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Moratorium in Biofuel Development Projects In Tanzania: The Need for Policies, Guidelines and Sustainability Criteria[1]

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Abstract

Three main assumptions have influenced bioenergy development globally, namely that: (i) bioenergy is a cheap and renewable alternative source of energy; (ii) bioenergy can reduce carbon emissions to the atmosphere; and (iii) bioenergy offers new opportunities to farmers in developing countries to reduce poverty and improve livelihoods. The third assumption has found sympathetic ears in Africa and has influenced development of several bioenergy programmes and experiments. It is assumed that alongside other benefits, bioenergy development will bring benefits to African farmers and improve their livelihoods, increase their revenues and, eventually, also enable them to reduce poverty. However, the development of bioenergy globally, and in Tanzania in particular, has raised more questions and concerns than the solutions it was supposed to provide. Tanzania is entering into this energy production process amidst increased demand in Europe, America and China for more bioenergy products, while there are few safeguard policies and institutional framework to guide the process. If this trend is left unguided it will result in negative impacts to local communities, the economy, the environment; and the overall food security will be jeopardized. This article calls for a moratorium on the development of bioenergy projects in order to take time to develop appropriate legal and institutional framework and safeguard policies for sustainable development of bioenergy industry in Tanzania.

***Keywords**: bioenergy, biofuel, environmental sustainability, food security, loss of land, guidelines.*

Introduction

Bioenergy development worldwide has been influenced by factors such as increase in CO_2 emissions arising from personal transportation, increasing cost of oil prices (for example, from US$50 per barrel in 2005/06 to nearly US$100 in 2008), and the assumption that bioenergy can provide opportunities to farmers to generate more revenue. In Africa it is assumed this will improve rural livelihoods and reduce poverty, albeit under right conditions (Oxfam, 2007).

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[1] When the preparation of this paper started, Tanzania had just started the preparation of the Guidelines for Biofuels, which have been approved in November 2010 and also the preparation of the National Biofuel Policy started in 2012. However, the gaps in policy measures were the basis for this paper ad the need for sustainability criteria is still apparent.

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The increase in CO_2 emissions is a matter of concern because of its impact on global warming and climate change. One of the fastest sources of CO_2 emissions is personal transportation, which is the world's largest consumer of fossil fuels (UNDP, 2007). The Human Development Report for 2006/2007 noted that in 2004, the transport sector had produced 6.3 Gt CO_2 (UNDP, 2007). The share of developing countries in carbon emission is growing, while the contribution of OECD countries is about two-thirds of total global CO_2 emissions (UNDP, 2007). The automobile sector in these countries contributes about 30% of the emission (UNDP, 2007).

Greenhouse gas emission from any vehicle is a function of distance travelled, amount of fuel used for the distance covered, and the carbon content of the fuel. Many developed countries have put in place fuel efficiency standards; with the European Union and Japan having the highest standards, while United States of America has the lowest in developed countries. The US standards are lower than those in China (UNDP, 2007). The European Union, the largest automobile market in the world, has set a target of 120g CO_2/kilometres by 2020 – a target that is challenged by manufacturers who claim that this would undermine the competitiveness of the automobile industry (UNDP, 2007).

While regulatory standards are being implemented, alternative fuels are also being promoted as a way of reducing CO_2 emissions, especially by using less fossil fuels and more fuels from plants. Many governments now see biofuels as a technology that offers triple advantage: helping to fight global warming, reducing dependence on fossil fuels (UNDP, 2007), and providing opportunities to farmers in developing countries to reduce poverty (Peskett et al., 2007).

Biofuels are products that can be processed into liquid fuels for transportation or heating. There are two primary types of biofuels in use: *bioethanol,* which is produced from sugarcane, sugar beet, corn, wheat, and sorghum; and *biodiesel,* which is produced from oil seeds such as rape, sunflower, jatropha, and soy. Palm and coconut oil is also another source of biodiesel. Bioethanol can be blended with petrol, and biodiesel can be blended with petroleum-based diesel for use in diesel-fuelled vehicles. Countries such as China, Malaysia, Brazil, several European countries and USA have been using different types of biofuel from sources such as wood, wood chippings and straw, pellets or liquids made from wood, methane from animal excrement, ethanol, diesel or other liquid fuels made from processing plant materials or waste oil (http://news.bbc.co.uk/1/ hi/sci/tech/ 6294133.stm). This paper does not consider the broader technical aspects of bioenergy. It is oncerned mainly with the policy, social and environmental implications of developing such an industry in the absence of clear policy and institutional framework.

