

ASSESSING THE ROLE OF THE ACTORS ALONG THE CASSAVA VALUE
CHAIN IN SELECTED COMMUNITIES IN MAMPONG IN THE ASHANTI REGION

KNUST

BY

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A thesis submitted to the Department of Marketing and Corporate Strategy of the Kwame Nkrumah University of Science and Technology in partial fulfillment of the award of the degree of Master of Business Administration (Strategic Management and Consulting).

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DECLARATION

I hereby declare that this submission is my own work towards the Masters of Business Administration and that, to the best of my knowledge, it contains no material previously published by another person or material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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DEDICATION

This thesis is dedicated to my godfather Daasebre Osei Bonsu II, Omanhene of Asante Mampong Traditional Area and Wife, Mrs. Janet Gyimah-Kessie.

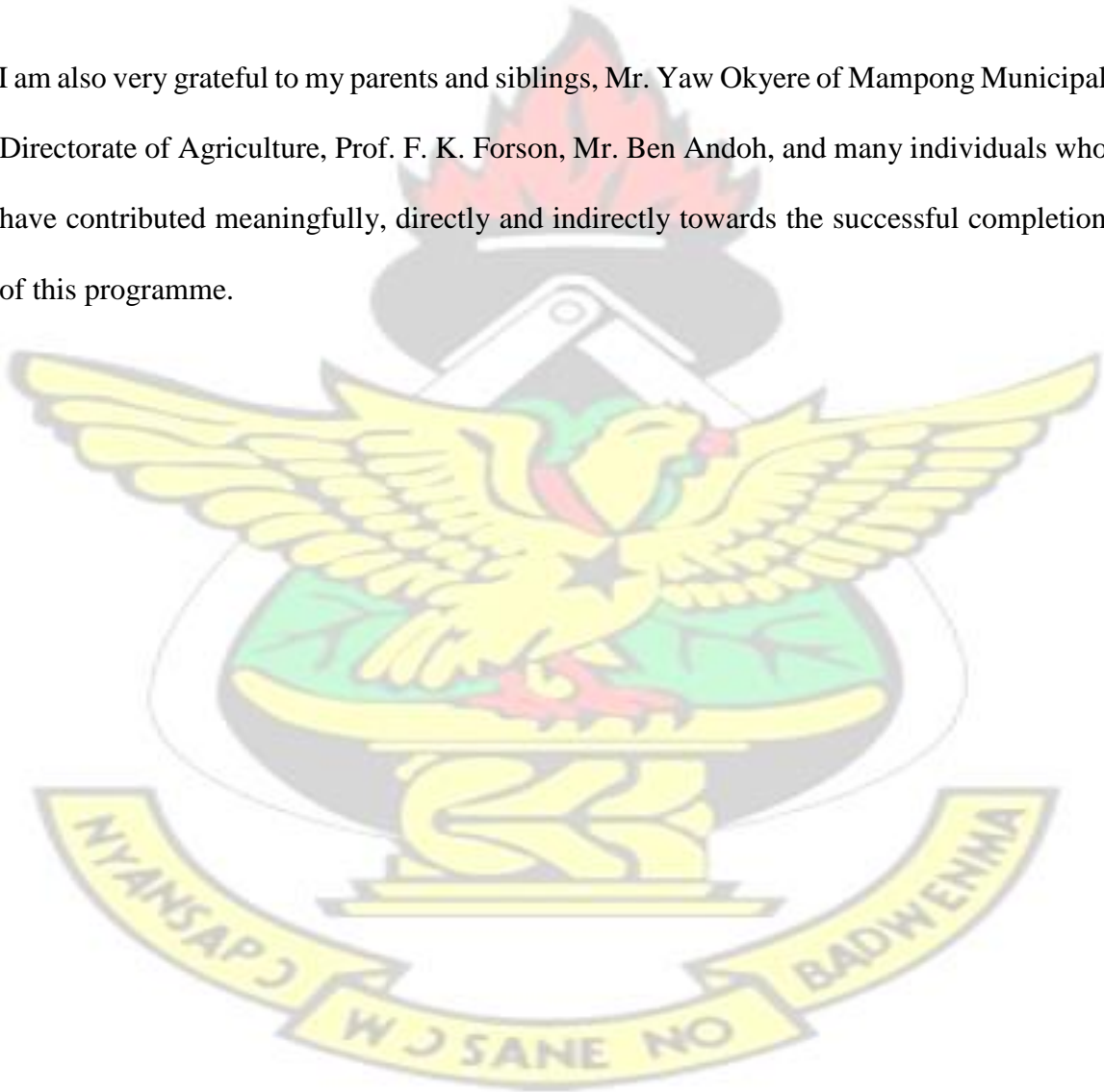


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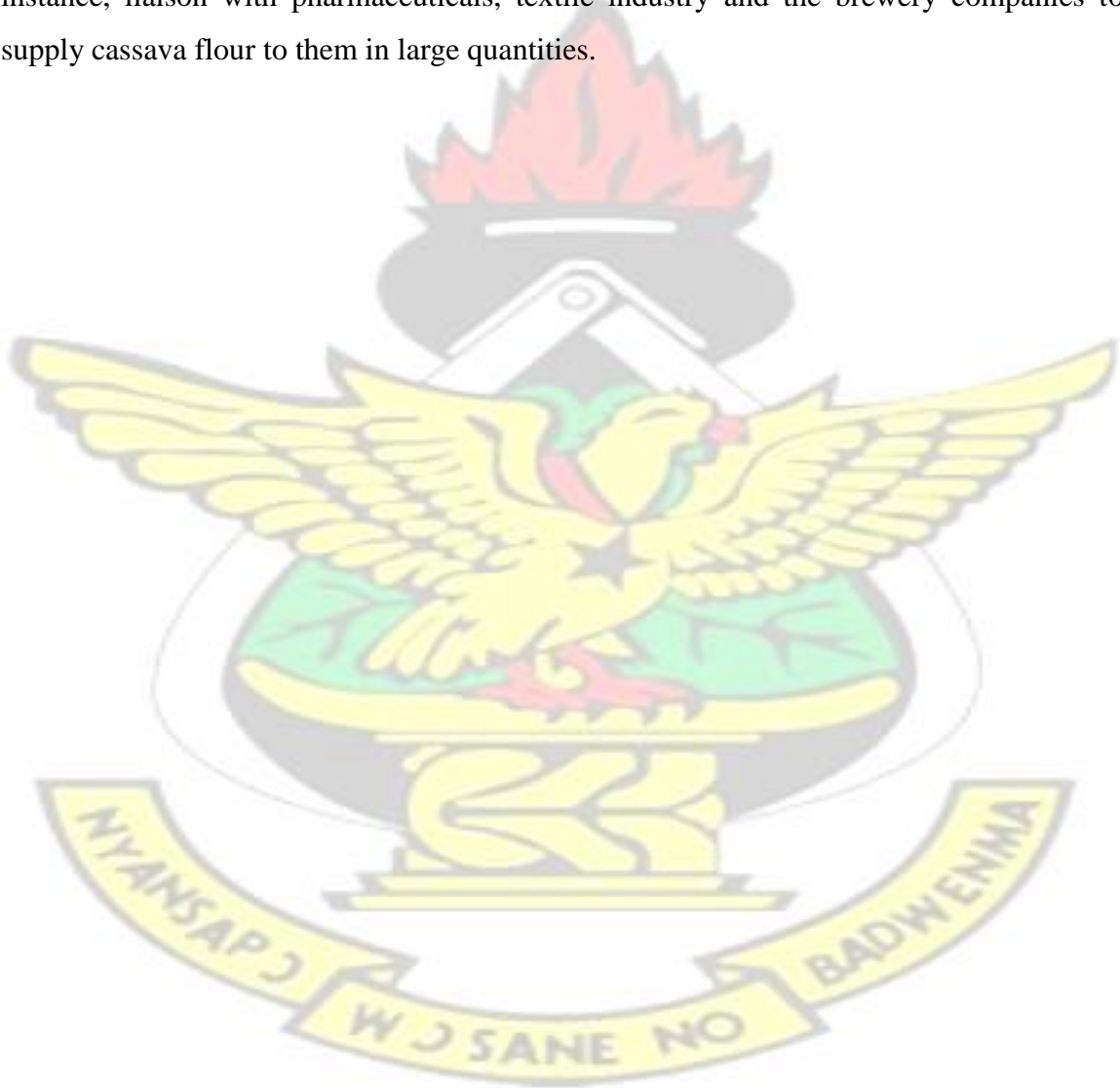


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ABSTRACT

The root and tuber (R&T) chains in Ghana has been noted to be underdeveloped. Processing is limited to traditional food stuff, mainly cassava based. The cassava value chain was also marked by weak governance within (i.e. self-regulation) and outside (e.g. laws, rules and regulations). The study which sought to assess the role of the actors along the cassava value chain in the Mampong Municipality was conducted using both formal and informal open and close ended questionnaires with cross section of the people in the municipality as well as observation techniques for the primary data. Also secondary data from publications, published and unpublished research documents were sourced. In all 75 farmer households, 10 cassava processors and some support service providers were interviewed using the quota sampling technique. Also 12 farmer field fora sites and upgrading of one cassava processing centre into a good practice centre which serve as the medium through which farmers, processors and other stakeholders learn to share knowledge and skills using focus group discussion approach. For instance, the respondents asserted that, the introduction of new and improved roasting stove has increased the output per worker per day from 45 kilo grams to 100 kilo grams which was about 150 % increase. In relation to cassava production, an acre of land produces between 18-21 tons which was

far higher previous output of 9-12 tons per acre. The study revealed that, the challenges facing the cassava value chain industry in the municipality includes; weak governance for associations, low working capital, no grading and standards for processes cassava products, and inefficient market for the cassava produce. It was recommended that, producers and processors as well as MoFA agencies in the cassava industry in the municipality should endeavour to build strong farmer groups/associations and intensify marketing search to identify new markets by adopting promotional strategies and distribution channels, for instance, liaison with pharmaceuticals, textile industry and the brewery companies to supply cassava flour to them in large quantities.



