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Management)



MASTER OF SCIENCE (M.Sc.) DIPLOMA THESIS

Land Grabbing for Biofuel Production: Implication on Small Scale Farmers Livelihood and
Food Sovereignty in Ghana

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DIPLOMA THESIS ASSIGNMENT

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Thesis title

Land Grabbing for Biofuel Production: Implication on Small Scale Farmers Livelihood and Food Sovereignty in Ghana

Objectives of thesis

The main objective of the research study is to explore the impact of land grabbing for biofuel on small-scale farming; the implication on the livelihood of farmers and food sovereignty in Ghana.

Specifically, the research study seeks to achieve the following objectives:

- to systematically review the impact (social, economic and environmental) of land grabbing for biofuel (jatropha plantation) on some selected agricultural communities in the Ghana,
- to review the land laws and reforms on lands that has direct impact on land acquisition in Ghana,
- to analyze the pertaining world trade policies, rules and regulations on land grabbing, especially policies that are related to land and agricultural products and terms of trade for these commodities in recent years.
- to discuss land grabbing and agriculture and how to confront the challenges that beset food production and security.

Methodology

The research will employ qualitative and quantitative research design tools. There will be analyzed the processes involved in the large-scale land acquisition and the effects on household food security and access to land. This will be done through case study approach which make use of multiplies of techniques for empirical analysis. Administration of questionnaires, in-depth open and semi-structured interviews, participant observation and focus group discussion will be done to gain insight into the challenges that small-scale farmers face with regard to large-land acquisition (land grabbing), agriculture and food insecurity. Also systemic literature review approach will be used to get the historical perspective of land acquisition and agriculture issues by reviewing books, articles, journals and reports published.

The proposed extent of the thesis

60 – 70 pp.

Keywords

Agriculture, Biofuel, Food Security, Jatropha, Land Grabbing, Land Used, Staple Food, Small–Scale Farms, Sustainable Livelihood Productivity

Recommended information sources

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Declaration

I declare that I have worked on my diploma thesis titled "Land Grabbing for Biofuel Production: Implication on Small Scale Farmers Livelihood and Food Sovereignty in Ghana" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any their person.

In Prague 18.04.2017

Dedication

To my dearest husband Stephen Yeboah, for his unimaginable love, understanding, support, and tolerance in many ways throughout the study period. Thanks honey for the encouragement and believing in me. You always say “Nana I know you can do this!” I am forever grateful and love you.

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To Mustapha Otchere Darko, thank you for your support. I do appreciate.

Abstract

Biofuel production drives land acquisition in Africa. This issue has come under the spotlight recently. Ghana is a case in point. Large-scale of lands are mostly taken by multinational companies and individual investors for biofuel production. Foreign companies have acquired a total of 769,000 hectares of land. These companies mostly from the developed countries such as Galten Global Alternative Energy (Israel), Jatropha Africa (UK), Biofuel Africa (Norway), ScanFuel (Norway) and Kimminic Corporation (Canada) utilise the land for biofuel production. Ghana has 3.99 million hectares of arable land and 2,075,000 hectares of permanent culture. This suggests that more than 37 per cent of arable land in Ghana is used for the cultivation of jatropha.

Using a case study approach, this study explores the implication of land use changes for biofuel production on the livelihoods of smallholder farmers and the consequent impact on food security in Ghana. The research sampled – using interviews and focus group discussion – 220 people in the Pru District in the Brong-Ahafo Region in Ghana. The Pru District hosts biofuel production. This research study reveals that ‘land grabbing’ for any purpose like growing biofuels brings negative livelihood changes on rural communities by reducing household income that small-scale farmers get from food crop production and the consequent effect on reduced food production. This in turn increases the risks of food insecurity.

Key Words: Biofuel, Food Security, Jatropha, Land Grabbing, Livelihood, Land Use and Sustainable Productivity.

Abstrakt

Akvizice půdy v Africe jako důsledek produkce biopaliv se v poslední době stává středem pozornosti. Ghana je typickým případem. Rozsáhlé pozemky jsou skupovány převážně nadnárodními společnostmi a individuálními investory pro výrobu biopaliv, kdy zahraniční společnosti získaly celkem 769 000 hektarů pozemků. Jde většinou o společnosti z rozvinutých zemí, jako jsou Galten Global Alternative Energy (Izrael), Jatropha Afrika (UK), Biofuel Africa (Norsko), ScanFuel (Norsko) a Kimminic Corporation (Kanada). Ghana má 3,99 milionů hektarů orné půdy a 2,08 milionů hektarů permakultury. Z toho vyplývá, že více než 37% orné půdy v Ghaně se používá k pěstování jatrofy.

S využitím případové studie tato práce zkoumá důsledky využívání půdy pro výrobu biopaliv pro drobné zemědělce, jejich životní podmínky a dále dopad tohoto přístupu na zajišťování potravin v Ghaně. Výzkumný vzorek tvořilo 220 lidí v okrese Pru v regionu Brong-Ahafo v Ghaně a využita byla metoda rozhovoru a soustředil se skupina. Oblast Pru byla vybrána pro svou významnou pozici v Ghanském zemědělství, ale zároveň zde začíná hrát stále významnější úlohu i výroba biopaliv. Tato výzkumná studie odhaluje, že uchvácení půdy za účelem rostoucí produkce biopaliva přináší negativní změny pro venkovské komunity tím, že snižuje příjem domácností z produkce potravinových plodin a zároveň snižuje produkci potravin, což vede k jejich nedostatku.

Klíčová slova: biopaliva, zajišťování potravin, jatropha, uchvácení půdy, živobytí, využití půdy a udržitelná produktivita.

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CHAPTER ONE

BACKGROUND AND OVERVIEW OF THE STUDY

1.1 Introduction

Globally, land and its related resources are fundamental source of livelihood. This is particularly in the case of Africa, where agriculture has been a key driver to economic growth and sustainable development (NEPAD, 2016). Agriculture is estimated to accounts for about 40 per cent of total gross domestic product, 15 per cent of exports, and ranging between 60 per cent and 80 per cent of Africa's potential (NEPAD, 2016). The sector accounts for over 60 per cent of jobs across the continent too (African Development Bank, 2016). Land, an important driver of agriculture, fulfills the basic social and economic needs and is a very important asset not only for sustaining livelihoods but also for generating wealth for in both rural and urban areas. Land provides a core basis for income and livelihood sustainability, including food and shelter (ActionAid Ghana, 2012).

However, the current controversy around large-scale land acquisitions by foreign investors has put basic human land rights issues and responsible agricultural investment at risk (see: GRAIN, 2008; Nolte and Vath, 2015). In recent years land grabbing globally has come under the spotlight particular in Africa (Oxfam, 2011; AFDB, 2016; UNOG, 2014) where most of the world's agricultural land are located especially due to biofuel production. Africa has immense resource potential. It has about 60 percent of the world's uncultivated arable land (African Development Bank, 2016). According to a joint study by the United Nation's Food and Agriculture Organization FAO, International Institute for Environment and Development (IIED) and International Fund for Agricultural Development (IFAD), since 2004 there have been nearly 2.5 million hectares worth of "approved land allocations" in just five African countries: Ethiopia, Ghana, Madagascar, Mali, and Sudan (Lorenzo et al., 2009; Nolte and Vath, 2015)

There are various definitions that have been ascribed to these large-scale (and small-scale) acquisition lands over the years. The international Land Coalition's Tirana Declaration in 2011 defined land grabbing as 'acquisitions of land by violation of human rights, particularly the equal rights of women, not based on free, prior and informed consent of the affected land users, not based on a thorough assessment, or are in disregard of social, economic and

environmental impacts, including the way they are gendered, not based on transparent contracts that specify clear and binding commitments about activities, employment and benefits sharing and not based on effective democratic planning, independent oversight and meaningful participation'. Land grabbing according to Borras and Franco (2012) definition is an explosion of (trans) national commercial land transactions mainly found around the production and import or export of food, animal feed, biofuels, timber and minerals. In the recent developments around the cases in the petroleum industry, biofuels has rapidly emerged as a major issue for agricultural development, formulation and implementation of energy policy, and natural resource management (World Bank., 2010). The growing demand for biofuels has being driven by recent rise high oil prices, energy security concerns, and global climate change (Sulle and Nelson, 2009). Biofuel, covers about 10 percent of the total world energy demand whether it is produced directly or indirectly from biomass, (Green Facts, 2016).

Deurwaarder (2005) argued that the increased price of petroleum fuel in 2006 was due to the industrialisation in emerging economies like China and India whose energy consumption has recorded impressive growth. It is projected that this consumption of petroleum fuel will increase in the coming decades (Deurwaarder, 2005). Of course there is increasingly demand for vehicles and the level of petroleum fuel consumer spending will remain high. Therefore the price of petroleum fuel would continue to be high over some period of time (Deurwaarder 2005).¹ About 96 per cent of global energy for transport comes from hydrocarbon-related fuels and relatively there are few countries with oil reserves and most of which are at risk with either political or economic crisis, which makes it instable (Deurwaarder, 2005). Indeed the side effects of petroleum fuel (from its discovery, extraction to combustion; example hydrocarbons such as a shale gas) is very well known globally to have negative impacts not only on the human health and the environmental but also influence the stability of a state.

Also, the global adoption of goals at the Conference of Parties (COP 21) in Paris has had repercussion on the use of fossil fuel. The Paris Agreement in December 2015 renewed the world's target of limiting global warming to below 2°C, including other stringent measures imposed on the fossil fuel industry. This has shifted the focus to the use of renewable source of energy, including biofuel to support transport and other industries (See: Mitchell and Mitchell 2016). With this on the mind of most of the advanced countries particularly in the

¹ The recent discovery and production of oil has seen the downward trajectory of oil prices since 2014. This is

EU and US, the intended nationally determined contributions (INDCs) adopted at COP21 committed to reducing global warming to 1.5 degree celcius above pre-industrial levels and related greenhouse gas emission pathway in 2018-2020 (Mitchell and Mitchell, 2016). Also an alternative energy consumption target to reduce the emission of binding greenhouse gases to a minimum level -40 per cent by 2030 has been set.

The global attention on the biofuel as an alternative to supplement the high dependence on the petroleum fuel especially for transportation system brought into light the biofuel saga. Biofuel is comparatively cheaper in terms of price, environmentally friendly and thus economically competitive than petroleum fuel. This has in part stimulated increased investment in biofuel production worldwide. Antwi-Bediako (2013) noted that it was as a result of the EU 2030 directive and the Kyoto Protocol (EU – SEA, Agenda 2030), on the alternative uses of biofuel energy and renewable energy sources for transportation that have engendered investors to go into the cultivation of the biofuel. This is because most of the investors presumed the availability of markets for biodiesel and feedstock for biodiesel production. This has in turn brought pressure on the land of most of the developing nation like Zambia, Tanzania and Ghana, among others, which have proportional amount of their arable land still uncultivated.

The most targeted continent by far with highest investor eye focus/ interest still remains Africa (AFDB, 2016). Nolte et al. noted that Africa has already concluded 422 agricultural deals, which of course included the production of biofuel, with a total estimated area of 10 million hectares involve (Nolte et al. 2016). There is a growing demand of bilateral and multilateral donors to incorporate in the developmental policies of government in Africa due to the production of biofuel (Bassey, 2008). On one hand investor want to invest in government project on biofuel of some states like Ghana, however, Ghana just like others Sub-Sahara Africa countries do not have any structural policy and regulatory framework for the biofuel industry (Deurwaarder, 2005; Hagan, 2007; Action Aid Ghana, 2012; US Department of State, 2013). Hughes et al. (2011) argued that some African countries like Ghana is working hard to reduce biofuel dependency, and also including the formulation of the Strategic National Energy Plan in 2006 which mandates 10 per cent blends of gasohol and biodiesel by 2015.

Land areas settled by indigenous communities and out of human reach are now being enclosed and transformed into economic centers, especially for cultivation of feedstock.

There have since been growing concerns over the past decade with regard to the increase in large-scale land acquisitions by foreigners. The International Land Coalition estimates that about 134 million hectares of land have already been “grabbed” in sub-Saharan Africa. The land acquisition process by these international investors for the biodiesel projects are not properly dealt with since most farmers lose their land, which serves as their vital source of livelihoods to these investors with little or no consultation (Action Aid Ghana, 2012). This misunderstanding between the actor involved mostly in the land issue has led to conflicts between the farmers, traditional rulers and the private investors (Richard Atwood, Director of New York Office, International Crisis Group’s Director), This study, therefore, seeks to contribute to the policy and academic debate on the socio-economic implications of industrial plantations of *Jatropha curcas* in Ghana focusing on the extent to which land grabbing poses greater risks to the lives of smallholder farmers.

1.2 Statement of Problem

As widely known, large-scale land acquisitions are not a new phenomenon. Several decades ago, according to Oxfam (2013), many Africans could boast of having land as a pride. Today the same cannot be said with respect to land. This is because many foreign and domestic companies and individual investors are acquiring large tracts of land for agricultural purposes, including the cultivation of biofuel crops (Hatcher and Bailey.,2011). The OECD has estimated global demand for biofuels to 172 billion litres by 2020, up from 81 billion litres in 2008 at the current production levels (See: GRAIN 2013). Mean an more farm lands, about 40 million hectares would have to be converted to growing crops for biofuel (UNEP, 2009).

According to FAO (2012), about 80 per cent of the world’s most vulnerable population to undernourished and malnutrition live in rural areas and mostly dependent on agriculture as their source of livelihood. Even though such of those investments have been noted by World Bank and IFIRI to ‘‘possess the potential of generating employment, increasing rural and urban incomes and improving competitiveness in regional and international trade, a considerable number of people are rendered landless, homeless and have be drag forward into poverty’’. The conversion of large tracks of land from food crop production to the production of biomass poses a potential treat to food production and consequently food security which endangers the livelihoods of rural people’ (Actionaid, 2012). Despite the fact that biofuel production has the potential to providing a new source of agricultural income and improve

local infrastructural, the current levels of ‘grabbed’ land by companies for the large-scale and export-driven expansion of biofuel production have threatening implications for local livelihoods in Ghana (Oxfam, 2013; Pohl, 2012; AU). This study therefore seeks to discuss land grabbing in the context of biofuel production and its implication on the livelihoods of smallholder farmers and the consequent impact on food security in Ghana.

1.3 Objective of the research

The main objective of the research is to explore the impact of land grabbing for biofuel production (Jatropha) on small-scale farming, and the implication on the livelihoods of farmers and food sovereignty in Ghana.

Specifically, the research seeks to achieve the following objectives:

- To systematically review the social, economic and environmental impact of land grabbing for biofuel (that is, jatropha plantation) on some selected agricultural communities in Ghana,
- To review land laws and property rights regime and reforms on lands that have direct impact on land acquisition and food production in Ghana.
- To analyze existing global policies, rules and regulations on land grabbing, especially policies that are related to land and agricultural production and terms of trade for these commodities in recent years.
- To discuss land grabbing and agriculture and how to confront the challenges that beset food production and security.