Trends in Biofuel Development

Biofuel is not a new source of energy; many communities across the world have used biofuel in the past, although on relatively small scale and often at household level. For example, Jhamtani and Dano (2007) note that during the Japanese occupation in South-East Asia, many rural communities, having no access to kerosene, used oil extracted from jatropha *curcas*, coconut and castor beans for lighting lamps at night and for cooking.

Years before World War II, pioneers such as Henry Ford and Rudolph Diesel designed cars and engines to run on biofuel; and in UK and Germany, biofuels mixed with petrol or diesel made from crude oil was sold to customers (http://news.bbc.co.uk/1/hi/sci/tech/6294133.stm). Today, there are few countries that have developed technologies to run their vehicles on bioenergy. More changes are likely to take place in the coming decades as more countries embrace biofuels for their transportation and heating requirements.

The last ten years or so have witnessed technologies and programmes for biofuels taking the 'longest leap forward', which has resulted in projecting biofuels as important alternative sources to fossil fuels globally. Today, there is unprecedented growth of a global biofuels market as many countries introduce policies and programmes to increase the proportion of biofuels in their energy portfolio. In Brazil, biofuels account for about one-third of total transport fuel (UNDP, 2007). In developed countries, biofuels have constituted an energy-based growth industry where very ambitious targets have been set.

In the USA, the use of biofuels is projected to reach 35 billion gallons by 2017, at least 5 times the current levels. The aim is to replace 15% of imported oils with locally produced ethanol (UNDP, 2007). The EU is also intending to raise the share of biofuels in road transport to 10% by 2020 (UNDP, 2007). These targets are supported by massive subsidies. In the USA, subsidies for maize-based ethanol reached US$2.5bn in 2006, while overall subsidies for ethanol and biodiesel, not to include direct payments to maize farmers in the USA, reached US$ 5.5–7.5bn (UNDP, 2007). In Europe, the arable area for producing biofuels will rise from estimated 3m hectares in 2006 to 17m hectares in 2020. Most of the increase in supply of biofuels in Europe will come from local production of cereals and oil seeds, with imports accounting for about 15-20% of total demand by the same year 2020 (UNDP, 2007).

Considerable effort in the production of biofuels will be needed to satisfy greater future global demand. For example, the European Union's target of 5.75% biofuel content in the fuel transportation blends by 2010 will put

pressure on production in Europe and outside. Global biofuel production is estimated at over 35bn litres, of which 90% is bioethanol. Also, only a fraction of bioethanol production enters the world market, while most of it is consumed domestically. Currently, production mainly of ethanol is dominated by the USA and Brazil by 39 and 33%, respectively. However, future increases in volume of production are expected to come from Brazil, USA, China, India, Malaysia, Indonesia, and now Africa.

Africa is entering the production of biofuels largely as a supplier of raw materials for markets in Europe, USA and Asia. Many African countries have set aside large areas of land as big as the size of India for agrofuel crop production (Wade, 2006 in Grain, 2007).

BOX 1: BIOFUEL PRODUCTION IN AFRICA

Several biofuel projects have started or are in the process of starting in Africa. In Nigeria, plans to establish ethanol factories using cassava and sugarcane and to import Brazilian made ethanol powered vehicles are underway. In Corte d' Ivoire, 21st Century Energy of USA plans to invest up to US$130 million in the production of ethanol from sugarcane, maize and sweet sorghum, and later to manufacture biodiesel from cottonseed and cashew nut residues. Similar plans exist in Kenya for jatropha, ethanol in South Africa, and in Congo where they are using eucalyptus plantations for production of wood chips that will be shipped to Europe for use as biomass. Also, oil palm plantations will be established in Congo for biofuel production. Burkina Faso in West Africa will have biodiesel production from cottonseed, and in Cameroon oil palm plantations will be expanded for production of biodiesel. In Uganda, plans to convert part of an island on Lake Victoria to oil palm plantations for biodiesel failed due to public opposition (http://tinyurl.com/29uolk). Similar programmes are taking place in Malawi, and Mozambique.

