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Jatropha potential on marginal land in Ethiopia: Reality or myth?

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ABSTRACT

Increasing fuel prices, concern about climate change and future energy security have led to tremendous global interest in the use of liquid biofuels in the transport sector which, in turn, has driven large-scale land acquisitions in developing countries for biofuel feedstock production. However, regardless of the vast nature of reported land deals and widespread concern about their potential negative consequences, implementation of most of the reported biofuel land deals in Ethiopia has not yet happened. Using a case study of large-scale jatropha plantation in Ethiopia, this paper examines the main causes underpinning the disappointing agronomic performance and finally termination of large-scale jatropha plantations. Although it has been argued that jatropha can be commercially grown well on marginal land without irrigation, this study indicates that moisture stress was the key factor in the failure of many large-scale jatropha plantations in Ethiopia. Furthermore, the use of untested planting material and conflict with local communities over the land were other important factors that contributed to termination of jatropha projects.

Introduction

Increasing fuel prices, concern about climate change and future energy security have led to tremendous global interest in the use of liquid biofuels in the transport sector (Schut et al., 2010; World Bank, 2010; German et al., 2011). Liquid biofuel has attracted the interest of governments and policy makers because of its immediate usability in the existing transport sector and the ease with which it can be blended with fossil fuels (Borras et al., 2011). The increased interest in the use of biofuels in the transport sector, together with the favourable policy environment for biofuels both in developed and developing countries, has led to intensified land acquisitions for large-scale biofuel feedstock production in Africa. The enthusiasm for the use of liquid biofuels was followed by the global food price crisis of 2007/08, both of which further increased the rate and scale of land acquisitions for food crops and biofuel feedstock production (PRAI, 2010). Borras et al. (2011) argue that the growing demand for biofuels will not be sufficiently met, even if all the currently cultivated land in the United States and the European Union were converted to biofuel production. Thus, as part of the solution to the interlinked food and oil price crisis, and as a response to the food versus fuel discourse due to the competition between biofuels and food crops for land and water, a dominant narrative has emerged which suggests the existence of global agricultural land reserves that are 'marginal or under-utilized' (Borras et al., 2011; Makki and Geisler, 2011). This narrative advocates the transformation of these 'marginal or under-utilized' lands into zones for food and biofuel production, resulting in a 'win–win' solution for food and energy security concerns. However, the assumption about the availability of 'marginal' land that can be used for large-scale biofuel feedstock production, either on a global or national level, and the effects of such large-scale land conversion on social, economic, and environmental systems, raised serious concern among academics, civil society and NGOs even before the emergence of the global food price crisis (UN-Energy, 2007; IFAD, 2008).

Ethiopia has portrayed itself as one of the countries with the highest potential for biofuels in Africa, and the government has proposed about 23.2 million hectares of 'marginal' land be converted for biofuel feedstock production, mainly jatropha. The Ethiopian government's arguments for the use of 'marginal' land are based on two assumptions: (i) there is ample 'marginal' land in the country, and (ii) biofuel feedstock (jatropha) can be commercially grown on so-called marginal land. Despite the fact that more than 80 companies were licenced to invest in biofuels in Ethiopia until 2010 and acquired more than 700,000 ha of land only for jatropha and castor bean production, the implementation of most of these projects has been delayed for years, while several biofuels investment projects which took off have collapsed. As most recent studies about large-scale land acquisition for biofuels and other commodities in Africa mainly focus on the scale, drivers, actors, and the potential impacts of these land deals, there is very limited empirical evidence regarding the factors underpinning this failure or lack of implementation of biofuels and other large-scale projects (Cotula et al., 2014). Thus, the main aim of this paper is to investigate the key factors behind the failure of biofuel projects, particularly large-scale jatropha projects which were operational for some time. In this paper,

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I hypothesize that the unsupported assumptions about the availability of 'vast tracts of marginal' land and the commercial level economic viability of jatropha on these land are the key underlying causes for the failure of most large-scale jatropha projects in Ethiopia.

The remainder of the paper is structured as follows. Section two presents the method used in the study. Section three discusses the development of the biofuel sub-sector, biofuel policy drivers and means of supporting policy to achieve targets in Ethiopia. To better understand the main causes of the failure of jatropha projects, section four presents conceptual discussions on 'marginal' land and the contested claims about jatropha performance on so called marginal land. Section five presents a case study of large-scale jatropha production in Ethiopia and discusses the major reasons for its failure. Section six discusses the main findings by highlighting the similarities in assumptions that led to the drastic failure of an East African large-scale groundnut scheme in present day Tanzania to the current assumptions used to promote large-scale jatropha production in Africa. Finally, section seven provides some concluding remarks.

Research method

Most of the field work for this research was conducted in West Hararge Administrative Zone (Miesso District) in Oromia Regional Governmental State of Ethiopia between December 2011 and February 2012. Emami Biotech's large-scale jatropha plantation was the main focus of the research. Pastoral and agro-pastoral production systems are the two common agricultural practices in the district, which has a total area of 176,026 ha with altitude ranging between 900 and 1600 m above sea level (Feto, 2011). The annual rainfall in the district ranges between 400 and 900 mm with a mean value of 790 mm.

