

Natural resources conflicts and the biofuel industry: implications and proposals for Ghana

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Abstract

*Africa has become an important target producer of the feedstock, *Jatropha curcas* L (JCL), for biofuel production. This presents opportunities for transforming production, markets and the well-being of farmers and rural populations in developing countries, if deals are well-structured. The history of natural resource use conflicts in Africa has important implications for understanding current resource ecology and the social and political relationships within it. Ghana has had varying resource management regimes in its history. This paper seeks to relate the history of Ghana's natural resources conflicts to the current rush for lands in Ghana for cultivation of JCL and to discuss its implications and opportunities for a sustainable JCL industry in the country. The colonial and postcolonial land conflicts and politics and the current and potential conflicts and opportunities associated with the JCL industry are presented. The paper offers suggestions not only for a sustainable cultivation of *Jatropha*, but also for a biofuel policy in Ghana.*

Keywords: *Biofuel; natural resources conflicts; land grabbing; *Jatropha curcas*; Ghana.*

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Introduction

Recent global rise in food and financial crises, climate change and opportunity for carbon trading, rapid increases in fossil fuel prices and the unpredictable supplies of oil due to instability in the Middle East and other production centres have been the bane of most high energy consuming countries. To address these concerns, biofuels from plant sources are being promoted and large tracts of land are being acquired to grow biofuel crops. Africa has become an important target producer of the feedstock, *Jatropha curcas* L (JCL), for biofuel production. There is no doubt that biofuels present promises as well as challenges to many developing countries. They present an opportunity for investments in agriculture, thus tapping the huge potential existing in many developing countries. If deals are well-structured, the JCL industry will be an opportunity for transforming production, markets and the well-being of farmers and the rural population. However, concerns remain over the impact on local communities, food security, the environment and, more importantly, issues of land use conflicts.

Conflict is an emotive term and most definitions connote disagreement due to differences in interests, values, perceptions, positions, power and goals (Daniels & Walker, 2001). According to Glasl (1999), differences are normal aspects of human life and cannot be equated to conflict. He asserts that conflict only occurs if an actor feels "impaired" by the behaviour of another actor because of the differences. The feeling of impairment or restriction is therefore a prerequisite for conflict and not differences. It is also widely agreed in conflict literature that natural resources conflicts are unavoidable, particularly because stakeholders have different competing interests, perceptions and ideas about their use and management (Ayling & Kelly, 1997; Ostrom, 1990; Hellstrom, 2001; Adams, et al., 2003). Although conflict is generally experienced as something destructive, it may nevertheless sometimes be positive (Bonacker, 1996; Bailey, 1997; Kriesberg, 1998) and become the driver of change that ensures sustainable management of resources. It is therefore important to perceive and deal with natural resources conflicts in a constructive manner, instead of ignoring them or simply trying to stop them.

Conflicts in the JCL industry may emerge because people have different uses for resources such as existing forests, water and land, or want to manage them in different ways. There are also social, economic and cultural attributes that may arise as a result of the continual (non)use of these resources or an attempted change or conversion from one form to another or to JCL production. The conflicts related to JCL as discussed in this article relate to land acquisition, production and land use change associated with its cultivation. The purpose of this paper is to relate Ghana's natural resources

conflict history to the current rush for lands in Ghana for the cultivation of JCL, and to discuss its implications and opportunities for a sustainable JCL industry in Ghana.

The next section of the paper describes the agro-ecology and history of natural resources conflicts in Ghana. This is followed by a review of the JCL industry in Ghana along with the sources of conflicts or potential conflict issues in the sector. The subsequent section appraises the risks and opportunities presented by the burgeoning JCL industry within the context of conflict prevention and management through active cooperation, dialogue and community economic empowerment. The last section concludes the paper, highlighting value creation and benefit sharing by all stakeholders as the unassailable principles for equitable natural resources use, especially in the biofuel (JCL) industry.

Environment and natural resources conflicts in Ghana

Ghana is characterized in general by low physical relief. The terrain is primarily composed of a series of plateaus at different elevations, ranging from sea level to the highest point of 880 m above sea level at the peak of Mount Afadjato. There are, nonetheless, four distinct geographical regions. Low coastal plains stretch across the southern part of the country. To their north lie three regions: the Ashanti Uplands, the Akwapim-Togo Ranges, and the Volta Basin. The fourth region, the high plains, occupies the northern and north-western sector of the country.