Ethiopia is perhaps the only country in Africa that has set aside the largest land for bioenergy production. The government of Ethiopia has identified 17.2m hectares of land as suitable for jatropha *curcas*, while 1.5m hectares are under negotiation. The industry promotes jatropha, castor beans and palm oil for energy production, while the government is supporting these initiatives zealously amidst serious concerns from the local population. The government of Ethiopia is planning to establish an ethanol plant, and to introduce new varieties of maize, sorghum and sunflower for biodiesel. A German company, *Flora Ecopower* is investing US$77m in bioenergy in Ethiopia, and part of their strategy is to gain control over the full production

chain. Subsequently, it has signed an agreement with farmers' associations in which about 700 farmers will each set aside two hectares of land for a period of five years for bioenergy crops (http://www.floraecopower.com).

Sun Biofuels of the UK has invested in biodiesel in Ethiopia, and has purchased 80% of the National Biodiesel Corporation of Ethiopia as a strategy to strengthen its position in East Africa. It also helped to draft the Ethiopian Biofuel Strategy, and it is collaborating with the government in surveys to identify areas that should be under biofuel (http://tinyurl.com27emzb). *Sun Biofuels* is also investing in biodiesel in Tanzania.

Concerns Associated with Bioenergy Development Projects

The development of bioenergy industries has had numerous challenges and has evoked high emotion in different countries. Some of the concerns associated with bioenergy development are summarized below:

- Controversies still surround the role of bioenergy in reducing greenhouse emissions. Some scholars argue that bioenergy has little energy benefits and savings, compared to the energy required to produce it. The net energy benefits of biofuels production may be negative for many crops because their energy outputs are less than the fossil energy inputs required to produce them (Peskett, et al., 2007). Thus, biofuel may cause more greenhouse gas emissions than conventional fuels if the full emission costs of producing bioenergy are taken into account.

- Bioenergy production increases the price of food by diverting food crops—such as cassava, maize, sorghum, etc—to for energy production. The price of maize and soy beans has shot up to unprecedented levels causing global concern, as this infringes on the availability of food. For example, the price of one metric tone of maize in USA, the biggest maize exporter, rose from US$122 in 2006 to US$233 in 2008 (htpp://siteresource.worlbank.org/INTDAILYPROSPECTS/Resources/Pnk_0408pdf). The World Bank, World Food Programme (WFP), International Monetary Fund (IMF) and other international organizations have raised concern regarding increasing food prices and their impacts in many countries. The problem of food deficit will affect Africa with or without the continent entering bioenergy markets because of the dependence Africa has on food aid and the effect the industry will have on food production on the continent.

- Displacement of local land users—especially in Africa, South America and Asia—is becoming an issue of concern. Bioenergy projects require large land areas, which eventually leads to displacement of local land

owners and limiting their accessibility and use of the land that has been their livelihood. Displacement creates landlessness and changes in land use amongst rural dwellers that may end up being tied to the plantations as casual labourers, or who might exert more pressure to other areas.

- Deforestation due to clear felling in order to plant bioenergy crops is impacting on biodiversity in general, and affecting natural carbon sinks such as forests and wetlands (Martino, 2007; Oxfam, 2007 (www.unep-wcmc.org/climate/mitigation.aspx). Replacing indigenous crops with mono-crop plantations may have negative effects on the environment and the availability of timber and non-timber forest products.
- There is also increased pressure on water use. Ethanol from sugarcane and wood chips from some species of eucalyptus may increase demand for water use, and thus increase problems of availability of water to local communities for various domestic and economic uses.
- Who is benefiting most from bioenergy development? This concern is more relevant to Africa because the main use of bioenergy is for automobile transportation, and the majority of Africans who will be cultivating for bioenergy cannot afford automobiles. The bulk of the bioenergy is for export. Furthermore, replacing sustainable and food secure agricultural systems and forests with foreign-owned industrial production will impact on the livelihoods of the rural people. Further, privatization of the land, which is the source of Africa's wealth, will undermine any chance that those countries have of determining their own future. Also, there is no evidence from anywhere in Africa that rural communities have managed to reduce their poverty based on biofuel businesses. To the contrary, displacement and loss of access to land have compounded their poverty.
- Many countries in Africa that have entered into the bioenergy industry do not have clear policies, standards or criteria for choosing amongst the alternatives provided by bioenergy. Due to this lack of relevant policies, standards and criteria, many countries in Africa have not set their priorities in energy development.
- Other issues include human rights abuse associated with labour laws in plantations, e.g., child labour, evictions from land, and marginalization of the poor and vulnerable groups.

