

In order to upgrade, most firms or SME owners, according to Dunn et al. (2006) take into consideration:

- Profits: The expected levels of profits are the net returns on investment in the upgrading process;
- Risks: firms do not usually have complete information about the likelihood of each outcome. They therefore look at the risk involved before deciding to upgrade;
- Sustainability: they usually assess how the upgrading could be sustained in terms of income flows, continued market access and future economic security;
- Household economic portfolio: most micro-scale enterprise owners would like to make sure that the household‟s production, consumption and investment activities take place simultaneously assuming that resources are available.

Hamel and Pralahad (1994) suggested that firms focus on their core competences while Teece and Pisano (1994) also thought that they should focus on dynamic capabilities. Focussing on core competences means that firms have to examine their capabilities to determine attributes which:

- Provide value to the final consumer
- Are relatively unique in the sense that few competitors possess them
- Are difficult to copy, that is where there are barriers to entry

On dynamic capabilities, Teece and Pisano (1994) argued that corporate profitability in the long run cannot be sustained by control over the market but through the development of dynamic capabilities which arise out of the firm‟s:

- Internal processes which facilitate learning, including the capacity to reconfigure what the firm has done in the past

- Position, that is, its access to specific competences either within its own activities, or those which are drawn from the regional or national system of innovation
- Path, that is, its trajectory, because change is always path-dependent.

Kaplinsky and Morris (2003) observed that these two related concepts (core competence and dynamic competence) provide an important environment for understanding the concept of upgrading because they are helpful in explaining the factors which drive and facilitate improvements in product and processes which arise from the activities of the firm itself. On the other hand, they are also weak because they stop at the level of the firm, and fail to capture upgrading processes which are systemic in nature.

4.6.2 Types of Upgrading

Many authors have identified four main types of upgrading in the value chain (Dunn et al., 2006; Kaplinsky and Morris, 2003; Humphrey and Schmitz, 2002). These are process, product, functional and chain upgrading.

a. Process Upgrading

This is an attempt to increase the efficiency of internal processes both within and between individual links in the chain resulting in greater output for the same level of inputs (Kaplinsky and Morris, 2003; Humphrey and Schmitz, 2002). It involves the adoption of new technologies and new ways of organising products. Thus, local producers are encouraged to learn from global buyers on how to improve their production processes, attain consistent high quality, and increase the speed of response. In the *kokonte* value chain in Ghana, processors realised the need to improve on their processing activities because of the falling demand for *kokonte* in the market due to the poor and unhygienic nature of their processing activities. This was done in collaboration with the FRI during the implementation of the Cassava SMEs Project. This actually led to the upgrading exercise reported in Chapter 7.

Dunn et al. (2006) observed that vertical and horizontal linkages are major sources of information to firms in process upgrading. Vertical linkages provide technical services as part of the product transactions while with horizontal linkages, groups

formed by SMEs often help producers to gain access to training, finance, information and advice from other firms in the value chain. Onumah et al. (2008) observed farmer groups such as the Dzorgbenyuie Farmers Association or processing groups such as the Deladem Women Group at Hlefi in Ghana, providing horizontal linkages whereby information is shared among members in the cassava value chain. Even though the farmer group at Totsunya-Okper was not active, the members were able to cooperate with the Cassava SME research group to organise the upgrading exercise (see Chapter 7).

Dunn et al. (2006) identified lack of investment capital as a major constraint to process upgrading because process upgrading requires investments in long term equipment such as power machinery and heavy tools. Berg et al. (2006) observed that cassava processing SMEs face similar problems especially in *gari* processing where they still use basic and obsolete processing equipment such as putting rocks on the wet cake or tying heavy logs on them to dewater the wet cake instead of the hydraulic press. Results showing that lack of investment capital is a major constraint to process upgrading are found in Chapter 7. If the *kokonte* is produced through this process, future prospects exist for higher consumption of the product because it is the quality of the *kokonte* that consumers want.

b. Product Upgrading

Changes in consumer preferences over the years have necessitated upgrading of products to meet these changes. In product upgrading, either new products are introduced or there is an improvement in the old products. Dunn et al. (2006) cited the growth of consumer demand for specialty coffee that meets certain health, safety, environmental and social standards that led coffee growers to upgrade their product to meet speciality coffee specifications such as international organic and fair trade specifications. With reference to cassava value chains, the emerging urban demand for safe and quality products in the cassava value chain (Jumah et al., 2008) contributed to the introduction of the instant *fufu* which is a more convenient form of the product for the middle class in the urban areas. These improvements have positive implications on the livelihoods of micro and small scale village processing units who depend on such activities for their incomes.

Chop bar processing households during their interactions with the Cassava SME Project staff, realised the need to upgrade the traditional pounded *fufu* to the instant *fufu* which is safer and more convenient to meet the emerging urban demands. This therefore, resulted in the upgrading exercise carried out with the processing households in Chapter 6. Opportunities therefore exist for the processors to improve their incomes as people who did not like the processing method for the traditional *fufu* will now patronise the chop bars.

c. **Functional Upgrading**

This has been described by Humphrey and Schmitz (2002) as acquiring new functions (e.g. a move from production to processing) to increase the overall skill content of activities. It could be a movement to own design and own brand manufacture. Dunn et al. (2006) observed that functional upgrading is motivated by the desire to eliminate the market power of intermediaries and the desire to improve the flow of market signals to producers. Thus as the intermediaries are eliminated, their functions are taken on by buyers or producers or by both. They also indicated that moving into a new level in the chain involves risks associated with shifting relationships, changing power balances and the need for new categories of knowledge and skills.

Functional upgrading was observed by Gereffi (1999:47) among developing country producers, especially in East Asia. According to Gereffi, the garment producers moved from assembly of imported inputs to increased local production and sourcing; to design of products sold under the brands of other firms; and finally to the sale of own branded merchandise in internal and external markets. In cassava value chains, Tuan and Cuna (2005) observed some actors in Vietnam that started to perform multiple functions, for example, large-scale farmers and starch processors who also perform trading activities and started exporting the produce.

d. Chain Upgrading

In chain upgrading, producers move into new value chains applying knowledge acquired from the current activities to new activities (Kaplinsky and Morris, 2003, Schmitz, 2004). Kaplinsky and Morris (2003) gave the example of how Taiwanese

firms moved from the manufacture of transistor radios, to calculators, to TV sets, to computer monitors and to laptops.

4.7 Strengths and Limitations of Value Chain Analysis

VCA concentrates on inter-firm linkages, allowing for an easy uncovering of the dynamic flow of economic, organisational and coercive activities between producers within different sectors. It is also a useful analytical tool in understanding how the policy environment can provide for the efficient allocation of resources within the domestic economy, as well as understanding the way in which firms and countries participate in the global economy (Kaplinsky and Morris, 2003).

VCA allows for learning and innovation which are necessary in creating and sustaining an industry‟s competitive advantage (Kula et al., 2006). Learning and innovation come from buyers in some chains and input suppliers in others. They are central to intervention strategies that have as their goal, improving and sustaining value chains.

The approach lays emphasis on the organisation of international trade, showing how production and trade are coordinated and shaped by lead firms. This gives rise to different patterns of industrial organisation. On the contrary, orthodox trade theory was concerned with endowments of production factors and assumes that trade relations are based on arms-length market based transactions (Altenburg, 2007).

The VCA helps to understand competitive challenges as performance of industries becomes more dependent on the quality of value chain relationships. If for example the chain is broken down into different stages and performance analysed, entrepreneurs and policy makers would be able to identify competitive disadvantages and define points of leverage for action. It is therefore an effective tool for identifying opportunities to improve the competitiveness of various players in the chain. According to Onumah et al. (2008), the VCA can help to explore the scope for alleviating the critical constraints faced by enterprises in the cassava sub-sector, including improving the provision of required services and promoting mutually beneficial relations between them, thereby increasing the incomes of households.

Merlin (2005) observed that there are two approaches that most African countries are applying to rural development. These are the livelihoods approach and the promotion of the private sector activities to support production and marketing. According to Merlin, some countries have shown that a key success factor lies in the re-definition of roles in the public and private sector actors along the value chains, arguing that the public sector should provide an enabling environment for the private sector to undertake agribusiness activities; whereas the private sector needs to improve its efficiency and competitiveness. The value chain approach therefore provides one framework for facilitating this public-private-farmer collaboration. In Ghana, the public sector is actively involved in the cassava value chain development. The CRI is actively involved in the development of cassava varieties which are being distributed to farmers by RTIMP and MOFA while the FRI has also developed the *kokonte* mini-chip technique for processing *kokonte.* It has also developed the instant *fufu* powder to supplement the traditional pounded *fufu*, in addition to fortified *gari* processing. There is also a cassava project, "Cassava, Adding Value for Africa" (C.AVA) which is promoting the production of High Quality Cassava Flour.

Mayoux (2003) was of the view that the clear visual representation of value chains in maps and diagrams enables information to be accessible even to the very poor and disadvantaged stakeholders in the production and marketing chain, thereby enabling them to participate in ongoing and sustainable systems of analysis and updating of the visual information. Mayoux also sees the chain as complementary to participatory and empowering development approaches as it promotes dialogue and accountability among stakeholders.

The VCA is found to be effective in tracing product flows, showing the value adding stages and identifying key actors and their relationships with others in the chain. However, these actors operate within certain rules that are set by others (e.g. trade rules) and the VCA needs to be complemented with information on these rules. Schmitz (2005) noted that providing information on tariffs, quotas, quality standards and labour standards is not difficult but providing the information in a specific and meaningful way is more complicated. According to Schmitz, the answer lies in an approach that prioritises visiting the companies and coordinates the chains from

producers to the final market, and getting to know the blockages and opportunities that arise throughout the chain.

Changing international markets may result in emerging, although limited market opportunities but this may represent growing business risks for value chains in developing countries due to increased competition in domestic, regional and international markets. According to Will (2006), this will possibly result in social and regional disparities of economic growth and the risk of marginalisation of the poor.

4.8 Combining the Sustainable Livelihoods Approach (SLA) with Value Chain Analysis (VCA)

It has been observed that both the SLA and the VCA are complementary and combining them may provide a more comprehensive understanding of both the structure of markets and the way in which markets for particular goods interact with livelihood strategies with the aim of reducing poverty (Kanji et al., 2005). The SLA focuses more on people and their production systems while the VCA explains the role of each actor in the chain, but with a few exceptions, the livelihood strategies of poor people in low-income countries involve markets and engagement with private enterprise in one way or the other (Albu and Schneider, 2008). Traditionally, livelihood strategies have focussed on households or individuals and an analysis of their livelihood scenario creates pointers for interventions. However, there is uncertainty that some of these designed interventions were appropriate (Livelihoods Perspectives, 2007).

Rural farmers rarely understand how the market works. According to sources such as IFAD (2003), they have little or no information on market conditions, prices and quality of goods, they are not organised collectively, and they have limited experience of market negotiation and little appreciation of their capacity to influence the terms and conditions upon which they engage with the market. A value chain analysis identifies market opportunities; better access to appropriate processing technologies; more efficient farm to market channels; and the timely access to affordable financial and business services (Hellin et al., 2005). The VCA also analyses power relations in the chain showing how some actors are more powerful

than others (Gereffi et al., 2005; Kaplinsky & Morris, 2003; Humphrey& Schmitz, 2004).

It has been observed that there are no widely agreed-upon strategies for achieving sustainable links between smallholder farmers and high value agricultural product markets (GFAR, 2005). A major challenge therefore for pro-poor growth is to build structures and develop the capacities necessary to enable resource-poor farmers to better integrate into value chains. Understanding value chains as a business-oriented approach leads to the question of how far the poorest of the poor can be integrated in a sustainable way without external support (Will, 2008). The SLF provides useful information on challenges and opportunities for integrating resource-poor farmers into value chains. The market perspective, not sufficiently catered for in the SLF has to be provided by other VCA tools (Giuliani, 2007).

A simple value chain for a particular commodity, for example, cassava, would include farmers, processors, middlemen and end users and also service providers. An analysis of this particular value chain could reveal a holistic insight on how these livelihoods function in the community. Based on such an analysis, a list of potential interventions could be generated and prioritised. This could therefore be regarded as a value chain focussed livelihood intervention strategy (Livelihood Perspectives, 2007).

The SLA and VCA can therefore combine to provide a kind of conceptual framework to assist practitioners to understand and analyse complexities, structure information and reveal patterns. Kanji et al. (2005:14) summarised the advantages of combining the two methods as follows:

- Livelihood analysis goes beyond costs and prices, income and consumption to provide complementary information to assets and choices that people make in particular contexts. It can help explain what is sometimes termed „weak supply responses“ to trade liberalisation, that is, when farmers have not responded to higher prices on one crop by producing more of it. It also recognises that other outcomes, apart from increased incomes, are important to people.

- Value chain analysis provides an essential picture of how the local interacts with the global and the way in which some firms may influence the workings of actors in other parts of the chain. The way in which pressure on prices and costs are often transmitted from retailers to producers has a critical bearing on the potential for enhancing livelihoods through supply chains for particular commodities.
- Both livelihood and value chain analyses can be conducted in a participatory way – either in the sense of generating data and understanding with different stakeholders or more powerfully, facilitating learning and action by people who are targeted by particular economic and trade policies. Increasing the involvement of different stakeholders, particularly those who are usually marginalised, can contribute to more effective policy processes for poverty reduction. During data collection for this study, participatory methods such as stakeholder analysis, wealth ranking and focus group discussions were used for the value chains and sustainable livelihoods analyses.

Kanji et al. (2005:21) illustrated that a combination of different methods and tools, drawn from livelihoods and value chain analysis have provided a more comprehensive understanding of the issues involved in promoting poverty reduction as follows:

i. The study of trade liberalisation and livelihoods in Mozambique began with the livelihoods of cashew nut producers and workers in the processing industry. However, investigating international trade and global value chains was essential in understanding national-level policy constraints and opportunities for improving livelihoods.

ii. In the rattan and bamboo weaving example in Vietnam, an understanding of vertical linkages along the supply chain was essential to inform effective policies to promote livelihoods, at the local government level. In addition, this study included an assessment of how a cluster of small enterprises might work together to enhance the livelihoods of producers.

iii. The study of shrimp farming in Bangladesh shows how critical issues relating to credit and livelihoods arose from semi-structured interviews with poor

shrimp farmers and VCA of the industry using existing information. The combination of VCA and SLA in Bangladesh is described in (Box 4.2).

Box 4.2: Combining Methods to Understand a Growing Sector: Shrimp in Bangladesh

The study employed a gender value chain analysis and pro-poor livelihoods approach. The goals of the analysis were as follows:

- To provide a detailed summary of the shrimp sector value-chain
- Identify where women and men are located in the value chain and explore any gender differences in returns, wages and profits
- Develop policy and recommendations to maximise opportunities for vulnerable groups – in particular, the resource poor, landless and women.

Primary data collected from focus groups and key informant interviews were used to analyse and map the market channels from production through processing and distribution. The VCA focussed on the institutional arrangements that linked producers, processors, marketers, distributors and consumers. A gendered value chain highlighted the different positions and contributions of men and women across the value chain and uncovered the economic, organizational, and asymmetric relationships among the actors located along different points of the industry.

The pro-poor livelihoods approach explored how growth in the sector can benefit the poor ensuring that rents and returns were better distributed across the value chain. The livelihoods analysis considered the entirety of production and earnings for the poor and assessed how shrimp and prawn fit into a household strategy for generating income and securing employment. The analysis focussed primarily on male and female fry catchers, small shrimp and prawn farmers and rice-field pond farmers.

Cultivation and processing of shrimp provides livelihoods for the poor, small farmers, intermediaries and exporters. However, the profits generated from shrimp exports are not broadly shared throughout the chain. Also, gender disparities permeated the chain leading to occupational segmentation, wage inequality and increased job insecurity for women.

Source: Gammage et al. (2006)

4.9 Summary

The chapter reviewed the concept of value chains from its evolution; and the three main contending frameworks – the Commodity Chains, Global Commodity Chains and Global Value Chains. It also looked at what a simple value chain is, how it features in the global economy and how it is governed. Upgrading in the value chains was reviewed taking cognisance of why firms upgrade, the four types of upgrading and the implications of upgrading. The chapter also touched on the strengths and limitations of the value chain and finally, how the Value Chain Approach can be combined with the Sustainable Livelihoods Approach in poverty reduction strategies.

The literature on value chains enabled me to outline how cassava is produced and processed and to identify all the major actors that are involved at the various stages from production to the consumer. The literature also facilitated the study of how cassava and its processed products are marketed and how these affected the livelihoods of the actors involved. One important aspect of the literature is the visual presentation of the three different chains under study. The maps enabled me to know exactly, the value added at each point of the chain and the cost of value added. Finally the map also assisted, for example, in assessing the benefits accrued from processing cassava into different products. The literature on upgrading facilitated the demonstrations on *fufu* and *kokonte* processing and in assessing how the livelihood features influenced their adoption in the two value chains (Chapters 6 & 7).

CHAPTER 5

METHODOLOGY

5.0 Introduction

The chapter deals mainly with the processes gone through from the selection of the study approach to data analysis. The study uses the Sustainable Livelihoods Approach and the Value Chain Approach, implementing them through a combination of quantitative and qualitative data.

The research methodology was designed to enable me to answer the four research questions posed. The following section therefore presents the questions and how I went about answering them.

The first question is: *Who are the actors in the cassava value chains? What are the relationships between them?* In an attempt to answer this question, two stakeholder workshops were held and these helped to identify the actors in the different cassava value chains and also, the relationships that exist between them (see section 5.4).

The second question is: *What are the features of their livelihoods that influence their participation in the value chains?* Thus question was answered by collection qualitative and quantitative data on households participating in the different value chains using the Sustainable Livelihoods Framework. Secondly, demonstrations were held on *fufu* and *kokonte* processing after which the perceptions of processors and other participants attending such demonstrations were sought. These perceptions showed how their livelihood features affect their adoption of the innovations demonstrated.

A third question posed was: *What are the factors influencing farmers" decisions on whether to sell fresh cassava or become involved in processing?* In answering this question, a processing company, Amasa Agro Processing Company Limited (Amasa) which processes cassava into HQCF, *agbelima* and *gari* was interviewed alongside farmers and processors who supplied the company with cassava roots and grits. Both qualitative and quantitative data were collected from all the actors.

The fourth question was: *What does a combined use of Sustainable Livelihoods Approach and Value Chain Analysis tell us about the prospects for promotion of new technologies?* This question has been answered through the use of the SLA in questions two and three and also the VCA in questions one and two (see section 9.3).

The methodology involved the selection of study locations, population of study, sampling and sample size. There was development of data collection instruments, data collection, and analysis.

5.1 Approach to the Study: The Sustainable Livelihoods Approach

The Approach recognizes people whether poor or not, as actors with assets and capabilities who in pursuit of their own livelihood goals develop strategies aimed at alleviating rural poverty (Carney, 1998). Livelihoods analysis, according to Carney (2002), entails:

- The context in which rural people live (policy, politics, history, demography etc.) including the effects of external trends, shocks and seasonality upon them.
- Their access to physical, human, financial, natural and social assets and their ability to put these to productive use.
- The institutions, policies and organisations which shape their livelihoods and
- The different strategies they adopt in pursuit of their goals.

In trying to gain an improved understanding of poverty, Ashley and Hussein (2000) observed that there are variations in livelihood priorities of people and that outsiders cannot assume knowledge of a given household or a group. Therefore assessment must be based on a prior understanding of people‟s objectives, an informed view of how their livelihoods are constructed and also, factors that are the essential causes and manifestations of their poverty.

I have decided to use the SLA for this research because it has been found to be very useful in analysing households, gender and governance; helps to identify the underlying constraints to improved livelihoods and means of overcoming them and it enables researchers to think holistically about assets and their potential interaction and the complementarities between the assets and their sequencing (Farrington et al.,

1999; Ashley and Carney, 1999; Adato and Meinzen Dick, 2002; Ashley and Hussein, 2000). It also provides a way to order information and understand the links between different aspects of people‟s livelihoods. The Sustainable Livelihoods Approach in this study is pursued though a mixed methods research using quantitative and qualitative data.

5.2 Using Quantitative and Qualitative Methods

The study was based on the mixed methods approach in which quantitative and qualitative methods were used to collect data.

5.2.1 Quantitative Methods

Quantitative research usually emphasises quantification in the collection and analysis of data. A key feature of the quantitative data is the numerical measurement of specific aspects of phenomena where competing explanations must be formulated in terms of the relationship between variables (Miller and Brewer, 2003). In quantitative research, subjects of study are selected randomly from the study population in an unbiased manner, standard questionnaires are used and statistical methods are used to test predetermined hypothesis regarding relationships between specific variables (Bryman, 2004; Babbie, 2004). The validity and reliability of a study typically depends upon pre-existing methodologies (Libarkin and Kurdziel, 2002). In quantitative research, researchers are able to develop a lot of explanatory models since a wide range of statistical methods are available. Thus this model helps to develop theories of cause and effect (Creswell, 2004). Since data analysis is governed by statistics, personal beliefs of the researcher will not have much impact on the study findings, as may be the case with qualitative data (Libarkin and Kurdziel, 2002).

In quantitative research, strategies of inquiry such as experiments and surveys are used and data is collected on predetermined instruments. Chambers (1983) indicated that research using questionnaire surveys easily misses poorer households or groups which are remote. They are often left out because they are regarded as unimportant or because they are not likely to complain. Secondly, planning at national and local levels coupled with professional disposition are some of the contributing factors that promote quantitative research. Chambers (*ibid*), however, indicated that questionnaire surveys should not be abandoned, but that they are still a legitimate, necessary and

useful tool, especially for data which are not sensitive and for which distributions and aggregates are needed. They can also have a useful role in following up and verifying hypotheses generated using qualitative methods.

5.2.2 Qualitative Methods

Qualitative methodologies are designed to provide the researcher with the perspective of target audience members through immersion in a culture or situation and direct interaction with the people under study (Weinrich, 2006). The approach tries to gain an in-depth understanding of a situation under observation. According to Miles and Huberman (1994), qualitative data are a source of well-grounded, rich descriptions and explanations of processes in identifiable local contexts and with such data one can preserve chronological flow, see precisely which events led to which consequences, and derive fruitful explanations. It stresses social meanings (quality) rather than the collection of statistical data (quantity). Qualitative research therefore allows local people to assess their own situations, diagnose and prioritise problems and develop solutions. It is, however, strongly dependent on the researcher conducting the study even though a number of standard approaches to collecting and interpreting qualitative data exist (Warburton and Martin, 1999).

Qualitative research, according to Bryman (2004) emphasises words rather than quantification in the collection and analysis of data that:

- Predominantly emphasises an inductive approach to the relationship between theory and research, in which the emphasis is placed on the generation of theories;
- Has rejected the practices and norms of the natural scientific model of positivism in particular preference for an emphasis on the ways in which individuals interpret their social world and
- Embodies a view of social reality as a constantly shifting emergent property of individuals" creation.

Qualitative research can generate data and numbers on numerous topics similar to outputs from questionnaires. Methods of generating data in qualitative research include measuring, counting, estimating, valuing, ranking and scoring. For example,

counting can be used in social and census mapping, which are very accurate for identification and listing of households for headcounts and for household characteristics (Chambers, 1997).

Interpretations of qualitative data are tied directly to the data source, and research validity and reliability are based upon the logic of the study interpretations, rather than statistical tests (Libarkin and Kurdziel, 2002). Qualitative studies therefore provide a framework for the context in which data is collected and a logical picture of events within that setting. Conclusions can then be applied to a very narrow range of outcomes and qualitative findings may therefore not provide any correlation between cause and effect on a broad scale.

5.2.3 The Mixed Methods Approach

Mixed methods approach is a procedure for collecting and analyzing both quantitative and qualitative data in a single study or in a series of studies, based on priority and sequence of information (Creswell, 2004; Tashakkori and Teddlie, 1998). The approach was developed in response to the need to clarify the interest of mixing quantitative and qualitative data in a single study. Mixed methods research started with researchers and methodologists who believed that quantitative and qualitative viewpoints and methods were useful as they addressed research questions (Johnson et al., 2007).

a. Types of Combinations in Mixed Methods Approaches

There are three main ways in which quantitative and qualitative instruments can be combined. The combinations are merging, sequential and concurrent procedures (Marsland et al., 2001; Creswell, 2004).

Merging consists of swapping tools and attitudes from one tradition to the other. Responses to open-ended questions can be coded and frequency tables can be created from qualitative methods or mapping could be used to generate village sampling frames for surveys. In this study, during the data collection on livelihoods, open ended questions were used but during the analysis, some of the responses were coded and frequency tables were developed for them. These include data on human capital, financial capital and physical capital.

Sequencing of tools is the alternate use of both quantitative and qualitative methods in data collection. In collecting data from processors who sell cassava roots to Amasa and process the rest into grits, *agbelima* and *gari*, qualitative data was collected on the livelihoods of the people and quantitative data was collected on the estimates of producing a hectare of cassava and also, estimates of the processed products. The same procedure was used for Amasa Agro Company, when qualitative data was collected on the company‟s general activities and quantitative data was collected on estimates of cassava and flour production.

Concurrent use of selected tools is the simultaneous but separate use of formal and informal approaches. Both forms of data were collected at the same time during the study and the information was then integrated in the interpretation of the overall results.

b. Rationale for the Use of Mixed Methods in the Study

Mixed methods approaches build on the strengths and also compensate for the weaknesses in quantitative and qualitative methods. Biases that may be inherent in any single method could be neutralised by combining all these methods and results from one method can help develop or inform the other method (Creswell, 2004). During the interviews, follow up questions were used for simple answers in order to remove pre-formed answers that the researcher might already have. Quantitative presentations in a study will also help to change the perception that it is not always possible, in a statistical sense, to generalise findings from a qualitative study (Punch, 2005; Creswell, 2004). Mertens (2003) is of the view that mixed methods approach can serve a larger, transformative purpose to change and advocate for marginalised groups especially the poor.

In the study, emphasis was laid on the qualitative more than the quantitative aspect because the researcher wanted to gain in-depth ideas about cassava farming and processing and how these contribute to the livelihoods of the people. There was also triangulation, using focus groups to ascertain information collected from the households. Areas where each method was used are outline in Table 5.1 below.

Table 5.1: Use of Qualitative and Quantitative Methods in the Research

Type of data	Method	Description of data collected
Qualitative	Key Informant Interview	• Study sites selection • Wealth ranking exercise • Value chain analysis
	Household interview	• Household livelihoods data
	Focus group discussion	• Wealth ranking • Value chain analysis • Perceptions on the two technologies introduced • Community access to assets, policies and institutions
Quantitative	Household interview	• Household data • Individual interviews • Estimates for producing a hectare of cassava • Estimates for producing grits/flour, *gari* and *agbelima* from a hectare of cassava • Net profits obtained from the above products, using one hectare of cassava • Estimates for the production of a tonne of HQCF

Source: Author, 2008

5.3 Selection of Study Locations

The selection of sites was based on cassava production and also on selected cassava based products – *fufu*, *kokonte* and cassava flour. During the site selection exercise, 19 villages in seven regions in Ghana were visited on the basis of their cassava production. These are Eastern, Greater Accra, Brong Ahafo, Volta, Ashanti, Western and Central Regions. The statistics on cassava production (MOFA, 2006) showed that the cassava produced in the Northern and Upper Regions was very negligible hence those regions were not visited. At the Regional level, Regional Development Officers in charge of crops and Women in Agricultural Development (WIAD) were the immediate points of contact to find out the cassava producing areas that are processing cassava into *kokonte* and cassava flour. The WIAD officers were involved because they were actually responsible for the dissemination and training of the technology on cassava flour in particular. They then assisted the researcher to locate Districts where farmers are processing cassava into *kokonte* and flour. In the Districts, some District Directors and AEAs were consulted, leading to location of some of the

villages. At the village level, discussions were held with village chiefs or Assemblymen, producers, processors and retailers as well. Discussion centred on:

- Producers (levels of production of cassava, other crops produced, other income generation activities, markets, potentials)
- Processors (access to cassava, access to machines, intensity of processing, source of financing, record keeping, marketing, other livelihood activities, contacts with AEAs, etc.)
- Other activities apart from farming.

Kokonte consumption has declined over the years and the production therefore has reduced in most areas. It was only Techiman Municipality in Brong Ahafo and Yilo Krobo in the Eastern Region that were found to be still producing *kokonte* in commercial quantities. Two villages in the Eastern Region were visited and Totsunya-Okper, which was the only village still producing *kokonte* in commercial quantities, was selected for the survey. In Techiman Municipality, Forikrom was also selected on similar grounds as that it is the only village still producing *kokonte* for the markets.

The following locations were selected for *fufu* processing: Suhum (Eastern Region), Kpeve in South Dayi (Volta Region), and Sokode, Kpeve, Anyinawase and Tsito in Ho Municipality (Volta Region). Suhum was selected because it is located on the Accra-Kumasi highway and serves as a major rest stop for travellers on that route. Most of the chop bars are located along the major road for easy access. On the other hand, Sokode, Anyinawase and Tsito are located on the Ho-Accra Highway and Kpeve is also on the Hohoe-Accra Highway.

One of the objectives of the research is to assess why farmers would like to sell the cassava roots or process them into grits to sell to an intermediary processor, instead of processing into other end products such as *agbelima*, *gari* and *kokonte*. This led to the selection of Ga West district because the only intermediary cassava processing company, Amasa Agro Processing Company Limited (Amasa) that processes grits into HQCF was located in this district. A summary of the selected locations is shown in Table 5.2 below.

Table 5.2: Summary of Selection of Study Locations

Technology	Village	District	Region	Chapter
Pounded *Fufu*	Suhum	Suhum-Kraboa-Coaltar	Eastern	7
	Sokode, Tsito, Anyirawase	Ho Municipality	Volta	
	Kpeve	South Dayi District	Volta	
Kokonte	Forikrom	Techiman Municipality	Brong Ahafo	8
	Totsunya-Okper	Yilo-Krobo District	Eastern	
Grits/HQCF	Ayikai-Doblo, Obeyie, Kwameanum, Hobor, Ashalaja	Ga West Municipality	Greater Accra	9

Source: Author, 2008

5.3.1 Profile of the Districts/Municipalities of Study Areas

Secondary data was collected from three District and three Municipalities to describe briefly their profiles as the study locations are found in these local government units. Under the decentralised local government system, Local Government Act 54 of 1993, classifications of Assemblies were done on population basis as follows:

- District Assembly: population is 75,000-95,000;
- Municipal Assembly: population is 95,000-250,000;
- Metropolitan Assembly: population over 250,000.
- In addition, demographic characteristics and ability to generate revenue are used in the classification system.

This accounts for the difference in the Districts and Municipalities being studied. The study locations are found in the Suhum-Kraboa-Coaltar, Yilo Krobo and South Dayi District Assemblies, and also Techiman, Ho and Ga West Municipalities (Fig 5.1).

Secondary data was collected from their District Planning Units using their Medium Term Development Plans.

a. Suhum-Kraboa-Coaltar District

Suhum-Kraboa-Coaltar District is located in the Eastern Region of Ghana and covers a land area of 940 square kilometres. The district capital is Suhum which is also the

study area. The district is bounded by the New Juaben District to the north east, Kwaebibrem and East Akim Districts to the north, West Akim District to the west and south and Akwapim North and Akwapim South District to the East. The district is in a semi deciduous forest zone and located within latitudes 5^0 45^1N and 6^0 5^1 N and longitudes 0^0 15^1W and 0^0 45W. It has a population of 166,472 made up of 82,228 (49.4%) males and 84,244 females (50.6%). The farming population is estimated at 106, 200 (63.8%).

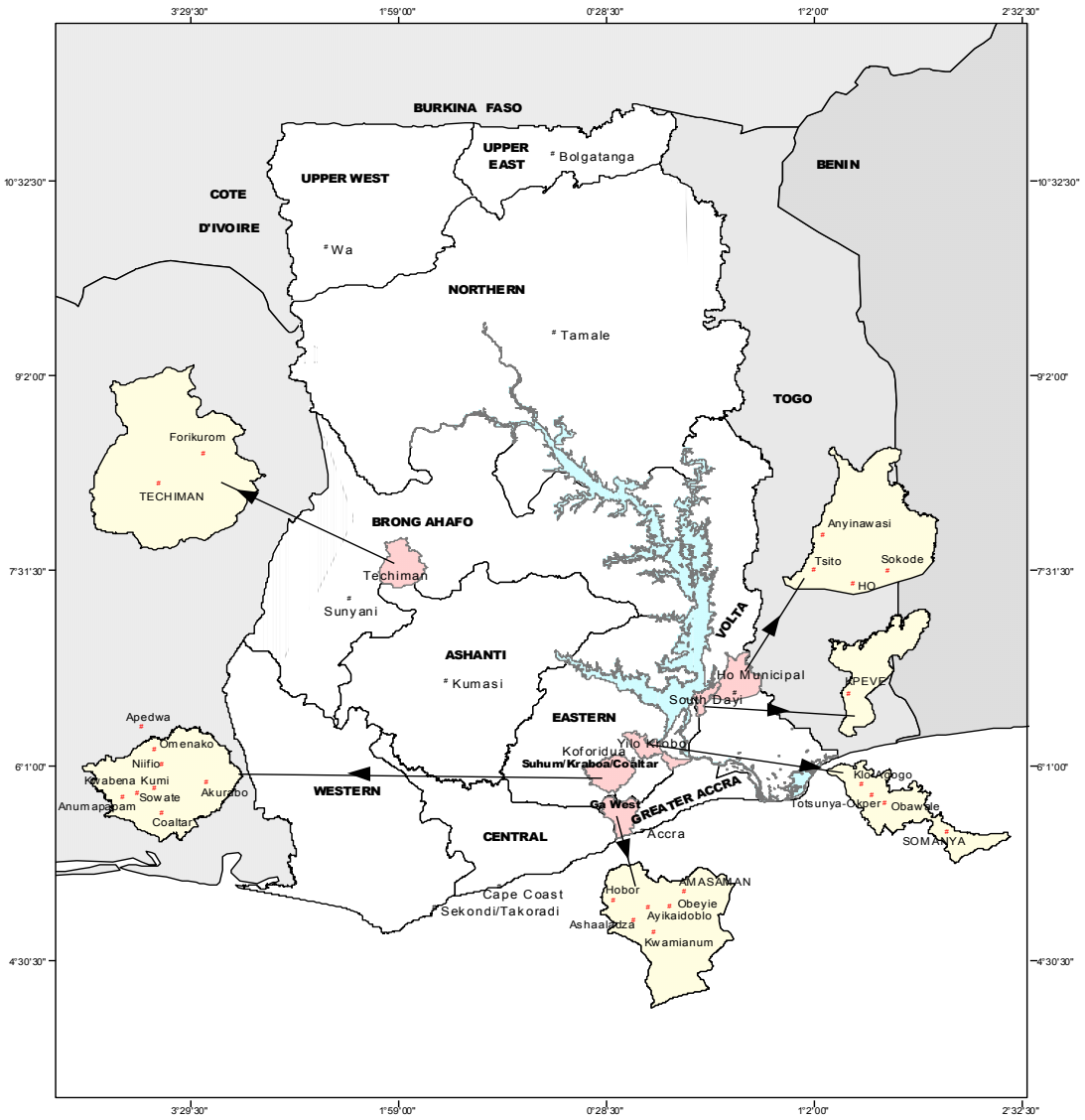
Climatic conditions are very suitable for agricultural activities in the district. Temperatures range from 24^0C to 29^0C. Relative humidity especially in the rainy season (June to September) is 87% and 91%. In the dry season, it is between 48% and 52%. Annual rainfall ranges between 1270mm and 1651mm. There are two rainy seasons. The first and major season occurs between April and July and the second and minor season occurs between September and November.

The area has a few ranges which stand out. The Atewa range which stands at about 610m above sea level is the highest elevation in the district. The range is the catchment area for the Densu, Suhum, Essiesem and Kua rivers. Fed by the two major rainy seasons of the district, some of these rivers hardly survive during the dry season.

The district was originally covered by a semi-deciduous forest. However, human activity in the form of cultivation, lumbering and extraction of fuel wood has drastically reduced the land covered by the original vegetation to insignificant levels and now covered mostly by re-growth thickets and secondary forests. There are three main soil types found in the district. These are the Damango-Murugu-Tanoso Associations, the Bediesi-Bejua Associations and the Kumasi-Offin Associations.

The main crops grown in the district include cocoa, plantain, cassava, maize and vegetables. There are two farming systems namely mixed cropping and mono-cropping. The land tenure system is dominated by share cropping while others hire out.

Figure 5.1 Districts of Study Locations in Ghana



Source: CERSGIS, 2008

The district has a total land area of 940 sq. km. About 74% of the total land area is suitable for agricultural production whilst 15.0% of the land area is taken up by settlements. The remaining 7.0% and 3.2% represent lands under forestry, roads and utility lines like high tension electrical installations and rivers, reservations and slopes respectively.

The Suhum-Kraboa-Coaltar district is heterogeneous in terms of ethnicity. There is a predominance of Akans (35%). There are other tribes which include Ewe (22.0%), Krobo/Dangme (23.0%), people of the Northern ethnic groups like Hausa, Kontonkoli and Basare (10.0%), the Guans (5.2%) and Gas (4.8%).

b. Yilo Krobo District

The Yilo Krobo district is one of the fifteen districts in the Eastern Region. The capital is Somanya. The district is divided into seven area councils namely, Somanya, Oterkpolu, Boti, Nkurakan, Nsutapong, Klo-Agogo and Obawale. Totsunya-Okper, the study area, is located in the Obawale area council.

The district falls approximately within latitudes $6^0$00‟N–$0^0$30‟N and longitudes $0^0$30‟E–$1^0$00‟W. It covers an estimated area of 805sq.km. The district is bounded in the north and east by Manya Krobo District, in the south by Akwapim North and Dangme West Districts and on the west by New Juaben, East Akim and Fanteakwa Districts. The total population of the district is 86,107 signifying a 4.1% increase over the population in 1984. This comprises 49% males and 51% females. Yilo Krobo is predominantly rural with more than 67% of its population living in rural areas. The average household size for the district is 4.9.

The Yilo Krobo district falls within the dry equatorial climatic zone which experiences substantial amount of precipitation. This is characterized by a bi-modal rainy season, which reaches its maximum during the two peak periods of May- June and September–October. The annual rainfall is between 750mm and 1600mm. Mean annual temperature is between 24.9^{0}C and 29.9^{0}C with humidity of 60-93%.

The district lies within the semi-deciduous rain forest and the coastal savannah zone of the country. There is the dry semi-deciduous zone (fire zone) which stretches from

the district to the lower part of the Manya Krobo District covering 855 square kilometres. The area is predominantly mountainous. The Akwapim Ranges stretch into the district from southwest to northeast across the district. The low lands are found in the south eastern part of the district. There are two main watersheds forming three river basins in the district. One of the watersheds is located on the Akwapim Ranges where rivers flow in the eastward direction on the lowlands into the Volta River. On the west of the ranges, the rivers flow into the Ponpong River, which empties into the Volta Lake. The highlands on the western part of the district also create another watershed hence the rivers flow through New Juaben to join the Densu River.

The health sector has infrastructural facilities but there are no doctors in the district. The Yilo Krobo District has three (3) private clinics, nine (9) reproductive/child health/family planning clinics, one (1) chest clinic three (3) private midwife‟s maternity homes, seventy-two (72) trained traditional birth attendants. There are four (4) community health planning and service centres at Obenyemi, Wurampong, Labolabo and Opersika.

On education, Yilo-Krobo has ninety-two (92) kindergarten/nursery schools, ninety-six (96) primary schools, forty-two (42) Junior Secondary Schools, three (3) Senior Secondary Schools, one technical school and one Teachers Training Institution. Most of the buildings are not in good condition and need systematic rehabilitation.

The main economic activity in the Yilo Krobo District is agriculture. Others are trading and small scale industrial activities. Almost 58% of the population is engaged in the agricultural sector. Crop farming is the principal agricultural activity in the district. The main crops grown in the district are maize, cassava, yam, cocoyam and plantain. A wide range of vegetables like tomatoes, garden eggs (aubergines), pepper and okra are also grown. All these crops are cultivated largely on small-scale basis. Records indicate that a total of 90,000 hectares is currently under cultivation. In the district, many of the soils of this land are losing much of their fertility as a result of continuous cropping. The main types of livestock reared in the district are cattle, goats, sheep, chicken and pigs.

c. Techiman Municipality

The Municipality is located in the Brong Ahafo Region and found in latitude 8° 00‟N and 7° 35‟S and longitude 1° 49‟E and 2° 30‟W. The capital is Techiman. The study village, Forikrom is 5 kilometres from Techiman on the Techiman-Nkoranza road. It shares boundaries with Kintampo Municipality to the north and northeast, Wenchi district to the west, Offinso district to the south and Nkoranza district to the east and southeast. The Municipality covers a total area of 669 sq. km. The population of the District is 177,000 with an average household size of 5.1.

Climatic conditions are favourable for crop growth as the municipality lies in three vegetation zones namely; the Guinea-savannah woodland zone, semi-deciduous zone and the transitional zone. It has an annual average temperature ranging between 24-27° C and an annual rainfall of 1,300-1500mm. Humidity falls between 75-80% in the rainy season and 70-72% in the rest of the year.

The topography is low lying and undulating. The area is well drained by three major rivers, Tano, Subin and Kyiridi. There are three main soil types. These are Damango-Murugu-Tanoso, Bediesi-Bejua and Kumasi-Offin Associations.

Agriculture is the dominant economic activity in the Municipality and covers 57% of the population. Farming systems are mainly mixed cropping and mono cropping. Land tenure systems include share cropping, rent and leasehold. The major crops grown are maize, cassava, vegetables, yam, plantain and cocoyam. Animals reared are cattle, sheep, goats and poultry.

The major ethnic groups are the Brongs and Ashantis. Other ethnic groups in the district are the Dagombas, Dagatis, Mamprusis and Ewes.

d. Ho Municipality

The capital is Ho. The study locations are Sokode, Anyirawase, and Tsito. The district lies between latitude 6° 55‟N and 6° 20‟N and longitude 0° 12‟E and 0° 43‟E. It shares boundaries with Hohoe district to the North, Kpando district to the west, North Tongu and Akatsi districts to the south and The Republic of Togo to the east.

The district has a land area of 2,660 sq. km. It has a population of 235,331 made up of 113,436 (48.2%) males and 121,895 (51.8%) females.

The geology of the district shows two main rock formations - The Dahomeyean and the Togo series. The general relief falls into two parts, a mountainous part, mostly to the north and north-east, and a lowland area to the south. The general drainage of the district is southwards and is dominated by the Alabo, Kalakpa, Waya and Tordzie rivers, which eventually flow into the Lower Volta. There are two major soil groups in the district. These are the (a) forest soils, namely the forest ochrosols, forest lithosols and intergrades of the two (b) the savannah soils namely tropical black earths and tropical grey earths. The vegetation also falls into two types namely the moist semi-deciduous forest which covers the hills in the district and the savannah woodland which occupies the rest of the district.

Mean monthly temperatures range between 22^{o}C and 32^{o}C. Annual mean temperatures however, range from 16.3^{o}C to 37.8^{o}C. Average number of rain days is 111 while annual mean rainfall ranges between 1020-2000mm.

The Municipality has three traditional councils namely: Asorgli, Hokpe and Awudome with three Paramount chiefs and 39 divisional chiefs. Politically, the district is divided into three constituencies. These are Ho East, West and Central. The Ho Municipality has various ethnic groupings with Ewes forming the majority with 84% followed by Akan, 8%, Guan, 4% and the other tribes such as Ga-Dangme, Gurma, Grusi, Kabre, in the minority.

Under the Self-Help Electrification Programme of the Government, all 16 council areas of the district are now supplied electricity from the national grid. This steady source of energy makes it possible for entrepreneurs to set up industries wherever they wish in the district.

The Ho Municipality has a total of 45 health facilities. The facilities are two hospitals, one polyclinic, 26 health centres and four reproductive and child health clinics. The rest are three Christian Health Association Clinics, three private maternity homes, and five private clinics.

There are a total of 162 Pre-Schools, 185 Primary, 114 Junior Secondary Schools, 22 Senior Secondary Schools, 1 Training College and 1 Polytechnic. The University of Ghana has established a residential Adult College at Tsito. The Evangelical Presbyterian Church has now established a University and is yet to start admissions.

There are waterfalls at Gbadzeme, Amedzofe and Ashanti Kpoeta, which run throughout the year. The Kalakpa Game Production Reserve at Adaklu-Abutia area presents the natural habitat for biodiversity and provides immense potential for eco-tourism in the district. There is the traditional *Kente* Industry in Agotime area, where indeed, the *Kente* industry is believed to have originated.

There are two major farming seasons. These are the major season starting from February to June, and the minor season starting from August to December. Food crop production is the dominant agricultural activity in the district. The main food crops cultivated are maize, yam, cassava, rice, cocoyam, plantain, cowpea, and vegetables such as okro, tomato, garden eggs and pepper. Tree crops such as cocoa, tea, avocado, orange, mango, oil palm, and coffee are also produced. Mixed cropping is the traditional practice by almost all small-scale farmers with maize-cassava combination being the most popular.

Land holdings are generally small and vary among the villages. Large holdings of about ten or more hectares can be found in some few areas. There are four basic forms of land tenure. These are family ownership, share cropping, leasehold, and outright purchase. Family ownership is however, giving way gradually to individual ownership.

The livestock industry is also flourishing very well in the district. These are mainly poultry, cattle, sheep, goats and piggery. Almost all farmers keep some poultry and small ruminants. Large-scale cattle farmers are prominent in the Adaklu area while medium scale poultry farmers are found in the municipality. Fish farming is now being developed and only a few farmers have fish ponds.

e. South Dayi District

South Dayi District was carved out of the Kpando District Assembly and was officially inaugurated on 19th August, 2004 with Kpeve as its capital. It lies within latitudes 3°20N and 3.5°05N, and approximately on longitude 0°17 E. The District shares boundaries with Kpando District and Hohoe Municipal to the north, Ho Municipal to the east and Asougyaman District in the South, while the Volta Lake forms the Western boundary. The District covers a total area of approximately 1,000 square kilometres with about 20% submerged by the Volta Lake. The population of the district was 36,278 and the average size of a household is about six.

The most conspicuous physical features of the South Dayi District are the Akwapim-Togo-Atakora ranges. Scattered over the district are hills and ridges, which give the topography an undulating nature.

There are two rainy seasons, the major one from mid April to early July and the minor one from September to November. The average annual rainfall varies from 900mm to 1,300mm. The vegetation of the District is a mix of savannah woodland and deciduous forest. The savannah woodlands consist of grass with scattered trees including acacia, bamboos, and baobabs. The semi deciduous forests are found on the slopes of the Akwapim-Togo-Atakora hills. The major soil types in the district are the savannah ochrosols and ground water laterites. This is a sandy loam type of soil with local adaptation, but along the Volta alluvial silty loams predominate.

About 80% of households in the district have access to electricity and almost 94% of the households use charcoal or fuel wood for cooking with serious implications on the environment. There is access to portable water as the district is the main source of water supply to the regional capital.

There is one Government hospital at Peki and five health centres fairly distributed in the district. There are two private maternity homes of fairly good condition located in Gemeni and Kaira. Apart from the Peki Government Hospital all the other Health Centres are not well equipped. The National Health Insurance Scheme is now fully in operation in the district, and more than 4,500 people registered.

In the educational sector, there are 37 pre-schools in the district, 31 primary and 18 Junior Secondary Schools, a Senior High School, a Secondary/Technical School and a Teacher Training College. The school feeding programme is being piloted at Tsatee.

Banking facilities available in the district include a branch of Ghana Commercial Bank at Peki and the Weto and Anum Rural Banks have agencies located at Kpeve, Peki Dzake and Dzemeni. By their location the district is well served with physical access to banks.

There are three main markets in the District. These are located at Kpeve, Peki and Dzemeni. All the markets are weekly except Kpeve, which is twice weekly, Tuesdays and Fridays.

