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Policy Challenges Related to Biofuel Development in Tanzania

Hussein Sosovele

Abstract: Biofuels have recently emerged as a major issue in energy policy, agricultural development and natural resource management. The growing demand for biofuels is being driven by high oil prices, energy security concerns and global climate change. In Tanzania there is growing interest on the part of foreign private investors in establishing biofuel projects, although globally there are concerns related to biofuel investments. Tanzania has approved a number of such projects, but the biofuel subsector faces several policy challenges that could clearly hamper its development. These include the lack of a holistic and comprehensive energy policy that addresses the broad spectrum of energy options and issues, and weak or absent institutional and legal frameworks. This article highlights some key policy issues critical to the development of biofuels and argues that if these challenges are not addressed at the national policy level, biofuel development may not result in the expected benefits to Tanzania and the majority of its local communities.

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Keywords: Tanzania, energy policy, biofuels, environmental damage, food security

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Over 90 per cent of Tanzania's energy requirements are obtained from wood-fuel, with about 2 per cent from electricity and 8 per cent from petroleum products.¹ This trend of wood fuel dependence as source of energy for the majority of the people is unlikely to change for many years to come, and it will have implications on long-term social development and environmental sustainability.

Approximately 2 per cent of the rural households and only 39 per cent of urban households have access to electricity. However, even households connected to the national grid often tend to utilize a mixture of energy sources, with electricity used for lighting and other sources for cooking. While the government's strategy is to support the development of various types of energy resources, it is the development of biofuels (liquid bio-energy) that has generated the most discussion and concern in Tanzania. This article discusses those policy challenges critical in the development of biofuels in Tanzania. A policy is defined here broadly as a statement of principles or intent established by an organization or government in order for it to achieve its goals and objectives with regard to specific subject areas, in this case biofuel development. Policy challenges are those aspects that together or in isolation influence the outcome of the desired policy goals and objectives.

Energy Problems in Tanzania

Tanzania faces several problems related to the supply, distribution and utilization of energy, despite its huge potential in relation to a variety of energy resources. Hydropower, gas and petroleum are the main energy sources used for commercial purposes, while the majority of Tanzanians rely on biomass energy for their daily needs. The forest areas that supply energy needs are being harvested and degraded at a rate faster than they are being regenerated. According to the Ministry of Energy and Minerals (MEM), Tanzania's deforestation rate stands at 91,000 ha per year; much of this deforestation is associated with clearing for charcoal and firewood (MEM 2009). The consumption of charcoal in urban areas has reached unprecedented levels. For example, as data collected only from manned control points suggest, Dar es Salaam alone consumes approximately 28,000 bags (on average 56 kg each) or 1,568 tonnes of charcoal per day, thus exacerbating deforestation and the degradation of land in the supplying regions (Malimbwi and Zahabu 2008).

1 See Tanzania National Website, Ministries, <http://www.tanzania.go.tz/ministries_f.html> (accessed 27 June 2010).

Tanzania's dependence on hydropower for commercial and industrial purposes has resulted in serious development problems. The generation of electricity from the main dams has declined since 2005 due to drought (Tanzania Economic Survey 2006). Consequently, the Tanzania Electricity Supply Company (TANESCO) carried out power-rationing across the country, sometimes up to 18 hours a day in some cities and towns. The economic loss caused by power rationing during the 2005–2006 period has not been calculated, but it can be expected to be several billion shillings.

Several measures, including moving people away from the river valleys and catchments (Sosovele 2007), were undertaken during the power-rationing period of 2005–2006 in order to avert the dangers of the prolonged decline in the level of water in the main hydropower dams. The importation of petroleum products for energy purposes costs the country approximately 400 million USD per year (MEM 2009), and recently supply challenges have resulted in increased pump prices. Pump prices have continued to fluctuate since 2004, resulting in increased costs for transportation and other goods.

Other energy resources—such as coal; solar, wind and geothermal energy; uranium; bioethanol; and biodiesel—that were virtually untapped began to attract interest from policy makers and the private sector in 2005. Tanzania is pursuing all these initiatives simultaneously, albeit without a clear energy strategy that sets national energy priorities. The current energy policy, passed in 2003, is not sufficient to address the new demands and challenges. It is against this background that biofuel development is taking place in Tanzania.