1.4 Research Questions

The primary question to be addressed during this research is *to what extent does land grabbing affect livelihoods of local communities and food sovereignty in Ghana?* This question leads to a number of secondary questions including:

- What is the prevailing state of the land grabbing for biofuel regime, how does it affect agriculture, consequently food production and food sovereignty in the three selected study areas in Ghana?
- What are the existing policies, laws and property rights regulations on land acquaintances and concessions both Ghana and international.

- What are the social, economic and environment implications of land grabbing in affecting communities?
- What are the existing mechanisms in place to mitigate the negative cumulative impacts of land grabbing on local communities in Ghana?

1.5 Organization of Study

This study is categorised into six chapters. Chapter One introduces the study and involves the background to the study, statement of the research problem, objectives of the study research questions, justification or significance of the study and the organization of the chapters. In Chapter Two, the study reviews existing literature on land and agriculture, which consists of both the theoretical and empirical review based on the listed objectives of the study. The third chapter is the background description of the study area profile in Ghana. It focuses on some selected communities in the Brong-Ahafo region of Ghana. Chapter Four provides delves into the methodology adopted for this research. This includes data about the research design, data collection and the description of the study sampling. Chapter Five of the study seeks to address the analysis and discussion of the survey conducted by the way of questionnaires, interviews and other available secondary source of data. Chapter six, which is the last chapter of the study looks at the summary of the findings, conclusion, and recommendation of the research.

CHAPTER TWO

BACKGROUND STUDY OF LAND GRABBING AND AGRICULTURE IN GHANA

2.1 Introduction

This chapter reviews the existing literature on land grabbing both from the historical and contemporary point of view. This chapter, therefore, situates the concept of land grabbing in the overall context of social and economic development of Ghana and local and rural livelihoods in particular. It discusses the underlying factors that drive the processes of land grabbing and the associated impacts. The last section of this chapter looks at the existing (and upcoming) policy, legal and institutional frameworks globally and Ghana per se.

2.2 Land Grabbing: what's the meaning?

Land grabbing as a political, social and economic concern is not a new phenomenon. But it became more prominent during the 2007 to 2008 boom in global food prices. The volatility of global food prices has also provided the incentive for countries that depend much on food imports to acquire overseas land for food production and expansion (AFDB, 2016). There are divided opinions regarding the impacts of land grabbed for other economic activities.

On the one hand, it has been argued that land grabbing constitutes an important step to ramp up agricultural investments, which have been low in developing countries. On the other hand, it is argued that land grabbing is happening in settings with weak policy and institutional frameworks, hence private investors taking advantage. This causes the displacement of farmers, depletion of large natural resources base and the risk of social and political conflicts. Cotula et al (2009) aver that large-scale land acquisitions can result in local people losing access to the resources on which they depend for their food security and to sustain their livelihoods.

What defines land grabbing? Many definitions have been put forward. But what is striking to point out is that non-state actors, non-governmental organizations for example, have been sceptical about land grabbing. Cotula (2012) defines land grabbing as 'acts that lead to 'the large-scale purchases or leases of agricultural or forest land on terms that are detrimental to the interest of the people already living on the land'. Sheppard and Anuradha (2009) argue that "land grab" is the purchase or lease of vast tracts of land by wealthy, food-insecure

nations and private investors from mostly poor, developing countries in order to produce crops for export. The World Bank (2010) also has referred to the term as “global interest in farm lands”, while others have called it transnational commercial land deals (see also Cotula, 2009).

To the International Land Coalition’s Tirana Declaration (ILC, 2011), land grabbing constitutes the acquisitions or concessions, which touch on the following:

- i. in violation of human rights, particularly the equal rights of women;*
- ii. not based on free, prior and informed consent of the affected land users;*
- iii. not based on a thorough assessment, or are in disregard of social, economic and environmental impacts, including the way they are gendered;*
- iv. not based on transparent contracts that specify clear and binding commitments about activities, employment and benefits sharing; and*
- v. not based on effective democratic planning, independent oversight and meaningful participation.*

The United Nations Food and Agriculture Organization (FAO), International Fund for Agricultural Development (IFAD) and International Institute for Environment and Development (IIED) (FAO, IFAD, IIED, 2009) together defined land grabbing as ‘land deals that does not only include the purchase of the ownership of land but also the acquisition of user rights, leases or concessions whether short or long term’.

2.3 Land grabbing: demystifying the underlying factors and impacts

Large-scale land acquisition – commonly referred to as land grabbing – brings a large number of actors operating in either the same or different political atmosphere. Several authors have provided the factors that have accelerated the global demand for large-scale lands. For the purpose of this research study, the factors that are relevant in the context of Africa will be discussed. Africa, in particular, has experienced rapid inflow of foreign direct investments (FDIs) over the past decades. Some of these FDIs, backed by governments in developed economies, have been on land deals to increase food production and boost food exports. Therefore, governments play key roles in promoting investment overseas – including with regard to land acquisitions (See: Cotula et al., 2009).

The authors catalogue five ways in which external governments can get involved in land deals that could end up as land grabbing activities: (1) direct land acquisition by central government agencies; (2) sovereign wealth fund (SWF) investments, which involves acquisitions of minority shares in foreign public-listed companies; (3) state-owned enterprises and other non-SWF equity share; (4) support to private sector in investor and host countries; and (5) framework agreements and national policy in the form of bilateral investment treaties (BITs) and cooperation agreements in agriculture (Cotula et al., 2009). There is also severally reported international land deals involve the private sector. An example include the 1.3 million hectares of land deal between the South Korean company Daewoo Logistics and the government of Madagascar (Deininger et al., 2011; Cotula et al., 2009).

Deininger et al (2011) provide reasons for the difference between yield increases and farm area expansion. From 1990 to 2007, growth of harvested area for different crops, which could come about either via substitution for other crops or via expansion into previously uncultivated areas, was narrowly concentrated in a few key commodities (Deininger et al., 2011). The demand for food – driven by high population growth, rising incomes, and urbanization – underpins the rush for large-scale agricultural land acquisitions. The World Bank argues that to cope with a 40 percent increase in world population, production would need to rise by 70 percent, and raising food consumption to 3,130 kcal/person/day by 2050 would require agricultural production to nearly double in developing countries (Deininger et al., 2011; see also: Bruinsma 2009). The factors identified form the key drivers for land grabbing, particularly as related to biofuel production. They include:

1. Demand for food, feed, pulp, and other industrial raw materials, driven by growth of population and income;
2. Demand for biofuel feedstocks as a reflection of policies and mandates in key consuming countries
3. Shifts of production of bulk commodities to land-abundant regions where land may be cheaper and the scope for productivity growth higher than in traditional producing regions already operating at the productivity frontier.

Focusing on oil crops, the rising energy prices and public subsidies account for the led to rapid increases in the demand for biofuel feedstock starting in 2003 (Deininger et al., 2011). In 2008 alone, the total area under biofuel crops was estimated at 36 million ha, more than twice the 2004 level, with 8.3 million ha in the European Union (mainly rapeseed), 7.5

million ha in the United States (mainly maize), and 6.4 million ha in Latin America and the Caribbean, mainly sugarcane (Deininger et al., 2011). These factors have escalated the number of land deals over the past two decades. Sub-Saharan Africa has been the hard hit. Compared to an average annual expansion of global agricultural land of less than 4 million hectares before 2008, approximately 56 million hectares worth of large-scale farmland deals were announced even before the end of 2009. More than 70 percent of such demand has been in Africa; countries such as Ethiopia, Mozambique, and Sudan have transferred millions of hectares to investors in recent years (Deininger et al., 2011).

Jatropha is particularly of interest to the growth of land deals in Africa. Jatropha, a shrub whose fruits can be used to produce oil for biofuels, has also attracted large-scale investments in Sub-Saharan Africa, partly due to the trade preferences and regime of the European Union. Initial experience failed to meet expectations and lower crude oil prices forced many newly established enterprises to exit the industry (Deininger et al., 2011). Michell (2010 cited in Deininger et al., 2011) avers that jatropha can be a viable fuel substitute in countries or regions with low wage rates and high fuel costs.

2.4 The state and trend of land grabbing

There is common ground agreement globally about the key number of factors that made up recent trend of land grabbing from the past. First, the trend according to Transnational Institution (2012) is unfolding at a relatively fast pace, as a result of the changing dynamics in the global food regime, safe investments by investors, in energy security responses to 'peak oil', and environmental protection in the context of climate change, as well as and in the international flow of finance capital in the North (TNI, 2012).

Deininger et al (2011) coded the implementation status, area of investment, commodity group, target and origin countries, and type of investor for all the information posted on the blog between October 1, 2008, and 31 August 31, 2009. As indicated in the World Bank, catalogues a number of media reports with descriptive evidence. Using a database of 464 projects, with 203 including area information, the authors analysed in total 56.6 million hectares (ha) of land area. "They were 48 percent of projects covering some two-thirds of the total area (39.7 million ha) involved Sub-Saharan Africa, then East and South Asia (8.3 million ha), Europe and Central Asia (4.3 million ha), and Latin America and the Caribbean (3.2 million ha)" (Deininger et al., 2011). This highlights the level of aggressiveness of investors. The analyses again showed that of the 405 projects with commodity data studies,

37 per cent focused on food crops, 21 percent on industrial or cash crops, and 21 per cent on biofuels, with the other distributed among conservation and game reserves, livestock, and plantation forestry. Biofuels, therefore, account for a significant proportion, hence, the need for this study to look at the case of Ghana. Deininger et al (2011) agree that putative demand focuses on Sudan, Ethiopia, Nigeria, **Ghana**, and Mozambique in Sub-Saharan Africa, which together account for more than 23 percent of projects worldwide (emphasis added: World Bank, 2010).

2.5 Land grabbing and sustainable livelihood

According to Chambers and Conway (1992), sustainable livelihood goes beyond the traditional definition and notion of poverty and livelihoods. It embodies aspects like vulnerability, shocks, change and buffers. This study therefore adapts to the definition given by Chambers and Conway (1992: 6): livelihood comprises capacities, assets and activities required for a living. Krantz (2001) defines a livelihood as sustainable when it can cope with and recover from stresses and shocks, and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.

It is widely document that land grabbing has impacts on the livelihoods of people living in rural communities. Though multilateral institutions like the World Bank arguably support large-scale acquisition (and hence land grab), non-governmental organizations have established the negative effects land grabbing poses on local sustainable livelihoods (see for example: Oxfam, 2012). Oxfam in its calculation indicates that land acquired between 2000 and 2010 has the potential to feed a billion people, equivalent to the number of people who currently go to bed hungry each night (Oxfam 2012).

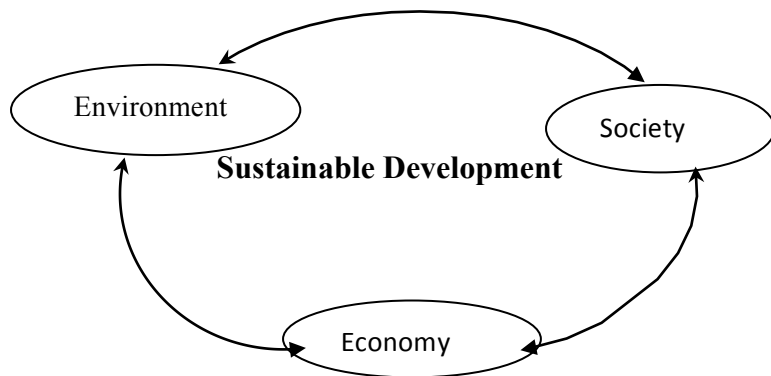
In Ghana, land acquisition by private investors and multinational companies is not a new phenomenon in the face of the political and economic history of Ghana. Colonization of farmland by foreign settlers heralds the beginning. In the 19th century, European colonialism seized global farmland. In Ghana, land acquisition and ownership determines the level of community engagements in the form of social and political structures. There is no doubt that land is one of the most important economic assets to humankind. It is hard to visualize any economic activity, which does not require the use of land. Interest in land is therefore of vital importance in business transactions and an essential pre-requisite for any economic venture. Asante (1975) earlier advised that unless title to land is assured by registration “the raising of capital on security hold will run into increasing difficulty. The security of title that was

supposed to have been provided by the Land Title Registration Act 1986 (PNDC Law 1152) did not materialise. It is therefore impossible to obtain definitive data on the scale of land-grabs especially because the definition of what might be considered as land-grab can vary significantly (Pearce, 2012).

It is widely agreed that land grabbing poses risks to sustainable rural livelihoods. Theting (2010) argues from the standpoint that large-scale agricultural investments of grabbed lands failed to fulfil the promise of building infrastructure, and creation of jobs in Eastern African countries like Kenya, Tanzania and Mozambique revealed. To Kachika (2010), even in situations where farmers were employed, the conditions contained in the contracts were not favourable and the number of workers was much reduced due to the mechanised nature of the farm. Makutsa (2010) also addressing the effects of land grabbing on livelihoods indicates that there will be severe food deficit in the Tana delta in Kenya, a home to many land grabbing cases, if all the proposed agricultural investments on all grabbed lands take off in the region.

Ghana is not an exception too. As in Chapters 4 and 5, this research study goes to provide evidence on the impact of land grabbing in Pru West District of Ghana.

Figure 1: Sustainable Development Circle



Source: Adapted from WCED, 1997

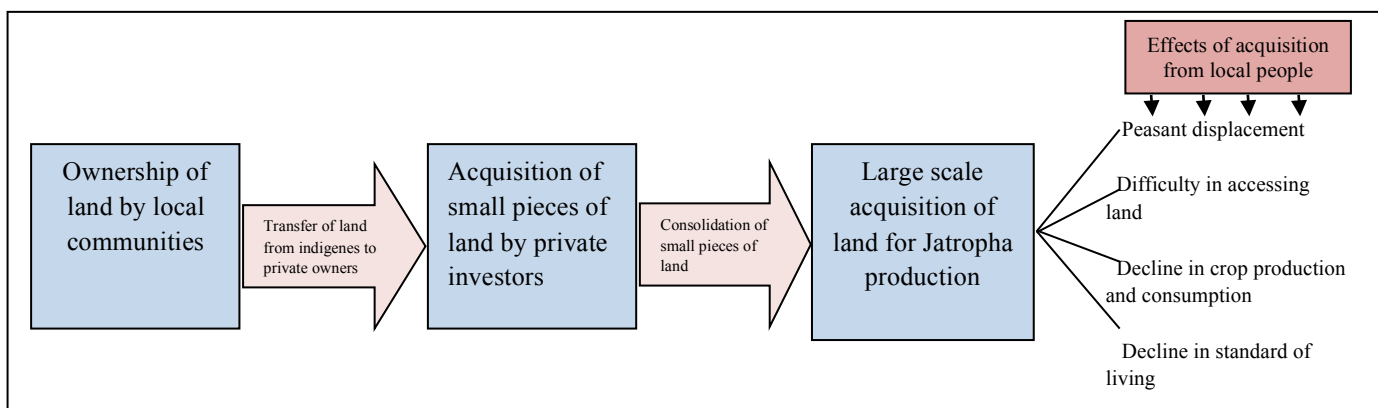
2.6 Land grabbing: Assessing the policy, legal and institutional framework

In the late 19th Century, as global norms surrounding slavery changed, Ghana shifted from an economy based on the slave trade to one that capitalised on resources (Agbosu, 2007). The nature of Ghana’s legal estate in land is formerly usually bound to the Social, Political and

Religious structures as well as beliefs and norms of a particular tribe of a society, however, in recent times has been closely associated with the socio-economic growth as well as capital capacity of a society. Ghana has witness many reform changes with respect to its communal land ownership system since colonial time where land was equally important as today (Agbosu, 2007; World Bank, 2010b). Larbi et al (2004) also provide the three basic forms of land ownership arrangements, namely, state land, vested land and customary land. But there are other classifications as well. The two categories of land ownership group according to Aubynn (2006), namely, lands that belong to the state (state lands) and lands that belong to stools or skins (customary lands).