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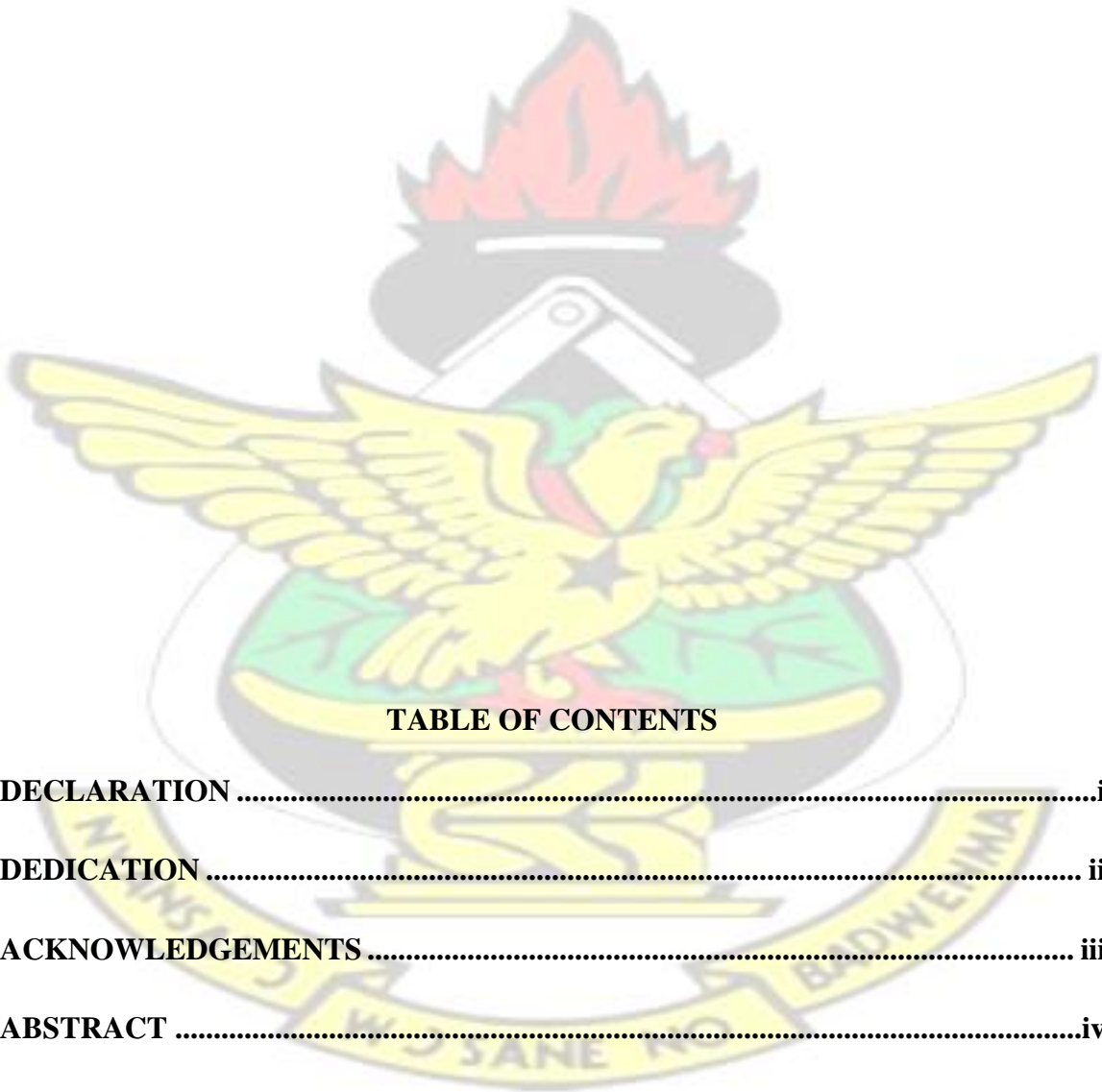


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LIST OF ABBREVIATIONS



BAC	Business Advisory Centre
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GPC	Good Practice Centre
GPRS	Ghana Poverty Reduction Strategy
HQCF	High Quality Cassava Flour
IFAD	International Fund for Agricultural Development
IITA	International Institute for Tropical Agriculture
METASIP	Medium Term Agriculture Sector Investment Plan
MiDA	Millennium Development Authority
MOFA	Minister for Food and Agriculture
NPSC	National Programme Steering Committee
PCO	Programme Coordinating Office
PSI	Presidential Special Initiative, Ghana
R&T	Root and Tuber
REP	Rural Enterprise Project
RPMIC	Regional Processing and Marketing Initiative on Cassava
RTEP	Root and Tuber Expansion Programme (Nigeria)
RTIMP	Root and Tuber Improvement and Marketing Programme (Ghana)
RTSC	Rural Technology and Science Centre
SWOT	Strengths, Weakness, Opportunity and Threats
VCDA	Value Chain Development Approaches

CHAPTER ONE

INTRODUCTION

1.1 Introduction

The economy of Ghana has experienced petite or no structural change over the past years. Agriculture remains the dominant sector which continues to generate income, employment and contributes economic output of the nation. Technological change has been very slow, most farmers still use only the cutlass and hoe, no or less value addition (processing) and production is still largely rain-fed making low productivity the reoccurring phenomena.

About 34% of Ghana's Gross Domestic Product comes from Agriculture of which cassava, yam and cocoyam contributes 50% (MoFA, 2010). About 55% of farmers in Ghana grow root and tuber crops and any attempt to add value to the production and processing can be a major poverty reduction strategy for the country (RTIMP, 2004). Women play very dominant role in the production of root crops. According to IFAD 2010 report, about 90% of people who market and process root and tubers into various forms are women (IFAD, 2010; RTIMP, 2006).

Root and tuber crops are considered to be food security crops in Ghana and their consumption forms between 16 and 31% of per capita daily calorie consumption in the country (GLSS 5; GSS, 2005). The Government of Ghana has recognized the importance of root and tuber crops in terms of contribution to employment generation and poverty alleviation and has formulated a policy targeted at root and tuber crop improvement as one of the key drivers of growth in the national economy through the value chain approach.

1.2 Problem Statement

Past interventions into cassava production by government and non-government agencies have succeeded in increasing production. Often, the increased production resulted in production glut or excess. For instance the implementation of Root and Tuber Improvement and Marketing Programme (RTIMP) which happens to be the second phase of Root and Tuber Improvement Programme (RTIP) with its numerous strategies have motivated both processors and producers for assurance of ready market for produce and advance improvement in their working capacity.

There are five main actors identified within the cassava value chain in Ghana. They include agencies of Ministry of Food And Agriculture agencies in the municipality, subsistence and commercial cassava producers, marketers of fresh and processed cassava for human consumption and processors of cassava i.e. for human consumption, livestock feed and industrial uses. In addition, other support service providers along the chain include financial service providers, transporters and extension service units.

The study sought to assess the role of each identified player along the value chain so as to profess recommendations to enhance the development of the cassava industry in the selected communities in particular and in Ghana in general.

1.3 Objectives of the Study

The research objectives include the following:

- To identify cassava value chain stakeholders and assess the institutional settings in the municipality

- To examine the socio-economic, production, processing and marketing constraints in cassava value chain in the municipality.
- To evaluate the opportunities and recommend strategies for achieving relative competitive advantage in the cassava value chain

1.4 Research Questions

- Where are the available sources of literature on cassava value chain in Ghana
- Who are the major or key actors and stakeholders and institutions and their role in the cassava value chain
- What are the key opportunities and treats attributable to the cassava value chain

1.5 Significance of the study

The cassava value chain in Ghana is underdeveloped. Production and processing is largely limited to domestic usage. It is also characterized by weak governance and is purely selfregulated. Its production is predominantly associated with rural communities which are mostly characterized by high incidence of poverty, high underemployment and unemployment rate, inadequate skills-training and lack of opportunities for self-development.

Conducting this research would help identify the key bottlenecks along the cassava value chain and measures to resolve them. The ripple effects would be the tendency to equip the rural poor to improve their productivity and hence their incomes, by negotiating a fair share of the value-added generated by their produce along the chain. In this way, small scale cassava farmers

and processors would be better integrated in their chain and the management and development of the latter would improve.

1.6 Scope of Study

The conceptual scope of the thesis was to assess the cassava value in some selected communities in Ghana. The geographical scope of the research was Asante Mampong and its environs in the Mampong Municipality of Ashanti Region.

Mampong municipality happens to one of the administrative districts which can be found in the Ashanti Region of Ghana. It shares boundary with Atebubu District, Sekyere East, Afigya-Sekyere, and Ejura-Sekyeredumasi to the North, South and West respectively. The municipality has longitudes and latitudes 0.05 degrees and 1.30 degrees west, 6.55 degrees and 7.30 degrees north respectively. It has a total land size of about 2346km² with about 220 settlements. From the search, about 70 percent of the communities were rural. The time scope of this thesis was 2014/2015 academic year.

1.7 Organization of Work

The thesis has been organized into five chapters. The first chapter was the general introduction of the study which include objectives, problem statement, research questions, significance of the study, overview of methodology, scope and organization of work. The second chapter reviews literature on the concepts and research carried out relating to cassava value chain. The Chapter three also talks about methodology which includes research design, sources of data, unit of analysis, population and sample frame, sampling size and brief profile of the study area.

The fourth chapter present's data analysis from primary data collected from the field of study.
The last chapter concludes the study by stating findings, conclusions, and recommendations.

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CHAPTER TWO

LITERATURE REVIEW

2.1 Definition of Value Chain

Value chain analysis concept can be attributed to Michael Porter. He introduced the concept in his book titled 'The Competitive Advantage' published in 1985. Porter alluded that internal actions of an organization should promote value addition to the service and products that the organization produces, and such actions should be executed at efficiently to enable the business achieve competitive advantage. He proposed that, costs of running should not exceed the expected value to be obtained which implies that clients should freely transact business and revisit the business centre in a manner that puts the business at most favorable position. He went further to activities of business entities into primary and supportive.

Primary actions to include goods obtained from organization's suppliers usually termed as inbound logistics, operations (processes of turning raw materials into finished good or final product), outbound logistics (distribution of finished goods), marketing (sales and services).

The support services as mentioned encompass technological advancement, personnel management and training, purchases and supply and infrastructure. Inference from the above explanation gives an indication that, support works were meant to lend a helping hand to the primary activities in achieving a firm's aggressiveness in terms of achieving its aspirations. From the above literature, value chain encompasses the whole firms' activity.

As cited by Kaplinsky and Morris (2000), the value chain concepts was an analytical tool that looks at the exchanges among different key players involved in the production and exchange activities at

both micro and macro levels. They stressed that, in conducting value chain studies no clear cut or correct way but the approach to take was dependent on the questions the research sought to answer.

Hillocks (2002) argued that, agriculture value-chain analysis is characterized by four issues. First stage was the basic level which involves thorough recording of the participating actors in the production, distribution, promotion, and sale of particular products.

The second approach looks at categorization of the distribution of benefits among actors in the chain through the analysis of margins and profits (i.e. returns on investment). This is particularly important in the context of developing countries, where the poor in particular are vulnerable to the process of globalization.

Third, value-chain analysis can be used to examine the role of upgrading within the chain. Finally, value-chain analysis highlights the role of governance in the chain. Governance was important from a policy perspective since it identifies institutional arrangements that may be targeted to improve capabilities in the value-chain, remedy distributional distortions, and increase value addition in the sector.

2.2 Value Chain Development Approaches (VCDA)

The concept of value chain is a very important because it gives an important change in thinking about development by focusing on private sector and smallholder agriculture empowerment. It gives a framework for understanding the relationship among independent entities that share responsibilities in the production of given commodity or service. Value chain looks at the required coordination and linkages among firms and individuals to bring a product from production to consumption. Globally the term has been used extensively to appreciate the implications of

worldwide markets for the poor. To development practitioners, value chain represents the type of intervention that provides solutions to poverty through systematic improved linkages between entities of similar or related interest and poor households. According to the World Bank (2007), poverty reduction can be achieved through renewed investment in agriculture by recognizing the diversity of stakeholders with special emphasis on the rural households since the poor and hungry were more likely to reside in the rural areas.

Value chain approaches usually focuses on development of organizations to work with two or more stakeholders to understand the performance of the chain and identify mutually beneficial options for improving chain performance. This is in contrast with development approaches that lay emphasis narrowly on improving the capacities of smallholders to increase their productivity or better managed natural resources (Devaux et al. 2008).

The VCDA concepts acknowledged the importance of private sector actors' participation and stand to reason that, there should be a closer collaboration at all times to increase the benefits of the poor and enhances options for sustainability in society. The benefits of VCDA approaches to smallholder farmers include increase in income, secured market through linkages, and access to new services production. To the firms, their gains include reduction in transaction cost, improved and reliable supply of quality raw materials (McVay and Runnekleiv 2005).

2.3 Cassava Production and Consumption in West Africa

Experts have predicted that, by 2020 cassava usage in world was likely to reach 275 million tons (IFPRI in Westby, 2008) with some predicting even higher figures to the tune of 291 million tons

(Scott et al, 2000 in Westby, 2008). Africa has been the lead producer of cassava in the world with an estimated average of 62% of the total world production. Nigeria leads Africa's chart with 19% of the market share globally (Hillocks, 2002).