Biofuel Development—A Brief History

Many scholars have written about global and local biofuel development, discussing various issues such as benefits, environmental concerns, land use issues, social issues, revenues, technologies, standards, etc. (see for example Oxfam 2007; Sosovele 2008; Mwamila et al. 2009; UNDP 2007; Martino 2007; GTZ 2005; Jhamtani and Dano 2007; WWF 2008 and 2009). The development of biofuels is influenced by factors such as the increase in CO₂ emissions from personal transportation, increasing oil prices, increasing demand for fossil fuels in the fast-growing economies of China and India, and diminishing fossil fuel reserves globally (Mwamila et al. 2009; UNDP 2007). In Africa it is assumed that biofuel development will improve rural livelihoods, reduce poverty and improve transportation (Oxfam 2007; Sosovele 2008).

The US, Brazil and Europe are leaders in the use of biofuels for transport purposes. Approximately one out of every 40 cars and trucks in the US

run on a commercial mix of gasoline and ethanol which is mostly made from corn (Mwamila et al. 2009). Brazil has pioneered ethanol production and use since the 1930s and has developed an integrated ethanol and automobile technology that has created flex-fuel or bi-fuel vehicles. Approximately 70 per cent of all cars in Brazil run on petroleum products or ethanol, or a blend of the two (UNDP 2007). Brazil is now developing a tri-fuel vehicle that can run on gasoline, ethanol and natural gas as well as on compressed biogas. The development of such technologies has been a prerequisite for Brazil's ethanol programme successes (UNDP 2007).

Biofuel development has generated ambitious targets in developed countries. For example, in the US the use of biofuels is to reach 35 billion gallons by 2017 in order to replace 15 per cent of imported oils with locally produced ethanol (UNDP 2007). The EU also intends to raise the share of biofuels used in road transport to 10 per cent by 2020 (UNDP 2007). These targets are supported by subsidies and investments in farming, research and development. In the US subsidies for maize-based ethanol reached 2.5 billion USD in 2006, while overall subsidies for ethanol and biodiesel, not including direct payments to maize farmers, reached 5.5–7.5 billion USD (UNDP 2007).

Most of the supplies to meet US and EU demands will certainly come from Asia and Africa. Many African countries have set aside large areas of land for biofuel crop production (Wade 2006). Ethiopia has set aside the largest amount of land for bioenergy production in Africa. Its government has identified 17.2 million ha of land as suitable for *Jatropha curcas*, while 1.5 million ha are under negotiation. The Ethiopian government is supporting these initiatives zealously amidst serious concerns on the part of the local population. A German company, Flora Ecopower, is investing 77 million USD in bioenergy in the country, and part of its strategy is to gain control of the full production chain.² Similarly, Sun Biofuels of the UK has also invested in biodiesel in Ethiopia and has purchased 80 per cent of the Ethiopia National Biodiesel Corporation as part of its strategy to strengthen its position in East Africa. Sun Biofuels also helped to draft the Ethiopian Biofuel Strategy and is collaborating with Ethiopian government on surveys to identify areas that should be used for the cultivation of biofuel crops.³ Sun Biofuels is also investing in biodiesel in Tanzania. Biofuel development is also taking place in Kenya, South Africa, Congo, Burkina Faso, Cameroon, Uganda and Nigeria. This development involves foreign companies

2 See GRAIN-website, <<http://www.grain.org/seedling/?id=481>> (accessed 27 June 2010).

3 Ibid.

and feedstocks such as cottonseed, sugar cane, maize, sweet sorghum, eucalyptus as wood chips, jatropha and oil palm.⁴

Biofuel Development in Tanzania

The assessment conducted by the German Association for Technical Cooperation in 2005 on bioenergy development in Tanzania laid the foundation for the development of biofuels in the country (GTZ 2005). The GTZ assessment estimated that nearly half of the country's land area is suitable for biofuel production, and it further noted that Tanzania has significant potential to produce biofuel from sugar cane, jatropha and palm trees. It added that the country could become a cost-competitive supplier of biofuel to the world market due to the relatively high sugar cane yields and the large amount of underutilized land (GTZ 2005).

