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Biofuel development in Ghana: policies of expansion and drivers of failure in the jatropha sector

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ABSTRACT

Biofuel development was mainly promoted in several parts of Africa as an energy security or rural development strategy. Jatropha was the biofuel feedstock that received the most interest across Africa from investors. However, jatropha expansion gave rise to a number of contested issues, which produced conflicts, winners, and losers. Access to land was at the heart of several of these conflicts. Though some success stories of individual jatropha projects have been documented, the overwhelming majority of these projects in Africa have either collapsed or faced significant difficulties. Understanding the reasons behind the failure of the jatropha sector is an important gap in the academic literature, while the lessons learnt from failed projects could inform future policies and practices. This literature review synthesizes the key drivers of failure of the jatropha sector in Ghana as identified in the literature, and complemented through site visits and expert interviews. It identifies a number of reasons behind the failure of individual jatropha projects such as poor business planning, institutional barriers, limited community participation, unfair compensation practices, obstacles posed by civil society and unconstructive involvement of chiefs. The findings indicate the systemic nature of these problems as they often worked synergistically to catalyse the collapse of many jatropha projects in Ghana. Re-vitalising the biofuel, and especially the jatropha, industry is virtually impossible given the current challenges. This would require a renewed political interest in Ghana particularly to deal with the deficits of the land administration institutions.

1. Introduction

Local energy demand in most countries of Sub-Saharan Africa (SSA) is largely met through locally sourced biomass energy (e.g. fuelwood, charcoal) or imported fossil fuels [1,2]. At the same time, a large part of the population lives under extreme poverty without access to modern fuels. This lack of access to modern fuels has been considered both a consequence and a driver of poverty [3]. Therefore, policy targets such as energy security, economic development and poverty alleviation are often highly interlinked in SSA [4,5].

Despite some early efforts in the 1980s [6,7], liquid biofuels largely emerged in the last 10–15 years as a potentially promising strategy to meet these interconnected policy objectives in SSA [6,7]. Following the adoption of ambitious biofuel policies in Brazil, EU and the US,[1] biofuels gained a lot of international attention, including from African governments, increasingly becoming an attractive sector for foreign direct investments (FDIs) in the continent [8–10].

In SSA, rural development and energy security seem to have been by far, the most important drivers for biofuel expansion with climate change mitigation playing a negligible role – if at all [7,11]. The emphasis in several African countries on FDIs in the agriculture sector as a pathway to economic development (and as a response to limited state-led investment) resulted in the sharp increase in the number of biofuel projects (especially jatropha-related) and the scale of related land acquisitions across the continent [12–16].

The hope that biofuels could promote energy security and rural development was however, contested given the regional differences and relationality in the drivers for biofuel development [7,17]. What shed further doubt on the perceived benefits of biofuels was the eventual emergence of negative impacts at the local level, including some highly contested issues such as food security [8,12,18–21] and land grabbing [22–24] which have produced conflicts, winners and losers [25–27].

While some jatropha success stories have been documented in SSA [36–38], the bulk of jatropha projects have underperformed or totally collapsed in Eastern and Southern Africa [37–41]. However, comprehensive studies in West Africa that explore the reasons and evidence for

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[1] The global biofuel boom of the 2000s was the result of a set of interconnected international circumstances. The main drivers of biofuel expansion varied between countries, but were mostly associated with energy security, economic gains (including rural development and foreign exchange savings) and GHG emission reductions [7,28–35].

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the failure of biofuel initiatives are still limited. This remains an important gap in the academic literature considering three main reasons. Firstly, there is a long history of formal policy interest in biofuels in West Africa, following the adoptions of energy protocol to boost energy supply in the sub-region by the Economic Community of West African States (ECOWAS) [52]. Secondly, while numerous policy directives have been put in place between 2006 and 2008 that promoted biofuels as a rural development strategy in the region [42–47],[2] the actual progress in implementing these mandates has been unclear [57]. Thirdly, the policy support of several West African governments to attract FDIs in the biofuel sector (as manifested by the surge of large-scale land acquisitions for biofuels) has raised many concerns [2,9,10,48,49].

The aim of this literature review is to re-construct the evolution of biofuel policies in Ghana and identify the reasons for the critical failure of the jatropha sector. Given the on-going discussion on whether jatropha could still be a viable development option for Africa [36,38,50,51], the outcomes of this paper will provide significant evidence from Ghana that could be considered in the formulation of national plans if jatropha-related development is to be re-kindled.

The review starts by offering an overview of the main policies and actors involved in the biofuel sector in Ghana (Section 2). Section 3 records the main smallholder-based (Section 3.1) and large-scale (Section 3.2) biofuel projects implemented in Ghana in the last decade, while Section 4 reviews some of their key environmental and socio-economic impacts. Section 5 discusses the main reasons for the widespread collapse of jatropha projects such as the discovery of crude oil (Section 5.1), the role of civil society (Section 5.2) and chieftaincy institutions (Section 5.3), the unfulfilled utopian promises made by biofuel investors (Section 5.4), the institutional barriers posed by the national government (Section 5.5), and the limited participation of local communities in project design and implementation (Section 5.6). Section 6 puts these findings into perspective by developing a conceptual framework of the linkages between these drivers of failure and the main actors involved. It further identifies some of the main lessons learnt from failed jatropha projects that could inform future biofuel practices in Ghana and beyond.