Majority of the active labour force of the area is employed in the agriculture sector of the economy. The main crops cultivated are maize, cassava, yam, oil palm and vegetables. Almost every farm household rears a few animals like local poultry, sheep and goats, at the backyard but not on commercial basis. There is grasscutter rearing, snail rearing, mushroom production and bee-keeping in the district to serve as alternative livelihood activities for farmers.

Artisanal fishing (river fishing) accounts for the bulk of fish landed in the District. Inland canoe fishing on the Volta Lake is characterized by low fish catch, use of small mesh nets, and the use of poisonous chemicals.

People in the district observe four major festivals. These are the Yam festival which is celebrated all over the District, Gbi Dukorza (celebrated by Peki and Hohoe), Kpalikpakpaza (celebrated by Kpalime/Tongor Traditional Areas) and Glimetsoza (celebrated by Kpeve, Klefe, Klikor, Tsorxor and Tsibu).

f. Ga West Municipality

The district was created in 2004 from the then Amasaman district which was divided into two. The capital is Amasaman. The district lies within latitude 5˚48‟ North 5˚29‟ North and longitude 0˚8‟ West and 0˚30‟ West and shares common boundaries with Ga East to the East, the Akwapim South, Suhum-Kraboa-Coaltar and West Akim to

the North, Awutu-Efutu-Senya to the West, and the Gulf of Guinea and Accra Metropolitan Assembly to the South. It occupies a land area approximately 810 square meters with over 400 settlements.

According to the 2000 National Population and Housing Census, the population of the Ga East and West Districts is estimated at 550,468. The Population figures for each of the districts are not available. Female populations of 273,937 represent 49% of the total population whilst males make up the other 51% i.e. 274,722.

The District lies wholly in the coastal savannah agro-ecological zone. The relief is generally undulating at less than 5% slope. Rainfall pattern is bi-modal with an annual mean varying between 790mm on the coast to about 1270mm in the extreme north. The annual average temperature ranges between 25.1˚C in August and 28.4˚C in February and March. February and April are the hottest months. Humidity is generally high during the year. Average humidity figures are about 94% and 69% at 6:00 and 15:00 hours respectively.

Four major rivers drain the District namely: the Densu, Nsaki, Onyansia and Ponpon rivers. The largest of the four, the Densu drains down from the Eastern Region through the Western portion of the district to Weija where it enters the sea. The Onyansia flows into the Accra Metropolitan Area discharging into the Odaw River and the Korle Lagoon.

Public health facilities are provided in both the rural and urban communities. In addition to the availability of many private health institutions in the peri-urban areas other public health infrastructure can be found in Amasaman, Weija, and Ngleshie Amanfro.

Infrastructure is not well developed. The District capital Amasaman lacks potable water. About a third of the over 350 rural communities in the District have access to boreholes and hand dug-wells whilst as much as 35% of them depend on dams, dugouts and streams for their water needs. Less than a third of the total number of settlements in the District is connected to the national electricity grid. Markets can be found in Mallam, Hobor, Anyaa, Ngleshie Amanfro and Amasaman.

The banking sector appears to be among the fast developing sectors in the local economy. Banking services are provided by the Ghana Commercial Bank at „Mile 7", Achimota and Rural Banks in Amasaman, Taifa and Achimota.

The major economic activity in the district is agriculture. Agricultural activities constitutes 55% of the economically active population and 70% in the rural areas depend on agriculture for their livelihoods. About 95% of farmers are small holders. The major agricultural activities are crop production, fisheries and livestock development. Among the wide range of vegetables produced in the district are tomatoes, pepper, beans and okro. Major food crops produced are cassava, maize, yam, cocoyam and plantain. Cash crops such as coconut, cashew, pineapple, mango and pawpaw are also widespread. Livestock found in the area are cattle, sheep, goats and swine. Poultry found in the area includes fowls, turkeys and ducks.

The coastline within the district is about 10km and provides a wide range of fishes including tuna, sardines, tiger fish, shrimps and lobsters. Canoe fishermen do most of the fishing and the women along the coast are engaged in processing and sale of fish. The major fishing communities are Bortianor, Oshieyee, Faana, Langma and Kokrobite.

5.4 Stakeholders Workshop to Identify Actors in the Cassava Value Chain

The study is built on answering four main research questions. The first question is "Who are the actors in the cassava value chains"? To answer this question, two stakeholder workshops were held at the beginning of the research to identify all the various actors in the cassava value chain and their relationships. The first stakeholder workshop was held at Suhum for pounded *fufu* and *kokonte* processors. Representatives of the following institutions participated in the workshop:

i. Department of Agricultural Extension, Legon;
ii. Food Research Institute;
iii. Ministry of Food and Agriculture;
iv. Ghana Health Service;
v. Traditional Caterers Association (representing pounded *fufu* processors) and
vi. Farmers and *kokonte* processors from Totsunya-Okper.

The second stakeholder workshop was held at the premises of Amasa at Ayikai Doblo to map out a value chain for grits/HQCF. Representatives of the following institutions participated:

i. Department of Agricultural Extension, Legon
ii. Food Research Institute
iii. Ministry of Food and Agriculture
iv. Amasa
v. Farmers who supply Amasa with cassava roots and grits.

The aim of the workshop, which was indicated in the letters of invitation, was again explained to all the participants. This was to identify all the actors in the cassava value chain and their interests and their relationships with each other, especially for pounded *fufu*, *kokonte* and grits/HQCF.

During the workshop, participants were asked to brainstorm on the following;

i. Identifying all the actors in the cassava value chain and in particular, pounded *fufu, kokonte* and HQCF
ii. The functions of the various actors
iii. Service providers and their functions
iv. The relationships between the actors and the service providers
v. The enabling environment and its impact on the actors.

The results of these workshops were synthesised with the data collected from households, individuals and Amasa to develop the value chains for pounded *fufu*, *kokonte* and grits/HQCF. The results are discussed in chapters 6, 7 and 8.

5.5 The Population of Study

A study population as defined by Babbie (2004) is the theoretically specified aggregation of survey elements. The population for this study is therefore made up of cassava farmers, processors of *fufu* and *kokonte* on one hand, and processors of cassava grits/flour, *agbelima* and *gari* on another hand. This population has been selected because the study aims at assessing the influence of cassava value chains on livelihoods of participants in the chain and also, what influences farmers‟ decision to sell roots or process them for sale. There are so many cassava processed products but

for the financial and time limitations, the researcher decided to assess only these products.

5.6 Units of Analysis

Units of analysis are those units that are initially described for the ultimate purpose of aggregating their characteristics in order to describe some larger group or explain some abstract or phenomenon (Babbie, 2004). The unit of analysis is the major entity that the research seeks to analyse. Three major units of analysis have been identified in this study. These are individuals, households and a processing company.

Using individuals as a unit of analysis, a researcher may make observations describing the characteristics of a large number of individuals such as sex, age, ethnicity and religion (Babbie, 2004). These data may be aggregated to provide a descriptive picture of the larger population. The individual as a unit of analysis has the advantage of being easily defined and identified and allows social relations to be explored (Babbie, 2004; Bryman, 2004). Individual farmers who supply cassava roots and grits to Amasa have been used as a unit of analysis because they were used to describe the relationships that exist between them and the processing company and also how they make decisions on their marketing channels and their processed products.

Another unit of analysis was a company, Amasa Agro Processing Company. This company was supplied with cassava roots and grits by individual farmers. Only one company was used as a unit of analysis because it is the only company which is processing cassava roots into HQCF in the region.

A third unit of analysis is households processing cassava into either *fufu* or *kokonte*. This is done to analyse their livelihoods and also find out how these livelihoods influence upgrading of their respective value chains. Household surveys were identified as an appropriate means of collecting data on changes in livelihood assets and outcomes, including livelihood diversification (DFID, 2005; Ashley and Hussein, 2000). Casley and Lury (1987:163) after examining several definitions, attempted to define households as follows:

> "*A household comprises a person, or group of persons, generally bound by ties of kinship, who live together under a single roof or within a single compound, and who share a community of life in that they are answerable to the same head and share a common source of food*"

This definition is not too different from that of the Statistical Service of Ghana (GSS, 2000).

> "*A household is defined as a person or group of people, usually a family, living together in the same compound (fenced or unfenced), answerable to the same head, and sharing a common source of food and/or income"*.

One important issue in household surveys is the question of „straddling" where different members of the household live and work in different places temporarily or permanently but send remittances. Permanent migration is not common and migration incomes generally form part of a strategy to improve livelihood security (Wilson, 2004). According to Casley and Lury (1987), the issue of straddling could be solved by referring to the recommendation of the UN Manual on Demographic Surveys that six months of continuous residence in the previous year is required to qualify one as a normal resident. Another issue is who the headship of the household is. Again, the UN Manual has been referred to by Casley and Lury (1987) to accept as the head, the person who is stated to be the head by members of the household as there will rarely or never be any disagreement.

The use of households as units of analysis is becoming important because of the suitability and relative availability of household lists, derived from a census or a special listing within a sample cluster (Casley and Lury, 1987). The household is also a site of production and reproduction and forms the basic economic decision making unit. Hulme (1999) observed that households are relatively easily identified and defined and they permit appreciation of household coping and survival strategies such as income, asset consumption and labour pooling. They also permit appreciation of link between individual, household and group/community and also an understanding of links between household life cycle and well-being. On the other hand, they have been observed to be sites of conflict and competing interests between actors of different ages and gender and they are units linked cooperatively in varying degrees

to other households (Wilson, 2004). The study therefore decided to use households as units of analysis based on the above conclusions.

5.7 Sampling

Sampling is a procedure which involves selecting representatives or a portion of a given population for study in order to draw conclusions about the larger population. Studying all the actors in the cassava processing industry and the individuals involved may take several years to complete even if it can to be completed at all. All the actors have to be identified and categorised. Sampling is thus the process of choosing the research units of the target population, which have to be included in the study (Bryman, 2004; Babbie, 2004).

5.7.1 Sampling of HQCF processor and farmers who supply the company with cassava and grits

The intermediary HQCF processor (Amasa Agro Processing Company Limited) was purposively selected because that is the only company processing cassava into HQCF, (see section 5.3 on study site selection). Amasa works with individual farmers who either supply the company with cassava roots or grits. To select the individual farmers, the Company provided a list of 56 farmers from whom cassava was bought for its operations over the past six (6) years. Amasa also informed the researcher that some of the farmers have lost their farm lands due to sand extraction and large scale pineapple farming in the area and have migrated out of the district. With this information, the researcher decided to apply the snowball sampling method of the available farmers. In snowball sampling, a researcher makes initial contact with a small group of people who are relevant to the research topic and then uses these people to establish contacts with others (Bryman, 2004). The staff of Amasa assisted initially by introducing the researcher to some of the farmers. The snowball sampling method was then used to locate the rest. In the end, a total of 43 farmers, made up of 27 men and 16 women, were interviewed.

5.7.2 Sampling of *fufu* and *kokonte* processing households using wealth ranking

Most often, researchers and extension agents have been accused of being biased towards rich farmers and sometimes male farmers thereby overlooking the poor and

female farmers. This research therefore tried to avoid falling into this trap by using wealth ranking to select the households in an unbiased manner.

Wealth ranking is the categorisation of households based on their wealth or socio-economic standards using locally defined indicators of wealth. It is designed to find out about local perceptions of wealth and poverty and their relative levels within a village or community (Afonja, 1992). When locally defined indicators of wealth are used, elements of bias (on the part of the researcher) that may influence the outcome of the exercise are avoided. Since it was introduced in the 1980s, wealth ranking has become an increasingly accepted means of assessing relative socio-economic status in most research projects (Chambers, 1994). Even though it is a popular method, Adams et al. (1997: 5) observed that wealth ranking techniques are perceived to be „rough estimates" of socio-economic status, while the formal household questionnaire is still regarded as the more valid and reliable method of collecting socio-economic information.

Wealth is the access to or control over important economic resources and this is characterised by levels of income and expenditure. According to Chambers (1983), the wealth status of an individual or household sometimes determines the vulnerability to famine, disease, political or social exploitation and access to government services. The division of communities into wealth groups therefore provides a sound basis for the identification of target groups. Another importance of wealth ranking could be found in the fact that many poverty alleviation programs seek to identify needy households to ensure maximum program coverage and target the allocation of limited resources. It also permits the development of focussed and effective measures to help alleviate poverty as well as subsequent monitoring and evaluation exercises (Adams et al., 1997). To enable the researcher to select sample sizes of different wealth groups, the exercise aimed at:

- Finding out the characteristics the local communities used in judging relative wealth of individuals;
- Establishing the relative wealth of individual households within the communities with several broad categories of wealth;
- Identifying the poorest and most vulnerable in the communities and

- Providing a basis for selection of households that have different incomes and access to resources such as land and labour.

The wealth ranking was done using a participatory approach with qualitative methods of data collection. The researcher led the discussions while an enumerator recorded the proceedings using flipcharts. The number of participants present in each community is presented in Table 5.3 below.

Table 5.3 Number of Participants Present at Wealth Ranking Programme

Village	Participants	Key Informants	Total
Oforikrom	18	3	21
Suhum	21	3	24
Okper	15	1	16
Kpeve	10	1	11
Sokode	18	2	20

Source: Author, 2006

The Process

The participants in the *kokonte* producing areas were made up of cassava farmers who were processing cassava into *kokonte*. In the *fufu* processing areas, the *fufu* processing households were contacted individually with the assistance of AEAs and the leaders of the Traditional Caterers Association. At each of the meetings held in the communities, participants were asked to indicate types of wealth groups they perceive to be found in their communities. They were then asked to give the characteristics that they think of such wealth groups. In the *fufu* processing communities, participants indicated three types of wealth groups as:

- *Sikafour* (those who have a lot of money -the rich);
- *Modenbofour* (those who have been working hard to make ends meet – the middle income group);
- *Ohiafour* (those who have very little money or not at all – the poor).

In the *kokonte* processing communities, an additional wealth group, *Ohiafour paa,* (the very poor) was added. The participants gave the characteristics of each wealth

group as shown in Table 5.4. The participants agreed that some of the characteristics overlap with others.

After a consensus was reached on the classification of the wealth groups, three areas (for *fufu* participants) and four areas (for *kokonte* participants) were demarcated on the ground for each of the wealth groups. Participants were later on asked to locate on the ground, the wealth group each of them belongs to. This aspect of the exercise was done three times for each of the communities because they know each other very well and therefore if a participant joins a group that others feel that he/she was not being honest they disagreed with him/her. Finally when there were no more disagreements, the groupings were accepted and this formed the basis of the sample size for each community. Results of the wealth ranking are shown in Table 5.4 below. In communities where the total sample size cannot be found during the wealth ranking exercise, snowball sampling was adopted to select the rest of the sample size.

The wealth ranking exercises were not attended by all members of the communities under study and moreover, the participants were not up to the required sample size. Some people who participated in the wealth ranking exercise could not participate in the research because they were temporary residents or were about to travel or some (especially the key informants) were not processing cassava. It therefore became important that the snowball sampling method be used to identify other households in the various wealth groups. During the interview, earlier respondents were asked to identify other people in the same wealth group or other wealth groups. This helped the researcher and his team to locate the rest of households in the various wealth groups interviewed.

The wealth ranking helped the researcher to select the needed sample size without bias to any particular wealth group as indicated above. The participants in the study were comfortable and did not feel that some people are more important or less important in the research. This led to higher participation as all households were able to answer questions freely.

Table 5.4 Results of Wealth Ranking Exercise in Study Areas

Sikafour **(The rich)**	***Modenbofour*** **(the middle income group)**	***Ohiafour*** **(The poor)**	***Ohiafour paa***
• Fine houses built with cement and roofed with iron sheets and walled • Expensive furniture • They have cars, TV, mobile phones • Large farms • Help the community/church • Children attend big and better schools and carry better bags and better food to school • Women buy better things in the market • Children are neatly dressed • Sometimes their children are stubborn • Women who are rich are noticed earlier because of their dressing and social behaviour • They have play grounds for their children • Have improved dogs guarding them • Hold expensive funerals for relatives sometimes	• Have farms but not as large as that of the rich • Houses made of cement blocks and roofed with iron sheets and walled (mostly local) • Mud brick houses • Use moderate furniture but sometimes benches and stools • Help the community • Few of them struggle to send their children to the city for education • Children wear fine clothes • Women show moderate dressing and social behaviour • They have bicycle, TV, radio and mobile phones • Careful about what they say • Sometimes they ***force*** to hold expensive funerals • Use their strength to work hard • Do not go for loans regularly	• Cannot afford a house/ continue to stay in family houses • mud constructed houses with thatch roofing • Furniture is usually kitchen stools and benches • Most men engage in excessive drinking • Usually hire out themselves as labourers • Children are usually school drop outs • Relatives sponsor the children. education in-some cases • Do not usually buy meat but only fish (anchovies) • Do not seek medical assistance except under very serious conditions • Cannot afford proper clothing always • Usually afraid to take loans	• Cannot afford a house/ continue to stay in family houses • Furniture is usually kitchen stools • Most men engage in excessive drinking. They are usually found hanging around drinking spots • Usually lazy and do not want to work • Children not go to school at all • Relatives sponsor the children. education in-some cases • Do not usually buy meat but only fish (anchovies) • Do not seek medical assistance except under very serious conditions • Cannot afford proper clothing always • Usually get food from relatives or their children sometimes beg for food from neighbours • Cannot take loans as nobody is prepared to give them loans

Source: Field Survey, 2005

5.7.3 Sample Size

Sample size refers to the actual number of respondents selected for a study. In qualitative research, samples are not wholly specified, but can evolve once fieldwork begins. Bulky data may be very difficult to analyse depending on the intensity of the research, type of questions it explores and the methods used (Sarantakos, 1993). It is therefore preferred that a sample size should usually be small. What constitutes a large enough sample for qualitative research is subject to debate (Perry, 1998; Liamputtong & Ezzy, 2005). Even though Romano (1989) suggested that the decision on the number of cases is left to the researcher, Perry (1998) was of the view that the researcher could add cases until theoretical saturation is reached. Another view was that the sample size depends on what a researcher wants to find out, how the findings will be used, and what resources the researcher has for the study (Patton, 1990). Liamputtong & Ezzy (2005) also emphasised sufficiency of responses to meet the aims and objectives of the enquiry. The researcher therefore considered the ideas of Patton (1990) and Liamputtong & Ezzy (2005) as worth using.

The sample size of 40 *fufu* processing households was selected because in the Sokode area, the villages were scattered and it was difficult getting a large sample size. Thus the sample size was selected from Sokode, Tsito, Anyirawase and Kpeve before reaching the 20 that was used. In Suhum, the *fufu* processors are well organised and their selection after the wealth ranking exercise was not as difficult as in the case of Sokode area. The only issue was readiness of households to participate in the research because of the nature of their work which takes them through the whole day.

An important factor in the sustainable livelihoods approach is social differentiation which was considered for this study. That is why in selecting households (from wealth ranking through snowball sampling) sex, tribe, religion were all considered. This was done not for *fufu* processors only, but for the other sample sizes as well.

The choice of sample size of 40 for *kokonte* processing households was similar to that of *fufu* households. During the preliminary exercise to select study areas, it was observed that *kokonte* consumption is very low hence production has also gone down. It was difficult getting a large sample size hence I decided to settle on 20 households for each community.

The selection of the intermediary HQCF processors was based on the fact that that is the only processor found in the district. The sample size of 43 farmers who supply the intermediary processor with roots and grits was used because when the intermediary processor gave a list of 56, it was discovered that some of the farmers have migrated to other areas outside the district.

The sample size for the study is therefore as follows:

i. Intermediary HQCF processor 1
ii. Farmers supplying cassava roots and grits to Amasa 43
iii. *Fufu* processing households 40
iv. *Kokonte* processing households 40

Table 5.5 below shows the distribution of *fufu* and *kokonte* households according to wealth groups.

Table 5.5 Sample Size of *Fufu* and *Kokonte* Processing Households

Commodity	Location	District	*Sikafour* (Rich)	*Modenbofour* (Middle income class)	*Ohiafour* (The Poor)	Total
Fufu	Suhum	Suhum-Kraboa-Coaltar District	2	14	4	20
	Sokode, Tsito, Anyirawase, Kpeve	Ho Municipality/ South Dayi		15	5	20
Kokonte	Forikrom	Techiman Municipality		8	12	20
	Totsunya-Okper	Yilo Krobo District	0	7	13	20
	TOTAL		2	44	34	80

5.8 Development of Data Collection Instruments

Three different checklists were designed for the study according to the units of analysis. These are:

- Household livelihoods analysis (*fufu* and *kokonte*) (Appendices 1 & 2)
- Farmers supplying cassava roots and grits to Amasa (Appendices 3 & 4)
- Amasa Agro Processing Company (Appendix 5)

The checklists were designed in very simple and clear English to allow for ease of understanding of the enumerators employed checklists. The main points taken into consideration for the development of the checklists:

- Assets of households
- Vulnerability factors
- Household strategies
- Gender factors
- Policies, institutions and processes
- Service providers
- Livelihood outcomes
- Linkages that exist between farmers and intermediary processors and also middlemen
- Decisions by farmers to sell cassava roots or process them for sale.

The data collection instruments were tested among some farmers and processors at Akwadum in the Eastern region. The researcher and an enumerator interviewed twenty households over a two-week period to assess the strengths and weaknesses of the instruments developed. It was also done to assess the length of the checklist, its readability and the ease of translation into local dialects. During the interviewing and analysis of the data some few flaws were detected about the checklist, the translations and also how the enumerator posed some of the probing questions. These anomalies were corrected and the instruments were well shaped for the real data collection exercise.

5.9 The Use of Enumerators

The official language spoken in Ghana is English. There are several other languages spoken in the country. In the areas selected for the study, the following languages are common:

Suhum	-	Krobo, Twi, Ewe
Sokode, Tsito, Anyirawase, Kpeve	-	Ewe
Oforikrom	-	Twi
Okper	-	Krobo, Ga-Adangbe

Due to the variation in languages spoken, different enumerators were employed for the purpose of correct translation to make the data collection effective. They were trained in English as the checklists were in English and they had to translate these into their own dialects. Apart from Totsunya-Okper and Suhum where the enumerator could speak Krobo and Twi, the other areas had different enumerators. Thus there were three enumerators in all. Even though Twi was common in some of the areas, travelling distance also became a problem hence the use of different enumerators at different places. The researcher himself speaks only Ewe fluently and Twi (about 60% fluency).

5.10 Data Collection

Both primary and secondary data were collected for the study. Secondary data were collected from District Assembly documents, research institutions, books and Internet websites. Primary data were collected as follows:

i. Livelihoods data collection from households
ii. Focus group discussions to validate household/individual interviews
iii. Interview with Amasa involving the Lead Promoter and the Production Manager
iv. Interview with individual farmers who were supplying cassava to Amasa Agro Processing Company

5.10.1 In-depth Household Interview

Semi-structured interviewing was used for the data collection exercise in the *kokonte*- and *fufu*-producing areas. Semi-structured interviews are usually designed to capture human experiences. As Polkinghorne (2005:138) puts it „it is the life-world as it is lived, felt, undergone, and made sense of, and accomplished by human beings that is the object of study". Semi-structured interview is a form of guided interviewing where only some of the questions are predetermined. It does not use a formal questionnaire but at most a checklist of questions as a flexible guide (Bryman, 2004). In contrast to the formal survey questionnaire, many questions were formulated during the interview and such questions usually arose from the respondent's response. Semi-structured interviews allowed participants more scope to dig out what people know or do not know and to follow up topics of interest as they arise in the discussion (Warburton and Martin, 1999). There is generally a positive rapport between the

interviewer and interviewee and this makes it an efficient and practical way of getting data. There is also high validity as people talk about issues in details and depth. In such an interview, complex questions and issues can be clarified and discussed and also, the problem of researcher predetermining what will or will not be discussed in the interview is resolved with the few questions involved. The interview is also easy to record either on video or audio tapes (WFP, 2007).

On the other hand, semi-structured interview is usually time consuming and expensive. Successful research depends on the skill of the interviewer. Occasionally the interviewer may give out unconscious signals that may compel the respondent to give out answers expected by the interviewer. Sometimes depth of the qualitative information may be difficult to analyse. Some of the information received may not be very reliable as it is difficult to exactly repeat the same questions to other respondents and the personal nature of the interview may make findings difficult to generalise (WFP, 2007; Bryman, 2004)

The household interviews were conducted with household heads and spouses where available. For *fufu* processors, the chop bar owners and some workers were interviewed since they are at the helm of affairs and some of them are also household heads. The household interviews were carried out by the researcher with the assistance of enumerators. This allowed for corrections to be made on the part of the enumerator to make sure that there is a level of understanding between him and the respondents. It also allowed for comments in probing questions so that the checklist was administered to exhaust most of the questions posed. In some cases, some respondents who had problems with time were visited on one more occasion to complete the interview.

For *fufu* processors, interviews were conducted usually after 3.00 p.m. when sales are almost going down. They normally start their activities very early in the morning around 4.30 a.m. to make sure that *fufu* is ready by 7.00 a.m. This made it necessary to arrange with them to start the data collection around 3.00 p.m.

In Okper, it was arranged that since Fridays are their taboo days and they do not go to farm or do any other field work, data collection should be done mostly on Fridays

and, when necessary, in the late afternoon to evenings when they were back from the fields. In Oforikrom, there were no taboo days. Data collection was also done in the late afternoon and evenings when the farmers return from their fields. Corrections to data collected were done in the locations.

5.10.2 Individual Interviews with Farmers Supplying Cassava Roots and Grits to Amasa

Qualitative and quantitative data were collected from the farmers over a five week period. The first week was used to identify farmers who produce cassava roots and sell to Amasa, and also process the rest themselves. The following three weeks were used to collect data from individual farmers while the final week was used for Focus Group Discussions to validate the data collected from the individual farmers.

5.10.3 Data Collection from Amasa

Data was collected from Amasa using a checklist. The data collected were both qualitative and quantitative. Two days were used to collect the data as some of the information on the Company was not ready on the first arranged date. The estimates for producing one hectare of cassava and also that of producing HQCF had to be verified and these took a lot of time.

5.10.4 Focus Group Discussions:

This is a form of interview involving few selected participants, usually between 5-8 people, who are knowledgeable or who are interested in the topic and are invited to participate in the discussion and emphasis is laid on interaction within the group and the joint construction of meaning (Bryman, 2004; Chambers and Mayoux, 2003). In qualitative research, information is collected from different sources as a form of cross-checking to increase validity of the data collected (Bird, 2002; Greene et al., 1989; Morse, 1991). Thus the focus group discussions as a form of triangulation were used to ascertain some of the information collected during the data collection exercise. There were exchanges between participants with differences of opinion which led to greater insights into their perceptions (Warburton and Martin, 1999). One key advantage of using the focus group is that it is cost effective in rapidly bringing together information and knowledge from many participants in roughly the same time as it takes to interview two or three people and this was observed during

the exercise. Such information is more accurate and reliable because individual responses are subjected to immediate examination and cross verification from other participants (Chambers and Mayoux, 2003). Table 5.6 shows the number of participants present at each focus group discussion.

Table 5.6 Number of Participants Present at Focus Group Discussions

Commodity	Village	District	Participants		Total
			Male	Female	
Kokonte	Forikrom	Techiman Municipality	7	3	10
	Totsunya-Okper	Yilo Krobo	4	2	6
Fufu	Suhum	Suhum-Kraboa-Coaltar	8	4	12
	Sokode	Ho Municipality	7	1	8
Cassava roots, grits, *gari*, and *agbelima*	Hobor	Ga West	3	5	8

A second round of Focus Group Discussions was held in the communities to discuss the draft value chains of the three products. The concept of value chains was explained to the farmers and processors and how the mapping was done. This generated a lot of discussions among the participants. There were some minor corrections to the value chains drafted. Another Focus Group Discussion was held with Amasa and some farmers. This was to validate the HQCF value chain.

5.10.5. Overcoming the weaknesses of semi-structured interviews

Respondents were made to know that all information collected were confidential and would not be used to implicate anybody anywhere. Enumerators and researcher paid attention closely to interviewees, and most answers provided by the respondents were probed to get further details. Respondents were allowed the freedom to express themselves freely. Precautions were taken against asking leading questions, avoiding repetition of questions and asking vague questions. Where participants decided to „go off" and start talking of issues outside the research, they were carefully „brought back" into the discussions. During focus group discussions, the tendency to dominate the discussions by certain individuals was observed and this was politely handled. However, there was a balance between flexibility and control of respondents.

The focus group discussions were used to validate information collected from households and individuals. This explains why the checklists for the individual household interviews and that of the focus group discussions were almost the same. This is because of cross-checking the information collected from the households to make sure that they are correct information to be used for the research.

5.11 Data Analysis

The research used the SLA and VCA approaches, collecting qualitative and quantitative data concurrently. The household and individual checklists were designed such that quantitative data were collected on some aspects of household assets, demographic characteristics and estimates for production and processing of cassava while the rest of the data were qualitative.

For the quantitative data variables were assigned codes e.g. sex as „sex", tribe as „tribe" and marital status as „mstatus" and responses were assigned numerical values e.g. responses for sex were coded as (1) male (2) female (see appendices 6, 7 & 8). Data were then entered into the soft ware, Statistical Package for the Social Scientist (SPSS). After frequencies were generated, errors were detected in the data entry. Data cleaning was therefore done in order to avoid distortion in the results.

During the data collection exercise, the researcher usually holds a brief meeting with the enumerators to review information gathered and write up notes on the qualitative data. A summary note, including all the main issues, was then written up on the data collected. After the final data collection, a summary coding worksheet was developed according to the variables under study (see appendices 6,7 & 8). The quality of data collected was given much attention. Thus data which were not found to be useful to the thesis were not included in the coding worksheet. The final write up was deduced from the coding sheet generated. A narrative analysis was adopted for the qualitative data collected. This was to enable the researcher to retain quality of data collected and to fully understand the household"s social ideas and meanings (Saunders et al., 2003). Descriptions and quotations were used as they are essential ingredients of qualitative inquiry.

5.12 Upgrading of *fufu* and *kokonte* value chains

The technology transfer process to upgrade the *fufu* and the *kokonte* value chains was carried out jointly with personnel of FRI and FFGL who were all collaborators on the Cassava SME Project. The two technologies – the instant *fufu* and the *kokonte* mini-chip technique were developed by the FRI. Thus they have well trained staff who assisted with the demonstrations.

The technology transfer process involved awareness creation meetings between January and March 2006 with the pounded *fufu* and *kokonte* processing households. After the awareness creation, dates were agreed upon for the demonstration to be held. In Suhum, members of the Traditional Caterers Association (TCA) agreed on 6th May 2006 while in Sokode area, they agreed on 30th March 2006. Households in Suhum, engaged in the chop bar operations that were not present at the meetings where the date and venue of demonstrations were agreed upon, were invited through their leaders. In Sokode area, since there was no organised group, I contacted the households personally and invited them to the demonstration.

a. The instant *fufu* technology transfer

The first demonstration for *fufu* flours was held on 30th March at the Popular Chop Bar, Sokode. A Training Officer from the Nutrition and Socio-economic Division of FRI demonstrated a stepwise preparation of *fufu* from the *fufu* flours provided by the team. On the first day of training, 20 people (18 women and 2 men) participated. The participants at Sokode appealed to the team to hold a second round of demonstration on 5th July 2006 at Sokode since they felt that once is not enough. The second training was also held at Popular Chop Bar and attendance increased to 24 (20 women and 4 men). Two of the men who attended the demonstration were farmers. During question time, the men complained that if this technology is encouraged, the sales of cassava may go down and they stand to lose their incomes. It was explained to them that the technology goes alongside the pounded *fufu* and cannot take over completely.

A second technology transfer for instant *fufu* was held at Suhum in the Eastern Region of Ghana on 6th May 2006. Thirteen members (9 women and 4 men) of TCA were present. The results of the demonstration exercise are presented in Chapter 6.

After the demonstration all participants had a share of the *fufu* to eat and an assessment was done. Participants were concerned about the shelf-life of the *fufu* after it has been prepared. It was explained that it can be kept for the whole day and could be subjected to the same conditions as that of traditional *fufu*. On the question of getting customers to know that they have such a product, the participants said they would achieve that by displaying the *fufu* packets at the chop bars and verbally inform consumers also. They observed that the *fufu* flour is economical because sometimes they buy a whole sack of cassava and all would turn out to be unsuitable for *fufu* but with the flour, one is assured of complete utilization.

The participants were asked to assess the sensory and other characteristics of the instant *fufu* based on taste, relieving drudgery, affordability, hygiene, smoothness, stickiness and ease of cooking. These were scored on a scale between 1-5 with 1 being the lowest value of the characteristic and 5 being the highest value. The results are shown in Chapter 6.

b. The *kokonte* mini-chip technique

A similar procedure was used at Totsunya-Okper where at a village meeting with the *kokonte* processors, 31st March and 21st April, 2006 were agreed upon for the demonstrations to take place and the venue selected was the open space where we held all previous meetings. The technology involved peeling of cassava, washing, slicing with the machine and then drying. The two day technology transfer for the processing of the FRI *kokonte* flour was held on 31st March and 21st April, 2006 for trainees from Totsunya-Okper. Fourteen trainees comprising of 8 males and 6 females participated in the first of the training. Thirty-one trainees comprising 21 males and 10 females took part during the second training.

To whip up more interest in the technique, an excursion was organised for the processors to the FRI cassava processing centre at Amasaman in the Ga West District to see the processes involved in producing the *kokonte* and other products such as *gari* and cassava flour. At the meeting, the farmer-processors were asked to select 17 people, making sure that men and women were given equal chances. The number was pegged at 17 because the mini-bus which was hired could take 19 people. That is, adding the driver and the researcher to make it 19. The 17 participants selected

included 10 men and 7 women. They explained that the figure was not balanced because most of the women were involved in other activities which did not allow them to make the trip. The chief of Totsunya-Okper participated in both training sessions and the field trip.

An assessment of the perceptions of the participants was done on five major variables which were cost of the technology, drying of the chips, hygiene, colour and packaging. A scale ranging from 1-5 was used for the participants to judge which variables they would prefer, that is, they score one as the lowest and 5 as the highest. The results are found in Chapter 7.

5.13 Summary

The chapter discussed the methodology used for the research. The SLA and VCA were combined, using quantitative and qualitative data. Locations were selected in seven districts in Ghana. A sample size of 80 households, an intermediary cassava processing company, Amasa, and 43 individual cassava farmers who supplied cassava to the Company were selected for the research. The households were selected using wealth ranking and snowball sampling while the processing company was purposively selected and the 43 individual cassava farmers were selected out of 56 farmers using the „available subjects" method. Value chains were mapped for pounded *fufu*, *kokonte* and HQCF. Data was collected using semi-structured interviews and focus group discussions. Finally, narrative analysis was adopted for the qualitative data while the SPSS was used to analyse the quantitative data.

CHAPTER 6
LIVELIHOODS OF PROCESSORS IN THE POUNDED *FUFU* VALUE CHAIN

6.0 Introduction

The aim of this chapter is to examine the livelihoods of pounded *fufu* processors in the *fufu* value chain in Suhum (Eastern Region), Sokode, Tsito, Anyirawase and Kpeve (Volta Region). The study examined their socio-economic characteristics and their livelihoods looking at their assets (physical, financial, human, social and natural) and how shocks, trends and seasonality factors affect strategies that they use to achieve their livelihood objectives. As indicated in Chapter 5, three wealth groups, *Sikafour* (5%), *Modenbofour* (72.5%) and *Ohiafour* (22.5%) were identified among the *fufu* processing households studied. A cross-tabulation, using the SPSS, showed differences among the *fufu* processing households in different wealth ranks. The *fufu* value chain was also analysed. The chain is composed of the main actors, including the *fufu* processors who operate „chop bars" (local restaurants), service providers and the enabling environment. In the value chain analysis the researcher assessed the perceptions of processors and consumers on the transfer of instant *fufu* technology by the Cassava SME Project and the implications for their livelihoods.

6.1 Socio-economic Characteristics of *Fufu* Processing Households

The socio-economic characteristics studied were sex, tribe, religion, marital status, age and household headship.

Fufu processors interviewed were mainly women (80%), while men formed 20% (Table 6.1). All the male respondents interviewed indicated that they were operating the chop bars jointly with their wives.

Their ethnic background shows that the respondents were mostly Ewe (65%) followed by Krobo (15%), Akan (15%) and Ga (5%). The high population of the Ewe was due to the fact that the Ho peri-urban area is predominantly made up of indigenous Ewe while Suhum, which is a Krobo area, has a lot of settlers.

Christians formed 95% of the study population and there were 5% Moslems (Table 6.1). No other religion was found among the *fufu* processors.

It was observed that 5% of the respondents were not yet married, 55% were married, 10% widowed and 30% divorced (Table 6.1).

Half of the processors were above 51 years old and 30% were in the 41-50 age cohorts while 17% were between 31-40 years and the rest 3% were below 30 years (Table 6.1). This means that almost 80% of the processors are above 40 years and this shows that there are older women in *fufu* processing. Most of the processors stated that they have been in the business for more than 20 years and one woman indicated that she had been into it for 35 years.

Table 6.1 Socio-economic Characteristics of Respondents

SEX	N	%
Male	8	20
Female	32	80
Total	**40**	**100**
TRIBE		
Ewe	26	65
Krobo	6	15
Akan	6	15
Ga	2	5
Total	**40**	**100**
RELIGION		
Christianity	38	95
Islam	2	5
Total	**40**	**100**
MARITAL STATUS		
Not yet married	2	5
Married	22	55
Widowed	4	10
Divorced	12	30
Total	**40**	**100**
AGE		
21-30	1	3
31-40	7	17
41-50	12	30
51+	20	50
Total	**40**	**100**
HOUSEHOLD HEADSHIP		
Male-headed	23	58
Female-headed	17	42
Total	**40**	**100**

Source: Field Survey, 2006

There were 58% male-headed households and female-headed households formed 43% (Table 6.1). Most of the female household heads were either divorced or were widowed as observed above.

6.2. Livelihoods of *Fufu* Processing Households

The livelihoods of *fufu* processing households include their assets, vulnerability and their objectives and outcomes. PIPs have been discussed under the enabling environment in the value chain.

6.2.1 Livelihood Assets

The livelihood assets of processing households include human, physical, financial, social and natural capital.

a. Human Capital

Aspects of human capital that were examined are demographic features of *fufu* processing households including their educational and health status**.**

i. Educational Status

The educational status of the processors showed that 10% of them had secondary education, 65% had basic education and 25% never went to school (Table 6.2). It was observed that all households found in the *Sikafour* category had basic education while 17.5% who never had any education were in the *Modenbofour* category and 7.5% were in the *Ohiafour* category. Those who had secondary education comprised of 3% *Ohiafour* and 17.5% *Modenbofour.* Households have access to basic and secondary educational facilities in all the two study locations.

Table 6.2 Educational Status of Respondents

Educational Status	N	%
Secondary	4	10
Basic	26	65
Nil	10	25
Total	**40**	**100**

Source: Field Survey, 2006

Education is one of the most important factors that are needed for desirable change in attitudes, skills and knowledge of individuals. According to Mandakini (2005) when women are provided with educational opportunities as well as autonomy needed to take advantage of such an opportunity, poor women are enabled to make strategic life choices and to negotiate their poverty. Literacy could also provide access to a number of assets such as social status and access to information regarding natural or financial capital (DFID, 2002a). The level of education of the processors which indicates that none of them had tertiary education and only 10% had secondary education means that they generally have a low level of education and this could affect some of their activities. Similarly, low levels of education were observed in other studies among women cassava processors (Ojomo, 1993; Odebode, 2008). In contrast, other authors observed a higher percentage of educated women in cassava processing (Amao et al., 2007; Ogunleye et al., 2008). For this group of processors, figures for those who never attended school (25%) were lower than the national figure (31%), while those for secondary education (10%) are also lower than the national figure (13.6%) but the figure for those who have basic education only (65%) is higher than the national figure of 38.6% (GSS, 2008). This could be due to the fact that figures of the *fufu* processors are from selected areas while the GSS figures cover the whole country.

There have been informal training programmes organised by Unilever and the Ghana Tourist Board (GTB) for the processors especially at Suhum. These programmes are organised alongside food fairs at district and regional levels. It is envisaged that the programmes will go a long way to improve on their knowledge and skills in food processing and must therefore be encouraged.

ii. Health Status

There have been no major diseases affecting the respondents and all are healthy apart from occasional cases of malaria. There is very good access to health care as there are health facilities in the study locations. Since the introduction of the National Health Insurance Scheme (NHIS) in 2003, 47% of the *fufu* processors have registered while 53% have not (Table 6.3). Households which registered comprised of all respondents in the *Sikafour* category, 33% and 10% from the *Modenbofour* and the *Ohiafour* categories respectively. Respondents who did not register indicated that they did not

understand exactly what the scheme entails and also they did not have money to register.

Table 6.3: NHIS Registration

Education status	N	%
Yes	28	70
No	12	30
Total	**40**	**100**

Source: Field Survey, 2006

The health status of a people generally determines the quality of life, level of productivity and life expectancy (GSS, 2008). The signs of good health among *fufu* processing households are an indication that they have a high level of productivity and ensure quality food for their customers. The households have access to health facilities but access does not only mean physical availability. Financial opportunity to pay for medical expenses is also important. The introduction of the NHIS would go a long way to solve the financial access because registered members are entitled to free medical care. The premium has been changing yearly and as at 2005 it was GH¢8.00 and then in 2006, it was GH¢10.00. Grüb (2007) reported that almost 6 million people were registered by the scheme in the country. Even though a larger number (53%) of the households have not registered with the NHIS, it is hoped that as education is advancing in the country, they would eventually register and the complaint of lack of money to register would also be overcome if they weigh the difference between the premium they would pay and the benefits they would get.

b. Physical Capital

The physical assets of the households interviewed were shelter, energy, water and sanitation, means of transport and sources of information.

i. Shelter

The majority of the houses (85%) in which those interviewed live are built with cement blocks and roofed with either iron or asbestos sheets while some households live in plastered mud brick houses roofed with asbestos sheets (Table 6.4). All the *Sikafour* and a few of the *Modenbofour,* forming 30% of the households, live in their

own houses, 45% in rented premises and 25% (including all the *Ohiafour* and few of the *Modenbofour*) in family houses.

Some households cannot afford to build the cement block houses and roof them with iron sheets thus they go in for the cheaper housing units that are within their limit. The mud brick houses are mostly found in the Ho peri-urban area while the cement block houses are more common in Suhum which is a fast developing town. According to GSS (2008), a little over 45% of Ghanaians live in their own houses, about 15% higher than the findings of this study. The high cost of constructing or buying new buildings has prevented many people from owning their homes but the traditional inheritance structure allows households to pass on their homes inter-generationally.

Table 6.4 Access to Shelter

Ownership of House	N	%
Personal	12	30
Family	10	25
Hired	18	45
Total	**40**	**100**
Type of house		
Mud bricks	6	15
Cement	34	85
Total	**40**	**100**

Source: Field Survey, 2006

Some processors have put up their own chop bar buildings while others are at rented premises where they pay between GH¢4.50 and GH¢8.00 a month depending on the landlord. The chop bar buildings are either cement buildings or wooden structures roofed with iron sheets (see Plate 6.1 on page 154). While some of the chop bars are located on family plots, some are located on rented plots or are permanently acquired. Since the land belongs to different families and individuals, the land rent ranges between GH¢2.00 and GH¢5.00 per month.

Furniture in the bars is of two types: the wooden bench with tables and the plastic chair with plastic tables. The bars are changing from the wooden benches gradually to the plastic chairs. This makes customers more comfortable than the wooden benches as the plastic chair affords „one man, one seat" while the bench can take between four

to six people at a time. Some of the floors have been decorated with linoleum carpets. Some of the bars have tabletop refrigerators for cooling water and soft drinks, which are sold to customers in addition to the food. Some also own deep freezers for storing meat, fish and vegetables. There are ceiling fans, wall clocks and sound systems in the bars, but they are limited to a few cases only. All these arise out of market competition. Some processors indicated that consumers patronise the well furnished and more modern chop bars more than those with the olden wooden chairs and tables and this is forcing them to improve the furniture in the chop bar. The households, through their own local perceptions, have come to the realisation that consumer satisfaction is the drive behind their improvement to the physical structures and services they render to the consumers.

Plate 6.1 A Wooden Chop Bar Building in Sokode

Picture: Author

ii. Energy

The main sources of energy include charcoal, Liquefied Petroleum Gas (LPG), firewood and electricity. All households studied were connected to electricity which is mainly used for light and for household equipments such as ceiling fans, refrigerators and sound systems. Charcoal and firewood are the main sources of energy for cooking and LPG gas is less used as only 3 (8%) processors are using it.

One limiting factor on electricity use is the high cost. Using an electric stove draws so much current that the processors indicated that they would only be producing at a loss if they use electricity. Similarly, Bannister (2002) observed that the people of Moshie Zongo Community in Kumasi, Ghana, do not use electricity for cooking because of high costs and also, cost of sharing the bills among co-tenants in a compound house. The *fufu* processors therefore depend on charcoal and firewood for cooking at the chop bars. This is common all over the world as reported by EIA (2006) that over 2.5 billion people still rely on traditional biomass for the everyday cooking and heating needs which are fundamental to human life.

iii. Water and Sanitation

All households use pipe-borne water and in addition, some use water from boreholes to supplement the pipe-borne water. The use of boreholes in addition to the pipe borne water saves costs and also ensures the smooth running of the chop bars as the supply of pipe-borne water is not regular and could go off for a week or even more. In cases where they buy the water from public pipe stands, the cost is GH¢00.30 per bucket (20 litres).

Avoidance of illness and disease in rural areas can be achieved through provision of clean drinking water (Ashong and Smith, 2005). GSS (2008) reported that there was an increased access to potable water and adequate toilet facilities in both rural and urban areas making access to these physical services positive. The service estimated that 39.5% of households have access to pipe-borne water, 40.7% well water and 19.8% from natural and other sources. The *fufu* processing industry uses a lot of water. This is because water is needed for washing peeled cassava, boiling, pounding, soup preparation, washing plates and washing floors. Fortunately the processors indicated that they have good access to water.

Some of the chop bars have provided only urinals with no toilets while others have not. Customers therefore use public toilets when the need arises. The chop bar environment is usually kept clean because the Environmental Health Inspectors always check and prosecute chop bar owners who refuse to keep their environment clean. Even though they have not provided toilet facilities there are public places of convenience in all the study areas but they must be encouraged to provide at least

urinals since not all of them have this facility. GSS (2008) reported that a fifth of Ghanaian households do not have any toilet facilities while 10.2% have access to flush toilets and 11% use the „Kumasi Ventilated Improved Pit" (KVIP), an improved toilet facility. The rest are 32% use pit latrines, 7% use pan/bucket. There is therefore the need to improve the toilet facilities since emergency cases could arise at any time.

iv. Transportation

Livelihood analysis shows that transport constraints and their impact on rural livelihoods and service provision are very important to the rural poor (Hanmer et al., 2000). Transportation is vital to the mobility of foodstuffs from the farm to the village and also to the urban areas. Trunk roads in the two study locations are tarred and are in good state. It is mostly the farmers and middlemen that supply them with cassava and other inputs. However, the cost of transporting cassava roots from the farm to the trunk roads is difficult as the feeder roads are in a poor state. Households therefore have problems with transportation, especially the cost. Only one household, which belongs to the *Sikafour* category, owns a pick-up vehicle. In this particular case, the woman has partnered with the husband who has a farm and supplies cassava to the chop bar.

c. Financial Capital

The aspect of financial capital discussed here is the source of starting capital. Access to credit facilities has been discussed in section 6.3.2 under financial service providers. Households who started the *fufu* chop bar business had varied sources of starting capital. Sources include cash capital from parents (35%); some took over from parents (27%) and the rest were from petty trading, addition of chop bar to drinking bar and remittances (Table 6.5). A divorcee indicated that during the divorce, the husband compensated her with some money which she used to start the business and the man continued to remit her (GH¢50.00 a month) because the two children were still with her. According to her she adds this remittance money to her working capital whenever the money is sent.

