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Biofuels in sub-Saharan Africa: Drivers, impacts and priority policy areas



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ABSTRACT

There has been a growing interest in jatropha- and sugarcane-based biofuels across Sub-Saharan Africa. Biofuel expansion in the region reflects policy concerns related to energy security, poverty alleviation and economic development. However, biofuels have also been linked to numerous environmental and socioeconomic impacts such as GHG emissions, water availability/pollution, deforestation, biodiversity loss, poverty alleviation, energy security, loss of access to land and food security to name just a few. Yet there is (a) an insufficient understanding of these impacts (and their synergies) in Sub-Saharan Africa, and (b) a lack of policies that could regulate the biofuel sector and ensure its viability while at the same time preventing its negative impact. The aim of this literature review is to synthesize the current knowledge about biofuel impacts in Africa and to identify priority policy areas that should be targeted for enhancing biofuel sustainability in the continent. The findings of this review indicate that biofuel impacts can be positive or negative depending on several factors such as the feedstock, the environmental/socio-economic context of biofuel production, and the policy instruments in place during biofuel production, use and trade. In most cases there are significant trade-offs but at least part of the negative impacts can be mitigated through careful planning. The incomplete and piecemeal understanding of these trade-offs combined with agronomic, institutional and market failures are currently the most important barriers for the viability and sustainability of biofuel investments in the continent.

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1. Introduction: biofuel drivers and policies in sub-Saharan Africa

Biofuels were heralded in the early-to-mid 2000s as an important strategy for reducing reliance on fossil fuels and mitigating the associated greenhouse gas emissions. In some national contexts they were perceived as a silver bullet, able to provide a sustainable source of fuel that could be grown in-country but that could also have numerous ancillary benefits on carbon emissions, economic development and poverty alleviation.

Biofuels have consequently received significant attention from governments and the private sector in Sub-Saharan Africa (SSA). Several SSA governments have supported biofuel initiatives as a means of boosting economic growth, rural development and energy security [1–3]. In particular, since 2005 there has been a surge of direct foreign investments¹ in SSA for acquiring large tracks of land to accommodate biofuel expansion [4–9].

The most important driver of biofuel expansion in SSA has been economic development. Investors perceived biofuels to be potentially lucrative commodities, that could be channeled to international markets, and in particular the emerging EU biofuel market following the ratification of the EU Renewables Directive 2009/28/EC (EU-RED). EU-RED sent a strong signal that biofuel/feedstock imports could contribute towards meeting the newly established EU biofuel blending mandates, if production within the EU was insufficient² [10,11]. A second market-related circumstance that might have further contributed to biofuel expansion in SSA has been the efforts of Brazil to make ethanol an internationally traded commodity [12–16].

Energy security has been the second major driver of biofuel expansion in SSA as most countries in the region are highly

dependent on traditional biomass or imported liquid fossil fuels [19]. Biofuels are particularly appealing to landlocked countries such as Malawi, where fossil fuel imports take a significant toll on trade balances. In fact most pre-2000s biofuel efforts in the continent (e.g. in Kenya, Malawi, South Africa, Zimbabwe), were aiming to increase national energy security and foreign exchange saving by reducing oil imports [1]. Transport has been by a wide margin the main foreseen use for domestically produced biofuels in Southern and Eastern Africa, whilst local energy use (e.g. rural electrification) has been the key use in some West Africa countries.

From an SSA government's perspective, feedstock/biofuel production (whether for exports or domestic use) could potentially boost rural development, having ripple effects on national efforts to alleviate poverty [1–3]. Rural development and “pro-poor” narratives have been very strong in discussions that legitimized biofuels in SSA and influenced the development of early biofuel policies [17,18].

On the other hand, environment-related concerns such as the reduction of greenhouse gases (GHGs) emissions and the improvement of ambient air quality have not been important direct drivers of biofuel expansion in SSA [1–3]. This is not surprising in a region with severe levels of poverty, where economic growth and development are prioritized. Yet concerns over climate change have been, in a way, an indirect driver of biofuel expansion in SSA as the EU, which was the main envisioned market for feedstock/biofuel exports from SSA, promoted biofuels partly as a climate change mitigation measure [11].

The above factors raised high expectations in SSA over biofuels, and catalyzed the significant expansion seen in the second half of the 2000s. The mandatory blending of biofuels into transport fuels has been the main legislative instrument for boosting biofuel uptake in the transport sector in SSA. Several countries in eastern and southern Africa have enacted such blending mandates, but in differing proportions [20], e.g. Angola (E10), Ethiopia (E5), Malawi (E10), Mozambique (E20 by 2021), Sudan (E5), Zambia (E10, B5), and Zimbabwe (E5 increasing to E15). Such mandates are often complemented with an array of policies that stimulate and protect national feedstock/biofuel

¹ Such direct investments were originating both from member (largely EU) and non-member (largely China and India) countries of the Organization for Economic Co-operation and Development (OECD).

² This was contrary to the other major biofuel markets at that stage that were either putting barriers for importing feedstock/biofuels (US) or were self-sufficient (Brazil).

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