From the literature cassava usage varies from country to country in Africa. The preponderance of its usage was either as fresh roots or as traditional processed products. The importance of processing cassava cannot be underestimated because the raw tubers usually got rotten within a short space of time, so when processed adds to it shed life.

Cassava was considered as one of the most prominent food crop in Africa and the world at large. It has a very wide array of uses, for instance in Nigeria, cassava was noted to be a very important staple food and Nigeria was noted to be the leading producer in the world followed by Indonesia, Thailand, the Democratic republic of Congo, Angola, Ghana, Brazil, Viet Nam, India and Mozambique (FAOSTAT, 2012).

Research has shown that cassava has a high potential to fight against poverty in Africa because of its low production cost (Nweke 2004, FAO 2005). Egesi et al (2006) also concluded that cassava which was considered as a reserve product to sustained rural folks in times of famine in some time past, has now become a staple food and cash crop for both urban and rural dwellers in Nigeria. This was a confirmation of a research conducted by Nweke et al (1997) which indicated that cassava accounts for 21 percent of the income of cassava producing households in Nigeria.

Cassava is a critical food commodity and an important staple crop in Africa especially in the countries along the tropical zones. The reason being that these countries have rapid population increases and cassava comes in handy to feed them since it was generally affordable compared to other staples. In Nigeria, cassava happens to be the third most consumed food crop in the country

(FAOSTAT, 2012) after sorghum and millet, rice, yams and maize.

From literature it has been revealed that, Nigeria has five (5) category uses for cassava products.

They include granulated products, fresh root, dried roots, pasty products, and cassava leaves. They processed cassava either as boiled or roasted for food which can be further pounded or added to soups and stews. Also non-food products such as starch and chips (animal feed) were also produced from the cassava tubers to prevent it from rapid deterioration. The cassava chips has been further grounded into a flour for human consumption (for the baking of pastries, pasta production etc). Fermented cassava was also use for alcohol production or further processed into biogas (Kenyon et al., 2006). Most advanced processing forms can transform cassava into biodegradable packaging, starch sweeteners, etc.

In Ghana, agriculture's contribution to GDP was about 34% of which cassava and yam forms a greater majority of about 50% (MoFA 2010 report). Sources from the Ghana Living Standards Survey indicates that, between 16-31 percent of per capita daily calorie of human consumption comes from cassava and yam and continue to serve as food security product.

2.4 Government Policy on Root and Tuber Crops

In Ghana Ministry of Food and Agriculture has been the focal point and lead agency for government of Ghana charged with the responsibility to develop and execute strategic policies for the agriculture sector in a very coordinated national socio-economic growth to bring about growth and change to improve the lives of its populace. As part of its mandate, they facilitated the preparation of the Food and Agriculture Sector Development Policy (FASDEP II) and the Medium Term Agriculture Sector Investment Plan (METASIP 2010-2015) with the following as its objectives.

- Food security and emergency preparedness;

- Improved growth in incomes
- Increased competitiveness and enhanced integration into domestic and international markets;
- Sustainable management of land and environment;
- Science and Technology Applied in food and agriculture development; - Improved institutional coordination.

The ministry had five main subsectors which include crops (cereals, and starchy crops), livestock (cattle, sheep, goats, pigs, and poultry), fisheries (marine, inland and aquaculture), forestry and cocoa.

The Government of Ghana has appreciated the enormous importance of root and tuber crops in terms of its contribution to employment generation and poverty alleviation; and has formulated a policy targeted at root and tuber crop improvement as one of the key drivers of growth in the national economy through the value chain approach.

Various governments have developed policies and programme to substantially improve the fortunes of the players in the cassava industry in Ghana. The most significant was the introduction of President's initiative on cassava under the reigns of President John Agyekum Kuffour. This led to the creation and establishment of cassava related factories prominent among them was Ayensu Starch factory. The initiatives paved way for the implementation of Root and Tuber and Improvement Programme (RTIP) in 2001. In 2002 an agreement was signed between RTIP and President's Special Initiative on Cassava to multiply and disseminate improved cassava planting materials to be distributed to smallholder and medium scale farmers in selected regions and districts.

A record shows that within one year of the agreement, RTIP had supplied about 2000 hectares worth of improved planting materials which was about 94% of total output. More farmers became keen and interested in cassava production as a result of its different uses i.e. as a source of raw material for starch production and its different domestic uses. The PSI embarked on vigorous awareness creation exercises across the country through radio and television programmes.

The successful collaboration between RTIP and PSI led to an increase in cassava production without corresponding increase in the market avenues. In order to remedy the problems associated with root crops market, Root and Tuber Improvement and Marketing Programme (RTIMP) was introduced as second phase to RTIP.

In a related development, cassava and yam was among the selected crops that were promoted under the Millennium Challenge Account (MCA) program for Ghana. The Millennium Development Authority (MiDA) was responsible for selection of beneficiary districts in accordance with MCA and GPRS II guidelines. The implementation of MiDA programmes projects complemented the work of RTIMP with aspiration of reducing poverty amongst farmers.

2.5 Cassava Production and Processing in Ghana

Cassava was predominant crop in eight (8) out of ten (10) administrative regions in Ghana. It was mostly grown in Ashanti, Central, Brong Ahafo and Eastern regions as indicated in the table below but is particularly abundant in Central, Eastern, Brong Ahafo, Volta, and Ashanti regions as highlighted in Table 1 below. Statistical figures from the Ministry of Food and Agriculture (MOFA) shows that, between 2007 to 2011 cassava productions grew by 40% in Ghana. Sources indicated that farmers increase their yield per hectare from 12.76 to 16.17 tonnes representing about 26%

upward increase over that period. The land size for cultivation by cassava farmers also increased by 11% within that same period.

Table 1.0 Cassava Production Estimates in Metric Tonnes (MT)

Year	2007	2008	2009	2010	2011
Region					
Western	699,396	717,894	721,950	689,350	656,700
Central	2,619,174	1,992,384	2,036,500	1,914,979	1,976,946
Eastern	2,619,247	2,929,543	2,036,500	1,914,979	1,976,946
Greater Accra	56,576	64,279	67,530	68,170	71,863
Volta	1,048,075	1,357,227	1,558,480	1,529,022	1,660,007
Ashanti	1,160,603	1,205,218	1,255,190	1,529,022	1,900,444
Brong Ahafo	2,426,982	2,499,550	2,616,970	2,728,057	2,883,353
North	354,890	605,201	93,1240	1,114,723	1,333,406
Total	10,211,929	11,351,095	12,230,630	13,504,086	14,240,867

Source: MOFA/SRID 2012

In Ghana, cassava was processed to minimize deterioration of roots and decrease toxicity due to its high perishability and potential high cyanide content. Experts have advised that, fresh cassava roots should be processed within 1-2 days of harvesting.

During a recent study by Vanhuyse (2012) cited by Ulrich Kleih et. al., 2013 indicate that both farmers and processors stated that sufficient roots were available and there have been some yield improvements with new varieties. Of the roots harvested in Ghana approximately 50% of cassava

was either consumed or sold as fresh roots to produce (at household level) boiled or pounded cassava (Fufu). Of the remaining 50% approximately: 25% used to produce Gari (roasted fermented cassava) 18% used to produce Agbelima (fermented cassava mash) 6% used to produce Kokonte (dried chips) and 1% used for industrial purposes.

According to Dziedzoave and Hillocks (2012), about 1,175MT and 10,685MT of High Quality Cassava Flour (HQCF) and other dried cassava flour respectively were produced in 2011. Their research revealed that, the total HQCF produced were supplied to the alcohol, beer, biscuit, food, mosquito coil, paper and plywood and poultry industries in Ghana.

2.6 Cassava Production, Processing and Marketing Profile in Western and Central Africa

According to FAOSTAT (2012) over the period the contribution of cassava to the rural economies in the West and Central African countries has been enormous and it has been regarded as engine of growth for rural economies in the forest and savannah belt. From 1961-2005, cassava production has attained an annual cumulative growth rate of 3.85% and 2.60% in Western and Central Africa respectively. As at 2004, the production figures for fresh cassava stood at 56 million and 28 million tons in Western Africa and Central Africa respectively with an estimated annual value of USD 3 to 4 billion at farm gate. Factors that contributed to these successes include the introduction of improved varieties which were high yielding and disease resistant and the use of technology to mechanize some aspects of cassava processing.

Generally, cassava has become an important cash crop and food staple for both urban and rural dwellers in Africa. Cassava products have been a strong contributor to the Gross Domestic Product (GDP) of most African countries.

Across Africa there has been an indication that, there was a strong political will to develop new products and market segments for cassava in Western and Central Africa. For instance in Nigeria, a number of initiatives have been taken by the Government to support cassava utilisation in the country.

In 2002, they set-up a Presidential Committee on cassava production and export, the mandatory inclusion of 10% cassava flour in all composite flour formulations for the baking and confectionary industry since January 2005, and inclusion of Gari in the National Strategic Food Reserve Programme.

Similar programmes have been initiated in Benin, Sierra Leone and Ghana with intention of reducing post-harvest losses by developing niche markets for High Quality Cassava Flour and upgrading of traditional processing facilities.

To achieve integration and consistent progress, a regional body has been established to coordinate activities on cassava industry development under the name Regional Processing and Marketing Initiative on Cassava (RPMIC) in Western and Central Africa.

The rationale for the regional initiative was to build synergies at national and regional level to take full advantage of the prospects in Africa.

2.7 Cassava Production Constraints

The constraints or problems associated with cassava production include technical, institutional and socioeconomic factors which has a wide range of effects on its competitiveness. They specifically include bad agronomic practices, diseases and pests, land related problems including degradation and ownership, insufficient supply of improved planting materials, marketing challenges including low access and poor pricing for cassava produce, inadequate processing options and poor extension

delivery systems which renders it ineffective and inefficient. The various disease and pests that attacks cassava include ACMD, CBB, the mealy bug (which has been greatly controlled), green spider mite (GSM) and the large grain borer which attacks dry chips of cassava in storage (FAO 2005). There were others like the white ants (termites) that usually destroy stems that were planted before they sprout.

2.8 Critique of the Literature

A few empirical research works have been carried out in the field of root and tuber value chains in a few developing countries in general of which cassava is a dominant crop. Most of the documents available were mostly progress and final reports sent to donor partners by programme/project implementers.

Some studies chanced upon include Olomola (2007) where an analysis was conducted on some selected root crop commodity chains in Nigeria from farm gate to foreign destination port using the value chain approach. The study found that operating profit and net profit were positive only at the production and processing stages.

Ulrich Kleih et. al., 2013 also conducted a study on Cassava Market and Value Chain Analysis, Ghana Case Study. This study was carried out by a Team from the Natural Resources Institute and Food Research Institute from 19th to 30th November 2012 to reassess the functioning of the cassava value chain in Ghana and analyse the industrial demand for dried cassava products (e.g. dried chips, industrial flour or HQCF) and their equivalent in fresh roots.