The most important aspect of the sources of starting capital was „taking over from parents". This is because even though processors who took cash from their parents were more, the people who inherited the business have accumulated a lot of

knowledge and skills which the new entrants might lack. The use of family labour becomes an important issue in *fufu* processing because the younger girls learn from their parents on the job. Britwum (2002) noted that there was very little separation between work and domestic life, as well as labour organisations because all family members have to contribute their labour to the family enterprise. As all the family members contribute their labour, they are at the same time in a form of apprenticeship (Adu-Amankwah, 1999). They therefore acquire the knowledge and skills and as their parents grow older, the business is handed over to them especially those who have not acquired higher education, because those with higher education have the tendency to look for „white-collar" jobs.

Table 6.5 Sources of Starting Capital

Sources	**N**	**%**
Took over chop bar from parents	11	27
Capital from parents (cash)	14	35
Petty trading	7	18
Former husband (divorcee)	1	2
Drinking bar added to chop bar	7	18
Total	**40**	**100**

Source: Field Survey, 2006

d. Social Capital and Access to Information

Social capital is discussed in the context of groups and access to information. The *fufu* processors belong to two main groups – the Traditional Caterers Association (TCA) and *susu* savings groups. The *susu* groups are discussed under the section on financial service providers (6.3.2).

i. Group membership

In Suhum, processors are well organised into the TCA which is a branch of the Regional Association in the Eastern Region. They attend weekly meetings and contribute dues of GH₵ 0.50 a week. They have an appellation which is well known to all members. On meeting your colleague, you salute him/her *"Aduani pa"* and the response is *"ema nkosuo" "ema aware so"*. That is, good food makes work to

progress and also makes an interesting and everlasting marriage. Benefits of the group membership include the financial contributions and attendance of members at birthday parties, weddings, funerals and other social activities organised by any member of the Association. Other benefits were their links with the GTB, Unilever and Centre for Indigenous Business Association (CIBA) as discussed in section 6.3.3. During the focus group discussion, one of the participants (found in the *Ohiafour* category) had this to say about the Association:

> *"When my husband died, I had no money, and no one to turn to. However, the executives approached me and indicated their readiness to assist me financially during the funeral and they actually fulfilled the promise. The Association is therefore a very good one"*

ii. Access to Information

Access to information is not lacking because of their relationships with Veterinary Officers of MOFA, Health Inspectors of Ghana Health Service (GHS), Unilever, GTB and the TCA. Information on animals for slaughter is provided by the extension officers of MOFA and GHS. The TCA of Suhum is a major form of horizontal linkage where information is shared regularly. They have easy access to each other and they meet every Wednesday to discuss matters affecting their work and their welfare. Information sharing is very common among the chop bar operators especially on the sources of inputs and pricing of their products.

Information related assets owned by processors include radio, television sets and mobile phones (Table 6.6). Households in almost all the wealth groups forming 95%, had radio, 63%, TV and 75% had mobile phones. All the households in the *Ohiafour* category did not have cell phones and TV sets. The use of communication equipment especially mobile phones is spreading among the chop bar operators.

Table 6.6 Ownership of Information Equipment

Equipment	N	%
Radio	38	95
Television	27	68
Cell phone	30	75

Source: Field Survey, 2006

The use of the telephone has become necessary because respondents indicated that they no longer have to move to places to request inputs such as cassava, fish, meat and drinks for those who have attached drinking spots to the chop bars. It has made it easier for them to contact their suppliers and this has reduced their travelling out of their stations greatly. The processors admitted that they do not use it only for their business but for family and other social matters. Some even said that they see it as a prestige to carry a mobile phone in public. Most of these findings are consistent with that of Sey (2007) who observed that some people use the mobile phone to get financial assistance, keep in touch with loved ones, and arrange contracts for execution and mostly to be in touch with family and friends. Similarly, market actors in the *fufu* market chain in Ifo market in Nigeria (Adebayo, 2005) and small-scale farmers and traders in Tanzania (Benglestorff, 2007) also agreed that mobile phones are good in spreading market information even though they complained of the high cost of maintaining it. One of the *fufu* processors, talking about the mobile phone, says:

> *"This time, it is fashionable to hold a mobile phone. Immediately you meet a friend or a customer, the first thing is to ask for your phone number. It was very embarrassing when I did not have one so I was forced to get one to avoid further embarrassment".*

The processors who have TV sets do not actually use them for information on their business, but as a form of entertainment to *fufu* consumers. TV sets are displayed in some of the chop bars for customers to view as they either wait to be served or when enjoying the meal. According to the processors, they did not have much time to watch the TV as they are engaged almost all the day. The few times that they watch TV is for part of the evenings and Sundays when they are not working. The transistor radio is used to gather information as they are also placed in most of the chop bars and the processors continue listening as they work. The processors are therefore using some of the information equipment to their advantage as they need information to make decisions on livelihood strategies and information on policies that affect their strategies. Thus it is only through improved information that individuals can make informed choices about the opportunities and constraints associated with agricultural based strategies (Chapman et al., 2003).

e. Natural Capital

There is very good and easy access to land in the two locations. Land is owned by families and family members have free access by consulting the family head. Settlers either hire or have outright purchase of the land for residential purposes and their chop bar operations. While some of the chop bars are located on family plots, some are located on rented plots or are permanently acquired. Since the land belongs to different families and individuals, the rent varies as there is no fixed rent. Rents ranged between GH¢2.00 and GH¢5.00 per month in the two locations.

Some processing households have farms. The men usually work on the farms while the women operate the chop bars. One household, found in the *Sikafour* category, indicated that the husband supplies cassava and ingredients such as tomato, pepper and garden eggs to the chop bars. These items are paid for because the farming activity is also an enterprise on itself and must not be allowed to collapse. Thus intra-household decisions on managing the farm and the chop bar are manifested by these households.

6.2.2 Vulnerability

The main factors that render chop bars vulnerable are the prices of inputs and seasonality of consumption.

a. Prices of Inputs for the Chop Bar

Prices of inputs usually go up with the least increase in the price of petroleum products. World crude oil price hikes between 2004 and 2007 led to increases in the price of petroleum products in Ghana, resulting in increase in the cost of transportation in the country. This has affected the cost of transporting cassava from the hinterland, increasing the price of meat especially grasscutter. These increases of prices made operations at the chop bars difficult because increasing the price of the size of *fufu* led to a lot of complains by consumers who actually ignore the fuel price increases and turn to blame the chop bar operators. A participant at the focus group discussion (who belongs to the *ohiafour* group) lamented thus:

"Life is already difficult for some of us and when prices of inputs go up, we find it to raise more money to buy such items and our situations become worse"

In the dry season, the land becomes very hard and harvesting of cassava becomes difficult. This leads to an increase in the price of cassava and then *fufu*. Another issue is the spoilage of cassava. During the transition between the dry season and the rainy season, harvested cassava deteriorates faster and sometimes what was bought from the farmers will not cook well, creating financial loss to the processors.

b. Seasonality of consumption

Seasonality of *fufu* consumption is one major factor affecting the industry. According to the processors, sales go down during the farming season when residents normally go to farm early in the morning and return in the evening. Also, during the Ramadan season when Moslems fast for forty days, sales go down drastically. The processors complained that most drivers do not stop over during the period, making sales very low.

6.2.3 Livelihood Objectives and Outcomes

The contributions of livelihood activities were assessed in the form of income, household food security, well-being and vulnerability.

a. Income and Well-being

One of the main objectives of *fufu* processors is to achieve an increased income in order to improve on their standard of living. A few households indicated that incomes have slightly improved over the past five years but the majority indicated otherwise. Improvement in income has led to some of the households completing their new houses, acquiring more physical assets like televisions, radios, mobile phones and fridges for their homes. One household, which was found to be in the *Sikafour* category, completed a new house built with cement and roofed with asbestos sheets in 2006.

There was expansion in some of the chop bars which were provided with improved furnishings and fittings like plastic chairs, fridges to provide iced water and soft drinks, linoleum carpets on the floor and sound systems to provide music to

customers. The attendants in some of these chop bars now use prescribed uniforms with aprons and they look neat and smart. Processors whose incomes have not improved complained of inadequate financial capital, lack of credit facilities for expansion, and shocks due to regular increases in petroleum products which affect prices of all other inputs. Their chop bars have not expanded, they are still in rented premises and furniture in the bars remains wooden benches and wooden tables.

The educational levels of adults in the households have been found to be low. However, there is an improvement in the level of education of their children as all the children of school-going age are in school and some have already completed. This could be attributed to the Free Compulsory Universal Basic Education (FCUBE) policy in the country. There were no reported cases of basic school drop outs. At the secondary and tertiary level, fees are paid and the respondents indicated that some of their children are actually in secondary and tertiary institutions, but not all of them. One female household head (in the *ohiafour* category) expressed her joy during the household interview thus:

> *"The Government actually came to our rescue. One of my children was out of school but when it was announced that there are no more school fees to be paid, she has gone back to school and I am happy about that"*

All households are in good health and there were no cases of disease outbreaks or serious ailments. Those who have not registered with the NHIS have been able to pay their hospital bills without hindrance. Moreover, there are free vaccination programmes for all children and they have access to health facilities in the communities.

Most processors indicated that they enjoy their peace of mind in whatever they are doing, either in the house or at the chop bar. A few of them, however, said that due to financial difficulties, it has not been easy for them as they cannot make ends meet. They are therefore not happy as they always have to buy food ingredients, cassava and meat on credit before paying later. They wished they could also use their own money to buy whatever they want but this has not been so.

However one woman who said she enjoys watching TV said that:

"When I watch films on some war torn countries, with women and children always carrying their baggage moving out from their villages to another place, very slim and without food, I always thank my God that I am not one of those people. Here, I eat always, drink good water and not fighting anybody. Despite the fact that I am not a rich person, I am happy that at least, I have my peace".

b. Household Food Security

The *fufu* processing households indicated that they have physical access to food, i.e. food is available on the market but they do not always have economic access, leaving them with the option of buying some of the inputs especially meat and cassava on credit. On the issue of safe and nutritious food, the households claimed that since they are producing food to sell to the general public, it is their duty to give out their best. They therefore claimed that because they provide safe and nutritious food to the general public, they themselves are also consuming such good quality food which is necessary for their active and healthy life. One of the limitations of the research was that there were no scientific tests on the food items prepared at the chop bars to find out how safe and nutritious they were. The food could be nutritious but may not be balanced and this does not make them food secure.

The households indicated that they do not store food for the future because they are using the supplies to cook on daily basis and there is therefore no need to keep food. Most of the inputs they use are perishable especially the cassava. They cannot therefore store the inputs. Another issue is that their capital base is not so strong to allow for much food storage. Thus it is not possible to conclude that they are totally food secure.

Box 6. 1: Case Study- The Story of a Chop Bar in Suhum

Mrs. A started operating a drinking bar before adding the chop bar business 31 years ago. Her husband, Mr. A had secondary school education while Mrs A had basic education. They have six children - five girls and a boy. The eldest daughter had a post secondary education and is gainfully employed outside Suhum. Apart from the boy who is still in secondary school, the other three girls have completed basic education and are helping at the chop bar. The main sources of energy are charcoal, firewood and gas for cooking while there is also electricity. The chop bar and dwelling home have access to pipe-borne water, a bore-hole, KVIP toilet and electricity. The couple have communication equipments such as the TV, radio and mobile phones and also a Nissan pick-up vehicle which is used to transport cassava and other foodstuffs from Mr. A‟s farm and other sources to the chop bar. Mr. and Mrs. A have separate accounts with the Mumuadu Rural Bank but have never accessed credit facilities from the bank because of the difficulties in accessing such loans. Mrs. A is a member of a *susu* savings group where she makes daily savings. The couple are members of the TCA. The chop bar is well furnished and there is a fridge, ceiling fans, TV set and a drinking spot. It is patronised mostly by civil servants and commuters. The couple indicated that increases in their income from their *fufu* chop bar and the farm have enabled them to complete a five bedroom walled house in 2007. They have physical and economic access to food and are able to pay their bills including their children‟s school fees promptly and enjoy their peace of mind.

Mrs. A currently prepares instant fufu for her customers after she was trained by the FRI. She mentioned that transporting cassava from the village is quite expensive and sometimes some of the roots get spoiled and do not cook well. Moreover, getting men to pound the fufu is usually a problem. She therefore thinks that the instant *fufu*, if patronised on a large scale, would go a long way to solve the problems mentioned above.

FRI Training Officer training Suhum chop bar operators on Instant *Fufu* preparation

Source: Field Survey, 2006

6.3 The Pounded Cassava *Fufu* Value Chain

The pounded *fufu* value chain consists of three main components which are the main actors, the service providers and the enabling environment (Fig. 6.1).

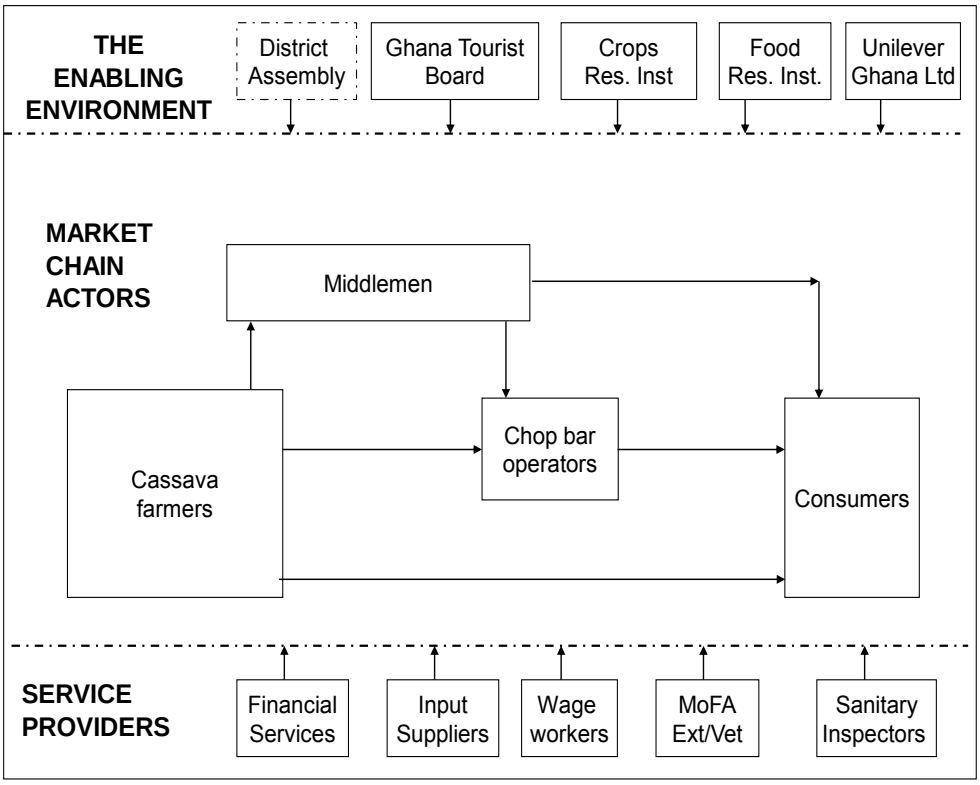
6.3.1 The Main Actors

The main actors in the chain include households engaged in cassava farming with some of them processing into *fufu*, middlemen and final consumers.

a. Cassava farming households

Cassava farming households form the starting point of the cassava *fufu* value chain. These are small-scale farmers producing cassava and other crops as livelihood activities. Improved varieties of cassava which were released and are in use in Ghana were found not to be good for *fufu* but are good for other processed products like *gari*, *agbelima*, starch and cassava flour. They form the main sources of cassava to *fufu* processing households even though a few of them also process their own cassava into *fufu.*

Figure 6.1: The Pounded Cassava *Fufu* Value Chain



Source: Field Survey, 2006

b. Middlemen

Cassava produced is either sold directly to the *fufu* processing households or through middlemen. In Sokode, Tsito, Anyirawase and Kpeve where the farmers live in the same village as the *fufu* processing households, the use of middlemen is not as common as it is in the case of Suhum which is far from most of the farming areas. In Suhum, middlemen buy the cassava roots from villages such as Niifio, Anumapampam, Sowatey, Apedwa, Omenako, Kwabena Kumi and Akurabo and sell to the *fufu* processors and also retail the rest in the Suhum market. However, some of the *fufu* processing households have direct contact with some farmers who supply them regularly on contract basis.

Even though there is a contract between some processing households and middlemen, it is not formal as it is not written. But it works well because they know each other and have worked together for a long time. They therefore have such benefits as identified by Mudhara and Kwaramba (1998):

- Quantity and quality requirements are stipulated and known in advance,
- Prices are usually agreed on and this removes uncertainty on each side and
- Supplies are generally guaranteed without failure.

However, Mudhara and Kwaramba (1998) cautioned that both parties are vulnerable to price fluctuations in cases of gluts or dry season, also rural people do not fully understand and appreciate the significance of contracts (verbal, written or implied) and this leads to defaulting rates.

c. *Fufu* Processing Households

Some households operate chop bars which are mostly micro and small scale enterprises. They process the cassava roots into pounded *fufu* which is a major item of diet for most Ghanaians especially in southern Ghana where the bulk of the *fufu* is prepared and consumed by the households (Asiedu, 1989; Onumah, 2007). The cassava is peeled, washed, boiled and pounded into *fufu*. It is usually pounded with plantain or cocoyam because the starch level in the pure cassava *fufu* is too high. The pounding is time-consuming and labour intensive as it involves a high level of drudgery and the hygienic aspect sometimes leaves much to be desired. The *fufu* is served with soup and thus ready for eating.

In Sokode, Tsito, Anyirawase and Kpeve, the chop bars process only *fufu* but in Suhum they have added other food items such as banku, rice and *kokonte* meal to the pounded *fufu*. According to them different people have different preferences for food items and therefore a variety of food items at the chop bar cater for a wide range of people.

Drinking bars have also been attached to most chop bars as another livelihood strategy of the households because some people would like to take some drinks either before or after the meals. This is not only to satisfy consumer demands but also serves as an insurance to the chop bar so that during periods when food consumption is low and incomes are falling from the chop bar, the drinking bars can offer some form of relief. Some of the processors also indicated that they were originally operating drinking bars and added the chop bar later.

Attaching drinking bars to the chop bars not only satisfies the requirements of some consumers but is a form of livelihood diversification for the households. According to Ellis (1999), diversification ensures risk spreading and protects against market failures and help in coping with shocks. Thus if for any reason, sales from the chop bar go down (processors indicated that sometimes there is seasonality of consumption), there would definitely be some income coming from the drinking bars to sustain the household. Not all households attach drinking bars to their chop bars even though they may all wish to operate drinking bars. One factor that limited some people is on religious grounds. The demographic features of the respondents show that there were 5% Moslems (section 6.1) and in this case, their religion does not permit them to do so. In Islam, alcoholic beverages or any intoxicants are forbidden by the Quran. Ashour (1995), using the Quran as a guide, indicated that Muslims are exhorted to keep a wide margin of safety between themselves and alcohol. Also, among the Christians, there were some groups whose beliefs do not allow them to sell alcoholic beverages. One example is the Seventh-Day Adventist Church. Self-control has been a major focus of the church and it has continued to vigorously oppose the use of alcohol and tobacco (SDA, 1992).

d. Consumers

Fufu is mostly consumed at the chop bars and only a few people take the food home. Travellers, especially on the Accra-Kumasi, Accra-Ho and Accra-Hohoe highways are the major people who patronise the chop bars. The location of the chop bars on these routes puts them at vantage positions for commuters to stop over for food. In addition to the commuters, most civil servants and other residents also patronise the chop bars.

The consumers usually prefer *fufu* that is sticky, smooth, devoid of lumps and prepared under hygienic conditions. The quality of the soup that is served with the *fufu* always counts a lot, in addition to the sensory qualities of the *fufu* itself. This is because if the soup is not palatable, the whole dish would not be accepted. The chop bars form part of an industry system that provides services to people away from home. Without the support of customers, the chop bars would be at risk. Customer satisfaction is therefore one of their utmost objectives. This is what exactly some of the chop bars have started doing by attaching drinking bars, playing music, supplying sachet water, (known as pure water) and having a dress code. Satisfaction of the customers not only constitutes the image of the particular food restaurant but also plays an important role in the business industry (Liu and Chen, 2000) and reinforces the consumers‟ likelihood of continued patronage (Hawkins et al., 1992). Thus the high patronage of the chop bars could be due to the satisfaction that people derived from their services.

6.3.2 Service Providers

The service providers include financial services, input suppliers, wage workers, extension/veterinary staff and sanitary inspectors.

a. Financial Services

Two main types of service providers to the processors are the informal financial service providers known as the *susu* groups and also the formal credit provided by the banks. About 65% of them save with the *susu* groups and 70% save with the formal banks. Daily contributions to *susu* groups range from GH¢2.00 to GH¢5.00. Members are entitled to loans depending on an individual‟s standing with reference to the contributions made so far. *Susu* groups form part of the informal financial sector

banking in Ghana and s*usu* is one of the oldest money-collection and savings system in Ghana (Reppert-Bismarck, 2006). These are transactions in which there are no legalities and they are based primarily on a personal business relationship. There are two types of *susu*. The first one is the Rotating Savings and Credit Associations (Jones et al., 2000; IFAD, 2000) This is usually formed by a group of 3-7 people or sometimes larger. The members contribute a fixed amount every month (or week) and this total amount is given to one member of the group at the end of the month (or week) until everybody has received once and then the cycle continues. The second type is operated by *susu* collectors who have membership cards and the contributions depend on the individual. After 31 days, a client takes back his/her money and the *susu* collector deducts one day"s contribution for his/her services. This second type of *susu* is one being operated by the *fufu* processors. The *susu* collectors advance loans to processors according to the contributions of each member and these are usually short term loans of up to three months. Reported cases of fraud led to the establishment of an apex body, the Ghana Cooperative *Susu* Collectors Association in 1990 to regulate their activities (GCSCA, 2008).

The *susu* groups do not need collateral or associations to grant loans. It all depends on mutual trust. A processor can therefore call the *susu* collector and ask for a loan and as long as he has the money the loan is granted and recorded. The *susu* groups have been very useful to the processors and are actually carrying out most of the duties of the banks who are more interested in granting loans to medium and large scale enterprises.

In the Suhum area formal financial services are provided by the Ghana Commercial Bank, the Agricultural Development Bank and the Mumadu Rural Bank. In Ho, there is the Ghana Commercial Bank, North Tongu Rural Bank, Barclays Bank, SSB Bank, National Investment Bank and the Weto Rural Bank at Kpeve. Despite the presence of all these financial institutions, there is still poor access to credit. The major source of credit for the processors is therefore from the *susu* group.

Some of the *fufu* processors in Suhum took loans from the Mumuadu Rural Bank in 2003 and the condition was that they repay by weekly instalments. The processors realised that the weekly payment was not favourable to them and after finishing

payment, they never went back for any loan and therefore relied on their *susu* groups for assistance. The processors indicated that they buy most of the inputs in bulk, thus paying loans weekly may reduce their financial standing and they were not able to carry on with the bulk buying. It was also difficult for them to pay the bank and continue with their business when sales dropped in some particular weeks. They would therefore prefer monthly instalments rather than the weekly one. Commenting on the re-payment schedule at the focus group discussion, one of the respondents said:

> *"Our business is such that we use cash almost always. How much do I earn a week before repaying loans weekly? I think this would only land me into more debt. The best thing is not to go in for such a loan and create trouble for myself".*

Access to credit to improve on livelihoods of the poor has become increasingly important over the years. The main problem faced by some of the *fufu* processors was inadequate working capital and poor access to credit facilities despite the presence of all the financial institutions mentioned above. This has been observed generally with SMEs (Aryeetey and Ahene, 2005; Tagoe et al, 2005; Ambrose-Oji, 2004). The *fufu* processors can sometimes use the Traditional Caterers Association (TCA) as their mouthpiece to push their case forward with the banks since the facilities they receive from the *susu* groups are very small. The Association can present their case to the Rural Bank authorities to review the re-payment schedule to meet the demands of the processors. The TCA for example, has negotiated with CIBA and members have acquired refrigerators on credit basis and pay by monthly instalments. In Ho per-urban where there is no association, it would be necessary for them to start organising themselves into an association which can champion their cause for them. Another avenue for credit assistance is the NBSSI"s Business Advisory Centres. This also deals with organised groups which fall under micro, small and medium scale industries.

b. Input Suppliers

There is easy access to markets in the two areas as Suhum has a central market where all goods are sold and markets exist at Tsito, Kpeve, Sokode and Ho. Access to cassava, meat, fish and ingredients is therefore very easy. One important feature that makes the Sokode chop bars unique is the daily supply of the grasscutter,

Thryonomys swinderianus (a wild rodent) by hunters. This is preferred by customers to any other meat. It is therefore the major meat used in addition to poultry and goat meat. In Suhum, they do not get a regular supply of the grasscutter but have a regular supply of beef, goat meat, and fish. Butchers in particular have a working relationship with the *fufu* processors in Suhum where they supply their daily needs of meat.

Prices of inputs usually go up with the least increase in the price of petroleum products. This makes operations at the chop bars difficult at times because increasing the price of a plate of *fufu* leads to a lot of complaints by consumers who actually ignore the fuel price increases and tend to blame the chop bar operators. Rise in world market prices of crude oil led to this situation as Ghana is dependent on oil imports. World crude oil price rose from US$21.87 per barrel in 2000 to US$126.06 in May 2008 before falling again in August 2008 (EIA, 2009). Thus lorry fares in Ghana continued rising and this affected the transportation of inputs also.

c. Wage Workers

The total number of labourers employed by each *fufu* processor ranged from 3 to 15 depending on the size of the enterprise. The greater part of the labour employed is family labour especially children and relatives. This is similar to the observations of several authors that family labour is mostly used in micro and small scale enterprises (Britwum, 2002; Adu-Amankwah, 1999; Odebode, 2008). The rest are hired outside the family and they are paid wages. Roles are assigned depending on the traditional roles of men and women in the society. Men usually do the pounding of *fufu* in Suhum and in this case only one person does it with the woman turning the paste in the mortar (see pictures below Plate 6.2).

Plate 6.2 Pounding *Fufu*

Group pounding in Sokode (Credit: Mike Morris, 2004)

Single man pounding in Suhum, (Source: Author, 2006)

In Sokode, Tsito, Anyirawase and Kpeve, there is group pounding which is usually done by women but occasionally men help them. The one-man system of pounding *fufu* in Suhum becomes a problem sometimes when the man refuses to turn up for work. According to the processors the inability of the man to turn up for work sometimes arises because of low wages, sickness or tiredness due to the intense physical effort involved in pounding. The *fufu* processors also mentioned that they have been bargaining with them over increase in wages but could not always meet their demands, looking at the total cost of production. One of the processors lamented thus:

> *"When he decides not to come to work, either through sickness or tiredness or otherwise, without telling the chop bar owner then a serious problem comes up. This problem is usually solved by mobilising the women to pound".*

The role of women includes boiling of cassava, preparing the soup, serving and washing dishes, in addition to sweeping and cleaning the environment. These roles require more female labour thus more females are employed in the chop bars than men.

Payment for labour varies from chop bar to chop bar. While some people are paid daily, some are paid weekly and the rest monthly. Payment is either in cash or in kind. Some people take breakfast, lunch and supper and collect the rest of the money but some take only supper and collect the money. According to the processors, workers who opt for only supper still take the breakfast either overtly or covertly but this is sometimes overlooked. The average daily wage for the men pounding *fufu* ranges between GH¢2.50-GH3.50 and that of women is between GH¢1.00-GH¢1.50 (i. e. in 2006). The men are paid higher because their work involves more intense physical effort that that of the women. The wages are considered low with reference to the type of work done. As at 2006, the daily minimum wage approved by government was GH¢1.60. Thus the wages for women in the chop bars fell below the daily minimum wage while the men are slightly above it. Similar low wages in the private sector were observed by Pellissery and Walker (2007).

d. Extension Services

Fufu processing households indicated that the Veterinary Service of MOFA carries out physical examination of animals to be slaughtered and use at the *fufu* chop bar to check if it is fit for consumption (ante-mortem). If it is fit, the butchers are allowed to slaughter the animal and if not, the animal is either sent for treatment or it is slaughtered and buried. If an animal is not declared sick and is slaughtered a post-mortem examination is conducted. Again, if the meat is found to be diseased, it is buried: if not diseased, it is allowed for human consumption. The processing households indicated that the activities of the veterinary extension officers have actually contributed to safe and hygienic food being prepared at their chop bars.

e. Environmental Health Services

The respondents again indicated that Health Inspectors from the Environmental Health Division of GHS collaborate with the Veterinary Officers, to make sure that the slaughter house is hygienic before animals are slaughtered and assist with the post-mortem examination. According to them, they, as food vendors, are supposed to go through annual health checks to avoid the spread of communicable diseases (especially tuberculosis) to consumers. The Health Inspectors therefore inspect their annual health certificates annually to make sure that there is compliance with the law. The processing households were happy with the activities of the Health Inspectors (and veterinary extension officers above) because according to them, they do not have problems of using poor quality meat, and also there is always proper sanitation at their premises.

6.3.3 The Enabling Environment

Mapping the enabling environment for the *fufu* value chain helps to understand the trends that affect the chain and examines the powers and interests that are driving a particular chain. It comprises the District Assembly, Crops Research Institute (CRI), Food Research Institute (FRI), GTB and Unilever Ghana Limited. Most of the information was collected during the stakeholder workshop to identify actors in the cassava value chain and some were collected during household interviews and focus group discussion.

a. District Assembly (DA)

District Assemblies have direct control of all economic activities in their area of jurisdiction. The DAs therefore work with the *fufu* processors by allocating land, which is otherwise vested in the Assembly, market stalls, and collect taxes for development purposes. To start *fufu* processing, the processor is licensed by the DA at a fee of GH¢12.00. A tax of GH¢20.00 is paid annually but processors are allowed to pay by quarterly instalments of GH¢5.00. These figures are subject to change. The DA therefore serves mainly as a revenue collection point for the *fufu* processors and assists the chop bar operators with market stalls where necessary.

b. Crops Research Institute (CRI)

The CRI has a broad research mandate covering all the food crops in the country. The roots and tuber crops have formed part of the research programs of the institute. One of the significant achievements of the institute is the development of improved cassava varieties (all are listed in section 2.3.2 of chapter 2). This has resulted in increase in yields from 10 MT/ha from local varieties to about 20 MT/ha from the improved varieties (CRI, 2008). Unfortunately, most of the improved varieties are not good for *fufu* but are good for other cassava processed products such as *gari*, flour, *agbelima* and *kokonte* (Adjekum, 2006; Safo-Katanka, 2004).

c. Food Research Institute (FRI)

The FRI is one of the research institutes mandated to conduct applied research into problems of food processing and preservation, storage, marketing, distribution and utilization, in support of the food industry and also advise government on its food policy (FRI, 2008).

The FRI has provided an enabling environment for *fufu* processors through the development of *fufu* flours from cassava, plantain, cocoyam and yam. In addition, it has developed the fermented cassava meal alongside other non-cassava food products. The FRI produces on a pilot scale and targets entrepreneurs to adopt the technologies.

One of the breakthroughs that have been made is the production of the instant *fufu* flour to reduce drudgery and provide a safe and convenient food to humankind. This

has been taken up by SMEs such as Elsa and Neat in Ghana (Jumah et al., 2006). In addition to the above advantages, it has also contributed to employment in these SMEs and has provided livelihoods for many Ghanaians who are either employed by the SMEs or are selling these products in kiosks and supermarkets or are using them at the chop bars.

d. The Ghana Tourist Board (GTB)

The GTB ensures that there is sustainable tourism development through the creation of an enabling environment for the provision of quality tourism facilities and services for the travelling public (GTB, 2008).

The GTB even though is responsible for registration and licensing of facilities including chop bars, has not been doing so because the DAs have taken over such functions. The Board registers and licenses only hotels, guest houses and restaurants. This is to avoid double registration of the chop bars which, on the other hand, cannot satisfy most of the requirements for registration with the GTB. It however, inspects the premises of the chop bars and makes sure that they conform to sanitation standards. The activities of the GTB complement that of the Environmental Health Services.

e. Unilever Ghana Limited

Unilever is one of the world‟s leading food manufacturing companies. To promote some of its food items, Unilever works closely with *fufu* processors by offering training facilities and holding food fairs for the processors. The company also distributes some of its products such as Annapurna iodised salt, and Royco cubes and supplies table covers, cups and water bottles to the processors. Unilever‟s campaign on „washing hands with soap and water‟ country wide is working well with the chop bars operators.

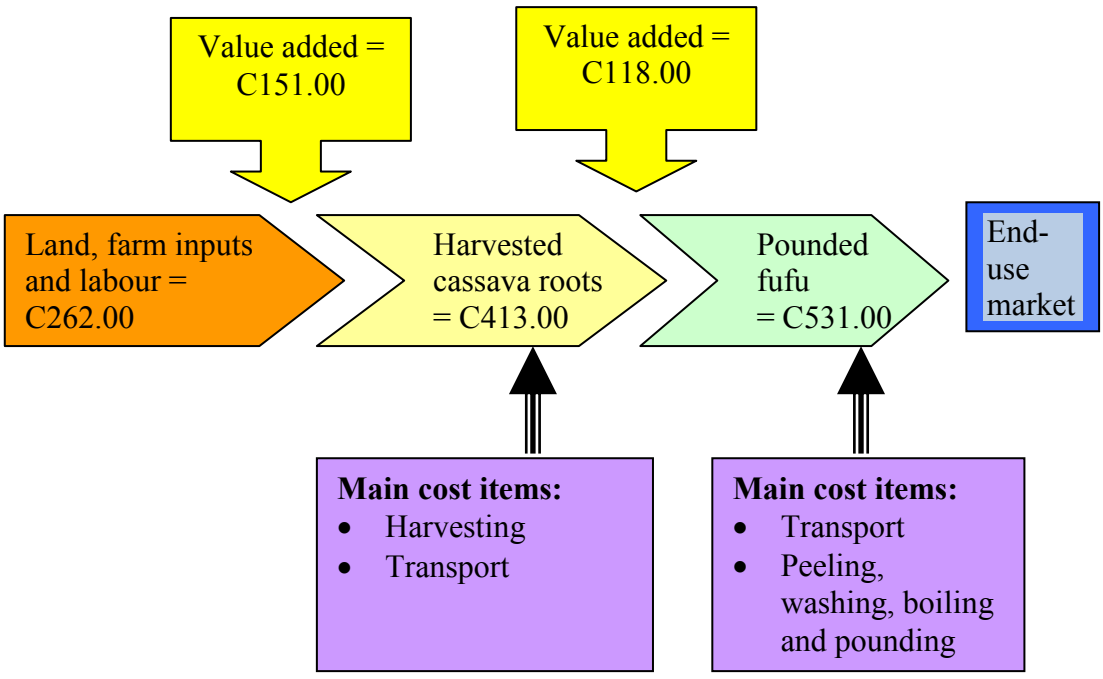
Unilever‟s promotion of food fairs for the TCA has been exposing the *fufu* processors to other competitors in the value chain. They were therefore able to learn from each other as their strengths and weaknesses were exposed. The fairs showed the rise in importance of food; the trend for sourcing locally consumed food and a greater consumer demand for better quality food. All these would eventually lead to process

upgrading in the *fufu* value chain because they would learn new ways of doing things in order to improve on their business.

6.3.4 Value addition in the pounded *fufu* chain in Ghana (per ha of fresh cassava roots)

Value addition in the pounded *fufu* value chain showed that *fufu* processing is a profitable venture. From the farm, it was observed that value added to the cropping of the land to get the cassava was GH₵ 151.00 and in processing the cassava roots into *fufu*, a value of GHS 118.00 was added (Figure 6.2). The cost of value added to the transformation of cassava into *fufu* reduced the value added to GH₵ 118.00. However, along the chain, it could be inferred that there is a value addition with costs. The main cost items were harvesting, transport, peeling, washing and boiling of the cassava and finally pounding of the boiled cassava. The value addition figures are based on estimates from the production of cassava per hectare (Table 8.14) and estimates from the *fufu* processors.

Figure 6.2 Value addition in the pounded *fufu* chain (per ha of fresh cassava roots)



***Source**: Estimates for cassava farmers and fufu processors*

6.4 Product Upgrading of the *Fufu* Value Chain

The awareness creation and arrangements toward the technology transfer process were explained in Chapter 5.

a. Demonstration of the technique

The preparation was done by measuring two cups of water and a cup of *fufu* flour and mixed together completely in a cooking bowl (Fig. 6.2). The mixture was cooked while stirring with a wooden ladle. The stirring continued on low heat into a thick smooth paste (5-10 minutes). More water was added when desired to soften the paste. The resulting thick smooth paste was moulded into balls. The team adopted the „learning by doing" method and the participants had turns to demonstrate what they had learnt, which they did successfully (Plate 6.3).

During the cooking process, the *fufu* flour which contains cocoyam as an additive was observed to require more water than the *fufu* flour containing plantain as an additive. The prepared *fufu* was eaten by all with light soup provided by the team. They were encouraged to stick to the 1: 2 ratio of flour to water to have a better consistency and a good product.

Figure 6.2 Flow Chart for Preparing Instant *Fufu*

Step 1: Measure the flour with a receptacle (e.g. cup)

↓

Step 2: Add water twice the volume of the receptacle

↓

Step 3: Stir to make into slurry

↓

Step 4: Put it on fire and stir till cooked

Plate 6.3 Instant *Fufu* Demonstration

1: The *fufu* powder pack

2: Mixing the flour with water

3: Stirring the mixture into *fufu*

4: Getting the *fufu* ball ready

5: Serving the *fufu* with soup

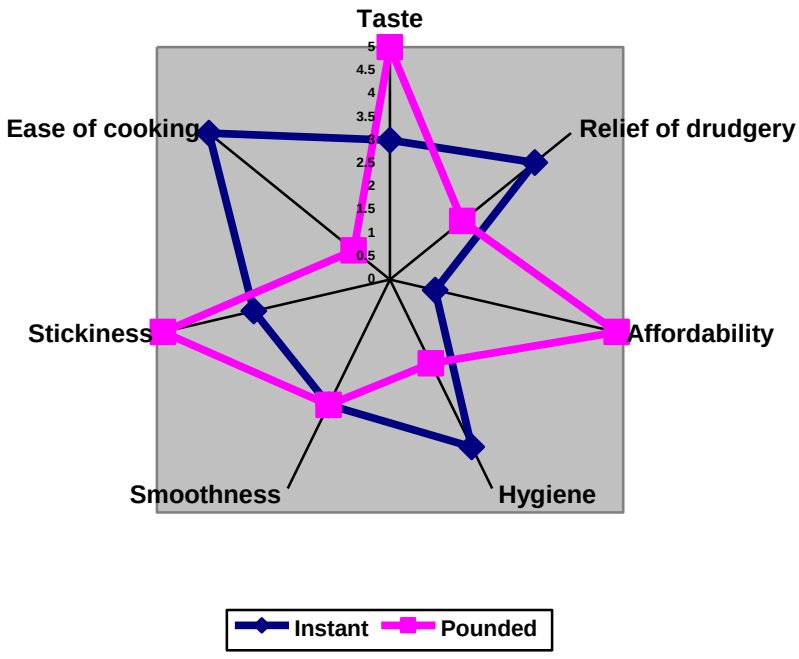
6: The end

Photo: Author, 2006

b. Respondent's Perceptions on the Instant and Pounded *Fufu*

Results from the demonstration showed that the pounded *fufu* was preferred to the instant *fufu* when affordability, taste and stickiness were assessed (Figure 6.4). In an earlier assessment during a market testing in Accra, Jumah et al. (2006) also observed that the stickiness of pounded *fufu* is better than the instant *fufu* but observed no significant differences in price and taste. The participants‟ worry was the price of a packet of instant *fufu* which they considered to be too high and they feared that if the technology is adopted the cost of the ball of *fufu* would definitely be higher than that of the pounded *fufu* thereby reducing sale and therefore profits which has been observed by Dunn et al. (2006) as an important consideration in product upgrading. Buying the higher cost instant *fufu* would greatly depend on the final consumers. If the consumers prefer the instant *fufu* over the traditional one, they may be prepared to pay more for it. The increasing rate of urbanization and a trend for spouses gainfully employed and working some distance away from home actually leads to the demand for convenient, safe and ready-to-eat foods (Onumah, 2007). Thus such workers may be prepared to pay more for a convenient and safe *fufu* as observed by Jumah et al. (2006).

Figure 6.4 Respondent's Perceptions of the Characteristics of Instant *Fufu*



For a technology to be adopted it must be compatible with the norms and values of the adopters. The taste and stickiness of the *fufu* is valued greatly by consumers. The preference of the pounded *fufu* to the instant *fufu* on these two characteristics shows the cultural context in which consumption of *fufu* is viewed. Thus the assertion of Rogers (1995) and Isham (2000) that an innovation should be perceived to be consistent with the existing values of the receiver therefore becomes relevant.

The participants preferred the instant *fufu* to the pounded *fufu* looking at such qualities as hygiene, relief of drudgery and ease of cooking while both products were rated equally when smoothness was assessed. There was a general perception among consumers that the pounders‟ sweat drops into *fufu* and this was one major reason why some consumers did not like the commercial pounded *fufu*. The participants were also happy that this unhygienic nature of the pounded *fufu* is not found in processing the instant *fufu*, thereby making it more hygienic. The participants complained of the unannounced absence from work by the man pounding the *fufu* (in Suhum) and sometimes a bag of cassava bought for processing could get spoilt, especially in the dry season. If drudgery is reduced, whoever is in charge of preparing the *fufu* may not wear down so fast and there would be more people willing to prepare the *fufu*. The issue of the „one-man‟ bluffing and disrupting activities in the chop bar would then be minimised. The process of peeling, washing, boiling and pounding makes *fufu* preparation a lengthy and difficult process. There were past efforts to reduce the drudgery and make quicken *fufu* preparation but they were more focussed on *fufu*-pounding machines which were too large and expensive for households but too small for the chop bar operators (Onumah, 2007). The current situation of using the instant *fufu* powder therefore promises a better future for the *fufu* industry.

6.5 The Effects of Livelihoods Features on Upgrading of *Fufu* Value Chains

The effects of livelihoods on upgrading of the *fufu* value chain have been examined in the context of all the five capital assets and institutions within the enabling environment. The effects of the livelihood features on upgrading of the chain are fully discussed in section 9.2 of chapter 9.

6.5.1 Human Capital

Aspects of human capital that have been assessed are labour, education and health. Labour for pounding *fufu* has sometimes been a constraint to the *fufu* processors because pounding is a difficult task and involves much drudgery. The preparation of the instant *fufu* requires less labour and is easier to prepare. The less labour requirement therefore becomes an advantage to the *fufu* processors and could encourage them to adopt the instant *fufu* technology. However, the technology would make the „pounding man" redundant because the women already have the skills for stirring banku, which is the same method, used to prepare the instant *fufu*. Thus an important constraint in *fufu* processing, shortage of labour for pounding can rather be a positive factor for upgrading in the *fufu* value chain even though it is a paradox. This is shaded grey in Table 6.7.

Educational levels of the processors were found to be low but did not have any effect on the upgrading of the chain because irrespective of their educational background, they have already realised the need for such an upgrading. Apart from the formal education they had access to informal training programmes offered by GTB, Unilever and the TCA. The informal training has created a lot of awareness in the processors about current technologies and the need for upgrading the *fufu* value chain.

Access to health facilities and the health status of processors was found to be good as there were no major illnesses among the processors. Pounding of *fufu* involves a lot of drudgery and one needs to be healthy in order continue with the business. The adoption of the instant *fufu* technology, which reduces drudgery, would not affect the health status of the processors and therefore become an important factor in upgrading the chain.

6.5.2 Physical Capital

Aspects of physical capital that have effects on upgrading of the *fufu* value chains are shelter, energy, water and sanitation and transport.

The chop bar buildings are very important for the upgrading process. Most of the chop bars are housed in „temporary" structures which do not look attractive to some customers who would want a more decent place to take their meals. Chop bar

buildings in temporary structures may not be attractive to customers and the chop bar owners may wish to improve on those structures before upgrading to instant *fufu*. This is because people who normally prefer the instant *fufu* are the middle income group who are not likely to patronise chop bars in structures which do not appear decent. Thus chop bars housed in the better buildings may be in the position to adopt such a technology earlier than chop bars which are not well housed. It would be noted that the other livelihood factors may be considered when adopting the technology. Thus the proper housing may, in some cases, not necessarily encourage such an upgrading.

The processors mostly use charcoal and firewood and, to a lesser extent, LPG for boiling cassava before pounding. Energy would be saved if the instant *fufu* is adopted because the process is faster than what is currently practised. The processors may therefore consider energy saving as a favourable factor in adopting the technology.

The current level of water supply to the chop bars is adequate enough to allow upgrading to the instant *fufu*. This is because the use of instant *fufu* even uses less water than the pounded *fufu*. There will be no need for washing and boiling of cassava, thereby saving water. Sanitation is also good and will allow for upgrading because most of the chop bars are under constant supervision by Health Inspectors, GTB and Unilever.

The instant *fufu* packet of 1kg is very portable unlike the bulky and perishable cassava roots which have to be transported to the destination as early as possible to avoid spoilage. A carton contains 12 packets and this does not pose any problem to transportation. Even in the urban areas where the *fufu* pack is sold in kiosks, a chop bar owner can easily walk to the kiosk and buy a few packets in case of emergencies. Thus difficulties faced when transporting cassava from the farming communities to the processors in urban and peri-urban areas would be reduced. Therefore, the poor access and high cost of transporting cassava, which is a constraint in the *fufu* processing industry becomes an advantage to the adoption of the instant *fufu* technology which leads to upgrading of the *fufu* value chain.

Table 6.7 Effects of Livelihoods Features on Upgrading of *Fufu* Value Chains

ASSETS										Enabling Environment	
Human capital		Physical capital		Social capital		Financial capital		Natural capital			
Shortage of Labour	↑	Proper Shelter	↑↔	Effective group membership	↑	Low capital/poor access to Credit	↑	Good access land for building structures	↔	District Assemblies	↔
Low levels of education	↔	Access to Energy in the form of electricity, Biofuels and LPG	↑	Good access to Information	↑	Savings group membership	↑			Assistance from the Ghana Tourist Board	↑
Good access to health facilities	↑	Good access to water and sanitation	↑							Extension activities of the Food Research Institute and the University of Ghana, Legon	↑
		Difficulties in transporting cassava	↑							Assistance from Unilever in the form of input credit	↑

Key:

↑ Enhances prospects for upgrading ↔ Does not enhance or reduce prospects for upgrading

The shaded cells show livelihood constraints that can be positive factors for upgrading in the value chain

Source: Joint analysis by farmer-processors and Author

6.5.3 Social Capital

Social capital is more developed in Suhum than in the other study areas. While the technology transfer process was carried out through the TCA of Suhum, it was done through individual contacts in the other study areas. Thus access to information through group membership has encouraged participation in the demonstration in Suhum. It even made the work easier for the Cassava SME team that held the demonstrations because the team was communicating through the Executives of the Association. Lack of organised groups of *fufu* processors in the Sokode, Tsito, Anyirawase and Kpeve areas is an important constraint to adoption of the technology because processors operate on individual basis and therefore do not have access to information from other processors. During the demonstration of the technique, they were encouraged to organise into a group, not only for the adoption of the technology but also for other benefits that their counterparts in Suhum and elsewhere are enjoying from group membership.

