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# Conflicting land deals and food insecurity:
## The era of Jatropha boom, bust and transformation in Ghana

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***ABSTRACT***

Global concerns about fossil fuel prices and climate change have directed focus on prospects of biofuels. In Ghana, large-scale biofuel development has been entangled with several problems including disputes over land use and a combination of challenges such as low yield performance of Jatropha, food versus oil seed prices and financial viability issues. Furthermore, the exercised land acquisition processes lacked transparency and could not protect the rights of vulnerable local people. One particular challenge is the withdrawal of companies without returning the land to the land owners. This paper reviews these findings in the context of land rights and implications on food security of the boom, bust and transformation of the abandoned land spaces. It also investigates the prospects for a more sustainable approach in light of improving policy indicators such as the Renewable Energy Act in 2011 (ACT832), which requires, among other things, that Ghana attains 10 per cent biofuels (biodiesel/bioethanol) in its energy mix by 2020 without compromising food security

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## 1. INTRODUCTION

Over the past few years, concerted global efforts at tackling the issue of climate change have resulted in the Kyoto protocol. In addition to this, the need to improve energy security has spurred on the EU and other Western countries to adopt a comprehensive and resolute approach towards the subject of Bio-energy. The Kyoto protocol, for instance, sets binding targets for 37 industrialized countries and the European Community to ensure the reduction of greenhouse gas (GHG) emissions. These set targets amount to an average of five per cent against the 1990 levels over the five-year period, 2008-2012. It is against this background that the European Union (EU) is promoting bio-fuel policy in several ways including stating that by 2020, 20 per cent of energy used in the EU and 10 per cent of each member state's transport fuel must come from renewable sources (Franco et al., 2010). The problems of peak oil, with concomitant sharp rises in the price of fossil fuel, and a huge growing global transport sector that is extremely dependent on fossil fuel (the major culprit in the emission of carbon and other greenhouse gas) have made a strong argument for the need for bio-fuels to curb sustainability problems in the EU context (Franco et al., 2010). This has subsequently led to the promulgation of Directive 2003/30 aimed at promoting the use of bio-fuels and other renewable fuels for transport.

The situation concerning a concerted effort towards promoting and implementing the use of bio-fuels in countries of the Economic Community of West African States (ECOWAS) including Ghana is however different. There is no clear policy and regulatory framework for the bio-fuel industry and land acquisition (Hagan, 2007). Even though Ghana promulgated a new Renewable Energy Act (Act 832), it has not presently completed comprehensive policies or related strategy for the promotion and development of bio-energy. A draft National Bio-fuel Energy Policy has currently been developed for submission to parliament for approval.

This paper explores the concerns and underlying causes of the boom, bust and transformation in the Jatropha industry in Ghana and policy implications, particularly on food security. Since the surge of interest in renewable-energy alternatives to liquid fossil fuels hit in 2004/5, the possibility of growing *Jatropha curcas* L. for the purpose of producing bio-fuel has attracted the attention of investors and policy-makers worldwide. The first significant milestone in the development of a coherent policy on bio-fuels was the promulgation of an EU policy of Directive 2003/30, the Bio-fuels Directive, which aimed to promote the use of bio-fuels and other renewable fuels for transport. An indicative, non-binding target of 5.75per cent for the inclusion of bio-fuels in petrol and diesel for transport was set for all Member States to achieve by 2010. The results of the Bio-fuels Directive were somewhat mixed and in early 2006, the Commission published a detailed *EU Strategy for Bio-fuels*, paving the way for a comprehensive updating of the 2003/30 Directive and the development of a more mature EU policy on bio-fuels. A further publication in 2007, the *Renewable Energy Road Map*, proposed a target of 20 per cent for the use of renewable energy and 10 per cent for the share of bio-fuels in the transport sector by 2020 (Franco et al., 2010). The latter target would be binding. A central component of the reform process envisaged by the Renewable Energy Road Map was the institution of an obligation upon fuel suppliers to reduce the greenhouse gas emissions of their fuel by 10 per cent. Bio-fuels were noted as a potential mechanism through which lifetime emissions could be reduced and accordingly, the creation of a

separate fuel blend was proposed to allow higher percentages of bio-fuels to be used in petrol and diesel. A further Commission document proposed the amendment of Directive 98/70, which set EU wide minimum health and environmental standards for petrol and diesel fuels (Stephanie, 2010).

The development of a more mature approach in EU bio-fuels policy was cemented with the publication by the Commission in January 2007 of an *Energy Policy for Europe* which sought to deal with issues of energy, industrial development and climate change more holistically. In March 2007, the European Council accepted the Commission's proposal of a binding target for a 20 per cent share of renewables in EU wide energy consumption by 2020 and endorsed a binding 10 per cent minimum target for all Member States in relation to the share of bio-fuels in petrol and diesel for transport (Franco et al., 2010). The introduction of a *binding* bio-fuel mandate was subjected to 'production being sustainable, second-generation bio-fuels (i.e. non-food feedstock for bio-fuels like Jatropha) becoming commercially available and the Fuel Quality Directive being amended to allow for adequate levels of blending'.