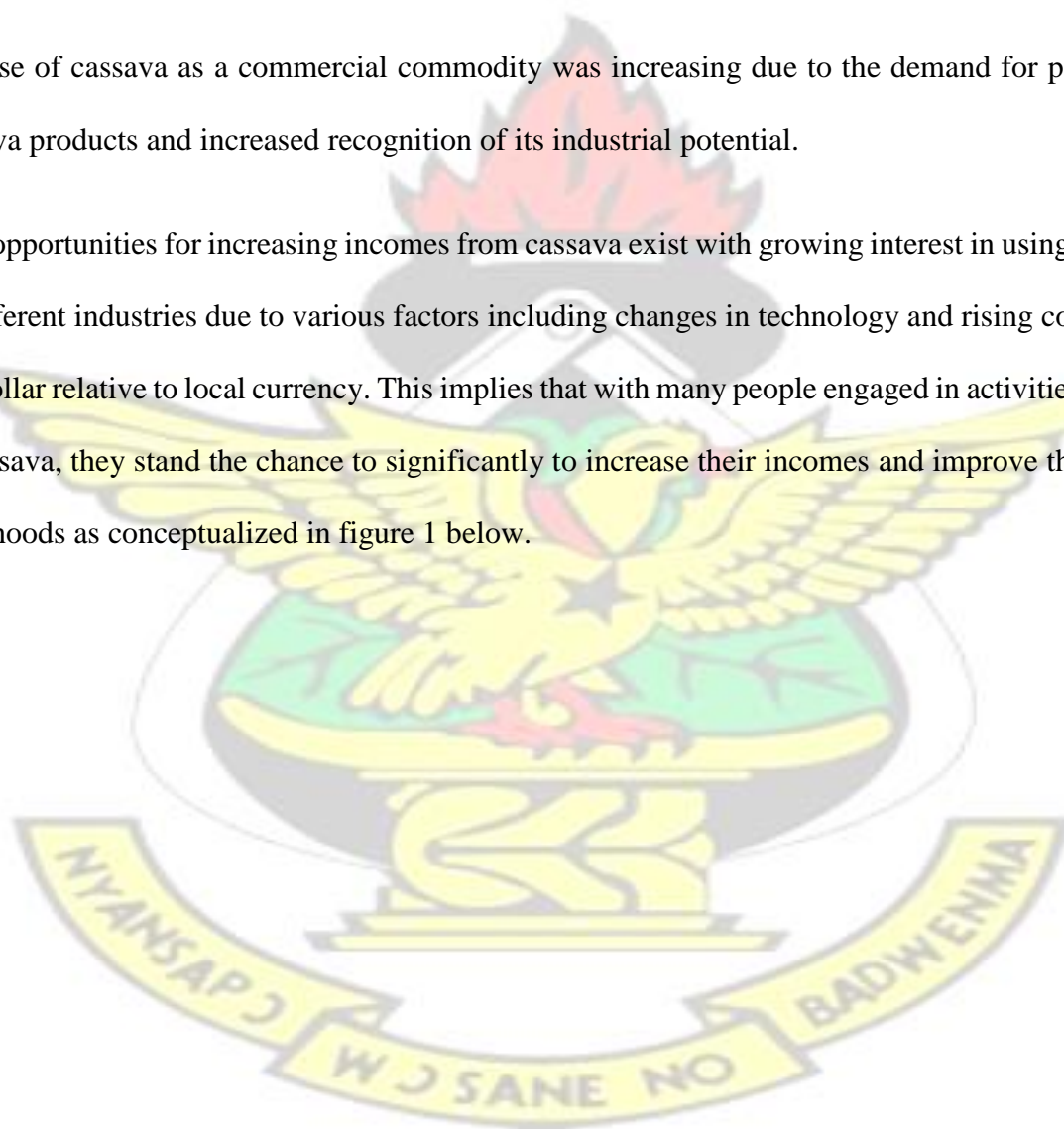
The report analyses the potential for each market sector and concluded that it is more likely to expand markets in the short to medium term in situations where cassava was used as a secondary

raw material (i.e. plywood and animal feed) compared to markets where it was a more principal component, e.g. bread baking.

Inference from the literature presents that, in Ghana as in other parts of Africa, cassava is an important staple crop primarily used for human consumption by way of sales of fresh roots and processed products in markets.

The use of cassava as a commercial commodity was increasing due to the demand for processed cassava products and increased recognition of its industrial potential.

Also opportunities for increasing incomes from cassava exist with growing interest in using cassava in different industries due to various factors including changes in technology and rising cost of the US dollar relative to local currency. This implies that with many people engaged in activities related to cassava, they stand the chance to significantly to increase their incomes and improve their rural livelihoods as conceptualized in figure 1 below.



CHAPTER THREE

METHODOLOGY

3.1 Research Design

Assessing cassava value chain in selected communities can be researched with detailed analysis through the collaboration efforts of all stakeholders involved. It was conducted to help establish the institutional linkages, intervention of government policy interventions, the Assembly and the role of other key sectors such as the traditional authorities.

3.2 Sources of Data

Along with observation, the study, involve the use of both formal and informal open/close ended questionnaires with cross section of farmers, processors and marketers in selected communities for primary data collection.

Also secondary data from publications, published and unpublished research documents, web based research were also sourced.

The interviewees were civil servants (agric extension officers etc), researchers, government officials, selected chiefs, cassava farmers, processors, marketers and community members reputed to be most influential in formulation of local opinions for instance assembly members.

3.3 Unit of Analysis

The unit of analysis for the research was cassava producers i.e. smallholder farmers(producers), processors and marketers and service providers (government agencies in agriculture in the municipality, financial service providers, transporters and extension

service and other partners in selected communities in Asante Mampong in the Ashanti Region.

3.4 Sample Size

Primary data was also collected from a sample of households in the selected community through the administration of questionnaires. The sample of the population was used due to the difficulty involved in getting everybody in the community. In the determination of the sample size, the mathematical method was adopted. The formula is stated below:

$$\text{Sample size} = \frac{N}{1+N(a)^2}$$

Where, N = Total number of households in cassava production

a = Margin of error based on the confidence level

The sampling frame used is the households in the community. The total number of households in agriculture in the district according to the 2010 DADU report is 118.

After a careful consideration of the representativeness of the sample size as well as the financial, time and operational constraints a confidence level of 93 percent, that is, a 7 percent margin of error was used and the sample size was calculated as follows:

Total number of households (N) = 118

Margin of error (a) = 0.07

Sample size = 118

$$1+118(0.07)^2 = 75$$

In addition to the above ten cassava processing centers were visited to get their views to help achieve the objectives of the study.

3.5 Sampling Technique

Quota sampling technique was used by the researcher to undertake the study because it has the following advantages considering the time range:

- it helps to know more about target group
- it gives a harmonized view about the target group
- it also give information on up-to-date government action

3.6 Data Collection Instrument

This was undertaken in two main ways. They include primary and secondary sources, the former helped in accessing information at first hand information (situational analysis).

This involved conducting of interviews using questionnaires and observation and the latter was sourced from reports and magazines, news papers, published and unpublished books, training manuals and journals and web based search.

3.7 Data Analysis

The quantitative aspect of the data was processed through the use of “Statistical Package for Social Scientists” (SPSS) and analyzed using comparison of means while the qualitative data were analysed manually with critical judgments with less or no intuition. Statistical tools such as frequency distribution tables and charts among other tools were used to present the data.

CHAPTER FOUR

DATA PRESENTATION ANALYSIS AND DISCUSSIONS

4.1 Introduction

The fourth chapter of the research presents the background analysis of data and proceeds to present the results and its interpretation in the light of the research objectives and questions in the same sequence as listed in chapter one. The chapter continues by linking the findings of the study to the literature reviewed in chapter two.

This chapter has been divided into sections. Section A examines the Institutional Analysis of the study area with emphasis on Municipal Directorate of Agriculture and RTIMP; Section B identifies the linkages among the cassava value chain in the study area. Section C captures the interaction with key stakeholders along the cassava value chain and Section D evaluates the opportunities and recommends strategies for achieving relative competitive advantage in the cassava value chain. The use of tables was employed to give more meaning to the findings and the analysis. All the data in this section were primary source (that is first-hand information) gathered by the researcher

4.2 Institutional Analysis

This stage of the report brings to bear the nature and structure of the Municipal Agricultural Directorate, Mampong which comprises legal requirements, human resource needs and many other pertinent issues of the organization.

4.2.1 Legal Status

The programme operates as sub unit of the Ministry of Food and Agriculture with divisions such as Crop Research, Veterinary and Grains and Legumes. This implies that the operations of the programme fall within the structures of the mother ministry.

4.2.2 Human Resource Needs Assessment

Director who serves as representative for Minister of Food and Agriculture headed the Municipal Directorate of Agriculture. The director acts and reports to the Ashanti Regional Directorate. The table below indicates the category of staff available at the Municipal Agriculture Directorate.

Table 2.0: Staff strength of RTIMP

Category of staff	Number		Difference	
	Existing	Required	Backlog	Surplus
AEA	7	12	5	-
Accounts Officers	2	2	-	-
Secretaries	2	2	-	-
Drivers	7	7	-	-
Supporting Staff	2	2	-	-
Total	27	27	-	-

Source: Author's Field Survey July, 2015

From the table above, the municipal directorate has seven (7) Agric Extension Agents (AEA), an accounts officer, and accounts assistant, two secretaries, one driver and administrative officer. Other staffs include cleaners/messenger and two (2) watchmen. The table depicts that, all category of staff were adequate except Agric Extension Agents (AEAs). They require the services of twelve (12) only has seven (7) at post currently. The Director remarked that, this has overburdened their work because of the shortage. He stress that, notwithstanding this challenge, they were doing their very best to provide extensions services to farmers as always.

4.2.3 Equipment and Logistics Needs assessment

The municipal directorate has a permanent office in the district with adequate logistics to augment the work at the district which includes cars and motor bicycles.

4.2.4 Operational Assessment

They provide services to root and tuber growers by supplying them with adequate planting materials and good agronomic practices. Staff of MoFA in the municipality especially agricultural extension officers has trained and educated processors and entrepreneurs with low level of production and marketing and negotiation skills. Interaction with these beneficiaries was carried out through workshops, seminars and field visits by the monitoring team and extension officers.

4.2.5 Research

The work of the Agricultural Directorate involves research to come out of new dynamic ideas to improve upon what already exists. With special emphasis on root and tuber

crops(cassava), the respondents indicated that in conjunction with research institutions and individual scientist they have done numerous researches of which includes:

- Development of fertilizer recommendations for optimum starch content in cassava.
- Development of fertilizer recommendations for prolonged shelf life of yam.

4.2.6 Achievements

Research discussion revealed that the Mampong Municipal Agriculture Directorate has been successful in choosing research topics, researchers, and in ensuring farmers participation i.e. linking research to extension and involving smallholder farmers.

4.2.7 Projects Undertaken

The Directorate with assistance from Root and Tuber Improvement and Marketing Programme embarked on initiated projects which include establishment and distribution of primary and secondary multiplication sites for cassava and yam, organising stakeholder meetings, workshops and seminars for root crop developers, monitoring of projects executed in the district and any other responsibility assigned by the mother ministry and the Municipal Assembly.

Table 3.0: Breakdown of Cassava and Yam Planting Material Established

Variety	Area(Hectare)	Variety	Area (Hectare)
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Bankyehemaa	1.2	Pona	1.0
Afisiafi	3.1	Laribako	0.4
Essanbankye	1.4	Denteh	1.6
Nkabom	0.5	Total	3.0
IFAD	0.4		
Tekbankye	1.1		
Dokuduade	1.0		
Agbelifia	0.6		
Total	9.3		

Source: Field Survey, July, 2015

4.2.8 Criteria in Locating Projects

The following are among numerous criteria in selection and location of projects.

- Reside in the municipality or zone.
- It can be accessible to other beneficiaries in the municipality.

4.2.9 Strategies Adopted

The strategies adopted include community visits and discussions with local people, organising workshops and seminars to train and educate farmers, and identify and select local equipments fabricators.

4.2.10 Stakeholders

Their partners include Root and Tuber Improvement Marketing Programme (RTIMP), International Fund for Agricultural Development (IFAD), Centre for Scientific and Industrial Research (CSIR)/ Crop Research Institute (CRI). The table below indicates the type of stakeholders the district have and their responsibilities and involvement.

