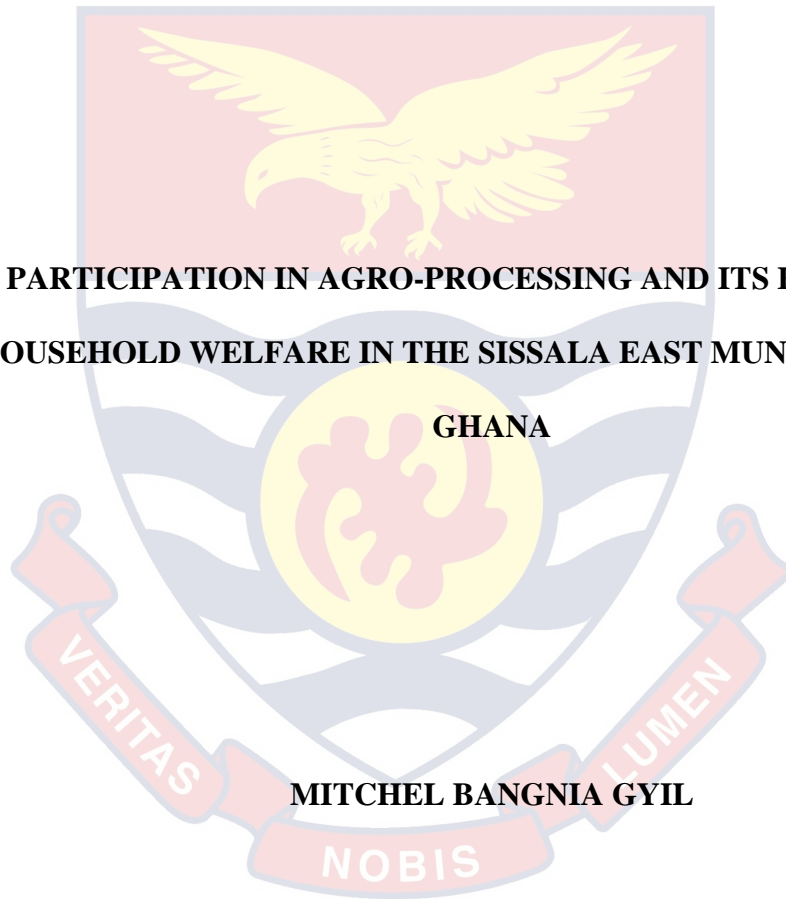


UNIVERSITY OF CAPE COAST

**PARTICIPATION IN AGRO-PROCESSING AND ITS EFFECTS ON
HOUSEHOLD WELFARE IN THE SISSALA EAST MUNICIPALITY OF
GHANA**

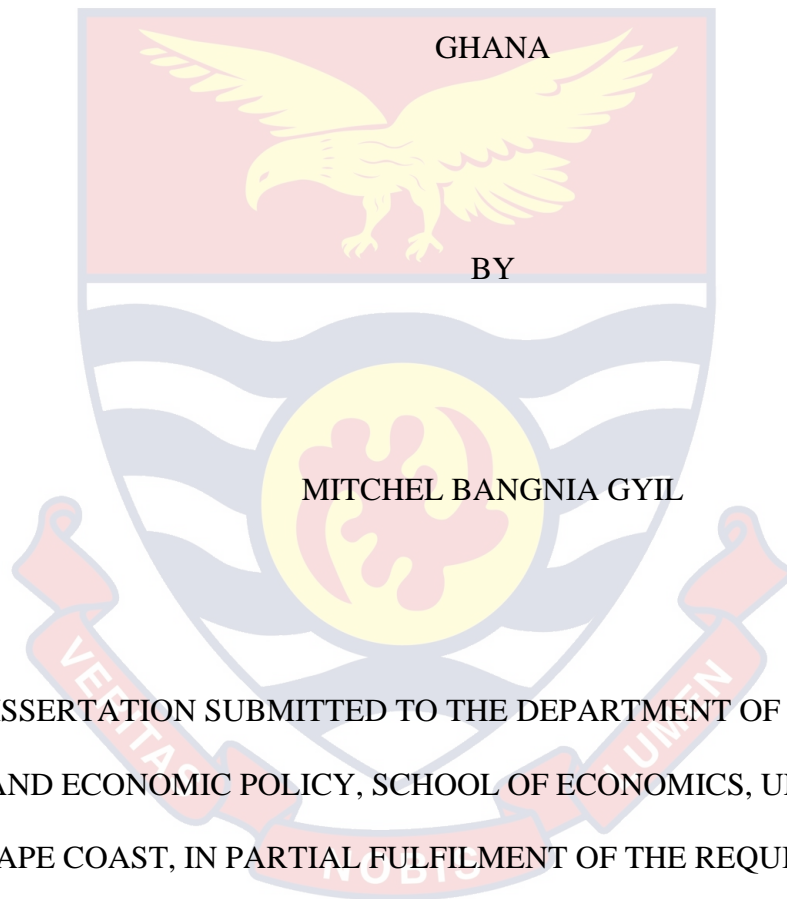


MITCHEL BANGNIA GYIL

2020

UNIVERSITY OF CAPE COAST

PARTICIPATION IN AGRO-PROCESSING AND ITS EFFECTS ON
HOUSEHOLD WELFARE IN THE SISSALA EAST MUNICIPALITY OF



DISSERTATION SUBMITTED TO THE DEPARTMENT OF DATA SCIENCE
AND ECONOMIC POLICY, SCHOOL OF ECONOMICS, UNIVERSITY OF
CAPE COAST, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR
THE AWARD OF MASTER OF SCIENCE DEGREE IN DATA
MANAGEMENT AND ANALYSIS

AUGUST, 2020

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature..... Date

Name: Mitchel Bangnia Gyil

Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Supervisor's Signature: Date:

Name: Dr. Francis Taale

ABSTRACT

Low participation in agro-processing deny the Ghanaian economy the full contribution of agriculture to the Gross Domestic Product (GDP). This study sought to investigate the effects of agro-processing adoption on household welfare in the Sissala East Municipality. A descriptive cross-sectional design involving a multistage random sampling technique was employed. In a chi-square test of independence, respondents' involvement in agro-processing showed significant association with the sex of respondent, educational level, and occupation. Also, respondents' involvement in agro-processing showed significant association with average monthly income, savings, ability to pay school fees, ownership of the house, building material, ability to pay electricity bills and household cooking fuel. It is therefore concluded that participation in agro-processing has a significant association with several household welfare parameters. It is recommended Government and Non-governmental Organisations (NGOs) may have to institute training programmes on agro-processing, put in place credit schemes to support agro-processing activities, make accessible the needed farm inputs to boost yields.

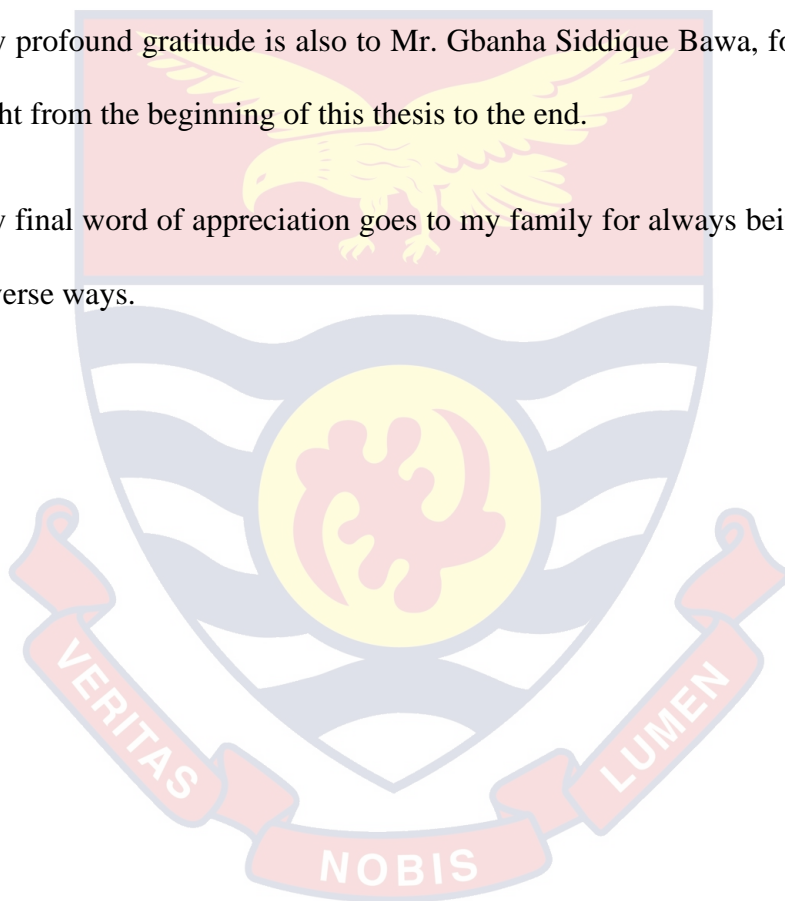
ACKNOWLEDGEMENT

My heartfelt appreciation goes to my supervisor, Dr. Francis Taale, for providing the needed mentorship and guidance in putting this piece together.

For the assistance and encouragement of the following personalities; Godfred Darku, Felix Dramani, and Emmanuel Aapengye, I say thank you all.

My profound gratitude is also to Mr. Gbanha Siddique Bawa, for his contribution right from the beginning of this thesis to the end.

My final word of appreciation goes to my family for always being there for me in diverse ways.



DEDICATION

To my parents

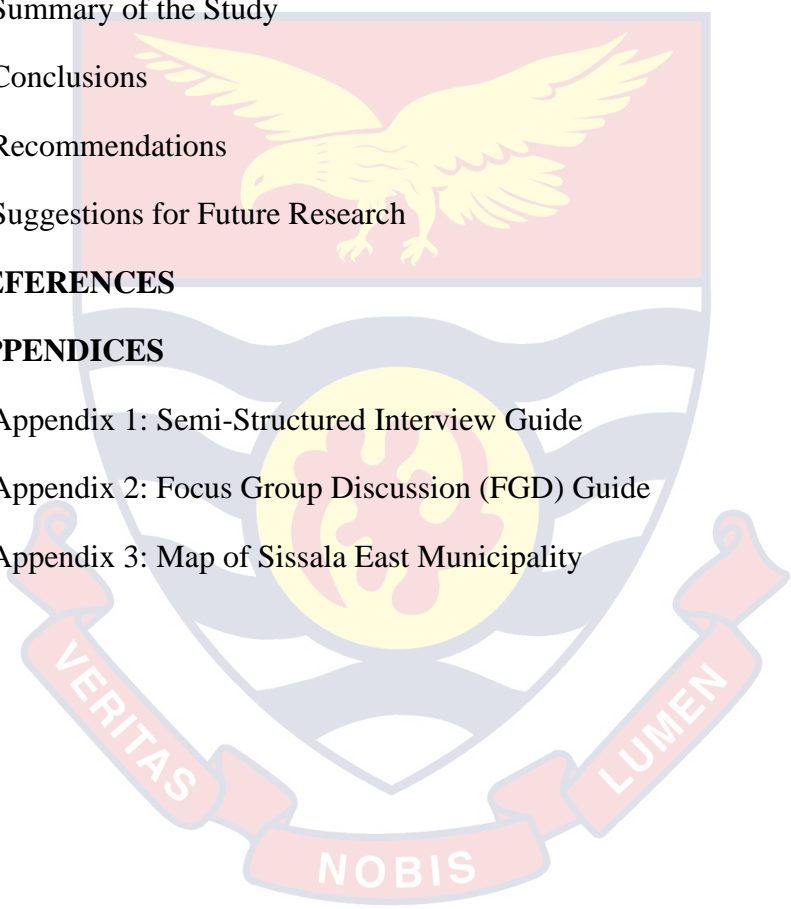


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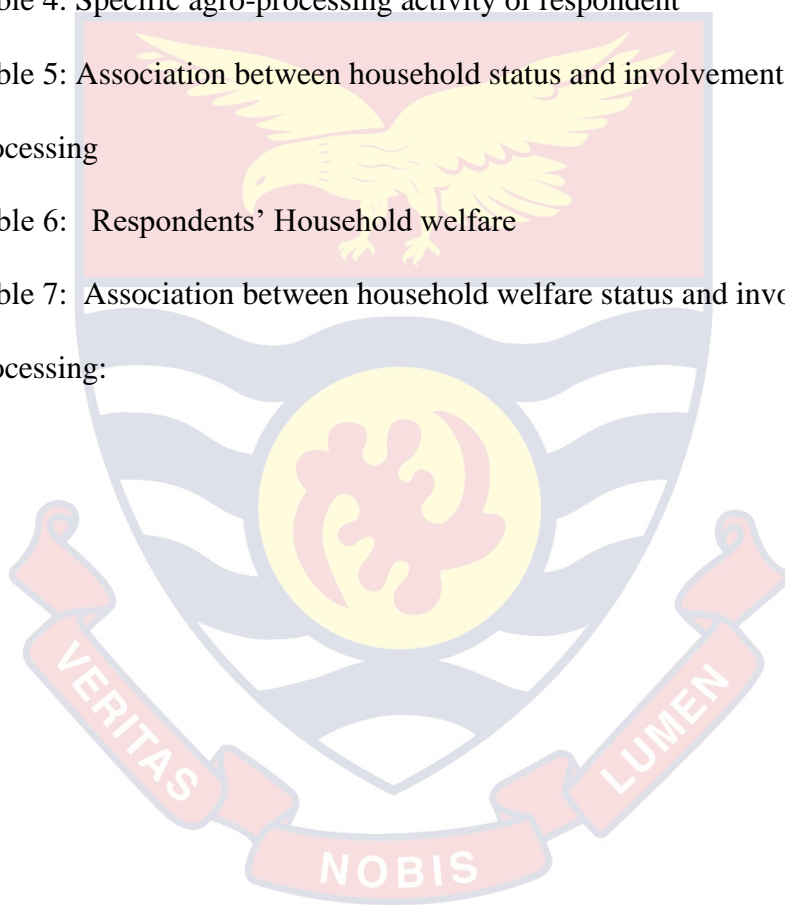
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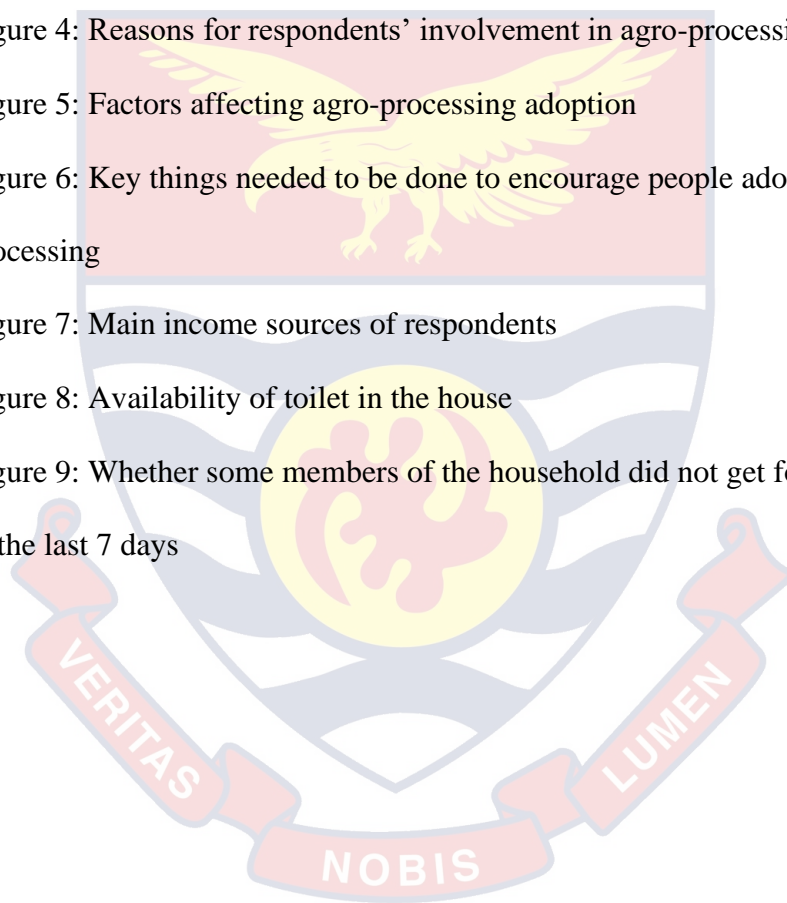
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LIST OF ABBREVIATIONS



ATR	African Traditional Religion
DANIDA	Danish International Development Agency
df	Degree of freedom
DFID	Department of International Development
FAO	Food and Agricultural Organisation
GDP	Gross Domestic Product
GPRS II	Ghana Poverty Reduction Strategy II
GROW	Greater Rural Opportunities for Women
GSS	Ghana Statistical Service
ISIC	International Standard Industrial Classification
ISSER	Institute of Statistical, Social and Economic Research
JHS	Junior High School
LIC	Lower-Income Countries
LMICS	Lower Middle-Income Countries
MEDA	Mennonite Economic Development Associates
MoFA	Ministry of Food and Agriculture
MoMo	Mobile Money
NDPC	National Development Planning Commission
NGOs	Non-Governmental Organisation
NHIS	National Health Insurance Scheme
SAA	Sasakawa Africa Association
SDGs	Sustainable Development Goals

SHS/Voc/Tech Senior High School/Vocational/Technical

SPSS Statistical Package for Social Sciences

UMICS Upper Middle-Income Countries

UNDP United Nations Development Programme

VSLA Village Savings and Loans Associations



CHAPTER ONE

INTRODUCTION

This chapter presents an introduction to the study, comprising the background to the study, problem statement, research questions, objectives, Relevance of the study and scope, as well as the organisation of the study

Background to the Study

The World Development Report (2008) brought to the fore the fact that some 800 million people were deemed poor (earning less than US\$1 per day), with 75 percent estimated to be living in rural areas and relying on agriculture for the bulk of their livelihood. As part of an agenda to ensure economic growth and development of the rural areas of low-income countries, the establishment of agro-industries and adoption of agro-processing for value addition to farm produce are regarded as key policy tools for consideration (World Bank, 2007).