6.5.4 Financial capital

Most chop bar operators complained of lack of credit for expansion of the business. The type of credit available to some of them is from the *susu* collectors and this is inadequate for their operations. The greatest advantage of the powder is that it can be kept for a long time in the shops without spoilage as in the case of cassava roots. A chop bar operator can therefore buy about 5 packets for one day‟s work without necessarily buying cartons to keep. In the case of cassava roots, an operator cannot buy a small quantity and when it is finished, he/she goes back to the village to buy another quantity. This may not be a good financial management practice and could result in a great loss. The new technology does not involve buying in bulk with huge sums of money at a particular time because the commodity can be bought in very small quantities. It is therefore affordable to all income groups. Thus processors who do not have sufficient capital are at an advantage position to adopt the technology since a processor can buy one or two packets at a time, use them, and go back to the shop for more packets. Thus, shortage of capital or poor access to credit, a constraint, is therefore a positive feature that could encourage processors to upgrade to the instant *fufu* technology even though this looks like a contradiction to the norm where positive livelihood features contribute to adoption of technologies.

6.5.5 Natural capital

Processors have access to land as a natural resource to build their chop bars. Some of them have their own buildings, some of which are temporal structures while some are permanent structures. Some of households which have farms and get some of their cassava from these farms will really need natural capital for their processing activities. However, natural capital in the form of land has not influenced upgrading of the *fufu* value chain.

6.5.6 The Enabling Environment

The chop bar operators have access to research institutions such as the FRI and the University of Ghana, Legon. These institutions carry out research and extension and assist the processors to upgrade the chain. Organisations such as the GTB and Unilever also carry out extension activities such as sanitation and provision of incentives like aprons, table cloth and input credit facilities, all aiming at upgrading of the chain. The District Assemblies are found to be mobilising funds in the form of tax but have not actually assisted the processors in upgrading the value chain. Thus the research institutions, GTB and Unilever provide a good enabling environment that encourages adoption of the technology and is therefore an advantage to the processors.

6.6 Summary

An analysis of the pounded *fufu* value chain was done for the main actors, the service providers and the enabling environment which form the three major segments of the chain. The main actors collaborate well with each other as the main input, cassava is supplied from farmers either directly or through middlemen and consumer satisfaction was assured. The major constraint faced by the processors is access to credit. However, members of *susu* groups get some form of assistance from the groups. The enabling environment was created by the DA for effective functioning of the main actors, research institutions provided the needed technology and GTB and Unilever also provided skills training and held food fairs for the processors.

Livelihood analysis of households showed that most of the capital assets were not well developed and processors are still vulnerable to input price shocks. There were improved incomes for only a few processors, resulting in acquisition of capital assets

and expansion of the chop bars. Processors have not yet attained food self-sufficiency. More important to them is that they are experiencing a general peace of mind, they are healthy and can afford to pay for their children‟s education.

Livelihood features that influence upgrading of the chain positively include proper housing for chop bars, access to energy in the form of biofuels and LPG, good water and sanitation, effective group membership and good access to information. Three livelihood constraints, shortage of labour for pounding *fufu*, poor access to credit and inadequate transport facilities have however been found to create circumstances favourable to adoption of the new technology. Activities of all institutions in the enabling environment have generally favoured upgrading except for the District Assembly which only collects levies. Other factors that have no positive or negative influence on the upgrading process are educational and health status of respondents and land for building. Thus livelihood assets and institutions do not have any negative effect on upgrading of the *fufu* chain.

CHAPTER 7
LIVELIHOODS OF FARMER-PROCESSORS IN THE *KOKONTE* VALUE CHAIN

7.0 Introduction

A survey was carried out in Forikrom in the Techiman Municipality and Totsunya-Okper in the Yilo Krobo District to explore the livelihoods of the farming households, taking into consideration their assets and capabilities, other non-farm strategies and their constraints. There was also an assessment of how they are vulnerable to trends, shocks and seasonality and their livelihood outcomes. Policies, institutions and processes have been discussed in the value chain analysis. As indicated in Chapter 5, two wealth groups, *Modenbofour* (37.5%) and *Ohiafour* (62.5%) were identified among the *kokonte* processing households studied. A cross-tabulation, using the SPSS, showed differences among *kokonte* processing households in different wealth ranks. A value chain analysis was carried out to identify the main actors in the *kokonte* value chain, the enabling environment (which includes policies, institutions and processes) that shapes the processing of *kokonte* and the service providers who assist with credit facilities and extension services. Finally, the chapter describes the livelihood features of farmer-processors that influence upgrading of the *kokonte* value chain.

7.1 Socio-economic Characteristics of Farmer-Processors.

The socio-economic characteristics studied were sex, tribe, religion, marital status, age and household headship.

The study sample was made up of 55% males and 45% females (Table 7.1). This was based on the wealth ranking exercise carried out in the villages and also on snowball sampling as discussed in Chapter 5.

The respondents were mainly Akan and Krobo and all were Christians. The two study locations are in the Akan and Krobo areas and no migrants were identified.

The marital status of the respondents showed that 70% were married, 20% widowed and 4% were divorced.

The majority of the respondents were above 40 years as 45% were in the age cohort of 41-50 and 25% were above 50 years. The men dominated the household headship as 68% of the households were male-headed and 33% were female-headed.

Table 7.1 Socio-economic Characteristics of Respondents

SEX	N	%
Male	22	55
Female	18	45
Total	**40**	**100**
TRIBE		
Krobo	20	50
Akan	20	50
Total	**40**	**100**
RELIGION		
Christianity	40	100
Total	**40**	**100**
MARITAL STATUS		
Married	28	70
Widowed	8	20
Divorced	4	10
Total	**40**	**100**
AGE		
21-30	1	3
31-40	11	28
41-50	18	45
51+	10	25
Total	**40**	**100**
HOUSEHOLD HEADSHIP		
Male-headed	27	68
Female-headed	13	33
Total	**40**	**100**

Source: Field Survey, 2006

7.2 Livelihood Assets of *Kokonte* Processing Households

The assets of *kokonte* processors include physical, financial, human, social and natural capital.

7.2.1 Human Capital

Aspects of human capital that were examined were educational status, labour employed and their health status.

a. Educational Status

Educational levels of households studied were generally low as 63% of them had never been to school, 28% had basic education, 8% secondary education and 3% tertiary (Table 7.2). The one person with tertiary education was a second year „distance education" student of the University of Cape Coast who is farming to finance his education. It was observed that 26.5% of households studied, who never had any education were in the *Modenbofour* category and 40% were in the *Ohiafour* category. Those who had secondary education were 3% and belonged to the *Ohiafour* category.

Table 7.2: Educational Status of Household Heads

Education status	N	%
Nil	25	63
Basic	11	28
Secondary	3	8
Tertiary	1	3
Total	**40**	**100**

Source: Field Survey, 2006

Similar low levels of education among cassava processors were observed by Ojomo (1993); Odebode (2008). On the other hand, researchers found higher levels of education among processors (Amao et al., 2007; Ogunyele et al., 2008). It is common knowledge that most farmers are not highly educated. This is because the educated youth generally look for white-collar jobs and leave the farming work to the poorly educated. Respondents indicated that all their children were in school and some had even completed tertiary education. Basic education in Ghana is currently free because of the FCUBE programme but secondary and tertiary education are paid for by parents. Even at the basic level, parents still buy text books and stationery and pay Parent Teacher Association dues. Most parents have not been able to afford the higher fees at secondary and tertiary levels, hence their children end up at the basic or secondary levels.

Households have access to basic educational facilities as the two communities have primary and junior secondary schools. In Forikrom all the schools are located in the town while in Totsunya-Okper, the children attend primary school at either Osuboe or

Obawale and attend Junior Secondary School at Obawale. The two study areas do not have Senior Secondary Schools but have access to these schools at the District capitals (Techiman and Somanya). Usually the size of the community coupled with their self-help spirit determines how senior secondary schools are located in the districts, but these two communities are actually very small and cannot afford building such schools, let alone providing housing facilities for the staff. The Ghana Education Service has however indicated that there is an improvement in access to education in the country especially equity in infrastructural development as one of its major achievements over the years (GES, 2004).

b. Health Status

No major illness has been reported among the respondents. Most of them indicated that their children have been immunised against the six killer diseases (polio, measles, whooping cough, tetanus, diphtheria and tuberculosis). All households have access to health facilities in the two communities. There is a community Health Centre at Forikrom and a Catholic Hospital at Techiman (8 km away). The people of Totsunya-Okper attend the clinic at Obawale (2 km away), Klo Agogo Health Post (5 km away) and in case of serious ailments; they go to the hospital at Koforidua or Atua (which are more than 30 km away from Totsunya-Okper).

Table 7.3: NHIS Registration

Education status	N	%
Yes	28	70
No	12	30
Total	**40**	**100**

Source: Field Survey, 2006

The health of the farmers is usually linked to their productivity. As long as they are healthy, they can carry out their farming and processing activities efficiently. Affordability of hospital bills is a contributory factor to health. On the registration with the NHIS, 28% registered (Table 7.3). Out of this, 25% who registered were in the *Modenbofour* category and 45% were in the *Ohiafour* category. With the NHIS, registered households have free access to medical care and need not worry about bills any longer. According to the farmers in Totsunya-Okper, some of the households that did not register (80%) indicated that they did not have money to pay for the initial

premium of seven Ghana cedis (GH¢7.00) and some also complained that the scheme was not properly explained to them, hence their inability to register. It has been observed that there was insufficient education on the policy in some communities and this contributed to failure of some people to register. There is therefore the need to carry out a more effective dissemination of information on the advantages of the NHIS to the rural people.

7.2.2 Physical Capital

The physical assets of the households interviewed were shelter, energy, water and sanitation and means of transport.

a. *Shelter*

Houses in the study areas were mainly of two types. There is the mud brick house plastered with cement in some cases and roofed with either thatch or iron sheets. The second type is the cement block buildings roofed with iron sheets. From the study, 80% of the households (some *Modenbofour* and all *Ohiafour*) live in mud brick houses while 20% (all are *Modenbofour*) have cement block buildings (Table 7.4). Ownership status shows that 60% of the households live in their own houses while the rest 40% still live in family compounds (Table 7.4).

Table 7.4 Type of House

Type	**N**	**%**
Mud bricks	28	80
Cement	12	20
Total	40	100
Ownership		
Personal	24	60
Family	16	40
Total	40	100

Source: Field Survey, 2006

The 80% of households living in mud-brick houses shows some level of poverty among the farmers. But GSS (2000) indicated that rural people who are engaged in own-account agricultural activities tend to live in mud bricked dwellings reflecting to a certain extent, level of rurality. Building a mud brick house in these villages is not too expensive as compared to the cement block buildings because all the materials used for the main construction are available free of charge. To build a mud brick

house, the process involves the use of pooled labour by friends and relatives. The proposed owner gets the materials ready and usually on a day of rest or taboo day, the selected friends and relatives assemble at the grounds to assist in the building of the house. One only needs to provide food and drinks and the work is carried out by the pooled labour. This continues for about two to three weeks before the work is completed.

The number of people living in their own houses (60%) is higher than the findings of GSS (2000) which is 52%. This implies that since all the raw materials for building a simple mud-brick house are available in the locality, it is easier and cheaper for them to put up a building. Those who still live in family houses are unlikely to have the resources to build their own houses, or they have aged parents to cater for, or they have inherited such houses.

b. Energy

Firewood and charcoal are the major sources of energy for cooking. Forikrom was connected to the national electricity grid in 2005 while Totsunya-Okper is yet to be connected. Most of the respondents in Forikrom have their houses connected to electricity but 25% of the households (all *Ohiafour*) interviewed have not yet done so. They attributed this to lack of funds and were even afraid that after the light is connected, payment of the bill would be another issue they have to contend with. They therefore use kerosene for their lanterns in the evenings. One of the respondents whose house is not connected had this to say:

> *"I don"thave sufficient to eat, cannot connect the house to electricity and I heard that the light bill is very high. How can I use my small money to feed my household and then start paying light bill? I have to wait for some time before doing that".*

Forikrom benefited from the agroforestry programme by the Adventist Development and Relief Agency (ADRA) and there were a lot of woodlots established in the community. They therefore have access to a lot of biomass. Totsunya-Okper is in a transitional zone where they also have access to biomass. It is therefore cheaper for both communities to use firewood for cooking. However, they need electricity for light in the evenings and also to use electrical equipment such as TV, radio, fridges

and charging of mobile phones. In Forikrom, lack of access to electricity is a matter of poverty but in Totsunya-Okper, they have not been connected to the national grid, let alone to their houses. Even they could not afford the self-help programme because they cannot raise the initial capital for it. Abavana (2008) indicated that this is one of the best ways to connect to electricity as 1,900 communities in Ghana have been connected to the national electricity grid through self-help projects. Box 7.1 below shows the criteria for joining the Self-Help Electrification Programme.

Box 7.1 The Self-Help Electrification Programme

This programme was introduced as a complementary activity to the National Electrification Programme. This was done (a) to accelerate grid connections for communities which felt their proposed projects on the programme of implementation were too far into the future, (b) reduce overall cost to Government and (c) to introduce community ownership.

Criteria for joining the programme

1. The community must be within 20Km of an existing 11kV/33kV network;
2. Interested communities must apply to be included in the programme;
3. The community must be willing and able to procure and erect all the low voltage distribution poles required for the works;
4. A minimum of one-third of houses in the community should be wired and ready to be serviced as soon as electricity supply is connected.

Government contribution to the programme

1. Government will provide all materials required for extension of the high voltage lines and transformers. And also, the installation and supervision costs.
2. Households will be connected for a token fee of the equivalent of US$5.00 if connection is requested within eighteen (18) months after the commissioning of the project in that community.

Source: Abavana, 2008

c. Water and Sanitation

Both communities have been provided with boreholes under the Danish International Development Assistance (DANIDA) programme. There are two bore holes in Totsunya-Okper and six in Forikrom. In Forikrom there is the Community Water Management Committee which supervises the use of water from the boreholes and each member pays twenty Ghana pesewas (GH¢0.20) per „pan“ (a big bowl which they use as the measure). This is in contrast to Totsunya-Okper where the water is fetched free and there is no water management committee. At Totsunya-Okper, during the focus group discussion, participants explained that they were aware that they should form a committee to manage the water but so far, there was no

breakdown of pumps so they have not thought of that. However, the Headman of the village had this to say:

> *"There have been occasions where we attempted contributing money, for example to start a day nursery school but almost all the people complained of lack of funds and nobody paid. Thus contributing money has always been our problem but we have to take this up seriously as we may face breakdowns very soon".*

There are public and private KVIPs in the communities but there are no flush toilets. There is one public KVIP in each community while four of the households interviewed in Forikrom have constructed private ones in their homes. Unlike water, they do not pay for the use of the KVIPs. The idea is that there are too many poor people in the village and asking them to pay for water and toilet facilities might be too much for them.

The establishment of a water management committee in Forikrom means that when pumps become faulty or breakdown, there are funds available for repair work to be done, assuming there is no embezzlement. In the case of Totsunya-Okper, if there is a breakdown and the people are not ready to contribute money to repair the pumps, then in the near future, all the bore holes would be out of use and this is not a sustainable development. The same argument holds for the KVIPs in the two communities because there are no management committees to handle them. Galaa and Bandie (2004) stressed the need for effective community water management committees for sustainability of these facilities. This is because a survey in six districts in the Upper regions of Ghana showed that even where the committees exist, some of the facilities are in disrepair because some of them do not keep adequate records and operate no bank accounts.

d. Means of Transport

All households depend on the use of public transport as none has its own means of transport. One farmer at Forikrom has a tricycle for carrying farm produce. In Totsunya-Okper, two farmers have bicycles which they use for short distance journeys. Farm produce is carried to the house by head load, usually by women and children. Public transport is however readily available in the two communities as they

are all located along main roads which are tarred. Transporting farm produce to the markets is therefore not a constraint in these areas.

The tarred roads in the two communities allow easy movement of their farm produce to the commercial centres. Rural areas which do not have good roads find it difficult to send their foodstuffs to the major marketing centres resulting in economic loss especially in the case of a perishable produce like cassava. However, these people do not have any of these problems.

7.2.3 Financial Capital

The aspects of financial capital of households were sources of starting capital, inflows of money and savings group membership. Access to financial institutions and credit facilities is discussed in section 7.6.2 under financial service providers.

a. Sources of Starting Capital

Almost all households inherited farming and farm lands from their parents. Thus cassava farming and processing has become a tradition in these areas. All the planting materials have been given to them by their parents and they continue with the farming business.

It has always been recognised that farming is almost always inherited from parents. In cases where family lands are allocated to members, the youth who are interested in farming normally ask their parents for a parcel of land or inherit that of their parents. Planting materials and tools like hoe and cutlass are supplied free by the parents or they all use what their parents have. The traditional inheritance system favours males to the neglect of females (Adu-Amankwah, 1999; Nukunya, 2003) thus it is the males who actually inherit the farms and in rare cases, women.

b. Inflows of Money

Four households receive remittances as an additional source of income. According to one of the respondents, the house occupied by the household was built through remittances from her children in Kumasi. In another instance, a female household head receives remittances from her former husband for the upkeep of the two children who were staying with her. She uses the money to cater for their educational needs as

well. Outward remittances were also observed as one respondent indicated that she is sponsoring her sister‟s education and sends her money in school. Another female household head also remits to her parents in the same village but staying in different households.

The efficient use of remittances by the farmers shows the trust their children have in them. Remittances have been found to increase access to other capital assets such as building a house or paying for education (de Haas, 2003; Kabki et al., 2003; Basok, 2003). The rural households are poor and need some form of assistance which is being provided by their children staying outside. This adds to their incomes that they receive from farming and therefore improving on their standard of living.

7.2.4 Social Capital

Social Capital has been discussed in the context of groups and access to information

a. Groups

Fifteen of the respondents in Forikrom belonged to the Abrono Organic Farmers Project (ABOFAP) (Box 7.2). There is also the Okper Farmers Association. ABOFAP was organised for the farmers to go into organic farming and bee keeping. The Okper Cassava Farmers Association has been in existence since the early 90s but it is not too active a group. The respondents indicated that the group was initially formed to seek financial assistance from the ADB but after the first loan repayment, they realised that it was not worth getting more loans.

The group is still in existence but not active. This is similar to the observation of Brown (2003) that most people form groups for a particular motive and when the motive is not achieved, group members usually lose hope and the group disintegrates. The groups in the communities have been used to improve on farming and other livelihood activities because of the linkages established, especially by ABOFAP. The organic farming coupled with the agroforestry programme in Forikrom is helping farmers to improve on soil fertility and they might not need to buy fertilisers to improve on their soils any longer. The groups‟ income generating activities like dry season vegetable farming and the poultry and livestock assistance from Heifer project

International (HPI) are also livelihood diversification activities that are helping farmers to achieve some of their livelihood objectives.

Box 7.2 The Abrono Organic Farming Project

The Abrono Organic Farming Project was established in 1992 by Nana Kwaw Adams after he was trained in organic farming at the Adventist Vocational Institute, Kumasi. This was in response to the declining soil fertility in the community. The project has a membership of 18 farmers made up of 10 males and 8 females. It has an office, store and a warehouse for food banking. The project is funded through local contribution of members and also donor support. It has links with government and non-governmental organisations as collaborators. These are MOFA, ADRA and HPI. The objectives of the project are to develop organic farming and improve food security for small scale rural farmers. Specifically the project involves training farmers in organic food production, bee-keeping, agro-forestry and dry season vegetable gardening. As at 2005, ABOFAP had trained almost 200 people in organic farming and dry season vegetable gardening. According to Nana Adams, about 10% of the trained youth found farming too difficult and gave up but the rest are doing very well.

Source: Focus Group Discussion

b. Sources of Information

The main sources of information to farmers in Forikrom were the AEAs of MOFA, HPI and ADRA. Farmer-processors indicated that AEAs provide them with information and practical training on current technologies in agriculture and also their production practices. Some of the information and training received were on improved seeds of maize and vegetables, improved cassava varieties, planting in rows at the correct spacing and timely weeding. These, according to the farmer-processors, were being practiced and have resulted in higher yields of cassava, maize and vegetables. Unlike Forikrom, farmers in Totsunya-Okper do not have access to any of these information sources and therefore depend on farmer to farmer extension.

Farmers have communication equipment such as the radio, TV, and cell phones which they use to receive information. Almost 88% of households comprising 33% *Modenbofour* and 55% *Ohiafour*, have acquired radio, while 10% (all *Modenbofour*) have TV sets and cell phones (all in Forikrom) (Table 7.5).

Table 7.5 Households' Ownership of Information Equipment

Source	n	% (N=40)
Radio	35	88
Television	4	10
Cell phone	4	10

NB. Totals do not add up to 100 because some households own a combination of the equipment

Source: Field Survey, 2006

Since there is no electricity in Totsunya-Okper, households use only battery operated transistor radios and there are therefore no television sets and cell phones. The farmers however, have access to a communication centre at Osuboe which is 2 km away. This centre uses mobile phones on commercial basis to transmit and receive messages. Incidentally, that is the only place where one can get the reception for the Vodafone network. All other networks are not found in the area. The communication centre operator indicated that she recharges her phones at Huhunya (5 km away) where there is electricity. They are therefore able to communicate with relatives outside the village through the Osuboe centre. There are two communication centres in Forikrom providing easy access to relatives outside the town. According to the farmers, communication is usually centred on urgent family issues especially, sickness, death or any emergency and sometimes for the fun of it, as observed by Sey (2007). They have not been using it for agricultural information.

In Forikrom, households who do not have TV sets visit others to watch TV programmes in the evenings. Their favourite programmes are the Akan drama, Ghanaian and Nigerian Films and football. Again, they do not use the TV for agricultural programmes because according to them, they are almost always on the farm when such programmes are being broadcast. Their inability to take interest in agricultural issues on the TV and radio might stem from the fact that extension officers have not sensitised them on such issues. In Techiman, there is a radio station, Classic FM, which is sponsored by Africa Farm Radio International and farmers in Forikrom can benefit from agricultural broadcasts from this station because rural radio broadcasts have been found to be a very useful tool in communicating agricultural technology and market information to farmers (Chapman et al. 2003; Abbey-Mensah, 2001; Benamrane, 2001; Quarmyne, 2001). According to Abbey-

Mensah, (2001) radio and television programmes became very popular with the listeners as reflected in listener research reports. Thus if the farmers are prompted by the extension officers, they may develop interest in the programmes.

7.2.5 Natural Capital

Natural capital was assessed in terms of access to land, hills and rivers.

a. Access to Land

Land is easily accessible to all households as the land belongs to families and all the farmers are indigenes. It is therefore acquired through inheritance and it is the family head who distributes land to members of the family. Immigrants also have easy access to the land through hiring and there are no hindrances to hiring of land in these areas. In both communities the cost of hiring an acre of land per year was twenty Ghana cedis (GH¢20.00). In both communities, all the respondents are working on family lands and there was therefore no hiring of land. Formerly, women were not allowed to inherit land because of the fear that if a woman inherits the land and gets married to another man outside the family, the land in the long run may be passed on to the children who by tradition are not full members of the said family. However, some women now inherit land due to various reasons, for example, a woman, who is a household head, had this to say:

> *"My father had three daughters without a son and I am the first born child. I stayed with him for a long time before getting married. After my marriage, I moved out to join my husband only to come back after my husband died. I therefore continued to use my father's land up till today. No one even questions me about it so it has become my property and I will also hand it over to my children".*

The size of farm holdings of food crops range between 1-2 hectares while the few plantation crops are above 3 hectares. Their constraint is that the growing population is leading to fragmentation of the land which several authors have noted (Ayivor, 2001; Codjoe, 1998; Jha et al., 2005; Bizmana et al., 2005). The size of farm holdings is also consistent with findings of MOFA (2003) and that of Oyewole and Philips (2006) who reported that majority of African small holders cultivate less than 2ha of farm lands.

Due to the land fragmentation and the small size of land, there is continuous cropping of the same piece of land over the years resulting in declining soil fertility, a situation Johnson (1997) described as induced human environmental change. The farmers indicated that they have not been using inorganic fertilisers because of financial reasons. The agroforestry and organic farming programmes in Forikrom may in the long run benefit the farmers in improving soil fertility as in the case of agroforestry and organic farming programmes (Quisumbing et al., 2001; Ayivor, 2001; Ruark, 2003).

b. Access to Hills

In Forikrom, there are hills which are used mostly for drying *kokonte*. Thus almost all *kokonte* producers in the village go there to dry the product as the hills serve as a very good drying area. The hills have served as a good space for drying *kokonte* but the process of drying the *kokonte* there is not really hygienic. The *kokonte* is not covered and left at the mercy of the dew overnight.

c. Access to Rivers

The river *Asukantia* flows through Forikrom while there is the river *Mogyawuie* in Totsunya-Okper. Water from these rivers is usually used for washing clothes and in addition, for nurseries in Forikrom because the two communities have potable and safe drinking water.

7.3 Vulnerability Factors

Kokonte processing households are vulnerable to high prices of inputs, declining soil fertility and increase in prices of petroleum products.

a. Prices of Inputs

Prices of inputs such as hoe, cutlass, seeds, fertilizers and insecticides continue to increase from year to year. For example, the price of hoe rose from GH¢2.00 in 2000 to GH¢3.50 in 2006 while the price of cutlass rose from GH¢2.00 to GH¢4.00 over the same period. This has affected production costs and the market prices for their products are not always favourable.

a. Declining Soil Fertility

There is generally an observed decline in soil fertility in the study areas. This is mainly due to continuous cropping of the same piece of land over the years, highly mechanised cultivation practiced in the 1960s, and the inability of the people to adopt soil conservation practices, a situation Johnson (1997) described as induced human environmental change caused by social activities or processes.

Another factor explained by the households was the fact that increasing population has made it impossible for them to practice land rotation and therefore continue to use the same piece of land every year. They therefore use inorganic fertilizers such as NPK, sulphate of ammonia and urea to improve fertility of the soil. In Forikrom, the introduction of organic farming by ABOFAP may in the long run, if fully adopted, help improve the situation.

b. Increase in Prices of Petroleum Products

Households also experience shocks from the increase in petroleum products since prices continued to rise since 2005. This is because an increase in the price of petroleum products leads to increases in transportation costs and all other inputs. According to them, there is no corresponding increase in the price of cassava and its products. Thus if there is for example, a glut in the cassava market, farmers lose a lot as they are forced to reduce the price of cassava and sell it at cheaper prices as they cannot transport the cassava back home with the high transport costs. An elderly woman, a farmer at Forikrom, who also processes her cassava into *kokonte*, lamented thus:

> *"Today, the price of petrol goes up, tomorrow, lorry fares go up. The drivers charge the bag of kokonte or cassava more than even we the human beings. Sometimes you enter the market and there is so much cassava that you either sell it cheap or you pay the same lorry fare and bring it back before processing into kokonte. Most often, I sell it cheap and come back because I cannot afford the transport fare back only to lose. We the farmers are being cheated everyday".*

7.4. Other Livelihood Strategies: Non-farm activities

Apart from farming and processing, the households are engaged in off-farm activities. Such activities include bricklaying, shoe repairs and hiring out labour for construction work by the men, while women engage in petty trading and selling of cooked food.

One household in Forikrom hires plastic chairs and canopies to others during funerals and festive occasions.

Engagement in all these activities is geared towards generating additional income to supplement earnings from farming and processing. One other reason that allows them to engage in other activities is that they do not go to farm everyday especially during off-season, making allowance for more time which they can use for other activities.

7.5 Livelihood Objectives and Outcomes

The contributions of livelihood activities were assessed in the form of income, well-being, food security, vulnerability and the impact of their activities on the environment.

7.5.1 Income and Well-being

Incomes of the households are generally observed to be low. The farmers claimed that they earn very little from farming and *kokonte* processing in addition to the other non-farm activities. Moreover, they most often do not get good prices for their farm products especially getting to the end of the rainy season when food is abundant and prices become low, a situation which UNRISD (2005) attributed to cheap food policies and distorted prices in many African countries. However, not all the farmers have low income. A few of them have bigger farm sizes with more crops and thus get more income. A typical case is that of one of the farmers shown in Box 7.3 below.

Despite their inability to increase incomes as expected, households have been able to afford basic education for their children but secondary and tertiary education is being afforded by just a few because of high cost of fees. The FCUBE programme now enables children of school going age to attend basic school but as noted by UNESCO (2000) direct and indirect costs to parents, poor quality of basic education, lack of teachers and infrastructure in the rural areas has made it difficult for rural areas to give their children the best of formal education. The Rural Education Volunteers and School for Life programmes in the Northern and Upper West Regions are alternative ways being used by some District Assemblies with support from NGOs to encourage volunteer teachers to accept posting to rural areas with fringe benefits including free accommodation, food and extra money (CARE, 2004).

Box 7.3 A Success Story, Forikrom

On his return from Nigeria, the traditional leader entered into full scale farming with the little financial capital that he brought. He then went for training in organic farming in Kumasi and later on established ABOFAP. He assisted farmers to form a group to start organic farming and agroforestry. By the end of 2005 he had 6 acres of cassava, 6 acres of citrus, 6 acres of mango, 5 acres of teak plantation and 10 beehives. He benefited from the HPI assistance in the form of 10 beehives, breeding goats and poultry. According to him, he processes the greater part of cassava produced from his farm into *kokonte* which is sold at Forikrom and Techiman market". He had links with HPI, ADRA, CARE International and MOFA and this has helped him to build up so much social capital hence, his access to resources for his farming activities.

Following regular funerals in the communities around Forikrom, he started hiring out chairs and canopies to bereaved families as another livelihood strategy. He indicated that two of his children were then in the University. He said he enjoys farming and its benefits".

Source: A Farmer

Box 7.4 A poor farmer's story, Totsunya-Okper

I inherited my father"s two-acre field after his death. I grow cassava, maize and groundnuts. All the income I received from the field has always been used for the family"s subsistence. I have realised that the seven children I have are too many as all the income is spent on them. I could not get any financial assistance from anybody so I continue with the hand-to-mouth policy. Yields are getting low because I cannot even afford to buy fertilizer. I therefore have to work on other people"s farms to get more income to sustain the family. I am really a poor man now.

Source: A Farmer

Members of all households are very healthy as there were no reported cases of frequent illness even though several researchers have shown that poor health has been a limiting factor for the rural people not being able to carry out their duties effectively (Jafry, 2000; Wakerman and Humphreys, 2002). The healthy state of the farmers is partly due to the fact that they have easy access to health facilities contrary to the reports that rural populations generally have less access to health services, often due to poorly developed infrastructure and poverty (Gwatkin et al. 2005). Households that have registered with the NHIS enjoy free medical care for most of their ailments

therefore there is no worry about medical fees which deters people from going to hospital.

7.5.2 Household Food Security

In Forikrom and Totsunya-Okper, households have physical access but do not always have economic access to all the food they need and at all times. Thus they are unable to satisfy one major pillar of food security, physical access as indicated by FAO (2002b). In years of inadequate rainfall, they do not have proper harvest of maize and therefore depend only on cassava for feeding and this affects their food reserves negatively. This is because cassava is a carbohydrate which needs to be used in proportion to the other food sources to give a balanced diet. Even though they keep livestock, they seldom use the meat as they claim that they usually keep the livestock to sell in case of financial needs.

For the safety and nutritious aspect with regards to the definition of food security, there were no assessments in the study because they have to be carried out in the laboratories and this was a limitation to the research work. Since the physical and economic access are not adequate, households cannot therefore be said to be food secure as UNRISD (2005) reported that many households in Africa are acutely vulnerable to food insecurity.

7.5.3 Vulnerability

Households are still vulnerable to increases in prices of farm inputs and also declining soil fertility. Increases in prices of farming inputs has been a major problem to households as the increases do not match with the corresponding increase in prices of their products. This is one of the factors militating against increases in their incomes. The input price increases were due to increases in prices of petroleum products as indicated earlier.

Respondents indicated that land fragmentation as a result of over population has led to continuous cropping, leading to decreasing soil fertility in the study areas. The respondents were of the view that the introduction of organic farming by ABOFAP is an innovation if carefully handled, would be able to improve soil fertility and increase yields. But in Totsunya-Okper, there is no soil improvement programme because they

do not have access to AEAs or NGOs to learn more about land conservation and proper tillage procedures.

7.5.4 Impact on the Environment

The agroforestry programme and the by-laws regarding bush fires have made the communities less vulnerable to the effects of such actions. As noted by some authors, such programmes have the capacity of improving soil fertility, increasing biodiversity and reducing the effects of climate change (Ruark, 2003). The respondents believe that the agroforestry programme has protected the watershed of River *Asukantia* hence drying of the river has become a thing of the past. The aforestation project has also improved soil fertility in some cases as the leguminous plant; Leucenea leucocephalla has been planted all over the village. The introduction of organic farming by ABOFAP is helping to conserve the soil and improve on its fertility. The use of fire belts and controlled burning of bush in both communities have also resulted in the improvement of the environment. The same can be said of Totsunya-Okper as the people have also been controlling bush fires over the years. In Forikrom a farmer had this to say during the focus group discussion:

> "*When the river was drying up, we thought we offended the gods of the land and started cursing the modern Christians who refused to observe our taboos. After we planted trees along the river beds and they are grown, the drying of the river is now very minimal. We have learnt a very big lesson".*

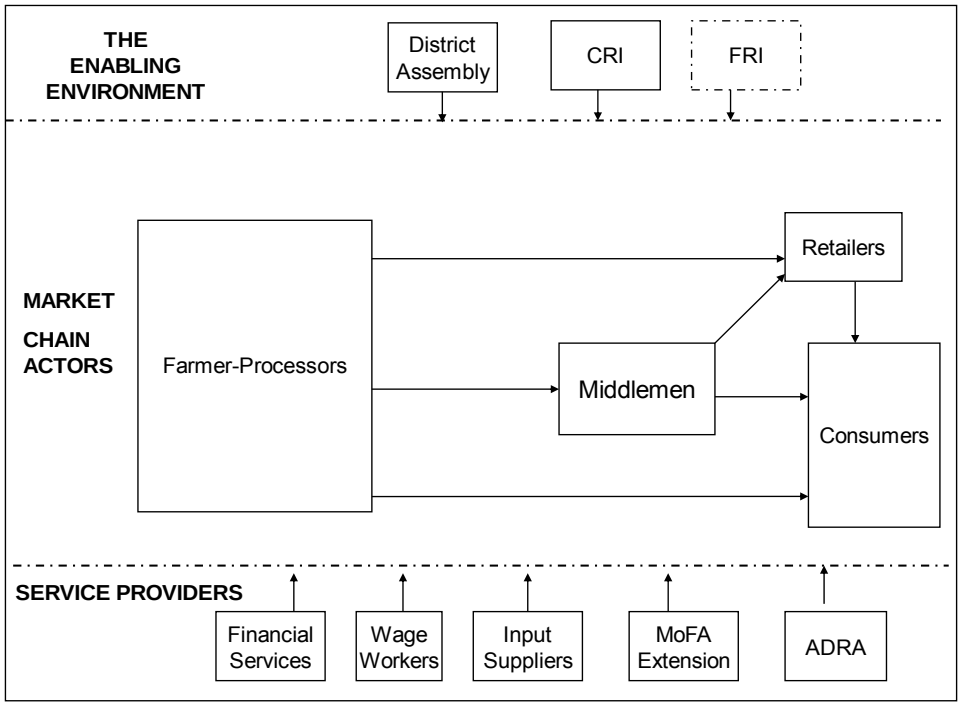
7.6 The *Kokonte* Value Chain

The *kokonte* value chain is a very simple chain with the main actors acting in an enabling environment with service providers.

7.6.1 Main Actors

The main actors in the *kokonte* value chain are cassava farmer-processors, middlemen, retailers and the consumers (Fig. 7.1).

Figure 7.1: The *Kokonte* Value Chain



Source: Field Survey, 2006

a. Farmer-Processors

The major crops grown by the farmers are cassava and maize. The rest are vegetables, groundnuts, yam, cocoyam, and potato. They also grow tree crops such as citrus, oil palm, cashew, mangoes, and plantain. The farmers have adopted a livelihood strategy that does not depend on only one crop but a variety of crops. This would serve as a form of insurance so that if one crop fails, produce and income from the others can be used as a safety net by the household.

In Forikrom, the farmers have been exposed to and have adopted improved cassava varieties such as *Afisiafi, Abasafitaa, Gblemoduade and Tekbankye* by AEAs of MOFA. Some of the farmers who could not remember the names of the varieties mentioned them as „Agric" meaning that they were introduced to them by the AEAs. Unlike farmers in Forikrom who grow improved cassava varieties in addition to the local ones, the people of Totsunya-Okper, grow mainly local varieties of cassava. This is because they never had access to extension services and the few improved cassava planting materials that they brought from friends elsewhere were mixed with the local varieties.

Local varieties of cassava cultivated in both communities are *Ankrah, Pepetifi*, *Nigeria, Taller, Yaababy, Bokentema, Ankuma, Bosomnsia, Oshewkaw, Kwatsam, Esi Panyin, Borkese, Tuobodom, Ampe-nkyene, Ajoomo, Baatia, Aserani, Ankoma, Kutuma, Tuaka, Asrodo, Biafra, Gbeze, and Train-Wusiw*. The farmers indicated that all the local and improved varieties are good for *kokonte* processing.

There is a sharp difference between the two locations in terms of access to extension. While farmers in Forikrom have access to extension, farmers in the other locality do not have. Thus the farmers at Totsunya-Okper do not have access to improved varieties or crop production techniques due to lack of extension officers, a major constraint to agriculture as identified by researchers (Morris et al., 1999; Röling, 1995). The extension agent to farmer ratio plays an important role in this situation. In Ghana, the official ratio is 1:1500 (MOFA, 2006) which is extremely high considering the logistics available to the AEA. There has been much concern for the high AEA to farmer ratio and one way to address the issue is to look at private extension delivery (Amezah and Hesse, 2004). A farmer, during the household discussions had this to say:

> "*"There is an AEA in Obawale but never visits us. When we approached him, he indicated that Totsunya-Okper is not part of his coverage area so we remain here without any agricultural advice. However, our Assemblyman has taken up the issue with the District Director of MOFA who promised to assist us soon".*

Another farmer, during the focus group discussion, lamented thus:

> *"We are also farmers who need advice. This village once produced cocoa for the country but my late father told me that the swollen shoot disease destroyed all their farms so we now produce cassava and other crops. You demonstrated to us how to prepare a better kokonte for the market. I think we can also do better if we had Extension Officers here helping us the way you did".*

The cassava farmers are the same people who process their cassava roots into *kokonte* as a livelihood activity. In addition to *kokonte*, some process cassava into *agbelima*. *Kokonte* processing is an activity which is undertaken by both men and women with their children assisting them. When the rainy season starts in March and April, cassava does not usually cook well and this is the time many people process their

cassava into *agbelima* and *kokonte* even though processing continues throughout the year.

Kokonte takes one to two weeks to dry because the sizes of the chips are so big that they do not dry fast. The chips are dried on hills and by the roadside of tarred roads (in Forikrom) and on raised sheds in Totsunya-Okper (Plate 7.1). In the evenings, the *kokonte* chips are not always collected from where they are being dried but left at the mercy of the dew. Fungus therefore grows on the chips making them look black or yellowish black. When such chips are milled and cooked, the final paste has the same colour and does not seem suitable for consumption to a lot of people. After drying, the *kokonte* chips are usually stored in jute sacks or in baskets. If not properly stored, they are infested with the Larger Grain Borer which feeds on them and reduces them into powder.

This method of *kokonte* processing has been found to be undesirable in most cases. Fungal growth has been observed widely on dried cassava chips in Africa (Wareing et al., 2001). The presence of these fungi results in the release of secondary metabolites such as aflatoxin and other mycotoxins into the cassava chips making them unsafe for human consumption. There is therefore the need to improve *kokonte* processing as the contamination is a major problem. The unsafe and inconvenient *kokonte* being produced formed the basis of the Cassava SME Project to intervene and introduce the process upgrading of *kokonte* production in the value chain (see section 7.7 on upgrading).

Plate 7.1 Traditional Drying of *Kokonte*

Drying *kokonte* on raised platform in Totsunya-Okper

Drying *kokonte* by the roadside

Photo: Author

c. Middlemen/Retailers

Since the farmers process their own *kokonte*, wholesalers do not play any role between the farmer and the processor. Their role begins when the *kokonte* has been processed at the village level and needs to be sent to the urban markets. Middlemen usually come to buy large stocks of *kokonte* from the communities and transport them to the urban centres thereby reducing the burden of transportation to the processors. Farmers‟ wives also send their own *kokonte* to the market and sell to middlemen or retail when the quantities are very small. Major marketing centres available are Techiman and Nkoranza (for Forikrom) and Nkurankan and Klo-Agogo markets (for Totsunya-Okper). Prices of farm products have been fluctuating depending on the seasons. Berg et al. (2006) observed the role of Market Queens as middlemen who control markets in Ghana. The Market Queens coordinate supply and demand in an effective way in the market such that outsiders usually have difficulties selling their products directly to consumers without the registered market women (Peppelenbos, 2005). However, the village women who bring their goods for sale in such markets, sometimes end up with lower prices from the market women. Thus middlemen, who buy at the farm gate, reduce all the un-anticipated problems that the women from these two villages might face in the markets.

d. Consumers

The consumers buy the *kokonte* and use it for their meals. It is usually cooked into a ball and served with soup in homes. They usually prefer *kokonte* which is whitish and free of odour. *Kokonte* chips that are extremely infested with fungi become almost black when milled giving the prepared paste the same colour. Westby et al. (2003) observed that *kokonte* is well liked by a significant proportion of urban based, higher income consumers, who, however, do not eat it because of its unhygienic method of production and safety. It is therefore not consumed by many people and has a reputation for being a low priced, low quality staple for lower income groups (Westby et al., 2003).

7.6.2 Service Providers

The service providers identified in the *kokonte* value chain are financial service providers, input suppliers and extension services provided by MOFA. MOFA extension staff was already discussed under farmers in 7.6.1

a. Financial Services

Credit is very important in any agricultural economy and its constraint can affect the farmer‟s investment behaviour. Banking facilities are easily accessible to the households as there are rural banks and Ghana Commercial Bank in district capitals. Only three farmer/processors indicated that they have been saving with the banks, two in Forikrom and one in Totsunya-Okper. The farmer/processors are all aware of banking facilities and also know the advantages of saving money in the banks, but they explained that they do not have sufficient funds to meet their needs before going to save the rest in the bank. One of the two farmer/processors that had accounts with the Ghana Commercial Bank indicated that he had a credit facility of one million cedis from the Ecumenical Church Fund in 2005. This loan attracted an interest rate of 36% per annum. He was however about to finish paying the loan as at the time of the data collection. In Totsunya-Okper, a farmer group of ten people once had a credit facility of five hundred Ghana cedis (GH¢500) from the Agricultural Development Bank in the 1990s through the Ghana National Association of Farmers and Fishermen. According to them, part of the loan granted them went into tips for bank officials and the money too was not received on time. Members were therefore not happy with the banking procedures and never asked for loans anymore. Their Secretary had this to say:

> *"We travelled almost every week to Koforidua only to be asked to go and come back again on an appointed date. We nearly gave up when one day the money was given to us. We realised that after several payments to bank staff and that of our transportation, we were left with just a small amount of money which could not be used for all our farming activities. Members therefore decided never to go in for such a loan any more".*

Poor access to credit by small-scale farmers has become a common phenomenon. It has been observed that formal institutions with their much greater financial capacity rarely reach rural people because of the risks and transaction costs (Jones et al., 2000). Also, most small-scale farmers cannot satisfy most of the conventional bank lending requirements in Ghana as found in Box 7.5 below. Apart from the conventional requirements, the rural banks prefer group lending to farmers instead of individual loans. This is to serve as a security so that when one member defaults, the rest can be held responsible.

Box 7.5: Conventional Bank Lending Requirements in Ghana

The conventional criteria applied by banks, including Rural/Community Banks, in assessing loan applications, include the following:

- The borrower must have had a deposit account with the bank for at least 6 months prior to borrowing.
- Satisfactory turnover on accounts (savings or current accounts).
- There must be evidence that the credit proposal is viable – for large loans this has to be demonstrated with the submission of a business plan.
- Evidence of proof of market for the product including, where possible, specific uptake contracts with credible buyers and a formal letter committing the buyer to pay for the product by means of a cheque issued in the joint names of the bank and the borrower.
- Factory visits will be undertaken to establish that equipment needed for the product line to be financed are functional and properly maintained.
-

Source: Onumah et al., 2008

Another constraint is the banks‟ bureaucratic tendencies, coupled with corruption as noted by the Totsunya-Okper farmers. This draws a lot of farmers, who are mostly illiterates, back because they feel cheated by these bank officials.

b. Wage Workers

Most households depend on family labour (men, women and children) for their farming and processing activities. In the female-headed households, all the work is done by the women as there is no man to provide support. In cases where they used hired labour (mainly on the farm, but not for *kokonte* processing), they engage casual labourers usually referred to as „by day‟, i.e. they work and get paid on daily basis. These people are paid on the average, one Ghana cedi, fifty pesewas to two Ghana cedis (GH¢1.50-GH¢2.00) per day in addition to lunch. Hired labour is easily available and affordable.

Some men also pool labour resources together and this is referred to as *nnoboa* groups in Forikrom and as the *katsu* in Totsunya-Okper. These are informal groups made up of men and the number ranges from 5 to 8 farmers who come together to help each other on their farms in a rotational manner. There are no written rules of the group. On the day of working on one‟s farm, the wife is supposed to prepare food for the workers. One advantage of the group is that if one falls sick during the period of

the rotation, work is done on his farm, and the wife prepares food for the workers. Weeding and mounding are the major activities done by the *nnoboa/katsu* groups.

Access to labour is not a constraint to farmers because family labour and hired labour are readily available. The wages paid to the hired labour are also fair according to the farmers. Younger people are more likely to form nnoboa groups because they have less capital to hire labour and have less access to family labour. Ayivor (2001) observed the same arrangements among the Ewe farmers which they refer to as *fido-fide.* The use of nnoboa groups does not entail too much cost because feeding the men is almost equivalent to feeding the „by-day" man who had to be paid his wages in addition. This ensures productivity among farmers as weed control in particular is very efficient and might result in higher yields.

c. Input suppliers

Input suppliers are traders who deal in farm inputs such as hoe, cutlass, seeds, fertilizers, insecticides and jute sacks. These inputs are found in all the marketing centres in the districts. Prices of inputs continue to increase from year to year. For example, the price of a hoe rose from GH¢2.00 in 2000 to GH¢3.50 in 2006 while the price of a cutlass rose from GH¢2.00 to GH¢4.00 over the same period. This has affected production costs, meanwhile while market prices for their products are not always favourable. Frequent price increases of farming inputs as a result of increase in prices of petroleum products is similar to what the *fufu* processors face and this has been discussed in section 6.2.2 in chapter 6.

7.6.3 Enabling Environment

The enabling environment for *kokonte* processing is provided by CRI, FRI, Food and Drugs Board (FDB) and District Assemblies.

a. Crops Research Institute (CRI)

The CRI has developed new cassava varieties for use in the country (refer back to section 6.3.3). These varieties are being used by farmers in the country. Farmer-processors in Forikrom are using most of these varieties as indicated in section 7.6.1. Even though some are being used by the farmers in Totsunya-Okper, they did not know the names and differences as they indicated that they picked these varieties

from other farmers. It has been found that almost all the improved and local varieties are good for the production of kokonte.

b. Food Research Institute (FRI)

The objectives of the FRI have been discussed in section on *fufu* processing in section 6.3.3.

The FRI has provided an enabling environment for *kokonte* processors through the development of the *kokonte* mini-chip technique, the technology that has been used in the process upgrading discussed in section 7.7. This technology has been identified by farmers as a very good alternative to the existing local *kokonte* processing technology, but the cost of the slicing machine has been their main problem as they do not have money to buy such a machine. The Institute also carries out research on other aspects of *kokonte* processing in partnership with other research institutions, e.g. fungal and mycotoxin contamination of *kokonte* (Wareing et al., 2001), economics of alternate drying systems (Johnson et al., 2002).

