

Biofuels – A Failure for Africa

A briefing by the African Biodiversity Network, the Ethiopian Society for Consumer Protection, and The Gaia Foundation, December 2010



Introduction

Ethiopia is at the forefront of biofuel developments in Africa. In 2007, the Ethiopian government identified 23.3 million hectares of land (equivalent to 20% of the country), to be put towards biofuel production¹. These ambitions were intended to position Ethiopia as a leader in Africa, in the emerging push for biofuels to provide economic and energy security for the continent.

There has been a great deal of hope and expectation that biofuels would solve many of the challenges facing Africa and the world today. International pressure comes from developed countries, hoping that biofuels will meet their colossal energy needs, reduce the need for diminishing supplies of fossil fuels, solve the global climate crisis, and create new business opportunities. Developing countries, and Africa in particular, have seen biofuels as an opportunity for development and wealth creation, and key to providing domestic energy security.

In Ethiopia, developments have proliferated under the government's ambition for biofuels to solve the country's growing energy needs, and farmers' hopes for income.

Excitement about the potential for biofuel production in so-called "marginal lands", in particular the arid and semi-arid regions of Africa, was driven in large part through a great deal of hype around a crop called *Jatropha curcas*. Across Africa and the world, many biofuel laws and policies at local, national and international level have been driven forward, based on the unproven potential of *Jatropha*.

Field Data from Wolaita and East Harerge, Ethiopia.

In June and July 2010, ABN collected in-field data on the operations of three biofuel companies.

Near the city of Wolaita Sodo, in the SNNP region of Southern Ethiopia, in-depth interviews took place with 6 farmers, 5 NGO representatives, 2 company leaders, 3 company employees, and 6 government officials specifically related to the Wolaita operations of Global Energy Ethiopia (Israel) and Sun Biofuels (UK).

In Eastern Harerge, outside of the city of Harar, in the Eastern region of Ethiopia, ABN conducted in-depth interviews and field visits with 5 local farmers, 4 former company employees, 6 government officials, and 5 NGO advocates related to the operations of Flora Eco Power (Germany).

¹ The Biofuel Development and Utilisation Strategy of Ethiopia – Ministry of Mines and Energy, September 2007

However, many of the ambitions and objectives stated in Ethiopia's 2007 Biofuel Strategy have failed to be translated on the ground.

In 2010 the African Biodiversity Network (ABN) decided to look at the experience of biofuel developments in Ethiopia in order to assess their performance towards the government's own target objectives: providing national energy security, raising farmers' incomes and providing jobs, and Jatropha production on marginal lands.

ABN's findings show that biofuels are failing Africa on all counts. The data shows the following key points:

- 1) Jatropha performs poorly in areas with low rainfall or low nutrient soil, to the extent that it is no longer being grown in areas originally developed for plantations.
- 2) Due to unproductive yields on Jatropha plantations, companies have recruited small farmers as out-growers to grow castor oil. Yet castor's yields are still just a fraction of those expected by companies and farmers alike.
- 3) Biofuel companies are paying farmers lower prices per unit than they would earn from growing traditional food crops, or failing to pay farmers at all.
- 4) Biofuel feedstock produced in Ethiopia is being exported for processing and sale in European and Asian markets. Thus it is not in any way addressing the government's stated need for energy security.
- 5) Challenges at policy level mean that the government is also failing to undertake the monitoring and regulation required to prevent negative socio-economic and environmental impacts.

The extensive land grabbing, deforestation and hunger resulting from Africa's Biofuel rush has already been detailed in ABN's previous publications (see *Agrofuels in Africa – the impact on land, food and forests*², and *Agrofuels and the myth of the marginal lands*³).

These new findings show that not only have biofuels been a disaster for Africa's communities and biodiversity, they have been a failure for farmers and, we propose, for government too.

Jatropha failing on Marginal Lands

Ever since the global momentum for biofuels began in 2007, the world has become increasingly familiar with the name of a little-known plant called Jatropha. A shrub producing oily seeds, the plant was more commonly known by small farmers in semi-arid regions of Africa and India, who found that its toxic leaves can act as an effective hedge to protect their food crops from livestock, while its seeds can be milled to produce a combustible fuel oil.