Agro-industry is broadly defined as post-harvest activities involving the transformation, preservation and preparation of agricultural production for intermediary or final consumption (World Bank, 2008). According to the Food and Agricultural Organization, agro-processing industries are typically comprised of upstream and downstream industries, where Upstream industries refer to the initial processing of agricultural commodities such as rice and flour milling, leather tanning, cotton ginning, fish canning, among others, and Downstream industries are said to involve in more complex processing of intermediate products made from

agricultural materials and include the making of bread, biscuits, textiles, paper, clothing, footwear, among others.

The International Standard Industrial Classification (ISIC) fragmented agro-industry to include; food and beverages, tobacco products, paper and wood products, textiles, footwear and apparel, leather products, and rubber products. Simplifying further, the agro-processing sector may be classified into two; domestic processing and factory processing, with the domestic processing activities, said to be dominated by female workers who are predominantly illiterate and have no formal training (Quartey & Darkwah, 2015).

The position of the agro-processing sector in economies globally cannot be over-emphasized. Agro-processing accounts for more than 50% of total manufacturing value-added in the Lower Income Countries (LIC), declining to 36% and 32% for Lower Middle-Income Countries (LMICs) and Upper Middle-Income Countries (UMICs) respectively. Processed products account for 80% of food and beverage sales globally, with 60% being consumed in high-income countries (Wilkinson & Rocha, 2008). The most important subsectors within the agro-industry sector are food-processing and beverages, accounting for more than 50 percent of the total formal agro-processing sector in low and middle-income countries (Quartey & Darkwah, 2015; Woldemichael et al., 2017). Among other benefits of agro-processing espoused by several studies include minimizing post-harvest losses, better pricing, and price stability. For instance, DANIDA stated that opportunities exist in the agro-processing industry for value addition, minimizing post-harvest losses, promoting price stability, and increasing demand for local

agricultural produce (DANIDA, 2012). Also, food crops processing has the potential of increasing the market opportunities for agricultural exports since processed goods generally have greater price stability than raw materials (Dijkstra, 2001). In all these, agro-processing also creates employment at low levels of investment that make effective use of local resources (Kindness et al., 2001).

Ghana's Ministry of Food and Agriculture reports that ineffective food processing technologies among other causes led to 35%, 34.6%, 6.9% and 24.4% post-harvest losses in maize, cassava, rice, and yam respectively in 2007 (MoFA, 2007). The World Bank noted that post-harvest losses rob farmers of the benefits and profits from their hard labor, time, money, energy and resources (World Bank, 2011).

Agro-processing in Ghana is an area of immense potential in agriculture that is yet to be significantly exploited, resulting in a relatively low degree of value-addition to farm commodities and low economic returns to farmers. The Ghana Poverty Reduction Strategy II (GPRS II) has stated that no significant progress can be made in improving the average real incomes of Ghanaians as a whole without significant improvements in agricultural productivity and the agro-based processing industry (NDPC, 2005). It is reported that 85% of all agro-processing firms in Ghana are micro-enterprises, 7% are very small firms, 5% are small firms and only 3% are medium agro-processing firms (Afful-Koomson et al., 2014).

About 86% of households in the Upper West Region engage in crop production as a source of livelihood (Daniel, 2011), and with all the potentials embedded in the agro-industrial sector, these households are doing little to diversify

but still depend largely on on-farm activities as a source of income. According to Marchetta (2011), agro-processing enterprises such as food processing exist in the Upper West Region as alternative livelihood strategies but are believed to be operated by women alone and on a small scale.

Agro-processing is a venture that is regarded by many to contributing significantly to the reduction of socio-economic challenges, improvement of income, employment, food availability and nutrition, and social and cultural wellbeing, which enhances the sustainability of smallholder farmers' livelihoods (Mhazo et al., 2012). Household welfare is viewed in terms of access to basic services as well as food intake, the consumption of various non-food goods and services, and the consumption of housing services Peter & Jesko, 1999)

With all these, this study seeks to delve into agro-processing adoption and household welfare in the Sissala East Municipality.

Statement of the problem

Agriculture remains a principal poverty mitigating activity in developing countries, contributing prominently to the Gross Domestic Product (GDP). However, the lack of agro-processing and storage facilities denies the Ghanaian economy its full contribution to GDP largely due to low participation in agro-processing activities in Ghana. For instance, MoFA (2012) indicates that only five percent of food products traded in Ghana are processed and that the total volume of processed food crops exported is relatively low. Like other food-growing areas in Ghana, Sissala East Municipality has won the accolade as one of the food baskets in Ghana with high production of maize and other products over the years. Aside

from the domestic agro-processing activities that are undertaken by households, the Municipal capital (Tumu) has two medium-scale agro-processing industries – a maize processing industry (KEDAN) and a cotton ginnery. Despite this, little is known about the effects of participation in agro-processing on the household welfare of the economy of the area.

MoFA (2007), maintains that growth in income of households is achievable through agro-processing, and thus has moved ahead to strategize in post-production management including improving supply chain management with emphasis on enhancing processors' access to technical advice and logistics, strengthen public and private sector linkages to support agro-processing, providing improved and targeted tax relief for agro-processors and promoting cottage level agro-processing industries among others.

Despite the strong stake of agriculture in the growth of most economies, it is widely believed that Africa's agriculture is not performing well, manufacturing remains one of the lowest in terms of value-added and employment, and the services sector is positioned to serve mainly the domestic consumers (Woldemichael et al., 2017). In Ghana, the crop sub-sector of agriculture contributes about 66.2% to the sector and has a large percentage of its products undergoing some form of processing (MoFA, 2010).

Agro-processing could help in the achievement of Sustainable Development Goals (SDGs) One (End extreme poverty and hunger) and Eight (Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all), with its potential of job creation for the

youth, price stability and reduction in post-harvest lose to maximize returns to the farmer. Agro-processing improves the efficiency of harvesting, field handling, packaging, storage, and marketing of agricultural produce and contributes to prolonging the shelf life of produce thereby reducing spoilage and wastage of food (Adhikari, 2006).

Processed foods also enjoy greater price stability on the world market and may therefore increase market opportunities for exports, contributing to income securities particularly in rural communities which are mostly engaged in farming (Owoo et al., 2017). Agro-processing is said to be the most important sub-sector of the manufacturing sector, with food and beverages representing the largest component of processed commodities (Quartey & Darkwah, 2015).

The findings of this study could bring to light the extent of agro-processing and its potential, and the influence it has on household welfare in the Sissala East Municipality. Also based on the findings, recommendations would be offered to stakeholders for appropriate interventions to be instituted to ensure that the agro-processing industry is exploited to the fullest to alleviate poverty.

All these brought to the fore the motivation to carry out this study, to assess the agro-processing adoption and household welfare in the Sissala East Municipality of Upper West Region, Ghana.

Purpose of the study

To assess participation in agro-processing and its effect on household welfare in the Sissala East Municipality.

Specific Objectives

Specifically, the study seeks to:

1. Identify the various agro-processing activities in the Sissala East Municipality.
2. Identify factors that affect the participation in agro-processing activities in the area.
3. Assess household welfare status in the Sissala East Municipality.
4. Determine the association between household welfare status and participation in agro-processing in the Sissala East Municipality.

Research Questions

1. What agro-processing activities are available in the Sissala East Municipality?
2. What are the factors affecting the participation in agro-processing activities in the area?
3. What is the welfare status of households in the Sissala East Municipality?
4. What is the association between household economic status and participation in agro-processing or the presence of the agro-processing industry in the Sissala East Municipality?

Significance of the study

Aside from the fact that the study was in partial fulfillment for the award of MSc. Data Management and Analysis, the findings could be relevant in enriching the body of knowledge about participation in agro-processing and its effects on household welfare in the Sissala East Municipality.

The findings would be useful to government and non-governmental organizations in decision-making towards the establishment of industries based on the resource base of the area, especially in the area of agriculture.

Through the findings of this study, appropriate interventions could be identified for policymakers. Eventually, an idea of the agro-processing sub-sector of agriculture could inform policymakers in Ghana and global stakeholders like Food and Agriculture Organisation (FAO) to come out with sharp policies and appropriately channel interventions to leverage the value addition of agricultural produce, to maximize returns for the local Ghanaian farmer and beyond.

Scope of the study

The focus of the study was on establishing the level of agro-processing activities going on in the Sissala East municipality, the participation of farmers in agro-processing activities, and the effects on the welfare of households.

In this study, the agro-processing sector covers a broad area of post-harvest activities – domestic processing or minimal processing and packaging of agricultural produce from both the farm and wild, and the industrial and technology-intensive processing of both the raw agricultural products and intermediate products.

Study limitations

The study, being cross-sectional in design made it limited in ability to draw any causal relationships between involvement in agro-processing and household welfare. The use of participant responses as a measure to evaluate the influence of

agro-processing on various household welfare indicators may not be entirely representative of the real situation. For fear of recall bias, the purpose of the study was continuously re-echoed so that respondents give accurate responses.

Definition of Terms

Agro-Processing: refers to the transformation of local produce into value-added agricultural products as well as the transfer of technology for agri-business development to improve income generation and food security.

Household: refers to an arrangement made by a person or group of persons, for providing themselves with food or other essentials for living.

Household Welfare: refers to the overall measure of households' cumulative living standard.

Organisation of the study

This dissertation is organised into five chapters, with appropriate captions as follows: Chapter One – Introduction; presents an introduction to the study covering the background to the study, the problem statement and justification, research questions and objectives, the relevance of the study, the scope of the study, study limitations, and definition of terms, as well as the organisation of the study. Chapter Two - Literature Review; presents the concept of the study, theoretical and empirical reviews, as well as the conceptual framework of the study. Chapter Three – Methodology; captures the study design, background of the study area, sample size and characteristic, sampling technique, study variables, data collection tools, data analysis, quality control measures, and ethical considerations. Chapter Four –

Results and Discussion; contains the results of the analyzed data and discussion, making the findings of the study. Chapter Five – Conclusion/recommendation; contains the summary of findings, conclusions, and recommendations based on the key findings of the study.

Chapter Summary

Chaptered one captured the background of the study, problem statement, study objectives, significance of the study, scope, limitations of the study, definition of terms, as well as organisation of the study. By way of the problem statement, the Sissala East Municipality was said to have won the accolade as one of the food baskets in Ghana with high production of maize and other products over the years. Generally, farmers in the area were said to be subsistence, though the area was blessed to have two medium-scale agro-processing industries – a maize processing industry (KEDAN) and a cotton ginnery. However, little was known about the effects of participation in agro-processing on the household welfare of the economy of the area. The purpose of the study stood as, to assess the participation in agro-processing and its effect on household welfare in the Sissala East Municipality.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter presents the concept of the study, theoretical review, empirical review and conceptual framework, as well as chapter summary. The concept of the study was presented under agroprocessing activities, participation in agro-processing and household welfare status. The empirical review looked at scholarly literature on the association between household welfare and participation in agro-processing. The conceptual framework gives a pictorial view of interrelated factors of participation in agro-processing and its effects on household welfare.

Concept

Agro-processing activities

There is said to be a very limited value addition on all the food products sold to local Ghanaian markets, with cereals and grain legumes often fundamental threshed, while roots and tubers, and plantains are sold predominantly in their raw form (Owoo & Lambon-Quayefio, 2015). Conversely, due to time demands and growing preferences for convenience, Ghana's urban population is moving away from consuming meals requiring long preparation and cooking times and towards already-processed foods (Hollinger & Staatz 2015).

Research had it that cocoa is the only agricultural product that is processed on a large scale, as the agro-processing industry in Ghana is described to be in its nascent stages (Sutton & Kpentey, 2012). It is reported that the agro-processing

industry in Ghana today is characterised by a large number of micro, small and medium scale processing enterprises that are involved in activities such as gari processing, fish smoking, flour making, nut, and palm oil processing as well as fruit and juice processing (Owoo & Lambon-Quayefio, 2015).

The Ghana Statistical Service (2014) revealed that the main food item processed by households is maize with about 1.5 million households involved in processing it into flour, and 13 million processing it into corn dough. More than two-thirds of households involved in fish processing (69.5%) and gari making (66.4%) sell some amount of their processed products. Also, 44.1% of households brewing pito sell it to the public (Ghana Statistical Service, 2014b).

Agro-processing such as the Palm and shea to extract oil/butter in West African countries including Ghana, involves very laborious activities (pounding/milling, kneading, washing, boiling, etc) and it is mostly carried out by women, who would always rely on very simple household equipment such as the mortar and pestle (Addaquay, 2004).

The cultivation of grains such as maize, millet, sorghum and rice is very popular among Ghanaians. Maize, which is widely consumed as a staple food in Ghana is regarded as the most important cereal crop produced (Morris, Tripp, & Dankyi, 1999). The processing of these grains is also primarily undertaken by women using simple household equipment at small scale level, and at the medium-scale level, grains are roasted and milled into flour and mixed with other legumes such as soya beans and groundnut and packaged for both domestic consumption and for export, while on a large scale, grains are processed into grits and serve as

raw materials for poultry farms and giant brewery companies, and grains in Ghana are also processed into high ended infant cereals such as Cerelac using state of the art food processing technology (Owoo & Lambon-Quayefio, 2015).

According to MoFA (2010a), roots and tubers such as cassava, yam, cocoyam and sweet potato contribute about 50% of Ghana's agricultural GDP, and cassava is said to be the most processed because it is the most perishable after harvest (FAO, 1998).

The processing of fruits is not popular at the household level, as a bit more skill is required, and a huge capital outlay is reported to be required for fruit juice processing, thus served as an entry barrier.

There is a large cotton ginnery in Tumu processing and marketing of cotton and its by-products and said to have employed 72 permanent workers and 120 temporary workers per cycle of ginnery most of who come from Sissala East district. The company also engaged about 8000 to 9000 cotton farmers in both Sissala East and West (UNDP, 2011).

Participation in agro-processing

The whole agro-processing idea cannot be said to be new in Ghana, as it could be traced back to the colonial period, where these activities were performed on a small scale and consumed locally (Okorley & Kwartan, 2000). As a measure of Ghana's progress in agro-processing, Ghanaian brands account for between 20 and 30 percent of processed and packaged food products in Accra and other urban centers (Andam, Al-Hassan & Asante, 2015).

The adoption of agro-processing is underpinned by a host of factors. For instance, several researches reported that male smallholder farmers are less likely to participate in agro-processing activities than their female counterparts, (Kuwornu, 2014; Marchetta, 2011; Simtowe, 2010). Also, (Williams et al. (2016) revealed that most (92.1%) of the agro-processors in Ghana are females while few (7.9%) are males. It could also be seen that almost 95% of actors involved in agro-processing are women with the male counterparts assisting in activities such as production, transport, operation and maintenance of agro-processing tools and equipment (Ampadu-Ameyaw & Omari, 2015; Quartey & Darkwah, 2015).

The results of a study that sought to assess the shea industry and rural livelihoods among women in Wa Municipality of Ghana revealed that 93.7% of the women participated in the shea value chain as the main source of livelihood strategy; as much as 69.8% of the respondents in the shea industry produce for both subsistence and commercial purposes. The study found limited access to investment capital as one of the challenges confronting women in the shea industry (Adams, Abudulai, & Bashiru, 2016).

It is argued that the development of the agro-processing sector often has stronger backward and forward linkages with the agricultural sector than other sectors and, thus, plays an important role in rural transformation (Figueroa, Mahmoud, & El-Enbaby, 2018).

The size of one's farm is noted to be a determining factor in agro-processing adoption. It is revealed in South Africa that commercial agriculture is the main player in the agro-processing industry, whereas smallholder farmers play a limited

role despite receiving support from the government (Mmbengwa et al., 2011). Larger farm sizes are associated with smallholder farmers' diversification into agro-processing activities according to (Kuwornu, 2014).

According to Alwang et al. (2005), better-educated households are more likely to diversify into agro-processing than those with little or no education. Similarly, empirical evidence from rural Ethiopia suggests that the determinants of participating in agro-processing are influenced by household size and level of education (Sisay, 2010).