Generally, rainfall in Ghana decreases from south to north. The wettest area is around Axim in the southwest where annual rainfall is about 2100 mm. Here, two rainy seasons occur: the first from April to July and the second from September to November. On the contrary, in the north, there is only one rainy season beginning in April and ending in September and the total annual rainfall is less than 1100 mm. The harmattan, a dry desert wind, blows from the northeast from December to March, lowering the humidity and creating hot days and cool nights in the north. Average temperature ranges between 24 and 30 °C. About 65% of the land area of Ghana is believed to be agricultural land out of which only about 11% is under permanent cultivation (Table 1). There are six agro-ecological zones in the country which, more or less, follow the north-south climate profile. These agro-ecological zones range from the Sudan Savannah in the north to the coastal Savannah in the south as shown in Table 2. Cereals, e.g. maize and sorghum, are common in northern Ghana and root crops, e.g. cassava, are common in southern Ghana.

Table 1. Landuse characteristics of Ghana (World Bank, 2010)

characteristic	Proportion
Surface area (sq. km) in Ghana	238540
Agricultural land (sq. km) in Ghana	148500
Agricultural land (% of land area) in Ghana	65.3
Permanent cropland (% of land area) in Ghana	10.6
Arable land (hectares per person) in Ghana	0.2
Arable land (hectares) in Ghana	4100000
Arable land (% of land area) in Ghana	18.0
Forest area (% of land area) in Ghana	23.2
Forest area (sq. km) in Ghana	52862

Table 2: Agro-ecological zones of Ghana and the associated dominant crops (Dazé, 2007).

Zone	Rainfall (mm)	Proportion of land area (%)	Length of growing season (days)	Dominant land use system	Main food crops
Sudan Savannah	1000	1	150-160	Annual Food crops	Millet, sorghum, maize
Guinea Savannah	1100	63	180-200	Annual food and cash crops, livestock	Sorghum, maize
Transitional Zone	1300	28	varied	Annual food and cash crops	Maize, roots, plantain
Deciduous Forest	1500	3	Major: 150-160, minor 90	Forest, plantations	Roots, plantain
Evergreen rainforest	2200	3	Major: 150-160, minor 100	Forest, plantations	Roots, plantain
Coastal Savannah	800	2	Major: 100-110, minor:50	Annual food crops	Roots, maize

The history of natural resources use conflicts in Ghana has important implications for understanding current resource ecology and the social and political relationships within it. The coping strategies to emerging conflicts are often based on this history or experience of the people. In the pre-colonial era, natural resources management in Ghana was through local traditions, with the chief or clan head at the pinnacle of decision making. There was relative harmony in this approach because of resource abundance and low population densities. The early history of formal natural resources policy in most countries in Africa has been deeply influenced by the history of colonialism (Wardell, 2005). In Ghana and other British colonies, governments expropriated and gazetted various natural resources to ensure a continued supply of resources to support British industries with little or no acknowledgement of local arrangements (McGregor, 1991; Wardell, 2005). Land, forest and minerals were sectors most affected by colonial interests. The long history of exclusion and expropriation resulted in the alienation of people from their rights to, and responsibilities for natural resources. Large tracts of land were compulsorily acquired by the state or designated for various land uses against the will of the people. Most land related conflicts therefore have this historical background.

The control over natural resources was also a main part of the independence struggles. For example, the Aborigines' Rights Protection Society was formed by traditional leaders and the educated elite to protest the Crown Lands Bill of 1896 and the Lands Bill of 1897 that threatened traditional land tenure, and later became the main political organisation that led organised and sustained opposition against the Colonial Government (Nti, 2002). After independence, there was a transfer of all state properties vested in the Governor General to the President. The national elections after independence had natural resources undertones and threatened to divide the country. After accusing a rival political party of receiving revenue from chiefs with rich land areas, the government of the Convention People's Party (CPP) enacted the Ashanti Stool Land Act and the Akim Abuakwa (Stool Revenue) Act in 1958 to manage the Ashanti and Akyem lands. By this arrangement, the legal interest in the Ashanti and Akyem lands went to the government whilst the beneficiary interest went to the community. In practice, however, the government had become the absolute landlord and had all the management powers, including the collection and distribution of revenue to the exclusion of all others. The vesting powers were subsequently extended to cover the rest of the country by the Stool Lands Act 30 of 1959, the Stool Lands Act 27 of 1960 and the Administration of Lands Act 123 of 1962 (Kasanga & Kotey, 2001). Although protests were often made by farmers to the District Commissioner, political pressure was used to let farmers abandon the fight to regain their land. After the CPP government was overthrown the Lands Commission was created to curb the excessive abuse of state power in respect of land administration.