Development of Biofuels in Tanzania

The main objective of the Tanzania Energy Policy of 2003 is to provide input in the development process of the country by establishing a reliable and efficient energy production, procurement, transportation, distribution and

end-use system in an environmentally sound manner, and with due regard to gender issues. The policy, among other aims, discourages forest depletion and promotes cost effective domestic energy sources, efficiency and human resources development. However, the policy does not provide clear policy statements or strategies for bioenergy development, or priority areas in terms of bioenergy options that could be developed. Tanzania is entering into the industry within the context of unclear energy policy priorities, complex issues and global concerns with regard to biofuels development.

Assessment of biofuels potential in Tanzania estimates that nearly half of the country's land area is suitable for biofuel production (GTZ, 2005). The assessment further notes that Tanzania has a significant potential to produce biofuels from sugarcane and oil seed crops such as jatropha and palm trees. It adds that the country could become a cost-competitive supplier of biofuels to the world market, due to the relatively high sugarcane yields and large underutilized land (GTZ, 2005).

The same report makes nine recommendations to the government to promote liquid biofuels. Among the nine recommendations, the report urges the government to establish a national task force to provide advice and recommendations regarding the formulation of biofuel policies and regulations suitable for Tanzania. However, the government is being urged to start *immediately and without waiting for results and policy advice from the task force, to promote increased use of biofuels through the learning-by-doing process* (GTZ, 2005) (emphasis added).

Several bioenergy projects have thus started in different areas in Tanzania, and many more are likely to come in the future (see Table 1).

Table 1: Companies involved in bioenergy projects in Tanzania

	Company	Type of Crop	Location
1	Bio-Alcohol Fuel Foundation (BAFF) of Sweden, Svensk EtanoKemi AB (SEKAB) of Sweden and SEKAB Biofuel (T) Ltd	Sugarcane	Bagamoyo and Rufiji, Coast Region
2	Prokon of Germany	Jatropha	Mpanda, Rukwa Region
3	WILMA – USA	*Croton megarocarpus*	Biaharamulo, Kegera Region
4	Mitsubishi Corporation, Japan		Arusha and Dar es Salaam
5	FELISA – Tanzania and Belgium	Palm Oil	Kigoma
6	InfoEnergy, UK	Palm Oil	Morogoro
7	KAKUTE –Tanzania	Jatropha	Arusha
8	TaTEDO –Tanzania	Jatropha	Various regions
9	Diligent Tanzania Ltd	Jatropha	Arusha

10	NEESTA of Dar es Salaam	Jatropha	Dar es Salaam
11	Kikuletwa Farm, Tanzania	Jatropha	Moshi
13	Sun Biofuel, UK	Jatropha	Kisarawe, Coast Region
14	Kitomonto Bagamoyo	Jatropha	Bagamoyo
15	National Services and Prisons Department, Tanzania	Jatropha	Various areas
16	J & J Group of South Africa	Jatropha	Kaliua, Tabora Region
17	Bioshape Holdings BV, of The Netherlands	Jatropha	Kilwa, Coast Region
18	Kapunga Rice Project Ltd, Tanzania	Jatropha	Mbarali, Mbeya Region

Experience with Bioenergy to Date

Tanzania has gained a bit of experience and learnt the following lessons in the *doing-by-learning* process, with respect to the development of bioenergy projects, some of which are explained below.