Research also established the effect of institutional factors on diversification of agricultural produce, with access to land said to be key according to (Ogeto, Cheruiyot, Mshenga & Onyari, 2013; Tarawali et al., 2012). Also, offering training and access to information has been revealed to be a factor in the adoption of agro-processing (Asmah, 2011).

The adoption of agro-processing has not been encouraging due to several challenges espoused by researchers over the years. Low supplies to the industry lead to the industry may affect it performing in full capacity resulting in sustainability issues, as farmers may for instance need to triple their yields to supply processors with tomatoes at a competitive price (Kolavalli, Vigneri, Maamah, & Poku, 2013). Also, the Ghanaian tomato cannot compete with imports because of farmers' high unit cost of production resulting from low yields (10 mt/ha in Ghana compared to 40 mt/ha in major tomato processing countries) (Andam & Silver, 2016).

Also, a major challenge said of the juice processing industry in Ghana is the issue of a limited supply of fruits, which serves as the main raw material for the industry (Owoo & Lambon-Quayefio, 2015). Their study further revealed that agro-processing adoption appeared low in Ghana due to the lack of agro-processing facilities and modern equipment, lack of marketing skills, unreliable supply of raw materials, failure to meet food processing regulations among others.

According to Afful-Koomson et al. (2014), transport costs are a major issue affecting profitability for agro-processors, according to small-scale food processors, with Processors reported to obtain raw materials at rural communities connected by poor feeder roads from smallholder farmers who produce small surpluses of many crops.

It is argued that the growth and development of small-scale food processing industries in West African countries have been limited as a result of inefficient and inappropriate technologies, poor management, inadequate working capital, limited access to financial institutions, high-interest rates, and low-profit margins (Büntrup, Swetman & Michalscheck, 2014).

It was reported in the Ghana Living Standards Survey (2014) that, of both agricultural and non-agricultural households in Ghana 42.3% are involved in some form of food processing (29.8% in urban areas and 57.9% in rural areas). The results also clearly show women are dominant in agro-processing activities with over 80% in every locality and close to 90% in urban areas (Ghana Statistical Service, 2014b).

The results reveal that the level of education influenced both the decision to participate in agro-processing (significantly positive) and that of the level of participation (significantly negative). The results also revealed that factors such as land tenure, agro-processing training, and information have a positive influence on the decision to participate (Khoza, Senyolo, Mmbengwa, & Soundy, 2019).

Household welfare status

Poverty is reported to be the major developmental challenge in rural Sub-Saharan Africa where agriculture is the dominant economic livelihood activity (Davis et al., 2010). Thus, increasing the productivity of smallholder farmers according to (Ravallion, 2009), will undoubtedly ensure poverty reduction in these rural areas.

The Ghana Statistical Service reports that almost all (94.3%) of the dwelling units in the Sissala East Municipality are owned by members of the household, and the main construction material for outer walls of dwelling units in the district is mud brick or earth accounting for 79.3 percent with cement concrete constituting 14.3 percent of outer walls of dwelling units. Also, the main source of fuel for cooking for most households in the municipality is wood (74.9%) (Ghana Statistical Service, 2014a).

It is reported that about three-quarters (75.5%) of the Ghanaian population 15 years and older are employed, with the majority of them engaged in agriculture (44.7%) and Services (40.9%), with farming said to be predominantly rural, as 82.5% of rural households were involved, and the majority (93%) of the agricultural operators are in rural savannah. The major source of household income is from non-

farm self-employment, contributing 48.3% to sources of household income. Wages from employment is the second major contributor to household income followed by household agriculture (Ghana Statistical Service, 2014b).

Mhazo et al. (2012), opined that agro-processing is commonly known to contribute significantly to the alleviation of socio-economic challenges, improvement of income, employment, food availability and nutrition, and social and cultural wellbeing, which enhances the sustainability of smallholder farmers' livelihoods. Several researches further highlighted that the involvement of smallholder farmers in agro-processing has the potential to contribute significantly to sustainable livelihoods (Mahlogedi & Thindisa, 2014).

It is revealed that even if the incidence of poverty is lower within the population of non-farm people (whether rural or urban) growth in income from non-farm sources could be proportionally more effective in reducing poverty (Cervantes-Godoy & Dewbre, 2010).

Although Sub-Saharan Africa has the highest poverty rate overall globally, rural poverty is about a quarter higher than urban poverty, with 65 percent of the population and 70 percent of the poor living in rural areas (Dercon, 2009).

Agriculture employs 65 percent of Africa's labour force and accounts for 32% of its gross domestic product (World Bank, 2008). The World Bank further intimates that expansion of smallholder farming can lead to a faster rate of poverty alleviation, by raising the incomes of rural cultivators and reducing food expenditure. According to the Institute of Statistical, Social and Economic

Research (ISSER), in Ghana, agriculture and its related activities remain the largest employer, employing approximately 50% of the labour force and contributing almost 21.5% of Ghana's GDP (ISSER, 2014).

It is said that the incidence of poverty tends to be higher in agricultural and rural populations than elsewhere, and most of the poor live in rural areas and a large share of them depend on agriculture for a living. However, previous studies intimated that agricultural income growth stood more effective in reducing poverty than growth in other sectors (Christiaensen, Luc and Demery, 2007; Ravallion & Chen, 2007).

Theoretical Review

The changing phenomena of the agro-industrial sector is both a response to and an agent of the tempted institutional and technological changes espoused (Reardon and Barrett, 2003). According to the World Bank (2005), perishability and prolonged production cycles, the agro-industrial sector in developing countries is changing in a similar manner to commodity chains on a global basis.

The Food and Agriculture Organization (FAO) and The United Nations Industrial Development Organization (UNIDO) (2009), had it that agro-industries in developing countries have been traditionally based on the use of bulk supplies that have relatively low unit values, but which are costly to transport.

World Bank (2013), postulates that long-term growth in Ghana's agro-processing sector can only be achieved through a sustained commitment to

strengthening the country's infrastructure, through better roads, warehouse space, access to energy, and other fundamental resources for doing business.

Emperical Review

According to the World Bank strengthening agricultural processing may be among the most effective ways to address global poverty (Bank, 2013). The Institute of Statistical, Social and Economic Research (ISSER) of the University of Ghana highlights the significance of agriculture to the Ghanaian economy, with the sector reported accounting for about 22% of the national GDP in 2014 (ISSER, 2014).

Several studies opined the enormous contribution of agro-processing in propelling the socioeconomic status of rural households. The agro-processing industry is argued to be an important source of employment and income generation globally (Da Silva, Baker & Jenane, 2009). It is further highlighted small-scale processing, in particular can create employment opportunities and make use of the local resource, though domestic processing activities are said to be dominated by female workers who are predominantly illiterates, and usually have no formal training, with processing skills acquired mostly through apprenticeship (Owoo & Lambon-Quayefio, 2017).

In Ghana, national-level data on the contribution of agro-processing industry on employment creation. Despite this, it is demonstrated that the agro-processing industry is an important source of employment for rural communities in Ghana, and especially for women (Ampadu-Ameyaw & Omari, 2015).

The processing of agricultural produce is revealed to be critical for food security, income security and sustained agricultural development for the overall economic growth of the country (Williams et al., 2016). As the urban population requires more agricultural commodities, with increasing demand for processed agricultural products, there exist greater potentials and profits for smallholder farmers and processors (Babu, Manvatkar, & Kolavalli, 2016).

There has been a shift in food consumption patterns in Ghana due to urbanization, suggesting a likely increase in demand for agro-processed food, strengthening the capacity of the sector to generate employment and improve livelihoods as well as reduce post-harvest losses (Williams, Akuffo-bea, Onumah & Essegbey, 2016).

The Department for International Development (*DFID*) emphasizes the historically close correlation between different rates of poverty reduction over the past 40 years and differences in agricultural performance – particularly the rate of growth of agricultural productivity (DFID, 2005).

According to (Dhrifi, 2014), agricultural growth would lead to a 32% decrease in poverty: this effect is divided into a direct impact of 0.98% and an indirect impact via economic growth equal to 0.22%.

It is reported that agricultural value-added per worker contributes significantly to reducing unemployment and rural poverty. This implies that agricultural productivity enhances more significantly the livelihood of the rural agricultural dependent population – which forms the bulk of unemployed youths

and women (Ogundipe, Oduntan, Ogunniyi, & Olagunju, 2017). It was concluded that when the direct and indirect effects of agricultural growth are taken into account, such growth is more poverty-reducing than growth in non-agricultural sectors (Bresciani & Valdés, 2007).

A study in Jordan revealed that being poor is negatively associated with households not engaged in agriculture and positively associated with agricultural activities. Interestingly, the association is negative for households in agro-processing suggesting the potential of the sector for income generation and employment, especially in rural areas, where it is more likely to find households in agro-processing and agriculture in comparison with urban areas. And the importance of women for the agro-processing sector is also evident, as seen in the negative correlation of a household having a male head and agro-processing type (Figueroa et al., 2018).

Agro-processing is commonly known to contribute significantly to the alleviation of socio-economic challenges, improvement of income, employment, food availability and nutrition, and social and cultural wellbeing, which enhances the sustainability of smallholder farmers' livelihoods (Mhazo et al., 2012).

Conceptual framework

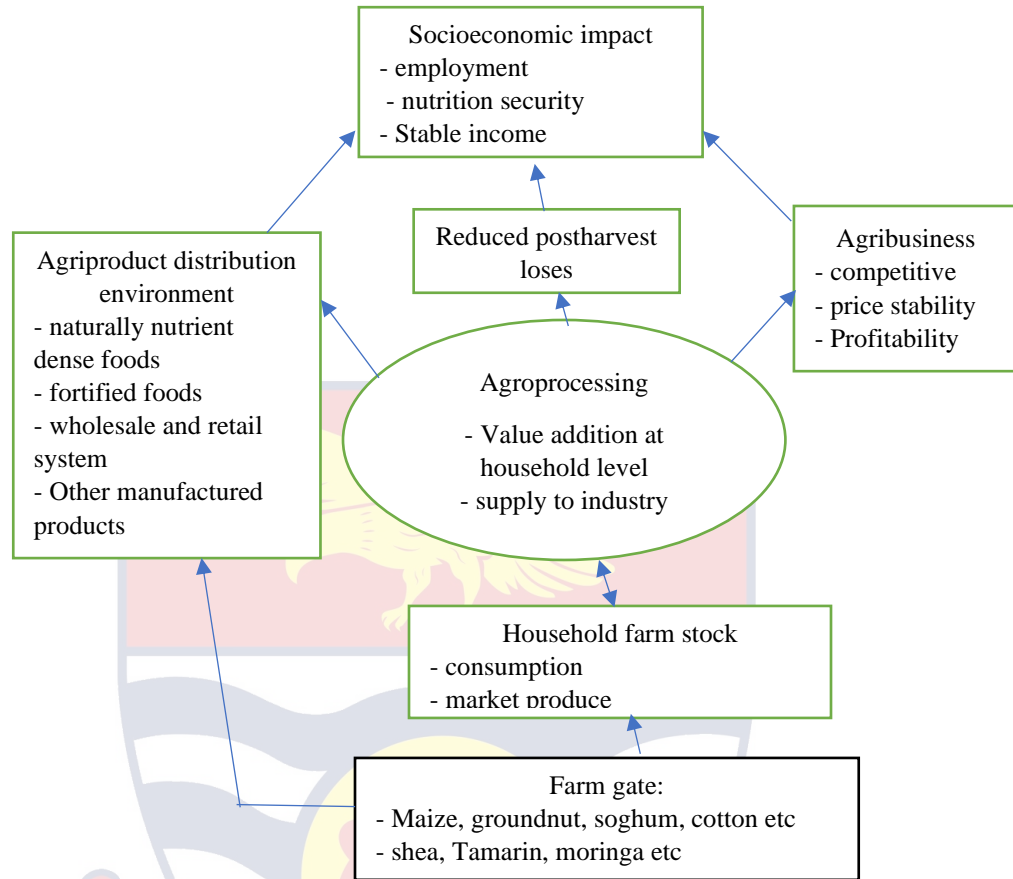


Figure 1: Conceptual framework

Source: Adopted from Maestre et al. (2016)

The conceptual framework of the study poses insights into assessing agro-processing adoption and the existing linkages to post farm-gate agri-food value chains and how household welfare is enhanced. The Department of International Development (DFID) expresses a long-term perspective on agriculture based on the assumption that sustained wealth creation and a self-financed exit from poverty depend, in the long-term, on economic transformation and the majority of the rural poor finding productive and better-paid employment outside of primary agricultural production, and stresses that agricultural growth and downstream processing and

productivity growth are likely to be important, if not essential, as a continued source, if not driver, of growth (DFID, 2015).

The framework integrates value chain concepts with agriculture and nutrition and identifies key outcomes and requirements for value chains to be successful at delivering substantive and sustained consumption of nutrient-dense foods by poor households and overall socioeconomic status (Maestre et al., 2017).

Farm produce from the supply base of any agricultural value chain. It is demonstrated above that, produce from the farm has two immediate pathways; the household stock for consumption or market/industry, and direct distribution to the market through middlemen. The household stock may then enjoy a reverse relationship with agro-processing, in which surplus foods are served the agro-processing industries for processing for household consumption or to agribusiness for competitive pricing and profitability. Agribusiness with its benefits of price stability, competitiveness may lead to employment creation and household income stability. According to Barrett (2008), agribusinesses create jobs and wage-labour opportunities, develop market opportunities and build sustained demand for farm production, and drive investment along the whole value chain.

The agri-food sector and health outcomes nexus has been a growing public health and economic concern in developing countries including Ghana for some time now. As demonstrated in the framework, agro-processing sees to food fortification and supply of nutrient-dense foods. The DFID opines that facilitating rural transitions from poverty to economic wellbeing, health, and overall welfare requires three complementary actions, first is continuing to support subsistence

agriculture is vital, building resilience to shocks and climate change, and raising productivity incrementally to improve food security and build household assets, the second action expresses the need for a strong focus on creating an off-farm job or wage labor opportunities, in commercial agriculture, agroindustry or the rural non-farm economy, and lastly is the public sector required to focus on building linkages and promoting mobility between rural and urban areas and/or between farm and off-farm opportunities (DFID, 2015).

The significance of agro-processing in limiting postharvest cannot be further highlighted. According to Sasakawa Africa Association (SAA), the overall potential of agro-processing to transform agriculture into a profitable business is huge, as it can reduce wastage, enhance food security, improve livelihoods for low-income groups, and empower women (SAA, 2005).

Chapter Summary

Chapter two contained a review of scholarly literature under the following themes; concept of the study (agro-processing activities, participation in agro-processing and household welfare status), theoretical review, empirical review and the conceptual framework.. The conceptual framework of the study offered intuitions into assessing agro-processing adoption and the existing nexuses to post farm-gate agri-food value chains and how household welfare is improved. On agro-processing, the literature reviewed showed that the main food item processed by households is maize in the Sissala East Municipality, more than two-thirds of households were involved in fish processing, and gari making (66.4%) respectively. On participation in agro-processing, literature revealed that the whole idea cannot

be said to be new in Ghana, and could be traced back to the colonial period, where these activities were performed on a small scale and used locally. The reviewed literature showed females were more into agro-processing than their male counterparts. On household welfare status, poverty was reported to be the major developmental setback in rural Sub-Saharan Africa where agriculture is the main economic livelihood activity.

On the association between participation in agro-processing and household welfare, several studies highlighted the massive influence of agro-processing in changing the socio-economic status of rural households positively. The review showed agro-processing was commonly known to contribute significantly to the alleviation of socio-economic challenges, improvement of income, employment, food availability and nutrition, and social and cultural wellbeing, which enhances the sustainability of smallholder farmers' livelihoods.

Despite the several studies reviewed, much could not be seen on the association between participation in agro-processing and household welfare indicators, such as the ability to pay electricity bills, health care, housing among others.

CHAPTER THREE

RESEARCH METHODS

Introduction

This section presents a description of methods, tools and activities, and how these were systematically applied to address the research problem. It captures the study design, background of the study area, sample size determination, sampling technique, research variables, data collection and study instruments, and the ethical considerations of the entire research process, as well as methodological limitations. Sissala East Municipal was the study location, with sixteen (16) communities included using appropriate sampling procedures.

Study design

The study was descriptive cross-sectional in design with both quantitative and qualitative data collected, using a semi-structured interview guide and focus group discussion guide. The Data collected included socio-demographic characteristics, household welfare situation, agro-processing activities, and factors affecting participation in agro-processing.

Study area

The Sissala East Municipality is found in the northeastern part of the Upper West Region of Ghana. The population of Sissala East Municipality stood at 56,528 (males = 27, 529 and females = 28,999), representing 8.1% of the Upper West Region's total population, and the Municipality is said to contain 8,652 households, with an average household size of 6 (Ghana Statistical Service, 2014a). It lies between longitudes 1.30 W and latitudes 10.00 N. The Municipality has a total land

size of 4,744sq km which represents 26% of the total landmass of the region. It shares a boundary with Burkina Faso to the north, on the east with Kassena Nankana and Builsa Districts, to the South-East with West Mamprusi District, and South-West with Wa East District, and Nadowli District, and to the West by Sissala West District.