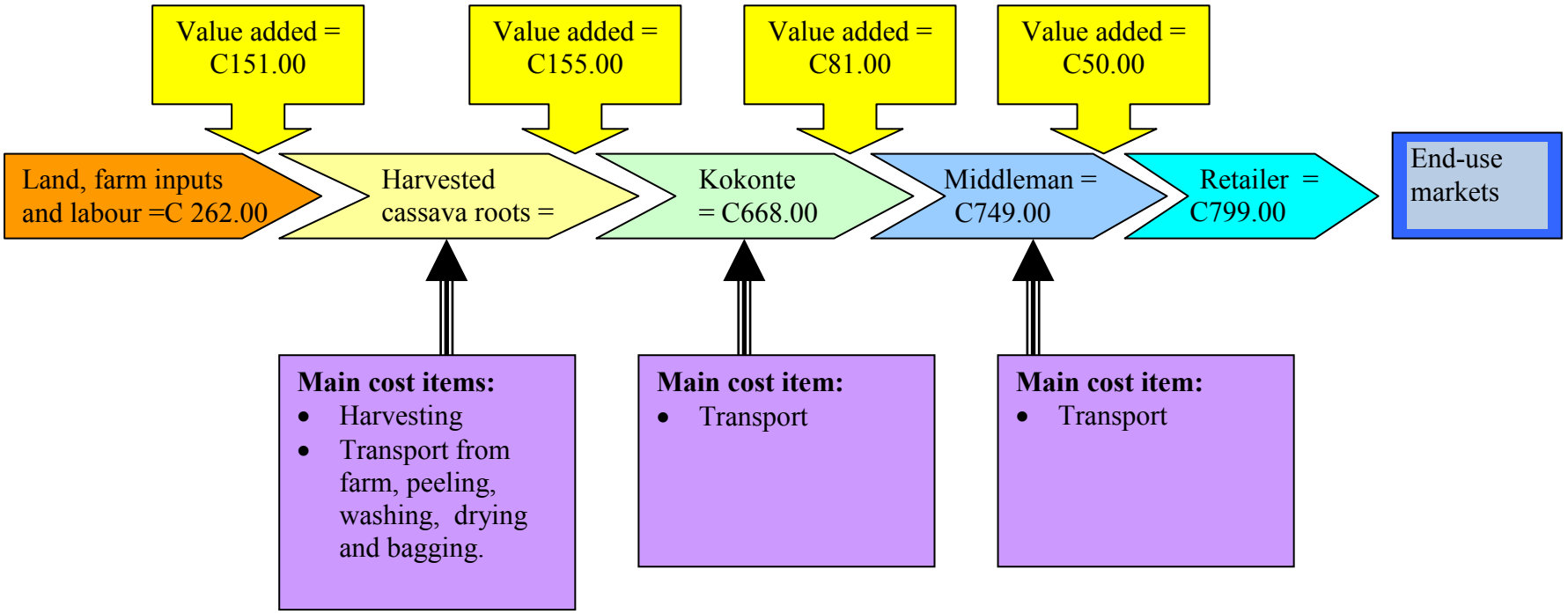
c. District Assemblies

The two District Assemblies, in which the study was conducted, were mainly concerned with the allocation of market stalls for marketing of kokonte and subsequent taxation of the wholesalers and retailers. The processors indicated that when they send their *kokonte* to the markets (Klo-Agogo and Techiman), they usually pay tax on each bag of *kokonte*. In some cases, there are road barriers on market days and they pay levies on large quantities of kokonte moving out of the districts.

7.6.4 Value addition in the *kokonte* chain (per ha of fresh cassava roots)

The transformation of cassava into *kokonte* is a simple process which is seen to yield profits. The profits reduce along the chain from the farm to the consumers. The value added to fresh cassava roots as they are processed into *kokonte* was GH₵ 155.00. As the *kokonte* moves along the chain, middlemen add a value of GH₵ 81.00 and retailers also add a value of GH₵ 50.00. The main cost items were harvesting, transportation, peeling, washing, drying and bagging. The value addition figures are based on estimates from the production of cassava per hectare (Table 8.14) and estimates from the *kokonte* pr processors.

Figure 7.2 Value addition in the *kokonte* chain (per ha of fresh cassava roots)



***Source**: Estimates for cassava farmer-processors*

7.7 Process Upgrading in the Chain

The awareness creation and arrangements toward the technology transfer process were explained in Chapter 5.

a. Demonstration of the Technique

The participants were taken through a practical demonstration exercise for processing the improved FRI *kokonte* chips. A diesel engine cassava slicer (Model SAA 100) was sent to Totsunya-Okper for the demonstration. Fresh cassava tubers were peeled and thoroughly washed for slicing. The motorized slicer was then used to slice the peeled cassava into slices (Plate 7.2). Participants were made to practice the use of the slicer and compare the even sizes of the sliced chips to that of the traditional chips. After slicing the cassava into chips, a black polythene sheet was spread on a raised platform and the chips evenly spread out for proper drying. Participants were advised not to dry on the floor or on the edge of the road as these increased the microbial load of the chips.

b. Perceptions of Processors on the Mini-chip Technology

An assessment of the perceptions of the participants was done on five major variables which were cost of the technology, drying of the chips, hygiene, colour and packaging (FRI indicated that they used this variables in earlier assessments when the technology was being tried and tested). A scale ranging from 1-5 was used for the participants to judge which variables they would prefer, that is, they score one as the lowest and 5 as the highest. Cost of the machine and polythene sheet was their major constraint as they indicated that these were not affordable (Figure 7.3). They therefore rated the machine lower than the manual technology that they have been using. The cost of the motorized slicer was in the range of GH¢1,000 -1,200 ($1,200) and a bundle polythene sheet (for drying) was between GH¢200 - 400 ($400). There was a consensus that pooling resources together to buy one slicer for the village could be a way out.

Plate 7.2 *Kokonte* Mini-chip Technique Demonstration

1-Peeling and washing

2-Slicing with the machine by a trainee

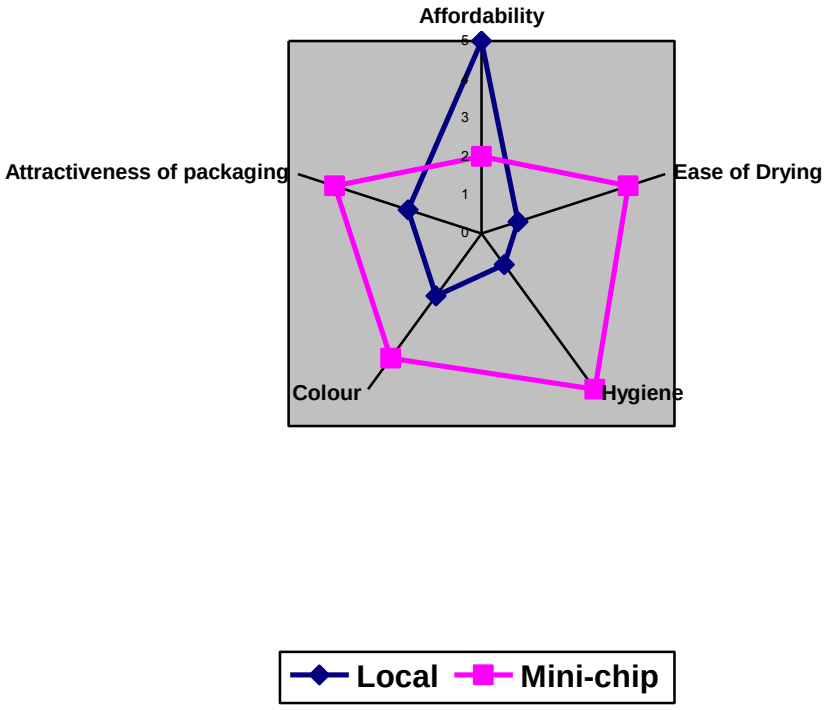
3-Drying on the polythene

4-Improved packaging of *kokonte*

Photo: Author, 2006

On drying, they preferred the new technology because the chips are so small that they can dry in two to three days. Moreover, the chips are covered with polythene sheet in case there is rainfall. This prevents fungal growth on the chips. Very good drying leads to whitish colour which they again preferred to the brown and black colour produced through the manual method which earned *kokonte* the name "Black Sanya". For the hygienic aspect of the *kokonte*, the farmers scored the mini-chip technique higher because with this method, fungal growth is almost eliminated and it is the hygienic aspect that prevents consumers mostly from buying the *kokonte*. Finally, the packaged *kokonte* was so appealing to them that even though they cannot afford to buy the machine, they said they would start bagging whatever they have produced in a similar manner. These perceptions are similar to the findings of Collinson et al. (2001) who, assessing urban market opportunities for high quality cassava products in Ghana, observed that majority of consumers interviewed were likely to purchase cassava products depending on price, hygienic manufacture and packaging.

Figure 7.3 Perceptions of Processors on the Mini-chip Technology



One major issue which the farmers brought up was marketing of the new product. They complained that since the product is different from the big slices that the consumers know, it would be difficult for them to price the new one on the market, a situation observed by Altshul (1999) when studying the use of the mini-chip technique in Northern Ghana.

Participants realised the need to improve upon their processing activities in order to get better markets for their *kokonte*. The *kokonte* mini-chip technique was found to be appropriate but the funds needed to buy the machine makes the technology not affordable. Literature on adoption indicates that an innovation to be adopted must have a comparative advantage over the existing one (Rogers, 1995). The farmers agreed that the machine has a relative advantage over the method they were using as the *kokonte* dries faster with a better colour and quality; however the cost of buying it is the problem. During discussions period after the demonstration, a processor contributed thus:

> *"You can see how poor we are in this village. Even your suggestions that we should contribute money and buy a machine may not work because there is no money. Moreover if we should contribute and buy this machine one day, issues of who controls it and how the moneys are to be paid would still create problems. Kindly look for the manual and affordable machines for us to buy"*

7.8 Effects of Livelihoods Features on Upgrading of *Kokonte* Value Chains

The effects of livelihoods on upgrading of the *kokonte* value chain have been examined (jointly by farmer-processors and the researcher) in the context of all the five capital assets and institutions within the enabling environment. These are fully discussed in section 9.2 of chapter 9. Table 7.6 shows how the assets and the enabling environment could influence the upgrading and these are explained below.

Table 7.6 Effects of Livelihoods Features on Upgrading of *Kokonte* Value Chains

ASSETS										Enabling Environment	
Human capital		Physical capital		Social capital		Financial capital		Natural capital			
Labour availability	↔	Poor access to energy in the form of electricity	↔	Effective group membership	↑	Poor access to Credit	↓	Good access to land for farming	↔	District Assemblies	↔
		Good access to biofuels and sunshine	↑								
Good access to education	↔	Good access to water and sanitation	↔	Good access to Information	↑	Poor savings-group membership	↓			Assistance from the Crops Research Institute	↑
Good access to health facilities	↔	Good Transport facilities	↑							Extension activities of the Food Research Institute	↑

Key:

↑ Enhances prospects for upgrading ↓ Reduces prospects for upgrading ↔ Does not enhance or reduce prospects for upgrading

Source: Joint analysis by farmer-processors and Author

7.8.1 Human Capital

Aspects of human capital that have been assessed are labour, education and health. Labour is readily available in the villages but it is the skill that is more important to operate the slicing machine. During the demonstration, some of the participants who tried their hands on the machine reported that operating it was not difficult. As soon as the machine is sparked, it no longer needs any control but just to feed it with cassava for slicing. Labour availability or skill required for operating the machine therefore has no effect on the upgrading of the chain.

The educational status of the farmers also has no impact on the upgrading process. This is because even though educational background was found to be low (63% of them never attended school), all they need is to learn how to operate the machine and this does not need any educational background. The few people who tried their hands on the machine were able to do it efficiently.

Access to health facilities and health status of the respondents was very good apart from minor ailments. One needs to be healthy in order to continue with all livelihood activities. Processors in poor health cannot carry out *kokonte* processing. Since they are in good health and the mini-chip technique has been developed to reduce health problems associated with the traditional *kokonte* processing, health as a factor will therefore encourage adoption of the technology.

7.8.2 Physical Capital

Aspects of physical capital that have effects on upgrading of the *kokonte* value chains are energy, water and sanitation and transport.

Energy in the form of electricity to operate the cassava slicer is totally not available in Totsunya-Okper but available in Forikrom where the technology has not been introduced. There are diesel-powered and electric-powered slicers on the market. The electric powered engine is easier to operate and more efficient than the petrol-powered engine. Since there was no electricity in the village, the diesel-powered engine was used for the demonstration. The processors therefore do not need electrical power to operate the machine. Without electricity the processors would be comfortable using the diesel-powered engine. Unavailability of electricity in the

village has therefore no negative influence on the adoption of the technology. The second aspect of energy is the solar energy that is needed for the drying of the *kokonte* slices and this is readily available. This will encourage fast drying of the slices.

Water and sanitation do not have any effect on the upgrading because washing of peeled cassava before slicing uses the same quantity of water that the traditional processing was using. Water is readily available in the communities in the form of boreholes and streams.

Transporting farm produce from the two communities is very good as the roads in the communities are tarred and they are closer to market centres. Availability of this infrastructure would therefore encourage adoption of the technology because there will be no question of unavailability of transport.

7.8.3 Social Capital

The social capital base in Totsunya-Okper is weak because the existing farmers‟ group is not functioning well. However, the research team worked with the group and encouraged them to work harder towards group sustainability. The cooperation of the executives of the group especially information flow during the technology transfer process was good. This actually encouraged the participation of members of the community. Social capital is therefore crucial if the technology is to be adopted.

7.8.4 Financial Capital

The main bottleneck to adoption of the technology was lack of capital and poor access to credit. The farmers claimed they are poor and do not have access to formal credit to be able to buy the mechanical slicer. This factor therefore contributed mostly to their inability to adopt the technology.

7.8.5 The Enabling Environment

Two research institutions, the CRI and FRI are in contact with the communities and are prepared to assist them with innovations in addition to the *kokonte* mini-chip technique. These institutions therefore will enhance the upgrading of the *kokonte* value chains.

7.9 Summary

Farmers and processors engage in other income generating activities such as livestock and poultry. There are other non-farm activities such as masonry, petty trading and hiring out of labour. In general, incomes have not improved over the years but farmers are able to afford their children‟s education, household health needs and there are no serious health problems. Households have physical and social access to food but do not always have economic access.

Agroforestry and organic farming projects established are helping farmers to improve the environment by increasing soil fertility and providing watershed for River Asukantia to prevent further drying in the dry season.

The *kokonte* value chain was made up of the main actors, service providers and an enabling environment. Constraints to processors include poor access to financial services, production of convenient and safe *kokonte* for consumers, frequent increases in input prices and soil fertility. A process upgrading of the chain, using the mini-chip technique was introduced by the Cassava SME Project but is still not adopted because of lack of financial resources to purchase the mechanical slicer.

Livelihood features have been found to influence upgrading in the chain. Those factors that affect the upgrading positively include health, energy, transport, social capital and institutions in the enabling environment. Only lack of credit had a negative effect on the upgrading while other factors that did not have any effect are labour, education, water and sanitation and land.

CHAPTER 8
LINKING SMALL SCALE CASSAVA FARMERS AND PROCESSORS TO HIGH QUALITY CASSAVA FLOUR MARKETS

8.0 Introduction

This chapter examines the value chain of a selected High Quality Cassava Flour intermediary processor – Amasa Agro Processing Company Limited (Amasa), a subsidiary of Motherwell Farms at Ayikai Doblo in the Ga West District of the Greater Accra Region. Motherwell Farms was established in 1981. Amasa was selected because it is the sole company processing cassava grits into HQCF in the region. The chapter contains an assessment of livelihoods of the cassava farmers who supply cassava roots to Amasa for processing, taking into consideration the linkages between the intermediary processor and the farmers. The chapter also examines if it is more profitable to the farmers to sell the roots directly to processors or to process the roots into end products for sale.

8.1 The Intermediary Flour Processor - Amasa

Amasa is a private limited liability company engaged in cassava processing. It was incorporated under the Ghana Companies Code (Act 179) 1963 in February 2002 with registration number CA-776. The company has four shareholders with one of them as the Lead Promoter (The Chief Executive). It has an office in Accra and the processing plant located at Ayikai Doblo. Amasa"s logo (Plate 8.1) carries the inscription, *„arrying cassava to the skies"*, showing the importance attached to cassava and how Amasa intends to promote its production and processing. As at August 2008, Amasa had permanent staff strength of 23, comprising 5 administrative staff and 18 farm and processing staff. This makes Amasa a small scale-enterprise, according to the classification of enterprises by the NBSSI (MOTI, 2002).

The parent company, Motherwell Farms, won the District Best Farmer award (Ga District) in 1991, Regional Best Farmer Award in 1992 and again won the Best Regional Farmer Award in 2000. Amasa Agro-Processing Company was awarded a

Certificate of Merit (Special National Award) during the 19th National Farmers" Day Celebration in December 2003.

Plate 8.1 Amasa's Logo:

'Lifting cassava to the skies'

8.2 The HQCF Value Chain

Identifying the HQCF value chain enables the researcher to have a better understanding of the relationships, functions and information flows between all the chain participants. It also helped participants to assess business opportunities and potential risks that exist in the chain. The mapped out chain includes the main actors, service providers and the enabling environment (Fig. 8.1).

8.2.1 Main Actors and their Functions in the Chain

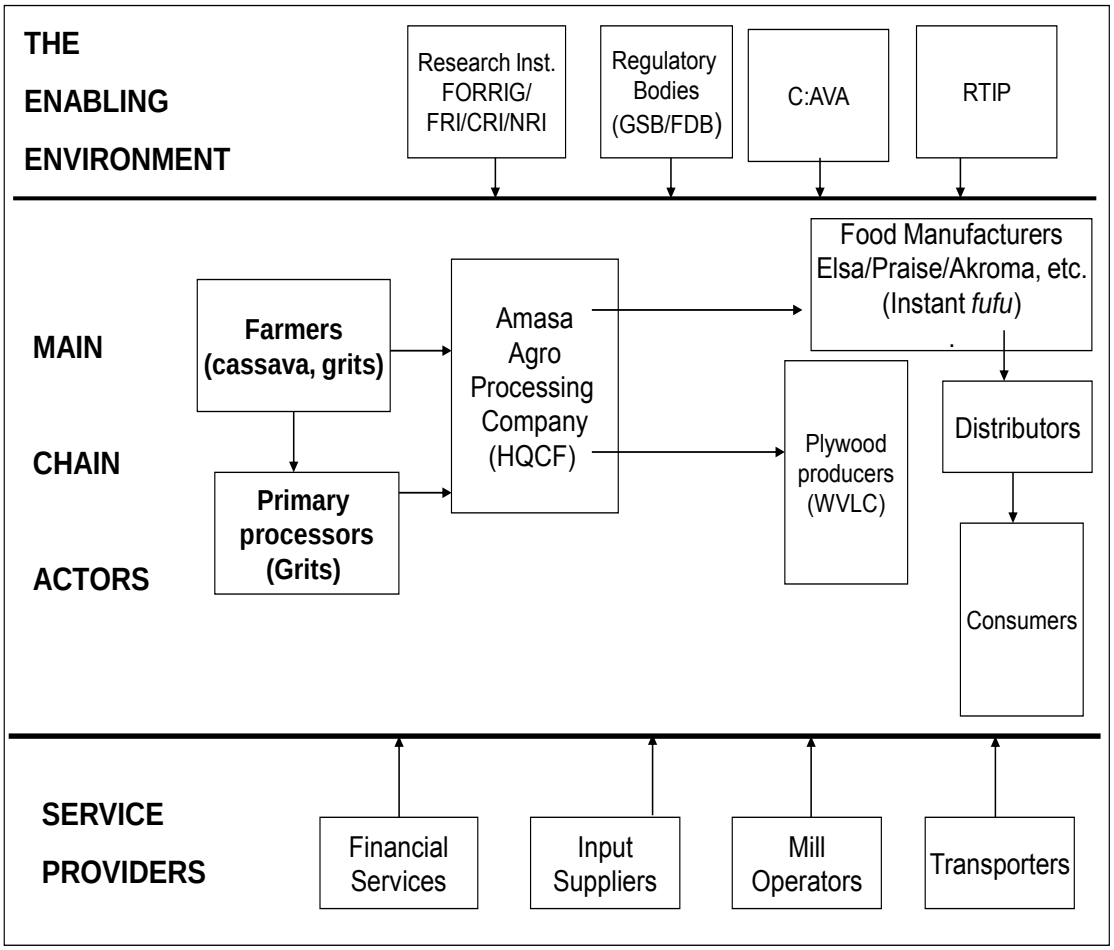
The main actors in the HQCF chain are the farmers, primary grits processors, Amasa as the intermediary processor, food and plywood manufacturing companies, distributors and final consumers.

a. Farmers

Small-scale farmers and medium to large-scale farmers supply Amasa with cassava roots since what Motherwell Farms produces is not sufficient to feed the processing company. In the Ga West District, small-scale farmers who supply Amasa are found in Ayikai Doblo, Obeyeyie, Ashalaja, Kwame Anum, Hobor, Kojo Ashong, Akraman and Okushibiade. Amasa buys un-harvested cassava roots on farmers" fields and harvests, using its own manual labour force. This is because the individual farmers

are scattered all over the communities and find it difficult to assemble the roots. Farmers sold the cassava roots by measuring the farm by a designated rope called *„kpaa"* in Ga or *„abonwuieve ka"* in Ewe. Each rope is approximately 22 yards (20.2m) long. The measurement is usually the square of a rope and there are nine square ropes in an acre. The cost of a rope of cassava roots is GH¢30.00 (August, 2008). Wenham (1995) made similar observations on selling cassava on the field were made by Wenham (1995) and Nweke et al. (2000). Farmers who sell cassava roots to Amasa are paid promptly and have their fields ploughed for them sometimes on a credit basis and also get free planting materials. Amasa did not buy from farmers in Ga West in 2008 because the supply of cassava was poor as a result of land fragmentation and sale of land to pineapple farmers and sand extractors as explained in section 9.2.1.

Figure 8.1: The High Quality Cassava Flour Value Chain



Source: Field Data, 2008

Amasa also buys cassava roots by weight from medium to large-scale farms (1 kg = GH¢0.09). The cassava roots are delivered to Amasa on the Company premises as required. In 2008, Amasa bought fresh cassava roots from Caltech Ventures at GH¢90/MT and Great Woman Enterprise (GWE) at GH¢60/MT. Variations in prices are due to distance from the respective farms. The price includes transport costs hence the difference. Thus the cost of cassava roots from Caltech Farms, which is located at Takla in the Volta Region, 168 km from Ayikai Doblo, is higher than that of GWE, Bawjiase, which is 31 km from Ayikai Doblo.

Farmers save a lot of transaction costs when Amasa buys un-harvested roots from their fields. That is, the cost of harvesting and transportation are removed and they are saved from any inconveniences arising out of these transactions. Farmers are also saved the situation of fluctuating prices on the market, sometimes resulting in losses. Furthermore, there is no issue of default payments. Moreover, their fields are ploughed for them by Amasa on credit basis and they get free improved planting materials. Thus farmers stand to benefit and improve their incomes by selling their cassava roots to Amasa.

Amasa also gains by buying cassava roots on weight basis because the quantity supplied is assured unlike buying from the field where Amasa might not be sure of the quantity to get in case of lower yields. The agreement of delivery on the premises also favours Amasa because of inconveniences involved in harvesting and transporting the roots to the company premises.

b. Primary Processors

Primary village processing units process cassava into grits and other products such as *gari*, *agbelima* and *kokonte*. They supply Amasa with grits which is further processed into HQCF. In August 2008, Amasa bought 50kg of grits at the cost of GH¢37.00. Amasa is the sole buyer of grits thus the small-scale processors could face a situation which could bring about inequality in bargaining power to the disadvantage of the small-scale processing units as observed by Jaffee (1995). The presence of another HQCF processor might lead to more bargaining power of the small-scale processors in the HQCF chain, leading to an increase in incomes as a livelihood outcome.

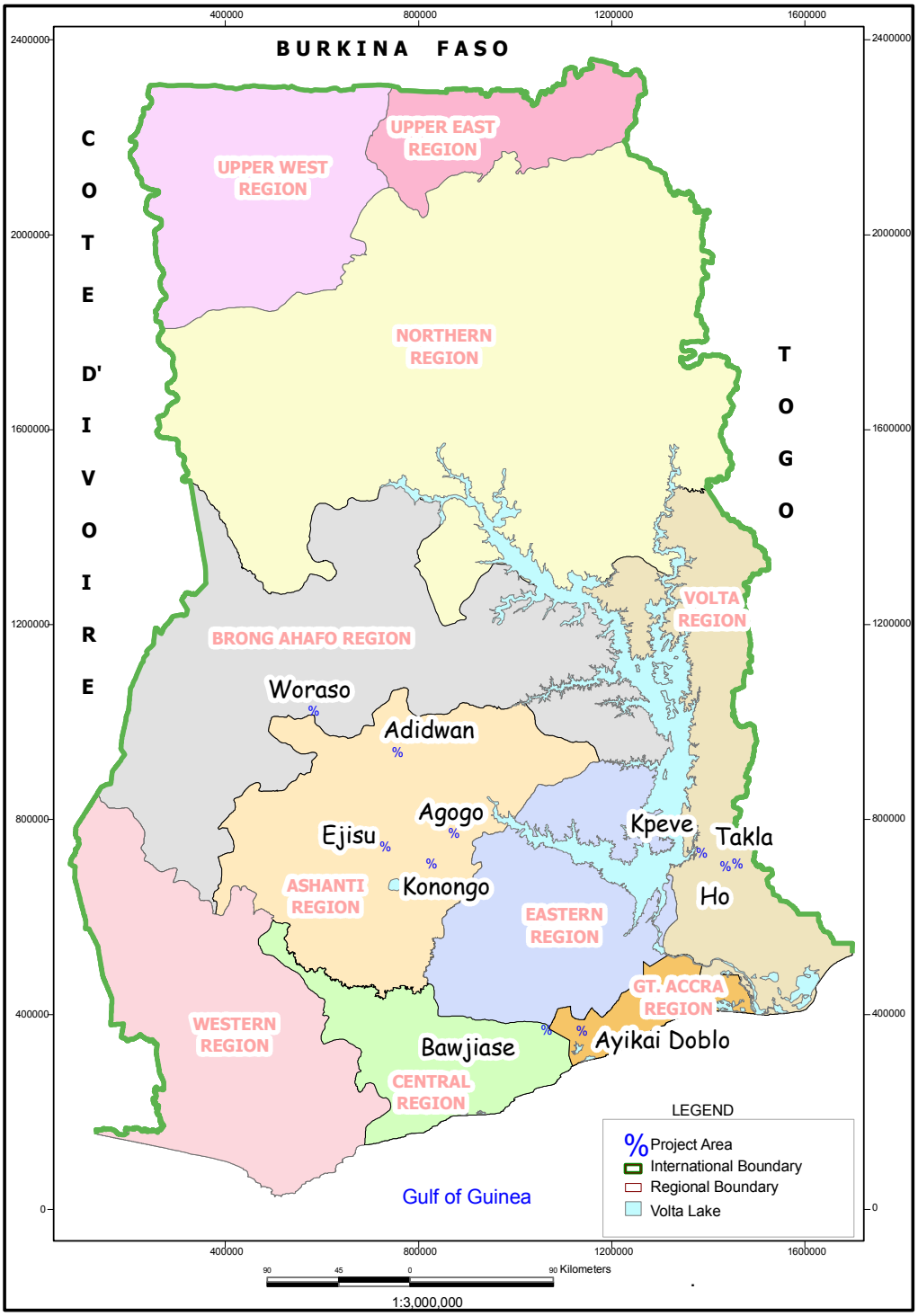
Table 8.1 shows sources of supplies of raw materials to Amasa between 2003 and 2007. Amasa now takes supplies from GWE, Caltech and small-scale farmers and grits processors who are nearer to the processing plant than the former supplies and this also lowers transaction costs.

Table 8.1 Sources of Supplies of Fresh Cassava Roots and Grits to Amasa Agro-Processing Company since 2003

SUPPLIER	PRODUCT	LOCATION	QTY (MT)	VALUE (GH¢)	SUPPLY SCHEDULE
Motherwell Farms	Cassava roots	Ayikai Doblo	300	9,000	Various times
MOFA/RTIP	Cassava roots	Kpeve	21.5	860	Various times
Ackom Farms	Cassava roots	Agogo	31.5	1,260	Various times
Konongo Farmers Association	Cassava roots	Konongo	120	4,800	Various times
Josma Agro-Industries	Grits	Woraso	10.8	3,240	Intermittent supplies
Okatakyie Owusu Farms	Cassava roots Grits	Ejisu	12 25	720 7,499	Intermittent supplies
Mad. Adoley	Cassava roots	Suhum	32	3,484	Various times
„Enso Nyame Yε" Group	Grits	Watro	4	1,200	Various times
Adidwan Cassava Farmers Cooperative	Grits	Adidwan	4	1,000	Various times
Feed and Flour Ghana Ltd	Grits	Amanfrom	16.5	4,950	Various times
Great Woman Enterprise	Cassava roots	Bawjiase	various	various	Various times
Caltech Farms	Cassava roots	Takla near Ho	various	various	Various times
Individual farmers	Cassava roots/grits	Various villages in Ga West	various	various	Various times

Source: Amasa Agro Processing Company Ltd., 2008

Figure 8.2. Map of Ghana Showing Locations of Amasa's Sources of Cassava Roots and Grits.



Source: Amasa Agro Processing Company, 2008

c. Motherwell Farms

The mother company, Motherwell Farms acquired an 80 ha land at Ayikai Doblo on leasehold and the farm was established in 1981. It has also acquired 452 ha of land, at Nkyenenkyene in the Kwahu South District of the Eastern Region for its expansion programme. Nkyenenkyene is located in an area where estate development is not yet a problem thus making land available for farming. There are no constraints to the possession of these lands, thus Amasa has the natural capital requirements for farming and processing of cassava as it has planned to expand in the near future depending on availability of credit facilities.

Motherwell has planted 20 hectares of cassava in the 2008 cropping season. The farm uses three cassava varieties namely, *Abasafitaa*, *Afisiafi* and *Capevars bankye* because they have good qualities for HQCF production. Amasa does not plant local varieties because they have lower yields and are not good for industrial purposes as compared to the improved varieties which are better for flour and starch.

Motherwell Farms, as a company, has made estimates for production and processing yearly as one of the planning strategies. The estimates include land preparation, planting and cultural practices until harvest. These are shown in Table 8.2 below. On the average, the farm spends an amount of GH¢468.28 as operational cost on 1 ha of cassava, gaining a net return of GH¢544.27. Using her own resources, the Company would make more profits in HQCF processing but the volume of cassava produced is lower than the demands of the processing factory. That is why Amasa is planning to expand the farm at Nkyenenkyene to feed the factory.

Table 8.2 Estimates for the Production of 1 ha of Cassava by Motherwell Farms

Items	Cost GH¢
Land rent per year	15.78
Mechanical Ploughing	30.00
Harrowing	30.00
Planting material	10.64
Planting	14.18
1st weeding	14.18
2nd weeding	14.18
3rd weeding	14.18
4th weeding	14.18
Harvesting and carting	15.19
Cutlass (one year)	5.00
Hoe (one year)	5.00
Baskets (6 months)	1.80
Sacks (6 months)	3.00
Operational cost/acre	**187.31**
1 acre yields 4,500kg (average)	
1 ha = 2.5 acres x GH¢187.31 = GH¢468.28	**468.28**
1 acre=4500kg=GH¢405.00	
1 ha=2.5 acres= GH¢405 * 2.5=GH¢1,012.50	
Gross income/ha	1,012.50
Total cost of production/ha	468.28
Net income/ha	**544.27**

Source: Motherwell Farms, 2008

d. Amasa Agro Processing Company

Amasa processes not only HQCF, but other products such as *gari*, *agbelima* and *kokonte*. The fresh cassava is usually processed into grits within 24 hours of harvesting. This is done to avoid spoilage and to ensure good quality grits. Grits bought from primary processors stored in well ventilated rooms and later processed into HQCF within a day or two. The Amasa flour is labelled „Eagle Brand". The only by-product, cassava peels, is sold to a pig farm at Ayikai Doblo at the cost of GH¢30.00 per MT.

Amasa has a multi-purpose processing plant which can process cassava into cassava flour, chips and pellets. The machine can process approximately 20 MT/day input of cassava roots. The output for dry flour is approximately 6.6 MT per day while it can produce approximately 1.5 MT of pellets/hour. This machine is currently being under

utilised because Amasa is producing very low volumes of the processed products due to the demand status of the products.

The total cost of producing one MT of HQCF (in 2008) from 4,500 kg of cassava has been estimated from cassava produced by Motherwell Farms, Caltech and Great Woman Enterprise (Table 8.3). Estimates were also made using grits bought from primary processors. The income derived from one MT of HQCF was GH¢1,100.00 as at August 2008. The net profit has been calculated using costs from the above mentioned sources. Using cassava roots from Motherwell Farms, Amasa makes more profit (GH¢635.00) than when cassava roots are bought from GWE (GH¢575.20) and Caltech (GH¢440.20) and when grits are bought from primary processors (GH¢330.95). This is because of the cost of buying the roots from these sources. The higher profits made by Amasa when roots from Motherwell Farms are processed are likely due to lower transaction costs incurred.

Table 8.3: Estimates for the Production of 1 MT of HQCF by Amasa

			Sources of cassava/grits			
ITEM	QTY	Rate GH¢	Mother-well	Caltech	GWE	Grits (various sources)
Grits	1000 kg	0.74				740.00
Fresh Cassava + transportation	4,500kg		187.31	405.00	270.00	0.00
Peeling	10 man days	2.00/man day	20.00	20.00	20.00	0.00
Water for washing			2.00	2.00	2.00	0.00
Labour for washing	2 man days	1.25/man day	2.50	2.50	2.50	0.00
Grating	2 man days	2.00.man day	4.00	4.00	4.00	0.00
Dewatering (pressing)	1 man day	2.00.man day	2.00	2.00	2.00	0.00
Crumbling (feeding drier)	2 man days	2.00/man day	4.00	4.00	4.00	0.00
Labour for drying	2 man days	2.00.man day	4.00	4.00	4.00	0.00
Diesel for drying	35 gals		187.25	187.25	187.25	0.00
Labour for milling/sifting	2 man days	2.00.man day	4.00	4.00	4.00	4.00
Diesel for milling and sifting	3 gals	2.00/man day	16.05	16.05	16.05	16.05
Filling/stitching	2 man days	2.00.man day	4.00	4.00	4.00	4.00
Cost of poly sacks	20 pieces		5.00	5.00	5.00	5.00
			442.11	**659.80**	**524.80**	**769.05**
1 ton of HQCF = GH¢1,100						
Gross income			**1,100.00**	**1,100.00**	**1,100.00**	**1,100.00**
Cost of production			**442.11**	**659.80**	**524.80**	**769.05**
Net income			**657.89**	**440.20**	**575.20**	**330.95**

Source: Amasa Agro Processing Company, 2008

Amasa has achieved consistent growth in performance since 2004. The company"s production of HQCF has increased from 30 MT in 2003 to 50 MT in 2007. Production of *gari*, *agbelima* and *kokonte* also increased within the same period (Table 8.4). The company is therefore producing HQCF in higher quantities than the other products.

Table 8.4 Summary of Amasa's outputs since 2003 (in MT)

YEAR	HQCF (tons)	*Gari*, *agbelima* and *kokonte*	Total output for all products	HQCF as % of total output
2003	30	21.5	51.5	58
2004	26	20	46	57
2005	30	31.2	61.2	49
2006	38	37	75	50
2007	50	53	103	48

Source: Amasa Agro Processing Company Ltd., 2008

e. Food Manufacturers

The major food manufacturers found in the HQCF value chain include both domestic and foreign companies. The domestic food manufacturing companies include Elsa Foods, Praise Export Services, Neat, Ghanafresh, Rosafric, Limex and Selasie. They use the HQCF to produce improved traditional foods such as Instant *fufu* powder, dried *Agbelima* and dried *banku-mix*. The foreign companies include Akroma Foods, UK and Winnie Krofa, USA. They also use the HQCF to produce the instant *fufu* powder and the improved traditional foods. Table 8.5 shows orders received from some of the food manufactures and other users of HQCF.

The improved traditional foods produced by the SMEs are sold to consumers who are mainly middle class elite and people of the higher income bracket in the country while the rest are exported. According to Onumah et al. (2008) the local market accounts for about 20% of their output while the rest 80% are exported to the Diaspora market for migrant Ghanaians in Europe and America. In Ghana, the retail outlets are mainly the supermarkets, fuel filling stations, open market and corner kiosks.

f. Plywood Producers

WVLC originally used wheat flour as an extender for adhesives in plywood. Since 2004, WVLC uses 100% HQCF as an extender. The company buys all the flour from Amasa. This is also included in Table 8.5

Table 8.5 Details of Order Received by Amasa (2003-2007)

CUSTOMER	PRODUCT	QTY (MT)	APPROX VALUE GH¢	REMARKS
Elsa Foods	Cassava flour Cassava grits Starch/*Agbelima Kokonte*	82 40 16 1	28,861 11,353.6 13,200 360	Continuous deliveries in phases as and when finances are available
WVLC	Cassava flour	144	57,600	Continuous deliveries
Rimon Hajjar Burkina Faso	Cassava flour	50	16,200	Unable to supply. Lack of raw materials
Angola	Cassava flour	24	9,396	Supplied
Cabisco Co Ltd. Cape Coast	Cassava flour	1	600	Supplied
Forestry Research Institute	Cassava flour	2.5	1,500	Supplied
Food Research Institute	Fresh cassava	6	3,000	Supplied
Winnie Krofa	HQCF *Kokonte*	7.4	3,330	Supplied
Akroma Foods	HQCF	3	2,100	Supplied
Praise Export Services	*Agbelima* grits	17.5	11,909	Supplied

Source: Amasa Agro Processing Company Ltd., 2008

8.2.2 Service Providers

Service providers include financial services, input suppliers, mill operators and transporters.

a. Financial services

Access to credit facilities has been a major concern to the company as it never had enough of it for its operations. In 2006, Amasa had financial assistance from the NBSSI but this was below what was expected for its operations. According to the Lead Promoter, there have been efforts to source financial assistance from some financial institutions in the country and also from the ECOWAS bank in Lome, Togo, but these have not yet materialised. Amasa is however, managing its resources in an efficient manner and is not too constrained by poor access to credit facilities. This can be seen in the Company‟s overall performance since 2004 (Table 8.6). Amasa‟s net income rose from GH¢4,651m in 2004 to GH¢11,564m in 2007, showing a very good performance.

Even though there are commercial and rural banks in the Ga West district, farmers and processors have not been accessing financial services from them because, according to the respondents, they are not aware of the channels to use to access such credit facilities. The only financial service provider is the Dekavi *susu* group. Details of this group and its operations are found in section 8.3.1.

Table 8.6 Summary of Amasa's Financial Performance since 2004

YEAR	Production volume*** (MT)	Sales revenue GH¢	Gross margins GH¢ m	Net income GH¢ m
2004	46.00	48,961	22,638	4,651
2005	61.20	59,966	28,084	5,920
2006	75.00	75,280	31,540	7,867
2007	103.00	103,253	43,542	11,564

*** Production volume comprises HQCF, *gari*, *agbelima* and *kokonte*

Source: Amasa Agro Processing Company Ltd., 2008

b. Input suppliers

The inputs used by the farmers, processors and Amasa were cutlasses, hoes, basket, poly sacks, pressers and sifters. These are readily available in Hobor market and shops in the District. In addition, Amasa buys diesel from fuel filling stations for his tractors and processing machine.

c. Mill operators

The farmers and processors usually grate their cassava at local mills which are found in the villages. They are owned by individuals and have served the processors efficiently.

d. Transporters

The farmers and processors have readily available transport to send their produce to other towns especially Amasaman and Accra even though the roads are in a deplorable state. Moving cassava from the farm to the house is by head-porterage since there are no accessible routes that vehicles can use. It is only Amasa which uses tractors to cart cassava bought from the farmers.

Amasa depends on haulage operators to transport cassava and grits from the suppliers to the factory at Ayikai Doblo. HQCF produced by the company is also transported to the end users at their various premises. Transport is not a constraint to Amasa as it is readily available always. Amasa is therefore able to bring in raw materials and also send its produce out without hindrance.

8.2.3 The Enabling Environment

In the enabling environment, there are research institutions, the RTIP (see chapter 2), and regulatory bodies like the FDB and GSB (see chapter 6).

a. Research Institutions

Amasa worked closely with a DFID project "Sustainable Uptake of Cassava as an Industrial Commodity" jointly managed by the NRI and the FRI. The project was funded by the Crop Post Harvest Programme (CPHP) of the NRI, UK. Other partners in the coalition included the Nutrition and Food Science Department of the University of Ghana, Forestry Research Institute (FORIG), NBSSI, MOFA and FFGL. Under the

coalition partnership, they produced HQCF for bakeries, premium quality *gari*, *agbelima* and high quality *kokonte*. The coalition completed formulation of adhesive and glue for the paperboard and plywood industries respectively and also glucose syrup for both pharmaceutical and biscuit factories. The coalition has enabled Amasa to introduce a new product (HQCF) and also improve on the traditional foods such as *gari*, *agbelima* and *kokonte*, a process Humphrey and Schmitz (2002) referred to as product upgrading. This is expected to improve on the financial performance of Amasa and currently the Company is one of the largest producers of HQCF in the country. This has led to the selection of Amasa by the C:AVA Project to be an intermediary processor in the HQCF value chain in Ghana (section 2.6.5).

b. RTIP

Motherwell Farms is an accredited secondary multiplier of improved cassava varieties for RTIP. One of the specific objectives of the RTIP is to develop a sustainable system for the multiplication and distribution of improved planting materials for root and tuber crops in order to increase their availability to smallholders (IFAD, 2004). Under this objective, foundation materials were to be transferred from breeding stations to certified farmers for further multiplication under less strict agronomic conditions. Motherwell Farms was then selected and has been producing planting materials for the project to distribute to farmers. Since these improved varieties have the qualities of producing better grades of HQCF (RTIP, 2002) Amasa stands to gain from these varieties for its processing operations as well as being a secondary multiplier.

Since Amasa was selected as a secondary multiplier cassava planting material, the company has been supplying famers in the district with these materials from varieties such as *Abasafitaa*, *Afisiafi* and *Capevars bankye* because they have good qualities for HQCF production. The farmers are therefore gaining from RTIP indirectly.

c. Food and Drugs Board (FDB)

As a licensed food manufacturer, Amasa subjects its products to inspection by the FDB before selling to consumers. The FDB ensures that all manufactured food products from Amasa are licensed and that the operations of Amasa conform to current codes of good manufacturing practices and registers such products to ensure

their safety, quality and efficacy. The FDB has however, not been working with the local farmers as they have not fallen into the category for inspection.

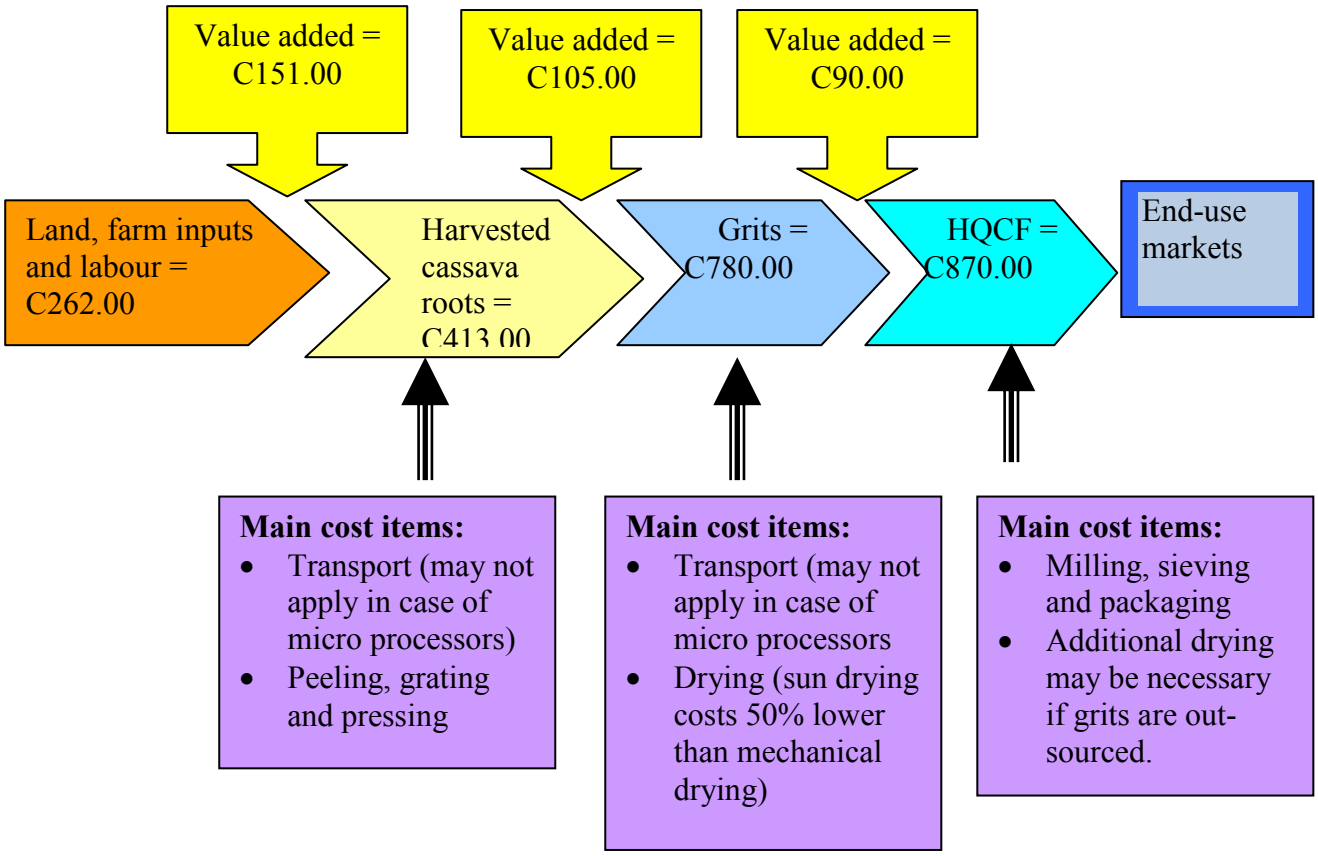
d. The Ghana Standards Board (GSB)

Amasa collaborates with the GSB during the certification of its products such as the Eagle brand HQCF and the other products such as *agbelima*, *gari* and improved *kokonte*. GSB carries tests and inspects activities for manufactured locally improved food products, calibrates, verifies and inspects weighting and measuring instruments of Amasa and promotes its quality management systems. Again, the GSB also does not work with the farmers because they have not been producing cassava processed products on a scale that warrants certification.

8.2.4 Value addition in the HQCF chain in Ghana (per ha of fresh cassava roots)

Processing cassava roots into HQCF yields profits along the chain. This is shown diagrammatically in Figure 8.3. When cassava roots are processed into grits, there is a value addition of GH₵ 105.00 per hectare of cassava. Processing grits into HQCF shows an added value of GH₵ 90.00. The value, however, decreases gradually as it moves along the chain. As shown in the diagram, the profit made on the cassava roots is higher than that of the grits and profits on grits is also higher than the HQCF. This is because of the cost of the value added, which is higher at the various stages. The value addition was deduced from estimates obtained from farmers and processors (Table 8.14)

Figure 8.3 Value addition in the HQCF chain in Ghana (per ha of fresh cassava roots)



Source: Estimates by cassava farmers, grits processors and Amasa (2008)

8.2.5 Governance in the HQCF Value Chain

In any particular value chain, the activities of actors are controlled and monitored – in other words, governed. Governance involves a significant degree of the distribution of gains along the chain. Amasa has identified the types of cassava that are high yielding and have high starch content for processing into HQCF. The parent company, Motherwell Farms therefore cultivates three main varieties, *Abasafitaa*, *Afisiafi* and *Capevars bankye* to feed the processing plant. When Amasa is buying cassava roots from farmers, it looks for the qualities of cassava roots that can be processed into HQCF to make profits. That is why Amasa was supplying the local farmers in Ga West District with improved planting materials. Also, Amasa buys the same improved varieties from Caltech and GWE also. Another issue of concern was that the local farmers were required to plant cassava in rows at a recommended spacing of 1m x 1m. This has been difficult for them to do since they are used to haphazard planting.