Tales of this plant's use in energy and food production by small farmers were used for widespread publicity to justify large-scale jatropha biofuel plantations. This was apparently without any irony intended – even though these same plantations often led to small-scale farmers being evicted from their lands. Such cases were a clear example of one system of farming being dubiously used to justify an altogether different model.

International and African policy makers, as well as international investors talked of the potential of Jatropha to create a new economic miracle from Africa's marginal and arid lands.

While the UK government's Gallagher Review on Biofuels admitted that there were



Jatropha curcas plants struggled to produce yields in the dry lands of Wolaita.

² African Biodiversity Network: "Agrofuels in Africa – the impact on land, food and forests" 2007 <http://www.africanbiodiversity.org>

³ African Biodiversity Network: "Agrofuels and the Myth of the Marginal Lands" 2008 <http://www.africanbiodiversity.org>

significant socio-economic and environmental problems associated with the production of biofuels, such as deforestation and rising food prices, the Review claimed these could be overcome by focusing biofuel production on so-called “marginal lands”. The EU’s Renewable Energy Directive also proposed the same, and even the highly influential 2008 report by Fargione et al, which was highly critical of biofuels and the carbon debt they accrue, maintained that “degraded and abandoned agricultural lands” could be used for biofuel production without the same negative impacts.

Implicit in all of these statements was the assumption that crops can be grown at all in these lands. And this was based almost entirely on the unproven hope that *Jatropha* would be a reliable and high-yielding performer in drylands.

At the end of 2006, Sun Biofuels initiated operations growing *jatropha* on 5,000 hectares of land in the small village of Mancha, Wolaita. Although the land was not inhabited, locals used the area for grazing and firewood collection. According to the all claims made about *jatropha*, this type of dry, low-fertile land should have presented no problems for biofuel production. However the crop performed very poorly. After a series of unsuccessful growing seasons, Sun Biofuels closed their Mancha operations in 2009, citing poor soil and low rainfall for their inability to produce sufficient quantities of fruit. According to a Sun Biofuel company leader, their experience that “a company can’t make money from a plant in a place without adequate rain,” clearly contradicted their expectations about *jatropha*’s potential in such conditions. The untended *jatropha* plants and fence surrounding their land can still be seen today.

In 2009, the World Agroforestry Centre, the Kenya Forestry Research Institute and GTZ jointly assessed the potential for *Jatropha* to meet expectation, particularly about the potential for high yields in areas of low rainfall and fertility. After interviewing hundreds of *Jatropha*-growing farmers in Kenya, they concluded that the reality was disappointing.

The findings of the “*Jatropha* Reality Check” report⁴ included:

- There are many media claims about the high production potential of *jatropha* – but these are rarely referenced or verified.
- A study of hundreds of *Jatropha* farmers in Kenya showed low yields.
- The costs of production in monoculture systems are uneconomical.
- *Jatropha* requires significant rainfall or irrigation, and does not perform well in dry zones.
- *Jatropha* is susceptible to many pests and diseases, contrary to claims.
- The only way that *Jatropha* makes economic sense is as a fence, which is how it has been traditionally grown in Africa .

The report highlights what biofuel companies had already discovered – that while *Jatropha* plant may survive and even grow in dry lands, without water it does not produce sufficient oily seeds needed for biofuel production.

This knowledge has led many biofuel companies to quietly drop their search for marginal lands, and instead seek to develop fertile lands with significant rainfall. In Ethiopia, this has also led to some companies dropping the use of *Jatropha* altogether, and focusing on other oilseed crops such as Castor.

The original focus of this report intended to look at the performance of *Jatropha* in Ethiopia. However, *Jatropha*’s failure has been so complete that by 2010, there were no *Jatropha* plantations in operation at the sites that we set out to examine.

Biofuels producing low yields

Partly as a result of *Jatropha*’s failure in Africa’s drylands, both Global Energy Ethiopia (GEE) and Flora EcoPower (FEP) have focused on castor as a biofuel crop.