Tanzania's vision for the development of the bioenergy sector is to contribute to the reduction of fossil fuels in transport sector and to stimulate socio-economic development (e.g. see Kiwele: "Bioenergy Policy Implementation in Tanzania" in Janssen et al. 2009). Tanzania has opted for biofuel development because of its favourable climatic conditions; its strategic location, mainly for export trade, close to the Indian Ocean; its own attractive investment policies; the availability of land, water and labour in the country; and in order to enhance the rural energy supply (MEM 2008).

The GTZ report made nine recommendations to the government for promoting liquid biofuel, including the establishment of a national task force to advise and guide the formulation of biofuel policies and regulations suitable for Tanzania. It stated that the government should start "immediately and without waiting for results and policy advice from the Task Force, to promote increased use of biofuel through the learning-by-doing process" (GTZ 2005: 122–123).

In March 2006 the National Biofuels Task Force was created to prepare enabling conditions for bioenergy development in Tanzania. However, it was not until 2008 that draft guidelines were issued, and by then several projects had already started, in keeping with the GTZ's recommendation. The draft biofuel guidelines produced by the Task Force direct the sector until such time as policies, legislation and an institutional framework are in place (URT 2008).

These guidelines cover issues such as the sustainability of biofuel developments, land acquisition, food–biofuel conflicts, the promotion of community engagement, and the use of part of the investor's land for food

4 Ibid.

production. The guidelines have created policy challenges, including the question of how to implement them when there is no binding law or policy. In addition, the guideline preparation process has been criticized for its lack of transparency and for the drafters' failure to include NGOs and other stakeholders, a common problem in Africa (Ribeiro et al. 2009).

The national guidelines for biofuels have not adequately addressed the issue of corporate responsibility. The main issue is that government and local communities could honour agreements entered into with private companies that go out of business for any reason. Under such circumstances, agreements on land transactions, employment, the mode of production, and community services are difficult to enforce without supporting laws. Other concerns that have not been addressed include the effect of biofuel projects on biodiversity, the suitability of land for bioenergy projects, the suitability of feedstocks with respect to their impact on land, and the capacity of the various institutions to manage bioenergy development projects.

Most investors in bioenergy are focusing on large-scale monoculture plantations for the cultivation of bioenergy feedstocks, with a combination of models such as out grower schemes and contract farming. In Tanzania there is no clear policy on how out grower schemes or contract farming should be developed for biofuels; however, Tanzania has long-term experience with out grower schemes for tobacco and tea (Matango 2006). This experience could be drawn upon to inform the biofuel development process in Tanzania. The total land area intended to be used for biofuel production is over 700,000 ha; however, less than 100,000 ha are currently under full production. Most companies are still struggling to obtain land and other permits. The biofuel production schemes that are common in Tanzania include large-scale projects with foreign companies as the main developers. Within this category there are close to 18 investments across the country cultivating jatropha and palm oil, mainly for external markets. There are also small-scale biofuel production projects involving jatropha, the energy from which is intended mainly for local community use (Sosovele 2008; WWF 2009).

Biofuel Policy Challenges in Tanzania

Despite the perceived benefits of biofuels, concerns have been raised regarding biofuel development in Tanzania. These concerns relate to broader bioenergy policy challenges that include the following:

1. *The Lack of a Guiding Policy and Legal Framework:* The main policy challenge for biofuel development in Tanzania is the absence of an integrated policy that takes into account energy development, transporta-

tion, agriculture and land, and water issues in relation to biofuel development. A biofuel policy should articulate a policy and legal framework, standards, criteria for investments, and targets (for blending) to be achieved and used in bioenergy development. In addition, if Tanzania wants to access external markets, its biofuel policies must accommodate the various certification standards and guidelines for biofuels, including those developed by the EU and from organizations such as the Energy Centre, which is developing various sustainability criteria through the Roundtable for Sustainable Biofuel initiatives. (Energy Centre 2008).

In addition, because of the absence of a policy, no decision has been made on which feedstocks to develop; a question that may have implications for land use in Tanzania. The current biofuel guidelines are insufficient to address this critical issue. These guidelines will be difficult to enforce in the absence of policies and laws regarding biofuel development.