Growth of the bio-fuel industry is being driven by government policies in three main areas. This includes (i) policies aimed at mitigating climate change, (ii) improving energy security, and (iii) using bio-fuel production as a strategy to support rural development. Mandates and targets for inclusion of bio-fuels in petrol and diesel, together with subsidies and border protection in the form of import tariffs and quotas, are the means by which governments provide the impetus to drive bio-fuel growth. The United States of America (USA) leads in production-related subsidies while other countries, including those in the European Union (EU) and Brazil, largely use tax exemptions as the policy instrument for the promotion of bio-fuels.

The ECOWAS sub region of which Ghana is a key member, is promoting regional energy cooperation and integration. The West African Gas Pipeline (WAGP) and the West African Power Pool (WAPPOOL) offer considerable opportunities for inter-country trade, and cross-border infrastructure in energy. To this regard, Ghana has signed the United Nations Framework Convention for Climate Change (UNFCCC) and to several conventions on climate change, biodiversity, land degradation and other environmental issues including the Kyoto Protocol.

### 1.1. Background

The Ghana Energy Commission's Strategic National Energy Plan (SNEP) 2006-2020 was to be adopted as the national energy policy in January 2006. SNEP 2006-2020 consists of three parts, namely the petroleum sector, the electricity sector and traditional wood fuels and renewables.

The current status of policy availability with respect to wood fuels and renewables (bio-energy) five years after the adoption of SNEP (2006 – 2020) which was stipulated to become effective is a draft national bio-energy policy submitted to parliament for approval. However, it has been shelved, therefore, there are no applicable laws governing investors and locals in promoting bio-fuels in Ghana. This puts Ghana behind policy wise and subsequently in terms of resolute measures to ensure energy security as well as mitigating climate change, a subject on which the country has signed on to a number of international conventions including the Kyoto protocol.

The process of land acquisition for cultivation of jatropha and other biofuel crops is not feasible in protecting the local right from the larger plantation giants. Currently, thirteen of the seventeen foreign companies involved in the cultivation of land for biofuel are into Jatropha cultivation (Schoneveld et al.,

2010). By August 2009, these companies collectively had access to 1,075,000 hectares of land, 730,000 hectares of which is located in the forest-savanna transition zone of central Ghana's Brong-Ahafo and Northern-Ashanti Regions. It is reported that, though almost half of the foreign companies involved in plantation development have planned to subsequently involve smallholders throughout outgrower agreements, these propositions are yet to be implemented. This position is aptly captured by a CEO of one of the companies as follows; '*It is important to first, establish yourself a market before committing anything to smallholders*' (Schoneveld et al., 2010). The expansion of plantations has come at a high social and environmental price. Large areas of forest land traditionally used by indigenous people have been expropriated and logging companies have often used oil palm plantations as a justification for harvesting timber (CICOL, 2010).

Ghana is not left out of the consequences of the new patterns of land use that come with the need for the cultivation of Jatropha for the purposes of biodiesel. An estimated 1,075,000 hectares of land is believed to be held by large-scale commercial bio-fuel companies in Ghana [Acheampong & Campion, 2014). Acheampong & Campion (2014) further espoused that all the bio-fuel plantations assessed in the central regions of Ghana - Brong-Ahafo and Ashanti, the acquisition of the lands necessitated that several households relinquish their landholdings for the purpose of plantation development. Furthermore, these affected households were not consulted by the bio-fuel companies. There was an instance in which an area of approximately 800 hectares was claimed by one company for Jatropha cultivation (from a 15,000 hectare lease). Acheampong & Campion indicated that an estimated 55 per cent of the land area was formerly under usufruct rights, forming part of a system of shifting cultivation, with the remaining land under secondary forest cover. About 70 households from three communities were involuntarily displaced from their lands without any form of compensation.

## 2. MATERIALS AND METHODS

The paper examined nine selected cases of biofuel projects in Ghana during the boom, bust and transformation of jatropha. The paper analyzed perspectives and challenges during boom, bust and land transformation and issues on local rights. These cases were selected for the following reasons: Firstly, all land deals were sanctioned by chiefs; Secondly, all the projects involved large-scale plantation models; Thirdly, all the project areas have a large number of migrants and minority indigenes who mostly have temporary land use rights either on family and individual land areas or on stool lands.

The research involved a two-month reconnaissance and preliminary fieldwork period and another two months for administering of questionnaires and interviews. To understand the dynamics of activities of chiefs in land deals and how these impacted on the rights of the communities, a total of three hundred and forty six respondents (346) were contacted. Two hundred and thirty four (234) respondents were administered with questionnaires; twenty four (24) were interviewed with a set of interview checklist and focus group discussions (FGDs) with respondents totaling eighty eight (88). During the detailed interview sessions, questions to further probe led to identification of some important stakeholders who played manipulative role in the traditional circles. The sample populations were residents and traditional authorities of communities affected by Jatropha cultivation (Table 1). These residents were involved in various livelihood activities, including workers of companies that had acquired land for Jatropha cultivation.