(a) Compliance with Existing Laws

According to the Environmental Management Act No. 20 of 2004 (URT, 2004), and the Environmental Impact Assessment and Audit Regulations of 2005 (URT, 2005), all bioenergy development projects require mandatory Environmental Impact Assessment (EIA). However, while some EIAs for the proposed bioenergy development have been undertaken, the quality of the EIAs have been a matter of great concern because the reports may not be very useful in informing decision makers about the most critical issues that have to be taken into account prior to passing decisions. Some of the weaknesses of the EIAs in bioenergy projects include the following:

- Inadequate identification and analysis of significant impacts and the development of mitigation measures;
- Inadequate identification of cumulative impacts, particularly the effect of outgrowers' schemes that most of the projects will support;
- Inadequate identification of biodiversity related issues;
- Inadequate identification of project alternatives;
- Inadequate public participation and stakeholder involvement;
- Some components such as cost-benefit analysis, resource valuation and impact evaluation are not adequately addressed;
- The EIA teams do not have all the necessary expertise to carry out detailed EIAs;
- Many local and national leaders that support these projects might not know the value of EIAs, hence they give these assessments very little support; and
- Some developers consider EIAs as bottlenecks, and hence do not provide adequate support and time to allow the teams do a thorough job.

The poor quality of the EIA reports is a result of inadequate local expertise and experiences in EIAs in general, and specifically in bioenergy projects in Tanzania. For example, in one EIA case for bioenergy development in Kisarawe District, the EIA team failed to carry out sufficient impact analysis and allowed a situation where an investor was putting in over US$50m of investment but the local people whose land was being taken were paid an average of US$250 per household as compensation for the loss of land. The team failed to connect the investment, the EIA and the national policies that support the use of private resources as investment for poverty reduction, i.e. *Mpango wa Kurasimisha Rasilimali Binafsi Tanzania* – MKURABITA). Land as a resource could be used as an investment to enable local people and their institutions (district councils) become shareholders in the proposed project instead of being required to sacrifice their land to a foreign company.

(b) Location for Bioenergy Projects

Investors have played a major role in influencing the location of bioenergy projects. For example, a bioenergy project in Kapunga, Mbeya, was located in a rice cultivation area that has very high rainfall and good agricultural land for food production. The developer-started trials in a 150-hectare farm to plant jatropha but most of it were destroyed by bad weather. The proposed development in an area formerly designated for rice production conflicted with national food policies, and raised concern about the country's priorities. Several other projects are proposed to start in high biodiversity areas or wetland areas that are suitable for food production or conservation purposes.

(c) Rising Public Concerns

Already the public and several NGOs have started to voice their concerns regarding bioenergy projects. Many of the concerns are similar to the global concerns that have dominated the industry in the last decade. In Tanzania, the concerns include land alienation, access to water, land use conflicts, food security, governance issues, poor infrastructure and lack of local markets for bioenergy products and export of raw materials. Others include impact on biodiversity, social-cultural issues, poverty and lack local financing such that most of the projects are foreign-owned, lack of appropriate policy, legal framework and supportive guidelines.

(d) Lack of Appropriate Policies and Guidelines for Bioenergy Development in Tanzania

The lack of appropriate policies, guidelines and standards to guide the development of biofuel projects in Tanzania was identified in 2005 (GTZ, 2005). A task force was established in 2006 in the Ministry of Energy and Minerals to advise the government on biofuel issues (MEM, 2007). The task

force was mandated to: (i) develop biofuel guidelines and national biofuels strategy, legislation and regulation; (ii) prepare a coordinated and integrated programme for biofuels development in Tanzania; (iii) develop a programme, identify and map-out suitable areas/land for biofuel development in Tanzania; (iv) elaborate suitable incentives to ensure return of investment (e.g., tax reductions); and (v) implement public awareness activities.

The National Biofuels Task Force is receiving financial and technical support from Swedish GAA SIDA funds. SEKAB[2] is a Swedish based company that is also interested in investing in biofuels in Bagamoyo and Rufiji, Coast Region, but some of their staff also sits in the National Biofuels Task Force to provide 'technical advice'. The involvement of SEKAB or Swedish government in this process raises questions whether SEKAB and SIDA will be impartial in developing policies, regulations and financial incentive packages that will reflect and protect national interests. The involvement of SEKAB in the process of formulating policies for bioenergy development in Tanzania is a continuation of the activities that major European investors in this sector in Africa are doing to secure total control of the production and marketing of biofuels. *Sun Biofuels* and *Flora Ecopower* have done the same in Ethiopia.