The economy of the municipality is mainly agrarian, in which agricultural-related activities remained the predominant economic activity, employing a greater proportion of the population. According to the 2010 Population and Housing Census, about 83.2% of the population in Sissala East Municipal are engaged as skilled agricultural. The people practice subsistence farming with only a few engaged in commercial farming. Its location offers an advantage for trade and other cross-border activities, which is a potential for the development of the local economy. The municipality has a major problem in terms of the road network, which hinders the socio-economic development of the communities in the district (Ghana Statistical Service, 2014a).

The municipality has a gently undulating land with varieties of soils such as Savannah Ochrosols, Tropical brown earth and Terrace or Alluvial soils, and are said to be better suited for the cultivation of cereals and root tuber crops including millet, maize, sorghum, yam and cash crop like cotton.

The industrial sector (manufacturing) is dominated by small-scale cottage industries, such as agro-processing industries, including shea nut and other oil and fat extraction industries, brewing of local drinks, among others (Ghana Statistical Service, 2014a). There is also a large cotton ginnery industrial outfit, and a maize

processing industry (KEDAN), both located in Tumu, employing a host of youth within and outside the municipality.

The illiteracy situation in the municipality is still high, with 58.4% of the population 11 years and above said to be non-literate, and the proportion said to be higher among females (33.3%) compared with males (23.1%) (Ghana Statistical Service, 2014a)

The health delivery system in the municipality is composed of both the public and private health care providers in the government and private intuitions. With the public health delivery system, the municipality has a municipal hospital located in the capital (Tumu), including 6 sub-municipal health and a host of functional Community-based Health Planning Services (CHPS) zones across the municipality. The private health care providers are mainly the traditional bone setters, traditional birth attendants, some herbalists, private drug sellers (both licensed and few unlicensed ones).

Target population

Farmers in the municipality, as well as the cotton ginnery and the KEDAN maize processing industry.

Inclusion criteria

Women who were given training under the Mennonite Economic Development Associates (MEDA) Greater Rural Opportunities for Women (GROW) project or through any other avenue were included in the study. Any other woman said to be involved in one agricultural activity or the other

were also considered. Male farmers who were identified to be directly supplying maize or cotton to the industries in Tumu or any other processors were also included in the study.

Sample size determination

The sample size of the study was determined using the following Snedecor and Cochran (1989) statistical formula for a single population proportion:

$$n = t^2 \times \frac{P(1-P)}{m^2}$$

Where P is the proportion of the targeted population involved in agro-processing in the study area, m is the margin of error, t is the z-value corresponding to confidence level, and n represents the sample size.

The proportion (P) of people involved in agro-processing was not known, thus represented by 50%, the margin of error (m) of 0.05 at 95% confidence level and t (z-value) = 1.96 were used in the calculation of the sample size.

Calculation:

$$n = 1.96^2 \times \frac{0.5(1-0.5)}{0.05^2}$$
$$n = 3.8416 \times \frac{0.25}{0.0025}$$

$$n = 3.8416 \times 100$$

$$n = 384. \approx 384$$

Therefore, a sample size of three hundred and eighty-four (384) farmers were included in the study.

Sampling technique

A multi-stage sampling technique was used to arrive at households and study subjects during data collection. The first stage involved dividing the district into seven existing sub-districts (clusters) namely; Tumu, Kunchogu, Wellembelle, Sakai, Kulfuo, Nabugbelle, and Nabulo of which four (Sakai, Tumu, Kunchogu, and Kulfuo) sub-districts were selected through simple random sampling technique (lottery method).

The second stage involved the selection of four communities (sub-clusters) from each of the four (4) selected sub-districts using a systematic random sampling technique. A sampling frame of ten (10), twelve (12), eleven (11) and five (5) respectively were used for the four selected sub-districts, regarding the master list of communities contained in the district profile; using intervals of two (2), three (3), three (3) and one (1) respectively.

Finally, a total of three hundred and eighty-four (384) households (respondents) were evenly distributed amongst the sixteen (16) communities with each having twenty-four (24). The women leaders who were given agro-processing training under the MEDA-Ghana GROW project were purposively selected for the study. Their respective households then served as the starting point in each community for the spin-a-pen random walk, to arrive at the required number of households, and the woman/or male who was involved in one agricultural activity or the other in each household was enrolled for the interview by consent. However, in the case where a particular household had more than one woman involved in agricultural activities, only one was selected for interview by lottery method.

Research Variables

This study looked at two main variables, namely; dependent and independent variables.

Dependent variables

Household welfare was one of the dependent variables of this study. An assessment of the welfare situation of households of participants of the study was conducted using a semi-structured interview guide, focus group discussion guide. By these, the household welfare was expressed in terms of participant responses on various socioeconomic indicators such as household income, food security, ownership of the house, type of building material, household cooking fuel, ability to pay electricity bills, and ability to handle health bills.

The participation in agro-processing was also the other dependent variable of the study which was measured by whether participants were undertaking any particular agro-processing activity as a livelihood venture or not.

Independent Variables

The independent variables considered in the study included employment status, income, food security, assets, age, sex, education, occupation, religion, ethnicity, household size, sociocultural factors, crop yields, capital, family support, technical know-how, and availability of resources.

Data collection instruments

The main data collection tools employed in the study were the Semi-structured Interview Guide and Focus Group Discussion Guide.

Semi-structured interview

The semi-structured interview guide was used to solicit information from participants at the household level. It contained both close-ended and open-ended questions and focused on the study objectives. It aided in gathering information on socio-demographic characteristics of respondents, agro-processing activities, participation in agro-processing and household welfare indicators.

Focus group discussion

This was prepared to guide the focus group discussion sessions involving women groups involved in Agricultural activities especially those that were involved in the MEDA-Ghana GROW project. Issues captured in the guide included the available and potential agro-processing activities, factors influencing participation in agro-processing, and their effect on household welfare. The study was conducted at the peak of the Covid-19 pandemic, as such the necessary precautions were put in place to ensure the safety of all participants. Both the data collectors and participants wore face masks and used hand sanitizers, with a maximum of nine (9) participants composing the group in each session and conducted in the open air.

Data analysis

Data collected were processed and analyzed using IBM Statistical Package for Social Sciences (SPSS) version 21.0 to draw valid and scientific conclusions. The SPSS software was used to run univariate, bivariate, and multivariate analyses. The univariate analysis helped in determining the frequencies of socio-demographic characteristics, agro-processing activities, participation in agro-processing, and frequencies on participants' performances on household welfare indicators.

Bivariate analysis was done using the Chi-squared test of independence (χ^2) to ascertain the relationship variables of household welfare and involvement in agro-processing. Test results were deemed statistically significant with reference to a p-value of less than 0.05.

Quality control

The following were measures considered to ensure that the data collected were of the needed quality. The structured interview guide was pre-tested on 5% of the sample size in a similar area which was not included in the study, to ensure that questions were unambiguous and to estimate the time needed to carry out the interview.

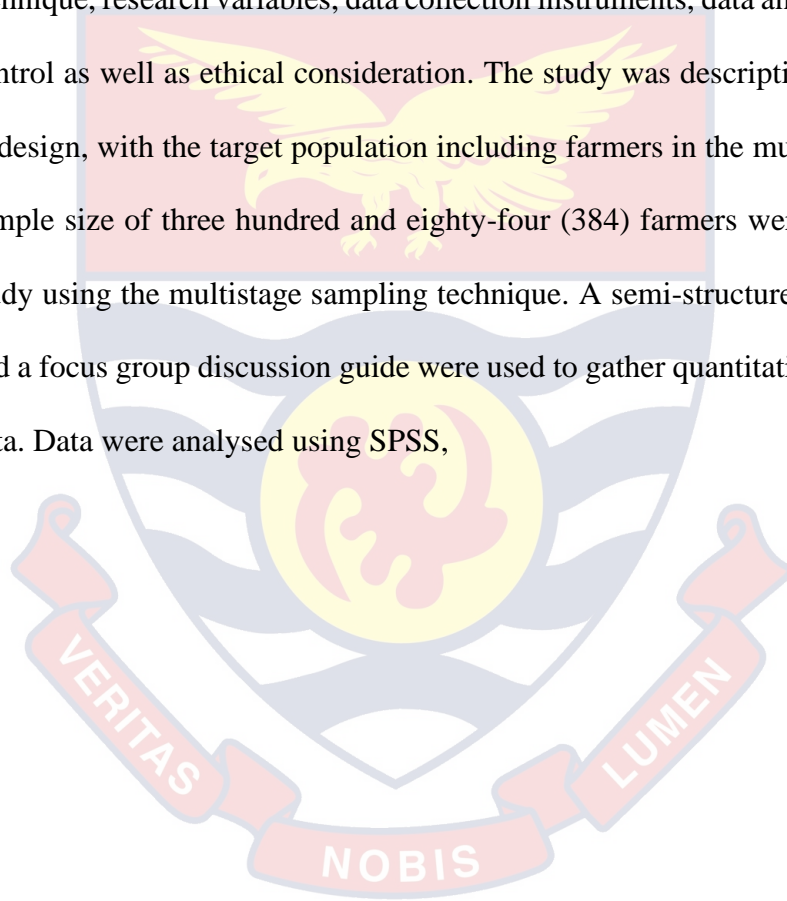
Ethical consideration

The study was largely community-based; as such proper community entry protocols were observed. By this, stakeholders of the various communities were duly informed of the research and the rationale behind it. The consent of each of the study respondents was obtained before the commencement of the interview after

the purpose of the study was well spelled out to them. They were also assured that information given was going to be kept confidential both during and after the study.

Chapter Summary

This chapter contained the study design, background of the study area, target population, inclusion criteria, sample size determination, sampling technique, research variables, data collection instruments, data analysis, and quality control as well as ethical consideration. The study was descriptive cross-sectional in design, with the target population including farmers in the municipality. A total sample size of three hundred and eighty-four (384) farmers were selected for the study using the multistage sampling technique. A semi-structured interview guide and a focus group discussion guide were used to gather quantitative and qualitative data. Data were analysed using SPSS,



CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This section contains the findings of the study from the analysed data which were presented in tables and charts. The findings were presented along with a discussion, concerning available literature where appropriate. It includes all the key variables of the study, namely; socio-demographic characteristics, agro-processing activities, participation in agro-processing, and household welfare. The level of association between participation in agro-processing and household welfare was also looked at.

Socio-demographic Characteristics of Households

The socio-demographic characteristics considered in the study include sex, age, religion, ethnicity, marital status, educational level, occupation, and household size as captured in Table 1. It was revealed that the majority (76.8%) of the 384 respondents were females and only a few (23.2%) were males. This study having more females included than their male counterparts participating in agro-processing activities goes to corroborate the assertion that small-scale agro-processing activities are almost a preserve of women, especially those in the rural setting (Addaquay, 2004).

The study found that the majority (50.3%) of the respondents were in 26-35 years age category while only 14 (3.6%) of respondents were found to be in the 46 years and above category. With over 97% of the study participants said to be within

the 16 – 45 age ranges, satisfies the youthful age bracket, with the required energies needed for rigorous physical activities. Farming activities, as well as agro-processing, are highly labourious, thus cannot have more persons in the higher age ranges getting involved, so the less than 4% of participants said to be involved in ages above 46 years can be said to reflect the reality.

The study area was Sissala East Municipality and as the name implied, the majority of the respondents were of Sissala descent making 80.7% of the 384 respondents enrolled in the study and the Dagaaba, Moshi, and other ethnic groups making 19.3%. With the Sissala population being more than 4 times, the population of all other ethnic groups put together, cannot be surprising as the entire municipality was named after the Sissala ethnic extraction, reflecting that the area was largely a Sissala land.

On religion, it was discovered that the study area was Muslim dominated as close to 70% of those enrolled in the study were in the Islamic religion, with the least practiced religion being the African Traditional Religion (ATR) with about 10% of the 384 respondents said to be in practice, as shown in Table 1.

On occupation, the majority (64.6%) of respondents were found to be into farming while the least 6 (1.6%) were said to be into skilled manual occupations. A little above 15% were said to be into professional jobs, as 72 (18.8%) were into sales and services as means of livelihood as shown above in Table 1. This goes to say that majority of the respondents were into farming as their main means of livelihood with just a few operating in professional jobs, sales and services, and

skilled manual jobs. This appears to be consistent with the 2010 Population and Housing Census report with over 83% of the population in Sissala East Municipal said to engage in skilled agriculture, in the form of subsistence farming with only a few engaged in commercial farming (Ghana Statistical Service, 2014a).

It was revealed that the majority (49%) of the 384 respondents were said to have at most 5 persons making their households, with the least (1.8%) indicated to have 16 or more persons making the population of the household. On marital status, it was discovered that 268 (69.8%) of the individuals interviewed were married/living together with their partner, while 20 (5.2%) were said to have divorced/separated. Also, 24 (9.2%) were identified to be divorced, separated, or widowed/widower. Those who were never married stood at 51 (13.3%), with those said to be widow/widower making 45(11.7%), as shown in Table 1.

The information displayed in Table 1 is a continuation of the socio-demographic background of the study subjects. It is reported that 28.6% of the 384 respondents had no formal education, while only 47 (12.2%) had attained tertiary education. Almost the same number (21.9% and 21.6%) managed to attain education up to primary and JHS levels, respectively.

Table 1: Distribution of socio-demographic characteristics of respondents

Variable	Frequency	Percentage
Sex of respondent		
Male	89	23.2
Female	295	76.8
Age group of respondents		
16 – 25	60	15.6
26 – 35	193	50.3
36 – 45	117	30.5
46 and above	14	3.6
Religion of respondent		
ATR	41	10.7
Christianity	83	21.6
Islam	260	67.7
Ethnicity of respondent		
Sissala	310	80.7
Dagaaba	47	12.2
Moshi	11	2.9
Others	16	4.2
Marital status of respondent		
Never married	51	13.3
Married/living together	268	69.8
Divorced/separated	20	5.2
Widow/widower	45	11.7
Educational level of respondent		
No formal education	110	28.6
Non-formal	9	2.3
Primary	84	21.9
JHS	83	21.6
SHS/Voc/Tech	51	13.3
Tertiary	47	12.2

Source: Field survey, 2020

Table 1, continue

Occupation of respondent		
Farming	248	64.6
Professional	58	15.1
Sales and Services	72	18.8
Skilled manual	6	1.6
Household size of respondent		
1-5	188	49.0
6-10	120	31.3
11-15	69	18.0
16 and above	7	1.8
Total	384	100.0

Source: Field survey, 2020

Agro-Processing Activities in the Study Area

On-going agro-processing activities in the study area

The study sought to know what agro-processing activities were observed to be ongoing in the Sissala East Municipality as displayed in Table 3. Agro-processing activities said to be undertaken by people in the area as observed include shea butter extraction, groundnut oil extraction, tom brown production, millet drink, pito brewing, and fruit juice production.

Shea butter extraction was revealed to be the dominant activity with close to 95% of the respondents indicated to have seen shea butter extraction be ongoing in the area. The extraction of shea butter is an indigenous activity and part of the women's tradition in the area, hence the reason for the high numbers of respondents said to be undertaking shea butter extraction.

Also, the majority (71.4%) of the 384 respondents attested to the prevalence of groundnut oil extraction in the study area. Groundnut is one of the dominant

crops in the area as cultivated by farmers hence the reason for the high numbers said to have observed as farmers converting some of their products into the oil. For Tom brown production, 271 (70.6%) could not confirm its existence in the municipality, against 29.4% who revealed to have observed Tom brown production to be ongoing in the area. The area is known for its high production of maize, though Tom brown production appears low as observed, though

The Millet drink production as an agro-processing activity in the municipality saw an almost balanced awareness as those who indicated to have observed its existence stood at 52.1% against 47.1% who did not observe it to be ongoing. Fruit juice production almost appeared not to be in existence with 394 (99%) of respondents not able to observe its prevalence, only 4 (1.0%) reporting to have seen the activity on-going in the district. For pito brewing as an agro-processing activity in the municipality, 244 (63.5%) of the 384 respondents noted they observed it was ongoing as shown in Table 2. Pito drink is a local delicacy with its patronage appearing traditional among some specific tribes such as the Dagaabas hence the high numbers. Millet drink patronage in recent years is fast gaining grounds, with many people now observed to be processing it for the local market. In buttressing the above, the 2010 population and housing census district analytic report had it that the industrial sector (manufacturing) is dominated by small-scale cottage industries, such as agro-processing industries, including shea nut and other oil and fat extraction industries, brewing of local drinks, among others (Ghana Statistical Service, 2014a).

In the focus group discussion sessions across various communities, shea butter was said to be an activity carried out by almost every woman as it is deemed as a traditional venture in which every credible woman should be able to undertake.