Beginning operations in June of 2008, Global Energy Ethiopia (GEE) signed a contract to rent almost 3,000 hectares in Wolaita for castor bean plantations. Within the year, GEE forfeited the land, claiming lack of infrastructure, unsuitable soil, encroaching inhabitants and a myriad of other issues that inhibited profitable production.

The company changed its model from a plantation run by the company, to contracting local farmers as “out-growers”. They encouraged farmers to replace part of their food crop production with castor growing, on the promise of substantial incomes, above

their current earnings. These farmers were growing a large variety of subsistence crops including maize, sorghum, haricot beans, peanuts, cassava, onions, sweet potato and many more. The farmers interviewed reported converting between 10-50% of their agricultural land from subsistence crops to castor bean, on plots that average only one hectare.

⁴ World Agroforestry Centre, the Kenya Forestry Research Institute & GTZ: “*Jatropha* Reality Check” 2009. <http://www.worldagroforestry.org/downloads/publications/PDFs/B16599.PDF>

Instead of using marginal land to grow castor, these farmers are using fertile, well-watered land, and displacing their own food production. The company has now expanded to work with 21,000 farmers in three surrounding woredas (districts).

GEE informed farmers that they could be expected to produce 50-100 quintal (one quintal is equal to 100 Kg) per hectare per year (ie 5,000-10,000 kg per year). Company representatives of both Global Energy Ethiopia and Flora Eco Power told farmers that if pruned properly they could expect 3 harvests a year.

The reality has proven very different for the farmers. Instead of 50-100 quintals per hectare, farmers in both the east and southern regions have been unable to produce on average more than 10 quintals (1,000 kg) per hectare. And instead of 3 harvests a year, no documented farmer has managed to get more than one harvest annually.

All farmers interviewed for the Wolaitta and East Harerge studies stated that the time, inputs, and change in land use had led to a loss of income, and that they would have earned significantly more with their usual growing practices raising crops such as maize to sell in the market.



Farmers are growing castor next to their food crops in their fertile and well-watered lands, displacing food production.

GEE's shift from managing a plantation to using out-growers now means that the farmers themselves shoulder the financial risk for poor yields.

There appear to be several reasons for the crop's poor performance compared to expectation. Most significantly, GEE's Vice President of Operations admits that inflated expectations were largely due to the company's basing their projections on data from pilot farms in Israel, China and India, where production was well established and carried out under favourable geographic and climatic conditions. The company failed to use data from areas that compared with the dry climate of Wolaitta when persuading farmers to become castor out-growers.

But the question must also be asked why they had not learned from their own unsuccessful attempt to grow castor, on a plantation in the same area and climate, just one year before.

A key reason for the choice of castor as a crop had been the Ethiopian government's claim that castor was suitable to the Ethiopian climate, and in particular its resistance to drought. However, in 2007 the Wolaitta region suffered a drought, leading to a particularly low castor bean yield. The farmers report that they have become accustomed to drought conditions, and were still able to cultivate maize, haricot beans and other crops under these conditions. But the castor failed, undermining the claims of its suitability for the Ethiopian climate.

A further reason for the failure of the castor was the lack of training support from the biofuel companies. None of the farmers interviewed had previously grown castor as a crop, other than as an untended hedge requiring no maintenance. Farmers claim that they were not given adequate monitored training by GEE or FEP on how to make the transition to larger-scale growing of castor. GEE's Vice President of Operations also admits that there may have been significant distortion of information in terms of economic expectations from the crop between the company leaders, down to the Ethiopian field supervisors. Due to the low ratio of company personnel to individual farmers, the field supervisors were rarely monitored to ensure that that data was properly transmitted.

"No of course we have not been successful. I have tried for two years to grow Kobo (Castor) but it never grows like the maize. I cut like they say so that it gives fruit three times a year but it never does. I am just wasting money." GEE Farmer from Kindo Koysha village, Wolaita

"Yes we made a lot of mistakes our first year. We told the farmers about what kind of production they would receive based on our test results from China. But this wasn't at all what happened so people were very upset." GEE Upper Management

Farmers paid low prices

100% of farmers interviewed have incurred financial losses through the out-growing of castor for either Flora EcoPower or Global Energy Ethiopia, compared to growing food crops.