Table 4.0: Stakeholder Participation Analysis

No.	Stakeholder	Responsibility	Means of Involvement	Impact
1	IFAD/RTIMP	<ol style="list-style-type: none"> 1. Transport of planting materials and supervision of establishment of secondary fields. 2. Establishment and running of farmer field fora. 3. Provide assistance in terms of funds and help in regulation 	Project support	Positive
2	MoFA Research station, Mampong	Production of primary improved planting materials	On contract	Positive
3	Traditional Authority	Organise the local people, make provision and access to land	Voluntary	Positive
4	Municipal Assembly	Provide assistance in terms of funds and help in regulation of activities	Voluntary	Positive
5	CSIR-Crops Research Institute	Conduct research, support running of farmer field for a	On contract	Positive
6	Universities Research Departments	Conduct research and demonstrations	On contract	Positive

Source: Author's Field Survey July, 2015 Table 5.0: POCC Analysis of RTIMP in the District

Programme/Project	Potentials	Opportunities	Constraints	Challenges
Reduce Prevalence of Diseases and Pests	<ol style="list-style-type: none"> 1. Presence of AES 2. Availability of agrochemical shops in the district 	<ol style="list-style-type: none"> 1. MoFA 2. DPCP 	<ol style="list-style-type: none"> 1. Resistance to change 2. High rates of illiteracy 	<ol style="list-style-type: none"> 1. High cost of inputs 2. Irregular supply of chemicals

Increase in Commodity Chain Linkage	1. Presence of agri-business associations 2. Presence of radio station(Mighty FM)	1. MoFA 2. Presence of marketing associations	-	1.Lack of institutional coordination
Facilitate Access to Micro Finance	1.Availability of financial institutions 2. Availability of DACF/ NGOs micro credit assistance	1.Decline in interest rates on DACF/NGOs credit assistance 2. Presence of Micro-Enterprise Fund	1.Lack of collateral 2.Poor perception on repayment of Government credit assistance	1.High interest rate charges at the banks 2.Untimely release of loans/credits
Planting Material Multiplication and Distribution	1.Presence of multiplication sites 2.Secondary sites	1. Presence of breeder planting material 2. MoFA Agric stations 3.Land availability	1. High cost of service 2. Resistance to change	1.High illiteracy rates
Upgrading of Small Scale Root and Tuber Processing Technologies	1.Presence of RTSC 2. Presence of Private fabricators	1. Presence of one good processing centre 2.Matching grant	1. Low income level 2. The practice of subsistence farming	1.Inadequacy of District Assembly Common Fund(DACF)

Source: Author's Field Survey July, 2015

4.3 Assessment of RTIMP

From the literature review and interactions with officers of the Agricultural Directorate and some processors, RTIMP was identified as one of the major stakeholders for cassava in the Municipality. This section of the thesis presents how its impact in the Municipality has been.

4.3.1 Awareness

The Ghana and IFAD financed programme, RTIMP which was a follow up of RTIP has been operational in the Municipality since 2007. It can be said that awareness creation by the implementers of the programme has been enormous.

The research indicates that about 92.9% of both root crops producers and processors interviewed in the municipality have heard about the program.

The medium through which people get to know or hear of the existence of the programme included radio advertisements and programmes, television documentaries about the programme, as well as through personal contact and agricultural extension officers with the percentage of 25.3, 6.3, 58.2 and 5.1 respectively.

4.3.2 Beneficiary Status

The implementation of the programme with emphasis on processing and marketing adopted the integrated commodity chain approach covering the full range of activities; i.e. bringing product from the field through all intermediary phases of transformation and delivery to final users. Since RTIMP's existence in the district, about 60% of cassava and yam producers have benefited in various ways including, access to planting materials, education and training (on crop management, equipment handling, pest and disease management, good agronomic practices among others), technical and technological assistance and financial support.

The major area of benefits was education and training which was in a form of equipment handling, production methods, processing and storage of processed commodities, pest and disease management, good sanitary practices and many others.

4.3.3 Form of Assistance

The following were assistance cassava and yam growers and processors had received as a result of the implementation of RTIMP in the municipality.

4.3.3.1 Planting Materials

Through the support from primary multiplication sites and MOFA agriculture stations about 75 farmer groups in the municipality have received different kinds of improved varieties of cassava and yam.

Averagely, each farmer has received materials sufficient for planting on an acre of land. According to officials from RTIMP and CRI, production of cassava was dependent on a supply of good vegetative planting materials. The multiplication rate of these materials was very low as compared to grain crops, which were propagated by true seed.

4.3.3. 2 Education and Training

Both farmers and processors have benefited in the area of education and training. The medium through which they acquire this include attending workshop and seminars, listening to radio programmes through which farmers and processors are briefed on good methods of farming and processing. Through the agricultural extension officers farmers have been educated on new developed technologies in farming activities at individual farmer level and also farming field fora. Their education and training ranges from soil

fertility management application of agro chemical, good farming practice, control of weeds and storage of farm produce.

4.3.3.3 Marketing of Produce

Through stakeholder meeting which usually involves producers (farmers), processors and market men and women in root crop business, the programme has been able to create the link which has facilitated easy communication among producers, processors and marketers. This phenomenon has created ready market for both farmers and processors since they were in constant touch with their customers in the municipality, the adjoining districts and even beyond.

4.3.3.4 Supply of Inputs

The survey reveals that the programme has not performed much in the area of supplying input to farmers. The inputs include agro-chemicals, wellington booth, and cutlasses, grinding machines, pressers, roasting pans, drying machines and platforms and many others. Farmers and processors have indicated that the only support received the from programme in this direction is the exposure to agro-chemical sellers and equipment manufacturers such as Ghana Regional Appropriate Technology Industrial Service (GRATIS), Sis Engineering and Rural Technology Service Centre(RTSC) for immediate supply when needed.

4.4 Expansion as a Result of RTIMP Assistance

Before RTIMP inception, cassava production in the municipality declined mainly because farmers had difficulty in disposing of extra production as a result of the use of improved cassava varieties but without sufficient markets. The presence and implementation of the

programme which provided farmers alternative market has deepened and strengthened farmers' interest because they have been assured of ready market and quite appreciable price increases for commodities.

The introduction of improved varieties and modern equipment for processing has increased cassava production in the municipality. For instance, the respondents asserted that, the introduction of new and improved roasting stove has increased the output per worker per day from 45 kilo grams to 100 kilo grams which was about 150 % increase. In relation to cassava production, an acre of land produces between 18-21 tons which was far higher previous output of 9-12 tons per acre.

The farmer field fora implementation in the municipality has strengthened farmers and other stakeholders' ability to learn the knowledge and skills in embarking on sound crop management, processing and marketing. It has also increased cassava farmers and processors ability to solve problems with or without support from the agricultural extension officers.

Discussions with the programme facilitators confirmed that they demonstrate to farmers using very practical and easy to understand approaches. For example, planting practices and biological control, some of which they have been able to apply with their traditional varieties of cassava and well as the newly introduced varieties.

Relevant technologies have been transferred to processors at the Good Processing Centre at Woraso. Participants have acquired skills in proper handling of equipment and machinery, environmental hygiene, and good production procedures. These sets of training improve their production style and output level. In short the research points out that those

cassava processors in the municipality produce high standard fresh cassava, quality cassava grits and gari because of the skills they have acquired.

4.5 Household Analysis of Cassava Producers and Processors

4.5.1 Age Structure

The survey reveals that out of the 75 cassava farmers interviewed, 66.7 percent were within the age bracket of 31-40 years. It implies that they fall into the working class group and more productive considering energy and strength they possess. It can be inferred that, age has a correlation with human strength and energy. Since a lot of energy was required for effective arable crop production in situations where the method of farming was labour intensive to a large extent accounted for active participation of the working population involvement in the production of cassava in the municipality. The age structure of the respondents has been indicated in the table below.

Table 6.0: Age Structure

Age	Frequency	Percentage
Below 20	1	1.4
21-30	5	6.6
31-40	50	66.7
41-50	12	16.0
51-60	4	5.3
61+	3	4.0
Total	75	100

Source: Author's Field Survey, July, 2015

4.5.2 Marital Status

From the survey, 50 of the respondents representing 66.7 % were married and 25 (33.3%) not married or single. This phenomenon confirms the fact that, the cassava farming activity

requires more human assistance hence they marry so that their couples assist them in undertaken the farming activities.

4.5.3 Years of Existence of Processing Centres

Agro-processing in Mampong Municipality started not too long ago but some individuals use to process cassava into Gari for family consumption even before 2000. The municipality can boast of about ten small cassava processing industries of which 60 percent were established between 2004 and 2006. The purpose of these establishments ranges from processing cassava to fend for themselves as individuals, to support food production level and others were in the business as a result of post harvest losses experienced because of non availability of market for their produce.

The up spring of these processing industries in this short while can be attributed to the presence and implementation of Root and Tuber Improvement and Marketing Programme (RTIMP) in the municipality. The pie chart below shows the years for which processing industries have been operating.

Table 7.0 Year of Existence of Processing Centres

Variables	Frequency	Percent
2007-2009	1	10
before 2000	1	10
2001-2003	2	20
2004-2006	6	60
Total	10	100

Source: Author's Field Survey, July 2015

4.5.4 Educational Attainment

The educational level of the respondents ranges from None, Primary, Middle School Leaving Certificate (MSLC)/ Junior High School (JHS), Secondary, Tertiary and others (that was with certificate in other professional courses) with 13.3 percent, 16.0 percent, 46.7 percent, 20.0 percent, 2.7 percent and 1.3 percent respectively.

Table 8.0: Educational Attainment

	Frequency	Percentage
Other	1	1.3
Tertiary	2	2.7
None	10	13.3
Primary	12	16
Secondary/SHS	15	20
MSLC/JHS	35	46.7
Total	75	100

Source: Field Survey, July, 2015

From the above table, majority (46.7%) completed only MSLS or JSS and adopted farming as their profession. It can also be noted that most (70.7%) can read and write basic instruction and were able to keep records on their returns. This was an indication that can promotes easy adoption of new farming methods and records keeping.

4.5.5 Legal Status

Registration of business was phenomenal in the processing industry because 70% of the centres visited were registered; some under the National Board for Small Scale Industries (NBSSI), Registrar's General Department and Cooperative Department in the district. This attitude permits regulation and promotes good practice. This was because renewal of their mandate by various registration boards was based on satisfying requirements. The percentage not registered was 30% of which was quite a significant number, therefore

measures should be put in place to encourage them to register to ensure consistency and adherence to rules and regulations.

4.5.6 Ownership

The forms of ownership in the cassava production and processing industry in the municipality include Sole proprietorship, Partnership and Company. The survey indicated that 60% were 'one man businesses' and partnership and company having 20% each. The implication was that raising capital (financial capital) was non-existent among the producers and processors in the municipality. These sole proprietors do not have adequate collateral to aid them in accessing credit facilities from the banks. This retards expansion and producing at full capacity.

4.5.7 Farm Size

The survey indicates that cassava farmers in the municipality operate on a small scale with 66.7 percent of them owning a farm size of 0-2 acres. Though significant number of the farmers has more than two farms, they still operate on small scale and as such there is much room for improvement to be able to feed the up springing of agro-processing industries in the Municipality.

It can be said that the existence of the programme has not contribute to increase in farm size but farmers yield has experience increased considerably as a result of introduction of improved planting materials and pest control mechanisms.

4.5.8 Land Acquisition

Land remains a highly complex and contentious issue, involving economic, social, political, cultural and often religious systems. Farming activities manifest itself on land and as such the survey finds that, only 4.0% of the cassava farmers own the land on which they farm on. About 70.7% of the respondents acquire their land on leasehold and on rentals basis. The survey reveals that farmers spend close between two hundred (GH¢200) Ghana cedis on land hiring per year for an acre which they consider it to be expensive.