Two government bodies are responsible for the state land, this include the Lands Commission and the Office of the Administrator of Stool Lands (OASL). Article 258 (1) of the 1992 Constitution of the Republic of Ghana ‘stipulates that these governmental bodies formed are to oversee, and in some cases effectively take over, the management and administration of stool lands when necessary’ (in the case of dispute over a land). The state’s authority on informal lands is implemented by OASL. According to the constitution, Lands Commission’s constitutional mandate includes “managing public lands, formulating land policy, advising traditional authorities on land use, and assisting in the execution of a title registration programme”.

Figure 2: A diagram showing the conceptual framework of the study



Source: Researcher’s construct, 2016

The livelihood framework depicts some linkages that exist among the various components. For instance, the kind of livelihood assets and policies or cultural system available to a particular community determines what vulnerability scenarios that can be created. The two therefore influence each other. This implies that these policies and processes regulate people’s access and use of assets. Hence, assets degradation depends on the kind of

institutional policies available. Also, weak or bad institutional policies can create various risks or vulnerabilities for existing livelihood assets.

2.7 Sustainable Livelihoods Framework

The introduction of the term Sustainable Livelihoods Approach (SLA) by Chambers and Conway (1991) have been of great credibility. As the world move from MDG's to SDG's, the term has become a key way to approach the global crisis and development (see also World Bank report, 2017). The term 'sustainable livelihoods' in their seminal report, Sustainable Rural Livelihoods: Practical Concepts for the 21st Century (Chambers and Conway, 1992), simply means, 'the capabilities, assets and activities required for making a living (ibid.)'. Many scholar has also made it clear the understanding of the livelihood. For example Hilson and Banchirigah (2009) the Department for International Development (DfID), indicated the 'livelihood concept by developing the SL Framework, which is 'a typology of putting the poor individuals, households and communities well-being under changing conditions' (Hilson and Banchirigah 2009). To establish the fact of in this studies, Sustainable livelihoods approach (SLA), which focus on poverty reduction and food production, is necessary for this study to increase the argument of land grabbing implication on small scale famer's livelihood. The issue of Land grabbing bring to mind the importance of this framework. Of course Land grabbing for biofuel has a clear link with the SL in that, SDG's gives way to both the important of the sustainable environment as well as reducing poverty and enhance better life for the poor.

Cited in Scoones, (1998:5), Chambers and Conway (1991) put SL in these five main types of capital:

- 1. "Natural capital** – the natural resource stocks (soil, water, air, vegetation) which are essential for sustaining livelihoods.
- 2. Economic or financial capital**– the capital base (cash, credit, savings, remittances and economic assets). This is the investment decision phase, where individuals and households make livelihood decisions about investments in natural, human or other forms of assets.
- 3. Human capital**– In other world the human capacity. The skills, knowledge, ability to provide labour and good health, and physical capability, which allows individuals and households successfully to pursue different livelihood strategies and progress.

4. Physical capital– The physical structures. The basic infrastructure manufactured goods and tools, which are required to produce or pursue livelihood strategies and enhance efficiency.

5. Social capital– the social resources and relations (networks, social claims, relationships of trust, affiliations, associations) upon which people draw when pursuing different livelihood strategies that demand coordinated actions (Maconachie and Binns, 2007)”. All the above mention is not possible when the basic source of livelihood for most poor and rural population are compromised in the name of investment in the agrobusiness toward biofuel production.

2.8 Problems Associated with Land Grabbing for Jatropha Production (Biofuel)

The problems associated with production of Jatropha are huge. From land and water grabbing to pollution and human displacement. In Ghana, studies on the impact of large-scale/commercial production of biofuel crops on local livelihoods are very limited. However, as the discussion comes more global concern, few scholars have made important research on this issue. For example studies (see: Boamah, 2010; German et al., 2010) attempt to assess the current and potential effect of commercial biofuel production on local communities. Indeed, the 2007/2008 UNDP Human Development Report in its discussion of the situation did mention other part of the world like south eastern Asia and among others, which have some internal instability (socio political) and environmental risk, due to rapid large acquisition of land for oil palm plantation development for biofuels. The case is worst in Africa. The tragedy is that all regions in Sub-Saharan Africa have a vulnerable food security situation, but are at the same time taking part in biofuel production. Causes of food insecurity in African countries and elsewhere are many and complex. The scary is that the most affected population is women and children who suffer malnutrition due to starvation or hunger (WHO, 2012). FAO (2015) stated the push factors as; climate change, risk and emergency management; Financial risk and crisis; agricultural problems; political instability, military conflicts and corruption; rapid population growth and natural disaster ”.

Other factors such as the following below are few of the problem associated with land grabbing for biofuel production; this is gather from multiple sources

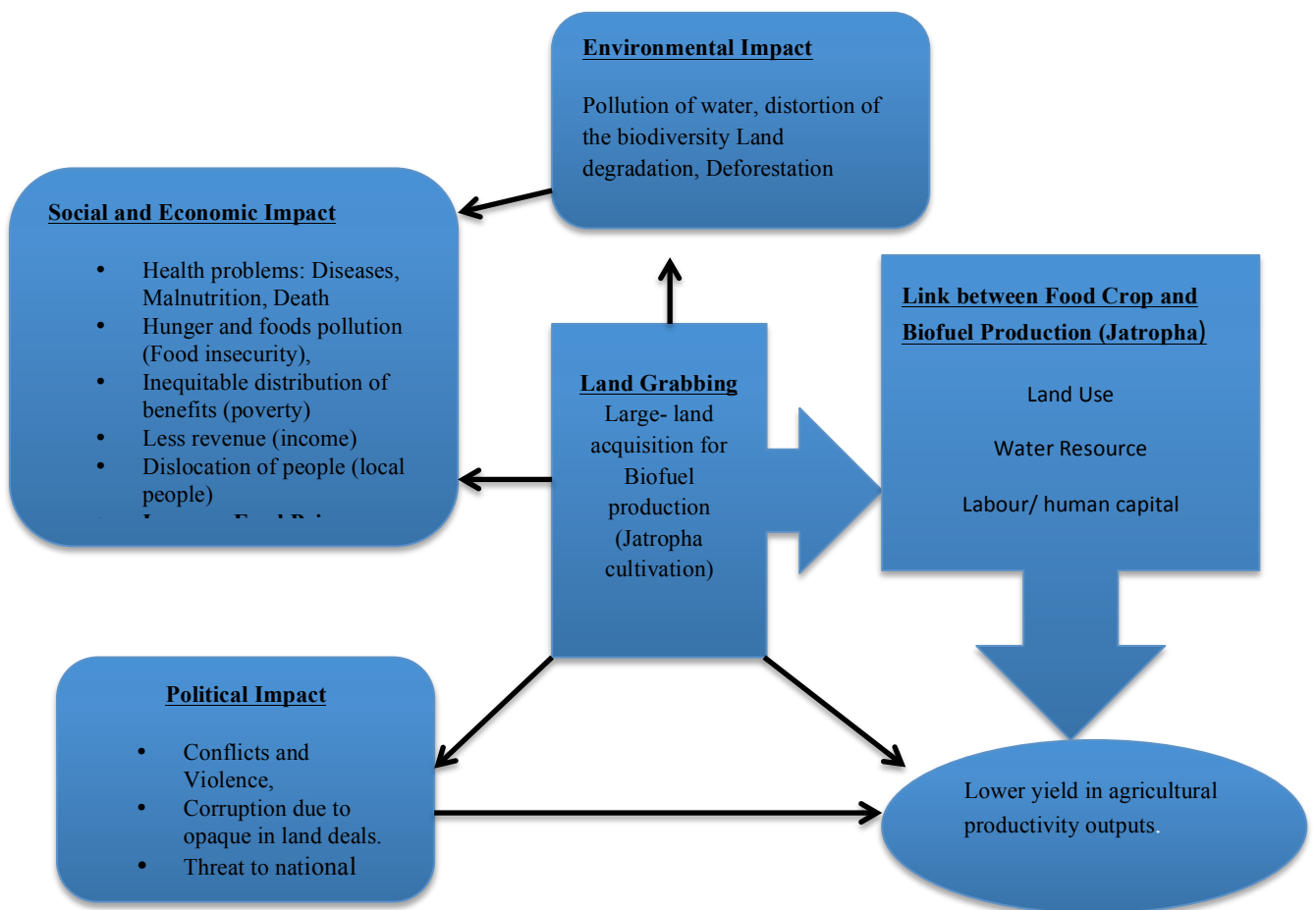
- **Displacement of Peasant Farmers.** The issue of Uganda and even Ghana where most of the lands grabbed have brought about displacement in some communities (Actionaid, 2012). Households and communities without formal land titles mostly

women lose informal access to land and resources more easily as compared to men (Creutzig, et al, 2013). This makes them vulnerable in many developing countries where the only source of livelihood for the most population is agriculture. In case of Ghana where more than half of the population livelihood depends on agriculture, the impact can not be overlooked.

- **Impact on Environment (water pollution).** Pohl (2010) argued the used of heavy chemicals such as insecticide pollutes water most found around where the jatropha plantation takes places. Kay & Franco (2012) also provide that water is a critical factor in land grabbing, because water is a key input factor for this biofuel production investment. “Water depends on specific time and space, and therefore can be very scarce on a seasonal basis, while very abundant in some part of the year’ (Scanlon et al, 2007).
- **Social and political conflict:** Meinzen-Dick and Markelova (2012) point out that land converted from smallholder production to plantation agriculture will not likely revert to its original users, “and within a generation farming skills may be lost.” Such land transfers therefore have “profound and long-term implications”. Oxfam International , (2013); ActionAid (2012); and Richard Atwood, Director of New York Office, International Crisis Group’s Director, all argued that in countries such as Pakistan, Sudan and Nigeria where violent, extremist anti-government movements are high the ability to exploit land based class divisions, the political risks are particularly high.
- **Increase food price:** The International Food Policy Research Institute (IFPRI) in 2009, noted that biofuel expansion based on actual national expansion plans would raise the prices of some staple food. They therefore estimated food crops such as maize, oilseeds, cassava and wheat to rise by 26, 18, 11 and 8 percent, respectively. This according to IFPRI would lead to the reduction in balance diet - calorie intake of between 2 and 5 percent, hence, increasing malnutrition in children (most affected children are under 5years) on average of 4 percent (Msangi, 2008).
- **Risks to Food Security:** The risk that comes as a result of biofuel production on the poor population is obviously huge. Less land used for agriculture mean high food insecurity. Most rural community household’s food security and income depends of agriculture. Once these lands are taken from them or reduced in size while the household population keeps increasing mean, land taken for biofuel production put a

biggest risk on these land dependent survivors. In other words, the risk of their source of livelihood and dignity would be compromised. In addition, FAO, (2011) highlighted the higher risk that land grabbing possesses on the poor urban consumers and poor net food buyers in rural areas - the rural poor. They argued that food insecurity have negative effect on children development and growth, as it increases their risk to poor health and diseases.

Figure 3: Problems associated with land grabbing for Jatropha production



Source: Researcher's construct, 2017

Figure 4: Image of *Jatropha curcas* L plant.



Source: Jatropha Curcas farm and seeds from jatrophacurcasplantations.com

2.9 Land Tenure System in Ghana

Under the State Land Act 1962(Act 125), “the declaration through the publication of an instrument designating a piece of land as required in the public interest automatically vest ownership of the land in the State”. The title thus acquired is the absolute or allodial title. Ollennu and Woodman (1985) explain in detail the connection between customary authorities and land tenure as followed:

“As the stool or skin is the shrine containing the soul and spirit of the family, the tribe or nation and is therefore the embodiment of the collective authority of all the members of the community, the tribe or the family, the ‘stool’ or the ‘skin’, of a particular village, town or tribe, is said to be the paramount or absolute owner of the land of the village, town or tribe. The occupant of the stool or skin, the head of the tribe or family, is a trustee holding the land for and on behalf of the community, tribe or family.” (Also cited: Amoako, 2014)

Agbosu et al., (2007) also catalogues the types of land tenure system in Ghana’s constitution as follows:

Public (State) Lands: Absolutely own by the state for the purpose that benefit the whole country. Example for the construction of public schools, hospitals and among others which services the public interest (see: FAO Africa Report, 2012).

Stool (Skin) Lands; *This land is administered according to the principles of customary or native law* (Aubynn, 2003).

Family Lands

Vested Lands

Private (Individual) Lands: These are land own by buying it from a family or a clan that own the land, or individual having it through inheritance.

Larbi (2008) gives five main categories of land tenure systems are Ghana;

- **“Private:** When an individual or group of people or company have access to land. All right reserved on the have to be obey.
- **Communal:** As the name sound, it belongs to members of a community
- **Open access:** Normally called the no mans land because it belongs tot the whole country. Eg the marine tenure (FAO, 2011).
- **State:** Land belonging to the state that are directly controlled by the government

2.10 The EU Concerns on Land Grabbing and Land Trade.

No too long ago the EU pledged during the COP21 Session on Climate Change in Paris to cut down it CO₂ emission and ensure sustainable environment (World Bank, 2010a; UNFCCC,. 2012). The action was a global call towards sustainable development; however, EU is more concern because it’s highly depends on imported food. These and other factors such as financial crisis in the 2007 – 2008 has call for my national security in this 21st century (Oxfam, 2010). The EU is seen as one of the agents of land grabbing globally (GRAIN, 2008). Africa is till the hardest hit. The TNI (2012) in its report indicated that ‘EU policies and the Renewable Energy Directive (RED) of the EU agenda 2030 have played a major role in large acquisition of land in the developing countries’.

Also the EU agenda 2020, the prospect of a long-term, lucrative European market for agro-fuels are important push factor into the oil palm boom in Southeast Asia and other part of the world for example (Franco et al., 2010). The issue is that not only developing countries are victims of land grabbing but also the EU itself. Franco et al (2010) argued that some countries within the EU - Eastern Europe such as Poland, Czech Republic Russia, Ukraine and many more have seen some trend of land grabbing of farmland by Companies, cooperates and investors from more developed EU countries such as Switzerland, Great Britain, Denmark, and France (Franco et al., 2010, TNI, 2012).