The first contacts were usually sub-chiefs, who prepared the grounds for meeting the divisional and the paramount chiefs, and community administrators, for example the assemblyman or unit committee chairman, who provided the initial list of possible community respondents. Subsequent respondents were identified by snow-balling among community members. This method was chosen, because the target respondents in each community were unknown, and snowballing provided a means of estimating the population of affected persons. Some of the checklist and questionnaire administrators were also chosen from these communities to be part of our group so that respondents felt comfortable speaking to the issues. The questionnaire administrators were given a general overview and purpose of the research and guided step-by-step through the checklist and questionnaire. Each person pre-tested a sample questionnaire in the local language, and the issues with translation were resolved at the community level. A list of questions for the various stakeholders was prepared and used as a guide. The interview responses were recorded on tape (mostly in vernacular) and later transcribed verbatim into English.

**Table 1: List of communities and the associated Jatropha companies with the respondents**

| Study communities | Numbers of respondents | Type/Category of respondent | Investor |
|---|---|---|---|
| Lolito | 50 | Farmers, Company workers, Chief, Farm watchman, Company workers | Biofuel Africa |
| Adidome/New Bakpa | 25 | Farmers, Company workers, Company Farm Manager, Chief, Company workers | Galton Agro Ltd |
| Old Akrade | 7 | Chief, Manager of Anuanom Industries, Company workers, famers | Annuanom Industries |
| Kobre | 62 | Farmers, Company workers, Unit Committee Chairmanm of Konkomba, Assemblyman, Odikro of Kobre, Okyeame of Kobre, Okyeame of Kojobofour, Unit Committee Chairman of Kojobofur | Kimminic Estate Limited |
| Bredie-Camp | 15 | Unit Committee Chairman, Okomfo of Bredie, (Link person to company), wife of affected Farmer, Migrant farmers at Camp | Kimminic Estate Limited |
| Kadelso | 56 | Farmers, Company workers, Assemblyman, Youth Chief, Company's Farm Manager, Company's Country Manager | Jatropha Africa |
| Ahenakom | 28 | Farmers, Company workers, Chief of Ahenakom, Village Elder, Company workers | Savannah Black Farming and Farm Mgt Ltd |
| Agogo area | 52 | Farmers, Company workers, Assemblyman, Affected farmers, Company's Farm Manager, | ScanFuel/ ScanFarm |
| Kpachaa area | 51 | Watchman, Chief of Kpachaa, Assemblyman, Landlord (Jurolana), Farmers | Biofuel Africa |

**Source: Field surveys, 2014**

## 3. RESULTS

### 3.1. Land Registration and Jatropha Boom in Ghana

Table 2 indicates Jatropha Investors in Ghana that have registered with the Environmental Protection Agency (EPA). Over 182,000 hectares of land have been acquired with the largest acquisition by Natural

African Diesel – that is, 50,000 hectares. The smallest registered Jatropha Investment was at Yeji, that is, 16.0 acres by Ohayo Ghana Foundation.

**Table 2: Registered Jatropha Cultivation Companies with the EPA**

| Name of Company | Project Description | Size of Land (Ha) | Location | Region |
|---|---|---|---|---|
| Scan Farm | Jatropha and oil palm plantation development | 20,000 | Agogo, | Ashanti Region |
| Ohayo Ghana Foundation | Jatropha Cultivation | 16 | Puriya-Yendi | Northern Region |
| Natural African Diesel (NAD) | Jatropha and moringa plantation development | 50,000 | Yeji | Brong-Ahafo Region |
| Bio–Fuel Africa Limited | Jatropha test farm and plantation project | 840 | Lolito, | Volta Region |
| Bio-fuel Solutions Ghana | Jatropha plantation | 12,000 | Woadze/ Goviefe Agbodome | Volta Region |
| Bio–Fuel Africa Limited | Jatropha plantation | 5,324 | Jimle | Northern Region |
| | | 3,562 | Kpalkori | |
| | | 3,000 | Yendi | |
| | | 5,000 | Kpachaa | |
| | | 4,000 | Gugoligu Sampino | |
| | | 2,000 | | |
| | | 10,000 | Kplatoli | |
| | | 6,876.45 | Yapei | |
| | | 10,000 | Gushiegu | |
| Jatropha Africa Ltd | Jatropha plantation | 50,000 | Kadelso | Brong-Ahafo Region |
| **∑ (Hectares of Land)** | | **182,618.45** | | |