4.5.9 Crops Grown by Farmers

Cassava, yam, sweet potatoes, potatoes and cocoyam are the kind of root crops grown in Mampong Municipality with a percentage of 40.0, 26.7, 2.7, 2.7, 1.3 and 9.3 respectively. Cassava and yam leads the chart because of market availability and good production harvest. The rest i.e. sweet potatoes, potatoes and cocoyam are grown on subsistent basis and not in commercial quantities. Besides root and tuber crops, farmers also grow crops such as maize, cowpea and others which form about 20.0 percent. The major percentage difference has been show in the table below.

Table 9.0.: Crops Grow by farmers

Type of Crop	Frequency	Percentage
Cassava	30	40.0
Yam	20	26.7
Sweet Potato	2	2.7
Potato	1	1.3
Cocoyam	7	9.3
Others	15	20.0
Total	75	100

Source: Field Survey, July, 2015

4.5.10 Methods of Farming

Mono and mixed cropping were the dominant methods of farming practice in the municipality.

From the table below, about 52 percent practice mono cropping while 44 percent adopts the mixed cropping while 44 percent adopts the mixed cropping method.

Ideally, one set of crops are supposed to be on a plot of land to avoid competition of growth and nutrients by plants. This promotes healthy and maximum production but for want of reduction in cost of production and maximizing benefits, farmers resort to adopt mixed cropping which is working to perfection.

The table below depicts the type of farming methods adopted by the respondents.

Table 10.0 Method of Farming

	Frequency	percentage
Others	3	4
Mixed cropping	33	44
Monocropping	39	52
Total	75	100

Source: Author's Field Survey, July 2015

4.5.11 Method of Processing Cassava

The major root crop processed in the municipality was cassava. The method of production adopted by the processors in the municipality was both capital and labour intensive. The labour aspect deals with uprooting of the cassava, peeling and washing, pressing, roasting and bagging of the processed commodity be it Gari or floor. The capital aspect of production deals with grinding, dehydration and drying of the floor. Grinding the peeled cassava roots into a mash was the first mechanised step towards making Gari.

It can be said that, these industries employ about 80 percent labour intensive methods in their production. The implication was that in the absence of available labour, activities of the industry come to a halt.

Discussions with processors from the survey indicated that, the RTIMP and the Municipal Agric Directorate has helped them improved their style of processing by reducing labour intensive in the area of grinding and drying cassava mash. They attributed it to the kind of training received from experts through demonstration workshops and seminars organised by RTIMP and also linking processors to fabricators for processing equipment. The table below shows machinery and equipment being used and their purpose by processors and pictures of this machinery and equipment has been shown in appendix 3.

Table 11.0.: Machinery/Equipment Use

Type	Purpose	Remarks
Cassava Grater	Grinding of cassava into mash	Almost every cassava processing firm in the municipality has one working but some has low capacity.
Presser	Pressing or Dehydration	Almost every cassava processing firm in the municipality has one working.
Slizzer Machine	Chipping of cassava	It was only available at the Good Practice Centre at Josma Agro-Industry
Hammer Mill	Milling of cassava flour	It is only available at the Good Practice Centre at Josma Agro-Industry
Djelemo Drier	Drying of cassava grits	It was only available at the Good Practice Centre at Josma Agro-Industry for demonstration purpose.
Solar Drier	Drying of cassava grits	It was only available at the Good Practice Centre at Josma Agro-Industry.

Mechanised Roaster	Roasting of gari	It was only available at the Good Practice Centre at Josma Agro-Industry.
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Source: Author's Field Survey. July, 2015

4.5.12 Sources of Funding

Financing business was essential to successful actualization of business aspirations. Cassava farmers in the Municipality finance their activities through bank loans, personal savings, plough back profits, family support and others (on credit basis) with respective percentages of 13.4, 73.3, 6.7, 1.3 and 5.3.

The major source of funding cassava processing industries in the municipality was through personal savings with 60% and only 40 percent having access to credit. The processors save with rural banks in the municipality but a significant percentage of them do not save (40%).

It can be emphasized that, the major source of financing cassava farming activities in the municipality was through personal savings. This reduces the farmers and processors ability to expand and producing more food. Having access to credit was a challenge in the municipality, difficult and time consuming since only 13.3 percent of the respondents have access to credit with about 88.7 percent of the respondents having no access to credit.

It can be asserted that, making accessibility to bank loans, grants and other forms of credit in the municipality would significantly increased cassava production levels to make the municipality a dominant food basket in the region and the country as a whole.

4.5.13 Marketing of Produce

The survey indicated that, about 66.7% of the cassava produce in the municipality were sold outside the settlements but within the municipality. There was the possibility that, cassava producers when increased their output can serve other districts to generate additional income.

Through the implementation of commodity chain linkage under RTIMP, producers of high quality cassava flour in the district have been linked to an alcohol processing plant in Kumasi. The factory was called U3 Alcohol Factory which has capacity to process 10 tons of cassava starch per day.

This linkage has created enabling opportunity for cassava agro processors especially cassava flour and starch producers because of ready market and reasonably appreciable price increase.

4.5.14 Access to Storage Facilities

The survey indicates that, about 80.0 percent of the respondents do not have access to storage facility. Only 20 percent have access to storage with 66.7 percent using crib barns as a means of storing their produce. Though access to storage facility was not encouraging, it can be attributed to the fact that most farmers sell their products fresh from the farm to customers and processors.

4.5.14 Employment

Job creation or employment generation was one of the assessment indicators to establish how the programme has impacted on the people in the municipality. The following were identified during the survey.

Table 12.0: Employment Situation

Gender	Farmers		Processors	
	Frequency	Percentage	Frequency	Percentage
Male	100	65.9	34	30
Female	52	34.1	84	70
Total	152	100	120	100

Source: Author's Field Survey, July, 2015

The table above indicates that 152 persons were employed by 75 farmers and 10 processors employed 120 people, with a gender dimension of 65.9 % and 34.1 % for male and female respectively for farming and Agro-processing employs about 70 percent females and 30 percent males.

This gives an impression that, this venture can create employment especially for women when encouraged. The survey indicates that on the average one small industry employs not less than twelve persons. It also gives an impression that though most of the farmers were on small scale, when encouraged and supported to expand they can employ substantial number of unemployed persons especially the youth in the Municipality.

4.5.15 Access to Agric Extension Services

Extension division under the Ministry of Food and Agriculture plays vital role in the development and promotion of agriculture. They (officers) serve as the medium upon

which research conducted by scientist and agriculturist is transferred into farmers to strengthen the sector. The table above depicts that, about 70.7 percent of the respondents have access to agric extension services with 90.7 percent receiving the services once per season. Only 7.5 percent and 1.8 percent have access more than once in a season.

Table 13.0: Access to Agric Extension Services

Access			How Often		
Response	Frequency	Percentage	Response	Frequency	Percentage
Yes	53	70.7	Once in a Season	48	90.7
No	22	29.3	Twice in a Season	4	7.5
Total	75	100	Others	1	1.8
			Total	53	100.0

Source: Author's Field Survey, July, 2015

The implication was that, education of farmers was carried out but not at constant and regular times. This phenomenon impedes a success in achieving desire results of extension service departments.

It can be said that 92.6 percent of the respondents receive the services of the division at no cost while about 3.8 percent pay for the services. Those who pay are those who makes special request outside the schedule of the area officer.

The respondents were of the view that through the implementation and establishment of farmer field fora usually termed as 'FFF' under RTIMP, it has given them the opportunity to have access to agric extension service because it was a difficult task to get the extension officers to come and educate them on individual basis.

4.5.16 Production Level

The following tables show the production strength of the producers and processors of root crops in the district. The survey indicates that averagely total output per acre for cassava, yam, sweet potato, potato, and cocoyam was about 7.2, 3.0, 3.0, 2.0, 1.3, and 2.1 tons respectively. About 92.0% of cassava produced were sold and about 7.0% and 1% represents consumption and post harvest losses respectively. The rest of the commodities and their respective percentage sold, consume and post harvest losses are shown in the table below.

Table 14.0. Production Level of Roots Crops in the Municipality

	Percentage sold	Percentage consumed	Post-harvest losses
	92	7	1
	62	30	8
	70	26	4
	67	30	3
	73	24	3
	87	10	1
Total	451	127	20

Source: Author's Field Survey, July 2015

The survey unveil that cassava was the only root crop being processed in the district. The final products include Gari, Cassava flour, 'Kokonte', High Quality Cassava Flour (HQFC) and animal feeds. Their respective average production levels and selling prices has been shown in table below.

Table 15.0: Production Level of Processed Commodity

Commodity	Average Production Per Month	Selling Price in Ghana Cedis	Value Per Month in Ghana Cedis
Gari	48 bags	130.00	6240
Cassava flour	50 tons	350	17500
Konkonte	24 bags	50	1200
Total			24940

Source: Author's Field Survey, July 2015

Both farmers and processors were of the view that the impact of the programme on production level has been enormous. For example, some of the improved varieties introduced by RTIMP with maturation periods of less than one year have the advantage that they yield faster returns allowing harvesting and selling the crop when other food crops were not yet in the market, consequently fetching higher prices.

Consequently the exposure of processors to the use of improved equipments, roasting stoves and many other training by the programme has positively reflected in their production level.

4.5.17 Cost of Farming Activities

Farming has activities of which each has its cost. The survey reveals that labour accounted for the main cost component which accounts for about 77% of the total cost.

The table below gives an average cost for maintaining an acre of root and tuber farm.

Table 16.0: Cost of Farming Activities.

Operation	Total Cost per acre (GH CEDIS)
Land preparation	70.00
Planting	50.00
Weeding 1	60.00

Weeding 2	60.00
Weeding 3	60.00
Weeding 4	60.00
Fire belt	40.00
Total	400.00

Source: Author's Field Survey, July, 2015

Farmers affirm that through Farmer Field Fora (FFF), they have been educated on the use of herbicide such as glyphosate to kill under growth weeds. This exposure has helped them to reduce the number of times they weed the farms from four (4) to three (3). The use of the herbicide cost between twenty-five (Gh¢ 25.00) and thirty (Gh¢ 30.00) Ghana cedis which was quiet cost saving to farmers.

4.5.19 Farmers Association

Grouping among farmers to champion their own cause was very crucial to modern day agricultural development. Most farmers have no collateral to facilitate their ability to access credit but their coming together enhances their ability to access credit. The survey depicts that, about 65.3% of the respondents join various farmers' cooperatives and association. This phenomenon eases Agric Extension Officers in identifying and educating farmers on modern methods of farming.

4. 6 Assessment of Support Services along the Cassava Value Chain

The aspect of this report sought to analyse the actors in the support services of the cassava value chain. They include financial service providers, transporters, and extension services.

4.6.1 Financial Service Providers

In the Mampong Municipality, there were five formal financial institutions which include Ghana Commercial Bank, Kwamanman Rural Bank, Otuasekan Rural Bank, Multi Credit and GN Bank as indicated in the table below.

Table 17.0: Type of Financial Service Providers

Characteristics	Frequency	Percent
Formal Institution	5	100
Money Lenders	0	0
Others	0	0
Total	5	100

Source: Author's Field Survey, July 2015

Interactions with these financial service providers indicated that, only 25% of cassava farmers and processors who had applied for financial assistance have been successful in getting the entire amount they requested. In response to a question on the mode of reimbursement of loans to their clients, 70% said it was per term with 30% on per installment. Generally, the repayment of loans by farmers was on per installment basis.

The financial service providers recounted the following as indicated in the table as their strengths, weaknesses, opportunities and threats.

