Jatropha biofuels in Dakatcha, Kenya - The climate consequences

1 Summary

This report summarises the findings of a study conducted by North Energy on behalf of Nature Kenya, RSPB, ActionAid, and BirdLife International. The study assesses the life-cycle greenhouse gas emissions from a proposed jatropha plantation in the Dakatcha woodlands, Kenya, that will mainly be used for biofuels in the European market.

Assuming typical conditions and yields, emissions are found to be 2.5 to 6 times higher than fossil fuel equivalents , principally as a result of the destruction of woodland and scrubland that will be required to plant the proposed jatropha. Under almost all scenarios it would not be possible to meet the European 'sustainability criteria' of delivering a 35% emission saving compared to fossil fuels, and under no scenarios could the 50% standard, which will be introduced in 2017, be met.

Yet this scheme is being put forward by a European-owned company and aims to supply the European market, suggesting that the sustainability criteria are failing to influence practices on the ground. As a result, we are calling for all subsidies and targets for biofuels in developed countries to be scrapped; and the proposed plantation in Dakatcha should be abandoned.

This report is based on the findings of North Energy (2011) *Lifecycle assessment of refined vegetable oil and biodiesel from jatropha grown in Dakatcha woodlands of Kenya*, a report commissioned by Nature Kenya, ActionAid, RSPB and BirdLife International. The full report is available from www.rspb.org.uk

2 Introduction

Demand for biofuels is growing rapidly across the world, particularly in developed countries where subsidy schemes have been introduced for biofuels purportedly because they promise lower greenhouse gas emissions than their fossil fuel counterparts. This has led to a gold rush for land in developing countries to feed these markets and benefit from generous subsidies.

One such land grab is currently taking place in the Dakatcha woodlands. Dakatcha is a vast natural forest and scrubland on the North Eastern coast of Kenya that is home to 20,000 people mostly subsisting off the land, as well as a treasure trove of wildlife, some of which is endemic to the area. Kenya Jatropha Energy Ltd, a company owned wholly by the Italian firm, Nuove Iniziative Industrali, submitted an application to plant 50,000 hectares of jatropha to make biodiesel that will principally be destined for the European market.

The fight to stop this is being led by Nature Kenya, ActionAid, the RSPB and BirdLife International. This report summarises the findings of research conducted by North Energy, a leading renewable energy consultancy in the UK that specialises in life cycle assessment of biofuels. The project aimed to establish the climate consequences of the proposed biofuels scheme in Dakatcha.

2.1 Dakatcha

The Dakatcha woodlands are near the town of Malindi on the coast of Kenya. The forests, thickets and woodlands of Dakatcha Woodland store water, protect the soil, shelter unique animals and plants including globally endangered birds and provide environmental services and direct benefits to the local people. The land is currently held in trust by the County Council of Malindi on behalf of the communities living on the land.

Woodland at Dakatcha – Nature Kenya

The Dakatcha landscape consists primarily of a series of dry forests, with some dense thickets and open woodlands interspersed with active and abandoned farmlands, in the rolling hills northwest of Malindi town. To the south, the site is bordered by the wide Galana-Sabaki River. The wooded hills are vital water catchments for the surrounding farmland.

2.2 Unique wildlife

Dakatcha Woodland has been identified as an 'Important Bird Area' as it is home to a number of globally threatened birds such as the southern banded snake eagle, Fischer's turaco, Sokoke scops owl, Sokoke pipit and Clarke's weaver.

Clarke's weaver is found in only two places on Earth: Dakatcha Woodland and Arabuko-Sokoke Forest to the south. Clarke's weaver probably nests in Dakatcha Woodland, although its nest has never been found. This site is therefore of critical conservation value to Kenya and the world. Without Dakatcha Woodland, Clarke's weaver would become extinct.

Dakatcha Woodland has also been identified as a Key Biodiversity Area (KBA) and a Global Biodiversity Hotspot critical for globally threatened plants and animals found only in a few East African coastal forests. However, despite its importance for water catchment, for

neighbouring communities and for plant and animal diversity, Dakatcha Woodland has no formal protection status.

2.3 Social impacts

The forest is home to over 20,000 people from the Watha and Giriama tribes, most of whom make their living from small scale farming, growing crops such as pineapples, cassava and maize to feed their families and sell in the local market.

Bulldozers at work in Dakatcha forest – ActionAid

They have lived in the woodlands for hundreds of years and face eviction to make way for the proposed biofuels plantation.

The community also relies on the woodlands for drinking water and firewood, and the surrounding trees and plants are an important source of herbal medicine. Most community members have family buried within the woodlands and the grave of a national resistance leader lies within the original 50,000 hectares requested by the company.

3 Calculating the greenhouse gas emissions from biofuels in Dakatcha

The current generation of biofuels are liquid fuels for transport or energy generation. They are derived from crops such as wheat and sugar for bioethanol production and palm oil, rapeseed and jatropha for biodiesel production. In Dakatcha, the proposal is for a vast plantation of jatropha to make biodiesel that will be used for heat and electricity in Europe and Kenya. Given that this is a global market, however, it may also be used for transport fuels. We have considered the potential greenhouse gas implications of all possible uses in this study.