While the main field work was conducted in Bordede Kebele of Miesso District, additional field visits were made to Shinile Zone in Somali Region, Bati District in Amhara region and Wolaita Zone in Southern Ethiopia. A qualitative case study approach was mainly employed to collect data for this research. The data collection process involved field observations of jatropha projects and qualitative data collection at different levels aimed at identifying the key issues behind the failure of large-scale jatropha projects in Ethiopia. Semi-structured interviews with key informants were conducted at three levels.

First, national level interviews were conducted in the capital city, Addis Ababa, with biofuel experts and government officials at the newly established Ethiopian Investment Directorate under the Ministry of Agriculture, the Ethiopian Biofuels Development Directorate, the Ethiopian Investment Agency, and Melkassa and Wendo Genet Agricultural Research Centres. Furthermore, additional interviews were conducted in Addis Ababa with former employees of Sun Biofuels, the Director of the Horn of Africa Regional Environmental Centre and Network, an NGO that supports biofuel initiatives in Ethiopia, and biofuel project managers of African Power initiatives, ATIRF Alternative Energy PLC and Fri-Elgreen Power Ethiopia, of which the latter two companies were at the pre-implementation phase of large-scale jatropha plantation in the southern part of Ethiopia. The semi-structured interviews at the national level mainly focused on gathering information on the number of licenced and active biofuel companies, project locations, amount of land acquired by biofuel companies, implementation status, the challenges faced by the investors in implementing their projects, and the reasons for the declining investors' interest in biofuel development in Ethiopia.

Secondly, regional level interviews were conducted at the Oromia Bureau of Mines and Energy, Oromia Investment Commission, and Miesso District Agricultural Office. The interviews at the regional level were used to cross-check the information obtained from the federal institutions (national level interviews) and to collect some additional information not available at the national level. In total, 28 interviews were conducted at the national and regional levels. Finally, at the local level, mainly at Bordede, interviews were conducted with development agents, village leaders, former employees and community members positively or negatively affected by the Emami jatropha project. Overall, three focus group discussions with five to eight participants, six semi-structured interviews with previous employees, and 12 key informant interviews were conducted with village leaders, elders and development agents. The interviewees at the local level were mainly asked to describe the land acquisition process, consultation issues, compensation (if any) in case farmers were displaced, and the positive and negative effects of the investment on the local community. During the interviews, the participants were able to describe their views and opinions about the impact of the project that enabled the researcher to better understand the situation which led to its termination. Since the main company that was considered for this study abandoned its jatropha project a few months before the field work, those who were managing the project were not available for interview. Thus, it was not possible to verify the views and opinions expressed by the local communities, former employees and village leaders from the project managers. Although we were initially prohibited from visiting the failed jatropha project, after some negotiation we were allowed to visit the farm. The field observations on the jatropha farms enriched our understanding of the performance of jatropha on the land with low moisture and poor soil fertility. Finally, secondary data were collected from different sources such as government policy documents related to biofuel investment and online sources to supplement the primary data.

Biofuel development in Ethiopia

In Ethiopia, large-scale investments in biofuels have a recent history with the first large-scale biofuel feedstock production being established in 2006 by the UK-based biofuel company, Sun Biofuels. Since 2006, Ethiopia has become a major destination for Foreign Direct Investment (FDI) in biofuels in Africa. Within 4 years, the interest to invest in biofuels increased massively so that, in 2010, about 83 companies had been granted a licence to invest in biofuels (Ethiopian Biofuels Development Directorate, 2011). Although most of the biofuel investments have not yet been implemented, the amount of capital that the biofuel companies committed to invest in biofuels represented up to 50% of FDI flow at the national level in 2011 (Bossio et al., 2012). According to the recent land deals data released in April 2012 by the International Land Coalition (ILC), in Ethiopia, more than one million ha of land was reported to be leased for biofuel projects out of which nearly 700,000 ha of land was reported to be leased for jatropha and castor bean projects (Land Matrix, 2012). However, according to the information from the Ethiopian Biofuel Development Directorate, in early 2012, there were only about five biofuel companies considered active which all together leased 102,471 ha.

There were two main driving forces that were assumed to have contributed to the dramatic increase in the number of planned biofuel projects in Ethiopia. The first driving factor was the government's desire to secure its national energy supply by producing biofuels from domestically grown feedstock (MoME, 2007). As Ethiopia is a landlocked and non-oil producing country, its economy is fully reliant on imported oil and is highly vulnerable to higher international oil prices. In addition to the increasing oil prices, the country's oil demand is also increasing rapidly due to rapid economic growth and the expansion of its transport sector. Thus, the high oil prices and the increasing demand for oil in the country encouraged the government to look for alternative domestic energy sources.

The second driving force was the increasing demand for biofuels at the global level. The EU energy directive of 2009 endorsed a mandatory target of a 20% share of energy from renewable sources in the overall energy consumption and a mandatory 10% minimum target to be achieved by all member states of the EU, mainly from biofuels in the transport sector, by 2020 (EU Directive, 2009). The directive claims that since transport fuels can be easily traded, member states with lower domestic