Table 18.0: SWOT Analysis for Financial Service Providers

Issue	Strength	Weakness	Opportunity	Threat
-------	----------	----------	-------------	--------

Supplying Credit or Loan	<ul style="list-style-type: none"> - Competent and experience staff - Availability of adequate capital - Data on farmers who promptly repay their loans 	<ul style="list-style-type: none"> - Delays in seeking approval to grant loans from Head Office - 	<ul style="list-style-type: none"> - Availability of some organized farmer groups - Receipt and management of customers deposits - Marketing of products through radio adverts 	<ul style="list-style-type: none"> - Loans not use for the its purpose - Most customers lack capacity to secure loans - Availability of other competitive banks - High prime rate impose by Bank of Ghana
Loan Recovery	<ul style="list-style-type: none"> - Sufficient logistics - Presence of mobile bankers to assist in loan recovery 	<ul style="list-style-type: none"> - Not all customers had guarantors - Rigid loan repayment terms 	<ul style="list-style-type: none"> - Assistance from group leaders - Business advisory services provided to clients 	<ul style="list-style-type: none"> - Bad weather affects farmers ability to repay the loans - Dislocation of customers

4.6.2 Assessment of Transporters and other Ancillary Service Providers

The transporters were the folks that bring the cassava raw materials from the cassava producer's farm to the processing centres and the finished product to the market. Their role is very pivotal in the sense that, failure to bring the cassava produce from the farm would eventually lead to postharvest losses. This research interacted with about ten (10) transporters including tractor owners, drivers, truck drivers and motorbike operators. In addition, some mechanics and fabricators were interviewed. Discussions with them revealed that, about 82% of the respondents do not have access to credit but need loan to

replace their vehicles and tractors. When asked if they belong to any cassava association or innovation platform, majority (60%) said they were members of the District Stakeholder Fora at the Municipal Assembly. They enumerated the following as some of their working challenges: overloading, high vehicle income taxes, high road tolls, limited access to qualified mechanics, poor nature of farm roads, high cost of spares and some customers not trust worthy. They recounted that, they have increased their transport fares and had also signed an agreement with their customers as coping strategy.

4.6.3 Extension Service Providers

The Extension Service was a sub-unit under the Ministry of Food and Agriculture. They provide support services under the cassava value chain concept. Using a rating of 1-5 where 1 represents non-functional activity and 5 being very high, the type of services provided by the Extension Service has been rated in the table below.

Table 19.0: Type of Service Provided to Cassava Value Chain Actors

Actor	Service	Rating	Remarks
Producers	Training	5	Very high
	Input Supply	2	Rarely perform this
	Extension Advise	4	High
	Coaching	4	High
Processors	Training	5	Very High
	Input Supply	2	Rarely perform this
	Extension Advice	4	High
	Sensitization	5	Very high
	Useful Information	5	Very high

Source: Author's Field Survey, July 2015

Table 20.0: Diffusion of Farm Technologies to Cassava Operatives

Characteristics	Activity	Response
Are the Cassava technologies you circulate focus on	Production	Yes
	Processing	Yes
	Marketing	Yes
	Consumers	Yes

Source: Author's Field Survey, July 2015

From the table above, it can be inferred that the focus of the extension service provider's cuts across all the actors along the cassava value chain (producers, processors, marketers and consumers) and the benefits accrued is enjoyed by all the actors. In a related question on who decide on the subject for extension service, 50% of the respondents maintained that the subject for extension services comes from Researchers, and 40% and 10% from Extension Officers and Government respectively.

4.6.3.1 Resource Assessment – Human, Financial and Logistics

The research assesses the resource capacity of the Extension Service Division of the Municipal Agriculture Directorate. The criteria were based on its adequacy and sufficiency or otherwise. From the table below, 58.8% of the respondents were of the view that the human resource capacity of the extension unit was adequate and qualified. In terms of financial and logistical capacity, 70.6% and 82.3% respondents asserted it were insufficient. The table below presents the details.

Table 21.0: Resource Assessment – Human, Financial and Logistics

Type of Resource	Assessment Criteria	Frequency	Percentage
Qualified Human Capacity	Adequate	10	58.8

	Moderate	5	29.4
	Inadequate	2	11.8
Financial Capacity	Sufficient	5	29.4
	Insufficient	12	70.6
Logistics Capacity	Sufficient	3	17.7
	Insufficient	14	82.3

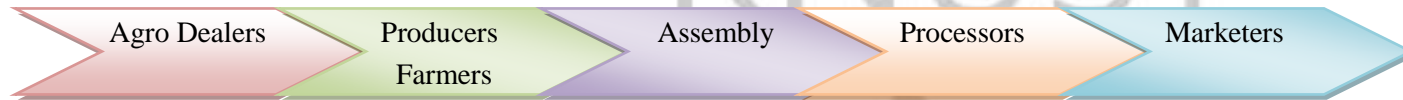
Source: Author's Field Survey, July 2015

Table 22.0 Impact of Resources on Extension Service Performance

Resources	Impact on you Performance	Suggestions
Qualified Personnel	<ul style="list-style-type: none"> - Able to trained and supervise farmers appropriately - Not all farmers were reached - Efficient and good performance of assigned duties 	<ul style="list-style-type: none"> - More skilled staff must be recruited - Capacity building and short training courses should be organized for Extension Service Officers
Financial Capacity	<ul style="list-style-type: none"> - Inability to organize more training sessions for farmers - Low impact on farmers activities - Low coverage which adversely affect performance 	<ul style="list-style-type: none"> - Sufficient funds for training should be made available
Logistical Capacity	<ul style="list-style-type: none"> - Work rate is declining - Infrequent visits - Low extension delivery 	<ul style="list-style-type: none"> - Procure more logistics for Extension Service Officers - Serviceable means of transport should be provided

Source: Author's Field Survey, July 2015

Summary of Cassava Value Chain Dimensions in the Municipality



Map of Sub-Channels and Actors within the Chain

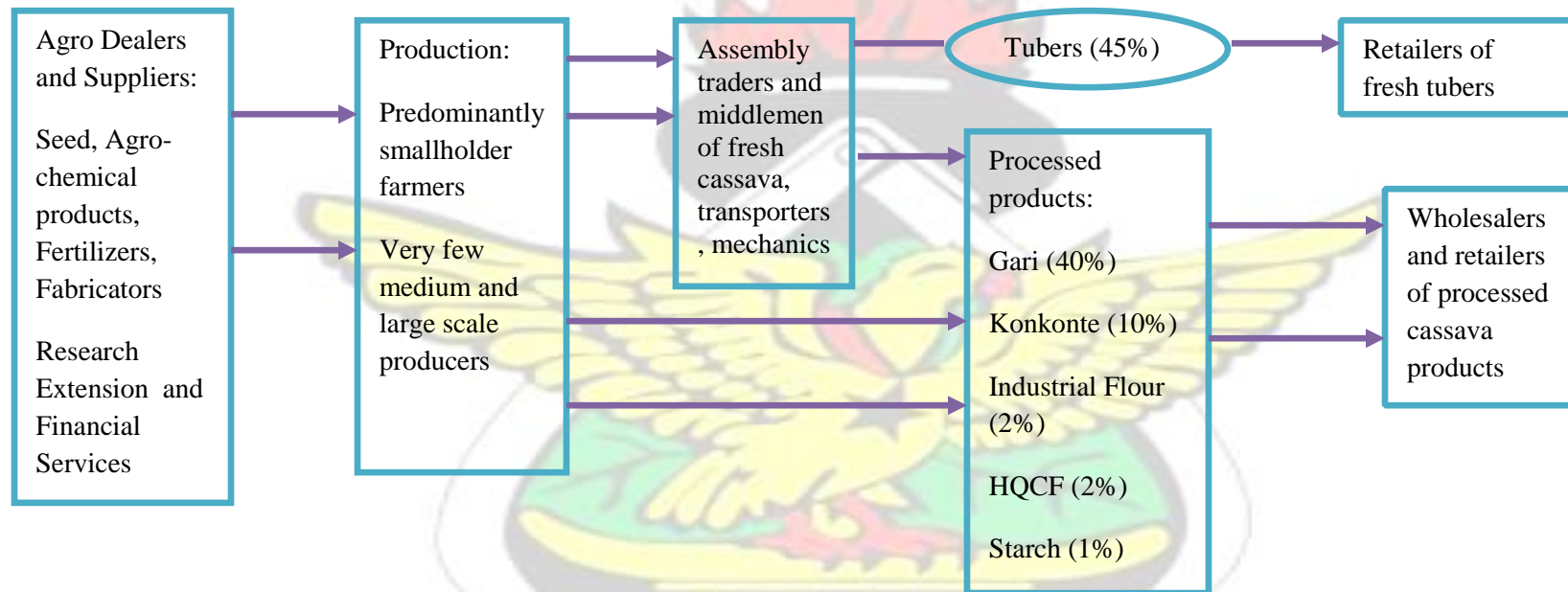


Figure 2: Sub-Channels within the Chain

Source: Author’s Construct, July 2015

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CHAPTER FIVE

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This was the final chapter of the thesis. It brings to fore findings, conclusion and recommendations.

5.2 Summary of Findings

5.2.1 Institutional Linkages

From the institutional analysis, it was established that there were institutions managing and promoting cassava value chain in the Municipality. They sought to empower resource-poor farmers, farmer groups and rural communities, including women, to ensure unimpeded access to improved root and tuber technology.

In conjunction with the Rural Technology and Science Centre (RTSC) and Business Advisory Centre in the Municipality, farmers have been provided with training in production processing and marketing of cassava as well as records keeping. They have also strengthened linkages between private firms involved in processing and exporting of end products such as high quality cassava flour.

There were indications that the greater contact and exchange of knowledge between institutions and clients in the cassava industry especially agriculture extension officers has made them more productive, leading to more efficient use of scarce resources in the area of cassava production and processing.

In addition, the implementation of RTIMP has certainly increased the efficiency of the work being done by the Municipal Directorate of Agriculture with mandates to work on some aspect of root and tuber crops. The programme has done this by bringing these institutions together through increased sharing of information and coordination of their efforts through stakeholder meetings and workshops.

5.3 Cassava Production and Processing Levels

The production levels of both producers and processors have increased because of the improved varieties and new technologies adopted as result of the assistance received from RTIMP strategies. The research has indicated that farmers have increased their output to about 60 percent.

Processors of cassava in the municipality have also experienced tremendous production increase. It can be noted from the research that about 150 percent production mark-up margin as a result of the modern technologies adopted in production. For instance Josma Agro Industries Limited, one of the beneficiaries of the programme increased its production output per worker per day from 45 kilo grams to 100 kilo grams as a result of the introduction of the improved roasting stove.

Level of production has increased as a result of improved planting materials availability and usage and the relevant technology application available to farmers and processors.

Moreover, provided that distribution continues of improved cassava varieties over the next years, that farmers continue giving away part of their improved material to other farmers

as they have been doing in the past, and that they remain interested in the new varieties, Mampong municipality would become a household name for cassava in Ghana.

5.4 Changes in Farmers and Processors Level of Income

Producers, processors and the workers response to whether there has been an increase in their level of income reveal that, about 65% of the respondents admit that there has been remarkable difference in their lives but they were unable quantify it in monetary terms. They admit that, the additional income has helped them to finance their children education, and buy household assets needed to better their lives

5.5 Challenges Facing Cassava Value Chain in the Municipality

Even though 65.3% of the respondents were in members of farmer associations, it was observed that these farmer associations had a very weak governance structure which renders them ineffective. This has lead to absence of united front for those in the cassava industry. As a result they were unable to negotiate for higher prices for their produce from buyers/traders. The processors and producers of cassava tend to compete among themselves. This phenomenon agitates for low pricing for produce among producers and processors.

Secondly, limited capital base for both producers and processors was also another challenge that prevails in the municipality. This ranges from inadequate working capital to make daily purchases of raw materials and farm inputs. This small capital base restrains processor ability to acquire high capacity machines and equipments.

Thirdly, lack of grades and standards for processed cassava especially gari was another challenge. There were no price difference between well process gari and low graded ones. The prices were virtually the same and this does not motivate processors who produce according to grades and standardization.