Land tenure and related conflicts differ significantly in Northern Ghana from those of Southern Ghana described above. Northern Ghana is that area of present day Ghana which from 1898 was administered by the Colonial Government as the Northern Territories (NT) of the Gold Coast, and whose limits were defined in Her Majesty's Order in Council of 1901. According to post independence demarcations, Northern Ghana refers to that part of Ghana covering the Northern, Upper-East and Upper West Regions. By the turn of the 19th century, a consensus had emerged among policy makers that the NT were lacking in natural resources and that it was therefore a waste of money to invest in the region. The Colonial Government therefore urged that expenditure be confined to the smallest amount consistent with the maintenance of British rights there until their value was more fully ascertained (Benning, 1975; Sutton, 1989; Cleveland, 1991).

Although the notion of private and communal land tenure existed and inhabitants usually had clear ideas about their boundaries, whether inhabited or not, the administrators assumed that uninhabited areas in the north had no owners. In 1923, Guggisberg, the then Colonial Governor, empowered the government to acquire any land which it required for public service without any compensation to the owners. This government control of land reached its peak in the NT when in 1927 all lands in the North were expropriated, having been declared public lands to be controlled by the Governor and administered for use and benefit, direct and indirect, of the natives (Larbi, 1995).

Also, the policy of amalgamation was instituted in the NT to make colonial administration of the vast area easier. Some chiefs were propped up and given special powers to oversee large areas. These 'paramount' chiefs therefore ruled over several ethnic groups which hitherto were independent or paramount according to their customs (Benning, 1975). Long after independence, some of these colonially empowered paramountcies have still maintained jurisdiction over such areas and management functions of land was delegated to and monopolised by the Lands Commission and its regional secretariats. Under the 1979 (188) and 1992 (257) Constitutions of Ghana, all northern lands divested by the state were returned to their original owners. Though progressive, the divesting clauses did not embody any safeguards as to the position of formerly encumbered state acquisitions and the identity of the allodial landowners. This has been a source of conflict between landowners and the state and among community members in respect of rival claims to same lands.

Implications of the history of natural resources conflicts on the *Jatropha* industry in Ghana

In Ghana, the *Jatropha* industry has been developed ahead of any policy framework on biofuels. Large tracts of land are being acquired by both local and international investors in the wake of the biofuel craze. It is estimated that a total of 769,000 hectares of agricultural land has been acquired by foreign companies mainly for agrofuels production (Friends of the Earth, 2010; Food Security Ghana, 2010). The predominant conflicts reported thus far are related to land (Ansah, 2009; Browne, 2009; Kolnes, 2009; Lane, 2009; Public Agenda, 2009). Land as a form of capital is a very important resource and manifests itself in all the forms or expressions of capital of the people of Ghana. It is this strong attachment to land that makes it a likely source of conflict in Ghana. The Constitution of Ghana allows the management of land by the stool and landowners. Therefore, these people can lease their land to investors for any purpose in as far as the specific customary arrangements are complied with. However, most of these stools and landowners do not have the capacity to manage or even get the optimum conditions from the lease of their land. Following these concerns, the Civil Society Coalition on Land (CICOL) took up the challenge to persuade the government to accelerate reforms in the land sector. This is because the commodification and privatisation of land and the dispossession of farmers and herders is seldom taken into account in the boardrooms of corporations or in high-level meetings with governments (Peters, 2004).

Within the short span of the JCL industry in Ghana, various conflicts and potential conflict issues have been reported or are being envisaged between the different stakeholders (Table 3). The identified stakeholders are as varied as the conflict issues. Current reported conflicts are predominantly between farmers, JCL companies and chiefs. The conflict issues are numerous and diverse and may be one to several at a time in a particular location. In conflict situations, the manifestation of the conflict depends on the actors involved. The main actors in JCL-related conflicts tend to include farmers, JCL companies, workers, landowners, governmental and non-governmental organisations, and the conflicts manifest in different ways (Table 4). For example, whilst the academia may battle with conflicts in academic journals through publications, farmers, land owners and JCL companies may go up in arms against each other or end up in the courts over protracted land disputes. There are reported cases of conflict escalation to all the different levels. However, the commonest are various forms of access restriction as in picketing of companies, road blockading/closing (e.g. JCL company premises or farm roads), removal by force, eviction, forced resettlement, displacement, relocation by force, destruction of farms by JCL companies, and invasion by landless farmers.