2. The evolution and development of biofuels in Ghana

2.1. Evolution of biofuel policies and their drivers

The genesis of biofuel interest in Ghana can be traced to Onua Amoah, a bio-chemist and Chief Executive Officer of Anuanom Industries Ltd [12]. In 2003, he called for government support to promote the development of jatropha biodiesel, including the training of farmers in jatropha cultivation [12,58]. Following his successful demonstration of biodiesel production from jatropha, the government of Ghana established four committees to offer recommendations regarding the promotion of biofuels nationally [58]. These committees were set under the new mandate for meeting the renewable energy targets following the adoption of ECOWAS Energy Policy in 2003 [53].

After a series of meetings, the first draft biofuel policy was issued in 2005. It recommended a 20% biodiesel blend (B20) for all government vehicles and the establishment of a Biofuel Implementation Group (BIG) under the Energy Commission [58]. In 2006, the National Jatropha Planning Committee submitted a revised version of this biofuel policy to the government for consideration. This revised version contained ambitious targets of 5% gasohol (E5) by 2010 and 10% biodiesel (B10) by 2015 in transport fuel used by the government. These blends where to be mainly met through the expansion of jatropha (for biodiesel) and cassava/sugarcane (for bioethanol) [59].

In 2006, the Strategic National Energy Plan (SNEP) included a refined policy statement and new biofuel blending targets for both gasoline and biodiesel. The policy objective was to *"secure and increase future energy security by diversifying sources of supply through fuel substitution and complementation of alternative fuels so as to achieve 10% penetration in supply mix by 2015 and 20% by 2020"* [53] (page 104).

To meet this commitment, the government selected 53 districts across the country to establish pilot jatropha plantations on 'marginal' lands to avoid competition with food production.[3] The National Jatropha Project Planning Committee was tasked to develop 1,000,000 ha of jatropha plantations within a period of 5–6 years [60]. These initial pilot projects were mainly smallholder-based schemes, where the farmers would have been responsible for cultivating jatropha based on training provided by the Ministry of Food and Agriculture. The government would have provided the market for this jatropha oil as the plan was for all government vehicles to run on B20 (see above), while Anuanom Industries Ltd would have been processing the jatropha oil. This early focus on smallholder-based jatropha production follows a similar trend to other parts of West Africa [61]. However, while in several of these early efforts, particularly in Mali, the major end-use of jatropha oil was rural electrification [43,62,63], in Ghana jatropha oil was planned to fuel government vehicles and not to be used directly by local communities.

In 2010, the government of Ghana drafted a new bioenergy policy that revised the policy targets of the 2006 SNEP. The new target was to blend fuels with 10% of biofuels (E10, B10) by 2020, and 20% of both gasoline (E20) and biodiesel (B20) by 2030 [64]. The policy further set objectives for removing institutional barriers, developing competitive markets and regulatory support, and reducing GHG emissions. The policy in a way sought to make Ghana a net-exporter of biofuels in the medium- to long-term [64], given that the domestic use of biofuel as specified in blending targets was not going to happen any time soon because the refinery and necessary technology were not yet in place. The continuous support to biodiesel crops such as jatropha and the fact that the majority of the FDIs came from Europe (Section 3.2), implicitly suggest that the main market was the European Union (EU) that had adopted a year earlier its Renewable Energy Directive (EU-RED).[4]

This seems to signify a shift in the main driver of biofuel development in Ghana, from energy security to economic and rural development. However, while none of the six major policy objectives of the 2010 Bioenergy Policy explicitly mentioned that biofuels were planned to be a rural or economic development strategy [64](page 17), the policy actively exhibited interest to attract Foreign Direct Investment (FDIs) through the introduction of fiscal and tax incentives (e.g. granting zero import duty and 10-year income tax relief to biofuel companies). These policy directives imply that more FDIs and larger land acquisitions would have been necessary to meet these targets [42,60].

The ensuing Renewable Energy Act of 2011 (Act 832) aimed to further boost biofuel development. The Act specifies the required steps for biofuel production in Ghana, but very limited prescriptions are made about the formal processes to be followed during large-scale land acquisitions for feedstock production [12,66,67]. Fig. 1 highlights the different stages and required submission procedures for issuing a biofuel development license, but whether these steps were actually followed is another matter. Feedstock production licenses (either for

[2] West African countries have adopted different blending mandates at different stages; e.g. Ghana (B20 by 2030), Nigeria (E10 by 2020), Mali (E20 by 2023) [53–55],. Furthermore, the ECOWAS has set a regional target of E15 by 2030 for its member states [56].

[3] While jatropha is toxic and unsuitable for human consumption, hence not a food crop per se, in reality it can divert indirectly food production through competition for land, water, capital and other agricultural inputs [7].

[4] EU-RED enforced an ambitious blending mandate of 20% by 2020, and allowed feedstock/biofuel imports from outside the EU if the blending mandate could not have been met through domestic production [65].