While farmers growing for GEE were initially happy with the promised price of 0.7 Ethiopian birr per kg (US\$0.04), this was based on the expectation of yields of up to 10,000 kg/hectare, 3 times a year. When actual yields in fact proved to be a tenth of this, with only one harvest a year, GEE raised the price to 1 birr (\$0.06). Even at this price, farmers are still making significant losses, earning just \$60 per hectare every year. The company still hopes to keep its out-grower farmers, attract more, and expand its operations further.

Farmers growing for Flora EcoPower in East Hararge have had even worse luck. In the first year, the poor castor yields meant that they made much lower incomes than if they had grown their usual crops such as maize. This was compounded by the 2007 drought.

However, during the second year, Flora EcoPower's Ethiopian operations declared bankruptcy and fled the area. All interviewed subjects stated that Flora Eco Power's own financial mismanagement led to their eventual bankruptcy, leaving rampant debt owed to the farmers, the company employees, local business and Ethiopian banks.

The castor that the out-growers had already sowed was left unpurchased by the company.

Both Flora EcoPower and Global Energy Ethiopia hold exclusive buyer's monopolies for castor bean for people from East Hararge and Wolaita, meaning that contracted farmers are legally forbidden to sell their crop elsewhere. When FEP ended their operations and left the country, they left thousands of farmers in 11 districts, with a non-edible, non-saleable crop, exacerbating the farmers' vulnerable situation.

Farmers report that a biofuel company from China offered to purchase the farmers' unused castor crop after FEP had left the country. However, some remaining FEP employees claimed that selling the castor to another country was in breach of the farmers' contracts, and that they were legally forbidden from doing so.

Farmers in East Hararge still have their remaining castor harvest to this day, unable to use or sell this disastrous crop.

"Maize is nice. I get a good price from maize not like Kobo (Castor). Sometimes the company didn't pay us immediately, they just take the Kobo and pay a week later. Sometimes longer. The supervisor takes the crop from us and gives us the money when they are ready. We don't have a choice to sell to anyone else." GEE castor farmer from Offa woreda (district), Wolaita



Growing castor as out-growers for biofuel companies has left farmers much poorer.

Exported biofuels failing to meet domestic energy needs

The majority of African states have developed extensive biofuel interests with the explicit aim of meeting domestic energy needs and thus reducing dependence on imported petroleum.

The Ethiopian government has welcomed foreign investors into the country, and allocated extensive areas of land for biofuel production. Ethiopian national policy on biofuels explicitly states that biofuel produced in the region is not to be exported, but to be used to meet national energy use first.

National biofuel policy has encouraged foreign direct investment (FDI) in biofuels through a diversity of mechanisms including a

7-year tax holiday, and being granted the same operational, ownership and banking rights as local investors. National power generation was also encouraged through the development of a biofuel feed-in tariff.

Both Flora EcoPower and Global Energy Ethiopia signed contracts agreeing that all biofuel produced will stay in the country to ensure full national gains.

In reality, however, no foreign biofuel investors (including GEE and FEP) have invested in processing infrastructure inside Ethiopia. The resulting biofuel feedstock is therefore all being exported, being processed into fuel or value-added products abroad, and is being sold in international markets, despite the wishes of the government.

“These companies have been exporting castor oil to Germany, to Europe, to developed countries... The reason why we are inviting these investors in biofuel is to fulfil the gap for energy in Ethiopia. But nobody is following this agreement because there was a loose follow up. Now it is in our hands and everything will be serious. When [the biofuel companies] receive the property they signed an agreement. They have signed previously agreeing to not export it but they are not following the mandate because they know no one is monitoring them, they know there is a gap so they export it.”

Representative from Ministry of Agriculture

Policy issues – gaps in information and enforcement

The threat of biofuel production in Ethiopia is not only the concern of local environmental groups and international NGOs. With the breakdown of companies such as Flora EcoPower, the Ethiopian government is becoming more aware of the risks associated with opening their borders to foreign investment and encouraging biofuel production on their lands.