Table 3. Stakeholders and the conflict issues in relation to the JCL industry in Ghana

Real or potential conflicting parties	Conflict issue or nature of the conflict	Examples reported in the media
Farmers, other community members vs JCL companies	<ul style="list-style-type: none"> • low or no compensation to farmers who have been evicted • inaccurate or misunderstanding on boundaries • companies developing roads or pathways or access routes and placing restrictions on use of such facilities. Farmers are likely to lose access routes to their farmlands or other places of interest • JCL companies often constructing dams on streams or digging waterholes for irrigation. Likely conflicts are access to and use of such water by community members, especially with already existing streams that community members used • demands for jobs • demands for developments • unionisation of workers into labour groups and demands for better wages and conditions for workers • stealing or illegal entry or trespassing on company property 	<p>1) According to a report by ActionAid Ghana and FoodSPAN in four regions in Ghana, community members in Bredi Camp, Brong Ahafo Region, complain of expropriation of their farmlands for jatropha production without consultation by either the biofuel company or the chief and no compensation was paid. Other complaints included import of labour and high turnover rates. [The Chronicle, March 18, 2010: Massive Jatropha Farming Threatens Food Security. http://allafrica.com/stories/201003180794.html]</p> <p>2) The people of Kpachaa, a village in Northern Ghana, are losing land to BioFuel Africa (Norway). Among their concerns is that the company has failed to deliver on promises of good, well-paid all-year-round jobs for villages, improved infrastructure, and assistance to modernise farming and increase productivity. (Daily Graphic, November 2, 2010: Land grab at Kpachaa – one more bad example from Ghana. http://farmlandgrab.org/post/view/16917)</p>
NGOs/civil society organisations and JCL companies	<p>Several NGOs and civil society organisations have taken interest in Jatropha cultivation in Ghana. Issues of contention include:</p> <ul style="list-style-type: none"> • scale or size of land being acquired at various communities; • compensation and mode of negotiation and acquisition of land; • social responsibility agreements and the capacity of community members alone to negotiate fair agreements • claims on usefulness of Jatropha to communities and local economy • effects of Jatropha cultivation on food security health effects and effects on soil fertility and other crops 	

Real or potential conflicting parties	Conflict issue or nature of the conflict	Examples reported in the media
NGOs/civil society organisations and landowners	<p>The system of customary land ownership gives room for land owners or custodians e.g. chiefs to negotiate directly with investors and to influence land use. Possible issues of contention are:</p> <ul style="list-style-type: none"> • types, timing and quantum of compensation payments • capacity and mode of negotiation by landowners and chiefs • terms and duration of the lease/sale • social responsibility agreements <p>distribution or use of proceeds from lease or sale of land</p>	<p>3) This publication describes the different protests and controversies on Jatropha. Examples from different communities, companies and civil society organisations are provided (Jatropha biofuel push in Ghana runs up against protests curled from http://www.trust.org/alertnet/news/jatropha-biofuel-push-in-ghana-runs-up-against-protests. Last accessed 3rd October, 2011)</p>
Landowners and farmers/youth groups	<ul style="list-style-type: none"> • loss of farmlands or other communal lands • information flow and mode of execution of compensation payments • non-involvement and distrust in the capacity and mode of negotiation by landowners and chiefs • lack of information on terms and duration of the lease • lack of information on the existence or details of social responsibility agreements <p>lack of information on amount of money received, acreage sold or distribution or use of proceeds from lease or sale of land</p>	<p>4) This report describes the state of the Jatropha industry in 12 communities in Ghana. There is a general feeling of dissatisfaction among community members about the operations of the companies. (Ghana: Massive Jatropha Farming Threatens Food Security, 18 March 2010 at http://allafrica.com/stories/201003180794.html . Last accessed 3rd October, 2011)</p>
Between government agencies/organisations	<p>The Ministries of Agriculture, Energy, Lands and Natural Resources etc. all have interests in the Jatropha industry. Possible conflicts may arise from each ones' quest for absolute or supreme jurisdiction over JCL companies.</p>	<p>5) This publication states that foreign investors' lack of familiarity with local customs and systems of land rights stoke tensions with the indigenous population (Jatropha in Ghana: right or wrong? September 12, 2010 http://www.hurriyetdailynews.com/n.php?n=jatropha-in-ghana-right-or-wrong-2010-09-12. Last accessed 3rd October, 2011)</p>

Real or potential conflicting parties	Conflict issue or nature of the conflict	Examples reported in the media
Between farmers or community members	<p>Large tracts of land are being acquired for Jatropha plantations. Also if prices are good, farmers will expand their farm lands or convert from existing crops to Jatropha cultivation. Possible conflicts will be over:</p> <ul style="list-style-type: none"> • reduced land area per person or landlessness of younger new farmers; • pilfering of other farmers food crops because of food shortages; • social unrest due to sudden immigration of people into communities and threats to the local culture 	6) It is also reported that most deals between the companies and landowners are not transparent. Foreign companies also use Ghanaians as front persons in the land acquisition to overcome some of the clauses in the land laws of Ghana (Land grab: owners have plenty needs, little capacity. Daily Graphic, 18 June 2011)
Between JCL companies	<p>If farmers or independent producers go into Jatropha cultivation, possible conflicts will be in:</p> <ul style="list-style-type: none"> • setting prices of products from independent producers • land acquisition and boundaries especially in contiguous areas • stealing of technologies • varying quality standards and problems of agreeing with common standards • wages to be paid workers • cross mobility of staff and leakage of company secrets 	