***Source: Environmental Protection Agency (EPA, Ghana), 2010***

## 3.2 Jatropha boom and Land Acquisition in Ghana

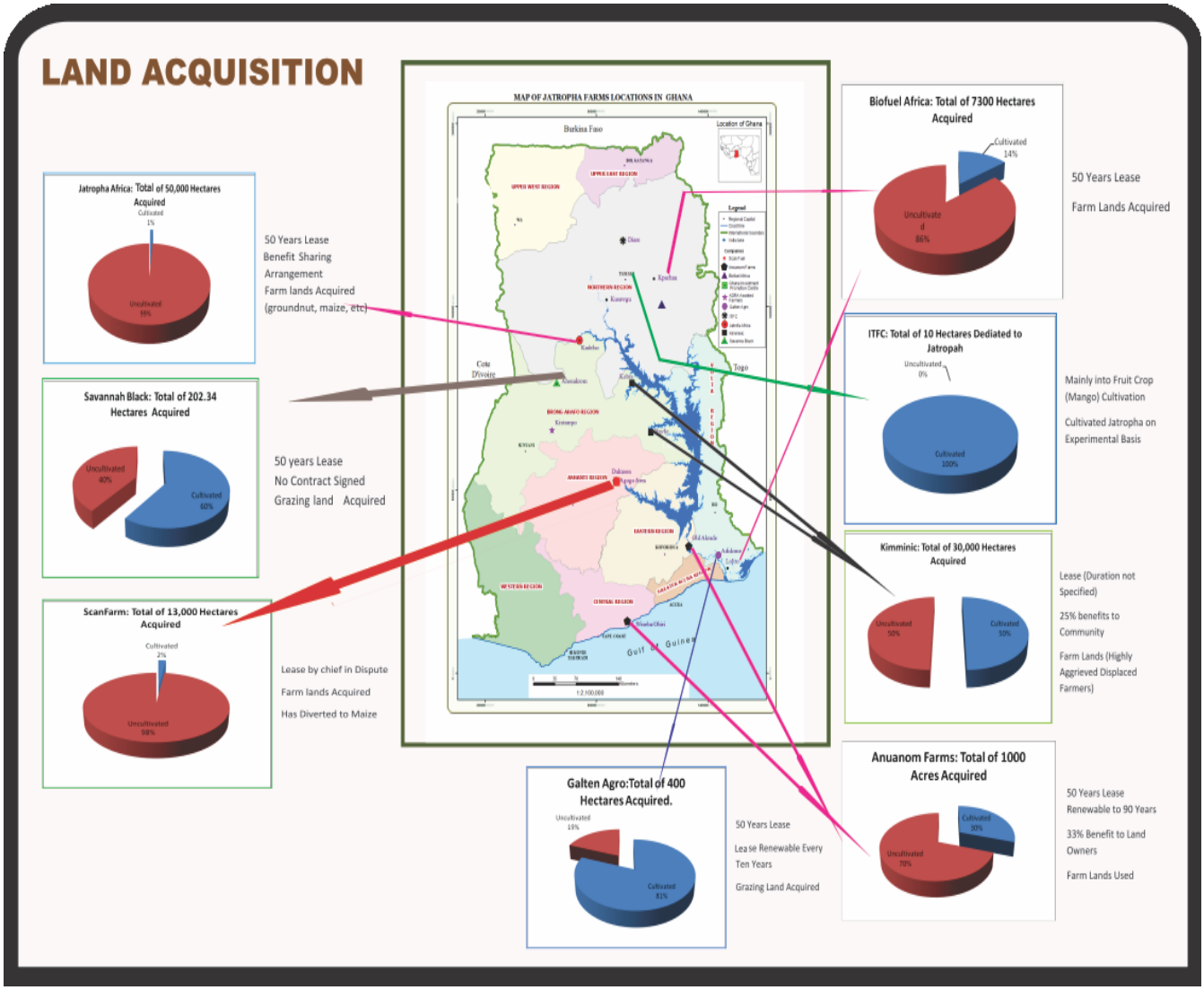
Table 3 captures the Jatropha companies found during the field survey. It also indicates the total areas they declared as having acquired and the areas they have cultivated thus far. A huge 90.25 per cent of lands acquired (as recorded during the survey) remain uncultivated, but are enclosed lands. A total of 84,102.91 hectares of land were acquired by the companies captured in the field survey (Table 3). Out of this area, 8,200.44 hectares were planted.

**Table 3: Areas of land acquired and actual areas of land cultivated for Jatropha plantations in Ghana**

| Name of Investor | Location/ Region | Year Established | Area of Land Acquired (Hectares) | Area of Land Cultivated (Hectares) |
|---|---|---|---|---|
| Savannah Black Farming and Farm Mgmt. Ltd | Ahenakom, Brong-Ahafo region | 2006 | 202.34 | 121.41 |
| Jatropha Africa | Kintampo South, Brong-Ahafo Region | 2007 | 50,000 | 202.34 |
| Bio-fuel Africa | Kpachaa, Northern Region | 2007 | 5,000 | 1,000 |
| ITFC | Tamale, Northern region | 2007 | 10 | 10 |
| Smart Oil | Yeji, Brong–Ahafo Region | 2008 | 50 | 50 |
| Kimminic | Bredie No. 1, Brong-Ahafo Region | 2008 | 12,140.57 | 6,070.28 |
| ScanFarm Ltd | Agogo, Ashanti Region | 2007 | 13,000 | 300 |
| Anuanom Farms | Old Akrade-Juapong, Eastern Region | 2006 | 404.70 | 121.41 |
| Galten Agro Ltd | Adidome, Volta Region | 2008 | 400 | 325 |
| Bio-fuel Africa | Lolito, Volta Region | 2007 | 2,300 | |
| **Total** | | | **84,102.91** | **8,200.44** |

Source: Field surveys, 2014

Figure 1 indicates the location and distribution of Jatropha companies captured in the survey. It also provides pie diagrams of areas cultivated in relation to land acquired but lying fallow; the type of lease agreement and its duration are also captured. There is a huge gap (90 per cent) between the areas of acquired land for the purposes of Jatropha cultivation and the actual land area cultivated.