Grits bought from primary processors are not supposed to be coloured, should be free from foreign materials and properly dried. Amasa therefore visits grits processors to educate them on the quality of grits required. Grits which do not meet the standards are usually rejected.

In another instance, food manufacturers and plywood and paper industries also require quality HQCF from Amasa. That is why Amasa grades the HQCF using the Codex standard for edible cassava. Amasa is therefore able to produce HQCF which is accepted by all the end users because it buys the acceptable raw materials and processes according to the quality expected by the GSB and the FDB.

8.3. Livelihoods of Farmers Supplying Cassava Roots to Amasa

This section describes the livelihoods of the farmers in the Ga West District who sell cassava roots and grits to Amasa. It also assesses the factors that affect their decision to sell fresh cassava roots or process them into products such as grits, *agbelima* and *gari*. It would be recalled that out of the 56 names Amasa gave as suppliers of cassava roots and grits, 43 were identified and interviewed.

8.3.1 Livelihood Assets

This section assesses the capital assets that the farmers use in producing and processing cassava to supply to Amasa.

a. Human Capital

Human capital has been analysed in terms of demographic characteristics of respondents and this includes sex, religion, ethnicity, age, marital status, educational levels and health. The respondents comprised 63% males and 37% females (Table 8.7). The majority of the respondents (65%) were Ewe migrant farmers from the Volta region while 35% were native Ga. On religion, Christians formed 81% and Traditionalists, who also believe in the Supreme Being, were 19%. Even though there are few Moslems in Ayikai Doblo, they are not engaged in crop farming.

Table 8.7 Sex, Ethnicity and Age of Respondents

Sex	N	%
Male	27	63
Female	16	37
Total	43	100
Ethnicity		
Ga	15	35
Ewe	28	65
Total	43	100
Religion		
Christianity	35	81
Traditional	8	19
Total	43	100
Age		
31-40	15	35
41-50	13	30
51-60	13	30
>60	2	5
Total	43	100

Source: Field Survey, 2008

i. Age of Respondents

The age brackets indicated that 35% fell into the 31-40 years group, 30% in the 41-50 age groups and another 30% in the 51-60 year group. Those beyond 60 years formed 5% of the total. Farming and processing activities need human energy especially manual work on the farm including head porterage of cassava from the house to the farm. The age of the respondents show that only 5% are above 60 years which is the

official retirement age for workers in Ghana but in most villages, people of this age are still in active farming. Thus almost 95% of the respondents are in the active year group and can carry out their farming and processing activities well.

ii. Marital Status and Household Size

It was observed that 7% of the respondents were single and these were men. Among the married respondents, 93% of the men were married while 81% of the women were also married while 3% of the women were widowed (Table 8.8). Out of the 27 male respondents, 67% had one wife each and 26% had two wives each. Those who had two wives each were Ewe settlers. Five of the men who had two wives share the same house with them while the rest two indicated that they stay with one wife in their houses whiles the other wives stay in different houses.

Table 8.8 Marital Status of Respondents and Household Size

Marital Status	M (n=27)		F (N=16)	
	N	%	N	%
Single	2	7	0	0
Married	25	93	13	81
Divorced	0	0	3	19
Total	27	100	16	100
Number of wives				
1	18	67		
2	7	26		
Nil	2	7		
Total	27	100		
No of Children				
1-3	4	15	3	19
4-6	7	26	11	69
7+	14	52	2	12
Nil	2	7	0	0
Total	27	100	16	100

Source: Field Survey, 2008

Most rural farmers in the quest for labour, decided to have more children of their own so that the children can be used as family labour, hence marry more wives. According to Berry (1994), polygamy was valued in pre-colonial times as a method for well-to-do men to beget additional labour.

The observed average household size of 4.5 is closer to the national average of 4 (GSS, 2008). Table 8.8 shows that the number of children is high as male respondents

with 7 or more form 52% and those with 4-6 children are 26%. Among the women respondents, those with 4-6 children are 69%, women with 1-3 children are 19% and those with more than seven children are 12%.

iii. Educational Status

Educational level of farmers was low as only 2% had secondary education, 42% had basic education and 56% never attended school (Table 8.9). The number of adults that never attended school is very high compared to the national average of 31% and GSS (2008) indicated that rural literacy rates are considerably lower than urban, with 60% of urban dwellers literate as compared to 40% of the rural population. Currently, there are educational facilities in the areas studied but the issue of a higher number who did not attend school might be due to the fact that if in 2008 the area is still not fully accessible then one can imagine the situation 40 years ago (Over 65% of the respondents are above 40 years). The failure to attend school by these people could also be attributed to the poor infrastructure in the area in those days. However, it has been observed that formal education is seen as less important to rural dwellers predominantly engaged in crop farming due to the nature of the enterprise in which people are engaged (Ashong and Smith, 2001).

Table 8.9 Educational Status of Respondents

Education status	N	%
Nil	24	56
Basic	18	42
Secondary	1	2
Total	43	100

Source: Field Survey, 2008

iv. Health Status

The respondents indicated that apart from minor ailments and sometimes farm accidents, they have not been experiencing frequent ailments. There are clinics in all the villages visited and in such ailments they go to the clinics for treatment. Their good health is an asset to their farm work and processing activities as poor health interrupts the capabilities of farmers.

Registration with the NHIS and therefore free access to medical care is very poor in the communities. This is because only 35% of the respondents registered with the NHIS and 65% did not register (Table 8.10). In these communities, education on the NHIS is still poor and needs more work to get the people registered in order to access free medical care.

Table 8.10 Registration with the NHIS

Registered	N	%
Yes	15	35
No	28	65
Total	43	100

Source: Field Survey, 2008

b. Physical Capital

Physical assets of farmers include shelter, water and sanitation, energy, transport and access to information.

i. Access to Shelter

Housing units in the study areas are not well developed. Most of the houses are mud brick types roofed with thatch. These are mostly built by the Ewe settlers who claimed that they have their original homes in the Volta region and they go there regularly especially to attend funerals. Most of them especially the elderly ones are not buried in the study area and are sent back home. This makes it prudent for them to build at their homes. The study however, did not assess the number of people who have gone back to build in their home towns as this cannot actually be verified. The few cement block buildings belong to the native Ga but most of them are also found in the mud-brick houses.

ii. Water and Sanitation

All the communities studied have access to safe drinking water from bore-holes fitted with pumps. Sanitation is not at its best because there was limited number of KVIPs and some people still use pit latrines especially in Hobor and Kwame Anum. The KVIPs, according to them, were part of the Danish International Development Agency (DANIDA) funded water and sanitation programmes in the district.

iii. Access to Energy

There was electricity supply in all the villages. The major source of energy for almost all households is firewood for cooking. The use of charcoal is minimal as the firewood is easier and cheaper to afford. There was no household using LPG.

iv. Transportation

A major problem for the people is the poor road network. The roads are not tarred and the heavy duty vehicles that cart sand to the urban areas have contributed more to damage on the already bad roads. The distance between Amasaman (the district capital) to Hobor through Obeyie, Ayikai Doblo, Ashalaja, and Kwame Anum is about 24 km but on the average it takes 45 minutes to travel from Amasaman to Hobor. Unfortunately for the people, the main bridge that links Ayikai Doblo and Ashalaja over a tributary of River Densu collapsed in September 2008. Commuters from Ashalaja, Kwame Anum and Hobor going to Amasaman and then to Accra have to divert through Nsawam or Kasoa, increasing the travelling time about three times fold. Roads play a critical role in the distribution of cassava, considering its bulky nature. The poor road network has made it difficult to transport their farm produce to the urban areas. Therefore most of the middlemen go to these areas to buy the farm produce and send to Accra and Kasoa. The effect is that the farmers and processors are paid lower prices for their products because they cannot go to Accra and Kasoa with such low volumes of goods. Wenham (1995) attributed high cost of cassava in urban areas to such poor roads and inappropriate means of transport

c. Financial Capital

Farmers mentioned that they needed to raise their financial capital to improve on their farming and processing activities in general. For farming, they needed more money to plough the land and purchase inputs while for processing, they needed money to buy processing equipment such as the grater, an improved press and roasting equipment. However, they complained of lack of access to credit facilities even though formal financial institutions are found in the district in Amasaman, Taifa and Achimota (see Chapter 5 section 5.3.1). Reasons given by farmers for their inability to access formal credit were that they are not aware of the channels to use to access such credit facilities and also the process to go through even if they are aware of the channels.

They therefore depend on their own sources of capital and sometimes on informal sources like relatives and friends.

One source of non-financial assistance is from Amasa. The company ploughs lands for farmers on credit basis. An informal financial group, the „Dekavi" *susu* group was found in Hobor. It was instituted by the Ewe migrants who felt the need to assist each other in times of financial crisis and membership was limited to only the Ewes. Their original objective was mainly to assist members in times of funerals. However, it has now been extended to all other sectors and as long as one is a paid up member, he/she is entitled to financial assistance. „Dekavi" *susu* group assists members with short term loans. Monthly contribution of members is GH¢2.00. The group has been in existence since the early 1990s. A member is allowed to borrow a minimum of GH¢10.00 at an interest rate of 25% for a period of 4 months. Non-members borrow a minimum of GH¢10 for a period of 3 months at an interest rate of 50%. The respondents in Hobor were all members of the *susu* group. Thus the *susu* groups fill part of the gap unfilled by the formal financial institutions.

d. Social Capital and Access to Information

Social capital has been discussed in the context of groups and also, access to information. Apart from the „Dekavi" *susu* group, there is no other formal social group in the area. Even though farmers alleged that they are aware of advantages of organised groups, they still have problems organising one. The focus group discussion created the awareness in them that if farmers and processors are well organised, some of the exploitation that goes on by middlemen may be limited so that farmers and processors can get better prices for their products at the village level and can also open avenues to access formal credit. Berg et al. (2006) suggested that formation of processor associations may help to improve their position towards traders and also facilitate linking them to institutional buyers. In Ghana, MOFA prefers working with groups and is therefore developing farmer-based organisations so that there would be an improvement in the social capital of farmers. This would assist them to access credit facilities and even call on the District Directorate to allocate to them an AEA. Thus MOFA, as one of its approaches to technology dissemination, collaborates with the Department of Cooperatives to strengthen the capacity and facilitate the formation of farmer based organisations (MOFA, 2002).

Farmers interviewed received information on farming and marketing from various sources such as Amasa, other farmers and traders. Amasa gives information on improved cassava varieties and planting in rows at the correct spacing as this facilitates harvesting when Amasa buys cassava roots from the farmers. Farmers receive information from each other on their farming activities especially the spread of cassava varieties. Another source of information is the traders. Traders inform them of the current demand and market prices of *gari* and *agbelima* in Kasoa and Accra. Although some of the information is not always accurate, the processors indicated that they have been visiting those markets sometimes and they know when traders want to cheat them.

Another source of information is the use of ICT (radio, TV and mobile phones) by the respondents. Even though 67% of the respondents own mobile phones and 72% own radio and 19% own Television sets, they indicated that they use such equipment for social purposes more than for their farming and processing activities, a situation similar to the observations of Sey (2007). Thus interaction of respondents in the value chain on their farming and processing activities using the cell phone is lesser than for their social interactions.

Table 8.11 Ownership of Information Equipments

	Radio		Television		Cell phone	
Ownership	N	%	N	%	N	%
Yes	31	72	8	19	29	67
No	12	28	35	81	14	33
TOTAL	43	100	43	100	43	100

Source: Field Survey, 2008

e. Natural Capital

Some of the respondents (Native Ga) inherited land from their parents while the Ewe settlers either purchased or rented land at a cost ranging between GH¢50-70 per ha. About 44% of the respondents own the land while the rest 56% have hired it (Table 8.12). Even though there is the share cropping system, none of the respondents acquired land through this arrangement. Settler farmers explained that hiring land is better than engaging in share-cropping as there are usually conflicts with the share cropping system. This is because the crops must reach harvesting stage before the

farm is shared and most often, the landlords insist on taking the area where the crops are yielding well.

Table 8.12 Access to Land

Ownership	N	% (N=43)
Own	19	44
Hired	24	56
Total	43	100
Land holding (acres)		
1-3	29	68
4-6	13	30
>6	1	2
Total	43	100

Source: Field Survey, 2008

Land holdings of settler farmers range between 2-10 acres (1-5 ha). The issue of land dominated the focus group discussions. Since settlements in the Ga West District started increasing due to overcrowding in Accra, the demand for sand for building purposes has been on the rise in areas closer to Accra. The Ga West district has a huge deposit of sand and the landlords have found the lease of land to sand extractors as an alternate livelihood option as they get a lot of income from this source. However, this has affected cash crop farming negatively in Obeyie, and Ayikai Doblo areas. Most farms have been destroyed and the implications are that, as most migrant farmers lost title to their land, food production has gone down and most people have started migrating to other districts. The second problem is found in Hobor, Kwameanum and Ashalaja areas where most of the land has been leased to commercial pineapple farmers to the disadvantage of food crop farmers. Pineapple is one of the major non-traditional export crops currently in Ghana and large scale farmers have acquired large tracts of land in the Ga West and Akwapim South districts which are very favourable areas for pineapple production. Other factors which necessitated citing of the pineapple industry in these two districts are the proximity of the area to the international airport and the major port in Tema; location of pineapple juice processing factories in Accra, Nsawam and Tema; and also, these cities offer domestic market for the fresh pineapples.

One of the Ewe settler farmers had this to say:

„Since the pineapple farmers came here, things have not been well with our farm lands. The landlords have leased the greater part of the land and my parents were forced to move out to Adiembra while I stay here with my wife to use the small land left for my father. I now have only 2 acres to work on".

The situation is not only a matter of concern to the farmers alone but a concern of the District Assembly as well. The Municipal Chief Assembly commented on it in his address to the District Assembly (Box 8.1)

Box 8.1 Sand Extractors: A Threat to Ga West Municipality

The Municipal Chief Executive of Ga West, Ebenezer Nii Armah, has expressed concern about the spate of illegal sand extraction in the area. He said "the sand extractors do not only evade tax but destroy farms and other lands for farming purposes, create pools of water which serve as breeding grounds for mosquitoes and buruli ulcer". The Chief Executive said this at the third ordinary meeting of the third session of the assembly.

Source: Ghanaian Times, 4th August, 2009

Most settler farmers have therefore started moving out of the area because of the land issue. This type of displacement is usually the case when the small scale farmer cannot compete effectively with the large scale farmer. Landlessness among the rural poor has been observed as a major result of migration in an attempt to secure livelihoods (Hazell, 1995; McDowell and de Haan, 1997). Loss or reduction in farm lands results in low incomes making the farmers worse off. They are thus not able to achieve their livelihood objectives of increased income, well-being and food security. Thus these farmers are using migration as a coping livelihood strategy to escape from worsening poverty.

8.3.2 Livelihood Strategies

A major goal of livelihood strategy is to ensure household economic and social security (Koczberski et al., 2001). To achieve this, the respondents keep livestock and poultry and engage in petty trading as a supplement to farming and processing activities. The main livelihood strategies adopted by the people are farming and processing. They also keep livestock and poultry. The women engage in petty trading

to supplement their processing activities. Migration is being used as a coping strategy by farmers who are losing their lands.

a. Farming

The major crops grown are maize, groundnuts and vegetables, with cassava being their most important crop. Almost 79% of the respondents crop between 1-3 acres of cassava while 30% crop between 4-6 acres (Table 8.13). One farmer has diversified into pineapple farming, cultivating 10 acres but still cultivates four acres of cassava. He is an outgrower for Discovery Pineapple Farms in Hobor. According to him, he has taken advantage of the prevailing situation where pineapple outgrowers gain more than the traditional food crops.

The farmers grow both improved and local varieties of cassava. The improved cassava varieties, *Abasafitaa* and *Afisiafi,* were introduced into the Obeyeyie and Ayikai Doblo communities by MOFA during the period of the PSI on cassava (2000-2002). Planting materials were supplied to some farmers with the intention of multiplying them to distribute to other farmers. According to the farmers, the MOFA officers never came back to supervise and distribute the cassava sticks. Motherwell Farms was also cultivating *Abasafitaa* and *Capevars bankye* and these were supplied to farmers as part of the extension package. There was also farmer-to farmer dissemination as some farmers collected the planting materials from each other. In Hobor, some farmers brought the *Kufour* from Bawjiase (where the PSI cassava starch factory is located). In reality, *„Kufour"* is the general name given to all the improved varieties especially, *Afisiafi*, *Gblemoduade*, *Abasafitaa* and *Tekbankye*. Since there was no MOFA extension staff in the area, the farmers did not know the real names of the cassava varieties and referred to them as *Kufour.*

Table 8.13 Acreage of Crops Grown by Farmers

Area with cassava-maize intercrop	Acreage	N	%
Cassava maize intercrop	1-3	34	79
Cassava maize intercrop	4-6	9	21
Vegetables	1-3	42	98
Groundnuts	0.5	22	98
Pineapples	10	1	2

Source: Field Survey, 2008

The farmers still cultivate the improved varieties to sell to Amasa but maintain their local varieties because the improved varieties take a longer time to mature, contain too much starch and are not good for *fufu* which is their main diet. The new varieties also rot easily during the heavy rains. Some of the farmers were of the view that the absence of AEAs in the area is a contributory factor to their inability to plant the improved varieties in lines at the correct spacing, using fertilizer to improve their soils and access to other facilities such as mechanized farming and credit facilities. During the focus group discussion, they indicated that they use some of the improved varieties for *gari* and *agbelima* production as they are good for these products. A farmer who processes cassava into *gari*, talks about the improved varieties:

> *„The improved varieties are very good for gari and agbelima but not for fufu. The issue is that, we depend mostly on fufu as our main food and cannot move away from our local varieties. Moreover, the local varieties mature between six to eight months whereas for the Kufuor, you have to wait for almost one year. That is not good for us".*

Tuaka is the most popular local variety in the area. Other varieties are *Biafra, Akatamanso, Madumaku, Bosomnsia, Yevesivi, Aŋortse, Yebesie* and *Bankye bordie*.

b. Rearing of Livestock and Poultry

All the farmers and processors keep small ruminants (sheep and goats) and poultry especially fowls and ducks. These are on a very small scale and they are all on free range. The farmers indicated that there are no by-laws in the communities restricting the movement of small ruminants because their farms are far away from the village hence there is no threat of destruction by the animals. The farmers sell some of these animals as an additional source of income but according to them, it is relatively unimportant because the income from these sources is very small.

c. Cassava Processing

The main cassava processed products found in the communities are grits, *agbelima* and *gari*. *Kokonte* is processed in some households mainly for their own consumption. Some of the farmers process their cassava roots into grits, *agbelima* and *gari* while some women also buy the cassava roots and process. It was observed that men were not involved in *gari* and *agbelima* processing. All the 16 women interviewed were involved in *gari* and *agbelima* processing while 18 out of the 27

men interviewed were involved in grits processing jointly with their wives. Women involved in *gari* and *agbelima* processing indicated that they use cassava from their own farms (this includes two widows) and the married women sometimes buy more from their husbands.

Women have therefore dominated the cassava processing business. In West Africa, almost all the studies found that women form the bulk of processors in the cassava value chain (Addy et al. 2004; Jaffee and Morton, 1995). Jaffee and Morton (1995) also made similar observations that *gari* processing in particular is a major female activity across West Africa while Nukunya (2003) indicated that there are cultural undertones because traditionally, the culture of most Ghanaian societies designate some roles on gender basis. It is therefore of no doubt that women are the main cassava processors in the study area. Men usually get involved when cassava processing increases and machines such as the grater and presser are in use (Ugwu and Ay, 1992; Adebayo et al., 2004).

d. Migrants

Migration as a form of livelihood diversification is common among farmers. The migrants found in the study area are the Ewe from the Volta Region of Ghana. According to them, their grandparents settled in the area when they found the land suitable for farming activities. They however still visit their people in the Volta Region and attend funerals also. Due to the commercial pineapple farming that has created shortage of land, some of the Ewe settlers have started moving out of the area, looking for land for their farming activities.

e. Marketing of Cassava and Cassava Processed Products

Farmers sell some of their cassava roots to Amasa and the rest to primary processors and other buyers. They sell the grits to Amasa as the sole buyer. Marketing of cassava roots and cassava processed products such as *gari* and *agbelima* are done mostly in the district while other middlemen from Accra and Kasoa come down to buy from the farmers and processors. These products are sent outside the district and retailed. There is a major market in Hobor even though most middlemen buy from individual houses also. Prices are not very stable and fluctuate from season to season. The major problem farmers and processors face is when there is an urgent need for cash for example, during payment of school fees, ailment or bereavement. In such circumstance, farmers are forced to sell sometimes at lower prices. Similar situations also occur during periods of glut.

i. Gari

Gari is sold using a local measure, the *olonka* (Plate 8.2). The *olonka* is approximately 2kg and there are 30 *olonkas* in a mini bag of *gari*. The weight of a mini bag of *gari* is thus approximately 60kg. The price of an *olonka* of *gari* in Hobor is GH¢1.30 (in 2008). Traders, usually women, buy the *gari* using the *olonka* because some of the jute and polythene bags are not standardised. They then fill their bags with the *gari* and send to the urban areas (Plate 8.2).

Plate 8.2 Selling *Gari* in the Market

Plate 8.3 Selling *Agbelima* in the Market

Picture: Author, 2008

ii. Agbelima

At Hobor, *agbelima* is sold using a *paint rubber bag* (see first picture above) which is approximately 8kg. There are 8 of such bags in a mini jute or polythene bag making the bag of *agbelima* to be approximately 64kg. The price (in August 2008) of a *paint rubber bag* of *agbelima* in Hobor is GH¢2.00 and the bag is GH¢16.00. In Accra and Kasoa, various types of *rubber bags* are used as shown in Plate 8.3 above.

The women indicated that processing of cassava has been their main source of livelihood. This is because they work on their husband‟s farms as part of their contribution to the household livelihood strategy but it is the income from these products that they also use to buy their belongings especially cloth, and use some again to feed the house. Similarly, Berry (1994) observed that many of the financial benefits that go to these women went into the upkeep of the household.

One problem faced by the village processors is mistrust between them and the women traders in the *gari* and *agbelima* value chains. Most often these middlemen buy on credit basis and could default in payment. The village processors do not even know the homes or market places where they can meet them and it is always a bad situation. Berg et al. (2006) observed such mistrust between value chain operators when they studied *gari* value chains in the Eastern and Volta regions of Ghana. This could lead

to failures in the market chain. Berg et al. (2006) suggested that associations could be established to link *gari* processors and reliable buyers, such schools and prisons.

8.4 The Decision to Sell Cassava Roots or Process for Sale

This section examines if it is profitable for farmers to sell cassava roots to intermediaries or to process and sell themselves. In the cassava value chain opportunities are available for farmers to

i. Sell the cassava roots direct to intermediary processors
ii. Process cassava roots into grits and sell to an intermediary HQCF processor
iii. Process the cassava roots into *agbelima* and *gari* and sell to middlemen or consumers

The issue of selling cassava roots or processing them is influenced by such factors as

i. The cost of producing a hectare of cassava and the profits made from it or
ii. The cost of processing cassava from a hectare of land and the associated profits.

To determine the above costs, estimates were made for producing a hectare of cassava roots and processing the cassava roots into grits, *agbelima* and *gari*.

8.4.1 Estimates for Producing 1 ha of Cassava Roots

The estimates were initially done with the individual farmers and were later standardised during the focus group discussion. Estimates for the production and sale of cassava fresh roots (Table 8.14) were done for four options:

a. Farmers who rented land and used hired labour
b. Farmers who use their own land and used hired labour
c. Farmers who rented land and used their own labour and
d. Farmers who use their own land and their own labour

These four options were used because most small scale farmers do not cost their activities especially family labour, sometimes because of illiteracy. They therefore do not know their actual profits when a hectare of cassava is produced. Costs identified for producing an acre of cassava roots are found in Table 8.14 below. Rent paid on land per year was GH¢30.00 and the cost of land preparation using mechanized plough is also GH¢30.00. Planting material used is the cassava cuttings which was estimated at 30 bundles, each costing GH¢2.00. Labour for weeding was GH¢3.00 a day, using 9 days for a hectare. In most cases, weeding is done four times before

harvesting and hired labour is done by men. For harvesting and carting to the house, the charge is GH¢9.00. Current market prices were used for the equipments.

Net profits calculated using the four options are as follows:

a. own land, own labour GH¢413.00
b. rented land, own labour GH¢338.00
c. own land, hired labour GH¢64.25
d. rented land, hired labour GH¢-10.75.

Table 8.14 Estimates for the Production of 1 ha of Cassava Roots by Farmers`

ITEM	Qty	Rate (GH¢)	Rent land buy labour (GH¢)	Own land buy labour (GH¢)	Rent land, own labour (GH¢)	Own land and use own labour (GH¢)
Land rent/production period	1 acre	30	30.00	0.00	30.00	0.00
Ploughing	1 acre	30	30.00	30.00	30.00	30.00
Planting material	30 bundles	2	60.00	60.00	60.00	60.00
Planting labour	10 man days	2.5	22.50	22.50	0.00	0.00
1st weeding	9 man days	3	27.00	27.00	0.00	0.00
2nd weeding	9 man days	3	27.00	27.00	0.00	0.00
3rd weeding	9 man days	3	27.00	27.00	0.00	0.00
4th weeding	9 man days	3	27.00	27.00	0.00	0.00
Harvesting and carting	1 man day	9	9.00	9.00	0.00	0.00
Cutlass (one year)	1	5	5.00	5.00	5.00	5.00
Hoe (one year)	1	5	5.00	5.00	5.00	5.00
Baskets (6 months)	9	0.2	1.80	1.80	1.80	1.80
Sacks (6 months)	6	0.5	3.00	3.00	3.00	3.00
Cost/acre (9 ropes)			**274.30**	**244.30**	**134.80**	**104.80**
1ha=2.5acres=2.5*9=22.5 ropes			**685.75**	**610.75**	**337.00**	**262.00**
Cost per rope=675.75/22.5			30.48	27.14	14.98	11.64
Income per rope = GH¢30.00						
1 ha = 22.5 ropes						
Gross income/ha = GH¢30 x 22.5 = GH¢675.00			**675.00**	**675.00**	**675.00**	**675.00**
Total cost of production			**685.75**	**610.75**	**337.00**	**262.00**
Net income			**-10.75**	**64.25**	**338.00**	**413.00**

Note: Data was collected from farmers in acres and converted to hectares

Source: Field Survey, 2008

8.4.2 Discussions on Cassava Roots Production

Estimates for the production of cassava roots from one hectare of land for the four options showed that when farmers use their own land and their own labour they attain a higher level of profits as compared to the other farm types. Using rented land and hired labour gives the lowest net profits. It has been observed that more small-scale farmers depend on family labour for their farming activities than hired labour (Britwum, 2002; Adu-Amankwah, 1999).

Generally, the farmers do not calculate the cost of family labour even though they value it. This is an indicator of why some enter into polygamous marriages to enable them have many children to assist with farm work (for example 26% of respondents in this research have 2 wives each, section 8.3.1.ii). The use of family labour has been observed as a kind of apprenticeship for the transfer of skills from generation to generation (Adu-Amankwah, 1999; Britwum, 2002). Finally the youth end up taking the farm job as their parents grow old.

The cost of hired labour has been found to be very high in producing a hectare of cassava. It is common knowledge that if a farmer uses family labour, production costs will definitely reduce and on the other hand, costs will rise when hired labour is used. Thus the difference in profits using own land and own labour as against own land and hired labour is very high (GH¢348.75). Similarly, using rented land and own labour as against rented land and hired labour, gives a very high difference in profits

Using land as a factor, the observed difference in profits when the farmer used rented land and hired labour and own land and hired labour is very small (GH¢75.00). Also, using own land, and own labour as against hired land and own labour, the difference in profits is very small. This means that land is not a crucial factor as labour.

Renting land for farming cannot always be avoided as long as farmers migrate to new areas (Wiley and Hammond, 2001) to continue farming as a livelihood option. Renting land has been found to be more profitable to some landlords because they are paid in cash. Tonah (2002) found out that most chiefs and landowners in Atebubu district in Ghana prefer to lease their lands to migrant farmers rather than indigenes

because the former can make substantial rent payments both in cash and kind while the indigenes only make token payments for use of the land.

Comparing the option where the farmers use *own land, own labour* to that of *rent land, hire labour* there is a big difference of GH¢423.00. This means that farmers who are fully settled on their own land using family labour are better off than those farmers (usually new entrants) using hired land and hired labour. This situation is rare for migrants in the short term but in the long term they can also attain this status. Some of the migrant farmers indicated that their grandparents who settled there long ago, bought the land that they are currently cultivating and it is the other migrants who had temporary tenure arrangements that are facing the ejection problems.

Farmers sell the cassava roots to Amasa, small scale village processors and middlemen. In addition to the prompt payment, Amasa sometimes plough their fields for them on credit basis, supply improved planting materials and also provide extension services by educating them on how to plant in rows at the correct spacing. Amasa does this to facilitate easy harvesting and also a good yield. Amasa also buys cassava roots when the Company receives orders for HQCF.

Unlike Amasa which pays promptly and in bulk, the village processors and middlemen most often buy cassava roots on credit basis, sometimes making part payment. The farmers indicated that sometimes the middlemen come back from Accra and Kasoa with a lot of excuses ranging from rotting of cassava to gluts and poor prices. There is therefore a level of mistrust between the farmers and the middlemen, a situation Berg et al. (2006) also observed in the mango and *gari* processing chains.

From the above observations, it would be more profitable to sell roots to Amasa than to the middlemen. But when Amasa receives no orders for HQCF production, a gap could be created in the marketing of roots by the farmers. However, most of the farmers‟ wives also buy the cassava roots and process, thus this situation does not always arise. From the discussions with the farmers, processors buy only one rope per week as they cannot handle a bigger quantity. It would therefore be better for the

farmers to organise themselves into better processing units to process most of the cassava as the processed products have a longer shelf life.

8.4.3 Estimates for Processing Cassava Roots into Grits, *Agbelima* and *Gari*

The three products are processed by small-scale family processing units as a major livelihood activity in the cassava value chain. They are processed as a form of value addition to the fresh cassava roots. The data shows that net profits for all the three processed products follow the same trend as cassava roots with the four options used. That is *own land, own labour* gave the highest results and *hired land, hired labour* gave the lowest results.

a. Estimates for Processing Cassava Roots into Grits by Farmer-Processors

To estimate the profits made for processing cassava into grits, the same four options of farm types were used because it is the same farmers who are processing the cassava roots. Thus the total cost of cassava roots per rope was deduced from Table 8.14 as they appear in Table 8.15. Peeling is GH¢0.75 for 2 man days and washing is GH¢0.10 for 2 man days. The cassava is transported to the grating point at GH¢1.00 and then grated for GH¢3.00. Dewatering is done for GH¢0.80 and sun drying which involves stirring the material regularly is GH¢1.00 per one man day. Most of these activities, with the important exception of grating, are done by women. This is because grating has been mechanised and all the cassava have to be sent to the grating units for processing. Net profits calculated using the four options as follows:

a. own land, own labour GH¢1,463.00
b. rented land, own labour GH¢1,388.00
c. own land, hired labour GH¢836.50
d. rented land, hired labour GH¢761.00

Table 8.15 Estimates for the Production of Grits from 1 ha of Cassava Roots by Farmer-Processors**

	Qty	Rate	Rent land, hire labour (GH¢)	Own land, hire labour (GH¢)	Rent land, own labour (GH¢)	Own land, own labour (GH¢)
Fresh Cassava	1 rope	vary	30.48	27.14	8.31	4.98
Peeling	2 man days	0.75	3.00	3.00	0.00	0.00
Washing	2 man days	0.10	0.40	0.40	0.00	0.00
Transport to grating point & back		1.00	1.00	1.00	0.00	0.00
Grating		3.00	3.00	3.00	3.00	3.00
Dewatering (pressing)		0.80	0.80	0.80	0.00	0.00
Cost of poly sacks	2 bags	0.50	1.00	1.00	1.00	1.00
Sun drying cost	1 man day	0.50	0.50	0.50	0.00	0.00
Total cost/rope			**40.18**	**36.84**	**12.31**	**8.98**
1 acre = 9 ropes						
1ha=2.5acres=2.5*9=22.5 ropes						
1 ha= 22.5 ropes * total cost/rope			**904.00**	**829.00**	**276.98**	**202.00**
1 rope produces 2 mini bags of grits (average); 1 bag=50kg						
1 ha =22.5*2= 45 mini bags						
1 mini bag sells at GH¢37.00						
Gross income= 45bags x GH¢37.00 = GH¢1,665.00			**1,665.00**	**1,665.00**	**1,665.00**	**1,665.00**
Total cost of production			904.00	829.00	276.98	202.00
NET PROFIT			**761.00**	**836.00**	**1388.02**	**1463.00**

****Estimates were done per rope and converted into 1 ha.**
Source: Field Survey, 2008

b. Estimates for Processing Cassava Roots into *Agbelima* by Farmer-Processors

To estimate the profits made for processing cassava into *agbelima*, the same four farm types were used. The total cost of cassava roots per rope was deduced from Table 8.14 for the four farm types as they appear in Table 8.16. Costs that were identified by processors include peeling, washing, grating, dewatering, labour for drying, sacks and also transportation. These costs are the same as those of grits. Net profits calculated using the four options are as follows:

a. own land, own labour GH¢855.45
b. rented land, own labour GH¢780.53
c. own land, hired labour GH¢239.75
d. rented land, hired labour GH¢164.75

Table 8.16 Estimates for the Production of *Agbelima* from 1 ha of Cassava Roots by Farmer-Processors**

	Qty	Rate	Rent land, hire labour (GH¢)	Own land, hire labour (GH¢)	Rent land, own labour (GH¢)	Own land, own labour (GH¢)
Fresh Cassava	1 rope	Vary	30.48	27.14	8.31	4.98
Peeling	2 man days	0.75	3.00	3.00	0.00	0.00
Washing	2 man days	0.10	0.40	0.40	0.00	0.00
Transport to grating point		1.00	1.00	1.00	0.00	0.00
Grating		3.00	3.00	3.00	3.00	3.00
Dewatering (pressing)		0.80	0.80	0.80	0.00	0.00
Cost of sacks	4	0.50	2.00	2.00	2.00	2.00
Total cost per rope			40.68	37.34	13.31	9.98
1 acre = 9 ropes						
1ha=2.5acres=2.5*9=22.5 ropes						
1 ha= 22.5 ropes * total cost/rope			**915.25**	**840.25**	**299.48**	**224.55**
Average product per rope = mini 3 bags; 1 bag=64kg						
Average product/ha = 22.5*3 = 67.5 mini bags						
1 mini bag sells at GH¢16.00						
Gross income= 67.5 mini bags x GH¢16.00 = GH¢1,080.00			**1080.00**	**1080.00**	**1080.00**	**1080.00**
Total cost of production			**915.23**	**840.25**	**299.48**	**224.55**
Net income			**164.75**	**239.75**	**780.53**	**855.45**

****Estimates were done per rope and converted into 1 ha.**
Source: Field Survey, 2008

c. Estimates for Processing Cassava Roots into *Gari* by Farmer-Processors

To estimate the profits made for processing cassava into *gari*, the same four farm types were used because it is the same farmers who are processing the cassava roots from their farms. Thus the total cost of cassava roots per rope was deduced from Table 8.14 for the four farm types as they appear in Table 8.17. Costs that were identified by processors include peeling, washing, grating, dewatering, labour for drying, sacks and also transportation. These costs are the same as those of grits. The cost of firewood which is GH¢10.00 per bundle, is bought by all processors and therefore runs through all the four options. The cost of roasting and sieving is GH¢1.50 for 2 man days. Net profits calculated using the four options are as follows:

a. own land, own labour GH¢785.75
b. rented land, own labour GH¢710.75
c. own land, hired labour GH¢102.50
d. rented land, hired labour GH¢27.50

Table 8.17: Estimates for the Production of *Gari* from 1 hectare of Cassava by Farmer-Processors. (Estimates were done per rope and converted into 1 ha).

	Qty	Rate	Rent land, hire labour (GH¢)	Own land, hire labour (GH¢)	Rent land, own labour (GH¢)	Own land, own labour (GH¢)
Fresh Cassava	1 rope	Vary	30.48	27.14	8.31	4.98
Peeling	2 man days	0.75	3.00	3.00	0.00	0.00
Washing	2 man days	0.10	0.40	0.40	0.00	0.00
Transport to grating point		1.00	1.00	1.00	0.00	0.00
Grating		3.00	3.00	3.00	3.00	3.00
Dewatering (pressing)	1 man day	0.80	0.80	0.80	0.00	0.00
Firewood for roasting	bundle	10.00	10.00	10.00	10.00	10.00
cost of roasting 2 days	2 man days	1.50	3.00	3.00	0.00	0.00
Cost of polysacks	6 bags	0.50	3.00	3.00	3.00	3.00
Roasting equipment - pans		2.60	2.60	2.60	2.60	2.60
1 rope			**57.28**	**53.94**	**26.91**	**23.58**
1 acre = 9 ropes, 1ha=2.5acres=2.5*9=22.5 ropes						
1 ha= 22.5 ropes * total cost/rope			**1288.75**	**1213.75**	**605.50**	**530.50**
1 rope produces 1.5 mini bags of *gari* (average)						
1 ha =22.5*1.5=33.75 bags; 1 olonka (2kg) = GH¢1.30						
1 mini bag=30 olonkas (60kg) =GH¢39.00						
Gross income= 33.75bags x GH¢39.00			**1316.25**	**1316.25**	**1316.25**	**1316.25**
Total cost of production			**1288.75**	**1213.75**	**605.50**	**530.50**
NET PROFIT			**27.50**	**102.50**	**710.75**	**785.75**

****Estimates were done per rope and converted into 1 ha.**
Source: Field Survey, 2008

d. Discussions on the Estimates for Processing Cassava into Grits, *Agbelima* and *Gari*

Results show that processing cassava roots into grits is more profitable than *agbelima* and *gari*. A hectare of cassava yields 67 mini bags of *agbelima* which is sold at GH¢16.00 per bag while the same hectare of cassava yields 45 bags of grits which fetches a better price of GH¢37.00 per bag. Grits thus has a price advantage over *agbelima* and therefore gives higher net profits. A hectare of cassava produces almost 34 bags of *gari* which sells at GH¢39.00 per bag. Processing *gari* requires an additional cost of buying firewood and labour for roasting and sieving, leading to increase in costs over those of grits and *agbelima*. Thus the cost of processing *gari* as compared to the other two products is very high. For example, the cost of processing *gari* using own land and own labour is GH¢530.50 which is almost twice the cost of processing either *agbelima* (GH¢224.00) or grits (GH¢202.00). However, market

price for *gari* does not compensate for the high processing cost, making the net profit on *gari* to be less.

Grits is an intermediary product which is finally processed into HQCF. The demand for grits depends on plywood factories and food producers making orders to buy HQCF from Amasa. Thus even though grits fetches a higher price than others, the demand is not regular as it is processed on demand from the intermediary HQCF processor. Unlike grits, *agbelima* and *gari* are consumed locally so there are more markets for them than the grits. The most used product is the *agbelima* which is consumed almost every day by Ghanaians. There is a high demand for *gari* in the domestic market especially by students and also institutions such as the army, prisons and schools (Berg et al. 2006; Addy et al., 2004). Though processors get more profit on grits, it is not in everyday demand like *agbelima* and *gari*. Even between *agbelima* and *gari*, *gari* has a longer shelf life than *agbelima* (Kordylas, 1991; Tortoe et al., 2006) and can be stored for a very long time. Therefore grits cannot be processed on a large scale throughout the year while *agbelima* and *gari*, despite their lower net profits, can be processed throughout the year because of their ready markets.

8.4.4 Discussions on Sale of Cassava Roots and the Processed Products

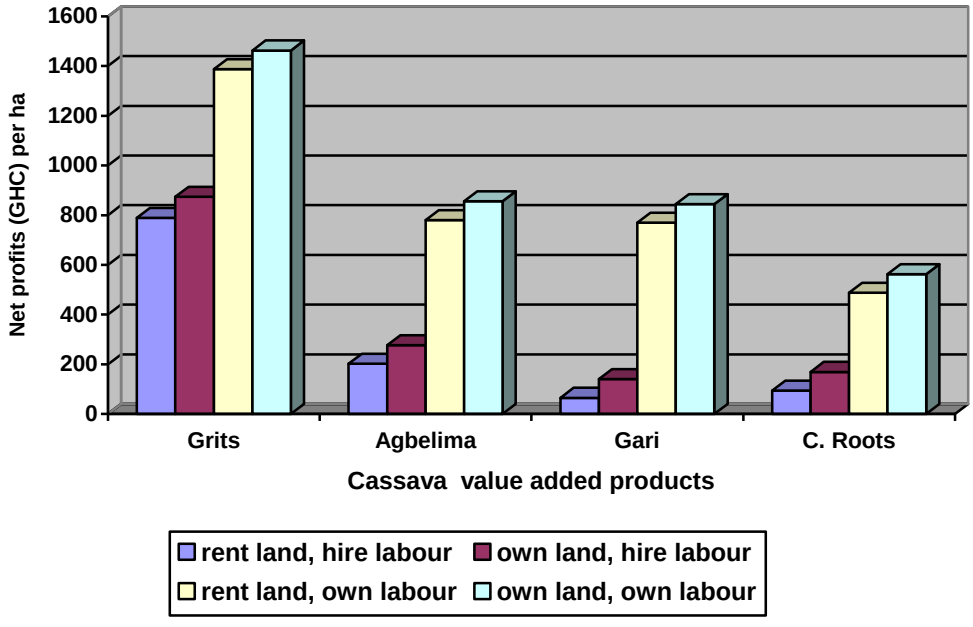
Table 8.18 shows a comparison of farmers selling cassava roots to intermediaries on one hand, and processing the roots into grits, *agbelima* and *gari* on the other. The four options of land and labour are still used here for the analysis. It has been observed that it is more profitable to add value to cassava roots than to sell only the fresh roots. But using two of the options, *rent land, hire labour* and *own land, and hire labour* it has been observed that more profits are gained when farmers sell their cassava roots than process into *gari*. This means that at these two levels, the farmer is better off selling his roots than processing into *gari*. For the rest of the options, it is profitable to process than to sell the roots. Processing therefore adds value and attracts more profit as graphically shown in Figure 8.3.

Table 8.18 Summary of Estimates for Production of 1 ha of Cassava Roots and Cassava Processed Products

OPTIONS		PRODUCTS			
		Grits	*Agbelima*	*Gari*	Roots
		(GH¢)	(GH¢)	(GH¢)	(GH¢)
	Gross Income	**1,665.00**	**1,080.00**	**1,316.25**	**675.00**
Rent land, hire labour	*Cost of Production*	*904.00*	877.75	1,251.25	580.75
	Net Income	761.00	164.75	27.50	-10.75
Own land, hire labour	*Cost of Production*	*829.00*	*802.75*	*1,176.25*	*505.75*
	Net Income	836.00	239.75	102.50	64.25
Rent land, own labour	*Cost of Production*	*276.98*	*299.48*	*605.50*	*337.00*
	Net Income	1,388.02	780.53	710.75	338.00
Own land, own labour	*Cost of Production*	*202.00*	*224.55*	*530.50*	*262.00*
	Net Income	1,463.00	855.45	785.75	413.00

****Estimates were done per rope and converted into 1 ha.**
Source: Field Survey, 2008

Figure 8.4 Net Profits made by Farmers who Process Cassava Roots Produced from 1 ha of Land

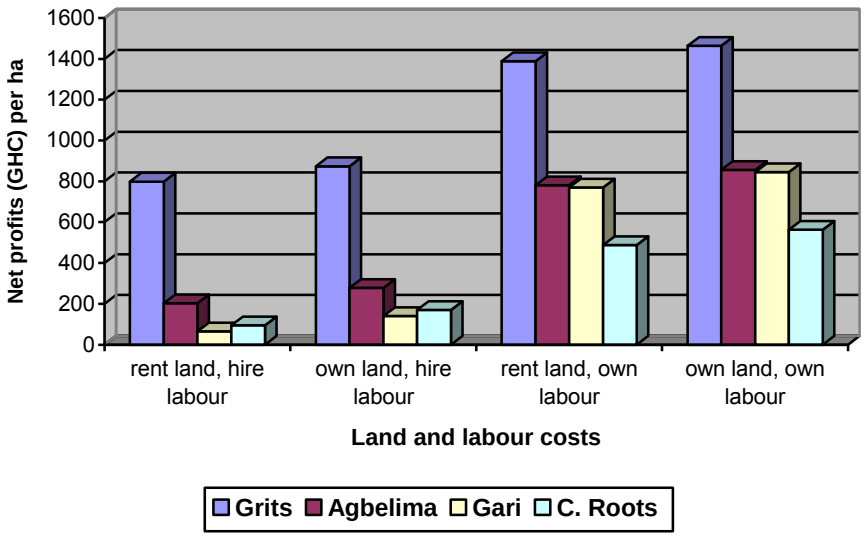


Source: Field Survey, 2008

Comparing the use of land and labour, it was realised that processing cassava roots into grits is consistently giving a higher profit margin irrespective of using hired land and hired labour or using own land and own labour (Fig. 8.3). The comparison follows a similar trend for the other two products – *agbelima* and *gari* which follow grits in the order of higher profits.

One major value added product in the cassava value chain, pounded *fufu,* uses cassava roots directly (see chapter 6). The roots are sold to middlemen who later retail them to chop bar owners processing the cassava roots into pounded *fufu*. Even though the prices of the value added products such as grits, *agbelima* and *gari* are higher than cassava roots, the roots have to be sold to the chop bar operators otherwise so many people would be deprived of their staple food. Even the *fufu* powder, which is used for the preparation of the instant *fufu*, is highly considered as food for the middle class and is not being used by the majority of the people who still depend on the pounded *fufu* (see section 6.4.4). Also, the farmers indicated also that in emergency situations, they sell the roots to solve pending financial problems (see section 8.2.1). The sale of cassava roots is still a profitable venture considering all the available options such as eating of pounded *fufu* by the populace, bulk and prompt payment by Amasa and default in payment by middlemen.

Figure 8.5 Net Profits of Farmers using two Variables - Land and Labour to Process Cassava Produced from 1 ha of Land



Source: Field Survey, 2008

8.4.5 Estimates for Processing Grits, *Agbelima* and *Gari* by Buyer-Processors

The cassava processors are mainly women who buy cassava roots from farmers for processing. They are mainly micro-scale processors who use family labour usually. The main commercially processed products are grits, *agbelima* and *gari*. Categories used for the calculation of net profits are:

a. Processors who buy cassava and use hired labour

b.Processors who buy cassava and use their own labour

The buyer-processors also experience similar trends in the cost of production and net profits as farmers who process their cassava roots. Again, net profits on grits are the highest followed by *agbelima* and *gari*.

a. Grits (Table 8.19)

a. Buy cassava, use own labour GH¢900.00

b. Buy cassava, use hired labour GH¢704.25

b. *Agbelima* (Table 8.20)

a. Buy cassava, use own labour GH¢292.50

b. Buy cassava, use hired labour GH¢108.00

c. *Gari* (Table 8.21)

a. Buy cassava, use own labour GH¢222.75

b. Buy cassava, use hired labour GH¢-29.25

The cost of labour is again a major determining factor for net profits in the processing of cassava. In processing *gari* when hired labour was used, there was a loss (GH¢ -29.25). However, when the cost of labour is removed, a net profit of GH¢222.75 is made even though this is still lower than those of grits and *agbelima*. Processing grits and *agbelima* using own labour, also increases profit margins by GH¢195.74 and GH¢184.50 respectively over the use of hired labour. Processors therefore make savings on their labour inputs from the enterprise. The processors may be better off working with an intermediary HQCF processor because the net returns on grits are very high as compared to the other two products – *agbelima* and *gari*.