Greenhouse gas emissions are emitted throughout the 'life-cycle' of a biofuel: from clearing the land to planting, growing and harvesting the crop, through to processing it into a biofuel and transporting it to market. This study estimates the complete life-cycle emissions that would arise from jatropha biodiesel grown in Dakatcha.

4 Main Results

[Caption for design] Lifecycle emissions from biofuels made in Dakatcha from jatropha were found to be 2.5 to 6 times higher than fossil fuel equivalents

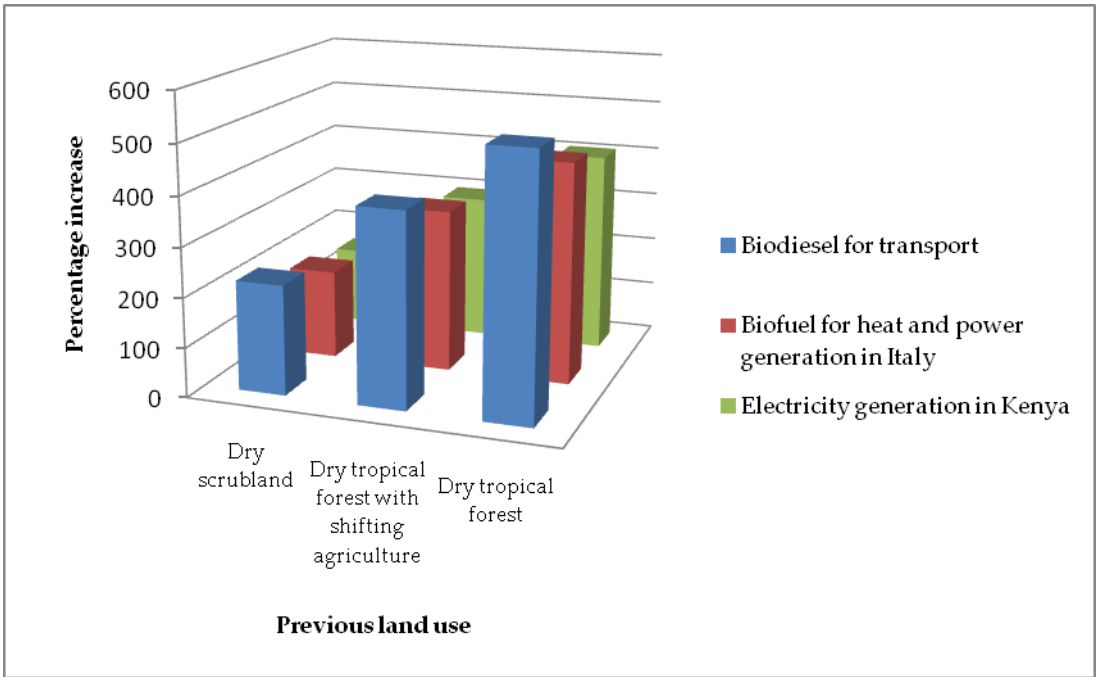
How the land will look if Jatropha is planted – ActionAid

In general biodiesel production from jatropha will lead to huge increases in greenhouse gas emissions compared to using fossil fuel equivalents. Table 1 shows the emission increases associated with the best and worst case scenarios for each of the land uses common in Dakatcha.

Table 1 Greenhouse gas emissions from jatropha biofuels grown in Dakatcha relative to fossil fuel equivalents (negative values indicate increases in emissions)

	Highest emission scenario	Lowest emission scenario
Dry scrubland	-237%	-157%
Dry tropical forest with some shifting agriculture	-402%	-296%
Dry tropical forest	-536%	-406%

Figure 1 Increase in greenhouse gas emissions compared to fossil fuels for different biofuel scenarios as proposed in Dakatcha



The life cycle analysis found that there are no realistic circumstances in which jatropha could be grown on woodland or scrubland in the Dakatcha region of Kenya and meet the target that will be introduced in the EU in 2017 of a 50% saving in greenhouse gas emissions compared to fossil fuels.

In almost all scenarios they would also not meet the existing 35% target. There is one exception where the target can be met marginally if yields are at the top end of what is physically achievable: where the jatropha is planted on scrubland and used for electricity generation or cogeneration. This scenario could not, however, meet the 50% greenhouse gas emission standard.

4.1 Abandoned agricultural land

The Dakatcha woodland and scrubland has small pockets of abandoned agricultural land throughout the landscape. Our study found that, in theory, planting jatropha on this land and using it for biofuels could deliver greenhouse gas emission reductions. In practice this is a highly impractical and, thus, unlikely scenario as small parcels of jatropha separated by other land uses would not deliver the economies of scale that developers targeting the European market are looking for.