2. *Inadequate Research and Development:* Brazil and the US have excelled in biofuel technology because they have invested heavily in research and development. Research and development for biofuels is linked to the automobile industry in order to produce vehicles that can run well on biofuels. Research and development is also needed in relation to the handling, processing and transportation of biofuel products. The promotion of any feedstock must be based on sound research findings. For example, the promotion of jatropha and its claimed benefits have been questioned by many scholars and researchers, and it is believed that the current rush to develop jatropha production on a large scale is ill-conceived and understudied and could contribute to an unsustainable trade that will not solve the problems of climate change, energy security or poverty (Ribeiro et al. 2009). Research and development must address the value chain of biofuel development, including technical quality standards to support local and regional trade flows. Such research work is not taking place in Tanzania, although the Ministry of Finance and Economic Affairs has set aside approximately one per cent of the national GDP for agricultural research since 2008.
3. *Conservation and Environmental Issues:* The environmental and ecological implications of biofuel production have not been adequately addressed in Tanzania. Some of the large-scale biofuel projects are located in ecologically sensitive areas and have resulted in the deforestation of valuable forest areas. For example, a biofuel project in Kilwa District resulted in the harvesting of valuable coastal and miombo woodlands in order for

them to be replaced with jatropha plantations. Other projects are located in watershed areas suitable for irrigation farming or biodiversity conservation: the ethanol project in Bagamoyo District is close to the Saadani National Park on the Wami River and thus threatens the watershed and elephant dispersal areas. The location of biofuel projects is a matter that requires policy decisions and guidance.

4. *Food Security:* The expansion of biofuel projects into areas that are suitable for food production is a matter of policy concern not only in Tanzania but also globally. Some bioenergy projects in Tanzania are situated on lands that are suitable for food-crop production. For instance, the Export Trading Company planned to cultivate jatropha on the Kapunga Rice Farm in southern Tanzania. This rice farm is one of the few highly mechanized farms in Tanzania that were recently privatized. The conversion of such food-producing areas into biofuel farms puts the country at greater risk of food insecurity.

Tanzania has had recurrent food-deficit periods, during which the government has been forced to distribute food aid. Generally, food-security issues entail the availability of food, access to food (with respect to prices and incomes), the utilization of food in terms of nutritional aspects, and the stability of food prices. It is therefore important for a bioenergy policy to mainstream food-security issues in the process of bioenergy development in order to guard against hunger and malnutrition. The draft guidelines' suggestion that each biofuel investor shall be required to use part of the land allocated for biofuels to cultivate food crops is difficult to enforce without legal support and close follow-up.

5. *Trade and Market Issues:* Most biofuel developments in Tanzania target the external market because local consumption is still relatively limited. Trade between Tanzania and potential markets is an important aspect, and if feedstocks are to be sold to Europe or the US, where certain standards and conditions apply, Tanzania must ensure that it complies with those standards. Biofuel production in Tanzania must therefore address this policy issue in line with the principles of international trade and international standards for labour, the environment, and land acquisition.
6. *Land Acquisition and Resource-use Rights:* Many biofuel investors and scholars on the issue, in Tanzania and in Africa in general, hold the view that there is plenty of land for biofuel development (see for example Hoogwijk et al. 2009). Concepts such as idle, barren, underutilized, marginal,

unproductive, degraded, or abandoned lands have been used to justify the allocation of land to large-scale investors, often without consideration of the interests of all land users. For hunter-gatherers or livestock keepers, there is no such thing as idle or underutilized land. Therefore, the social context and the mode of life of a particular community must be understood before land is taken away. The provision of access to land for biofuel development requires policy attention not only to tenure rights but also to the broader issues of environmental management and the socio-cultural aspects of land.

The process of acquiring land for biofuel projects in Tanzania is characterized by controversies and irregularities. For instance, many investors negotiate with local people directly or through their agents in order to acquire large pieces of land. These negotiations are carried out haphazardly with local communities that do not know their rights or the implications of such large-scale outright land purchases. Due to a combination of ignorance, corruption and poverty, some local people or their leaders sign off on land agreements that result in the displacement of local people and the loss of land and other properties. In Kisarawe District, one biofuel company paid an average of 250 USD per household for the loss of land. This amount was too low and did not consider the actual market value for the land, and it ended up marginalizing local communities even more. Policy attention must be directed at ensuring that land for biofuel development has been obtained with the prior and informed consent of the affected population.