A participant said; *“shea butter extraction can be traced down to Adam and usually learned naturally, which has always been our primary alternative source of livelihood, after mainstream farming. It used to be done with the use of grinding stone, but now we use grinding mil to support”*

Millet drink production they said has been there, but they didn't know it could be prepared for the market. They said groundnut oil extraction is available but done by few women. For example, one of the participants commented as follows:

Comment by a participant; *“aside from shea butter some women do produce tom brown, millet drink, and groundnut. There are some one-one women seen around producing pito, but are mostly Dagaaba women”.*

Table 2: On-going agro-processing activities

Variable	Frequency	Percentage
Shea Butter		
Yes	362	94.3
No	22	5.7
Groundnut Oil		
Yes	274	71.4
No	110	28.6
Tom Brown		
Yes	113	29.4
No	271	70.6
Millet Drink		
Yes	200	52.1
No	184	47.9
Fruit Juice		
Yes	4	1.0
No	380	99.0
Pito Brewing		
Yes	244	63.5
No	140	36.5

Source: Field survey, 2020

Potential agro-processing activities in the study area

Aside from the agro-processing activities observed to be ongoing in the municipality, respondents were further asked to indicate any agro-processing activity they thought could be established in their locality based on the resources available. As could be seen in Figure 2 below, maize processing was considered by the majority (56.5%) of the 384 respondents to be a potential activity in their locality. Soya processing and fruit juice production had almost the same number of respondents (14.7% and 14%) respectively seeing them as potential activities that could be carried out in the study area.

As noted, what respondents perceived to be potential agro-processing activities in the area included, maize processing stood out followed by soybean processing and fruit juice production. The study area is famous for its high maize production over the years as was revealed in 2010 that maize production in the municipality stood at 18,360 metric tons, as such any industry intended to process maize would not go hungry for raw material (MoFA, 2010b). The majority of respondents asserted the availability of some agro-processing industries within or around their localities and made mention of the Cotton ginnery and KEDAN maize processing industry in Tumu town. This goes to corroborate UNDP results in 2011 highlighting the presence of a large cotton ginnery in Tumu, processing, and marketing of cotton and its by-products (UNDP, 2011).

During the focus group, discussion sessions participants shared their views on the potential agro-processing industries that could be established. They responded based on what food crop they think was abundant and that any industry sited in line would never lack raw material. They mentioned fruit juice, cashew nut processing, maize processing, soybean processing, tomato processing among others. See comments below from some individual participants;

“as for things that can be done, they are there ooh, during tomato time you will see tomatoes rotting away, and even mango when they are ripening, so if there is something that can process them it will be good”

Another said, *“I think maize processing or soybean processing will be good here, a lot of these products are produced here with high yield”* In addition to this,

another participant said amidst laughter, “go and tell the people in power to come and do it for us we want it”.

Figure 3: Potential agro-processing activities in the study area

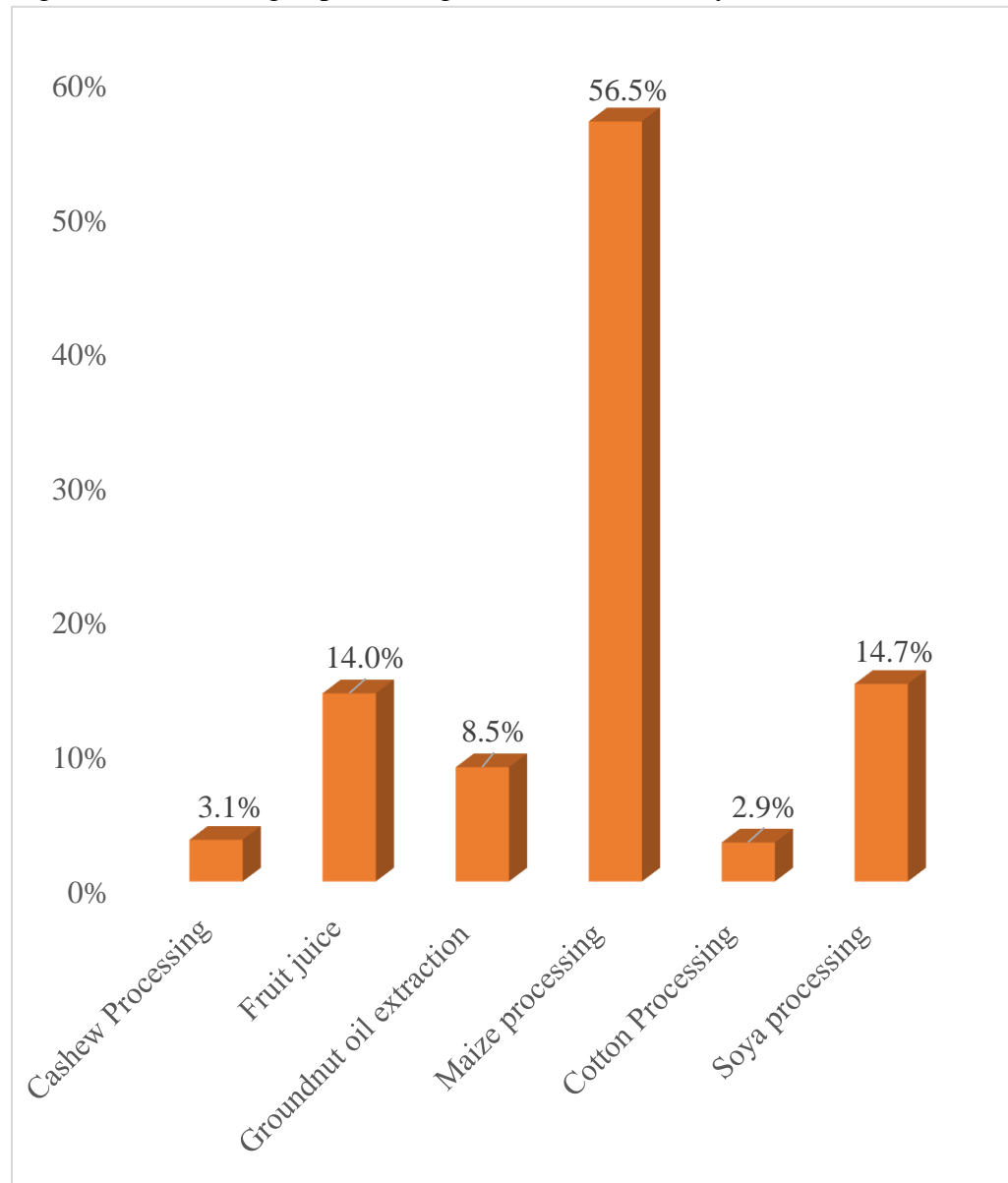


Figure 2: Potential agro-processing activities in the study area

Source: Field survey, 2020

Agro-processing industries in the study area

Table 3 captures information on the availability of agro-processing industries and their operations in the study area. The majority (76.3%) of the 384 respondents indicated agro-processing industries existed within or around their localities.

On the specific industry said to be within or around the respondents' area, two industries were mentioned, the KEDAN maize processing industry and the cotton ginnery in Tumu.

Of the 293 respondents of the study who said yes to being aware of the existence of agro-processing industries, 59.7% mentioned KEDAN as the industry they can think of around their localities, while the rest (40.3%) mentioned the cotton ginnery as the industry they knew of around their locality.

On whether they supplied the industries mentioned with some of their produce, 172 (58.7%) of the 293 respondents who attested to these industries said yes, they supplied the industries with their produce, while 121 (41.3%) said no, they do not supply the industries with their produce. And of the 172 respondents who said they supplied the industries with their produce, 139 (80.8%) said they supplied maize to the maize processing industry (KEDAN), while 19.2% indicated they supplied cotton to the cotton ginnery.

Further, as to whether any other family member supplied the existing industries, the majority (58.4%) of the 293 respondents said yes, while 33.8% said they do not have family members supplying any of those industries, and 7.8%

indicated they could not tell if indeed any family member was involved in supplying the industries with their product as shown above.

Also, of the 171 who said their family members supplied to the industries, 54.5% said they did supply maize, with the rest said to have supplied cotton as shown in Table 3.

In all the focus group discussion sessions held across the selected communities, many of the participants were able to mention the existence of the two existing medium to large scale agro-processing industries in the municipal capital (Tumu), and mention the benefits they derive from them.

A participant asserts, *“yes, we are all aware of the cotton ginnery, but it is not as vibrant as it used to be. This is because of the low supply of cotton by farmers. They don’t longer farm it as they the feel work involved is tedious with little benefits. Over the past few years, the industry appears dormant but it is now being worked, I’m told”*.

Another participant said, *“I have been told of the KEDAN but I have not been there personally. My husband and his friends do supply the company with some of their farm produce”*.

Table 3: Agro-processing industries

Variable	Frequency	Percentage
Availability of agro-processing industry within or around the locality		
Yes	293	76.3
No	91	23.7
Available industries in the locality		
Cotton Ginnery	118	40.3
KEDAN maize processing industry	175	59.7
Supplies to the industry personally		
Yes	172	58.7
No	121	41.3
What is supplied personally		
Cotton	33	19.2
Maize	139	80.8
Family member supplies to the industries		
Yes	171	58.4
No	99	33.8
Don't Know	23	7.8
What Family Member Supplies		
Cotton	76	44.4
Maize	95	54.5

Source; Field survey, 2020

Participation in Agro-Processing Activities

Respondent's participation in agro-processing

Figure 3 gives the distribution of respondents in terms of their adoption of agro-processing activities. on whether they were involved in agro-processing or not, 74.2% said they were involved while 25.8% said they were not into agro-processing. This implies that the number of respondents reported to be participating in agro-processing were almost 3 times more than those who indicated they were not involved. Shea butter extraction, groundnut oil extraction, tom brown, millet drink and pito brewing were the agro-processing activities the respondents reported

to be undertaking. Also, all the women who were enrolled in the focus group discussion indicated they do at least one agro-processing activity.

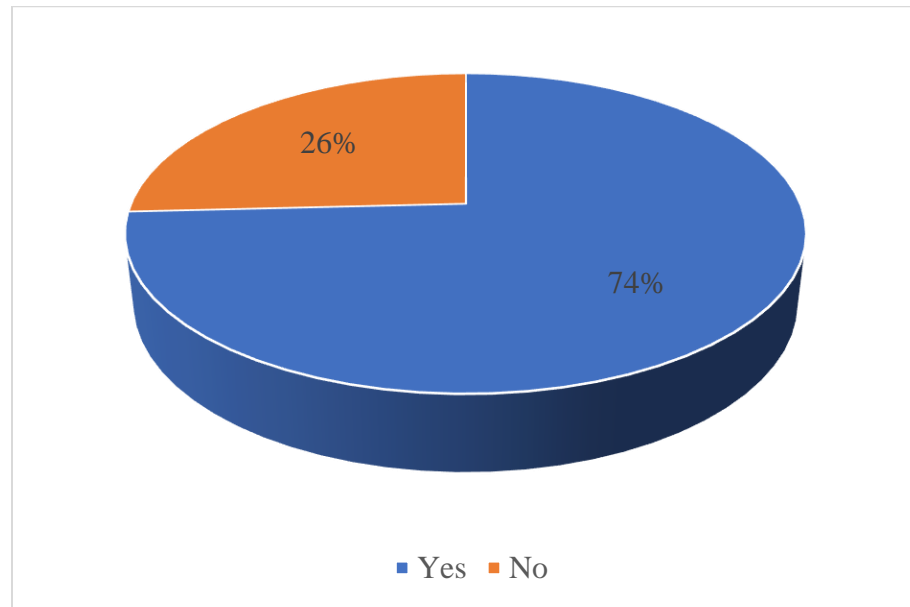


Figure 3: Participation in agro-processing

Source: Field survey, 2020

Specific agro-processing activities undertaken

The specific agro-processing activity respondents were involved in was assessed, as displayed in Table 4. On shea butter extraction, it was revealed that the majority (70.9%) were into the extraction of shea butter, with 29.1% said not to be into shea butter extraction. This shows that the vast majority of respondents who said they were into agro-processing undertook shea butter extraction with no male found to be involved, unlike the other agro-processing activities mentioned, having less than 50% each of respondents reported to be involved. This aligns with the findings of a study in the Wa municipality with close to 94% of women said to be involved in shea butter extraction (Adams et al., 2016).

The study reports fewer respondents (35.8%) to be involved in groundnut oil extraction, as the majority (64.2%) indicated they were never into the production of groundnut oil. Also, it was revealed that 84 (29.5%) indicated they were into the production of millet drink, against 201(70.5%) who reported that they were not into the production of millet drink.

With pito brewing, it was revealed that only 15.8% of the 384 respondents were said to be into pito brewing while the rest (84.2%) indicated they were not involved in pito brewing, as shown in Table 4. As revealed by this study, having very few people undertaking pito brewing, the 2010 Population and Housing Census Sissala East Municipal report had a contrary figure, with close to half of residents said to be involved in pito brewing and selling it to the public (Ghana Statistical Service, 2014b).

Table 4: Specific agro-processing activity of the respondent

Variable	Frequency	Percentage
Shea butter extraction		
Yes	202	70.9
No	83	29.1
Groundnut oil extraction		
Yes	102	35.8
No	183	64.2
Tom brown production		
Yes	52	18.2
No	233	81.8
Millet drink production		
Yes	84	29.5
No	201	70.5
Pito brewing		
Yes	45	15.8
No	240	84.2

Source: Field survey, 2020

Reasons for involvement in agro-processing

On the reasons for which respondents got involved in agro-processing activities, both household consumption and commercial as reason stood out. As shown in Figure 4 below, 41% of the 285 respondents said to be involved in agro-processing activities mentioned the reason for their involvement in agro-processing to be both household consumption and commercial reasons. Those who said they were into agro-processing for commercial reasons stood at 39% with only 19% said to be into agro-processing for purposes of household consumption. With the majority said to be participating in agro-processing for both household consumption and commercial reasons, followed closely by commercial and a few stating they engaged in agro-processing purposely for household consumption, goes to support the finding that processing of grains with legumes were packaged for both domestic consumption and for commercial, including exports (Owoo & Lambon-Quayefio, 2015). Some products, notably pito were said to be primarily for commercial, buttressing the 2010 population and housing census report (Ghana Statistical Service, 2014b).

During the focus group discussion sessions, almost all the women who were part of the discussion indicated their involvement in one agro-processing activity or the other and as well cited reasons for undertaking such activities.

Below are some of the opinions shared by participants:

“as for me I’m only involved in the extraction of shea butter and I do so for the consumption of the household in some of the times, when we are in the lean

season, I sometimes produce it for sale. For here the popular agro-processing activity is shea butter, only a few do things like groundnut oil”.

Another said, “I am aware of my friend who produce millet drink and tom brown for sale. For me I do groundnut oil and it is mostly for commercial reasons”.

Among others, another participant said; “I do not undertake any agro-processing activity at the moment though I could do a couple of the activities but for ill health. The problem with this trade is that we use too much energy and it is time-consuming because we have no technologies here that can help us”.

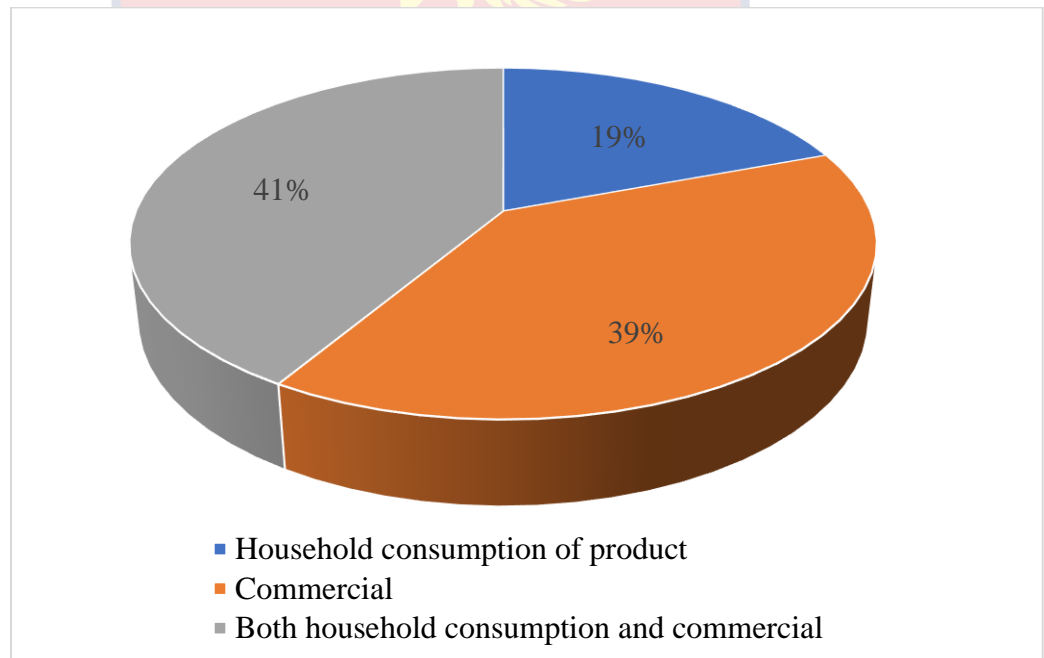


Figure 4: Reasons for respondents' involvement in agro-processing

Source: Field survey, 2020

Factors affecting agro-processing adoption

On the factors that affect the adoption of agro-processing, all 384 respondents noted that there exist factors that affect the adoption of agro-processing in the study area.