Table 4. Potential forms or trajectory of escalation and manifestation of biofuel related conflicts

Stage	Manifestation
1. Feeling of anxiety	complaints, rumours, anger, discontent, disagreement over decisions/issues
2. Debate and critique	Open debates, verbal clashes, accusations, quarrels
3. Protest and campaigning	Demonstration and protests by local groups, environmental groups, media campaign, letter-writing campaigns, protests against a particular plan
4. Access restriction	Picketing of companies, road blockading/closing e.g. JCL company premises or farm roads, removal by force, eviction, forced resettlement, displacement, relocation by force, invasion by landless farmers
5. Arbitration by chiefs, assemblymen	Complainants bring case before chiefs for arbitration
6. Court	Case is brought before the district magistrate courts and may end up in the higher courts
7. Intimidation and physical exchange	Threat, death threats, intimidating, confiscation of machinery, killing, injury, shooting, ambushing, violence clashes, bandit attack, police arrests, use of soldiers
8. Nationalization and internationalization	Protest in national and international media (e.g. newspapers, magazine, video) and via social networks such as facebook

Source: Yasmi, 2007

Jatropha production: risks and opportunities

Potential risks and likely implications

The land use change resulting from a possible change to or increase of biofuels is one of the biggest challenges or potential conflicts associated with JCL cultivation (Planning Commission of Government of India, 2003; International Energy Agency, 2004; Lapola et al., 2009). Due to similar ecophysiological and climatic requirements of both JCL and food crops, potentially high JCL productivity will go hand in hand with high food crop productivity. Thus JCL plantations in high productivity sites may have the undesirable effect of displacing or replacing food crops (Ariza-Montobbio et al., 2010). According to the International Energy Agency (2004), a 10% substitution of petrol and diesel fuel would require about 40% and 38% of current cropland area in the United States and Europe respectively. Another report by Westcott (2007) presents a rather dire situation that, devoting all corn and soybean acreage in the US to ethanol and biodiesel production would offset only 12 and 6% of gasoline and diesel consumption for transportation fuel respectively. Use of so much land to meet a relatively small share of transportation fuel demand is improbable if not unreasonable.

Another area of conflict is the perception of pro-biofuel companies and governments that wastelands will be used for the cultivation of JCL (Planning Commission of Government of India, 2003). Even the very concept of wasteland has been a source of conflict in some parts of the world (Ariza-Montobbio et al., 2010). Wasteland has very different connotations depending upon whether one is thinking in fiscal, social, or agro-ecological terms. The economic connotation originated during the colonial period, when the term was applied to all land that did not generate revenue for the British government. Whilst the economic connotation may be technically dealt with, culturally, there is no wasteland in many parts of the world (JA & UNAC, 2009; Simply Green, 2009). In Ghana, the Environmental Protection Agency mandates that land not suitable for food crops be used for JCL. However, this requirement has not been adhered to. *Jatropha* might indeed grow on marginal or wasteland, but it is not clear that seed quality and yields would be sufficiently high, or that available plots would be sufficiently large, to make growing economic. If *Jatropha* is planted on slightly better land, it does better and begins to compete with other cash crops, such as maize, sugarcane, and coffee for the land resource (Weyerhaeuser, et al 2007). Investors know this and are interested in high yields and have usually gone for fertile agricultural lands.

Another land use concern is the potential impacts on soils and local biodiversity. JCL being an exotic species in most actual growing areas, the

impact of land use change on biodiversity is expected to be negative, although this will largely depend on the mix of land use which is replaced by JCL and on how JCL is cultivated (Impact will be especially negative when (semi-)natural systems such as dryland forests are cleared. Also, the allelopathic effects of JCL on native vegetation, if it so exists, is not quantified. No information is available on nutrient cycles and the impact on soil biological life (Achten et al., 2008). Very little is known about acidification, eutrophication and other unmentioned impact categories of the JCL production cycle. The impact of JCL cultivation on biodiversity will also heavily depend on the applied cultivation system and intensity. Heavy machinery and high fertilizer application are expected to be the main drivers towards a negative impact, but this is not yet investigated.