Another area that EU used to implicate land grabbing is it trade Policy and free trade agreement, what Paul Kagame – the president of Rwanda called the so- called ‘business aid,

not the aid'. “Its clear on one hand the EU claimed to support the development of Africa trade but in return take the most valuable asset of the people of Africa, thus land, either for natural resource extraction or to grab large sums of land to grow food to feed their people in Europe”. The adoption of the EU ‘Everything But Arms’ (EBA) agreement in 2001, which allowed the world’s least developed countries to import into the EU free from any duties or restrictions or taxes – excluding arms and ammunitions is a key strategy to get hold of their needs. Even though the agreement may seem good, nevertheless, ‘countries like Cambodia, Ghana, South East Asia and elsewhere have suffered global land grabbing’ through EU aggressiveness for biofuel (AFDB 2016; Franco et al., 2010; World Bank 2017). May be Rwanda’s President and Moro (the author the dead Aid) was right when they said Aid is a game, as more and more lands are acquire by developed countries across Sub- Sahara Africa, mostly by the former colonized masters, in the name of supporting Africa through trade. The Free trade agreement and policy has indeed generated a one of the strongest incentive for land grabbing (TNI, 2012)

Figure 5: Image EU Jatropha Project in Ghana



Source: Researcher’s own field image, 2016

In Ghana the land grabbing case has been highlighted by many scholars such as Acheapong, 2013; Bediako, 2013, Oxfam, 2013; Actionaid, 2012). More land are still been grab by foreign multinational companies mostly from the developed countries for the purpose already disused above. Also few of the companies operating in Ghana are identified in the Land Matrix report 2016; FOE and others literatures sources;

Table: 1.0 Some Biofuel Companies operating in Ghana

Company	Location of investment in Ghana	Size of Land Acquired (ha)	Crop type
Scanfuel (Norway)	Kumasi, Ashanti, Akanland, Agogo,	400,000	Jatropha
Jatropha Africa (UK/Ghana)		120,000	Jatropha
Galten Global Alternative Energy (Israel)	Volta Region	100,000	Jatropha
Jatropha Africa (UK/Ghana)		120,000	Jatropha
European Union	Walawala, Region Northern	500	Jatropha
Savannah Black Farming & Farm Management	Ahenakom, Brong-Ahafo Region	202	Jatropha
Global Green (the Netherlands)		1,350	Teek
Agroils (Italy)	Yeji, Brong Ahafo region, Pru district	105,000	Jatropha
Biofuel Africa Ltd. (now called Solar Harvest Ltd., Norway)	Northern Region Volta Region	27,000	Maize and Jatropha
Kimminic Corporation (Canada)	Bredie No. 1 and Kobre, Brong-Ahafo Region	13,000	Jatropha

Source: Adapted from Antwi-Bediako et al. (2012), Friends of the Earth, (2012) and Land Matrix (landportal.info/land matrix)

CHAPTER THREE

CHARACTERISTICS AND PROFILE OF STUDY AREA

3.1 Introduction

This chapter discusses the historical profile, economical trajectory and political issues that help in shaping Ghana's economy. It also gives some physical characteristics of the region under discussion and the selected communities of the study. All the regions in Ghana are known for the production of high agricultural output. However, the Brong-Ahafo Region is one of the regions, which gives Ghana the highest staple food production as well as endowed with abundant of fertile farm land and natural resources. The region is thus commonly referred to as the 'bread basket of Ghana'.

3.2 The History of Ghana

Located in the western part of African, Ghana is the first sub-Saharan country in colonial Africa to have gained independence from the European colony (British) in 1957. Ghana, which was formally called Gold Coast was the first place in sub-Saharan Africa where Europeans arrived to trade - first in gold and later in slaves. The northern part of Ghana share borders with Burkina Faso, western to Cote D'Ivoire, Togo to the east and Gulf of Guinea to the south. The country has total area, 238,500 square kilometers.

Ghana is the world's second largest cocoa producer behind Ivory Coast, and was projected over take Ivory Coast and become the world largest producer of cocoa by 2015. It's the world's tenth largest producer of gold, thus making it Africa's second biggest gold miner after South Africa. It is one of the continent's fastest growing economies, and newest oil producer. The country's main exports are Gold, cocoa, timber, tuna, bauxite, aluminium, manganese ore, diamonds and energy (hydro-power).

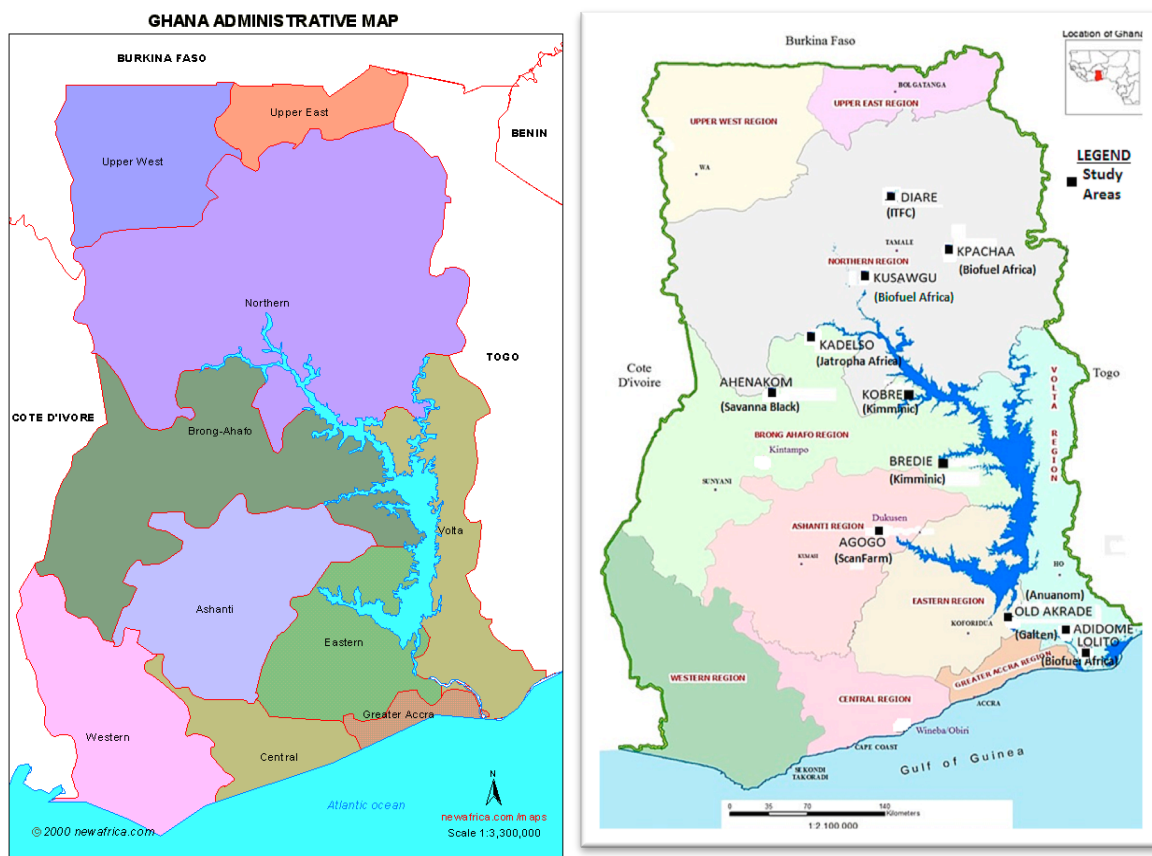
Agriculture sector accounts for 30% of the national GDP and employs about 45 per cent of the population (MOFA 2012). This is followed by the industry sector at 18.6 per cent, particularly the mining sector and the service sector. GNI per capital: US \$1,410 (World Bank, 2011). Mining and quarry forms the largest part of Ghana export particularly gold account for about 38 per cent of the total export revenue, whiles cocoa forms the second in line in terms of export value after gold, account for 22.4 per cent of the exports in 2011 (World Bank, 2011). Ghana has 10 main administrative regions: Western, Eastern, Central,

Greater Accra, Ashanti, Brong Ahafo, Volta, Upper East and Upper West. For the purpose of this research, only the Brong Ahafo region (and the Pru district) with jatropha plantation was studied.

3.3 Agriculture Overview in Ghana

Agriculture is a major driver to Ghana’s economy. The sectors contribution though has dwindled over the past years, is still vital to sustaining economic growth. Agriculture contributes to about 22 per cent of Ghana’s gross domestic product, down from 52 per cent in 1995 (World Bank 2017). This is as a result of the competition from other growing sectors including industry and commerce.

Figure 6: Map of Ghana showing the administrative regions AND Figure 7: Jatropha growing areas in Ghana



Source: Adopted from Acheampong and Campion, 2014

Table 2: Land Area by Region in Ghana

Region	Northern	Brong-Ahafo	Ashanti	Western	Volta	Eastern	Upper West	Accra	Central	Upper East	Total
Area (sq. km)	70.38	39.56	24.39	23.92	20.57	19.32	18.48	3.24	9.83	8.84	238.53
% of Total	29.5	16.6	10.2	10	8.6	8.1	7.7	1.5	4.1	3.7	100

Source: *The Ghana Survey Department, (2010); Ghana Land Commission, Accra*

It employs about 45 per cent of the active labour force. In rural communities more than 70 per cent of people are involved with and depend on agriculture (MOFA 2012). Cocoa, the country's major export earner, contributed an estimated US\$1,731 million in exports in 2013 (Government of Ghana 2013). Cocoa has accounted for 28 per cent of agricultural growth in Ghana since 2000 (World Bank 2013). Cocoa is produced largely by smallholders on small farms, constituting about 90 percent of total production. Farming is predominantly practiced on a smallholder basis with about 90 percent of farm holdings are less than 3 hectares in size (Chamberlin 2007).

3.4 Profile of the Study Area

3.3.1 Study Area

Although Ghana has 10 administrative regions and almost all the regions have the cultivation of the biofuel plants, only 1 out of the 10 regions would be considered for the purpose of this research; the Brong-Ahafo with specific communities; Kadelso, Ahenakom, Kobre and Bredie all in the Brong-Ahafo region of Ghana where *Jatropha* plantation are located. Indeed, other regions such as the Volta regions and Western region have been noted to have some of the largest investments in *jatropha* plantation, however, this thesis would concentrate on the above mentioned part of Ghana which leads in all kinds of agricultural products and where most of the county's economic plants; cocoa, oil palm, timber and main food staple plants (plantain, cassava, rice, maize, cocoyam, among others) are located. They are also considered because of it higher land fertility and rainfall pattern.

The Brong-Ahafo region is also one of the key areas, which have seen large investment in the *jatropha* biofuel activities in recent times. The region, which covers an area of 39,557 sq/km is the second largest region in Ghana in terms of land area size. However in terms of population it's has 2,310,983 accounting 9.4 percent of the country's total population (GSS, 2010). The Brong-Ahafo (see Figure 5: Map of Ghana) lies in the forest zone that is major

cocoa and timber producing area. The northern part of the region lies in the savannah zone, which is a major grain- and tuber-producing region (MG, 2010). About 68 per cent of the economically active people engage in agriculture for their livelihoods. The area is thus endowed with fertile land and natural resources notably gold. The region recently is also reported to have massive destruction of the forest, farm land, water-bodies and loss of employment of youth whose livelihoods depend mostly on farming as a result of the activities of illegal mining and poor agriculture practice.

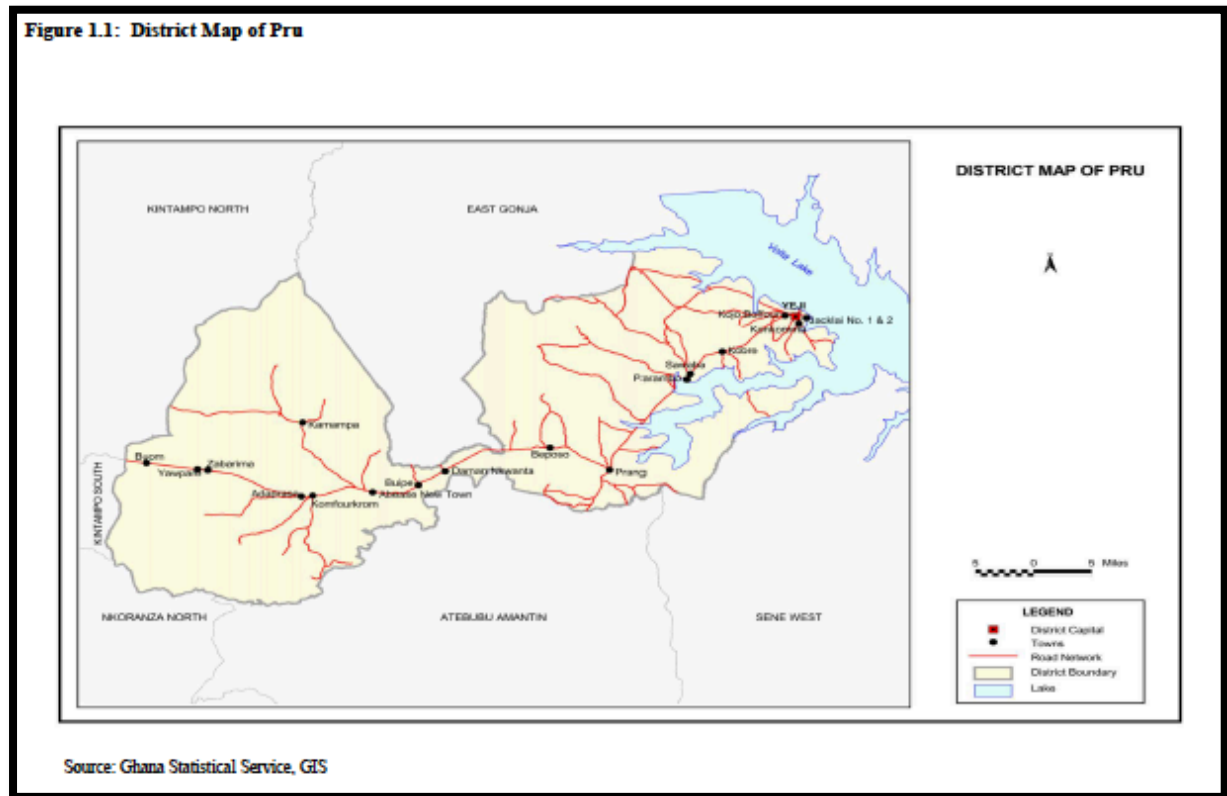
Pru District

Pru district, with Yeji as the capital, in the Brong Ahafo Region is the study area of this study. It has an area size of 3,244.4 km² and population of 129,248, which makes it one of the highly populated district in the region (Ghana Statistical Service, 2010). This may have been accounted for as a result of immigrants from other parts of the country particularly the northern part who move there because of the fishing and marketing activities that take place there (Ghanadistricts.com, 2014)². It shares boundaries to the north by East Gonja District in the Northern Region and to the south by Atebubu-Amantin and Nkoranza Districts. To the east, it shares boundaries with the Sene District and to the west with Kintampo South and Kintampo North Districts. The district lies close to the White Volta. Even though it possesses some best and rich agricultural land; it's also well known fishing community in Ghana. Volta Lake serves as irrigation for farms, fishing, transportation and source of drinking water. Yeji has been chosen for this study out of many districts in the region because it is the hub of Jatropha plantation.