In assessing the factors that affect participation in agro-processing, lack of training stood out with 136 (35.4%) of the 384 respondents attesting, as shown in Figure 5. Also, 127 (33.1%) mentioned poor yield as a factor that affects agro-processing adopting, with the least (4.7%) pointing to household unpaid work. From the findings, the factors affecting agro-processing adoption, lack of training, poor yield, and start-up capital stood out. Lack of capital as a challenge in agro-processing adoption in this study goes to support earlier research findings. For instance, limited access to investment capital was regarded to be one of the challenges confronting women in the shea industry in Wa in the Upper West region of Ghana (Adams et al., 2016).

Poor yield as a factor that affects participation in agro-processing only underpins the need for the constant supply of raw materials for sustenance, thus farm sizes may as well determine the volume of harvest that is achieved. In line with this, it is reported that the size of one's farm is noted to be a determining factor in agro-processing adoption (Mmbengwa et al., 2011).

Agro-processing requires some needed skills to be successful, as such lack of training as one of the militating factors identified by respondents is justified. Aside from the specific skill training needed, the educational level of the individual plays a role in this light as attested to by other research findings (Sisay, 2010).

On key things that needed to be done to encourage more people's involvement in agro-processing capital support stood out, closely followed by the provision of training and fertilizers to boost farm yield. A few respondents said they needed spousal support to relieve them of the unpaid household's workload.

Startup capital as espoused by many of the respondents is justified since it may aid in so many ways in establishing the industry. This is buttressed by a survey report that argues that the growth and development of small-scale food processing industries in West African countries have been limited as a result of inadequate working capital, limited access to financial institutions, high interest rates, and low-profit margins among others (Büntrup, Swetman & Michalscheck, 2014).

The need for training in adopting agro-processing was regarded highly by many of the respondents. Training offers the individual specific skills in agro-processing activities thus may be necessary to execute an agro-processing agenda without many difficulties, thereby enhancing adoption. This is in tune with the position that, offering training and access to information was revealed to be a key factor in the adoption of agro-processing (Asmah, 2011).

The need for fertilizers as a means to boosting yield was also highlighted by a good number of the respondents as being an important measure to promote agro-processing adoption and seems to align with the assertion that the agro-processing industry suffers in Ghana due to unreliable supply of the main raw material for the industry (Owoo & Lambon-Quayefio, 2015).

On a chi-square test of independence to establish the association between involvement in agro-processing and demographic factors such as sex, age, marital status, educational level, and occupation. Of the factors sex, educational level, and occupation respectively showed a significant association with agro-processing adoption.

The association between sex of respondent and involvement in agro-processing was found to be statistically significant ($p < 0.001$) in this study, which is in consonance with research that highlights the importance of women for the agro-processing sector, as a negative correlation of a household having a male head and agro-processing type was revealed (Figuroa et al., 2018).

The results reveal that the level of education influenced both the decision to participate in agro-processing (significantly positive) and that of the level of participation (significantly negative). The results also revealed that factors such as land tenure, agro-processing training, and information have a positive influence on the decision to participate (Khoza et al., 2019). Several other researches buttress this association, with male smallholder farmers said to be less likely to participate in agro-processing activities than their female counterparts, (Kuwornu, 2014; Marchetta, 2011; Simtowe, 2010).

As educational level was revealed to have a strong association with agro-processing adoption in this study, other researches showed a similar outcome. (Alwang et al., 2005), in a study also revealed that better-educated households are more likely to diversify into agro-processing than those with little or no education. A similar position was seen of (Sisay, 2010) with agro-processing said to be influenced by the level of education.

This study finds the occupation of the individual to have a strong association with involvement in agro-processing, with farmers said to be more involved. In line with this, the development of the agro-processing sector often has stronger

backward and forward linkages with the agricultural sector than other sectors (Figueroa et al., 2018).

The focus group discussion sessions also had participants sharing their opinions on factors affecting agro-processing adoption. They mentioned a number of factors, including; lack of time, limited knowledge on various things that can be processed from existing commodities, poor yield, poor market, lack of funds to start among others.

Some individuals' comments include; *“as long as I have the interest to venture into more of agro-processing, some pressures will not allow me, such as unpaid household work, poverty, and limited knowledge as more training may be required”*.

Another said, *“Even though some training was offered me and some women leaders in other communities by MEDA-Ghana on the GROW project on soya processing among others, I find it difficult to embark due to lack of money to start. Even my husband will not allow me the free space to proceed, as he always piles me with work both in the house and home”*.

In another group, one participant noted, *“if more education is given with some financial support more of the women will be involved. But our husbands must also be willing to support with some of the needed products and should free us with some time”*.

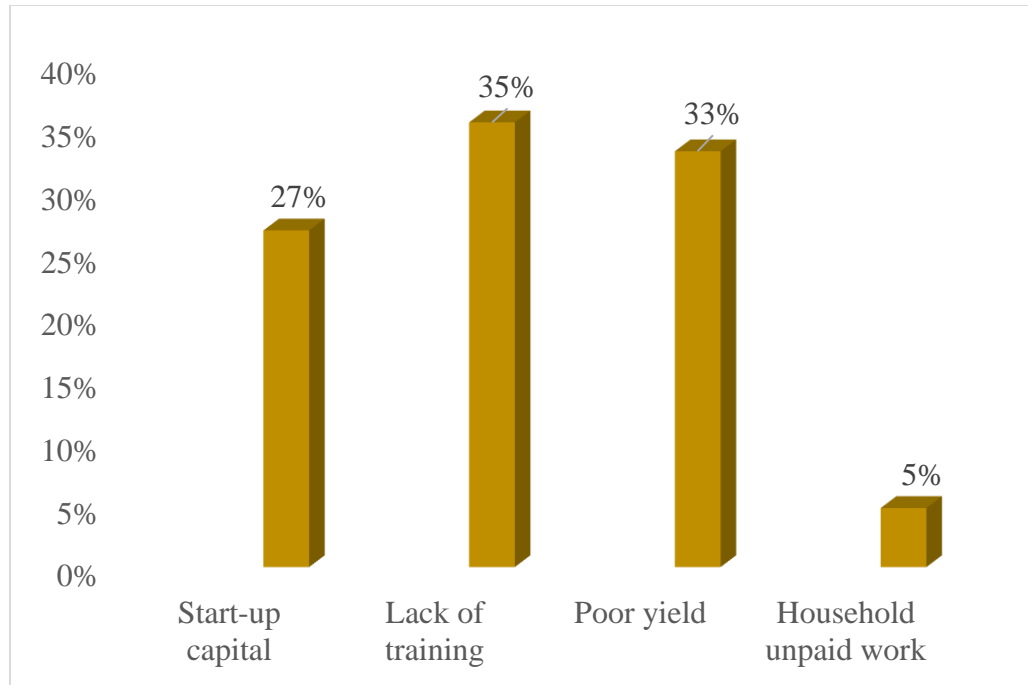


Figure 5: Factors affecting agro-processing adoption

Source: Field survey, 2020

Key things needed to be done to encourage people to participate in agro-processing

On key things that needed to be done to encourage more people to take up agro-processing, the provision of capital support stood out, closely followed by the provision of training.

During the focus group discussion, the women expressed their opinions strongly on what could be done to promote agro-processing in their communities. Mention the need for support from their spouses, capital support to start, need for training, siting of some machines in the communities to reduce the stress they go through, among others.

For instance, a participant intimated, “we could produce more shea butter in commercial quantities but for the lack of machines, one may see things like tom brown in the cities made of maize and others wish do same, but lack of knowledge would certainly not allow them”.

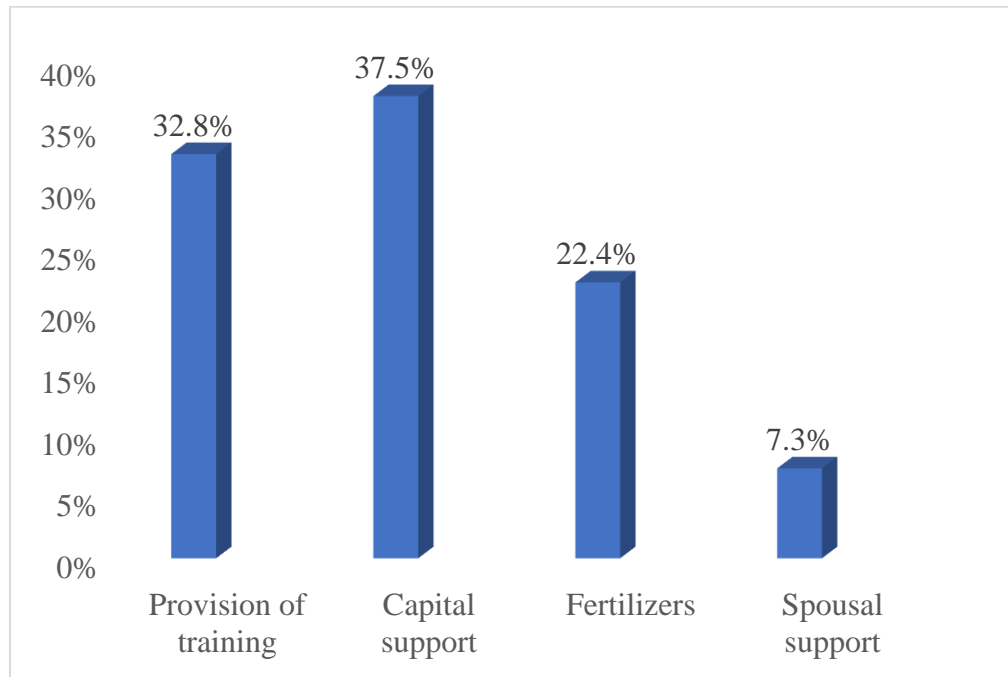


Figure 6: Key things needed to be done to encourage people to participate in agro-processing

Source: Field survey, 2020

Association between socio-demographic variables and involvement in agro-processing activities

The association between household status and involvement in agro-processing are shown above (Table 4.3.6). A chi-square (χ^2) test of independence was performed to examine the relation between gender and agro-processing involvement. The relationship between these variables was significant, $\chi^2 (1, N = 384) = 37.179, p < 0.001$. Females were more likely to adopt agro-processing. Also,

there was a significant relationship between educational status of participants and agro-processing adoption, $X^2(5, N = 384) = 11.863, p = 0.037$.

Participants without formal education were more likely not to adopt agro-processing. Furthermore, there was a significant association between the type of occupation of respondent and adoption of agro-processing, $\chi^2(3, N = 384) = 31.896, p < 0.001$. However, there was no significant association between the age and agro-processing adoption, and marital status of participants and agro-processing adoption.

Table 5: Association between household status and involvement in agro-processing

Variables	Participation in agro-processing		Chi-sq (χ^2)	df	p-value
	Yes	No			
Sex of respondent					
Male	44(49.4)	45(50.6)			
Female	241 (81.7)	18.3(18.3)	37.179	1	0.00
Age category of respondents					
16-25	47(78.3)	13(21.7)			
26-35	140(72.5)	53(27.5)			
36-45	89(76.1)	28(23.9)	1.747	3	0.627
46 and above	9(64.3)	5(35.7)			
Marital status					
Never married	38(74.5)	13(25.5)			
Married/living together	192(71.6)	76(28.4)			
Divorced/separated	18(90.0)	2(10.0)	5.042	3	0.169
Widow/widower	37(82.2)	8(17.8)			
Educational level of respondent					
No formal	72(65.5)	38(34.5)			
Non-formal	9(100)	0(0)			
Primary	62(73.8)	22(26.2)	11.863	5	0.037
JHS	69(83.1)	14(16.9)			

SHS/Voc/Tech	40(78.4)	11(21.6)			
Tertiary	33(70.2)	14(29.8)			
Occupation					
Farming	170(68.5)	78(31.5)			
Professional	42(72.4)	16(27.6)			
Sales and Services	71(98.6)	1(1.4)	31.896	3	0.000
Skilled manual	2(33.3)	4(66.7)			

Source: Field survey, 2020

Household welfare

Figure 7 showed the main sources of income ordered in terms of importance, less importance, least important and none. With farming as a source of income, the majority (80%) of the 384 respondents had farming as their important source of income, while 18% regarded it as less important, with only 1% regarding it as least important, as shown in Figure 7. Farming had close to 100% of respondents said of being their important source of income, followed by agro-processing, trading, wage/salary in that order. With farming regarded as the main source of income by a greater majority of the respondents in the study area couldn't be surprising as the economy of the municipality is described as being mainly agrarian in its profile. By this, agricultural-related activities remained the predominant economic activity, employing a greater proportion of the population. Buttressing this, farming is regarded as being predominantly rural, with the majority of the operators said to be in rural savannah (Ghana Statistical Service, 2014b).

On agro-processing as a source of income, more of the respondents (41%) regarded it as an important source of income, as those who regarded it as less important stood at 37%, and 16% indicated agro-processing as a source of income

was none important. This is to say that agro-processing as a main income source to the household was also regarded as important by a good number, as it was deemed to contributing a lot to their livelihood. This is in consonance with a number of studies, highlighting that it contributes significantly to the alleviation of socio-economic challenges, improvement of income, employment, food availability and nutrition, and social and cultural wellbeing, which enhances the sustainability of smallholder farmers' livelihoods ((Mhazo et al., 2012; Mahlogedi & Thindisa, 2014).

Wage/salary as a source of income was regarded as none important by the majority (69%), as only 20% saw it to be important. Charcoal, support from relatives and animal husbandry all had the majority of respondents (70%, 63% and 36% respectively) indicating they were not important sources of income to them. Trading and wage/salary as main income sources were regarded by quite a good number of respondents as being important. The two respective income sources were considered by these respondents to be the number one means of livelihood to their households. Though not so many respondents regarded trading as well as wage/salary as important income sources, other research reports intimate that the major source of household income is from non-farm self-employment, contributing close to 50% of the household's sources of income, as wages from employment was revealed to be the second major contributor to household income followed by household agriculture (Ghana Statistical Service, 2014b).

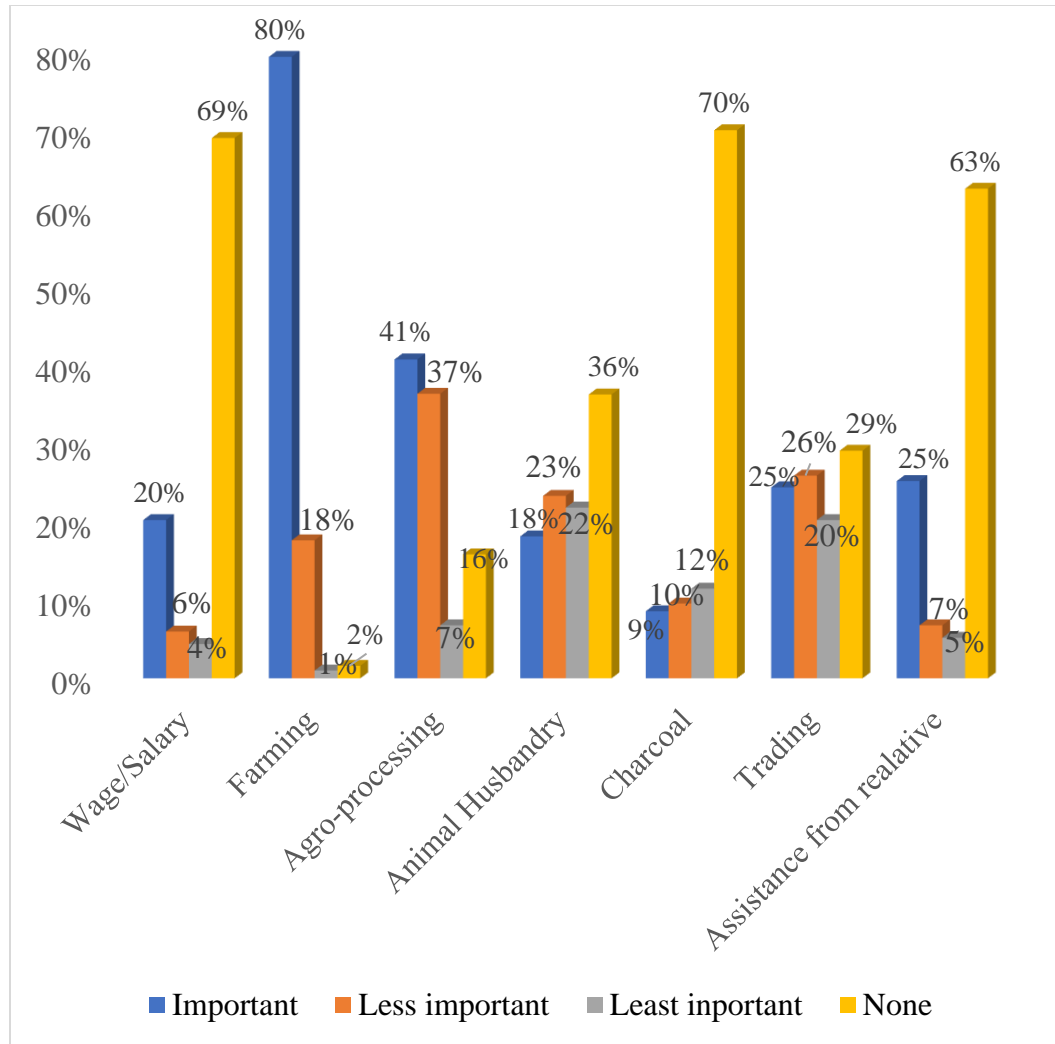


Figure 7: Main income sources of respondents

Source: Field survey, 2020

The study sought information on other key welfare indicators such as average monthly income, involvement in saving, ability to pay school fees, ability to handle medical bills with or without NHIS, ownership of the house, main building material, ability to pay light bill, availability of toilet in the house and household feeding as shown in Table 6. On the average income of respondents, the majority (33.1%) indicated their average monthly income to be in the range of Gh₵ 151-300, closely followed by those with an average monthly of less than Gh₵ 150

making (29.2%). Those with an average monthly income of above Gh₵ 600 stood at 15.6%, while the least (11.5%) having monthly incomes in the range of Gh₵ 451-600. This meant that over 60% of respondents had their average monthly incomes below Gh₵ 300, thus a greater percentage of the respondents are within the poverty bracket. This appears to be in tune with the report that highlights poverty to be the major developmental challenge in rural Sub-Saharan Africa where agriculture is the dominant economic livelihood activity (Davis et al., 2010).