Fourthly, the challenge of securing an efficient market for the farmers that are growing cassava within the municipality catchment area was impeding their efforts to enhance dissemination and adoption of high yielding improved varieties of cassava. Some farmers' were apprehensive to the sensitization message on the use of improved planting materials of high yielding varieties of cassava because there were no ready markets to give them a good return on their investment.

Lastly, minor operational problems such as untimely supply of raw materials (fresh cassava), power failures, breakdown of machinery and equipment, makes processing plants normally operate not at full capacity.

5.6 Conclusion

Cassava has become very acceptable as a raw material in the food and beverage industry for the manufacture of biscuits, noodles, baby foods, alcoholic drinks, etc, and as a binding or thickening agent in soups/sauces and plywood industry. According to the respondents, standard recipes for production of HQCF-based pastries have been developed in some countries within the sub-region. One hundred (100%) percent substitution for wheat flour is possible in the production of a large number of HQCFbased confectioneries but greater quantities of bakery fats and other texture enhancing ingredients would also be required for the preparation of acceptable products.

From my assessment, the players on cassava value chain industry were responsive to the existing opportunities. The strategies being implemented along the cassava value in the municipality have the potential to take advantage of the existing opportunities to minimize the potential adverse effects of the external challenges. What was required was financing to support cassava producers and processors to meet the large quantities and standards by their clients.

The following have been outlined as key impediments to cassava production amongst smallholder farmers in the municipality.

In terms of cassava production and processing, it remains traditional with almost all the processes were done manually. It was considered resilient and therefore planted in poor soils with little or no fertilizer application. The respondents mentioned the following as some of the constraints associated with raw cassava producers along the chain:

- Inefficient systems such as limited access to transportation to convey produce from farm gates to processing centres.
- The weight of cassava causes transporters to charge exorbitant fares which in effect reduce the net price hence the cassava producer becomes worse-off.
- The bulky and easy-to-rot nature of cassava requires factories to be sited at locations closer to the farm gates.
- Sun-drying remains a major source for processing cassava chips and flour in the municipality and the implications were that larger orders from clients could not be met on-time.
- Cassava processors and producers rely heavily on labour in their daily activities.

5.7 Recommendations

The following suggestions were being recommended for successful implementation and development of cassava industry in the municipality in particular and the country in general. They include:

First, there should be a mechanism to develop partnerships with cassava processors and domestic supermarkets. This can be achieved through the establishment of a working group that should set up a strong cassava commodity chain to bring high quality cassava products to supermarkets using standardized and upgraded cassava processing equipment through identification of best performing processing equipment and machinery.

Secondly, functions of each player along the commodity chain should be focused and much more specialized. This would ensure improvement in cassava productivity, economies of scale and efficiency (i.e. farmers do not become processors);

Thirdly, product quality, hygiene and packaging training must be intensified among players in the cassava industry to attract middle class consumption and export opportunities and provide market information on required product specifications for their produce since there was a potential high return on well graded processed cassava.

Fourthly, research on improved drying efficiency implements to lower the difficulty in drying commodities among processors to enable them meet the demands from the brewery industry whose specification requirements and volumes needed were high.

The fifth recommendation would be, producers and processors in the cassava industry should endeavour to intensify marketing search to identify new markets by adopting

promotional strategies and distribution channels, for instance, liaison with pharmaceuticals, textile industry and the brewery companies to supply cassava flour to them in large quantities. When this is achieved, processors would increase their sales and would be able to expand to absorb much more raw materials thereby suppressing farmers' apprehension in getting ready markets for their fresh cassava

Sixth, governance of industry associations within the cassava industry must be strengthened so that, they can create avenues to share knowledge benefit from joint functions (such as research, training, marketing, purchasing of bulk inputs e.g. equipment, packaging materials, proposal writing etc.) and represent a strong voice to lobby government on key issues and demand for high prices for their produce.

The last recommendation would be appeal to government for institutionalization of production, supply and usage of composite flour containing at least 2-5 % of cassava flour by wheat flour millers. This would not only create market for the cassava industry but also help in reducing importation cost to the nation.

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APPENDIX 1:

INSTITUTIONAL QUESTIONNAIRES

Demographic Background

1. Name of Institution
.....
2. Date of Establishment
.....
3. Location of Institution 4.
Area of Coverage
5. What legal instrument(s) established your institution?
6. Does your institution have rules and regulations? Yes{ } No { }
7. If yes in one, list the main regulations
 - i.
 - ..
 - ii.
 - ..
 - iii.
 - ..
 - iv.
 - ..
8. If no in 1, what is/are the reasons?
9. What is the chain of command in your institutions?

INSTITUTIONAL CAPACITY

1. Human Resource Needs Assessment

Category of Staff	Number		Difference	
	Required	Available	Backlog	Surplus

2. Equipment Needs Assessment

Type	Number		Condition	Remarks/Comments
	Existing	Required		

OPERATIONAL ASSESSMENT

1. What are performed by your institution?

Task	Implementing Agency	Resources Required	Remarks

2. Who are the beneficiaries of this project/programme?.....

3. Do you have any interaction with your clients? Yes { } No { }

4. If yes, in what way do you interact?

5. If no, who acts as the intermediary between clients?

6. What are your operational strategies in performing your responsibilities?.....

7. Do you do research? Yes { } No { }

If yes, list them?

.....

8. In your own assertion, how do you assess the impacts of your projects on beneficiaries?
9. What mode of operation do you practice?
10. Has the programme been successful in choosing? Tick appropriately if applicable
 (a) Research topics { } (b) Researchers { } (c) Ensuring farmers participation{ }
 (d) Linking research to extension { }

Do you have initiated projects? Yes { } No { }

If yes, briefly describe them in the table

Project	Location	Amount Involved	Source of Funding	Purpose

11. To what extent have your activities impacted on cassava operatives in your zone?

Issue	How	To what extent	
		Quantity	Quality
Increase in Income			
Food Security			
Environment			
Institutions			
Social Capital			

12. What criteria or issues does your institution consider in locating projects?.....

.....

13. Are your financial resources adequate to fund projects? Yes { } No { }

If no, assign reasons

STAKEHOLDER ANALYSIS

1. Do you have stakeholders? Yes { } No { }
2. If yes, who are they and in what capacity?

No	Stakeholder	Responsibility	Means of Involvement	Impact

POTENTIALS, OPPORTUNITIES, CONSTRAINTS AND CHALLENGES ANALYSIS

1. What are the Potentials, Opportunities, Constraints and Challenges of your institution?

Programme/Project/Activity	Potential	Opportunity	Constraints	Challenges

2. What problems are the associated with operation?
3. What do you suggest can remedy the above problems?
4. Are you satisfied with your performance? Yes { } No { }
 If yes, assign reasons?
- If no, assign reasons?.....
5. What would you recommend differently for implementation of similar or subsequent projects?.....

APPENDIX 2:

Questionnaires for Cassava Producers, Processors And Marketers

Demographic Background

1. Name
2. Date of Establishment.....
3. Purpose for Establishment.....
4. Location

OPERATION

1. What is the legal status of your firm? (a). Registered (b). Not Registered
2. If registered, under what ordinance or law?.....
3. What is the form of ownership for this firm? (a) Sole Proprietorship (b) Partnership (c) Company (d) others, specify.....
4. What root crop do you process?.....
5. What method of production do you use? (a) Capital Intensive (b) Labour Intensive (c) Others, specify.....
6. How many people have you employed? (a) Male [] (b) Female []
7. What raw materials do you use?.....
8. What is the source(s) of your raw materials?.....
9. What kind of machinery or equipment do you use?

Type of Machine	Purpose	Condition

10. What do you process?

Commodity	Quantity (Kg or Tonnage)	Selling Price Per Ton or Kg

11. What is the cost of operating this firm?

Activity	Cost	Remarks
Transportation		
Raw Materials		
Machinery		
Labour		
Others specify.....		

12. How do you finance your business? (a) Loan (b) Personal Savings

(c) Others specify.

13. Do you save? (a) Yes [] (b) No []

14. If yes, what is the name of bank?.....

15. What do you consider as operational constraints?.....

16. What can attribute to the cause of these constraints?.....

17. What do you suggest can be done to solve the problem?.....

ENVIRONMENT

1) What kind of waste do you produce? (a) Solid waste (b) Liquid waste (c) Both (d) others specify.....

2) How do manage your waste?

Type of Waste	By What Method	Cost

ECONOMY

1) What is the projects' impact on the local economy?

Issue	How	Indicators
Job Creation		
Usage of Raw Materials		
Food Security		
Income/ Retention of Capital		
Market		

KNOWLEDGE ABOUT POLICIES ON CASSAVA

- Have heard about any policy on Cassava industry? Yes { } No { }
- If yes, through what medium?(a) Radio Announcement (b) On television (c) Personal contact (d) Others , specify..... 3.
- Are you a beneficiary of the policy intervention? Yes { } No { }
- If yes, what form of assistance? Tick appropriately if applicable.
 - Equipment/ Implements { }
 - Education and Training { }
 - Market { }
 - Technological Assistance { }
 - Finance { }
 - Others, specify.....
- If no, assign reasons.....

6. How did you acquire the assistance?

Form of Assistance	How
Equipment/ Implements	
Education and Training	
Market	
Finance	
Technological Assistance	
Others , specify	

7. What is the impact of the programs of the policy on your firm? In terms of :

	Before	After
Market for Produce		
Production Output		
Access to Raw materials		
Use of Technology		
Others (specify)		

8. How do you assess the impact of the programme on Cassava processors?.....

9. What do you find as bottleneck/problem(s) in the programmes' operation?.....

10. What would you suggest to resolve the above problems?.....

11. What motivate you in your operation?.....

12. Who are your stakeholders?.....

13. How do you relate with them?.....

14. Are any difficulties in dealing with them?.....

15. If any, in your estimation how can it be resolved?.....

APPENDIX 3

MACHINERY AND EQUIPMENT



Solar Drier for Cassava Flour



Djelema Drier for Cassava



Cassava Slizzer Machine



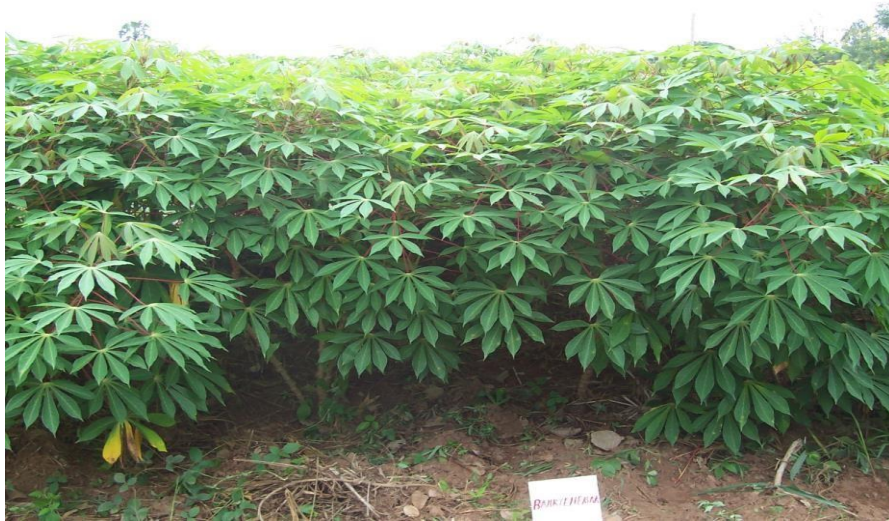
Cassava Grinding Machine (Diesel Engine with Grater)



Hammer Mill



Method of Storage for Gari (Roasted Cassava)



Cassava Multiplication Site at Woraso



Farm Labourers at Work in Cassava Farm