Table 8.19: Estimates for the Production of Grits from 1 ha of Cassava Roots by Buyer-Processors**

	Qty	Rate	hire labour (GH¢)	own labour (GH¢)
Fresh Cassava	1 rope	vary	30.00	30.00
Harvesting	1 rope	1.00	1.00	0.00
Transport from farm	1 rope	2.00	2.00	0.00
Peeling	2 man days	0.75	3.00	0.00
Washing	2 man days	0.10	0.40	0.00
Transport to grating point & back		1.00	1.00	0.00
Grating		3.00	3.00	3.00
Dewatering (pressing)		0.80	0.80	0.00
Cost of polysacks	2 bags	0.50	1.00	1.00
Sun drying cost			0.50	0.00
Total cost for 1 Rope			**42.70**	**34.00**
1 acre = 9 ropes				
1ha=2.5acres=2.5*9=22.5 ropes				
1 ha= 22.5 ropes * total cost/rope			**960.75**	**765.00**
1 rope produces 2 mini bags of grits (average); 1 bag=50kg				
1 ha =22.5*2= 45 mini bags				
1 mini bag sells at GH¢37.00				
Gross income= 45bags x GH¢37.00 = GH¢1,665.00			**1665.00**	**1665.00**
Total cost of production			960.75	765.00
NET PROFIT			**704.25**	**900.00**

****Estimates were done per rope and converted into 1 ha.**
Source: Field Survey, 2008

Table 8.20: Production of *Agbelima* from 1 ha of Cassava Roots by Buyer-Processors**

	Qty	Rate	hire labour (GH¢)	own labour (GH¢)
Fresh Cassava	1 rope	vary	30.00	30.00
Harvesting	1rope	1.00	1.00	0.00
Transport from farm		2.00	2.00	0.00
Peeling	2 man days	0.75	3.00	0.00
Washing	2 man days	0.10	0.40	0.00
Transport to grating point & back		1.00	1.00	0.00
Grating		3.00	3.00	3.00
Dewatering (pressing)		0.80	0.80	0.00
Cost of poly sacks	4	0.50	2.00	2.00
Total cost per rope			43.20	35.00
1 acre of land = 9 ropes				
1ha=2.5acres=2.5*9=22.5 ropes				
1 ha= 22.5 ropes * total cost/rope			**972.00**	**787.50**
Yield per rope = mini 3 bags; 1 bag=64kg				
Average product/ha = 22.5*3 = 67.5bags				
1 mini bag sells at GH¢16.00				
Gross income= 67.5*16=1080.00			**1080.00**	**1080.00**
Total cost of production			**972.000**	**787.50**
Net profits			**108.00**	**292.50**

****Estimates were done per rope and converted into 1 ha.**
Source: Field Survey, 2008

Table 8.21: Estimates for the Production of *Gari* from 1 ha of Cassava Roots by Buyer-Processors**

	Qty	Rate (GH¢)	Buy cassava, hire labour (GH¢)	Buy cassava, use own labour (GH¢)
Fresh Cassava	1 rope	30.00	30.00	30.00
Harvesting	1 rope	1.00	1.00	0.00
Transport from farm	1 rope	2.00	2.00	0.00
Peeling	2 man days	0.75	3.00	0.00
Washing	2 man days	0.10	0.40	0.00
Transport to grating point & back		1.00	1.00	0.00
Grating		3.00	3.00	3.00
Dewatering (pressing)	1 man day	0.80	0.80	0.00
Firewood for roasting	bundle	10.00	10.00	10.00
cost of roasting 2 days	2 man days	1.50	3.00	0.00
Cost of sacks	6 bags	0.50	3.00	3.00
roasting equipment - pans		2.60	2.60	2.60
1 rope			**59.80**	**48.6**
1 acre = 9 ropes				
1ha=2.5acres=2.5*9=22.5 ropes				
1 ha= 22.5 ropes * total cost/rope			**1345.50**	**1093.50**
1 rope produces 1.5 mini bags of *gari* (average); 1 bag=60kg				
1 ha =22.5*1.5=33.75 bags				
1 olonka =GH¢1.30; 1 mini bag=30 olonkas =GH¢39.00				
Gross income= 33.75bags x GH¢39.00			**1316.25**	**1316.25**
Total cost of production			**1345.50**	**1093.50**
NET PROFIT			**-29.25**	**222.75**

****Estimates were done per rope and converted into 1 ha.**

Source: Field Survey, 2008

8.4.6 Comparing Farmer-Processors to Buyer-Processors

With regards to the four categories of using land and labour by farmer-processors, farmers made more profits on the three products than buyer-processors who buy cassava and use hired labour to process (Table 8.22). When buyer processors use their own labour, they also get more profits than when farmer processors use hired land with hired labour or own land with hired labour. The conclusions drawn in the earlier discussions on farmer-processors facing problems of high labour costs are still valid for the buyer-processors also as the cost of labour is predominant in cassava production and processing. It is therefore better to produce cassava and process if the farmer is going to use family labour which would not be paid for.

Table 8.22 Comparing Buyer-Processors to Farmer-Processors

	Grits	Agbelima	Gari
	Net profits GH¢	Net profits GH¢	Net profits GH¢
Buyer- processor			
Buy cassava, Hire labour	704.25	108.00	-29.25
Buy cassava, Own labour	900.00	292.00	222.75
Farmer-processor			
Hire land, Hire labour	761.00	164.75	27.50
Own land, Hire labour	836.00	239.75	102.50
Hire land, Own labour	1388.02	780.53	710.75
Own land, Own labour	1463.00	855.45	785.75

Source: Field Survey, 2008

8.5 Conclusions

Amasa plays a major role in the HQCF value chain as the sole intermediary processing grits into HQCF in the Greater Accra Region. The company buys cassava roots and grits from farmers and small-scale processors providing them with ready markets for their produce which may improve on their livelihoods. Amasa‟s governance in the value chain has led to product upgrading (farmers now produce grits) and process upgrading (farmers using improved varieties and planting in rows for better yields). Farmers who sell cassava roots or grits to Amasa are paid promptly and in bulk. This is in contrast with what happens when they sell to other intermediaries like market women who buy on credit and sometimes default in payment. The farmers also receive credit facilities and extension services from Amasa.

It has been observed that processing cassava roots adds value and therefore attracts more profit. When profits accruing from the products are ranked, grits are ranked first, followed by *agbelima* and *gari*. Despite this observation, farmers would prefer to sell the roots to Amasa because of bulk and prompt payment and also, credit facilities. It is not only the cassava roots that they sell. Occasionally, they sell other products such as *gari* and *agbelima* to middlemen and consumers as well. Processors, who buy cassava roots and process using their own labour, make more profits than

farmers who hire land and labour to produce cassava and process into end products. Finally, farmers who add value to their cassava roots using their own land and own labour generally make higher profits than processors who buy the cassava roots and add value to it. However, farmers who decide to add value to their own cassava roots need additional support extension services, improved planting materials, better processing practice and business skills to contribute meaningfully in the higher value cassava markets.

CHAPTER 9

General Discussions, Summary and Recommendations

9.0 Introduction

The chapter discusses how the study answers the four research questions posed. I therefore recap the four questions here as follows:

i. Who are the actors in the cassava value chains? What are the relationships between them?
ii. What are the features of their livelihoods that influence their participation in the value chains?
iii. What are the factors influencing farmers‟ decisions on whether to sell fresh cassava or become involved in processing?
iv. What does a combined use of livelihoods approach and value chain analysis tell us about the prospects for promotion of new technologies?

Finally, conclusions are drawn and recommendations made for further studies.

9.1 Actors in the Cassava Value Chains and the Relationships between them

The main actors in the three chains identified are the farmers, middlemen, processors (primary and intermediary) and consumers.

9.1.1 Farmers

Farmers form the main starting point of the cassava value chains. They produce cassava and sell to primary processors, middlemen and consumers. The farmers who are mostly small-scale producers are either native or settler farmers. In addition to cassava, they grow other crops such as maize, plantain, yam and vegetables. This is because mixed cropping is widely practised in Ghana (Sakyi-Dawson, 2000; Gyasi et al., 2002; Duadze, 2004) and is used by farmers as a form of security in case other crops fail. Some of the farmers process their cassava into end products; sell to other processors, middlemen, HQCF processor and direct consumers. Livelihood features of the farmers are discussed in section 9.2.

9.1.2. Middlemen

The middlemen buy the cassava roots from farmers and sell to retailers in the urban areas, chop bar operators, processors and sometimes directly to consumers. They buy

either the harvested cassava roots or the standing crops. They sometimes buy the standing crops on the farm and harvest when needed because they want to increase flexibility in timing fresh root deliveries to urban markets and processing units. This is an advantage to the farmers especially when they need cash urgently even when the middlemen are not ready to take the cassava immediately. The practice has also been found in Nigeria and the Democratic Republic of Congo (Wenham, 1995; Nweke et al., 2000).

Some middlemen have contractual agreements with the *fufu* processors by supplying them with cassava roots regularly and on time, one of the benefits of using middlemen as observed by Mudhara and Kwaramba (1998). Thus processors, who do not have direct contacts with the farmers, usually look for middlemen to supply them with cassava. This could be described as "bulking up" (van der Meer, 2006; Conroy, 2003) and interpreted as reducing processors‟ transaction costs, specifically, their search costs. This therefore ensures that consumers are never disappointed at the chop bars because of lack of cassava.

One major role the middlemen play in the cassava value chain is the link between them and the consumers in the urban markets. In most urban markets in Ghana, middlemen and retailers, who are mostly women, have formed very strong associations with the heads known as Market Queens (Peppelenbos, 2005). The Queens control the open-air markets and obstruct attempts at direct marketing by farmers, thus farmers are forced to sell to the middlemen and sometimes receive low prices for their products.

9.1.3 Primary Processors

Primary processors were found to be engaged in processing cassava roots into *fufu*, *kokonte*, grits, *agbelima* and *gari*. The processing units for *kokonte*, *agbelima*, grits and *gari* are mainly micro-enterprises while most of the *fufu* processors have more than five employees and could be classified as small-scale enterprises (MOTI, 2002). The processors use mainly family labour which accounts for this situation.

Due to the bulky and perishable nature of cassava, most of the roots are processed into shelf stable foods (Kordylas, 1991; UNIFEM, 1989; Tortoe et al., 2006).

Processing is done by some farmers while others sell to primary processors. It is mainly done by women. Some of the men were found in grit processing which they do jointly with their wives. Thus the majority of processors are women as observed by many authors (Addy et al. 2004; Jaffee and Morton, 1995; Odebode, 2008). The issue of women dominating the processing aspect of cassava could be attributed to the fact that most of the women who are married do not have their own farms but work on their husband‟s farms. Buying cassava from their husbands to process is a way of improving on their livelihoods and also ensuring food security in the house. This is because in the rural areas, most of the household financing, especially food, is done by the women. However, Ugwu and Ay (1992), observed that the number of men involved in cassava processing increases as the opportunities for commercialisation increase. Ugwu and Ay indicated that as mechanised processing equipment such as graters and mills are acquired, men‟s participation in cassava processing tends to increase since they often control and operate these machines.

One major obstacle to *fufu* and *gari* processing is the effect of the smoke on the eyes of processors. The women processors complained of eye problems resulting from smoke encountered during boiling of cassava or roasting of *gari*, a situation observed by Adanu et al. (2009) in the Adaklu area in Ghana where most women are suffering from eye pains as a result of smoke during processing. The smokeless stove has therefore been recommended for *gari* processing to arrest this situation (Adanu et al., 2009; GRATIS, 2006).

9.1.4 Intermediary Processor (HQCF)

Amasa, the only intermediary processor selected for the study is a subsidiary of Motherwell Farms which produces cassava roots to feed the processing factory. The Company buys cassava and grits from small-scale and large-scale farmers and processes into HQCF. Amasa also processes cassava into *gari*, *agbelima* and *kokonte* on a smaller scale.

Amasa, as an intermediary processor in the HQCF value chain, forms a link between small scale processors and end-use industries. The company buys the raw materials from farmers and primary processors thereby providing ready markets for their products. This increases incomes of farmers as there is bulk and prompt payment

which the farmers do not always get from middlemen. Farmers who produce cassava sometimes do not get ready markets and during a bumper harvest, there is a glut leading to poor prices. Some of these farmers now process the cassava into grits and sell to Amasa and make more profits than selling the fresh cassava roots. Thus Amasa has created more income opportunities for the farmers.

Small-scale farmers who sell cassava to Amasa in the Ga West Municipality were offered credit facilities in the form of ploughing their fields with deferred payments and supplied with free improved cassava planting materials. These farmers do not have access to any formal credit and therefore benefit from this direct value chain financing (Fries and Akin, 2004).

The end-markets for Amasa‟s HQCF are plywood factories and manufacturers of improved traditional foods such as instant *fufu*, dried *agbelima* and *banku-mix*. The production of the traditional improved foods has helped in satisfying consumer demands (especially the middle class and civil servants who are mostly away from home) of safe and convenient foods.

HQCF is found to be a close substitute for wheat flour and can be substituted for about 10-20% wheat in bread and about 30% for snack foods (Graffham et al., 1999). The Government of Ghana supports wheat/composite flour production, partly in response to the rising cost of wheat flour and bread on the local market. The minimum level of inclusion is estimated at a rate of 10% which will require 17,000 MT of HQCF (Onumah et al., 2008). Wheat imports into Ghana in 2006 were 344,000,000 MT, valued at $66,750 and in 2007; it was 357,700,000 MT, valued at $120,000 (FAOSTAT, 2007). Thus the cost of importing the wheat flour is rising. It is expected that with the current estimated supply of 77,800 MT of HQCF in the country, wheat imports could be reduced drastically to preserve the foreign exchange earnings of the country if Amasa and other HQCF producers enter production to meet the demands of the end markets.

9.1.5 Consumers

The importance of consumer satisfaction has been recognised by researchers as well as practitioners (Peterson and Wilson, 1992). Consumers of cassava and cassava

processed products buy from the open markets, kiosks or supermarkets. In the case of pounded *fufu*, it is usually consumed at the chop bars and in rare cases, sent home. Consumers are usually concerned with quality and price of the products. They carefully assess sensory qualities of cassava and its processed products before buying. For fresh cassava roots, they look for the cooking qualities while for pounded *fufu*, they look for qualities such as smoothness, stickiness, and hygienic practices at the chop bar. Consumers look mainly for texture in *agbelima* and *gari* and if the desired qualities are not found, the product is most often rejected. For the farmers to remain in business, they have to produce cassava end-products of good quality. As observed by Henning-Thurau and Klee (1997), customer satisfaction with a product or services is often seen as a key to the producer‟s success and long term competitiveness.

The demand for safe and more convenient food has prompted product upgrading in the pounded *fufu* chain. Urban consumers and commuters who stay away from home for most periods during the day patronise the chop bars consuming *fufu* and other food items. One mode of pounding *fufu* is where one man pounds sometimes without wearing a shirt and sweats profusely. Most consumers perceive that his sweat drops into the *fufu*, discouraging consumers to patronise such chop bars. This factor, coupled with the need to reduce drudgery contributed to the development of the instant *fufu* which is easier to prepare and is more hygienic. The adoption of the instant *fufu* by chop bars is encouraging. However, most consumers are not aware of the products at the chop bar and it is now that the awareness creation is in progress. The *fufu* chop bar operators do this by displaying the *fufu* pack at the chop bars and also inform consumers of the product as a form of advertising the product. Since the product is new, the few consumers who are aware of it need some time to adjust to it as the sensory qualities such as stickiness, and smoothness and price are issues the consumers are contending with (Jumah et al., 2006). Most of the consumers are of the view that if stickiness and smoothness are closer to the traditional pounded *fufu*, then price may not be too much of a factor to them.

Traditional processing of *kokonte* has been found not to be suitable as the product develops moulds and is not safe for human consumption. Moreover, the milled powder sometimes appears grey or deep black, with the result that *kokonte* has been referred to as the poor man‟s food. Similar to the pounded *fufu*, FRI developed the

mini-*kokonte* chip technique which produces chips under hygienic conditions. This led to process upgrading in the *kokonte* value chain whereby the technology was introduced to processors. The technology which the processors claimed is better than the traditional one has however, not been adopted because the processors could not afford the initial cost of the machine. They indicated that they are poor people who do not have access to credit. This is similar to other findings among cassava processors (Adebayo and Sangosima; 2005; Wicklein and Kaschnar, 2001; NARO SAARI UGANDA, 2004). An observation was that even though there was a farmer group in the Totsunya-Okper where the technology was introduced, it is not a cohesive and sustainable one as they do not even meet. A stronger group work in the village could be a way out to get financial assistance from the formal financial institutions or even an NGO. The other aspect too is that the slicing machine is too expensive and a manual or smaller model would have been more affordable. However, Patiño et al. (1998), found that despite the initial high cost, low-income farmers adopted a similar chipping machine technology in Brazil because the farmers were found to be well organised into groups.

9.2 Features of Livelihoods of Actors in Cassava Value Chains that Influence their Participation in the Value Chains

Two different technologies were introduced by the Cassava SME Project in the cassava value chain. These were the introduction of the instant *fufu* preparation to the *fufu* processors and the introduction of *kokonte* mini-chip technique for processing *kokonte*. Adoption of these technologies depends on some of the features of the livelihoods of the processors.

Features of the actors that influence upgrading of the value chains include their human capital base, access to physical capital, financial capital and social capital. In the two value chains studied, it was observed that natural capital did not influence the adoption the technologies introduced.

9.2.1 The Pounded *Fufu* Value Chain

a. Human capital

Aspects of human capital that have been discussed were shortage of labour, low levels of education, access to health facilities and health status of processors.

i. Shortage of labour

Some processors depend on both family labour and hired labour for their activities. Most children of school going age are in school, following the FCUBE program adopted by the Government of Ghana. Processors therefore use more hired labour, especially for pounding *fufu*, than family labour at the chop bars. Pounding is mostly done by men, especially in the Suhum area where only one man pounds while a woman turns the *fufu* in the mortar. Since pounding is a difficult task, processors usually have problems with regular supply of this type of labour, a situation Odebode (2008) also observed among women processors in Nigeria. The instant *fufu* technology does not involve pounding. As indicated earlier, the powder is stirred like *banku*. This is a task which women are traditionally used to and can do it more effectively than men. Thus, this negative factor of labour shortage rather becomes an incentive to processors to adopt the instant *fufu* technology. This is because, apart from removing drudgery, the new technology eliminates peeling, washing and boiling of cassava. This looks like a paradox in normal adoption theories but has rather provided an incentive to processors to upgrade the *fufu* value chain by adopting the new technology.

ii. Education

There was generally a low level of formal education observed among the processors similar to the situations of other processors studied (Ojomo, 1993; Odebode, 2008) even though other authors also observed a higher percentage of educated women in cassava processing (Amao et al., 2007; Ogunleye et al., 2008). The World Bank (2008) attributed the low attainment of education in rural areas to farm work where children miss school or drop out to help with farm work. Another issue is that governments have limited capacity or will to provide educational infrastructure in the rural areas, resulting in poor quality of rural schools which diminishes their attractiveness and the benefits of schooling.

Education is one of the key factors needed for desirable change in attitudes, skills and knowledge of individuals. This has been emphasised by Boz and Akbay (2005). According to Mandakini (2005) when people are provided with educational opportunities as well as the autonomy needed to take advantage of such an opportunity, they are enabled to make strategic life choices and to negotiate their

poverty. Classifying adopters, Rogers (1995) indicated that the innovators and early adopters of technologies are those who have higher education, read journals and books on agriculture and have contact with extension officers, among other factors. Other authors also observed that education significantly influences adoption of technological innovations in agriculture (Asadullah, 2005; Asfaw and Admassie, 2004; Doss, 2003). Irrespective of the low levels of education, the zeal with which the processors discussed issues openly and their active participation in the demonstration of the technology were highly encouraging. Thus the low level of education did not influence adoption of the technology. This was similar to the observations of Llewelyn and Williams (1996), and Abdul et al. (1993) who did not find any significant influence of education on adoption of technologies, contrary to what others observed above.

iii. Access to health facilities and health status of processors

In all the study areas, processors have easy access to health facilities leading to their good health status that was observed. One significant aspect of *fufu* processing is the health status of the processor. *Fufu* processing is a difficult job which requires that processors must be healthy in order to operate the chop bar. This was evidenced in the fact that Health Inspectors from the Ministry of Health usually monitor the health status of the processors regularly and make sure they attend medical check-ups yearly. Thus processors who do not have health certificates are not allowed to operate the chop bars. Health status therefore plays a leading role in the adoption of the technology

b. Physical capital

Physical capital that is available to the participants comprises proper shelter, access to energy, water and sanitation and transportation.

i. Shelter

Processors were found to be using two types of shelter. These were the temporary and permanent buildings. The temporary ones have been housed in structures that are not too decent for some consumers, similar to the consumer complaint of the unhygienic methods being used for the pounded *fufu* preparation. The permanent buildings looked more beautiful and therefore have the advantage of being patronised by people

who prefer more decent places, especially the middle income class people who are more concerned with more hygienic and safe food for consumption (Jumah et al., 2006, Onumah, 2007). Thus better and well-kept chop bar buildings would attract more customers and would therefore be an incentive to processors to upgrade the chain by adopting the new technology. On the other hand, owners of the less developed bars know that the category of people who prefer the instant *fufu* may not come to their bars regularly and may not wish to introduce the technology to their bars due to lack of patronage

ii. Access to Energy

Processors have good access to energy in the form of electricity, biofuels and LPG. The preparation of the instant *fufu* powder is faster using the LPG or electric stove. This is because the powder could be prepared into *fufu* in five to eight minutes whereas cassava could be boiled for about 20-30 minutes before pounding. Since many customers are not patronising the technology at the moment, the few people who would ask for it, could be served within five to eight minutes using the LPG or electric stove which are available to some of the processors. This would save a lot of time because the processors would shift from the use of biofuels (which takes a longer time) to electric or gas stove even though some processors complained of high electricity tariffs. The adoption of the technology could therefore be enhanced since the processors already have good access to electricity and LPG.

iii. Water and Sanitation

Poor access to water has been described as the major cause of poor health and poverty by Nicol (2000) and WaterAid (2007b). Communities studied have access to clean and safe water. Water is not only used for domestic purposes but also for agricultural and industrial purposes as well. Most small-scale processors need water for their processing activities. As noted by Adebayo et al. (2004), cassava processing, especially *fufu* processing, uses a lot of water and they found poor access to water as a major constraint to *fufu* processors in South Western Nigeria. Even though water is a critical factor in pounded *fufu* preparation, it is not critical when using the instant *fufu* powder. During the preparation of the instant *fufu* (as described in chapter 6) the powder is mixed with water in the ratio of 1:2 and stirred. While stirring, small volumes of water are added until the desired paste is required. Comparatively, water

is needed in very small quantities when using the instant *fufu* powder. Therefore, access to water, even though necessary, is not a major factor that is constraining the upgrading of the *fufu* value chain. However, the water available should be of good quality so that its use does not lead to disease situations.

Good sanitation at the chop bars may lead to consumer satisfaction as no consumer would like to take his meals in an environment that is not pleasant. Waste water, cassava peels and waste food contribute to poor sanitation problems. Since most people would like hygienic and clean food prepared in a neat environment, good sanitation becomes a necessary factor at the chop bars.

iv. Transportation

Processors face problems with transportation of cassava which is bulky and spoils easily when it is not used within 24 hours. Transporting *fufu* powder is not as costly as the fresh cassava roots. *Fufu* powder in urban areas could be bought from any shop or kiosk whereas cassava for a chop bar has to be bought in large quantities from the market or village. Transaction costs are therefore reduced when processors use the instant *fufu* powder, compared to buying the fresh cassava roots for processing. Similar saving of transaction costs during transportation of cassava was observed by Minot and Hill (2007) and Wenham (1995). Thus difficulties in transporting cassava, which is a constraint to pounded *fufu* processing, is now an advantage rather and could rather encourage the adoption of the technology. This is something else counterintuitive about the adoption of technologies.

c. Access to Social Capital and Information

Observations from the study show that, apart from Suhum where the processors are in an organised group (TCA), processors in the other study areas operate individually. Information sharing, access to institutions such as GTB, Unilever, FRI were all developed with the group. Discussions on the technology transfer started with the executives of the TCA before the transfer. The group also had the chance to attend food fairs at district and regional levels, broadening their knowledge about the chop bar business. In Sokode, Anyirawase, Tsito and Kpeve areas where the processors do not operate in groups, they also have access to information from Veterinary Officers, Health Inspectors, Unilever and the GTB. Group development and group functioning

therefore places the processors in Suhum in a position to upgrade more effectively. This is because, as has been observed, it is generally perceived that the decision to adopt a technology is influenced sometimes by social networks (Sajjad et al., 2009, Gibbs et al., 2007).

d. Access to Financial Capital

Access to financial capital is one of the major constraints faced by the farmers and processors. This is a situation which runs through all farming communities in the country (Addy et al., 2004; Aryeetey and Ahene, 2005; Onumah, 2007; Tagoe et al., 2005). All the participants in the value chains studied complained of the lack of or poor access to financial capital hence their inability to expand their activities. This is consistent with other authors, who attributed the inability of processors to adopt improved technologies on cassava to poor access to credit facilities (Adebayo and Sangosima, 2005; Wicklein and Kaschnar, 2001).

Most of the formal financial institutions like Agricultural Development Bank and the Rural Banks have been established to assist the rural people with credit to improve on their livelihoods. In March 2009 there were 135 Rural and Community Banks, 18 Savings and Loans Companies, 19 Non-Bank Financial Institutions and 26 Universal and off-shore Banks in the country (BoG, 2009). Despite these high numbers of banks, farmers and processors still complain of poor access or lack of access to credit facilities. Credit to agriculture and SMEs remains low and continues to decline largely because of high transaction costs and the perception of the banks that these enterprises are highly risky (Onumah et al., 2008).

Unlike cassava which is bulky and has to be transported at high costs, *fufu* powder could be bought a few packets at a time and is even shelf-stable. Processors do not need a large capital to engage in the use of the *fufu* powder. Two or three packets of the powder could be bought from a kiosk and used. Later, more could be bought. Thus a processor does not need to buy large cartons of the powder and store. This is an advantage to poor processors who have insufficient capital to buy large quantities of cassava roots for processing. Low capital or poor access to financial capital has therefore become a factor that can positively influence the adoption of the technology, a finding which is inconsistent with findings from other studies, which

indicated that access to financial capital influences adoption of technologies (Henderson, 2001; Boz and Akbay, 2005; Adebayo and Sangosima, 2005).

9.2.2 The *Kokonte* Value Chain

a. Human capital

Aspects of human capital that have been discussed were shortage of labour, low levels of education, access to health facilities and health status of processors.

i. Labour availability

There is abundant labour in the study areas for both farming and processing activities. The mini-chip technique is a labour saving device which reduces the number of drying days from two weeks to about three days. It would therefore save labour which could be used for other farming and processing activities in the communities. It however needs skills to operate the machine. After trying their hands on the slicing machine, the participants felt that one does not need any special skills to operate it. Thus labour availability had no influence on the adoption of the technology.

ii. Education

Most of the processors had very low education or never went to school. This was evidenced by the fact that 28% had basic education and 63 % never attended school. The *kokonte* processors expressed satisfaction with the operations of the machine and were eager to acquire one after they realised its usefulness. Even though some authors observed that education significantly influences adoption of technological innovations (Asadullah, 2005; Asfaw and Admassie, 2004; Doss, 2003), educational levels of these processors did not therefore any effect on the adoption of the technology because no special education is needed to operate the mechanical slicer. Related observations were made by other authors who did not find any significant influence of education on adoption of technologies (Llewelyn and Williams, 1996; Abdul et al., 1993).

iii. Access to health facilities and health status of processors

In the two communities studied, the people had access to health facilities like clinics and health posts. They also have access to hospitals at the district centres which were not too far from these communities. There were no disease situations in the

communities and all the processors reported that they did not have health problems. Health status of the people has been found necessary for the upgrading because the technology itself stresses the importance of health and as it is centred on producing a safe and hygienic *kokonte*. The processors need to be healthy in order to be able to carry out their processing activities.

b. Physical capital

Physical capital analysed included energy, water and sanitation and transportation.

i. Access to Energy

The village of Totsunya-Okper has not been connected to the national electricity grid. They therefore depend on the use of lanterns and biofuels for their domestic activities. This necessitated the training team to use a diesel-powered slicing machine instead of electrical-powered machine. Since the petro-powered machines are readily available, electrical energy is therefore not an important factor in the adoption of the technology.

Energy in the form of biofuels and sunshine is abundant for the processors. It was therefore realised that energy in the form of sunshine would make the drying of the thin flakes faster, making sunshine an important factor for the new technology to be adopted.

ii. Water and Sanitation

Water is still needed for washing the peeled cassava before the slicing machine can be used. In the communities, there is abundant water for the processing activities. Water is therefore not a contributing factor for the adoption of the technology.

Kokonte needs to be produced in an environment which is safe so that contamination of the *kokonte* chips could be avoided. The process of drying where the processors leave the kokonte chips on the drying mats overnight would be overcome with the new technique. This will actually improve the *kokonte* quality and make it safer for human consumption. Sanitary conditions in the drying areas are very necessary if the mini-chip technique is to be adopted.

iii. Transportation

Physical capital in the form of transport did not have influence on adoption of the technology because

Roads in the study communities are tarred and movement of persons is easy. The new technique even reduces the bulky nature of *kokonte* that has to be transported over long distances to marketing centres. The nature of the roads in the study areas therefore do not have any influence on the adoption of the technology that has been introduced even though good roads in the rural areas have often been cited to facilitate economic activities and open up markets and also encouraged the adoption of higher yielding crop varieties (Zohir, 1990; Booth et al., 2000).

c. Access to Social Capital and Information

The re-organisation of farmers‟ group in Totsunya-Okper and the existing group in Forikrom could influence the adoption of the technology because social networks have been perceived to contribute to decision making process towards adoption of technologies (Sajjad et al., 2009, Gibbs et al, 2007). Since the processors complained of lack of access to credit facilities to enable them purchase the slicing machine, pulling financial resources together could be one effective way to acquire the machine. They could also have easy access to credit from formal financial institutions if they have a strong and cohesive group since the banks now prefer to grant loans to groups instead of individuals (Jones et al., 2000).

Another advantage that the processors can benefit from the group membership is the flow of information. As group members meet regularly, general issues are discussed and there is always information flow among the members. Effective group membership could therefore help the processors to take decisions on adoption and also pull resources together to acquire the machine.

d. Access to Financial Capital

The issue of lack of access to credit has been discussed in section 9.2.1 above. The *kokonte* processors face similar situations of poor access to credit facilities like the *fufu* processors. Rogers (1995) observed that access to financial resources is one of the major determinants of adoption of technologies. The processors claimed they

were poor and do not have access to credit facilities and therefore cannot afford to buy the slicing machine. This is consistent with the findings of Adebayo and Sangosima (2005) who attributed the inability of processors in South Western Nigeria to adopt improved technologies on cassava due to poor access to credit facilities. One way of getting accessing credit is group membership discussed above. For example when the Totsunya-Okper group was active in the early 1990s the members were able to source credit facilities from the ADB. However the group was not cohesive and therefore could not be sustained. Thus if the processors had access to funds, there would not have been problems with acquiring the machine for their processing activities.

9.3 Implications of Combined use of the Sustainable Livelihoods Approach and Value Chain Analysis on Prospects for Promotion of New Technologies

The study concentrated on livelihoods analysis and value chain analysis. The livelihoods analysis focussed on cassava farmers and processors who are the main actors in the cassava value chain. The value chain analysis helped to explain the vertical and horizontal linkages that exist in the three cassava value chains studied and also, the nature of markets and the market relationships that exist.

The livelihood analysis showed how farmers and processors in cassava value chains combine their assets with strategies to attain their livelihood objectives. It recognises that outcomes, such as food security, well-being and more sustainable use of natural resources, besides increased incomes, are important to people (Scoones, 1998; Ashley and Carney, 1999). Combining both value chain and livelihoods analyses provides a more comprehensive understanding of both the structure of markets and the way in which markets for particular goods interact with livelihood strategies (Kanji et al., 2005; Kula et al., 2006). An important observation was price shocks that actors in the chain were subjected to. There was always increasing costs of inputs and transportation which affected the cost of cassava production, processing and marketing. Even processors (especially *gari*, *kokonte* and *agbelima* processors) most often do not get the required selling prices for their products because the prices are dictated by middlemen who travel from the urban areas to the villages to purchase these items. This is similar to the observation by Berg et al. (2006) when they studied the *gari* value chains in Ghana. The *kokonte* processors were not even sure of how to

price new *kokonte* but they envisaged that after calculating the cost of production, and realising their yield, they can be in a position to price the new product.

The livelihoods approach made it clear the importance of the decision making process of cassava farmers in selling the cassava roots directly to an intermediary processor instead of processing the cassava roots into shelf-stable products. Similarly, Kanji et al. (2005), combining the value chain approach with livelihood analysis noted that the livelihoods analysis made explicit farmers‟ choices about what to produce, process and market, which was valuable to government policy to promote cashew nut exports and to promote poverty reduction in Mozambique and India.

The study revealed characteristics of cassava and cassava processed products that form the determining factors for consumer acceptance in the chain. These demands, for example the sensory qualities of *kokonte* and the pounded *fufu*, call for either product or process upgrading. The study revealed the incentives and conditions under which target households will actually adopt new and improved technologies for upgrading the chain. Actors in the cassava value chains are sometimes faced with constraints with reference to their assets (Onumah et al., 2008; Addy et al., 2005; IFAD, 2004). These constraints usually prevent or limit their adoption of technologies hence, failure to upgrade their value chains. In the *fufu* value chain, it was observed that the processors had problems with shortage of labour, low levels of education, difficulties in transporting cassava roots and poor access to credit facilities. The low levels of education did not have any influence on adoption of the technology as it was in the case of poor access to financial capital and labour scarcity. Acemoglu (2009), indicated that in standard endogenous growth models, an increase in the supply of labour encourages technological progress. In contrast, the famous Habakkuk hypothesis in economic theory claims that technological progress was more rapid in the 19th century United States than in Britain because of labour scarcity in the former country. Acemoglu (2009), studying labour scarcity and innovation adoption, observed that labour scarcity will encourage technological advances if technology is strongly labour saving. Similarly, Scherr (2000), found that there is willingness to adopt resource-conserving practices that are economically viable in the farmers‟ context of risk and resource constraints (Scherr, 2000).

In the *kokonte* value chain, there were also livelihood constraints such as low level of education, poor access to energy in the form of electricity, poor access to credit facilities and poor group membership. However, apart from poor access to credit facilities, the other constraints did not have any influence on adoption of the mini-chip technique.

The two technologies introduced to the actors have been developed by the research institutions and are available but the mode of technology transfer matters. Training in the technologies was easy and participation in the demonstration exercises was encouraging. Awareness creation among actors in the *fufu* value chain, especially consumers is on-going and the powder is now available at some of the chop bars. Thus consumers have started patronising the bars with the instant *fufu* powder. The *kokonte* mini-chip technology was not adopted because of the cost involved in purchasing the slicing machine. Our research team that conducted the demonstration did not take into consideration the cost of the technology to the processors hence the inability of the farmers to adopt the technology. On the other hand, a smaller unit of the mechanical slicer which might be more affordable could have been used for the transfer process.

Following from what Kainji et al. (2005) observed about combining the two approaches, it was found that the SLA identified features of livelihoods (such as their assets and the enabling environment). The VCA also showed areas where upgrading of the chain were necessary (e.g. product upgrading of the *fufu* value chain and process upgrading of the kokonte value chain). There are some of the features that were found to enhance adoption of the technologies while some did not. For example, poor access to credit encouraged adoption of the instant *fufu* technology while the same poor access to credit did not encourage the adoption of the *kokonte* mini-chip technique. It is therefore important that, a participatory assessment of the technologies with actors in the chain is carried out to enable outsiders to know exactly what the needs of the people are. This will unveil all their prospects and constraints which will eventually lead to points of intervention. The views of the actors about the intervention are also necessary in order not to promote a technology that they do not need. Even when they actually need that technology, a participatory assessment could tell whether they can afford it or not so that alternative solutions could be sought. For

example, the cassava slicing machine that was introduced to the *kokonte* processors at Totsunya-Okper, which they cannot afford to buy. A combination of the two approaches therefore indicates that neither the SLA nor the VCA could capture on their own, how to promote new technologies in a particular value chain. It is only when they are applied together that, they offer a greater scope for understanding the influence as well as relationships between livelihood features and various elements in the cassava value chain.

9.4 Factors Influencing Farmers' Decisions on Whether to Sell Fresh Cassava Process for Sale

This section deals with the cost-benefit analysis of selling fresh cassava roots or processing into products such as *agbelima*, *gari* and grits for sale. The analysis involved calculating the cost of producing a hectare of cassava, the net profit made when the cassava roots are sold fresh. Also, the cost of processing cassava roots into a bag of *agbelima*, *gari* and grits for sale was calculated and finally compared to selling the fresh cassava roots.

Most household decisions are usually affected by their socio-economic situations, coupled with policies, rules and regulations that are enforced by the state and community. The decision by the farmers to sell cassava roots or process to sell initially takes into account, how much is gained when a hectare of roots is sold to Amasa and also, how much is gained when the roots are processed into grits, *agbelima* and *gari*. Estimates received from the farmers and processors indicated that processing the roots into end products such as grits, *agbelima* and *gari* are more profitable in terms of face value of cash than selling the roots. This has been referred to by Kula et al. (2006) as a comparative advantage.

Agbelima and *gari* are sold through middlemen or directly to consumers. The middlemen sometimes buy on credit and pay in instalments and once in a while there could be a default. Processors therefore stand to lose when the middlemen do not honour their obligations. This is in contrast to when they sell the cassava roots to Amasa because Amasa pays promptly and in bulk therefore having a competitive advantage over other buyers. Amasa therefore has a competitive advantage over the middlemen who buy from the farmers.

Agbelima and *gari* form part of the household foods which are consumed at least once a day in almost all the households. If cassava roots are processed into these products, part is kept for the household consumption and as long as the processors do not compute their costs and returns, they cannot even tell what amount exactly they have kept for consumption.

Farmers selling cassava roots to Amasa usually have their fields ploughed for them by Amasa on credit basis. This fills the gap created by the formal financial credit institutions to which the farmers do not have access. During land preparation, the farmers could face financial difficulties and may either be forced to sell some property or use manual labour to prepare just a small portion of land. This therefore encourages the farmers to sell the roots and grits to Amasa as they stand to gain more than selling *agbelima* and *gari* to middlemen.

Amasa also provides farmers with improved planting materials alongside extension services on planting distance and row planting. The farmers indicated that there were no AEAs in the area and they therefore lack access to improved technologies and production practices. Amasa has therefore provided this link to the farmers who sell roots and grits to the company, thereby improving their productivity.

The farmers have therefore concluded that they feel more comfortable selling the cassava roots to Amasa than to middlemen or process for sale because of the above advantages that they get from Amasa. Also, the middlemen sometimes default in payment and a glut in the market forces them to reduce their prices. Similarly Ellis and Allison (2004) observed that vulnerable farmers prefer livelihood security to rise in average incomes. It therefore implies that the farmers feel better off with Amasa than the middlemen even though the processed products fetch higher income that selling the unprocessed roots.

9.5 Recommendations

The study would not be complete if recommendations had not been made with regards to the improvement to the cassava value chains and the livelihoods of the farmers and processors. The main objective of the study is to "identify appropriate strategies for the promotion of new cassava-processing technologies in Ghana and elsewhere in Africa". The following recommendations could therefore be appropriate strategies for the promotion of cassava-processing strategies.

9.5.1 Financing Value Chains

One of the most important constraints to the cassava value chains studied is the access to financial capital. This has placed limitations on investments to be made by the chain participants. To this end, it would be important to re-visit the banking regulations concerning lending to farmers to make it easier for them to borrow from the banks. For example the long period of processing the applications for farmers could be reduced by cutting out some of the bureaucratic procedures because this is a factor that has discouraged most farmers from borrowing. The farmers should also be encouraged to build upon their social capital by developing cohesive and sustainable groups since the Rural Banks accept group membership as a form of collateral. Such groups could be accepted and financed by NGOs also since the NGOs also prefer working with farmer groups rather than individuals.

Prospects exist for financial support especially from the private sector non-bank financial institutions in the country. Currently, there are 18 of such institutions. Some of these include Procredit Savings and Loans Ltd., First Allied Savings and Loans Co. Ltd., Adehyeman Savings and Loans Co. Ltd. and Women‟s World Banking-MASU. Their repayment conditions are more flexible than what pertains to in the Rural and Commercial Banks. For example, with Procredit, the customer decides on how much to take and how long to repay the loan. All Procredit needs are a personal identity card, a guarantor, preferably the spouse of the customer or any close associate who is in employment. The repayment could be weekly, fortnightly or monthly depending on the choice of the customer. Irregular payment plan is also available upon request. Similar conditions apply in the other non-bank financial institutions also. Farmers and processors can therefore take advantage of such situations.

9.5.2 Improving Access to Information through Extension Services

Access to information is very important to the actors in the cassava value chain since information is valuable to all the participants especially on production, processing and marketing. In communities where there are no AEAs at all, community leaders should organise and call on the District Directorate of Agriculture to present their problems. By so doing, the Directors will realise the seriousness of the farmers and assist them by posting an AEA to the community. Another option is to approach NGOs for assistance as in the case of Forikrom where a local leader was able to solicit assistance from HPI for the farmers.

Currently there are prospects for farmers to access information on their cell phones, thanks to programmes by Farm Radio International and Busylab‟s TradeNet platform. With Farm Radio programmes, a farmer or processor can access any time of information by following prompts on the mobile phone. Therefore in areas where there are no AEAs, farmers and processors can access all the information they need. *Fufu* processors can also access all the information they need on inputs and their prices on any of the above platforms. Some District Agricultural Development Units have also made cell phones available to their AEAs who also make their numbers available to farmers so that information can be accessed by farmers through this medium.

9.5.3 Development of Manual and Cheaper *Kokonte* Slicing Machines

Farmers claimed that the *kokonte* mini-chip technique is a better way of producing *kokonte* but the problem was with the cost of the mechanical slicer which was used for the demonstration. Fabricators could be encouraged to develop manual chippers at a lower cost and this can easily be adopted by the processors so that the quality of *kokonte* produced would be enhanced.

9.5.4 Legislation on the use of HQCF in the Bakery Industry

Wheat imports to Ghana have been on the increase and affect the country‟s foreign earnings. The use of HQCF at about 10-20% substitute in the bakery industry could reduce our imports if the Government support for the HQCF industry could be turned into legislation so that it becomes mandatory for bakers to use this percentage of

HQCF as a substitute for wheat. This would mean an improvement on the HQCF value chain so that there is always a constant supply to the bakers.

9.5.5 Implications of findings for current projects on cassava value chain development for improved livelihoods

Poor access to credit facilities has been a major observation during the study. Cassava projects in the country should develop ways of assisting farmers and processors of cassava to access such facilities. Group development leading to cohesion and sustainability of such groups must be a major goal. This would enable project beneficiaries to use such groups as collateral to access loans from credit institutions. Such groups could also provide good bargaining power in case of pricing of their commodities.

One way of reducing poor access to agricultural information is the current use of e-extension. This is done through the use of cell phones. Projects could encourage their participants to use their cell phones to access such information which is even provided in local languages currently by African Farm Radio International and Busylab‟s network platform.

Most project interventions are usually carried out by providing machines and equipment that may not be affordable by the beneficiaries. This was experienced during the *kokonte* mini-chip technology transfer where the machine which was introduced was not affordable to the beneficiaries. Care should be taken to provide the beneficiaries with affordable and appropriate technology that may be within their financial means.

9.6 Conclusions

The main objective of the study was to identify appropriate strategies for the promotion of new cassava processing technologies in an attempt to ensure an effective upgrading of cassava value chains. There were specific objectives and four main research questions for the study. Literature was reviewed on three main subjects: cassava which forms the core subject of the study, the Sustainable Livelihoods Approach and Value Chain Analysis.

A sustainable livelihoods approach was used to collect both quantitative and qualitative data from eighty (80) households in five (5) districts in the country. A cost-benefit analysis was also done for forty three (43) farmers who either sell cassava roots to an intermediate processor or process the roots into other products such as *gari*, *agbelima* and grits. An intermediary cassava processing company who buys the cassava roots and grits from farmers was also interviewed.

Three cassava value chains, pounded *fufu*, *kokonte* and HQCF were analysed. The main actors in the value chains were farmers, middlemen, primary and intermediate processors and consumers. Identified service providers to the chains were financial services, wage workers, input suppliers, agricultural extension officers (government and NGOs), sanitary inspectors and transport services. An enabling environment was provided by the local communities, District Assemblies, regulatory bodies and research institutions.

A livelihood analysis was done on household producing and processing cassava to assess their access to assets in the form of human, physical, financial, social and natural capital. It also assessed how they are affected by vulnerability factors such as trends, shocks and seasonality. In addition, the study looked at all the alternate livelihood strategies they adopt in addition to their main livelihood strategies (farming and processing) in order to achieve their livelihood objectives.

A combined use of livelihood and value chain analysis showed that the farmers and processors have more access to some assets than others. In general, they have better access to physical and natural capital while they have lower levels of education and poor access to financial capital. In isolated cases, road network and electricity supply were poor. Also, leasing of land to sand extractors and large-scale pineapple farmers has displaced some small-scale farmers who have to migrate to other areas to continue with their livelihood activities. Increasing population has led to land fragmentation resulting in continuous use of the same piece of land and finally, poor soil fertility. Seasonality of consumption of pounded *fufu* was observed as a constraint faced by the *fufu* processors. Markets exist for cassava and cassava processed products in the rural and urban areas. However, *fufu* and *kokonte* processors face a situation of consumer demand for hygienically safe and convenient

foods. This is because some consumers do not favour the way pounded *fufu* and *kokonte* chips are prepared. This necessitated a product upgrading of the pounded *fufu* by the introduction of instant *fufu* technology but patronage by consumers is low because most of them are not aware that such a technology has been introduced into the *fufu* chop bars. There was also process upgrading of the *kokonte* chips using the mini-chip technology and this has not been adopted because the processors could not afford the cost of the slicing machine.

In the pounded *fufu* value chain, it was observed that negative factors such as shortage of labour, inadequate transport facilities and low capital/poor access to credit have rather encouraged upgrading of the chain. This is because the instant *fufu* powder does not need huge capital investment, can be transported easily as it is not as bulky as the cassava roots, and also the preparation of the instant *fufu* powder is not labour demanding. Other factors such as proper shelter, access to energy, water and sanitation, information, and savings group membership were also found to encourage upgrading of the chain.

In the *kokonte* value chain, livelihood constraints such as shortage of labour and poor access to energy in the form of electricity were rather found to encourage adoption of the *kokonte* mini-chip technique. This is because in the absence of electricity, there are diesel-powered chipping machines which could be used by the processors. Also, the machine is a labour-saving device which could slice cassava faster and drying of the chips takes two to three days instead of two weeks with the old technology. Other livelihood features that were found to encourage upgrading of the chain were good access to health facilities, information and research institutes and also effective group membership.

Some of the farmers and processors have also started grits processing to supply to Amasa in addition to supply of roots. Such farmers and processors benefit from direct value chain financing from Amasa by having their fields ploughed for them on credit basis and also they get free improved planting materials. The decision to sell the roots or process to sell, depends on the costs involved. Even though estimates showed that farmers gain more by processing cassava roots into *gari* and *agbelima*, they prefer to sell to the intermediary processor because of prompt payment and the direct value

chain financing from Amasa. HQCF produced by Amasa is used by food manufacturers to produce improved traditional foods such as instant *Fufu*, Dried *Agbelima* and *Banku*. The HQCF is used as an adhesive in the plywood industry and also as a substitute for wheat in the bakery and confectionery industry. Thus if fully accepted as a substitute for wheat, will reduce Ghana‟s wheat imports and save on foreign earnings.