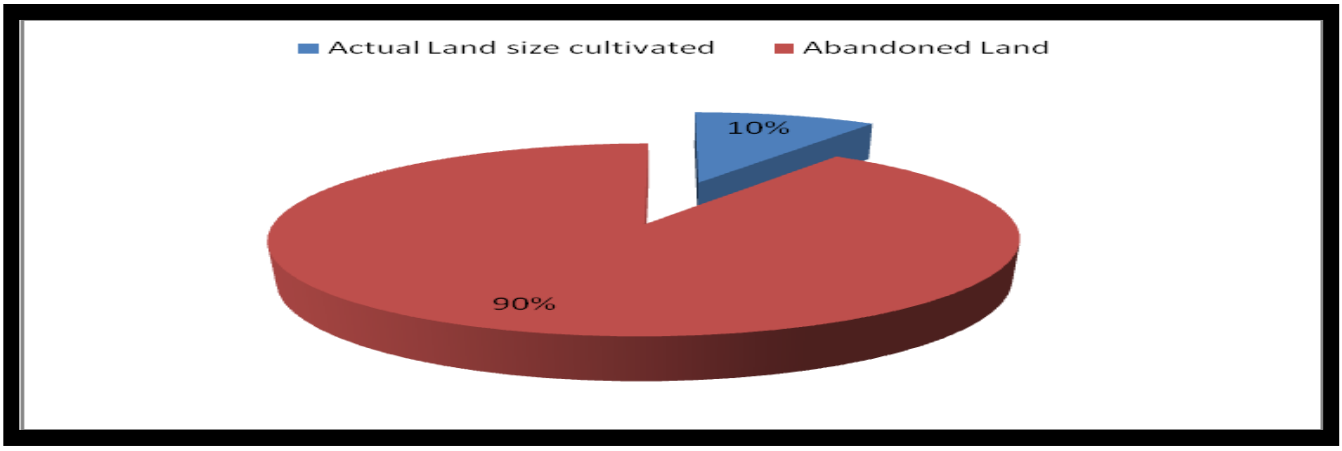




**Figure 1: Actual land size cultivated by Jatropha companies and abandoned land from 2006 to 2012**

Source: Field surveys, 2014

## 3.3 Abandonment, Transformations and Land Rights

The story of Jatropha investment in Ghana is a mixed one: whether they have folded up, been put on hold or totally closed down (Table 4).

**Table 4: List of functional and closed or halted Jatropha projects surveyed in Ghana**

| Jatropha Company | Functional | Hold Up/Closed |
|---|---|---|
| 1. ADRA Assisted Jatropha Farmers | × | √ |
| 2. Savannah Black Farms | × | √ |
| 3. Jatropha Africa | × | √ |
| 4. Smart Oil | √ | × |
| 5. Bio-fuel Africa | × | √ |
| 6. Kimminic Estate Company | √ | × |
| 7. Integrated Tamale Fruit Company | × | √ |
| 8. ScanFarm Ltd | × | √ |
| 9. Anuanom Farms | × | √ |
| 10. Galten Agro Ltd | √ | × |

Source: Field survey, 2014

Legend

√ - Reason Applicable × - Reason Not Applicable

Companies like Jatropha Africa as well as Bio-fuel Africa had to fold up because of various reasons (Table 5) of which the unavailability of funds to sustain their projects was a major factor. In the case of Bio-fuel Africa, the withdrawal of the Norwegian Partners and the company's inability to source for funds locally to sustain the project saw the abrupt discontinuation of an otherwise progressing Jatropha investment.

**Table 5: Reasons for Hold Up or Closure of Surveyed Jatropha Farms**

| Jatropha company | Reason(s) for fold up | | | |
|---|---|---|---|---|
| | Market Availability for Seeds | Source of Funding | Yield/Farm Practice | Poor Management |
| 1. ADRA Assisted Jatropha Farmers | √ | × | × | × |
| 2. Savannah Black Farms | × | × | √ | × |
| 3. Jatropha Africa | × | √ | × | × |
| 4. Bio-fuel Africa | × | √ | × | × |
| 5. Integrated Tamale Friut Company (ITFC) | × | × | √ | × |
| 6. ScanFarm Ltd | √ | × | √ | × |
| 7. Anuanom Farms | × | × | × | √ |

Source: Field survey, 2014

Legend

√ - Reason Applicable × - Reason Not Applicable

## 4. DISCUSSION

### 4.1. Jatropha Boom and Transformation in Ghana

Ghana's economy is significantly agricultural-based, as it forms part of the substantial sectors of the country. The rate of the country's economic growth seems to be linked to the performance of the agricultural sector. This observation is attributed to the following developments: in 1990, the GDP grew

by only 3.3per cent due to an agricultural growth rate of negative 2 per cent; but when in 1991 the GDP for agriculture grew by 5.8 per cent, there was a corresponding growth of 5.3 per cent by the entire economy. For a number of subsequent years, agricultural GDP growth rate had been under 5 per cent, and the GDP for the entire economy had behaved likewise, that is, had been 5 per cent or less (Asuming-Brempong, 2003).