The use of the inedible oil as domestic fuel and pressed cake as soil fertiliser, micro-finance schemes and the provision of small-scale farmers with alternative income has been very much publicised (New Agriculturist, 2007; Green Grants, 2009). In contrast to the above, Ariza-Montobbio et al. (2010) argue that despite JCL being presented as a 'pro-poor' crop, the results show a bias towards big farmers. Under the existing JCL farming regimes, the by-products are kept under private companies' control in industrial centres, and the oil extraction is highly centralised. Therefore, while small-scale JCL production may be a sustainable solution for rural communities, it is the large-scale corporate production that threatens to upset the delicate balance farmers face in providing both income and food by adopting JCL (Green Grants, 2009). Therefore, for the large oil companies, building or buying biodiesel from a few 100,000 ton refineries is not likely to make economic sense. Similarly, a model where scattered small-scale JCL producers each produce a few tons of JCL seeds on scattered marginal land is not likely to be financially feasible for downstream processors (Weyerhaeuser et al., 2007).

The increased cultivation of JCL as biofuel feedstock can displace other food crops and increase global prices of these crops. This may result in the clearing of wilderness, forest and grassland in order to grow these displaced and increasingly profitable crops (International Risk Governance Council, 2008). The diversion of edible crops from food markets to bioenergy production has already resulted in increased competition for agricultural land and led to concerns about impacts on food prices. In a study in India by Harrison et al. (2009), contrary to common claims that JCL does not displace or replace food crops, households were previously cultivating food crops in the plot in which they began JCL cultivation. Furthermore, in half the sample, the JCL plot covered more than 50% of the total landholding of the household, making a major dent in the previous food production of the household. Thus, if not properly managed globally, additional expansion of the use of agricultural crops for bioenergy could further worsen global food security, which is already at risk due to population and consumption growth

requiring more food and more energy (Pimentel et al., 2007; Gerbens-Leenes et al., 2009).

JCL seeds and oils are toxic and the implications to human health and work environment are being questioned. The fruits contain irritants affecting pickers and manual dehullers. Accidental intake of seeds and/or oil can cause severe digestion problems. Whilst Horiuchi et al. (1987) and Hirota et al. (1988) suggest that JCL oils promote skin tumours, Lin et al. (2003) and Luo et al. (2006) showed that the oil rather has anti-tumour effects. Therefore, for safety reasons, intercropping edible crops with JCL is considered risky. Also, the use of the seed cake as fertilizer in edible crop production raises bio-safety questions. Gressel (2008) warns that there is a serious lack of information about the effects of burning JCL oil in closed quarters, which is an important human health issue as the oil is proposed as a cooking fuel as well as a feedstock for bio-diesel production. The call is also made for precaution in the use of accessions with high initial phorbol ester content since available extraction procedures for the removal of the phorbol esters are insufficient to bring those accessions to acceptable toxicological levels.

A successful JCL industry will involve building institutions that facilitate the relationship between the smallholder farmers upstream and the oil and biodiesel processing industries downstream (Weyerhaeuser et al., 2007). Apart from the economic contractual arrangements, for most communities, it is a form of social and cultural contract because of the changes that take place in their way of life. In a research conducted by Ariza-Montobbio & Lele (2010), the failure of JCL to perform anywhere close to the hype and expectations raised by government agencies and private companies is already a source of conflict. Furthermore, companies have now abandoned the buyback contracts they had signed with the JCL farmers. This has also affected social relationships. For example much greater conflict ensued between farmers and local promoters of JCL who were scorned by the adopters as responsible for the loss in livelihoods.

To be a viable substitute for fossil fuel, an alternative fuel should not only have superior environmental benefits over the fossil fuel it displaces, be economically competitive with it, and be producible in sufficient quantities to make a meaningful impact on energy demands, but it should also provide a net energy gain over the energy sources used to produce it (Hill et al., 2006). The two main biofuel options presently considered are ethanol (from fermentation of carbohydrates) as a substitute to gasoline, and vegetable oils (biodiesel) to replace diesel fuel. Besides the uncertain reduction of emissions, there are concerns about the extent of land necessary to cultivate these crops in order to produce a significant substitution of fossil fuels (Lapola et al., 2009). Also, policies need to be clear and protect various interest groups. In various places, the industry has never taken off because

upstream, smallholder farmers are unwilling to take on the risk of paying for, planting, and maintaining JCL trees unless they have a secure source of demand in 3-5 years when their trees begin to bear seeds. Downstream, refiners are unwilling to make longer-term investments in refining capacity unless they have a secure source of adequate supply, which they will not have for 3-5 years.

A changing climate and a lack of water, compounded by the corporate acquisition of arable land, leave Africa's subsistence farmers in a tenuous position. These issues have to be taken into cognisance when drafting national policies. Current or potential future conflicts will arise from these environmental changes. As the various countries move forward in developing their biofuel investment policies, various organisations are advocating for the inclusion of policies that protect rural farmers from displacement, preserve subsistence farming, and find small-scale ways to create economic opportunities around biofuels. Already demands are being made by agricultural associations and environmental groups for the review of land allocation made for JCL cultivation in Kenya and Tanzania. The governments are under pressure to reverse decisions of allocation of fertile lands in prime areas (Green Grants, 2007; Browne, 2009; Simply Green, 2009).