According to Schoneveld et al. (2011), 66 per cent of the population depend on agriculture as the main activity and the rest of the population largely on fishing and trading. In recent times the economically active population farmers have diversified to growing of Biofuel plant which has become a global alternative way to solving problems associated with fossil fuel (Schoneveld et al. 2011). The rapid expansion of large land acquisition by both foreign and local companies for the cultivation of large scale jatropha biofuel plantation has become a major concern to the local people and the state since the livelihood of the local people depends on their land (Oxfam, 2012).

² (ghanadistrict.com, 2014) The information of Pru and the expansion of land grab for jatropha cultivation can also be viewed at myjoyonline.com, Ghanaweb.com

Figure 8: Map of Pru District



Source: Ghana Statistical Service, 2012

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Research Design

The main aim of this study is to investigate the impacts of land acquisition for Jatropha plantation on small-scale farmers livelihood and food security in Ghana. The study thus employs a case study method, which is used as empirical survey to probe into the contemporary phenomenon within real-life context. Yin (2006) stated that when the boundaries between phenomenon and context are not clearly evident; and in which, multiple sources of evidence are used, case studies give detailed contextual analysis of a limited number of events and their relationships. Case studies are useful especially in helping to understand complex issues (Matveev, 2002).

The study adopted the qualitative research design tool using a combination of qualitative and quantitative approach to answer the research questions. The qualitative techniques is used to analyse the processes involved in the large-scale land acquisition and the effects of the said acquisition on household food security while the quantitative techniques enable the analyses of the effects of land acquisition on access to land and levels of food production. Case study approach, make use of multiple data collection methods and analysis techniques, which provides researchers an opportunities to triangulate data in order to strengthen the research findings and conclusions.

4.2 Sample Selection

Several large-scale jatropha plantations exist in the country. The jatropha project within the Brong-Ahafo region is conveniently selected as a case study project in investigating the land related effects on small-scale farming based on proximity of the communities to the researcher.

4.2.1. Sampling Technique

Given that the research problem of large-scale land acquisition is not uniformly distributed in places considered for the study, there is the need to sample from the larger cases countrywide. In this study, preliminary visits to the study communities were done.

4.2.2 Sample Size Determination

Sample populations which included all selected communities and farmers directly and indirectly affected by the large-scale land acquisition were studied. From the sampling population, a sample size of 220 respondents was selected for the study. The sampling units included farming households in the selected communities who were affected by the land acquisition. The breakdown of the sample is as follows. Fifty (50) respondents each was purposively selected from the four study communities within the Pru District for data collection whilst 5 key informants each from the four selected communities were selected at the institutional level for interview on the social, economic and political dimension of land acquisition.

A total of 200 respondents were selected for this study. Out of the 200 household questionnaires. A response rate of about 100% was obtained for the analyses of the household data in this chapter. The SPSS software (version 20) and the Excel Statistical Package were used to present the analyses. Discussions of the results were also linked to literature to make inferences and validations. This was done to allow for comparison of the study results to similar studies on the subject of large-scale land acquisition for jatropha plantations.

4.3 Data Collection

Two research assistants were trained by the researcher to collect data from the field. In the course of data collection, respondents were asked about issues related to the study under discussion. This procedure was repeated for the rest of the households.

4.3.1 Types of Data Collected

The types of data that were gathered for this research included demographic, social and economic data of respondents. Demographic data includes age, sex, gender of households, and the main occupation of these households, household size, and educational background. Data was collected based on the objectives of the study.

Primary data was collected through field observations and interviews from small-scale farmers, key informants such as chiefs, company officials, development planners, land administrators at the Lands Commission, Town and Country Planning Department and other stakeholders involved in land usage and planning. Interviews were also conducted.

4.3.2 Data Collection Instruments

Field Observations and Focus Group Discussion: The researcher employed field observations and focus group discussions as tools to observe all the relevant characteristics (such as topography, market, farming) of the study area, and understand the social and economic activities of communities and other stakeholders. According to Mack et al (2005: 14) participant observation helps in ‘gaining an insight and understanding the environmental, physical, social, cultural, and economic contexts in which study participants live. What they do, how frequently, and with whom etc, is very necessary because it portrays the problem the exact way they are in a given community’.

Also the data collection was done with the aid of participatory research tools such as questionnaires and direct interviews with various traditional authorities, traditional councils, farmers, institutional and key informant interviews. In the case of questionnaires, information was solicited from respondents (in this case heads of farming households) through the administration of open-ended and semi-structured questionnaires. Respondents were given the opportunity to express themselves and give their own understanding of issues concerning the land acquisition. The questionnaire was grouped into sections aligned with the research questions so as to establish consistency with the study objectives.

Interviews were used to complement the questionnaires. In a case study research, using only structured questionnaire could place a limit on the responses that the study sought to measure, interview guides (open ended questions) was also used to collect data in order to triangulate and understand the real issues on the research problem. These data were mostly collected from the institutional respondents. Telephone Assisted Interviews (TAI) was done to validate some of the responses collected through interviews from the Company and the Office of the Administrator of Stools Lands located in in the respective regions of study. The data collected via the direct interviews and TAIs were recorded by the researcher for cross-checking and validation. The multiple sources of data as typical of case study research was used to increase the reliability and authenticity of the findings of the study.

CHAPTER FIVE

DATA PRESENTATION, RESULT AND DISCUSSION

5.1 Introduction

This chapter provides a presentation and discussion of the demographic characteristics of the respondents. That is: age, gender, marital status, educational background, household size, among others. This was done with the use of frequency and percentage distributions and cross tabulations. The second section of this chapter presents the data analyses based on the study objectives with a detailed discussions on the effects of large-scale land acquisition on small-scale farmers. In the second section, frequency and percentage distributions to determine the effects of large-scale land acquisition on small-scale farmers were done.

5.2 Data analysis and results

5.2.1 Demographic characteristics of respondents

Gender of respondents

Based on the information collected from respondents of four selected communities where jatropha is grown for biofuel stock in the Brong-Ahafo Region of Ghana, 61.5 per cent of the total respondents were male while 38.5 per cent were female. Also out of the 61.5 per cent male respondents, 49.5 per cent were household head while 3.0 per cent were spouse. This was followed by 4.5 per cent each of the respondents being parents and children as well. On the part of the females, out of the total of 38.5 per cent, none was recorded as household head, however 31.5 per cent were recorded as spouse while 7 per cent was recorded as parents. The information above implies that all household considered for the study were headed by males and with the support of their spouse and other family members.

Table 3: Gender of respondents

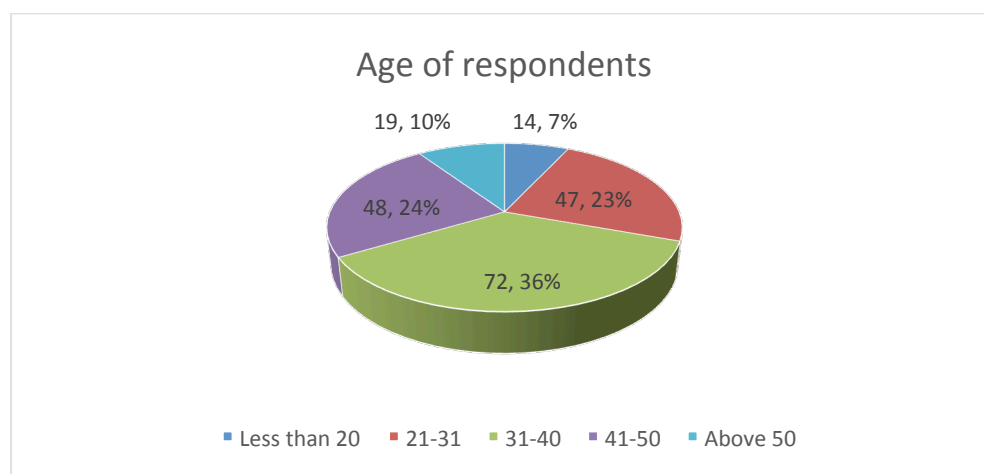
	Relationship with respondent					Total
		Household head	Spouse	Parent	Child	
Gender of respondents	Male	99 49.5%	6 3.0%	9 4.5%	9 4.5%	123 61.5%
	Female	0 0.0%	63 31.5%	14 7%	0 0.0%	77 38.5%
Total		49.5% 99	34.5% 69	11.5% 11	4.5% 9	100% 200

Source: Researcher’s field survey, 2016

Age of respondents

Majority of the respondents represented by 36 per cent were within the age group of 31-40 years (See Figure 7). This is followed by the age group of respondents between 41-50 years old representing 24 per cent. The age group of 21-30 years also recorded 23.5 percent of the total respondents. Finally, age group of above 50 years was represented by 9.5 per cent. These results give an indication that the youth dominated the respondents considered for this study.

Figure 9: Age of respondents



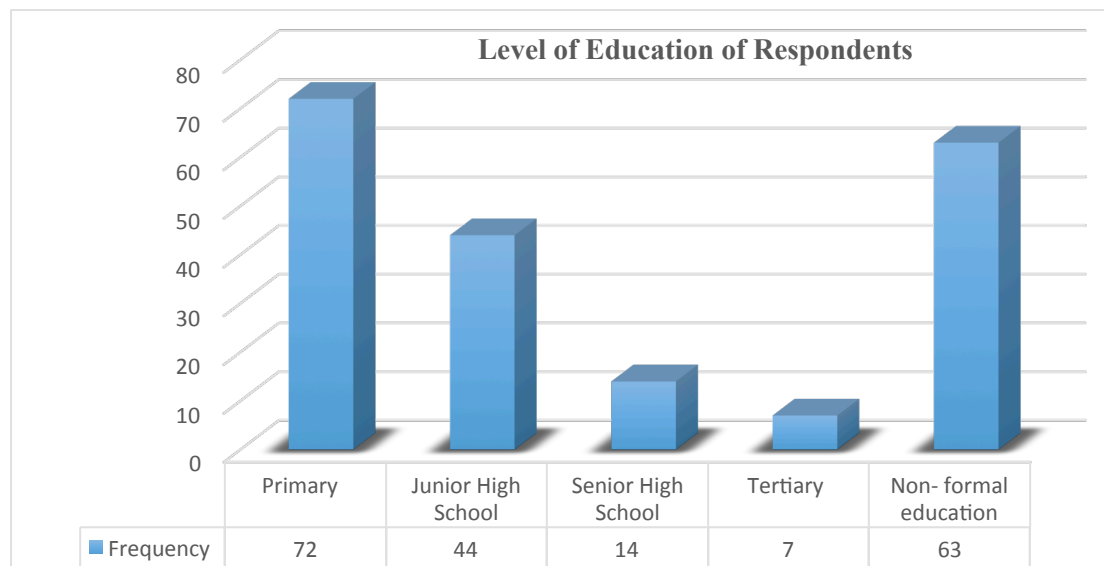
Source: Researcher’s field survey, 2016

Educational background of respondents

From the figure 8 below majority of the household head considered for this study had attained primary education. This is represented by 72 (36 per cent). Respondents with no

formal educational background ranked second 31.5 per cent. This was followed by 22 per cent of the respondents who had the Junior High Educational background. Respondents with Senior High and tertiary educational backgrounds were 7 per cent and 3.5 per cent respectively. This is an indication that though majority of respondents has had primary education, few could advance in the level of education to attain secondary and tertiary education. This could therefore affect the way most respondents appreciated things, especially in relation to the legitimacy of most large scale acquisition of their lands.

Figure 10: Education level of respondents



Source: Researcher’s field survey, 2016

The relationship between household size and economic activities of respondents

Assessing the household size and the economy of respondents is very vital. This helps to know the current economic status of respondents. Table 4, therefore relate all respondents to their economic activity. According to table 4, 47 per cent of the total respondents were gainfully employed. Out of employed respondents, 17 per cent of them had their own farms. With respect to the household size and their activities in relation to farming, the results are as follows; household less than 5 and 11-20 household members represented 4 (2 per cent) each while household which 6-10 in number represented 26 (13 per cent). In the area of trading 23 (11.7 per cent) of the respondents were engaged in it, while 27 (13.5 per cent) were employed at the jatropha plantation either as casual workers or permanent workers. This is in line with

Schenoveld et al. (2010) assertion that biofuels have the potential to bring increased employment and income to some rural populations thereby contributing to poverty reduction. He also argued that this may have impact on food production since there is some shift of labour from scale-scale farming to employee at the jatropha plantation.

At the jatropha plantation sites, some respondents were employed as either the security or farm laborers. The top positions like supervisors and managers were hired from outside the communities. Only 9 (4.5 per cent) and of the respondents were employed as salaried workers, while 1 (0.5 per cent) worked elsewhere in other professions.

From the table 4, it has been realized that majority of the respondents are engaged in farming activities. The four communities under consideration are mainly farming communities. Therefore it is not surprising to have many people engaged in farming. The table also shows a shift increment from plantation work to farm work as the number of people in the various households increased. This may have been geared by the increase in demand for food by the various households than remunerations given to workers of the plantation. Trading ranked third as the most patronized economic activity engaged in by respondents.

Only 1 (0.5 per cent) of the respondents was engaged in other works. This is an indication that other types of economic activities apart from the ones mentioned above, employed few members of the communities.

Table 4: Cross tabulation of household size and economic activity

Household Size		Name of employment					Total
		Farming	Trading	Jatropha plantation	Salary work	Other	
Less than 5	Frequency	4	1	19	6	1	31
	%	2%	0.5%	9.5%	3%	0.5	15.5%
6-10	Frequency	26	6	4	3	0	39
	%	13%	3%	2%	1.5%	0%	19.5
11-20	Frequency	4	9	4	0	0	17
	%	2%	4.5	2%	0%	0%	8.5%
More than 20	Frequency	0	7	0	0	0	7
	%	0%	3.5%	0%	%	%	3.5%
Total		34	23	27	9	1	94
		17%	11.7%	13.5%	4.5%	0.5%	47%

Source: Researcher's field survey, 2016

Marital Status and Religion of Respondents

Table 5, shows the relationship between marital status and religion of respondents. The result from the table indicates that out of the 200 respondents from the four selected communities, 42 (21%) were single. Out of the singles, 29(14.5%) were Christians, 6(3%) were Moslems, while 7 (3.5%) were traditionalists.

Majority of the respondents were married. This represents 138(69%) of the total respondents. Most of the married respondents were Christians, and represented 59(29.5%), followed by Muslims. Also widow or widower and divorced recorded 11 (5.5%) and 9 (4.5%) respectively. No respondent belonged to any other religion apart from the above mentioned. That is Christianity, Islam and Traditional religion. The results therefore infer that majority of respondents interviewed were married and belonged to the Christian religion.