From the 1980s and 1990s through to today, the liberalized market approach was adopted as a policy guide for the Ghanaian agricultural sector. This approach led to a structural adjustment of the agricultural sector with the support of the Bretton Woods Institutions. The liberalized market approach has had diverse effects on the output of the agricultural sector in Ghana. Examples of the effects of this policy intervention as revealed by Asuming-Brempong (2003) include "*the policy effects of agricultural activities on the environment such as the promotion of export commodities, the exploitation of timber and forest resources, mining, and indiscriminate sale and use of agro-chemicals in Ghana*". On the other hand, promoting cash and export crops through government policy incentives have improved rural incomes for farmers that cultivate such crops, and helped to reduce poverty among this group. In general, the policy effects on the roles of agriculture in Ghana have been mixed.

Owing to the fact that Jatropha production is agrarian in nature, it is only a matter of consequence that investments in this area, though a bit more diversified as compared to the cash crops and other agricultural products, will be equally affected by this policy position. It must however be noted that, the performance of the Ghanaian agricultural sector is not due to only the national policies but also international agreements. According to Faaij (2006), the EU currently produces a surfeit of comestibles; mainly on account of generous subsidies provided to European farmers under the Common Agricultural Policy (CAP). The original intention of the CAP was to boost agricultural outputs. However, indications are that, it has contributed to high prices of produce. This puts members of influential European farming lobbies at the advantage to secure ample income at the expense of a justly competitive agricultural market (Botterill, 2006). The funding of this widely criticized policy represents close to one (1) per cent of EU's GDP and guarantees a minimum price for crop producers (Faaij, 2006). The situation captured above will therefore put the Jatropha farmer in Ghana at a globally competitive disadvantage going by the CAP system.

Another important consideration by way of looking at the effects of developments in the agricultural sector on Jatropha production is the possibility of a large global demand for first-generation biofuels. In the event that this arises, it would mean that, immeasurable acres of arable land could be turned from use in foodstuff cultivation to the farming of cash crops to be sold to OECD countries for use in biofuel production (Anderson & Fergusson, 2006). Ghana as a largely agrarian economy would suffer a decrease in the reserve of available food at the national level. It would also lead to an increase in the prices of such food that finds its way to the local market (Runge, 2007). Agrarian-based economies like Ghana rely heavily on food produced either within the nation itself or in neighbouring countries. A large quantity is also imported. This often leads to an increase in national debt (Bourguignon, 2004).

Due to rising food prices and international conventions as well as national policies for alternative energy, the last decade has seen tremendous increment in the scope and scale of investments in land for the cultivation of food and biofuel crops (Deininger & Byerlee, 2011). According to Deiningr & Byerlee (2011), 56.6 million hectares of large-scale farmland deals have been announced between 2008 and

2009 – with more than 66 per cent of the area targeted by these investments located in Africa. This demand is estimated to be equivalent to more than 20 years of agricultural land expansion in Africa. Africa is progressively becoming an attractive destination for farmland investments due to its relative abundance of cheap and agro ecologically suitable land (FAO, 2009) and its increasingly liberalized trade and investment regime (UNCTAD, 2009).

Despite all these volumes of possible land-linked investments in Africa, the level of interest is not met with commensurate local policy environments to ensure equitable or sustainable land use. For instance, in Ghana, land acquisition, ownership and management accounts as one of the biggest hindrances to development. It is estimated that land disputes constitute a rather alarming figure of 50 per cent of all cases filed nationally (Aryeetey, 2007). Though there are laws, management adjudication and administration institutions, there seems to be no coherence in their roles. The overlaps and contradictions in these bodies have worked against effective land administration and related concerns.

### 4.2. Land Registration and Jatropha Boom in Ghana

A study conducted by Aryeetey (2007) led to the gathering of data, both primary and secondary, on the status of Jatropha investments among others. The study sites visited by the author provided a bird's eye view of the distribution of Jatropha cultivation in Ghana (Figure ). The Jatropha projects started taking off well in the country from 2005 - 2006 and reached its peak between 2007 and 2008. Eight out of the 9 companies captured in the field visit started their operations between 2007 and 2008. Cultivation then dipped from this peak season to a situation where no new projects have been initiated since 2010.

Data obtained from the Environmental Protection Agency (EPA) of Ghana as at November 2011 indicated that, a total of over 182,618.45 hectares of land has been acquired and subjected to the due processes of Environmental Impact Assessment (EIA) for the purposes of Jatropha cultivation. Natural African Diesel (NAD) is registered with the EPA as having acquired the largest area of land for Jatropha investment. However, the highest quantity of land acquired by a single entity for the purposes of Jatropha cultivation as verified during the field survey is by Bio-fuel Africa, with over 45,000 hectares of land acquired in the Northern Region and 840 hectares in the Volta Region. However, according to the EPA, not all companies operating in the country have actually undertaken the required processes of impact assessment of their Jatropha projects.