Potential opportunities and suggestions

Despite the above fears and findings in other parts of the world, the JCL industry presents great opportunities in Ghana. Ghana has 65% of the land area being agricultural land with only about 10.6% being permanently cropped (World Bank, 2010). This makes Ghana an opportune place for the JCL industry. However, agriculture employs 60% of Ghana's work force, mainly small landholders and about 90% of farm holdings are less than 2 hectares in size (Ministry of Food and Agriculture, 2007). The rural population in Ghana accounts for a majority of the poor and food insecure people in Ghana. They depend on the land for their livelihoods and food security and therefore loss of arable land is likely to have a major negative impact on the rural people. These farmers have limited education and alternative employable skills and thus are very vulnerable to shocks related to agriculture (external or internal; natural or man-made).

As of August 2009, 1,075,000 hectares of land has been acquired for various agricultural investments, mainly in JCL (Schoneveld et al., 2010). The fear is that, these large scale land acquisitions may not necessarily lead to a spill-over effect or increased economic activities in other sectors or massive job creation for local communities. The benefits to the local communities will depend on the general economic conditions and how deals are planned,

designed, implemented and managed. If designed within the context of rural development and “stakeholder” economic empowerment, JCL is likely to produce a win-win outcome for investors and host countries in the long-term (von Braun & Meinzen-Dick, 2009; Schoneveld et al., 2010; Cuffaro & Hallam, 2011).

In this regard, an issue of overriding importance is the land tenure system in Ghana. The land tenure system in Ghana is complex and flexible and provides ultimate rights of control to chiefs or landowners (not to cultivators) who allocate land through various mechanisms (Kasanga and Kotey, 2001). Many farmers therefore have no rights of control over, or priority for allocation of land their families have farmed over generations, a situation which affects their ability and incentive to invest in the land in the long-term (Cuffaro & Hallam, 2011). Goldstein and Udry (2008) observed that individuals who hold local social or political office have more improved security of tenure over plots they cultivate than non-office holders. This system of customary land ownership gives room for land owners or custodians (e.g. chiefs) to negotiate directly with investors and to influence land use without prior notice, consent or knowledge of the local people or even the government. This has implications for the quality of contract, social responsibility agreements, rights and access to land by the local communities and land use planning.

Unfortunately, these chiefs or community members (smallholders) sometimes lack not only knowledge about these land investments but also more importantly, the expertise to effectively negotiate favourable terms with such powerful national and international actors, or enforce agreements if the investor breaches the terms of the contract (von Braun and Meinzen-Dick, 2009). The balance in these negotiations is usually tipped in favour of the foreign firm also because of the support from host states or local elites who infiltrate the process. Most land owners view the involvement of CICOL as an opposition to their progress rather than a fight for fair deals for landowners in land negotiations. Communal actions or agitations have, however, been successful in some cases. In Kusawgu in the Northern Region, for instance, such efforts have succeeded in changing a supposed private JCL intended plantation to a community-government mango plantation. According to Mwangi and Markelova (2008), by acting collectively, the poor can stimulate a shift in power relations which in the case of land acquisition can help preserve livelihood options. These efforts can even be more effective when civil society gets involved on behalf of the poor, as was done by CICOL in Kusawgu. Collective action can secure property rights and access to resources, to challenge and overturn existing power structures or even to create space for the poor to participate in policy dialogue.

In Ghana, there is therefore the need to strengthen farmers' groups and local community groups and put in place structures for their recognition by government agencies. These community based groupings, and civil society organisations must be involved in or consulted in all negotiations and decisions regarding large-scale land acquisition. For the smooth operation of this participatory mechanism, a coordinating body (at district, regional or national levels as appropriate) should be setup to serve as an interface between farmers' groups, local organisations, national stakeholders and investors. The coordinating body should comprise representatives from government agencies (i.e. Ministries of Food and Agriculture, Lands and Natural Resources, Energy, Interior and the Attorney General Department), the Lands Commission, Stool Lands Administration, the Environmental Protection Agency, farmers/ local community groups and civil society, and technical experts when needed, and on an ad-hoc basis chiefs or landowners intending to sell large tracts of land.

National guidelines should be developed to guide and regulate land contract negotiations - size of land, duration of contracts, local community ownership or share, enforcement of contract, etc. The guidelines should take into consideration the fact that, conversion of land to large-scale farms or plantations operated by foreign labour causes loss of local land rights and generates little employment for local skilled or unskilled labour (von Braun and Meinzen-Dick, 2009). The fact is, the majority of farmers are impoverished in rural areas with small land holdings, are trapped in a cycle of low productivity and poor quality of harvests and face the brunt of continual environmental degradation that limits their output volumes and incomes. Farm investment projects that evict these smallholder farmers and replace them with large-scale ones will not address the underlying issues facing poor farmers but rather aggravate them.