Table 5: Cross Tabulation of Marital Status and Religion of Respondents

		Marital status of respondents				Total	
		Single	Married	Widow/widowe r	Divorced		
Religion of respondents	Christia n	Freq	29	59	1	9	98
		%	14.5%	29.5%	0.5%	4.5%	49%
	Islamic	Freq	6	26	4	0	36
		%	3.00%	13%	2%	0%	18%
	Traditio nalist	Freq	7	21	3	0	31
		%	3.5%		1.5%	0%	15.5%
	None	Freq	0	32	3	0	35
	%	0%	16%	1.5%	0%	17.5%	
Others	Freq	0	0	0	0	0	
	%	0%	0%	0%	0%	0%	
Total	Freq	42	138	11	9	200	
	%	21%	69%	5.5%	4.5%	100%	

Source: Researcher's field survey, 2016

5.2.2 Acquisition of Land

Acquisition of Land from the Land Commissions Perspectives

A resource person from the regional lands commission in Sunyani (capital city of Brong Ahafo region), Mr. George Tetteh in an interview indicated the processes followed to secure lands especially in the Brong Ahafo region.

“According to Mr. George Tetteh, lands in Brong Ahafo were mostly vested and in the hands of the chief on behalf of their people. Therefore anyone who desired to acquire a land has to pass through various channels, which included applying for the land from the caretaker chiefs. The chief then allocates the land to the company or person in pursuant of such land. After all the necessary payments in the form of money and drinks have been made. The person is then given an allocation letter or notice together with the site plan of the site or plot. The person is then advised to prepare the necessary official documents in the form of lease upon consulting the office of the Lands Commission, Land Valuation and Internal Revenue Service for the necessary actions to be done”.

This is short description on how to go about to acquire vested lands from caretaker chiefs in the Brong-Ahafo region of Ghana.

Land Acquisition from the Perspective of Some Respondents

Most of the respondents interviewed during the focus group discussion indicate of 30-40 people each from the study communities indicated that, in their area of residence, chiefs were mainly the custodian of the lands. In Kadelso, for instance, some respondents affirmed that chief usually took drinks and token from people who wanted farm lands to work on. However, the same could not be said about instances where large land acquisitions were involved. Respondent had no idea of what transpired in the event of large land acquisition, which usually rid robbed them of their lands.

In Bredie, most respondent had no idea of any laid down processes and procedures laid down by the Lands Commission, Office of the Administration of Stool Land, Traditional Authorities or whatsoever with respect to the acquisition of lands in their communities. The same comments were made in Ahenakon and Kobre. With the various acquisitions, according to most of the respondents, no public forum was held to make communities appreciate the agreement or transaction reached by guarantor and the guarantees of the land. Again, since no such arrangement was made regarding the large scale acquisition of land at the district and regional level, official from the office of the district assemblies could be contacted in the wake of the companies acquiring such lands.

Acreage of Land Lost to Jatropha Investments Respondents

Not all respondents owed lands however, majority of respondents 174 (75.5 per cent) reported that the activities of jatropha plantation companies resulted in the loss of their farm lands as well as dormant land which were expected to be used in the future. As much as 126 (63 per cent) of the respondents reported losing less than 11 acres of land. These lands according to most respondents were used on subsistence bases to cultivate foodstuff for their families and sold the extra produce which were left. Also 12 (6 per cent) and 5 (2.5 per cent) of the respondents indicated that they lost about 11-20 acres and 21-30 acres of land to the jatropha plantation respectively. These lands according to them were family lands inherited by pockets of family members from generation to generation.

In Bredie and Kobre, respondents in an interview indicated that they were forced out of their lands often at the barrel of a gun without prior notice by Kimminic Corporation, the company which acquired tracks of land for jatropha plantation. Some confirmed their unharvest farm produce were destroyed in the process, left destitute and unable to feed their families, have become a normal happening to them. The people of the village of Kobre in the Pru District of the Brong-Ahafo Region reported that the jatropha plantation started almost 7 years ago by a company named Kimminic Corporation on the land of Kobre community, which belonged to the Kojobofour Traditional Area. According to the residents, no prior consultations from the chiefs or elder were made. 'The company however came, brought people to survey the lands, followed by equipment, mainly comprising of tractors and bulldozers to commence work on their lands' – Mr.Kojo Atwin (a farmer who loss his inherited land to jatropha plantation company). Their operations according to most respondents commenced with the seizure of many lands. Since the chiefs who gave the lands out for cultivation were not from Kobre and those consented to the agreement were also deceased, the issue of whether the land was formally acquired from the chiefs or not were in contention now. The people residing in the village knew nothing about the terms of the contract.

In Bredie No.1 in the Nkoranza District of the Brong Ahafo region, respondents indicated that Kimminic Corporation also started operation 7 years ago. The land acquired by the company stretched from Piegnina to the boundary with Ejura in the Ashanti Region. In this case also respondent indicated that no prior consultations were made before the commencement of work. The actual size of the land acquired is not known since no one in the village knows the contractual agreement between the company and the community if even any. According to the residents the land size keeps widening as time went on.

Table 6: Acreage of Land Lost to jatropha Investments Respondents

Size of land lost (acres)	Number of respondents	Percent of respondents
Less than 11 acres	126	63%
11-20 acres	12	6%
21-30 acres	5	2.5%
31-40 acres	1	0.5%
41-50 acres	1	0.5%
51-60 acres	2	1%
71-80 acres	0	0%
81-100 acres	0	0%
More than 100 acres	1	0.5%
Not sure of size	53	26.5
Total	200	100

Source: Researcher's field survey, 2016

Effects of Land Grabbing on Access to Land Before and After Acquisition of Land

The acquisition of land especially a major farming communities usually have a serious implication of residents. This survey therefore tries to find out the accessibility of land to farmers before and after the acquisition of land for jatropha production. From the table 7 comparisons are made with respect to land accessed by respondents before acquisition and after acquisition. The results shows that majority of respondents had 3-4 acres of land to farm on before the acquisition. This is represented by 147 (73.5 per cent). However after the acquisition, there was a drastic reduction in access to 3-4 acres plots of land. There is also a sudden increase in respondents who acquired land size of 1-2 acres from 10 (5 per cent) to 114 (57 per cent) after the acquisition. There was no changes to respondents who used to have 5-6 acres of land, as 16 (8 per cent) was recorded before and after the acquisition of lands for jatropha production. On the other hand, respondents who hand more than 7 acres of land before the acquisition were reduced from 13.5 per cent after the acquisition.

The results above indicates that access to land reduce with respect to size as acquisition for jatropha progressed. This also implies that acquisition of lands were done in phases, and therefore the size of lands for jatropha plantation increased with time and consequently

reduce the sizes of land of respondents who had considerable size of lands. This implies that there is a devastating effect of large acquisition of land especially to small-scale farmers. This is noted by (Coutla et al, 2009)

Table 7: Effects of Land Grabbing on Access to Land Before and After Acquisition of Land

	Before		After	
	Frequency	Percent	Frequency	Percent
<an acre			21	10.5%
1-2 acres	10	5%	114	57%
3-4 acres	147	73.5%	49	24.5%
5-6 acres	16	8%	16	8%
More than 7 acres	27	13.5%	0	0%
Total	200	100	200	100

Source: Researchers field survey, 2016

Effects of Large - Scale Acquisition Land on Size of Land used by Farmers

The survey also delved into the size of land formerly cultivated by respondents before and after acquisition of land for jatropha plantation. It can be seen from table 8, that most of the respondents were used to using bigger sizes of lands, that is 3-4 acres by 64.5 per cent, 5-6 acres by 11 per cent and more than 7 acres by 14.5 per cent of the respondents before the acquisition. Before the acquisition, no respondent operated on less than an acre of land, possibly because people could have access to large tracks of unused lands, however after the acquisition for jatropha plantation no respondent could cultivate more than 7 acres of land, those who could cultivated land sizes of 5-7 acres and 3-4 acres reduce drastically from 11 per cent to 3 per cent and 64.5 per cent to 24.5 per cent respectively.

This is an indication that the amount of food crop yield or harvested from lands cultivated formally have reduce due to the reduction in land sizes available for farming.

This result also confirms that there have been shortages with respect to available lands needed for production of food. Implying that with the acquisition of large track of land for jatropha production, there was no or limited room for expansion of small-scale farms. The above analysis gives a clear indication, before the acquisition, most respondents never sort to expand their farm sizes probably because the land they were using were enough to feed them,

however as the acquisition progresses, many farms shrink in size and so most farmers wish to expand their farms, which could not be possible.

Table 8: Effects of Large -Scale Acquisition Land on Size of Land used by Farmers

	Before		After	
	Frequency	Percent	Frequency	Percent
<an acre			25	10.5%
1-2 acres	10	5%	120	60%
3-4 acres	129	64.5%	49	24.5%
5-6 acres	22	11%	6	3%
More than 7 acres	29	14.5%	0	0%
Total	200	100	200	100

Source: Researchers field survey, 2016

5.2.3 Effects of jatropha cultivation on Food production and food Security

Effects of land loss on fallow periods

In farming communities like Kadelso, Bredie, Ahenakom and Kobre the use of inorganic fertilizers are not common, therefore result to the practice of fallowing to help soil they cultivate on regain its strength. The study decided to find out the effect of land grabbing on their fallowing practices.

According to most of the respondents interviewed, there had been a reduction in the fallowing period of their land. As seen from table 8, land sizes reduced with the acquisition, and therefore respondents who used to farm on bigger lands had to accustom themselves to smaller ones. They could not fallow their lands for longer period of time due to the reduction

Table 9: Effects of Land Loss on Fallow Periods

Fallow period	Before		After	
	Frequency	Percent	Frequency	Percent
Less than 1 year	96	48%	131	65.5%
1-3 years	44	22%	53	26.5%
3-5 years	29	14.5%	13	6.5%
5-7 years	19	9.5%	3	1.5%
More than 7 years	12	6%	0	0%
Total	200	100%	200	100

Source: Researchers field survey, 2016

From table 9, 96 (48 per cent) of the respondents could fallow their land for less than 1 year before the acquisition of lands for jatropha plantation, however there was an increase of 17.5 per cent after the acquisition. The same can be said about respondents who fallowed their lands for 1-3 years but a sharp decline in lands, which could be fallowed from 5-7 years from 9.5 per cent to 1.5 per cent. According to the results show cased on the table 8, respondents who could fallow their land for 1-3 years also showed a study increase from 22 per cent to 26.5 per cent while there was a decline from 9.5 per cent to 1.5 per cent of those respondents who claimed they could fallow their land for 3-5 years. Also there was no evidence of land being fallowed for more than 7 years. This may be as a result of the fact that operations of most of the jatropha companies had not surpassed more than 7 years.

This implies that there are decreases in the fallow periods for farmers in places where jatropha farms have been setup. This in effect may have a ripple effect on crop yield since farmer cannot vacate their land for longer moments, farmers may also find it difficult to practice shifting cultivation or land rotation since lands available are not enough.

Cost of Lands before and after Jatropha Plantation

With respect to the cost of land before and after the land acquisition, there was a substantial rise in the cost of land for farming after large-scale acquisition of land. In the typical rural community setting in Ghana, ownership of land as indicated in the literature review is usually through inheritance, those who need addition land or are not privy to such inheritance rent them on yearly bases. Respondents who had no ownership of land rented lands from chiefs and other people in possession of land. 46.5 per cent of the respondents indicated that before the acquisition, they paid up to GH50. The cost of lands in the various communities not fixed. Some respondents confirmed pay some token, accompanied with drinks upon request of the land. This to some respondents was done in view of the fact that it was believed that since land was a free gift of nature, it could not be sold outright.

After the acquisition there was an increase, leading to the payment of GH60 per an acre of land. There was no report of any payments of 51-100 per years or 101-500 per year. This may have been as a result of the fact that before the acquisition, lands in communities under discussion were not so scarce and therefore acquisition or ownership of one did not even warrant for any payment to be made. Also there was a steady increase in land costing 501-1000 from 13 per cent to 14 per cent after the acquisition. It was realized that respondents who rented land at such amounts usually the lands they acquired for longer period. It must

however be noted that such lands were give out at a specified amount known only to the acquirer and the owner of such lands. Also, 26.5 per cent of the respondents were not sure as to how much their lands cost, as large tracts of the land was entrusted to them by other persons.

Table 10: Cost of Lands Before and After Jatropha Plantation

Cost of land per year	Before		After	
	Frequency	Percent	Frequency	Percent
Less than GH50	93	46.5%	64	32%
51-100 per year	0	0%	13	6.5%
101-500 per year	0	0%	0	0%
501-1000 as specified by owner	26	13%	28	14%
Not applicable	28	14%	34	17%
Can't tell	53	26.5%	61	30.5%
Total	200	100	200	100%

Source: Researcher's field survey, 2016

Effects of Large-scale Land Acquisition on Household Economy of Farmers

This section of chapter five delves into how large-scale acquisition of lands affects the economy of small-scale farmers. In this section the patterns of production, consumption, income and expenditure before and after acquisition of lands will be looked at. Since there are no specified standards as to the measurement of production and consumption, 50kg bags was used as the standard yardstick for measurement. The 50kg will be applied to only grains, cereals and nuts while tubers were used for crops like yam and cassava.

Effects of Land Grabbing on Quantities of Food Produced by Farmers

It was realized by the study that, communities considered for the study cultivated mainly four food crops namely maize, yam, cocoyam and plantain. The studies therefore looked at the production pattern (output level) of respondents before and after large-scale acquisition of their land. It must however be noted other varieties of crops are grown together with the above mentioned and this varies to communities. Food crop production also competes with other economic activities like mining (Yeboah, 2014 in thesis submitted to the Graduate Institute of International and Development Studies, Geneva). However, for the purpose of our

studies the four major food crops commonly cultivated – maize, yam, cocoyam and plantain to all the studied communities was considered.

Table 11: Average quantity of maize produced before and after land acquisition

Maize production / kg	Before		After	
	Frequency	Percent	Frequency	Percent
1-10 bags			74	37%
11-20 bags	104	46.5%	54	27%
21-30 bags	25	22.5%	0	0%
31-40 bags	0	0%	0	0%
Above 41 bags	0	0%	39	19.5%
Not applicable	48	24%	14	7%
Can't tell	19	9.5%	19	9.5%
Total	200	100	200	100%

Source: Researcher's field survey, 2016

Again, the average output of maize production before the acquisition, 46.5 per cent of the respondents could produce 11-20 bags of maize, this however decreased to 27 per cent after the acquisition. Though there were no report of productions of 1-10 bags and above 41 bags of maize before the acquisition respectively, there seem to be a sudden shift from nothing to 37 per cent after the acquisition with respect to a harvest of 1-10 bags and 19.5 per cent with respect to a harvest of above 41 bags. On the other hand, 9.5 per cent of the respondents were not sure as to whether there was an increase or decrease in production before or after the acquisition. This result is in contrast with Hunsberger et al., (2014a), Muller et al., (2011), who argue that expanded biofuel production can reduce national and local food security through rising food prices or changes in land tenure systems and patterns of food production.

Also there seem to be a massive improvement in yields, especially with the production of above 41 bags of maize after jatropha cultivation. This increase never happened before the cultivation of jatropha. The introduction of new farming technics according to most respondents played a role in this increment. Table 12, on the other hand, shows that production of tubers of yam decreased drastically after the inception of biofuel cultivation. This supports Muller et al., (2011) argument that biofuel production poses negative impact on food crop production and food security.