Furthermore, access to and the rights to resources such as water could be undermined by bioenergy development projects if current and future local needs as well as ecosystem service requirements are not considered. For example, the demand for water for ethanol-based projects in Bagamoyo and Rufiji may negatively impact on other water users, including ecosystem services on the Wami and Rufiji rivers. These policy challenges must be addressed in order to make biofuel production compatible with national and international standards.

7. *Institutional Framework:* The institutional arrangement for bioenergy development projects in Tanzania is not very clear, and institutional coordination issues thus fall within the purview of the National Biofuels Task Force. Bioenergy development projects go beyond the energy sector to other sectors that must be involved in the development and decision-making process. A clear institutional arrangement and clear coordination mechanisms are critical policy issues that must be addressed to reduce institutional conflicts and duplication of efforts.

Other policy challenges that are also important in the development of biofuels in Tanzania include the development of a benefit-sharing mechanism between local communities, investors, and local and central governments, including the use of land as an investment; policies to guide investor commitments; and corporate social responsibility codes to ensure that commitments are honoured. For example, the bioenergy policy must ensure that investors provide guarantees and action plans for enhancing their environmental, social, and financial and investment commitments, especially in view of weak governance. Equally important are issues related to taxes, rural development policies, and risk management. A tax regime that not only ensures the generation of revenues but also encourages developers to invest in the sector and to pay taxes must be developed. In addition, policy instruments based on financial incentives should be developed in order to attract small-scale biofuel producers. Policies that integrate biofuel development with risk preparedness and risk management must also be developed. For instance, risks such those associated with the production, transportation and handling of biofuels could undermine the perceived benefits of biofuel development. These policy issues must be mainstreamed as part of the biofuel policy development process in order to enhance the sector's success.

Conclusions

Large-scale biofuel development for commercial production has only recently begun in Tanzania, with some companies involved in feedstock cultivation. The actual processing of biofuels on a commercial basis for use in the local market or for export has not yet started. The development of biofuels has generated concern regarding several policy challenges, including the lack of a policy framework to guide the sector. The claims used to justify biofuel development in Tanzania are too ambitious; they necessitate an integrated policy framework that takes into account agriculture, land use, the availability of water, and transport and energy needs in order to guide the sector. The current draft guidelines are not a suitable tool for this purpose and are hardly adequate to steer the development of biofuel in Tanzania towards the desired goals. It is on this basis that some analysts have called for a moratorium on biofuel development until appropriate policies and laws are in place to guide this process (Sosovele 2008; Mwamila et al. 2009).

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Politische Herausforderungen in Bezug auf Biokraftstoffe in Tansania

Zusammenfassung: Biokraftstoffe sind in jüngster Zeit in den Bereichen Energiepolitik, Landwirtschaftsentwicklung und nationales Ressourcenmanagement zu einem wichtigen Thema geworden. Die wachsende Nachfrage nach Biokraftstoffen wird durch die hohen Ölpreise, Befürchtungen in Bezug auf Energiesicherheit und den globalen Klimawandel vorangetrieben. In Tansania ist wachsendes Interesse ausländischer Privatinvestoren an Biokraftstoffprojekten zu beobachten, obwohl es weltweit Bedenken gegenüber solchen Investitionen gibt. Die tansanische Regierung hat einer ganzen Reihe entsprechender Projekte zugestimmt, doch mit dem Biokraftstoffsektor sind politische Herausforderungen verbunden, die diese Entwicklung behindern könnten. Dazu gehören das Fehlen einer ganzheitlichen und umfassenden Energiepolitik, die das ganze Spektrum energiepolitischer Fragestellungen und Optionen einschließt, wie auch schwache oder fehlende institutionelle Rahmenbedingungen und gesetzliche Grundlagen. Der vorliegende Beitrag wirft ein Schlaglicht auf einige wesentliche Problembereiche, die mit Biokraftstoffen verbunden sind. Der Autor vertritt die Ansicht, dass die Entwicklung des Biokraftstoffsektors möglicherweise nicht zu den erwarteten Vorteilen für Tansania und die Mehrheit der lokalen Gemeinden führen wird, wenn diese Problembereiche nicht auf nationaler politischer Ebene in Betracht gezogen werden.

Schlagwörter: Tansania, Energiepolitik, Biokraftstoffe, Umweltschäden, Ernährungssicherung