On the involvement of respondents in savings, close to 80% of respondents said they were involved, while 77 (20.1%) were said not to be involved in saving. Of the 307 respondents who said they were into savings, the majority (41.7%) mentioned the Village Savings and Loans Associations (VSLAs) to be the place they save their money. 32.9% saved with the bank, while 25.4% were reported to be saving with the mobile money (MoMo) system.

The majority (82.3%) of the 384 respondents were said to have their children in school. And of those who said they had children in school, 81.6% indicated they could pay the school fees of their children, while 18.4% noted they were unable to pay the school fees of their children as shown in Table 6.

The study reports that the majority (93%) of the 384 respondents of the study be valid subscribers of the National Health Insurance Scheme (NHIS), against a few who were said not to be valid subscribers of the health insurance scheme. And of the 307 respondents who reported to be valid subscribers of the NHIS, 58.3% noted they have been regularly renewing their subscription. Also, the least number (30.7%) of the 384 respondents indicated they had the ability to handle the medical

bills of the household, with or without NHIS, close to 70% said they were unable to handle medical bills, as shown in Table 6.

Table 6: Respondents' Household welfare

Variable	Frequency (n)	Percentage
Average monthly income of the household		
Less than 150	112	29.2
151-300	127	33.1
301-450	41	10.7
451-600	44	11.5
Above 600	60	15.6
Involved in saving		
Yes	307	79.9
No	77	20.1
Place of savings		
VSLA	128	41.7
Bank	101	32.9
Mobile money (MoMo)	78	25.4
Having children in school		
Yes	316	82.3
No	68	17.7
Ability to pay school fees		
Yes	258	81.6
No	58	18.4
NHIS subscriber		
Yes	357	93.0
No	27	7.0
Ability to renew subscription regularly		
Yes	208	58.3
No	149	41.7
Ability to handle medical bills with or without NHIS		
Yes	118	30.7
No	266	69.3

Source: Field survey, 2020

The study found that the majority (48.2%) of respondents owned the house they live in, with over 70% of the respondents saying the house was built with bricks as shown in Table 6 extension below. This appeared in consonance with the

2010 population and housing census report which indicates that, close to 95% of the dwelling units in the Sissala East Municipality are owned by members of the household, as close to 80% said the main construction material for the outer walls of the buildings made up of mud brick or earth (Ghana Statistical Service, 2014a).

On the issue of congestion of the rooms they lived in, 66.4% noted the rooms were spacious enough. Also, close to 90% of respondents noted they had electricity in their homes, with 87.5% saying they could pay their electricity bills.

On the type of cooking fuel, the majority (82.3%) noted they used firewood, with only 4.7% said to be using LPG gas. The vast majority of respondents found to be using firewood as cooking fuel goes to buttress the claim that the main source of fuel for cooking for most households in the Sissala East municipality is wood (74.9%) (Ghana Statistical Service, 2014a).

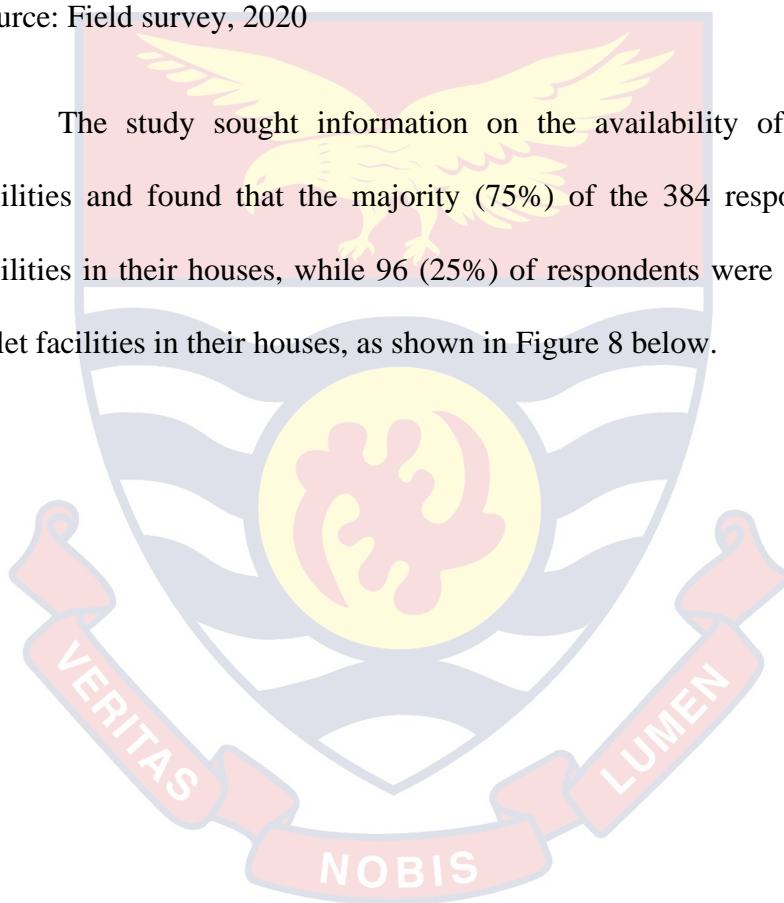
Table 6, continue

variable	Frequency (n)	Percentage (%)
Ownership of house		
Owner of the house	185	48.2
Family House	163	42.4
Rented	27	7.0
Provided by employer	8	2.1
User not paying rent	1	0.3
<i>Total</i>	<i>384</i>	<i>100.0</i>
Main building material		
Bricks	273	71.1
Block	109	28.4
Mud	2	.5
<i>Total</i>	<i>384</i>	<i>100.0</i>
Rooms enough to prevent congestion		
Yes	255	66.4
No	129	33.6
<i>Total</i>	<i>384</i>	<i>100.0</i>
Electricity in the house		
Yes	344	89.6

No	40	10.4
<i>Total</i>	384	100.0
<i>Ability to pay light bill</i>		
Yes	301	87.5
No	43	12.5
<i>Total</i>	344	100.0
<i>Fuel for cooking</i>		
Fire Wood	316	82.3
Charcoal	50	13.0
LPG gas	18	4.7
<i>Total</i>	384	100.0

Source: Field survey, 2020

The study sought information on the availability of household toilet facilities and found that the majority (75%) of the 384 respondents had toilet facilities in their houses, while 96 (25%) of respondents were found not to have toilet facilities in their houses, as shown in Figure 8 below.



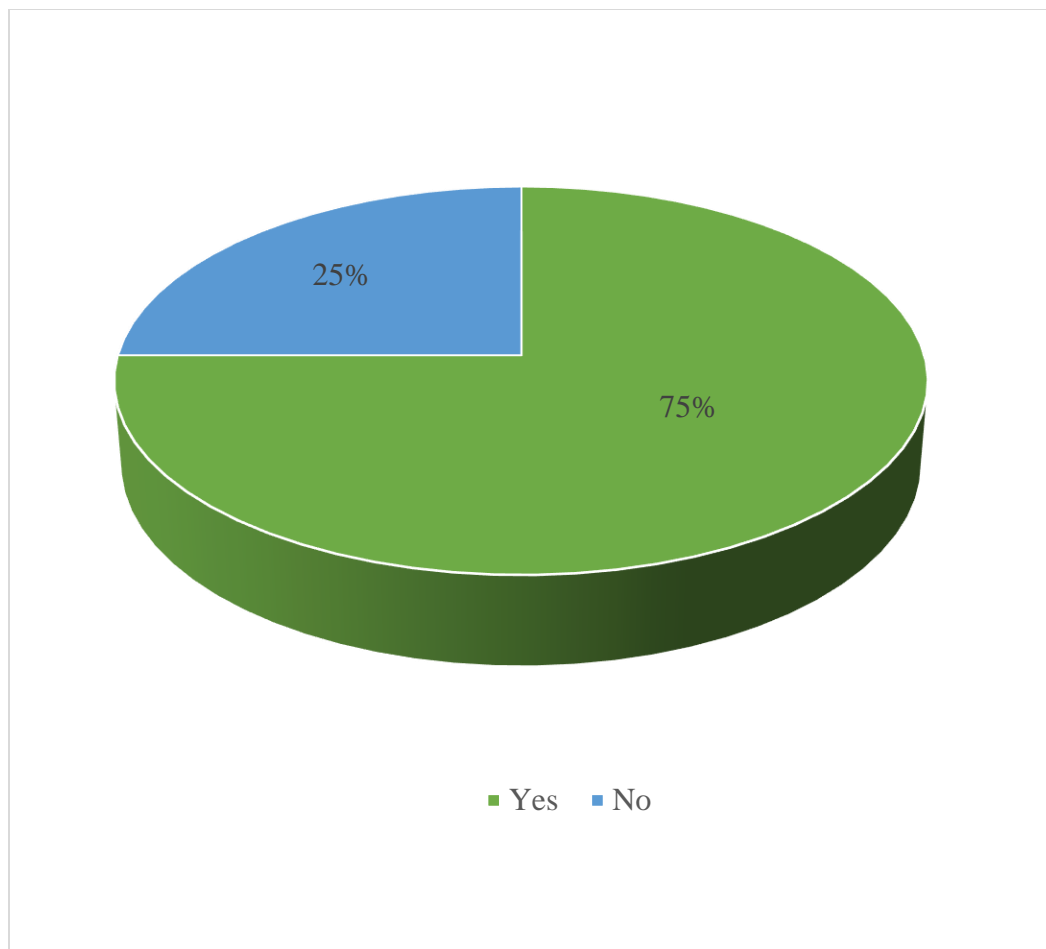


Figure 8: Availability of toilet in the house

Source: Field survey, 2020

As shown in Figure 9 below, the study found that as many as 98(25.5%) respondents reported having some household members going without food in the last seven days, with 74.5% indicating no household member went without food during the last seven days.

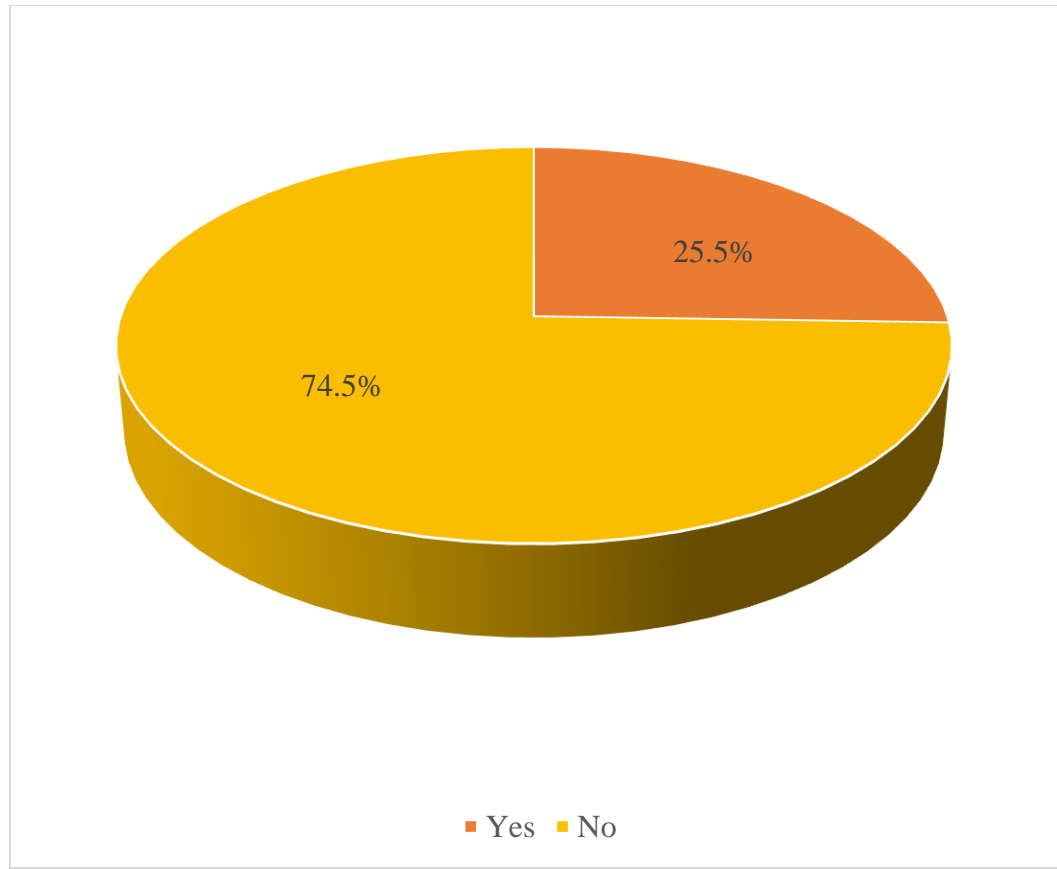


Figure 9: Whether some members of the household did not get food to eat during in the last 7 days

Source: Field survey, 2020

Association between household welfare status and involvement in agro-processing activities

The relationship between household welfare status and involvement in agro-processing is shown in Table 7. A chi-square test of independence was performed to assess the association between average monthly income and agro-processing involvement. The relationship between these two variables was significant, $X^2(4, N = 384) = 42.371, p < 0.001$. Participants who earn an average of Gh₵ 451-600 were more likely to adopt agro-processing than those who earn below

or more than the 451-600 Ghana cedis. Additionally, there was a significant relationship between savings and agro-processing involvement, $\chi^2 (1, N = 384) = 34.464, p < 0.001$. Participants who were involved in savings were more likely to adopt agro-processing than their counterparts who were not involved in savings. Moreover, there was a significant relationship between the ability to pay school fees and the participation in agro-processing, $\chi^2 (1, N = 384) = 32.569, p < 0.001$. Those participants who reported having the ability to pay school fees for their wards were more likely to be involved in agro-processing compared with respondents who reported having difficulties in paying school fees.

Also, house ownership showed a significant relationship with agro-processing involvement, $\chi^2 (4, N = 384) = 12.327, p = 0.015$. In this study, the ability to handle health bills with or without NHIS did not show a significant relationship with agro-processing involvement. An assessment of the relationship between the main building material of the house and agro-processing involvement showed a significant association, $\chi^2 (2, N = 384) = 7.256, p = 0.027$. Participants whose houses were built with blocks compared with bricks and mud were more likely to adopt agro-processing.

Additionally, there was a significant relationship between the ability of a participant to pay electricity bills and agro-processing involvement, $\chi^2 (1, N = 384) = 69.380, p < 0.001$. Participants who reported having the ability to pay electricity bills compared with those who said they could not pay were more likely to adopt agro-processing. Moreover, there was a significant relationship between the type of cooking fuel and adoption of agro-processing, $\chi^2 (2, N = 384) = 9.736, p = 0.008$.

Participants who reported using LPG were less likely to adopt agro-processing compared with those using firewood and charcoal as cooking fuel.

Table 7 presents a continuation of the results of the chi-square test of association. Availability of household toilets had a significant relationship with agro-processing involvement, $\chi^2 (1, N = 384) = 15.792, p < 0.001$. Participants who had household toilet facilities compared with those without toilet facilities were more likely to be involved in agro-processing. However, in this study, having adequate food for the entire household or not, did not show a significant relationship with agro-processing involvement.

The chi-square test of independents between household welfare parameters and involvement in agro-processing had average monthly income, involvement in savings, ability to pay school fees, ownership of the house, main building material, ability to pay electricity bills, household cooking fuel and availability of household toilet facility showing a statistically significant association with involvement in agro-processing.

All the welfare indicators of the study are a function of financial status, thus having a significant association implies involvement in agro-processing has a positive influence on poverty alleviation. Corroborating this, several studies opined that involvement in agro-processing significantly contributes to the alleviation of socio-economic challenges, improvement of income, food availability and nutrition, and social and cultural wellbeing, which enhances the sustainability of smallholder farmers' livelihoods.

This study finds that average monthly income has a significant association with involvement in agro-processing as those households said to be involved in agro-processing had higher average income than those not involved. This is in tune with findings of a study in Jordan where being poor has a negative association for households in agro-processing (-0.282) suggesting the potential of the sector for income generation and employment, especially in rural areas, where it is more likely to find households in agro-processing and agriculture in comparison with urban areas (Figueroa et al., 2018).