Table 12: Average Quantity Of Yam Produced Before And After Land Acquisition

Yam production per year	Before / tuber		After/tuber	
	Frequency	Percent	Frequency	Percent
1-50 tubers				
51-100 tubers	111	55.5%	88	44%
101-150 tubers	0	0%	38	19%
151-200 tubers	0	0%	43	21.5%
Above more than 200	57	28.5%	12	6%
Not applicable	18	24%	11	5.5%
Can't tell	14	9.5%	8	4%
Total	200	100	200	100%

Source: Researcher's field survey, 2016

Household's Views on Meeting their Food Needs Before and After the Establishment of Jatropha Plantation

Table 11 shows the amount of yam produced before and after land acquisition purposely used for producing biofuels. There was no reported evidence of the production of an average of 1-50 tubers of yam before and after the acquisition. Majority of the respondents (55.5 per cent) produced an average of 51-100 tubers of yam every year before the acquisition. There was a decline of 23 per cent after the acquisition of land for jatropha. Again respondents who could harvest more than 200 tubers of yams before the acquisition represented 28.5 per cent and after the acquisition, there was a reduction from 28.5 per cent to 6 per cent. On the other hand, 9.5 per cent and 4 per cent of the respondents chose not applicable in favour of before and after acquisition. They indicated that since various crops are cultivated including yams, it was very hard to determine the amounts produced in a particular crop season. Judging from the table 12, the implication here is that, quantities of yam increased after the acquisition.

Table 13: Meeting the Food Needs of Household Before and After Plantations

Meeting food need	Before		After	
	Frequency	Percent	Frequency	Percent
Not enough food	14	7%	42	21%
Food needs rarely met	17	8.5%	54	27%%
Food needs sometimes met	26	13%	27	13.5%
Food needs meet most of the time	54	27%	56	28%
Surplus food available	89	44.5%	21	10.5%
Total	200	100	200	100%

Source: Researcher's field survey, 2016

From table 12, the food needs of respondents are ascertained before and after the establishment of jatropha plantation. As indicated in the table few respondents 14 (7 per cent) indicated food was not enough before the establishment, while 17 (8.5 per cent), 26 (13 per cent) and 54 (27 per cent) indicated that food needs were rarely met, food needs were sometimes met and food need were mostly met respectively before the establishment of the plantation. Also majority of the respondents represented by 89 (44.5 per cent) indicated that there were always surplus foods before the establishments of the jatropha plantations. After the establishment however, the percentage of response for food not being enough shoot from 7 per cent to 21 per cent, while responses for food rarely met also saw an increment from 8.5 per cent to 27 per cent. Surpluses with regard to food availability before jatropha plantation also reduced from 44.5 per cent to 10.5 per cent.

The above agrees with Oxfam findings on land grabbing, as a key component of food insecurity across the world with Africa mostly affected. Ghana is not an exception. The establishments of jatropha plantations have indeed reduced the food need of most respondents. This may be attributed to the fact that upon reduction of most farm sizes as indicated in table 7, income of respondents consequently reduced (Oxfam, 2012).

5.2.4 Effects of Jatropha Cultivation on Employment and Income Generation

From the interview conducted for the study, most respondents confirmed loosing so much to the jatropha plantation projects. Some respondents almost lost all their farm produce to the jatropha plantation when they were forced out of their land without any compensation.

Though some of the inhabitants of the affected communities were employed, the level of income was considered woefully inadequate.

“According to a former worker of Kimminic Corporation, though the companies employed them to work for the plantation, remuneration was inadequate. This according to him (Mr. Fosu) forced him to seek other job opportunities elsewhere”

From the survey, it was realized that people were denied their normal livelihoods (crop farming) and were employed by jatropha plantation companies as security men, drivers, supervisors and so forth as argued in Hunsberger et al., (2014b) and EU policy agenda 2020 report. However, from the finding of this research most of these people have higher cost of living such as housing and transportation, aside from feeding their families due to the settlement displacements. In Bredie, it was reported that over 400 people were employed to work for Kimminic Corporation, while in Kobre the same company employed more than 400 people for the production of jatropha. However, not all workers were residents of the town. The high ranking personnel like the supervisors and managers who oversaw the day-to-day operations of the farm were mostly from other places. In Kadelso and Ahenakom the number of people employed were far less. Less than 200 people have been employed. In Kadelso for instance an average of 90 field workers were employed by Jatropha Africa. This number may be as a result of the fact that though companies like Savanna Black had acquired large sums of land, the company was not fully operational hence smaller in size as compared to the other two companies mention above.

5.2.5 Impact of Jatropha on Water Resources

Water is one basic needs of life. From interviews conducted by the researchers, some streams and springs were enclosed by the acquisition. For instance in Ahenekom streams which are used for domestic and agriculture purpose have been engulfed by lands acquisitions. Hence the quality of the water has been compromised. Pohl (2010) argued that jatropha production makes use of insecticide and other inorganic chemicals, which pollute community’s sources of drinking water. In spite of this, water resource for the four communities was available but lack quality due to pollution. According to some key informant used for the study since the communities were not connect to the national water system, they face high risks of diseases and pollution of food crops. This according to them result in low yield in agriculture production, food insecurity and high cost burden on health, which affects their livelihood.

Some also dug-out well as their main sources of water and therefore had enough water to drink but less for agriculture purposes.

In Bredie and Kobre the case was not different from the other communities discussed above. The residents reported having enough water especially in the raining season but polluted due to runoff. ‘Most well dried up in the dry season and the little left for drinking and agricultural purposes are used by the jatropha plantation companies, since they have better machine to tap all the water’ (Mr. Azuma, one of the farmers). This according to some respondents like Mr. Azuma makes the water a little scarce.

Table 14: Impact of jatropha plantation on local people

	Impacts	Frequency	Percent
Positive impacts	Built health center for local people	17	8.5%
	Opened up the local economy	54	27%
	Created employment for the people	98	49%
	Provided good roads	0	0%
	Provided boreholes	31	15.5%
		200	100%
Negative impacts	Non-farm products like picking snails, mangoes etc has become scarce	84	42%
	Polluted our water sources	15	7.5
	Reduce accessibility to land	65	32.5
	Increased the cost of living	26	13
	Reduce food production	10	5
Total		200	100%

Source: Researcher’s field survey, 2016

Table 14 above explains the impact of jatropha plantation on the local people of the four selected communities considered for this study. Most respondents representing 49 per cent indicated that the establishment of jatropha plantation created employment for local people and other people whose services were engaged by the companies. Also 27 per cent of the respondents indicated that the jatropha plantations’ operations helped to open up the economy of the areas through the boosting of petty trading and commercial activities.

Notwithstanding these good impacts respondents were equally not happy about the negative impacts the establishment of jatropha plantation had caused. First and foremost majority of the people 84 (42 per cent) of the respondents indicated that the large scale acquisition of land robbed them the opportunity to earn extra income from non-farm products like snails,

mango, pears, prekese, hunting and others. According to respondent, since many people found it extremely difficult to farm during the dry season, the local people usually depend on such products to earn extra income, while waiting for the rainy season. However, the operations of the companies through large scale acquisition made it impossible.

Also 32 per cent of the respondents indicated that they were denied access to land, which formally belonged to them. According to these people, this in a way ultimately reduced their accessibility to land and their chances of expansion, especially in the event of increase in family size. The cost of living according to 13 per cent of the respondents had increased. As reported by one respondent in an interview conducted, it was uncharacteristic of most locals to purchase foodstuffs like yams, cassava, maize, among others, outside of the community. However, as the prices of most goods and services in the area increase, the practice of buying farm produce was now common to most local people even though most of the respondent weren't happy about this new development. According to them this put financial burden

5.3 Discussion

The production of jatropha to serve as a feedstock for the production of biofuel is practically not a bad idea. This is view of the numerous advantages linked to such product. However, the negative effect on land and resources like water upon which the cultivation is based is clear. Of course large scale adoption of mono-cultural practices is known to have negative implications.

From the above analysis of the study it has been realized that most responds and inhabitants of areas considered for the studies are predominantly farmers, while some others were also engaged by the plantation to work as casual or permanent works. The study revealed that access to land was reduced in the cause of land acquisition for jatropha cultivation and that no prior notice or forum was made to make people especially those affected aware of such acquisitions.

These actions of caretaker chief and people at the helm of affairs in the various communities led to the seizure of land belonging to the people, displacement of settlement and ultimately led to reduction of the size of land for food crop cultivation. The difficulty in accessing land obviously reduces the fallow practices of the local people who formerly used that as a mechanism to revive their land fertility.

Again, outputs of farmers from the lands they farmed had appreciated. This appreciation in level of food was as a result of the employment of various improved farm techniques like the use of inorganic fertilizers to mitigate the situation at hand.

In spite of the above mentioned, most respondents reported of shortages in food needs and reduction in food surplus. This therefore infers that most people were being forced to farm elsewhere or reduce areas where they farm

5.4 Limitations

Since the issue of land grabbing is highly connected to politics and opaque in nature of the dealings, it was difficult for the researcher to get more top official to speak about the issue. Hence limited data.

Since other factors such as animal waste, mining activities, human waste and other environmental factors other than Jatropha production may also result in the pollution of the water and food production, it was difficult for the researcher to quantify the pollution level.

No form of financial support for students hence researcher have to depend on her own internal generated funding for field trip and case study sites. This however put a lot of financial stress on students and consequently, limit them from empirical studies.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

6.1 Introduction

This chapter outlines the summary of the key findings from the study, conclusion and recommendations based on the findings. In summary, the research study uncovers a negative correlation between the production of jatropha and land acquisition and livelihoods of smallholder farmers in the Pru District in the Brong-Ahafo Region.

6.2 Summary of key findings

Relationship between household size and Economic Activity of Respondents

From the four communities considered for the study majority of respondents engaged in farming activities. There was a sudden shift from plantation work to farm work as the number of people in the various households increased. However, there was not enough land to increase the size of their farms. This is an indication that other types of economic activities (trade) apart from the ones mentioned above employed few members of the communities since some of the plantation workers come from different places.

Acquisition of Land

There was no clear evidence of any existing contract with custodians of the lands belonging to the communities and the companies involved in the jatropha plantation investment. Land acquired from areas of study were acquired in phases and consolidated as time went on. The right land acquisition processes were not followed during the acquisition of lands belonging to local residents of the areas under study. Lands were therefore forcefully taken without regarding (taken into consideration) the livelihood of these farmers or people who cultivated the land. From the research I believe people in charge of affairs of the district do not know much about how land transactions take place in areas where jatropha project are located.

Acreage of land lost to jatropha investments respondents

Though not all respondents held interest in lands, majority of people 174(75.5%) reported losing their lands to the activities of jatropha plantation companies. Most of the affected farmers were small-scale farmers who cultivated on subsistence bases to feed themselves and their families. Therefore their source of sustainable livelihood has been compromised due to the activities of the jatropha for biofuel production.

Effects of land grabbing on access to land before and after acquisition of land

Access to land reduced with respect to size as acquisition for jatropha progressed. Acquisition of lands belonging to the communities was done in phases, and therefore the size of lands for jatropha plantation increased with time and land sizes of farmers reduced. Before land acquisition majority of the respondents interviewed cultivated more than 2 acres of land, however after the acquisition there was a sudden drop to 1-2 acres. Large-scale land acquisition had a devastating effect on small-scale farmers. This is addressed by (Ndung'u, P. 2004; Pohl, 2010; Oxfam, 2012; Coutla et al, 2014) that land is of crucial importance to the economies and societies, which contribute key share to GDP and employment in most countries, and constituting the main source of sustainable livelihood for a large portion of the population.

Effects of large scale acquisition land on size of land used by farmers

It has also been realized that land sizes reduced with the acquisition of large track of lands for jatropha plantation. Most of the respondents were used to using bigger sizes of lands; that is 3-4 acres by 64.5 per cent, 5-6 acres by 11 per cent and more than 7 acres by 14.5 per cent of the respondents before the acquisition. No respondent operated on less than an acre of land, possibly because people could have access to large tracks of unused lands, however after the acquisition for jatropha plantation no respondent could cultivate more than 7 acres of land, those who could cultivated land sizes of 5-7 acres and 3-4 acres reduce drastically from 11 per cent to 3 per cent and 64.5 per cent to 24.5 per cent respectively. The implication is that, with all things being equal, the amount of crop produce which used to be harvested from lands cultivated formally will reduce in the face of the reduction in water and land sizes available for farming. This is supported by (Creutzig, et al., 2013) who indicated that Households and communities without formal land titles can see their access to land compromised, or can be excluded from production schemes or associated benefits. In some cases, women loose informal access to land and resources more easily than men.

The shortages in land created no room for expansion of small-scale farms, as most of the land had been used for jatropha production. Therefore, most farmers produce less food crop.

Effects of jatropha cultivation on Food production and food Security

In farming communities like Kadelso, Bredie, Ahenakom and Kobre, even though the use of inorganic fertilizers had been employed so as to increase yield. There is low yield due to the reduction in land sizes, which consequently meant reduction in farm output to meet the increasing demands of households. Food for household according to the survey was not a problem as majority indicated having enough to eat, the main problem was with the drastic reduction in surpluses which used to be gained.

Fallow period for land also reduce due to the reduction in size of lands for farming. 96 (48 per cent) of the respondents could fallow their land for less than 1 year before the acquisition of lands for jatropha plantation, however there was an increase of 17.5 per cent after the acquisition. The same can be said about respondents who fallowed their lands for 1-3 years but a sharp decline in land access, which could be fallowed from 5-7 years from 9.5 per cent to 1.5 per cent. Farmers who could fallow their land for 1-3 years also showed a study increase from 22 per cent to 26.5 per cent while there was a decline from 9.5 per cent to 1.5 per cent of those respondents who claimed they could fallow their land for 3-5 years. This situation however, had effect on crop yield since most of the farmers used the traditional system of farming. Of course soil fertility is an input in terms of farming, once it's compromised, would obviously, likely to reduce food crop production or yield.

Effects of large-scale land acquisition on Household economy of farmers

Few respondents 14 (7 per cent) indicated food was not enough before the establishment, while 17 (8.5 per cent), 26 (13 per cent) and 54 (27 per cent) indicated that food needs were rarely met, food needs were sometimes met and food need were mostly met respectively before the establishment of the plantation. Also majority of the respondents represented by 89 (44.5 per cent) indicated that there were always surplus foods before the establishments of the jatropha plantations. After the establishment, however, the percentage of response for food not being enough shoot from 7 per cent to 21 per cent, while responses for food rarely met also saw an increment from 8.5 per cent to 27 per cent. Surpluses with regard to food availability before jatropha plantation also reduced from 44.5 per cent to 10.5 per cent. There was a reduction in food need of most respondents.

Impact of jatropha on water resources

According to some key informant used for the study since the communities were not connected to the national water system, few people who can afford dug out well, which were mostly used as their main sources of water and therefore had enough water to drink. But the quality of the water was a problem since mostly of the jatropha plantations make use of excessive inorganic chemicals that pollute their surface waters, which serve as the main sources of water for drinking and irrigation purposes. This means that the jatropha plantations do not only affect staple food crop production but does have a health risk on the farmers who drink from the water bodies and eat food produced from these irrigated farms. In the dry seasons when water is scarce, the rural communities have to compete with the companies who are well equipped for the same water for both drinking and the irrigation for their farms produce.