Owing to these challenges of the JCL industry, specific guidance on use of contract farming and out-grower schemes with guaranteed market and prices that involve existing farmers and land users can enable smallholders to benefit directly from foreign investment. Arrangements that allow farmers to work with investors, where investors provide advice on farming practices, providing credits or guaranteeing loans, and helping to secure inputs, would build local capacity, improve quality, and increase yield, productivity and incomes. This approach takes into account the threats posed by large-scale land acquisition to the creation of win-win scenario for both local communities and foreign investors. The guidelines must also include a code of conduct for all stakeholders, particularly, foreign investors, land owners and chiefs. Key elements of the guidelines for land acquisition and operations of JCL companies should include the following:

- Transparency in negotiations and mandatory disclosure and publication of all processes should be a prerequisite for effective corporate self-

regulatory codes. Existing local landholders must be informed and involved in negotiations over land deals. Free, prior and informed consent should be the standard to be upheld. The media and civil society can play a key role in making information available to the public (Von Braun and Meinzen-Dick, 2009; Cuffaro & Hallam, 2011; World Bank, 2011). This will help nip potential disputes over ownership in the bud.

Companies should respect existing local land rights, tenure arrangements and customs (Vhugen, 2011). Customary arrangements exist for various leasehold agreements for agriculture. Issues related to compensation, working time and taboo days, sacred sites and festivals related to agriculture are very important for a peaceful investment climate.

Benefits sharing arrangements should be clearly spelt out and must be part of the contractual agreement. Apart from initial lease amounts, part of the benefits accrued from company operations e.g. a percentage of annual profit, should be given to the community. This will provide an on-going revenue stream that could be used for community development. On the other hand, instead of investors acquiring land to produce JCL, contract farming or out-grower schemes are even better because they leave smallholders in control of their land while they still deliver output to the investor.

A system of cultivation that guarantees environmental sustainability should be developed and maintained. The Environmental Protection Agency should regulate and enforce the required environmental impact assessment and monitoring regulations to ensure sound and sustainable agricultural production practices that guard against depletion of soils, loss of critical biodiversity, increased greenhouse gas emissions, or significant diversion of water from other human or environmental uses (von Braun & Meinzen-Dick, 2009; Cuffaro & Hallam, 2011; World Bank, 2011). As much as possible, intercropping JCL with other food crops should be promoted.

Local conflicts management capabilities should be developed, strengthened and recognised by all stakeholders. The chiefs, landowners, farmers, JCL firms, governmental organisations and related stakeholders in various communities that have adopted the cultivation of JCL should be trained in identification of early signs of conflicts, facilitation, mediation, arbitration and documentation. The cost of use of these facilities should be kept to a minimum so that the poor are not disadvantaged.

Land use planning and management systems in Ghana must be strengthened and national and regional land use quotas should be assigned to non-food investments like JCL. In the interim, chiefs and their elders and landowners should be trained in mapping and rudimentary mapping procedures, basic use of GPS to create and maintain land boundaries, and documentation of title deeds, even at the

community level. These should be further documented and stored with the Lands Commission. These arrangements must be consistent and enhance, not impede, the on-going land reforms and registration programme in Ghana. The Lands Commission of Ghana should work closely with landowners and continuously update its database of land transactions.

- Business agreements with a benefit sharing scheme could be signed between firms and individuals or communities associated with the JCL industry. If this is done under the auspices of the Coordinating body, it will strengthen indigenous ownership, use, and access rights to natural resources and the enforceability of rules and regulations. Individual landowners and communities need to be assisted by a competent independent authority in their dealings with sophisticated foreign investors.
- At the national level a research and development unit should be set up and financed by the industry to offer research and provide information to various stakeholders on the conflicting issues concerning JCL. This will allow for the sharing of experiences and the dissemination of good practices across the industry.

Conclusions

Ghana has had a long history of conflicts related to natural resources. The dynamics of these conflicts have been influenced by colonial and post-colonial political interferences. Recent natural resource conflicts associated with land relate to expropriation, ambiguous land ownership systems and tenorial arrangements, unfair or unpaid compensation and abuse of power. Large scale acquisitions of land for *Jatropha* have been a major source of conflict in many communities in Ghana. Investments that lead to the deprivation of local communities of the use of resources on which their livelihoods depend, without adequate compensation and/or provision of alternative livelihoods will, in the long run, lead to discontent among the local people. Due to the political and economic importance of land to people, any land deal for biofuel or JCL production should take into account the issues raised and be based on sound principles of value creation and benefit sharing.

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