In the focus group discussion sessions, several of the participants who were involved in agro-processing attest to its positive impact on the welfare of their households. They mentioned household nutrition, health care, farming, clothing among others as areas in the household said to benefit from their agro-processing proceeds.

One participant intimated; *“there are times in the dry season, if it was not for the profit from my shea butter business, I wouldn’t be able to buy soup ingredients. Our husbands don’t support us in household feeding aside the supply of raw grains, so some of these things that women do”*.

Another participant said, *“I have a story to share; I remember the last time my second born was sick and there was no money anywhere it was the money I took from the bulk shea butter purchaser that saved him. The money was later paid back using shea butter”*.

In another discussion, one said; “one woman said my groundnut oil extraction activity has helped me financially, it boosted my savings power, in which my finances helped in caring for my children, clothing, payment of fees, feeding, healthcare among others”.

Table 7: Association between household welfare status and involvement in agro-processing:

Variable	Involvement in agro-processing		Chi-sq (X^2)	df	p-value
	Yes	No			
Average monthly income					
less than 150	60(53.6)	52(46.4)	42.371	4	0.000
151-300	100(78.7)	27(21.3)			
301-450	37(90.2)	4(9.8)			
451-600	42(95.5)	2(4.5)			
above 600	46(76.7)	14(23.3)			
Involved in savings					
Yes	248(80.8)	59(19.2)	34.464	1	0.000
No	37(48.1)	40(51.9)			
Ability to pay school fees					
Yes	203(78.7)	55(21.3)	32.569	1	0.000
No	24(41.4)	34(58.6)			

Table 7, continue

Ability to handle health bills with or without NHIS						
Yes	86(72.9)	32(27.1)				
No	199(74.8)	67(25.2)	0.159	1	0.690	
Ownership of house						
Owner of the house	148(80.0)	37(20.0)				
Family House	109(66.9)	54(33.1)				
Rented	23(85.2)	4(14.8)				
provided by employer	4(50.0)	4(50.0)	12.327	4	0.015	
Only a user (paying no rent)	1(100.0)	0(0.0)				
Main building material						
Bricks	199(72.9)	74(27.1%)	7.256	2	0.027	
Block	86(78.9)	23(21.1)				
Mud	0(0.0)	2(100.0)				
Ability to pay electricity bills						
Yes	246(81.7)	55(18.3)	69.380	1	0.000	
No	9(20.9)	34(79.1)				
Household cooking fuel						
Fire Wood	227(71.8)	89(28.2)	9.736	2	0.008	
Charcoal	46(92.0)	4(8.0)				
LPG Gas	12(66.7)	6(33.3)				
Availability of household toilet						
Yes	229(79.5)	59(20.5)	15.792	1	0.000	
No	56(58.3)	40(41.7)				
Member of the household going without food for a whole day without food						
Yes	73(74.5)	25(25.5)	0.005	1	0.943	
No	212(74.1)	74(25.9)				

Source: Field survey, 2020

Chapter Summary

This chapter captured the findings of the study along with a discussion of the same. The findings were presented with reference to the objectives of the study, under the following themes; socio-demographic characteristics, agro-processing activities, participation in agro-processing and household welfare, as well as the

association between participation in agro-processing and household welfare. The discussion was done in conjunction with the scholarly literature reviewed in the study.

The socio-demographic characteristics considered in the study include sex, age, religion, ethnicity, marital status, educational level, occupation and household size. The study captured agro-processing activities in the study area in terms of the ongoing and potential agro-processing activities. Agro-processing activities said to be undertaken by people in the area as observed include shea butter extraction, groundnut oil extraction, tom brown production, millet drink, pito brewing, and fruit juice production. However, shea butter extraction was reported to be dominant with closed to 95% said to be involved. On the potential agro-processing activities, maize processing was deemed to be the most potential by 56.5% of respondents as the area is very famous in terms of maize production. On availability of agro-processing industries, majority of respondents asserted to the availability of some agro-processing industries within or around their localities and made mentioned of Cotton ginnery and KEDAN maize processing industry in Tumu town.

Participation in agro-processing activities; 74% were reported to be undertaking some processing of their farm produce, with 70.9% into the production of shea butter. On factors that affect participation in agro-processing, lack of training, poor yield, and start-up capital stood out.

Association between participation in agro-processing and socio-demographic variables had sex, level of education and occupation showing statistical significance. Household welfare was assessed, with the main sources of

income ordered in terms of importance, less importance, least important and none. By this, farming was regarded as their important source of income by the majority (80%) of respondents, followed by agro-processing, trading and wage/salary.

The study sought information on other key welfare indicators such as average monthly income, involvement in saving, ability to pay school fees, ability to handle medical bills with or without NHIS, ownership of the house, main building material, ability to pay light bill, availability of toilet in the house and household feeding. On the average monthly income, over 60% of respondents had their average monthly incomes below Gh₵ 300, thus a greater percentage of the respondents were within the poverty bracket.

On the association between household welfare status and participation in agro-processing activities, average monthly income, savings, payment of school fees, house ownership, main building material, ability to pay electricity bills, type of cooking fuel, and availability of household toilet.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Introduction

This chapter brings to closure the entire research piece. It contains the summary of the study, conclusion, and recommendations of the study, which were stated with reference to the objectives of the study.

Summary of the Study

- Several researches have established the nexus between agro-processing and household welfare, and this current study further assesses participation in agro-processing and its effects on household welfare. The study sought to; identify the various agro-processing activities in the Sissala East Municipality, identify factors that affect the participation in agro-processing activities in the area, assess household welfare status in the Sissala East Municipality, and determine the association between household welfare status and participation in agro-processing in the Municipality.
- The study was descriptive cross-sectional and employed multistage random sampling to arrive at study subjects.
- The study found more females (76.8%) than males participating in agro-processing in the Sissala East Municipality, and corroborate the assertion that small-scale agro-processing activities are a preserve of women. Farming was found to be the major occupation of the majority (64.6%). While 12.2% had education up the tertiary level 28.6% attained no formal education.

- Agro-processing activities said to be undertaken by people in the area as observed include shea butter extraction, groundnut oil extraction, tom brown production, millet drink, pito brewing, and fruit juice production. Shea butter extraction was however found to be dominant as attested by 94.3% of respondents followed by groundnut oil (71.4%). Also, Maize processing was considered by 56.5% of respondents to be a potential agro-processing activity in their locality as maize is the crop maize produced in the area.
- 74.2% of the 384 respondents were reported to be directly involved in one agro-processing activity or the order, with 70.9% said to be into shea butter extraction, followed by groundnut oil extraction (35.8%).
- All 384 noted the existence of militating factors on people's participation in agro-processing. Among others, lack of training stood out with 35.4% of the respondents attesting, as 33.1% mentioned poor yield, and 4.7% pointing to household unpaid work.
- The chi-square test of independence between participation in agro-processing and socio-demographic variables had sex, level of education, and occupation showing a statistically significant association (p -value < 0.05) with participation in agro-processing.
- The main sources of income were ordered in terms of importance, less importance, least important and none, with farming regarded by close to 100% of respondents as being their important source of income, followed by agro-processing (41%), trading, wage/salary in that order.

- Over 60% of respondents had their average monthly incomes below Gh₵ 300, thus a greater percentage of the respondents are within the poverty bracket.
- The chi-square test of independence between household welfare status and participation in agro-processing activities, had average monthly income, savings, payment of school fees, house ownership, main building material, ability to pay electricity bills, type of cooking fuel, and availability of household toilet showing a statistically significant association with participation in agro-processing.

Conclusions

In conclusion, the study found participation in agro-processing to have a significant association with household welfare in many respects. Average monthly income, involvement in savings, ability to pay school fees, ownership of the house, main building material, ability to pay electricity bills, household cooking fuel and availability of household toilet facility, were the household welfare parameters found to have a statistically significant association with agro-processing adoption.

Recommendations

Based on the findings of this study, the following recommendations were made for appropriate stakeholder consideration:

- The Sissala East Municipality has great potential in agro-processing, so the establishment of agro-processing industries by the government and other

investors could be a worthy investment as farmers will be encouraged to produce more.

- Government and Non-governmental Organisations (NGOs) may have to institute training programmes on agro-processing, put in place credit schemes to support agro-processing activities, make accessible the needed farm inputs to boost yields.
- Participation in agro-processing has shown a strong association with household welfare, thus government and NGOs may consider further educating the rural folks and support them with agro-processing machines to get the involvement of more people.

Suggestions for Future Research

The study had its focus on assessing the participation in agro-processing and its effects on household welfare. However, further research could be conducted into the influence of various perceived factors that affect that negatively affect the participation of more farmers in agro-processing. This study only identified factors that affect participation in agro-processing but did not test the level of influence these factors had in affecting farmers' participation in agro-processing.

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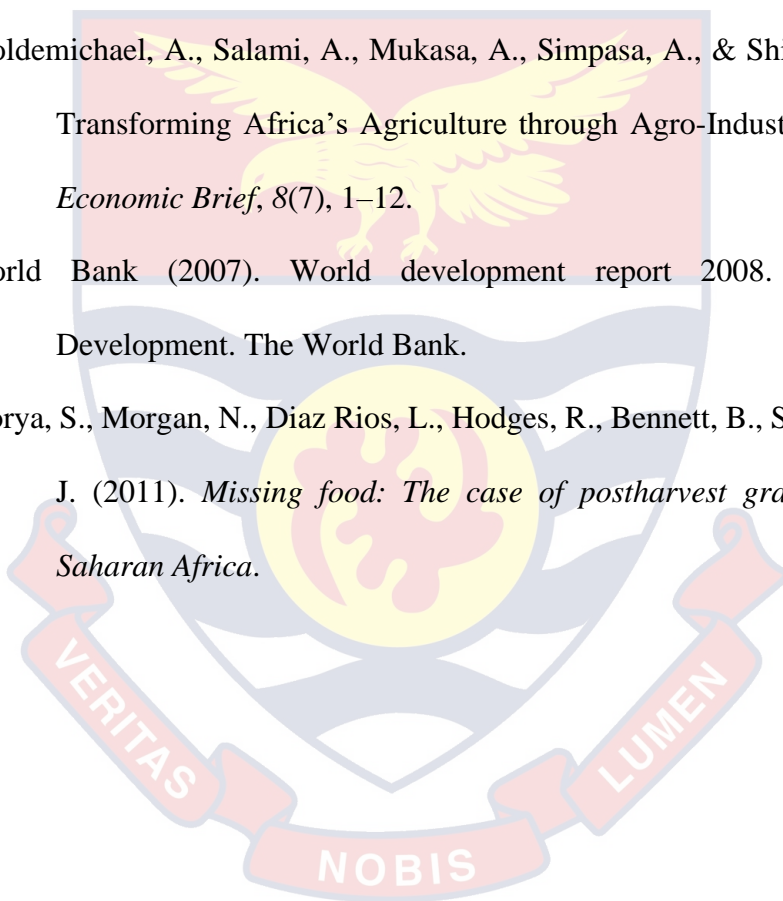
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APPENDICES

Appendix 1: Semi-Structured Interview Guide

Community Name

Date of Interview.....

Name of Interviewer.....

Questionnaire Number.....

This questionnaire is designed to collect information for a study on **EFFECTS OF AGRO-PROCESSING ON HOUSEHOLD WELFARE IN SISSALA EAST DISTRICT**. Your views will contribute significantly to the outcome of the study.

I will therefore be grateful if you voluntarily participate. Your responses are strictly confidential and shall not be revealed to any third party. Thank you

SECTION A: DEMOGRAPHIC CHARACTERISTICS

1. Sex of respondent 1) Male [] 2) Female []
2. Age of respondent(years)
3. Religion 1) ATR [] 2) Christianity [] 3) Islam [] 4) Others (specify)
4. Ethnicity 1) Sissala [] 2) Dagaaba [] 3) Moshi [] 4) Others (specify)....
5. Marital status 1) never married [] 2) Married/living together [] 3) Divorced/separated [] 4) Widow/widower []
6. Educational level of respondent 1) No formal education [] 2) Non-formal [] 3) Primary [] 4) JHS [] 5) SHS/voc/tech [] 6) Tertiary []
7. Occupation 1) Farming [] 2) professional/technical [] 3) sales and services [] 4) skilled manual [] 5) unskilled manual 6) Others (specify)...
8. Number of persons in your household

SECTION B: PREVAILING AGRO-PROCESSING ACTIVITIES

9. What agro-processing activities do you observe to be undertaken by people in your community? (multiple options allowed to be ticked) 1) shea butter extraction [] 2) groundnut oil [] 3) tom brown [] 4) millet drink [] 5) fruit juice [] 6) Others (specify).....
10. What potential agro-processing activities can you think of in this area?
.....
11. Are you aware of any agro-processing industry within or around your locality 1) Yes [] 2) No []
12. If yes, mention them.....
13. Do you supply the industry or industries listed above with some of your farm produce? 1) Yes [] 2) No []
14. If yes, what do you supply? 1) Cotton [] 2) maize [] 3) fruits [] 4) Groundnut [] 5) other (specify)
15. Apart from you, does any member of your family supply these industries with some of their farm produce? 1) Yes [] 2) No []
16. If yes, what do they supply? 1) cotton [] 2) maize [] 3) fruits [] 4) Groundnut [] 5) other (specify).....

SECTION C: PARTICIPATION IN AGRO-PROCESSING ACTIVITIES

17. Are you involved in agro-processing? 1) Yes [] 2) No []
18. If yes, what agro-processing activities are you are involved in? (multiple choices allowed). 1) shea butter [] 2) groundnut oil [] 3) tom brown [] 4) millet drink [] 5) fruit juice [] 6) others (specify).....

19. Which of these best describes the reason for your agro-processing? 1) household consumption of product 2) commercial 3) both household consumption and commercial
20. Are there any factors affecting agro-processing adoption? 1) Yes 2) No
21. If yes, what key factor affect your adoption? 1) start-up capital 2) lack of training 3) Yield 4) Household unpaid work 5) Other
22. What key thing do you think should be done to encourage more people to go into agro-processing? 1) provide training 2) capital support 3) fertilizers 4) Spousal support

SECTION D: WELFARE

23. What are the main income sources of your family? (read all the options to the interviewee. 1-important, 2-less important, 3-least important, 4-none)

Income sources	Importance
a) Wage/salary	
b) Farming	
c) Agro-processing (shea butter, millet drink, etc)	
d) Animal husbandry	
e) Charcoal	
f) Trading	
g) Assistance of relatives	
h) Other (please specify)	

24. What is the average monthly income of your household? 1) Less than 150 2) 150-300 3) 301- 450 4) 451-600 5) above 600
25. What happened to agricultural production in the last 5 years? 1) Increased 2) Decreased 3) Did not change

26. Are you involved in savings? 1) Yes [] 2) No []
27. If yes, where do you save? 1) VSLA [] 2) Bank [] 3) micro-finance [] 4) others (specify)
28. Do you have your children in school? 1) Yes [] 2) No []
29. Are you able to pay fees and other educational charges? 1) Yes [] 2) No []
30. Are you a valid subscriber of the NHIS? 1) Yes [] 2) No []
31. If yes, are you able to regularly renew your subscription? 1) Yes [] 2) No []
32. With or without NHIS are you able to adequately handle all health bills of your household? 1) Yes [] 2) No []
33. What is your ownership status of the house you currently live in? 1) Owner of the house [] 2) family house [] 3) Renter [] 4) Provided by employer [] 5) User not paying rent [] 6) Other (specify)
34. What is the main building material? (observe and tick only with the respondent confirming) 1) Brick [] 2) Block [] 3) Wooden [] 4) Stone [] 5) mud [] 6) Other (specify)
35. Are they rooms enough to prevent congestion? 1) Yes [] 2) No []
36. Do you have electricity in your house? 1) Yes [] 2) No []
37. If yes, are you able to pay your electricity bills 1) Yes [] 2) No []
38. Which fuel do you mainly use for cooking? (Tick one) 1) fuelwood [] 2) Charcoal [] 3) LPG gas [] 4) Other (specify)
39. Is your household having a toilet facility? 1) Yes [] 2) No []
40. What type of toilet facility? 1. Pit latrine 2 Water Closet 3 Other
41. Do women in your family own/inherit the land? 1) Yes [] 2) No []

42. If yes, can they sell land or can they decide how to use it? 1) Yes [] 2) No
43. During the past 7 days did any member of your household go a whole day without food because there was not enough food to eat? 1) Yes [] 2) No []
44. If yes, how many people went without food?.....



Appendix 2: Focus Group Discussion (FGD) Guide

1. What agro-processing activities do you observe to be ongoing in your community?
2. What potential agro-processing activities do you are available here?
3. Are you aware of any agro-processing industry in this community or nearer to your community
4. Let's mention the industries if any?
5. Can we show by hands those who are involved in agro-processing activities?
6. Each of you whose hands are up should mention the activities you are undertaking.
7. What are your reasons for your involvement in agro-processing?
8. Do you think that some factors affect the participation in agro-processing?
9. Let's mention these factors.
10. What do you think should be done to promote agro-processing adoption?
11. What is the benefit of your involvement in the agro-process in improving your household welfare?

Thank you all for your contributions!

Appendix 3: Map of Sissala East Municipality