Impact of jatropha plantation on local people livelihood

Most respondents representing 49 per cent of total respondents indicated that, the establishment of jatropha plantation created employment for local people and other people whose services were engaged by the plantation. Also 27 per cent of the respondents indicated that the jatropha plantations' operation helped to open up the economy of the areas through the petty trade and commerce that went on in the area.

Respondents were equally faced with the negative impacts the establishment of jatropha plantation. Majority of the people 84 (42 per cent) of the respondents indicated that the large-scale acquisition of land robbed them from their main source of livelihood – thus farming. The opportunity to earn extra income from non-farm products like snails, mango, pears, prekese, hunting and others, have eventually disappear or limited.

6.3 Conclusion

As the world set a target to achieve environmentally friendly world and reduce climate change; the moves from fossil to biofuel has become important global issue. The case study research, from the above analysis concludes that large-scale acquisition of lands for jatropha cultivation has numerous severe implications on small-scale farmers livelihood and food sovereignty. This comes as a result of poor regulatory enforcement, corporate irresponsibility, elite capture and under-regulation of land deals. It is obvious, land and forest is the most vital source of livelihood for the rural people and once communities lose access to them, they lose

everything. In areas where large-scale acquisitions of land induce resource scarcity, capacity for livelihood reconstruction is challenged. This stems from the fact that several farmers in communities considered for the study lost their homes and farmlands without being compensated. Even worse, in cases where respondents are threatened at gun point to vacate out of their settlement, farms and all their belongings without any formal notification directly impacts on their food security and income earning potential. The most affected populace as a result of land grabbing is the vulnerable group, especially, women and migrant farmers who have comparatively limited or insured access to this vital livelihood resource.

Though jatropha productions for biofuel proffer some benefits, but it's flourishing at the huge expense of agriculture. This consequently, has an impact on food production, security and livelihood. Most rural communities in Ghana are into agriculture, mostly food crop production as a source of livelihood. In fact about 80 per cent of the population in Ghana are involved directly in farming. This means distorting agriculture contributes to aggravating poverty levels among rural communities who are mostly farmers. Land and water are seen as their main source of livelihood since it is the main input of agriculture. The best way to ensure sustainable agriculture is by safeguarding the main source of livelihood of the local system. One thing is clear from our research, land stand out to be the most critical needs of the rural communities.

From the analyses, it was seen that land and water resources grabbed for jatropha have impacted negatively by reducing food production. Since most of the small-scale farmers who feed the country have lost their land to these foreign companies for jatropha cultivation. FAO stated the 'right to food security as when everybody have the right to access sufficient, affordable, safety and nutritious food' to meet their dietary needs and preferences for an active and healthy life'. This means that when any of the pillars is compromised there comes food insecurity. The research has proven that indeed there is a negative (landless, water pollution, human health risk and food insecurity) link and implication between staple food production and jatropha plantation for biofuel. Through our research findings both the secondary and primary qualitative analysis, both Jatropha plantation and food crop production make use of the same input factors, which are land used, human labour, and water. These directly affect food productivity in all ways of the argument. Also most community member could not appreciate the systems of large acquisition land this is because their lands could be taken from them without any complain.

The Right to Food is the basic right of people, therefore it is every government responsibility to ensure that its population have enough food to eat and quality water to drink. Ghana is not an exception when it comes to land grabbing which is putting many rural communities into poverty, hunger, displacement of settlement and some case dead. Ghana has been cited as one of the countries with key problem of land grabbing for purposes other than food crop production.

There is the need for governments in Africa and Ghana in particular to put up better regulation on local land acquisition, land concessions and wise investment that will aim of feeding it population than biofuel. Hunger is a national security threat that needs to be treated as matter of urgency. 'A hungry man they say is an angry man'. Large land acquired to feed the world aggressiveness for biofuel particularly Europe's agenda 2030 mission must be well trade, what IFPRI define as the 'Win-Win' approach. This means right set of legal, institutional, and political-economic procedures that mutually benefit all actors. The realisation of helpful coexistence between commercial and subsistence agriculture must be ensure. Since Africa's population is the hardest hit of hunger! It is therefore important to fulfill their food needs first.

6.4 Recommendation

- Land is a main source of livelihood for most the population in Ghana and for that matter should not been seen belonging to just one person or few pockets of people. We strongly recommend that the acquisition of lands, especially land entrusted to chiefs (caretakers) on behalf of local communities, all transaction should be transparent and appropriate stakeholders involved. Laws and laid down procedures must be adhered to with regards to land acquisition avoid future conflict.
- Deserving and appropriate compensations should be arranged for the farmers who are affected in the course of large-scale acquisitions of land. To do so there should be, legal entity or framework set aside to enforce the payment of compensations by the companies who acquire large scale of farmland to the farmers. Also special boards should be set aside to give free education and monitoring on financial management. How to use the made from compensation, something like free financial consultation. This in a way will prevent haphazard spending leading to diverse and direst poverty mostly experience by people compensated.

- Traditional authorities should be schooled by the various state lands institutions like the Lands Commissions, Office Of The Administration of Stool Lands on how to dispose of lands without much negative effect or burden on dwellers of land
- It is obvious that food crop production is the worst hit when it comes to biofuel production activities. State agencies like the ministry of food and agriculture must do well to intervene on behalf of communities and areas, which are considered as food baskets to the country. A sustainable investment in agriculture, thus financial package towards bolster food production at both local and national level means reducing food insecurity and ensuring sustainable livelihood for the rural areas.
- ‘To ensure food security and hungry free for present and future expected population as agreed by all UN member states (SDG’s), Africans leaders, especially Ghana government should encourage the small-scale farmers to practice a large scale and commercial farming system; mechanical farming system just like other regions, such as Europe and USA (few size of land and labour but higher productivity)’ (Amoako, 2014). Investment such as infrastructure; for example irrigation system, feeder roads, storage facilities as well as human capacity building, such as agric-technicians, extension officers. This will help to boost the volume of food production for local consumption and significantly improve the economic and social development of Ghana’(Amoako, 2014, thesis submitted in Mendel, Brno). Other technical know-how and supports as to the use of excessive agro-chemicals can also be checked by the above ministry to helps avoid any harmful repercussions associated with its use on farmers and foods, so as to ensure food quality and safety.

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OTHER SOURCES OF INFORMATION

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List of Abbreviations

AFDB : Africa Development Bank

EIA: Environmental Impact Assessment

EPA: Environmental Protection Agency

FAO: Food and Agriculture Organisation

GPRS: Ghana Poverty Reduction Strategy

ILO: International Labour Organisation

IMF: International Monetary Fund

OASL: Office of the Administrator of Stool Lands

SLA: Sustainable Livelihoods Approach

TNI: Transnational Institute

UNCED: United Nation Commission on the Environmental & Development

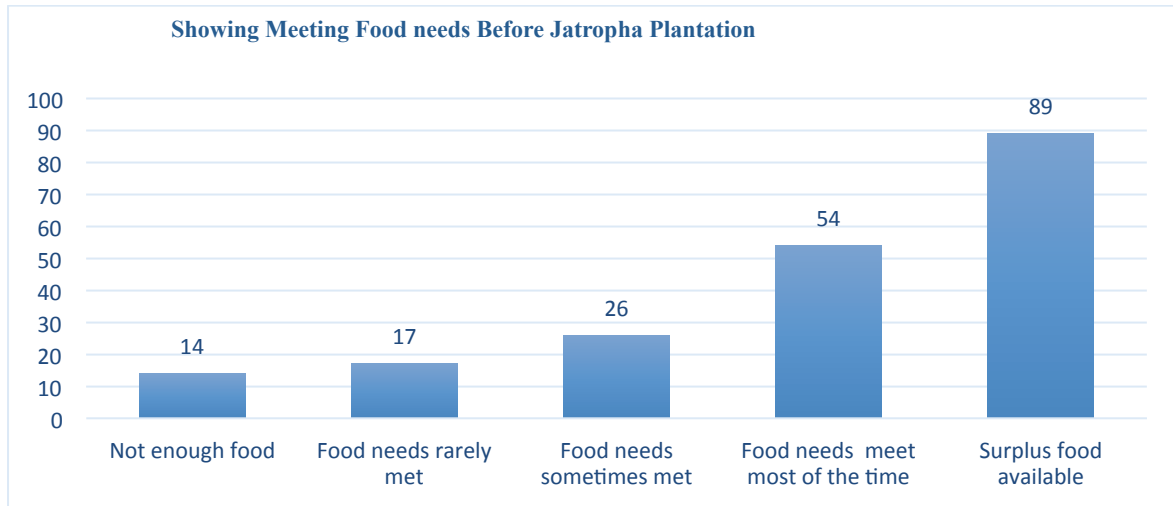
UNDP: United Nation Development Programme

UNEP: United Nation Environmental Programme

WCED: World Commission on Environment and Development

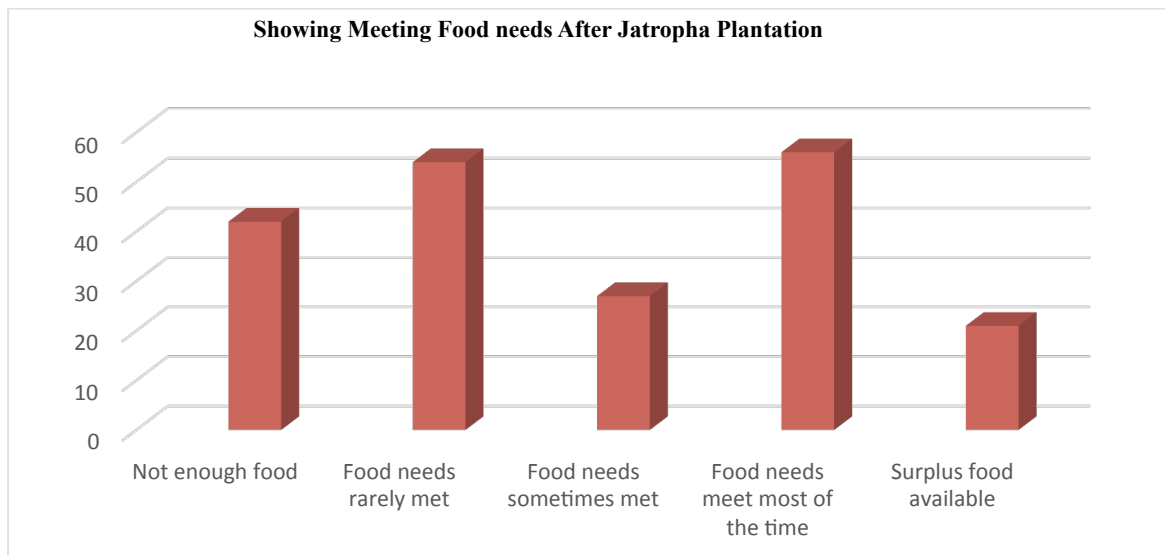
APPENDIX

Appendix 1: Meeting Food needs Before Jatropha Plantation



Source: Researcher's own work

Appendix 2: Shows Meeting Food needs After Jatropha Plantation



Source: Researcher's own work

Appendix 3 : Questionnaire

Questionnaire for inhabitants of selected communities where land has been grabbed for jatropha cultivation

Section A: BIO DATA

1. Gender of respondent
 Male Female
2. Age of respondent
 -20 21-31 31-40 41-50 above 50
3. Highest level of formal education completed
 Primary Junior High Senior High Tertiary None
4. Employment status
 Employed Not employed
5. If employed, type of employment
 Own Farming Trading Plantation job Salary work
 Other (specify) _____
6. Marital status
 Single Married Widower/widow Separated Divorced
 Other (specify) _____
7. Religion
 None Islamic Christian Traditional
 Others (specify).....

SECTION B: How was the large-scale land acquisition for the jatropa project done?

8. What is your household size?
 Less than 5 6-10 11-20 More than 20
9. How is land acquired in this community?
10. Have you ever lost your land to jetropha plantation?
 Yes No
11. If yes to 10, what was the acreage of land lost to jetropha investment?
 Less than 11 acres 11-20 acres 21-30 acres 31-40 acres
 41-50 acres 51-60 acres 71-80 acres 81-100 acres
 More than 100 acres Not sure of size
12. Do you know of any process for the large-scale land acquisition?
 Yes No
 If yes, mention.
13. Were you notified about the land acquisition for the project?
 Yes No
14. Were you involved in the land acquisition?
 Yes No
 If Yes, at what stage?

Section C: In what ways did large-scale land acquisition for jatropa plantation affect farmers' access to land?

	BEFORE	AFTER
--	--------	-------

15. Size of the land you had initially acquired?		
16. Size of land you operated on?		
16. How did you acquire the land		
18. How much did you acquire the land?		
19. Did you expand your land use (e.g Farm) after initial acquisition?		
20. How much land did you expand?		
21. How much did you acquire the extra land?		
22. Size of the land you had initially acquired?		
23. Size of land you operated on?		
24. How did you acquire the land		
25. How much did you acquire the land?		

Section D: How did large-scale land acquisition for jatropha plantation directly affect the output of farmers?

	BEFORE	AFTER
26. What major crops did you cultivate?		
27. Average quantity of food crop produced per farming season		
28. Average quantity of food crop consumed per farming season		
29. Average total income from land related sources per season (Farm income and Non-farm income)		
30. Average total expenditure per season (Food items and Non-food items)		
31. Livelihoods activities Wood fuel like firewood, charcoal, dawadawa, shea nut, hunting,		
32. Acquisition of land for jatropha affect fallow periods		

Section E: How did large-scale land acquisition for jatropha plantation directly affect household economy of farmers within the project communities?

	BEFORE	AFTER
33. What major crops did you cultivate?		
34. Average quantity of food crop produced per farming season		
35. Average quantity of food crop consumed per farming season		
36. Average total income from land related sources per season (Farm income and Non-farm income)		
37. Average total expenditure per season (Food items and Non-food items)		
38. Livelihoods activities Wood fuel like firewood, charcoal, dawadawa, shea nut, hunting, hay		

Section F: How did large-scale land acquisition for jatropha plantation affect household food security of farmers within the project communities?

	Strongly disagree	disagree	Uncertain	Agree	Strongly agree	not applicable
39. food supply decreased after acquisition						
40. Food is very difficult to access of late						
41. Food prices have increased after the acquisition of land						
42. Food is sufficient for all after the acquisition						

Section G: Effects of land grabbing on water resources

	Strongly disagree	disagree	Uncertain	Agree	Strongly agree	not applicable
43. The amount of water resource available has reduced						
44. There is always difficulties in accessing clean water						
45. Acquisition of large tracks of land has led to the loss of some water resources for the community.						

Section H: Impact of jetropha plantation on local people

	Impacts	YES	NO
Positive impacts	Built health center for local people		
	Opened up the local economy		
	Created employment for the people		
	Provided good roads		
	Provided boreholes		
Negative impacts	Non-farm products like picking snails, mangoes etc has become scare		
	Polluted our water sources		
	Reduce accessibility to land		
	Increased the cost of living		
	Reduce food production		