4.2 The effect of yields

A 'sensitivity analysis' was conducted to look at how the net emissions from the scheme varied when key assumptions were changed. One of the most sensitive variables that is particularly uncertain at this stage is yield. Based on jatropha yields from the project's

Environmental Impact Assessment, annual yields of between 5.1 and 11.9 t/ha were predicted. But we found that there are no realistic circumstances where yield would be high enough to meet the EC target of a 35% or 50% saving compared to fossil fuels where forest is displaced. Where the jatropha is planted on scrubland, which is the expected situation for some of the proposed plantation, very high yields of >8t/ha could allow some biofuel uses to meet the 35% target. Even these scenarios would not, however, meet the 50% target.

5 Will sustainability standards stop this from happening?

Sustainability standards are often put forward as the answer to preventing biofuels in developed countries causing environmental and social disasters such as the scheme proposed in Dakatcha. The EU has introduced a requirement that biofuels meet three generic sustainability standards: emission savings should be higher than 35% compared to fossil fuels, and biofuels should not be grown on lands that have a high carbon stock nor on some areas of high conservation value. Our analysis has shown that jatropha biodiesel from Dakatcha would not comply with the EU's greenhouse gas standard, let alone the biodiversity standard. Yet the company looking to take forward the Dakatcha scheme is aiming to produce biofuels for the EU market. Their existing customers potentially include the European furniture giant, Ikea. Why won't the EU's sustainability standards prevent this from happening? There are two key reasons:

No one checks whether companies are doing what they are saying – It is down to the company to designate the previous land use of the plantation; no one actually visits the site to check up on them. As long as the jatropha meets the requirements of the sustainability criteria, the company just has to fill out some forms and collect their subsidies. In Dakatcha, Nature Kenya, ActionAid and active community groups were watching and able to link up with international organisations to shine a spotlight on the bulldozers, but this won't be the case in most instances.

The standards are vague and ridden with loopholes - The greenhouse gas standard allows companies to use default values to calculate their lifecycle emissions. In this study we've done a detailed assessment of the emissions from jatropha biodiesel, working out the emissions based on actual data from the region in question. Biofuel companies don't have to do this. They can get away with claiming they don't know the detail and using 'default' values instead, which are inevitably based on rosy assumptions.

6 What's the solution?

Sustainability standards such as those introduced by the EU don't work. They lack teeth and are full of loopholes. Meanwhile, targets contained in the EU Renewable Energy Directive (RED) are stimulating the growth in the production and consumption of biofuels. Nature Kenya, RSPB, ActionAid and Birdlife International do not believe that these targets can be met sustainably given the proposed massive increase in biofuels by member states. The analysis in Dakatcha is just one example. We are therefore calling for the scrapping of all support and targets for biofuels in developed countries, until it can be demonstrated that such targets can be met sustainably. Instead, Governments should focus on reducing emissions in the transport sector through rolling out electric vehicles and renewable electricity, along with major improvements in energy efficiency and greater use of public transport, cycling and walking.

The globally threatened Clarke's Weaver which will go extinct if the jatropha project proceeds – Steve Garvie

We are calling for the proposed biofuels plantation in the Dakatcha Woodlands to be abandoned. We are not opposed to development but it must be carried out in a manner that takes into account the interests of all parties involved. The principle of free, prior and informed consent must be adhered to in relation to land acquisition. Rights must be upheld including community's rights to land, shelter, food and water. This project also threatens to destroy an area that is important for its biodiversity and which is home to a number of endangered species.

Sustainable biofuels could have a role in the future, particularly for the aviation and heavy haulage sectors, where decarbonisation options are limited. That means that, in the meantime, we have to keep on working on sustainability standards that do work.

7 Methodology

We used data from the Environmental Impact Assessment (link) submitted by Kenya Jatropha Energy Ltd to the Kenyan Government, supplemented with assumptions that reflect usual practice where the necessary details were lacking. This data was inputted into an existing model owned by North Energy for calculating the total GHG emissions emitted

by making biodiesel from jatropha grown in Dakatcha. The methodology is consistent with that required under the EU Renewable Energy Directive. The results were then compared to the emission saving targets for biofuels that are established in the RED of 35% and 50% relative to fossil fuels.

The area that KJE Ltd wants to plant jatropha on in Dakatcha consists of a range of land uses. It is mostly natural dry woodlands, interdispersed with scrubland and subsistence farming. This means that the greenhouse gas emissions from clearing the forest and ploughing the land must be accounted for in the greenhouse gas emission calculation.

We explored a range of scenarios for biofuel production from jatropha in Dakatcha, including different:

- Possible products and uses: biodiesel for transport in Kenya, refined oil for electricity generation in Kenya, and refined oil for heat and electricity cogeneration (heat and electricity) in Italy.
- Means of refining the oil: fuel-oil fired boiler with grid electricity, plant with fuel-oil fired CHP, plant with biomass-fired CHP.
- Different land-uses: scrubland, dry tropical forest with some shifting agriculture, and pristine dry tropical forest. Carbon losses from converting these land uses to jatropha are based on EC default values, as specified in the EU Renewable Energy Directive.