Ethiopia's official Biofuel Development and Utilisation strategy was produced by the Ministry of Mines and Energy in late 2007. While intended as a strategy to ensure successful widespread biofuel production for Ethiopia, it also explicitly states the principle of the need to take the negative economic, environmental and cultural impacts seriously, and to assure the land, water, grazing and food security and environmental sustainability. .

However the document omits any outline of how the government will enforce these strategies to minimize the social and environmental impacts.

There is no public literature about when, who and how, implementation will be carried out to ensure that mandates in the strategy are fulfilled. The Ethiopian government clearly lacks mechanisms for monitoring the negative impacts of these companies and ensuring the provisions in their strategies are actually followed.

Marginal lands?

The Biofuel strategy explicitly emphasizes the benefits of growing biofuels on arid and unused (marginal) lands. However in Wolaita, a densely populated area already experiencing land pressures and largely dependent on food aid, 5,000 hectares of land used by locals for grazing animals was allocated to Sun Biofuels, and another 3,000 hectares to Global Energy Ethiopia. GEE admitted that the portions of the allocated land were inhabited when they moved in.

Out of date information

Allocations of land to companies have often been based on data mappings that are 30 years old. A representative from the Ministry of Agriculture, stated that the Ethiopian government had not gathered GIS data, which would enable them to detect whether land was inhabited or not, in the past 30 years. This has led to the allocation of land deemed to be unoccupied, when in fact it was inhabited and used. Only in 2009 did the ministry open a new departmental division to proceed over foreign investments, and begin remapping the demarcated areas so that they could avoid giving investors land inhabited by citizens.

Lack of monitoring and implementation

In 2007, international controversy erupted over Flora EcoPower's allocation of land in East Harerge, 87% of which included the Babile Elephant Sanctuary. Community members, sanctuary employees and local NGOs protested this infringement on nationally protected territory. This eventually led government employees to investigate and denounce the company's actions. But by the time

the government intervened, the company had already deforested areas of the elephant habitat. In fact, there is still no evidence of a monitoring body that investigates the impact of large-scale biofuel industries in the country. The head of the Biofuel Development Bureau in the Ministry of Water and Energy (previously the Ministry of Mines and Energy) admitted that the Bureau is in the process of co-ordinating a monitoring forum, four years after biofuel operations have begun in Ethiopia.

Although there is now increased awareness and sensitivity to such potential impacts, much still needs to be done in the policy arena to prevent future damage and destruction.

Conclusion

The extensive and aggressive rush for biofuels in Ethiopia and across Africa was largely based on the assumption that crops such as jatropha and castor could grow successfully in the continent's drier climates. The experiences of three major international biofuel investors in Ethiopia show that this assumption was wrong. We now see that castor struggles to produce a fraction of its anticipated yields, and jatropha barely fruits at all.

Small farmers have borne the brunt of the financial burden for this mistake. The average Ethiopian smallholding is just one hectare of land. In Wolaita, land holdings are often as small as one third of a hectare. As contracted out-growers for the companies, they have displaced their own food production and livelihoods. When the crops have failed to yield the promised (wildly unrealistic) amounts, the farmers have been the ones to bear the financial burden for its failure. 100% of farmers interviewed reported that growing biofuel led to a loss of income compared to growing their usual diversity of food crops.

The Ethiopian government is also losing out. Their original intentions in opening the country up to international biofuel investors, was with the explicit aim of meeting the country's national energy needs with the resulting fuel. Contracts were signed by companies, with the government, agreeing to these terms. But the lure of the international markets is clearly too strong for biofuel companies. With no Ethiopian processing plants yet developed by the companies, government representatives are forced to watch the continued export of all of the country's biofuel feedstock.

With no mechanisms to ensure that the biofuel stays in the country, or indeed any monitoring and implementation systems to ensure that socio-economic and environmental principles are adhered to, the government may be forced to admit that biofuel has been a failure for the country.

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