### 4.3. Jatropha boom and Land Acquisition in Ghana

Information from the survey conducted indicates that Savannah Black Farming and Farm Management Limited were incorporated by an American investor who through consultations with the Chief and people acquired 202.34 hectares of land at a 50 year lease in 2006. However, there is currently no written contract to that effect according to the chief of the town. About 121 hectares of the total land has so far been cultivated. According to the Chief and people of the village, the land that was acquired was not being cultivated by anyone. It was a grazing ground for cattle, sheep and goats. They had different land areas for planting food crops hence no one was affected. After the initial harvests, the investor returned and the farm has since been abandoned.

Jatropha Africa is a Ghanaian-British partnership that went into Jatropha cultivation in Kadelso in Kintampo North District of the Brong-Ahafo Region. The company acquired 50,000 hectares of land for a lease period of 50 years from the community based on a benefit sharing agreement which was reported differently by the Assemblyman and Elders of the community and the Farm Manager. According to the

Assemblyman and Elders, the agreement stipulated that, the community takes one-third of the returns from the project while the company takes the remaining two thirds. The contract presented by the Farm Manager however, stipulated that the community was entitled to four (4) per cent of the annual proceeds from the project. Of the 50,000 hectares acquired, only 202.34 hectares have been cultivated.

In the case of Bio-fuel Africa, it was gathered that the company effectively acquired a total of 7,300 hectares of land from the Volta and Northern regions of Ghana. In the Northern region, a land area of 5,000 hectares was acquired initially with plans to expand to 15,000 hectares. When the project started, an area of 3,000 hectares was cleared but the company ended up planting only 1,000 hectares. The company has since abandoned the plantation and rumours are that, the original Norwegian owners sold the company to another group because it was not profitable. The new company attempted getting a loan from banks in Ghana but did not succeed. They are currently conspicuously diverting to maize cultivation.

As at December, 2011, Kimminic Estate Company, a Ghanaian-Canadian company, was the only active Jatropha Company, which indicated they have been increasing the size of land under cultivation every year. At the time of the survey, the company has planted over 6,070 hectares of the total 12,140 hectares of land acquired. However, not all the land is dedicated to Jatropha cultivation. Some areas are used for growing soybeans as well as maize. The land acquired by Kimminic in Bredie in the Brong-Ahafo region was given out by the '*Nifahene*' (a sub-chief) with the consent of the Paramount Chief of Nkoranza. The land was acquired on a lease agreement where the community receives 25 per cent of profits. The lease however has no time limitation. The company also has a plantation in Kobre, also in the Brong Ahafo region.

ScanFarm, which was hitherto, ScanFuel, is now into the cultivation of other crops such as maize and soybean. ScanFarm Limited acquired about 13,000 hectares of land from the chief and people of the Agogo traditional area. The company abandoned its initial 300 hectares of the acquired land that were used for Jatropha cultivation. Large portions of this Jatropha area which are suitable for maize have been converted to maize production. Jatropha only remains on the unsuitable land.

Galten Agro Ltd happens to be one of the remaining and fully functional Jatropha farms in the country. Galten Agro Limited acquired 400 hectares of land from the Adidome area in the Volta region and has so far planted 325 hectares. The land was leased for a 50 year period subject to renewal every 10 years. The lands acquired were used mainly for grazing purposes and some small areas for maize, pepper and cassava cultivation. Their yield target is five (5) tons of seeds per hectare on the average. According to the farm manager, if pruning is done and cultural practices are good, one can harvest 526 fruits per plant. Thus, it is possible to attain the target. The company has a long-term target of producing biodiesel in Ghana in about 30 years. For this reason, they have acquired land in Tema. Currently, 30,000 hectares of land have also been acquired in the Brong-Ahafo region for seed production.

### 4.4. Abandonment, Transformations and Land Rights

Most of the investors have changed from Jatropha to produce other crops like maize, soy beans, mango and others. Based on this turn of events in the Jatropha industry, some communities such as Ahenakom in the Brong-Ahafo Region claim they will not release their land anymore for Jatropha cultivation but will rather cultivate food crops such as maize, since they have not benefitted from the cultivation of the

Jatropha. According to the EPA, some companies that registered for Jatropha cultivation such as Bio-fuel Africa have sent reports to the agency indicating their intent to divert to maize production. Also, some of the companies that have registered with the EPA concerning Jatropha cultivation are not operational. One of the main reasons why most of the Jatropha projects in the country have come to a standstill is the lack of a ready market for Jatropha in the country. For example, the Adventist Development and Relief Agency (ADRA) assisted Jatropha farmers to privately venture into Jatropha cultivation but all the farmers stopped because there was no market for the harvest. Even for the abandoned plantations, no one is harvesting because there is no market.

In an interview with officials of the Energy Commission, there were no incentives for Jatropha investors. The Commission was waiting for the policy frameworks of Renewable Energy Act to be completed so that they could provide incentives and promulgate the legal framework to guide the whole sector. However, currently, section 31 of the Renewable Energy Act, 2011, establishes a Renewable Energy Fund to provide financial resources for the promotion, development, sustainable management and utilization of renewable energy resources. This notwithstanding, the Ministry of Food and Agriculture (MoFA), one of the key sectors tasked with developing bio-fuels, hinted the survey team that they are contemplating changing focus on Jatropha, since they apprehend the possibility of most crop lands being diverted into Jatropha farming resulting in land use conflicts and food insecurity.

