

Biofuel developments in Mozambique

An analysis of policy, potential and reality by Marc Schut

Introduction

In Africa, there is an increasing interest in the production of biomass for the use of biofuels. Mozambique is believed to be one of the countries that can contribute substantially to the production of biofuel crops. Currently huge investments are made by mostly foreign private investors. In different parts of the country plantations for sugarcane, Jatropha, sweet sorghum and cassava have emerged; of which some have the intention of growing up to 150,000 ha. Many experts claim that Mozambique has the potential of becoming a 'biofuel superpower' because of its assumed abundance of land, water and labor. However, these studies are often based on data that do not pay sufficient attention to the complexity of agriculture in development countries. In our research we want to complement such studies by providing additional insight in other drivers that determine the real biofuel potential for countries like Mozambique. Subsequently we analyze how far Mozambique is in terms of achieving its biofuel-related policy objectives.

Country statistics

Land area: 801,590 million km²
 Population: 20 million
 Arable land: 36 million ha
 Land under cultivation: 4-5 million ha
 Average land area per family: 1.4 ha
 Minimum wage: 1,126 Meticais (€31) for the agricultural sector
 Agricultural sector: 3.2 million smallholder households, 400 commercial farmers
 Agricultural sector contribution to GDP: 23%
 Agricultural extension system: 1 per 1,067 farm households

Biofuel time-line Mozambique

- 2003**
 - EU: 'Replace 5.75% of petrol and diesel for transport by biofuels by 2010'.
- 2004**
 - Mozambican president: 'Mozambique should be an oil-exporting country, and that Jatropha should be planted on all unused soils'.
- 2004-2006**
 - Distribution of Jatropha seeds, but no follow-up (extension, market development, etc.).
 - Establishment of inter-ministerial working group on biofuels to guide biofuel investment and production (2005).
- 2006**
 - EU Strategy for Biofuels (February 2006)
 - Research Jatropha Task Force by Technoserve, ICRAF and IIAM (June 2006).
- 2006-now**
 - Sustainability criteria (Dutch, RTFO, RSB, BSI).
- 2007**
 - EU: binding minimum target for biofuels of 10% for vehicle fuel by 2020 (January 2007).
 - Mozambique workshop on sustainable biofuels (December 2007).
 - Establishment of Subgroup for Sustainability Criteria and Development Models (December 2007).
- 2008**
 - Mozambique Biofuels Assessment/Econergy (May 2008).
 - Agro-ecological zoning exercise 1:1,000,000 (May 2008).
 - Mozambique and 7 other countries file complaint about 'unjustifiably complex' EU sustainability criteria (November 2008).
 - Wave of private investors (slowed down at the end of 2008).
 - Formal approval of Procana (30,000 ha sugarcane) and Principle Energy (18,000 ha sugarcane) (December 2008).
 - Development of Mozambican Sustainability Criteria (December 2008 till now).
- 2009**
 - Biofuel Strategy approved (March 2009).
 - First meeting of the Subgroup for Sustainability Criteria and Development Models (June 2009).
 - Agro-ecological zoning exercise 1:250,000 (expected to start soon).

Mozambique's biofuel policy

The government decided to embark upon the promotion of biofuel production and use, with the objective to:

- Respond to National Poverty Alleviation Agenda, especially agricultural development, employment and income generation in Mozambique's rural areas.
- Reduce dependency on imports of fuel (Mozambique is a 100% fuel importing country).

The government has set aside over US\$ 700 million for biofuel research, production and promotion.

Potential

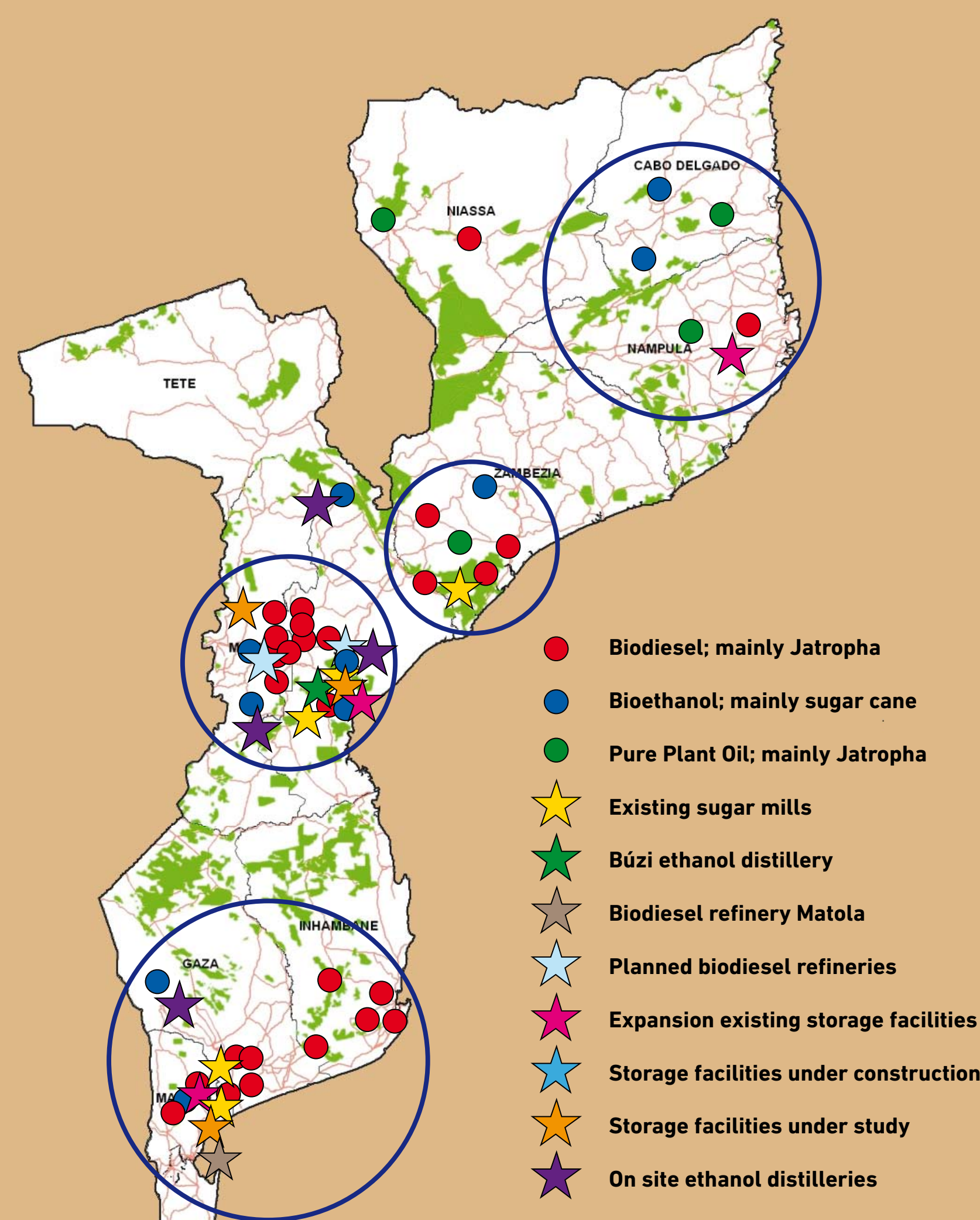
Mozambique is considered by experts as a promising region for biomass production in Africa. They assume that Mozambique can achieve full energy independence and supply international markets with surplus production. These predictions are often based on the country's:

- Favorable climate and environmental conditions.
- Availability of suitable land and water for potential biofuel crops.
- Large rural population who may benefit from labor intensive biomass production.
- Government that supports (foreign) investment, integrating biofuel production and use in its poverty reduction strategy and is concerned with energy security.
- Trade relationships with EU and other SADC countries.

Several studies on the biophysical potential of biofuel production in Mozambique have been conducted. These studies showed that Zambézia, Tete, Nampula and Niassa are amongst the provinces with the highest potential for biofuel production. Maputo, Manica and Sofala are amongst the provinces with the lowest potential.

Inventory of existing biofuel developments in Mozambique

In our inventory we did not distinguish between projects that formally applied for land-titles and expressions of interest for reasons of confidentiality. We have projected the developments on a map which shows the result of the agro-ecological zoning exercise (scale 1:1,000,000), and highlights 7 million ha of land available for large-scale agricultural projects. By December 2008 the Government of Mozambique had officially received 17 biofuel-related investment proposals (see table). Other projects could be characterized as expressions of interest, or applied for land-titles at district or provincial level. We have also mapped existing and planned biofuel-related infrastructure in Mozambique.



Geographic spread of biofuel developments versus agro-ecological zoning in Mozambique (IIAM and DNTF, 2008)

	Bioethanol projects	Biodiesel projects	Total
#	5	12	17
Land formally requested (ha)	66,000	179,404	245,404
Total investment (US\$)	1,003,000,000	298,000,000	1,301,000,000
Average investment per requested hectare (US\$)	15,197	1,663	5,303
Employment (jobs)	Between 8,925 and 11,956	Between 25,093 and 30,264	Between 34,018 and 42,220
Employment per requested ha	Between 0.14 and 0.18	Between 0.14 and 0.17	Between 0.14 and 0.17
Main crop	Sugarcane	Jatropha	-
Average estimated yields	113.3 t cane ha ⁻¹	2.64 t Jatropha oil ha ⁻¹	-
Market	Mostly EU	Mostly EU	-

Analysis of the 17 formal biofuel investment proposals (in collaboration with CEPAGRI).



Farmer harvesting Jatropha fruits

Analysis and conclusions

Based on our analysis of biofuel developments in Mozambique we can draw the following conclusions:

1. Areas identified during the agro-ecological zoning exercise are not popular amongst biofuel investors. The agro-ecological zoning has not yet guided the geographical spread of biofuel developments in Mozambique.
2. Biofuel developments are mainly situated around areas with existing good infrastructure such as; processing facilities, roads and harbors, availability of labor, (tele-)communication, and access to goods and services (e.g. health care and financial services). Biophysical potential is important, but not the only driving force for developing competitive business. We see that the provinces with the low biophysical potential - Maputo, Sofala and Manica - have the highest interests of projects and investors.
3. When comparing these first conclusions with the government's objective to promote biofuel production as a way of: 'Responding to our National Poverty Alleviation Agenda, especially in rural areas', we conclude that the majority of biofuel projects have no interest in locating themselves in or near remote rural areas in Mozambique and do therefore not directly contribute to this objective. Moreover, employment creation seems lower than the government's expectations.
4. In the current situation, the government's second objective: 'Making the country less dependant on fuel import' is unlikely to be achieved. In absence of a domestic or regional market, the majority of projects focus on premium markets in the EU which does not directly contribute to solving the fuel-dependency problem the country is facing.

The biofuel sector in Africa is characterized by complexity and uncertainty. This research shows that biophysical and agro-ecological production potential are not the only factors that drive biofuel developments in Mozambique. When studying the potential for biofuel production in countries like Mozambique, one has to take into account social, economic and legal factors to understand the extent to which reality matches the suggested potential.