9.7 Suggestions for Further Research

From the recommendations of the study, it would be worthwhile carrying out further research into the following:

i. The failure of farmers and processors to form and develop cohesive and sustainable groups.
ii. Effectiveness of agricultural extension and education on livelihoods of farmers.

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APPENDIX 1: CHECKLIST FOR LIVELIHOODS DATA COLLECTION

VILLAGE:

NAME OF RESPONDENT:
SERIAL NUMBER ……

PHYSICAL CAPITAL

1. Housing (cement, mud brick, own, hire, family), any improvements?
2. Energy sources (Charcoal, kerosene, gas, electricity, firewood, etc)
3. Access to water supply (borehole, dug out, pipe, river, etc.)
4. Sanitation (KVIP, WC, dug out, free range)
5. Access to information (Newsletter, Radio, TV, Telephone, Internet, Journals, consumers, suppliers, Extension officers
6. Transportation (owned, public)
7. Tools and equipment (access to mechanised services - ploughing, milling, grater, presser, etc), farming tools, processing tools

FINANCIAL CAPITAL

1. Source (s) of starting capital
2. Sources of income (income from salary, wage labour, farm, remittances, etc.)
3. Membership of savings groups. Conditions.
4. Take loans from the group? Conditions.
5. Hold bank accounts, Loans from bank, conditions

SOCIAL CAPITAL

1. What networks exist – cassava farmers, processors, consumers, (within farmers, within processors, among farmers and processors/consumers, among processors and consumers
2. Membership of groups, associations etc
    a. How did you join and what are the conditions of membership
    b. Perceived benefits or disadvantages of group membership.
3. Participation in community activities and collective work
4. Extent of trust (in the form of deferred payments), exchange and mutual support? Middlemen give advance payments?

HUMAN CAPITAL

1. Knowledge/skills in cassava cultivation and processing
2. Labour employed
3. Conditions: permanent, or temporary
4. Mode of payment
5. Health status of family members.
6. Anyone with chronic illness?
7. Frequency of hospital attendance by members of the household
8. Access to health care – source, location (including local medicine/herbs).
9. Registered with NHIS? If no, why?

Information on household members

Household member	Gender 1.Male 2.Female	Age 1.<10 2.10-19 3.20-29 4.30-39 5.40-49 6.50+	Status 1. Head 2. Spouse 3. Child 4. Parent 5. In law 6. Relative	Education 1.Nil 2.Basic 3Secondary 4Post Sec 5Tertiary	Marital status 1.Single 2.Married 3.Widowed 4.Divorced 5. Separate	Ethnicity 1Akan 2Ga 3Krobo 4Ewe Others	Status in Society 1. Chief 2. Religious leader 3. Unit Com. Member 4. Assemblyman 5. Nil	Religion 1. Christian 2. Moslem 3. Tradition 4. Atheist 5. Other	Secondary occupation 1.Trader 2. Artisan 3.Civil servant 4. Others
1.Respondent									
2.									
3.									
4.									
5									
6.									
7.									
8.									
9.									
10.									

NATURAL CAPITAL

1. What is the household"s access to land?
2. Nature of access (private ownership, rental – give costs, communal, family)
3. Access to other resources, (rivers, streams, hills) what they use the resources for.
4. Conflicts over use of resources

VULNERABILITY

TRENDS

1. Input prices and their effects
2. Market prices and their effects
3. Chieftaincy disputes and their effects
4. Ethnic conflicts, etc. and their effects
5. Soil fertility and its effects
6. What do you do to prevent or control in case of any of these events?

SHOCKS:

1. Shocks experienced in recent years:
    a. Fuel prices vs. transportation of produce,
2. How do you cope with the following?
    a. Diseases, deaths, farm injuries
    b. Processing injuries

SEASONALITY:

1. How do you cope with the following?
2. labour availability,
3. demands for cassava, *fufu*,
4. When do you sell more, when do you sell less
5. When do you experience cash shortage?
6. Which time in the year is cash income important? E.g. school fees time

POLICIES/INSTITUTIONS

Policies and local by-laws influencing and regulating farming/processing
Advantages and limitations to these policies
Are there policies of waste disposal, sanitary conditions during processing etc?
Any taxes paid and how (District Assemblies, Internal revenue service?

ORGANISATIONS e.g. MOFA, NGOs, District Assembly)

1. Visits (how regular, planned or unplanned
2. What activities do they carry out with you?

LIVELIHOOD STRATEGIES

PRODUCTION

1. Main crops grown
2. Cassava varieties grown (improved, local)
3. Which is used for what? (*fufu*, *gari*, *kokonte*
4. Size of holdings
5. Outputs
6. Quantity sold/stored
7. Technologies used in production and adoption, who introduced them?
8. Were there some technologies you have discarded?
9. What gains have you made, using these technologies?
10. Disadvantages of the technologies

PROCESSING

1. Food items processed
2. Source of cassava/ other raw materials
3. Any new technologies Introduced to you? from where:
    a. how were they introduced to you
    b. Were there some technologies you have discarded?
    c. Compare innovations to old practices
4. Constraints to farming/processing
5. What are your plans to improve on your income?

LIVESTOCK AND POULTRY

1. Livestock (cattle, goats, pigs, chickens, rabbits etc)–
2. Role of livestock in their livelihoods

COPING STRATEGIES

1. Do you sell some of your assets in times of stress? Which ones?
2. Do you work for others, which work and what is the mode of payment?
3. Do you migrate to other towns during crisis?
4. Do you engage in any other jobs?
5. Do you invest in assets for your future?

LIVELIHOOD OUTCOMES

More income/less income

1. Sources: farming, processing, livestock
2. other sources (pensions, remittances, other jobs etc)
3. Debt status

Increased/reduced well-being

1. Voice in the community
2. Physical security of HH members
3. Peace of mind
4. Access to services (health, education, sanitation)
5. Pay bills (school fees, water, electricity, hospital)

6. Afford decent housing

Reduced vulnerability/worsened

1. Trends (soil fertility, inputs, chieftaincy, ethnic conflicts)
2. Shocks (fuel prices, lorry accidents, bush fires, injuries, vacation of post by employees) etc)
3. Seasonality (rainfall, supply of cassava and/or ingredients, fish, meat, labour, cash shortage)

Improved food security/worsened

1. Store food/sell all
2. Buy more? Physical, social and economic assess, quality of foodstuffs bought

Sustainable use of natural resources

1. Bush fire control
2. Erosion control
3. Forest degradation
4. Continuous cropping

APPENDIX 2: CHECKLIST FOR FOUCUS GROUP DISCUSSIONS ON LIVELIHOODS

HUMAN CAPITAL

1. Knowledge/skills in cassava cultivation and processing
2. Labour employed
3. Conditions: permanent, or temporal
4. Mode of payment
5. Access to health care – source, location (including local medicine/herbs).
6. Registered with NHIS? If no, why?

PHYSICAL CAPITAL

1. Energy sources (Charcoal, kerosene, gas, electricity, firewood, etc)
2. Access to water supply (borehole, dug out, pipe, river, etc.)
3. Sanitation (KVIP, WC, dug out, free range)
4. Access to information (Newsletter, Radio, TV, Telephone, Internet, Journals, consumers, suppliers, Extension officers
5. Transportation
6. Access to markets
7. Tools and equipment (access to mechanised services - ploughing, milling, grater, presser, etc), farming tools, processing tools
8. Access to educational facilities

FINANCIAL CAPITAL

1. Source(s) of starting capital
2. Sources of income (income from salary, wage labour, farm, remittances, etc.)
3. Operations of savings group (Susu group?)
4. Access to bank loans

SOCIAL CAPITAL

1. What networks exist – cassava farmers, processors, consumers, (within farmers, within processors, among farmers and processors/consumers, among processors and consumers
2. Membership of groups, associations etc
    a. How did you join and what are the conditions of membership
    b. Perceived benefits or disadvantages of group membership.
3. Participation in community activities and collective work
4. Extent of trust (in the form of deferred payments), exchange and mutual support? Middlemen give advance payments?

NATURAL CAPITAL

1. Access to land?
2. Nature of access (private ownership, rental – give costs, communal, family)
3. Access to other resources, (rivers, streams, hills) what they use them for.
4. Conflicts over use of resources

VULNERABILITY:

TRENDS

1. Input prices and their effects
2. Market prices and their effects

3. Chieftaincy disputes and their effects
4. Ethnic conflicts, etc. and their effects
5. Soil fertility and its effects
6. What do you do to prevent or control in case of any of these events?

SHOCKS:

1. Shocks experienced in recent years:
    a. Fuel prices vs. transportation of produce,
2. How do you cope with the following?
    a. Diseases, deaths, farm injuries
    b. Processing injuries

SEASONALITY:

1. How do you cope with the following?
    a. labour availability,
    b. demands for cassava and cassava products
2. When do you sell more, when do you sell less
3. When do you experience cash shortage?
4. Which time in the year is cash income important? E.g. school fees time

POLICIES/INSTITUTIONS

1. Policies and local by-laws influencing and regulating farming/processing
2. Advantages and limitations to these policies
3. Are there policies of waste disposal, sanitary conditions during processing etc?
4. Any taxes paid and how (District Assemblies, Internal revenue service?

ORGANISATIONS e.g. MOFA, NGOs, District Assembly)

Visits (how regular, planned or unplanned
What activities do they carry out with you?

LIVELIHOOD STRATEGIES
PRODUCTION

1. Main crops grown
2. Cassava varieties grown (improved, local)
3. Which is used for what? (*fufu*, *gari*, *kokonte*
4. Size of holdings
5. Outputs
6. Technologies used in production and adoption, who introduced them?
7. Were there some technologies you have discarded?
8. What gains have you made, using these technologies?
9. Disadvantages of the technologies

PROCESSING

1. Food items processed
2. Source of cassava/ other raw materials
3. Any new technologies Introduced to you? From where:
    a. how were they introduced to you
    b. Were there some technologies you have discarded?

c. Compare innovations to old practices
4. Constraints to farming/processing
5. What are your plans to improve on your income?

LIVESTOCK AND POULTRY

1. Livestock (cattle, goats, pigs, chickens, rabbits etc)–
2. Role of livestock in their livelihoods

COPING STRATEGIES

1. Do you sell some of your assets in times of stress? Which ones?
2. Do you work for others, which work and what is the mode of payment?
3. Do you migrate to other towns during crisis?
4. Do you engage in any other jobs?
5. Do you invest in assets for your future?

LIVELIHOOD OUTCOMES

More income/less income

1. Sources: farming, processing, livestock
2. other sources (pensions, remittances, other jobs etc)

Increased/reduced well-being

1. Voice in the community
2. Physical security of HH members
3. Peace of mind
4. Access to services (health, education, sanitation)
5. Pay bills (school fees, water, electricity, hospital)
6. Afford decent housing

Reduced vulnerability/worsened

1. Trends (soil fertility, inputs, chieftaincy, ethnic conflicts)
2. Shocks (fuel prices, lorry accidents, bush fires, injuries, vacation of post by employees) etc)
3. Seasonality (rainfall, supply of cassava and/or ingredients, fish, meat, labour, cash shortage)

Improved food security/worsened

1. Store food/sell all
2. Buy more? Physical, social and economic assess, quality of foodstuffs bought

Sustainable use of natural resources

1. Bush fire control
2. Erosion control
3. Forest degradation
4. Continuous cropping

APPENDIX 3: CHECKLIST FOR FARMERS SUPPLYING CASSAVA TO THE INTERMEDIARY FLOUR PROCESSOR – AMASA AGRO PROCESSING COMPANY

NAME:
LOCATION:
DATE OF INTERVIEW

- **Demographic characteristics of individuals** (sex, age, marital status, tribe, religion, household size, number of children.
- **Access to land**, type of tenure, rent if any, size of land holdings, acreage for cassava, acreage for other crops, *estimated cost of land*
- **Access to credit**, credit sources, credit assessed since start of cassava farming, interest on credit
- **Cassava varieties grown** (sources of varieties, types of varieties, perceptions of improved varieties over local varieties, % traditional, % improved varieties, cultural practices, yield per acre/ton, quantity sold, quantity stored for consumption, in what form is it stored?, where?, how important is each storage facility? What is the profitability of each way in which it is sold. Rank and calculate if possible
- **Labour** (availability, family or hired, costs of hiring), estimate the cost of personal and hired labour.
- **Access to tools and equipment**
- Total cost of producing an acre of cassava, Profit margins per acre (calculate from data collected).
- Number of bags sold to processors, frequency (weekly or monthly etc) cost of a bag of cassava
- Reduced costs or inputs for production? Perceptions

Processed Products

- Which end-products are obtained? (*gari*, *kokonte*, agbelima etc)
- Volume of product obtained per week?
- How is drying done? What are the constraints?
- Do you grade your end-products? Criteria for grading

Processing Costs

- Labour requirements per processing activity (including your own and hired labour)? Gender of workers?
- Expenditures for hired labour per day, week or year?
- Fuel and lubricants costs per week?
- Water costs per week?
- Packaging costs
- Other operating costs
- Equipment costs. List tools and equipment
- Cost of facilities (shed, drying floor, etc)
- How long can equipment and facilities be used
- Annual taxes and levies (if any)
- What do you charge for processing (per bag or other unit)?
- Other uses of facilities

- Problems with processing, please rank

Storage of End-products

- How and how long?
- Shelf-life (How long can it be stored)
- Problems with storage, please rank?
- Losses: causes, extent, control measures?

Marketing of End-Products

- Customers: Types of buyers, and gender, Where are they from?
- Contractual arrangements (cash or sale on credit)
- Quantities sold per week, month or year (seasonality)
- Prices obtained (seasonality)
- Where do you sell (seasonality)
- Marketing costs (depending on season):
- Has your business declined or expanded during the last five years?
- Do you have ready market for your produce? If you were able to produce more, could you sell it? If yes, why didn't you increase your production? Have you ever had requests in terms of quality and quantity from your customers whom you could not meet? If yes, from whom, and why couldn't you fulfil these demands?
- Problems with marketing, please rank

Group membership

- If there is an association: how is it organised? How many members does it have (male and female)? etc.
- Problems with association, please rank

APPENDIX 4: CHECKLIST FOR FOCUS GROUP DISCUSSION FOR FARMERS SUPPLYING CASSAVA TO AMASA AGRO PROCESSING COMPANY

NAME:
LOCATION:
DATE OF INTERVIEW

- **Access to land**, type of tenure, rent if any, size of land holdings, acreage for cassava, acreage for other crops, *estimated cost of land*
- **Access to credit**, credit sources, credit assessed since start of cassava farming, interest on credit
- **Cassava varieties grown** (sources of varieties, types of varieties, perceptions of improved varieties over local varieties, % traditional, % improved varieties, cultural practices, yield per acre/ton, quantity sold, quantity stored for consumption, in what form is it stored?, where?, how important is each storage facility? What is the profitability of each way in which it is sold.
- **Labour** (availability, family or hired, costs of hiring), estimate the cost of personal and hired labour.
- **Access to tools and equipment**
- Total cost of producing an acre of cassava, Profit margins per acre (calculate from data collected).
- Number of bags sold to processors, frequency (weekly or monthly etc) cost of a bag of cassava
- Reduced costs or inputs for production? Perceptions

Processed Products (NB: The farmer is not processing into flour)

- Which end-products are obtained? (*gari*, *kokonte*, agbelima etc)
- Volume of product obtained per week?
- How is drying done? What are the constraints?
- Do you grade your end-products? Criteria for grading

Processing Costs

- Labour requirements per processing activity (including your own and hired labour)? Gender of workers?
- Expenditures for hired labour per day, week or year?
- Fuel and lubricants costs per week?
- Water costs per week?
- Packaging costs
- Other operating costs
- Equipment costs. List tools and equipment
- Cost of facilities (shed, drying floor, etc)
- How long can equipment and facilities be used
- Annual taxes and levies (if any)
- What do you charge for processing (per bag or other unit)?
- Other uses of facilities

- Problems with processing, please rank

Storage of End-products

- How and how long?
- Shelf-life (How long can it be stored)
- Problems with storage, please rank?
- Losses: causes, extent, control measures?

Marketing of End-Products

- Customers: Types of buyers, and gender
  Where are they from?
- Contractual arrangements (cash or sale on credit)
- Quantities sold per week, month or year (seasonality)
- Prices obtained (seasonality)
- Where do you sell (seasonality)
- Marketing costs (depending on season):
  Transport
  Tolls and fees
  Handling charges
  Other costs
- Has your business declined or expanded during the last five years?
- Do you have ready market for your produce? If you were able to produce more, could you sell it? If yes, why didn't you increase your production? Have you ever had requests in terms of quality and quantity from your customers whom you could not meet? If yes, from whom, and why couldn't you fulfil these demands?
- Problems with marketing, please rank

Association

- If there is an association: how is it organised? How many members does it have (male and female)? etc.
- Problems with association, please rank

APPENDIX 5: INTERMEDIARY HIGH QUALITY CASSAVA FLOUR PROCESSOR BUYING CASSAVA ROOTS AND GRITS FROM FARMERS AND PROCESSORS (CHECKLIST)

NAME:

LOCATION:

- **Background to the Processing Company**
- **Access to land**, type of tenure, rent if any, size of land holdings, acreage for cassava, acreage for other crops, *estimated cost of land*
- **Access to credit**, credit sources, credit assessed since start of flour production, interest on credit
- **Cassava varieties grown (if intermediary is also a farmer)** - sources of varieties, types of varieties, perceptions of improved varieties over local varieties, % traditional, % improved varieties, cultural practices, yield per acre/ton, quantity sold, quantity stored for consumption, in what form is it stored?, where?, how important is each storage facility? What is the profitability of each way in which it is sold. Rank and calculate if possible
- **Access to tools and equipment**
- Total cost of producing an acre of cassava, Profit margins per acre (calculate from data collected).
- Cost of cassava roots (if the processor is not a farmer)

Raw material

- What is the source of raw material? What are the contractual arrangements with suppliers? How are prices and quantities set?
- Cost of buying grits from primary processors (cost per bag, cost of transportation, other handling charges)
- Quantities of raw material handled per week, seasonal changes?
- Maximum quantity of raw material you can process per day or per week (capacity)?
- Quality of raw material (Age)?
- Varieties used?
- Extension activities with primary processors (introduction of new cassava varieties, use of graters, fermentation process, drying process, etc)
- Do you grade raw material before processing and what happens to the various grades?
- Prices paid for raw material? Seasonal changes?
- Storage of raw material? How and how long?
- Problems related to raw material, please rank

Processed Products

- Which end-products are obtained? Is cassava grit or flour among the products?
- Ratio of fresh to processed products?
- Throughput per week. Volume of product obtained per week?
- How is drying done? What are the constraints?
- Do you grade your end-products? Criteria for grading

Processing Costs

- Labour requirements per processing activity (including your own and hired labour)? Gender of workers?
- Expenditures for hired labour per day, week or year?
- Fuel and lubricants costs per week?
- Water costs per week?
- Packaging costs
- Other operating costs
- Equipment costs. List tools and equipment
- Cost of facilities (shed, drying floor, etc)
- How long can equipment and facilities be used
- Annual taxes and levies (if any)
- What do you charge for processing (per bag or other unit)?
- Other uses of facilities
- Problems with processing, please rank

Storage of End-products

- How and how long?
- Shelf-life (How long can it be stored)
- Problems with storage, please rank?
- Losses: causes, extent, control measures?

Marketing of End-Products

- Customers: Types of buyers, and gender, Where are they from?
  What are their preferences (domestic or export markets)
- Contractual arrangements (cash or sale on credit)
- Quantities sold per week, month or year (seasonality)
- Prices obtained (seasonality)
- Where do you sell (seasonality)
- Marketing costs (depending on season):
- Has your business declined or expanded during the last five years?
- Do you have ready market for your produce? If you were able to produce more, could you sell it? If yes, why didn't you increase your production? Have you ever had requests in terms of quality and quantity from your customers whom you could not meet? If yes, from whom, and why couldn't you fulfil these demands?
- Problems with marketing, please rank

By-products

- Which by-products are obtained?
- Use of by-products
- Income obtained

Association

- If there is an association: how is it organised? How many members does it have (male and female)? etc.
- Problems with association, please rank
- Calculate total income (total sales – cost of production).

APPENDIX 6: DATA CODING SHEETS – *FUFU* PROCESSING HOUSEHOLDS
6A. QUALITATIVE

TOPIC	FINDINGS
PHYSICAL CAPITAL	
Energy	LPG (minor), Firewood (most), Charcoal (most)
Water	Pipe-borne, Bore-holes, very good and reliable, some households have their own sources, some buy from public stand pipes @ GHS.30/20 litre bucket
Sanitation	Urinals provided at most chop bars, no toilets, environment always clean because of regular inspection by health inspectors
Transportation	Tarred trunk roads in study areas, vehicles readily available to cart foodstuffs, poor feeder roads in the hinterland making cassava transportation difficult and expensive, one household owns a pick-up and uses it to cart produce form their own farm
FINANCIAL CAPITAL	
Sources of starting capital	Fiscal cash from parents, inherited chop bar business (majority); encouraged through use of family labour as apprenticeship, compensation from divorced husband (an individual), Refer quantitative data
Membership of savings groups	Susu groups, daily contribution ranging GHS 2-5; entitled to loans depending on financial standing, repayment for 3 months, no collaterals; take back your money after 31 days with one day"s contribution as tax,
SOCIAL CAPITAL	
Group membership	Traditional Caterers Association, monthly dues (GHS.50/week), weekly meetings, heir appellation is- *"Aduani pa"* and the response is *"ema nkosuo" "ema aware so"*. Benefits assistance during sickness or death, birthday and child out-dooring of new born child, food shows, assistance from GTB, Unilever and CIBA
Access to information	Information on meat hygiene from Vet, Ghana Health Service Sanitation inspectors, GTB, Unilever and CIBA. Own ICT equipment such as radio, TV and cell phones. Cell phones seen as a prestige in society; used to call cassava suppliers sometimes, but used mostly for social activities. Listen to radio and TV programmes for news and mostly for social activities
HUMAN CAPITAL Quantitative data	
NHIS registration	No because they did not understand the concept Some did not have money to register
Health status	Generally good. Minor ailments exist but considered as normal
Ability to labour	Good because of good health status
NATURAL CAPITAL	
Land	Easy access, Land owned by families, consult family heads for access, settlers either hire or have outright purchase, some of the chop bars located on family plots, rented plots, permanently acquired. Rents ranged between GH¢2.00 and GH¢5.00 per month. Some processing households have farms. Men work farms and supply cassava and ingredients, women operate the chop bars. These items are paid for because farming is another enterprise. Intra-household decisions on managing the farm and the chop bar are manifested by these households.
LIVELIHOOD OUTCOMES	
Income/well-being	Improved incomes (especially *Sikafour and Modenbofour and few Ohiafour.* The only *Sikani* complete a new house, all wealth groups sent their children to basic, secondary and tertiary institutions, good health status for all, have their peace of mind, some *Modenbofour* and *Ohiafour:* still face financial difficulties and cannot operate fully. Still buy on credit and pay afterwards.
Food security	Have physical access, financial access is not the best especially for the *Modenbofour* and *Ohiafour*. No lab assessment for safe and nutritious food. Households do not store food items as some are perishable

6B CODING FOR QUANTITATIVE DATA

Variable	Code name	1	2	3	4	5
Location	locate			sokode	suhum	
Sex	sex	M	F			
Wealth group	wealthgr	rich	modenbo	poor	v poor	
Age	age	21-30	31-40	41-50	51+	
Household headship	head	maleh	femaleh			
Education	educate	nil	basic	secondary	tertiary	
Marital Status	mstatus	not yet	married	widowed	divorced	
Tribe	tribe	akan	ga	krobo	ewe	
Religion	religion	christian	islam			
NHIS registration	nhis	yes	no			
Radio	radio	yes	no			
Cell phone	mobile	yes	no			
Television	tv	yes	no			
House ownership	houseown	personal	hired	family		
House type	hstype	mudbrick	cement			
Source of capital	sscapita	took over	parents	petty trading	former hubby	drink bar+chop bar

QUALITATIVE CODING SHEET - *FUFU* PROCESSING HOUSEHOLDS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
locate	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Sex	1	2	2	2	2	2	1	2	2	1	2	2	1	1	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	1
wgrp	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	3	2	2	2	3	2	1	1	2	2	2	2	2	2	2	3	3	2	2	2	3	3	2	2	2
age	4	6	4	6	6	6	5	4	5	3	4	6	5	4	5	6	6	6	6	6	5	6	6	5	4	6	5	5	6	6	5	6	6	5	5	5	6	6	4	6
head	1	2	1	1	1	1	1	1	1	2	2	2	1	1	1	2	1	1	1	1	1	1	1	2	2	1	1	1	2	2	2	2	2	2	1	2	2	2	2	1
educate	2	1	2	2	2	1	23	2	2	2	2	2	3	2	2	1	1	2	1	1	3	2	2	2	2	2	1	1	2	2	1	2	2	1	3	2	2	2	2	2
mstatus	1	2	2	4	4	2	2	2	2	4	2	4	2	1	2	2	4	4	4	4	2	2	2	3	3	4	2	2	2	4	2	4	2	2	2	3	4	2	3	2
tribe	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	1	3	3	4	1	2	1	4	1	4	1	2	5	3	4	3	3	1
religion	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1
nhis	1	2	1	2	1	1	2	2	2	2	2	2	2	1	2	1	2	1	2	2	1	1	1	1	2	1	1	2	1	1	2	1	2	2	1	1	1	1	2	2
radio	1	1	1	1	1	1	1	1	2	1	2	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
mobile	1	1	1	1	1	1	1	1	2	1	2	1	2	1	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2	1	1	1
tv	1	1	1	1	1	1	1	1	2	1	2	1	2	1	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2	1	1	2
hstype	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	2
hsown	1	2	1	2	1	2	2	3	2	2	3	1	3	2	3	3	1	2	2	3	1	1	1	2	1	1	2	2	2	2	3	3	1	1	1	1	1	1	1	2
sscapita	1	2	2	2	2	3	1	2	2	3	1	3	1	4	3	1	2	2	5	2	5	1	1	2	2	2	2	1	5	2	1	1	5	5	5	1	3	3	3	5

APPENDIX 7: DATA CODING SHEETS – *KOKONTE* PROCESSING HOUSEHOLDS

7A. QUALITATIVE

TOPIC	FINDINGS
PHYSICAL CAPITAL	
Type of house	Cement and mud bricks, mud bricks built through pooled labour, using relatives and friends. Built on taboo days, food is prepared for them.
Energy sources	Forikrom connected to national grid, no electricity in Totsunya-Okper, households use mainly charcoal and firewood
Water	Pipe-borne, Bore-holes, very good and reliable. In Forikrom, some households have their own sources, some buy from public stand pipes @ GHS.30/20 litre-bucket. Water management committee in Forikrom, none in Totsunya-Okper
Sanitation	Public KVIP in both villages, 4 households have their own
Transportation	Tarred trunk roads in study areas, vehicles readily available to cart foodstuffs, poor feeder roads in the hinterland making cassava transportation difficult and expensive. TRICYCLE
FINANCIAL CAPITAL	
Sources of starting capital	Almost all inherited farm land from parents, with planting materials.
Sources of income	Farm, Pension, remittances; one built house through remittances, one female receives from former husband for upkeep of her two children; one respondent sponsoring her sister"s education, another female remits her parents in another house in the town.
Inflows	Four households receive remittances,
Bank savings/loans	3 in Forikrom saving with GCB, one took loan from Ecumenical Church Fund in 2005. Okper farmers took loan from ADB, Koforidua, early 1990s, found procedures too complex, spent much time travelling, spent much of the money on tips for banking staff, vowed not to take bank loans anymore, affected group sustainability, group exists but not effective.
SOCIAL CAPITAL	
Group membership	15 responded in Forikrom are members of ABOFAP; secondary data on ABOFAP provided by leadership, more on Abronu Organic farming by ABOFAP during FGD. Sponsored by HPI, ADRA, MOFA
Access to information	Own ICT equipment such as radio, TV and cell phones (quantitative data available). Cell phones seen as a prestige in society; used mostly for social activities. Listen to radio and TV programmes for news mostly for social activities, especially films and football. Visit others to watch TV. In Okper, poor reception, one particular place to get Vodafone network, com centre at Osuboe, 2 km away. Com centre operator, no electricity, recharges at Huhunya 5 km away. 2 com centres in Forikrom
HUMAN CAPITAL	
Educational status	Quantitative available, Forikrom, basic and JHs available; Okper, children attend primary at Osuboe/Obawale, JHS at Obawale. No SSS, go to District capitals.
Health	
health	
NHIS registration	No because they did not understand the concept Some did not have money to register Refer quantitative data.
Health status	Generally good. Minor ailments exist but considered as normal. Refer quantitative data.
Ability to labour	Good because of good health status
NATURAL	

CAPITAL	
Land	Easy access. Through inheritance or acquired through family heads. Immigrants hire. Cost is GHS 20.00/yr. All working on family lands. Holdings range between1-2 ha. Land fragmentation prevents expansion of farms
Hills	Easy access for drying *kokonte* at Forikrom. Chips not covered in the evenings, at the mercy of the dew
Rivers	Asukantia at Forikrom, Mogyawuie at Okper. Household use, nurseries.
STRATEGIES	Farming, brick laying, shoe repairs, hiring out labour to others and construction work. One farmer in Forikrom has chairs and canopies for hiring for social events
Vulnerability	Increases in prices of inputs; over population, land fragmentation, declining soil fertility. ABOFAP organic farming may help
Livelihood Outcomes **Impact on environment**	Most have low incomes, able to afford education for children, all are healthy, poor economic access to food. Agroforestry programme restored drying up of River Asukantia, improved environment in Forikrom. Secondary data provided using a flyer. Focus group discussion

7B CODING FOR QUANTITATIVE DATA

		1	2	3	4
Location	locate	Forikrom	T-Okper		
Sex	sex	M	F		
Wealth group	wealthgr	rich	modenbo	poor	v poor
Age	age	21-30	31-40	41-50	51+
Household headship	head	maleh	femaleh		
Education	educate	nil	basic	secondary	tertiary
Marital Status	mstatus	not yet	married	widowed	divorced
Tribe	tribe	akan	ga	krobo	ewe
Religion	religion	christian	islam		
NHIS registration	nhis	yes	no		
Radio	radio	yes	no		
Cell phone	mobile	yes	no		
Television	tv	yes	no		
House ownership	houseown	personal	hired	family	
House type	hstype	mudbrick	cement		

a. CODING SHEET- *KOKONTE* PROCESSING HOUSEHOLDS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	35	37	38	39	40
locate	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Sex	1	1	1	2	2	1	2	2	2	2	1	2	1	2	1	2	1	1	2	2	1	1	1	1	2	2	1	2	1	2	1	1	1	1	1	1	1	1	1	1
wgrp	2	2	2	3	2	3	2	2	3	3	3	3	3	2	3	3	3	2	3	3	3	3	2	3	2	3	2	2	2	3	3	2	3	3	2	3	3	3	3	3
age	2	2	3	3	1	3	2	3	2	4	2	4	2	4	2	4	3	3	3	3	3	4	4	2	2	4	3	3	3	2	3	3	4	2	4	3	3	3	3	4
head	1	1	1	2	1	1	2	2	2	2	1	2	1	2	1	1	1	1	12	1	1	1	1	1	2	1	1	2	1	2	1	1	1	2	1	1	1	2	1	1
educate	3	1	1	1	2	1	1	1	2	1	1	1	1	1	3	1	1	1	2	2	5	2	1	2	1	1	2	1	1	1	3	2	2	1	1	1	1	1	2	2
mstatus	2	2	2	3	2	2	3	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	4	2	2	2	3	2	3	2	3	4	2	3	2	2	3	2	4
tribe	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
religion	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
nhis	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	2	2	2	1	2	2	2	1	1	1	1	1	2
radio	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1
mobile	1	2	2	2	2	2	2	1	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
tv	1	2	2	2	2	2	2	1	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
hsown	1	1	1	2	1	2	1	1	2	2	2	2	2	1	1	1	1	1	1	2	2	2	1	2	1	2	1	1	1	2	2	1	2	2	1	1	1	1	1	1
hstype	1	1	1	2	1	2	1	1	2	2	2	2	2	1	2	2	2	1	2	2	2	2	1	2	1	2	1	1	2	2	2	2	2	2	1	2	2	2	2	2

APPENDIX 8: DATA CODING SHEETS – HOUSEHOLDS SUPPLYING AMASA
8A QUALITATIVE

TOPIC	FINDINGS
PHYSICAL CAPITAL	Most houses are mud brick types roofed with thatch. Built mostly by the Ewe settlers. They have their original homes in the Volta region because they go back for funerals. The few cement block buildings belong to the native Ga. Some have mud-brick houses. Good access to safe drinking water from bore-holes fitted with pumps. Limited number of KVIPs, pit latrines especially in Hobor and Kwame Anum. The KVIPs, built by DANIDA Firewood for cooking;. Use of charcoal is minimal, no household using LPG. Poor road network. Roads are not tarred, heavy duty vehicles that cart sand to the urban areas have contributed more to damage on the already bad roads. The distance between Amasaman to Hobor 24 km but it takes 45 minutes because the road is poor. The main bridge that links Ayikai Doblo and Ashalaja over a tributary of River Densu collapsed in September 2008. Commuters divert through Nsawam or Kasoa to Accra
FINANCIAL CAPITAL	Poor access to credit. Formal financial institutions are found in the district. They are not aware of the channels to use, complained of loan process being complex. Depend on their own sources of capital and informal sources like relatives and friends. Amasa assists, ploughs lands for farmers credit basis. Supply cassava planting materials free. An informal financial group, the „Dekavi" *susu* group was found in Hobor. It was instituted by the Ewe migrants who felt the need to assist each other in times of financial crisis and membership was limited to only the Ewes. Original objective: to assist members in times of funerals. Now extended to all other sectors and as long as one is a paid up member, he/she is entitled to financial assistance. „Dekavi" *susu* group assists members with short term loans. Monthly contribution of members is GH¢2.00. Formed in 1990s. A member is allowed to borrow a minimum of GH¢10.00 at an interest rate of 25% for a period of 4 months. Non-members borrow a minimum of GH¢10 for a period of 3 months at an interest rate of 50%. The respondents in Hobor were all members of the *susu* group.
SOCIAL CAPITAL	Apart from the „Dekavi" *susu* group, there is no other formal social group in the area. Farmers aware of advantages of organised groups, they have problems organising one. FGD created more awareness in them. Limit exploitation by middlemen Farmers received information on farming and marketing from Amasa, other farmers and traders. Amasa: information on improved cassava varieties and planting in rows at the correct spacing Traders inform them of the current demand and market prices of *gari* and *agbelima* in Kasoa and Accra. Another source of information is the use of ICT (radio, TV and mobile phones
HUMAN CAPITAL	Refer to quantitative data.
NATURAL CAPITAL	Land is inherited, hired, outright purchase. Share cropping not practised because of conflicts in sharing. Land holdings of settler farmers range between 2-10 acres (1-5 ha). Demand for sand for building purposes has been on the rise in areas closer to Accra. Landlords have found the lease of land to sand extractors as an alternate livelihood option as they get a lot of income from this source. Affecting cash crop farming negatively in Obeyie, and Ayikai Doblo areas. Most farms have been destroyed People have started migrating to other districts. In Hobor, Kwameanum and Ashalaja most of the land leased to commercial pineapple farmers.
LIVELIHOOD STRATEGIES	Farmers sell some of their cassava roots to Amasa, primary processors and middlemen and other buyers from Accra and Kasoa. Major market in Hobor Prices not very stable and fluctuate from season to season. During urgent need for cash: payment of school fees, ailment or bereavement forced to sell sometimes at lower prices. Also during periods of glut.

8BCODING FOR QUANTITATIVE DATA-

		1	2	3	4
Sex	sex	M	F		
Age	age	21-30	31-40	41-50	51+
Education	educate	nil	basic	secondary	tertiary
Marital Status	mstatus	not yet	married	widowed	divorced
Tribe	tribe	akan	ga	krobo	ewe
Religion	religion	christian	islam		
NHIS registration	nhis	yes	no		
Radio	radio	yes	no		
Cell phone	mobile	yes	no		
Television	tv	yes	no		
House ownership	houseown	personal	hired	family	
House type	hstype	mudbrick	cement		
land ownership	land access	own	hired		
land holding	land holding	1-3acr	4-6acr	>6acr	

c. HOUSEHOLDS SUPPLYING AMASA WITH CASSAVA ROOTS AND GRITS

resp	sex	age	edu	mstatus	tribe	rel	nhis	radio	mobile	tv	land	Lhold
1	1	1	1	1	1	1	1	2	1	1	1	3
6	1	1	1	2	2	2	1	2	1	2	2	2
3	1	2	2	1	1	1	2	1	2	1	1	2
4	1	3	3	2	2	1	2	1	1	2	2	2
5	1	1	1	2	1	1	2	1	1	1	1	2
6	1	1	2	2	2	1	1	1	2	2	1	1
7	1	1	1	2	2	1	1	1	1	2	1	1
8	1	2	2	2	2	1	2	1	2	1	1	2
9	1	2	1	2	2	1	1	1	1	2	1	1
10	1	3	1	2	2	1	1	2	2	2	1	1
11	1	1	1	2	1	1	2	1	1	1	1	2
12	1	2	1	2	2	1	1	1	2	2	1	1
13	1	4	2	2	1	1	2	1	1	2	1	2
14	1	3	2	2	2	1	1	2	2	2	2	1
15	1	1	1	2	1	1	2	1	1	1	1	2
16	1	2	2	2	2	1	1	1	1	2	1	1
17	1	3	2	2	2	1	1	2	1	2	1	1
18	1	2	2	2	2	1	1	1	2	2	2	1
19	1	1	1	2	2	1	1	1	1	2	2	1
20	1	3	2	2	1	2	2	2	1	2	1	2
21	1	4	1	2	2	1	1	1	2	1	2	1
22	1	2	2	2	1	1	2	2	1	2	1	2
23	1	2	1	2	1	1	2	1	1	1	1	2
24	1	3	2	2	2	1	1	1	1	2	2	1
25	1	2	1	2	1	1	2	1	2	2	1	2
26	1	3	1	2	2	1	1	1	2	2	2	1
27	1	3	2	2	2	1	1	1	1	2	2	1
28	2	1	1	2	1	1	2	1	2	2	1	2
29	2	3	1	2	2	1	1	1	1	2	2	1
30	2	1	2	2	2	1	1	2	1	2	2	1
31	2	1	1	2	2	1	1	1	2	2	2	1
32	2	2	2	2	1	2	1	1	1	2	2	1
33	2	2	2	2	2	1	1	1	2	2	2	1
34	2	1	1	2	2	1	1	1	2	2	2	1
35	2	1	2	2	1	2	1	2	1	2	2	1
36	2	2	1	2	2	1	1	1	2	2	2	1
37	2	3	1	2	2	1	1	1	2	2	2	1
38	2	1	2	2	1	1	1	2	2	2	2	1
39	2	3	1	2	2	1	1	1	2	2	2	1
40	2	1	2	2	2	1	2	2	2	2	2	1
41	2	3	1	3	1	2	2	1	1	2	2	1
42	2	2	1	3	2	2	1	2	1	2	2	1
43	2	2	1	3	2	2	2	1	1	2	2	1

APPENDIX 9: CODING FOR VALUE CHAINS

a. THE *FUFU* VALUE CHAIN

ACTORS	FUNCTIONS	RELATIONSHIPS/LINKS	CONSTRAINTS	OTHER REMARKS
Farmers	Produce cassava	Linked to middlemen, processors and final consumers	Improved cassava varieties not good for pounding *fufu*	Not common in Sokode area as in Suhum because farmers and processors live in the same village
Middlemen	Buy cassava from farmers and sell to *fufu* processing households and consumers	Linked to farmers, processors and consumers		Informal contracts with processors for the supply of cassava
Fufu processing households	Process cassava into pounded *fufu*, prepare other food items such as banku, omo tuo, ampesi, *kokonte*. Some add drinking bars	Farmers, middlemen, consumers	Sometimes delays in supply of cassava, full bag of cassava could get rotten, drudgery in pounding, time-consuming, difficult to get pounding men regularly, Consumption goes down during Ramadan, farming season. Goes up during weekends (funerals) and market days	Drudgery, time consuming and unhygienic nature calls for instant *fufu* preparation. The tow locations located on Kumasi Accra highway, Ho-Accra Highway, Hohoe-Accra highway
Consumers	Buy cassava or *fufu*	Farmers, processors, middlemen	Some do not like the unhygienic nature of *fufu* preparation	Calls for convenient and hygienic forms of *fufu*. Prefer sticky, smooth *fufu* devoid of lumps
SERVICE PROVIDERS				
Formal Financial services	Provide credit facilities	Farmers, processors	Processors took loan from Mumuadu in 2003; do not like weekly repayment conditions. No more loans. Cumbersome loan procedures	Available banks: GCB, ADB, Mumuadu Rural Bank (Suhum), North Tongu Rural Bank, Barclays Bank, SSB Bank, GCB, NIB (Ho), Weto Rural Bank at Kpeve.
Susu groups (informal)	Provide savings and credit schemes	Processors, retailers		Found in Suhum. About 65% Processors save with susu groups. Daily contributions range from GHS2.00-%.00. Obtain loan depending on financial status. Duration is 3 months. No loan, take your contribution after 31 days. A day‟s contribution is taken by collector as his benefit.
Input suppliers	Supply cassava, chicken, beef, goat meat, grasscutter, fish , ingredients		Price hikes during fuel price hikes	24 hr supply of grasscutter in Sokode. Allow for good patronage.

Wage workers	Assist in *fufu* processing	Processors	„Pounding man" sometimes refuses to report for work without permission, creating uncomfortable situations.	An advantage to adopt instant *fufu* processing
Vet officers	Physical examination of animals before slaughter. Post-mortem examination of slaughtered animals	Processors and Health inspectors	-	Contributing to safe and hygienic food
Health Inspectors	Post-mortem examination of slaughtered animals Issuing health certificates Inspecting premises regularly for proper sanitation	Processors and Vet officers	-	Contributing to safe and hygienic food
ENABLING ENVIRONMENT				
District Assembly	Allocating land, market stalls, licence chop bars, and collect taxes	Processors	-	Licence fee +GHS 12.00. paid annually or quarterly instalments.
Crop research Institute	Developed improved cassava varieties	farmers	All improved varieties are not good for *fufu*	Increase in yields from 10mt to 20mt
Food Research Institute	Developed instant *fufu* powder (cassava, plantain, cocoyam and yam)	Processors, middle income group		Adoption is low in the country
Ghana Tourist Board	Inspects chop bar premises to make sure they conform to sanitation rules	Processors		Almost repeating the work of Health Inspectors
Unilever Ghana Ltd.	Distributes products on promotion basis; e.g. annarpuna iodised salt, Royco cubes for seasoning, table covers, cups and water jugs. Organise food fairs	processors	-	Introducing competition among processing households.

b. THE *KOKONTE* VALUE CHAIN

ACTORS	FUNCTIONS	Relationships/links	CONSTRAINTS	Other remarks
Farmers-processors	Produce cassava Process cassava into *kokonte*	Linked to middlemen, processors and final consumers	Improved cassava varieties not good for pounding *fufu* No Agric Extension Agents in Okper Poor quality of *kokonte* Big size of chips, dry almost two weeks,	Ankrah, Pepetifi, Nigeria, Taller, Yaababy, Bokentema, Ankuma, Bosomnsia, Oshewkaw, Kwatsam, Esi Panyin, Borkese, Tuobodom, Ampe-nkyene, Ajoomo, Baatia, Aserani, Ankoma, Kutuma, Tuaka, Asrodo, Biafra, Gbeze, and Train-Wusiw
Middlemen/retailers	Buy cassava and *kokonte* and sell in urban markets at Techiman, Nkoranza, Klo-Agogo, Nkurankan	Linked to farmers, processors and consumers	Market Queens insist they sell to market retailers and not consumers direct	
Consumers	Buy *kokonte* and cassava	Linked to middlemen/retailers		Prefer whitish *kokonte* without odour
SERVICE PROVIDERS				
Formal Financial services	Provide credit facilities	Farmers, processors	Complex procedures at the banks	
Wage workers	Provide labour especially on farms	Farmers, processors	Usually children and dependants who are school children	Pooled labour known as nnoboa or katsu. 5-8 members work on each other‟s farm on rotation basis. Food is provided by wives. Labour readily available
Input suppliers	Provide inputs such as hoe, cutlass, seeds, fertilizer, insecticides, jute sacks	Farmers, processors	Regular fuel price hikes leading to increased costs of inputs	Inputs readily available
MOFA Extension	Provide agric advice	Farmers, processors	No Agric Extension Agents in Okper	
ADRA	Provide agricultural advice and on agroforestry (Forikrom)	Farmers	-	Agroforestry well developed in Forikrom
ENABLING ENVIRONMENT				
District Assembly	Allocating land, market stalls, and collect taxes	Farmers, processors		Use tax money to develop districts
Crop research Institute	Developed improved cassava varieties	Farmers		All improved varieties good for *kokonte*, Increase in yields from 10mt to 20mt
Food Research Institute	Developed *kokonte* mini-chip technique	Processors, middle income group	Cassava slicing machine too expensive	Adoption is low in the country

c. THE HQCF VALUE CHAIN

ACTORS	FUNCTIONS	Relationships/links	CONSTRAINTS	Other remarks
Individual Farmers-processors Caltech, GWE, Motherwell Farms	Produce cassava Sell some to Amasa and other processors	Linked to Amasa, middlemen, processors and final consumers	Improved cassava varieties not good for pounding *fufu*	Sell cassava using ropes (kpaa, or aborwuieve ka) measurement". Estimates done. Farmers happy with Amasa buying from them because of bulk payment and ploughing of fields
Primary grits processors	Process cassava into grits and sell to Amasa, some buy cassava and process into grits	Linked to farmers, Amasa	-	
Amasa	Buys cassava and grits and process into HQCF. Brand is Eagle brand	Farmers, plywood and food manufacturers	Poor access to credit	Buys roots and grits from farmers. Buys roots on the field, uproots with own labour. Ploughs fields for farmers on credit, supply planting materials free. Most data were secondary data from Amasa
Food manufacturers	Buy HQCF from Amasa and process into instant *fufu* powder, dried agbelima and banku-mix	Amasa, consumers	-	Elsa Foods, Praise Export Services, Neat, Ghanafresh, Rosafric, Limex and Selasie. Linked to export markets Bakeries also use HQCF as substitute to wheat flour
Plywood producers	Buy HQCF from Amasa and use as adhesives in the plywood industry	Amasa, consumers	-	
Distributors	Buy plywood and food items and sell to retailers and consumers	Amasa, plywood and food manufacturers, retailers and consumers	-	
Consumers	Buy food items and plywood for use	Distributors and retailers	High cost of instant *fufu* powder Poor education on instant *fufu* preparation	
SERVICE PROVIDERS				
Financial services	Provide credit facilities	Farmers - processors, Amasa	Complex procedures	Amasa benefited from loans from NBSSI, applied to ECOWAS bank, Lome but nor materialised Farmers access loans from only Dekavi

				susu group
Input suppliers	Provide inputs such as hoe, cutlass, seeds, fertilizer, insecticides, jute sacks. Amasa heavy duty equipment from suppliers	Farmers - processors, Amasa		
Mill operators		Farmers - processors, Amasa		
Transporters		Farmers - processors, Amasa		
ENABLING ENVIRONMENT				
Research Institutes FORIG, CRI, FRI	Carry out research on cassava and cassava processed products	Farmers - processors, Amasa	-	Secondary data
RTIP	Carry out extension services on improved cassava varieties	Amasa		Amasa is a secondary multiplier of improved cassava varieties
FDB	Inspect HQCF and certify for Amasa to ensure safety, quality and efficacy	Amasa		
GSB	Certification of Amasa¨s products	Amasa		