Why Is a Moratorium Needed Now?

A framework for sustainable development of bioenergy development in Tanzania does not exist. These missing links underscores the need for a moratorium to assess the critical problems associated with bioenergy developments and prioritize actions. The suggestion that Tanzania can proceed with the *doing-by-learning* process seems to be untenable and costly due to increasing concerns regarding bioenergy locally and globally. Some of the effects caused by hastily implemented biofuel projects may be very difficult and costly to undo by the time proper mechanisms are put in place. For example, the environmental, social and economic implications resulting from the biofuel projects may have far greater effects and over a long period even if projects take different directions.[3]

A moratorium is thus called to enable the government to develop and put in place the following policies and instruments in order to guide the development of the biofuels industry.

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[2]SEKAB has since been replaced by ECOENERGY, a company led by some former SEKAB staff, and still interested in sugarcane cultivation in Bagamoyo.

[3]Many of the companies that acquired land for biofuel in Tanzania are actually not in production, and some simply abandoned the land and their equipment, leaving local people in limbo.

(i) National biofuels policy guidelines, strategy and legislation

This work, which has started with the National Biofuels Task Force, must be completed so that it helps to guide the industry. The development of the policies must be participatory, involving local producers and organizations representing local communities, and the most affected stakeholders.

(ii) Sustainability Criteria

The industry must be developed in a sustainable manner. However, in the absence of sustainability criteria, the goal to achieve sustainable bioenergy development will not be met. True, the European Union is now developing sustainability criteria for the bioenergy industry; but locally-based criteria are important as these should reflect the situation and concerns that Tanzania is facing with regard to bioenergy. Issues such as biodiversity, food security, land, labour rights, governance, social standards, marketing, financing, capacity development, poverty issues and benefits to local and national economy must be prioritized in the criteria for sustainable biofuels development in Tanzania.

(iii) Capacity Development Programme for Bioenergy

Tanzania is entering into the biofuels industry without sufficient human and technical capacity to carry out research and development and to manage the issues that are associated with bioenergy technologies. In the absence of such capacity, Tanzania will remain dependent on developed countries and may find its resources being utilized to benefit external markets. A programme of capacity development targeting local expertise is, therefore, necessary.

(iii) Integration of Strategic Environmental Assessment (SEA) in the Development of Policies and Programmes for Bioenergy[4]

The Environmental Management Act No. 20 of 2004 (URT, 2004) directs that policies and programmes such as for bioenergy require SEA as a condition for their approval. The value of SEA has been explained in detail in the Act and elsewhere (Dalal-Clayton & Sadler, 2005; Verheem & Tonk, JAMM, 2000; Partidário, 1996; Noble, 2000; Thérivel et al., 2004). The National Biofuels Task Force must ensure the processes they are coordinating include an undertaking of the SEA not only as a matter of compliance with the Environmental Management Act No. 20 of 2004, but as a measure of best practice. These processes cannot be developed when several bioenergy projects are being implemented, and with varying degrees of impacts.

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[4]A Strategic Environmental Assessment for biofuel policy development is in the final stages, hopefully this will inform the biofuel policy.

Conclusion

The paper has examined the development of bioenergy projects globally, in Africa, and in Tanzania in particular. The analysis has laid bare the underlying assumptions supporting the development of biofuels and issues that have characterized this industry. Issues such as its impact on food production, biodiversity, human rights, reduction on green house emissions, and benefits to local communities have been addressed. Several measures have been put in place at different levels to address these issues. However, Tanzania seems to have entered into the industry without having sufficient policies and guidelines. The few projects that have been started in the country have already indicated the existence of many problems and concerns.

This paper is calling for a moratorium in the development of biofuel projects in Tanzania until appropriate policies, guidelines and priority areas are identified. The process—including policy and guideline development—has started but it will be important to allow it to come to a reasonable conclusion before projects are allowed to take off. In that way, the government will be in a position to manage and direct the industry while taking into account local and national interests and issues of sustainability.

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