Many rushed into Jatropha cultivation with the assumption that the plant could do well irrespective of soil quality or proper agronomic practices as gathered during field interviews. Companies such as the Integrated Tamale Fruit Company (ITFC) and ScanFarm had to give up on Jatropha when their experimental farms showed it required good soil as well as proper tendering for maximum yield.

Another problem that bedeviled the Jatropha industry in Ghana was poor management. For example, the fold up of the Anuanom Jatropha farm was attributed mainly to poor management after the death of the founder. The successor did not keep to the earlier agreements made between the landowners and the company, and this led to the abrogation of the land contract. Also, Jatropha Africa's operations in Kadelso were also hampered by poor management, as company executives lived in Accra and the local farm manager had bad relationship with the workers.

### 4.5. Land Transformation and rights

The authors established an almost abandoned Jatropha sector during the survey in 2011 as established in the preceding sections. They again carried out a follow up survey in 2014 to determine the transformation that has taken place after abandonment. From the follow up survey, the Jatropha investments are almost fading out. In most cases, the lands are lying fallow with the companies still in possession of the lands. Some of the companies have diverted to other agricultural investments while others have left altogether. For instance, a shareholder of Jatropha Africa and a respondent indicated that, when the company went bankrupt, the new focus of the current shareholders is food production. Trials were therefore being carried out on planting maize.

The transformation that occurred in investments into Jatropha had its accompanying changes to land use but not to the ownership rights accrued by the investors. As a result, most of the lands lie fallow with only small sections being used for food crop cultivation. The companies still hold rights to the lands acquired though the lands are not being utilized for the purpose of their acquisition.

## 5. CONCLUSIONS

This paper establishes the decline of Jatropha investments and their impacts on local members. It also establishes the current transformation processes in the Jatropha space where communities may have access to lands, but solely for small scale food crop cultivation purposes. The knee jerk approach to Jatropha investments in Ghana led to the sudden boom and bust and the resultant land issues. In order to establish a more sustainable investment into Jatropha bio-fuel in a manner that will be both profitable and beneficial to local land use interests, the whole project must establish the following:

I. Field trials into the viability and yield of Jatropha on the soils of areas of interest
II. A thorough market survey; both locally and internationally
III. Stakeholder mapping and consultation as well as an environmental scan to establish a business model that looks at how various interests can be served; inclusion of smallholders, as opposed to the original solely plantation approach that was adopted during the boom

A key area to study is that of policy and its impacts on future investments in this area. Notwithstanding the general lack of a conducive policy environment during the boom and bust, the government's late effort at providing a conducive policy climate for bio-fuels led to the passing of the Renewable Energy Act in 2011; (ACT832). Within this Act, it is projected that, Ghana attains 10 per cent biofuels (biodiesel/bioethanol) in its energy mix by 2020. A new National Land use Bill, which is steadily on course and is due to be completed, as well as the Lands Administration Project (LAP-II), are expected to provide a convenient climate for Bio-fuel endeavours. With regards to a local market for biofuels, Act 832 requires the National Petroleum Authority (NPA) to ensure that bio-fuel petroleum blends become part of the list of national petroleum products. In light of current developments in the policy environment and based on lessons learnt from the rise and fall of the local Jatropha plantations, this paper proposes a look into the prospects for more sustainable Jatropha plantations; taking into account relevant policies, the best fit business models, market prospects, the potential of conflict free land acquisition and use as well as exploring opportunities to elicit government support for private sector led projects.

## 6. ACKNOWLEDGMENTS

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## 8. ADDITIONAL READINGS

In order to better appreciate the findings of our study, we recommend additional readings of the following publications:

Acheampong, E. & Campion, B.B. (2014). The Effects of Biofuel Feedstock Production on Farmers' Livelihoods in Ghana: The Case of Jatropha curcas. *Sustainability*, *6*(7), 4587-4607; doi:10.3390/su6074587

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## 9. KEY TERMS AND DEFINITIONS

**Jatropha boom**: used to refer to the period in which companies intensively acquired land areas for the cultivation of Jatropha. This period was characterized by a heightened global interest and preference of Jatropha as a bio-fuel crop.

**Jatropha bust**: used to refer to the period of substantial withdrawal of investments toward Jatropha cultivation. This was caused by the failure of Jatropha to meet global expectations as the best crop for bio-fuel production.

**Jatropha transformation**: used to refer to the period after the bust of Jatropha in which Jatropha lands were either abandoned or used for different purposes such as the cultivation of food crops. This period has been characterized by the lack of global interest in Jatropha as a source of bio-fuel.

**Jatropha:** a non-food crop believed to have originated from Mexico through the Olmeca people which is for medicine, housing, feeding animals amongst others. The crop later became the so-called 'wonder crop' for bio-fuel which is expected to substitute fossil fuel due to the consequences of climate change.

**Land:** any part of specified area on the ground defined by its boundaries and affected to a qualified activity.

**Large scale land acquisition**: any acquisition of land space covering an area of at least 50 acres.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest.