

BIOENERGY IN TANZANIA: THE COUNTRY CONTEXT

Jacqueline Cleaver, Rommert Schram and Godwil Wanga

3. TANZANIA¹

Tanzania, situated on the Eastern Coast of Africa, is one of the continent's most politically stable countries. The country is categorized as a least developed and low-income food-deficit country. Tanzania is in the bottom 10 percent of the world's economies in terms of per capita income. The economy depends heavily on agriculture, which accounts for approximately 25 percent of GDP, provides 85 percent of exports, and employs 80 percent of the work force.

This chapter considers the state of Tanzanian economy against which bioenergy developments have to be considered. The chapter begins by presenting an overview of the economic performance of the country. The following sections consider the agriculture, food security and energy situation in Tanzania. Section 3.5 presents a summary of biofuel investments in Tanzania to date. Section 3.6 offers some concluding remarks.

3.1 THE ECONOMIC CONTEXT OF TANZANIA

Following an economic crisis in the 1970s, Tanzania initiated a series of home-grown economic reforms in 1981. During the 1980s, the Government of Tanzania approached the International Monetary Fund (IMF) and the World Bank for advice and funding. This resulted in further economic reforms implemented through a Structural Adjustment Programme between 1982 and 1986. The Tanzanian shilling was devalued to boost exports, prices were partially liberalized and government expenditure reduced. In 1985, an IMF-supported Economic Recovery Programme was introduced. This led to further liberalization of the economy and monetary tightening. During the 1990s further institutional reforms were undertaken, in particular to the civil service and the privatization of state-owned companies. The 1990s also witnessed political reforms. Tanzania's first multi-party elections were held in 1995. In 2000, Tanzania's commitment to economic reform ensured its eligibility for debt relief under the World Bank's Heavily Indebted Poor Countries (HIPC) initiative, and substantial donor inflows. By 2004, ODA inflow was 15 percent of GDP (UNICEF, 2006).

¹ All data presented in these two following sections is extracted from the World Development Indicators 2009 of the World Bank, the Economic Survey of Tanzania 2007 and the CIA World Factbook of 2009.



Tanzania remains a poor country with a per capita GDP of 362 USD² in 2008, consistently below the sub-Saharan regional average since 2000, and 58 percent of its population living below 1 USD a day, compared to the regional average of 42 percent. Tanzania's population reached a total of 42.5 million in 2008 and is growing at a rate of 2.9 percent a year. The macroeconomic reforms of the 1980s and 1990s improved economic growth in Tanzania. Between 1987 and 1992, real GDP growth averaged 3.5 percent, more than double than in the previous decade. During the 1990s, growth continued at a very modest 3.7 percent. Since the late 1990s, real GDP growth has continued to climb, and in 2008 reached approximately 7.1 percent.

Inflation, which had averaged 23 percent over the 1990s, fell to 5.2 percent in the period between 2000 and 2007 and subsequently rose to 10.3 percent in 2008. While the growth rate looks promising, the reality is that it is not adequate to sustain the high population growth. The consumer price index is heavily weighted by food prices at around 70 percent, but in late 2004 this weight was reduced to 56 percent. Food prices can be highly volatile due to drought and even the use of the Strategic Grain Reserve only helps dampen but does not usually eliminate this effect.

In 2007 the agriculture sector accounted for 24.6 percent of Tanzania's total GDP, second to the services sector which contributed 47.3 percent, with industry and construction contributing 20.9 percent and fishing with the smallest contribution of 1.6 percent.

Agriculture has performed poorly over the last few decades but still employs most of the population in Tanzania. Tanzania's industrial sector is one of the smallest in Africa accounting for about 22.7 percent of GDP. Most of the industry is concentrated in Dar es Salaam and over 90 percent of industrial activities are dominated by small- and medium-sized enterprises (SMEs). The manufacturing sector primarily focuses on the domestic market with little exports of manufactured goods.

The increase in Tanzania's macroeconomic growth rate has disproportionately benefited its population and increased overall inequality. With a Gini co-efficient of .35, an income share of 42.3 percent held by the highest 20 percent of the population and only 7.3 percent of income held by the lowest 20 percent in 2000, Tanzania exhibits a lack of equality in income distribution.

Further, in spite of promising growth, many households remain very vulnerable to repeated climatic and economic shocks with implications for their food insecurity. According to the 2004/05 Tanzania Demographic and Health Survey, 38 percent of children under five in the country are chronically malnourished, that is, they have stunted height for their age, and over 30 percent of all regions in the country have stunting rates of over 50 percent.

² Extracted from the WDI. Values are in constant 2000 USD.

On the energy front³, Tanzania struggles to meet its own energy needs and access to modern energy is still very limited. Over the last ten years, domestic energy demand has grown rapidly due to both the increase in economic activity and population growth. Access to energy is extremely limited and the energy balance is dominated by biomass-based fuels particularly fuelwood (charcoal and firewood), which are the main source of energy to both urban and rural areas.

The estimated total energy consumption is more than 22 million tonnes of oil equivalent (TOE) or 0.7 TOE per capita. To date, a large share of current energy use is still met by traditional biomass, namely 90 percent of total use. The remaining share of energy use comes from fossil fuels, 6.6 percent, gas, 1.5 percent, hydro, 0.6 percent, and coal and peat, 0.2 percent. All of the fossil fuels are imported in Tanzania and 75 percent of these are used by the transport sector.

Tanzania continues to rely on imported petroleum products. Electricity generation is mainly hydro-based, while thermal plants provide electricity for peak loads. Development of natural gas for electricity is ongoing. The dissemination of renewable energy technologies has been limited to the promotion of improved stoves, improved charcoal production techniques, solar, biogas and windmills and to a lesser extent photovoltaics. Initiatives to increase utilization of coal for electricity are being explored.

3.2 POVERTY IN TANZANIA

Income Poverty in Tanzania

Tanzania has been called: “Africa’s sleeping giant” because of its steadily rising economic growth. However, the reality has been that the percentage of households living below the poverty line hardly changed between 1991 and 2001, falling by only 3 percent. Today, more than half of the population lives in absolute poverty; 57.8 percent of Tanzanian people survive on less than USD1 a day and 89.9 percent live on less than USD2 a day (GoT, 2005).

Between 1990 and 2007 the Human Development Index (HDI) rose by 1.15 percent annually from 0.436 to 0.530 today. HDI scores in all regions have increased progressively over the years although all have experienced periods of slower growth or even reversals. The HDI for Tanzania is 0.530, which gives the country a rank of 151 out of 182 countries with data (UNDP, 2006).

Eighty-one percent of those living below the poverty line are in households where the main activity of the head of the household is agriculture (GoT, 2005). Many of those living below the national poverty line earn their income through the sale of agricultural products (see Table 3.1).

³ Extracted from the GoT, Tanzania Energy Policy (2000) and IEA (2006).

Table 3.1

Distribution of poverty by main source of cash income in Tanzania

Cash income source	Percent of the poor (%)
Sales of food crops	49.6
Sales of livestock	7.2
Sales of livestock products	1.4
Sales of cash crops	20.5
Business income	8.4
Wages and salaries in cash	3.6
Other casual cash earnings	4.9
Cash remittances	2.3
Fishing	1.5
Other	3.3

Source: NBS Social and demographic statistics (NBS, 2007)

Poverty remains widespread and more than 40 percent of the population lives in chronic food-deficit regions where irregular rainfall causes repeated food shortages. Approximately 1.4 million people are living with HIV/AIDS. The disease has worsened the poverty level, reduced agricultural productivity and the availability of farm labour in several districts. The epidemic affects the capacity of poor households to sustain their livelihoods and remain food secure.

Poverty levels vary across the country but are higher among rural families that rely exclusively on livestock and food crop production and live in the arid and semi-arid regions (IFAD, 2003). Rural poverty levels far exceed the national averages and are much higher than in urban areas. It is estimated that 87 percent of the rural population lives under the poverty line and about 19 percent of rural mainland Tanzanians and 13 percent of Zanzibaris live with less than the minimum food requirement of 2 200 kcal per day (ADF, 2007). Nutritionally, the populations living in the central and northern highlands are found to be the most vulnerable, while the coastal and southern highlands areas register the most acute poverty levels, although by international standards and from a policy point of view all regions are very poor (IFAD, 2003).

3.3 THE AGRICULTURE SECTOR AND THE AGRICULTURE SECTOR POLICY⁴

Despite being the slowest growing sector of Tanzania's economy, the agriculture sector accounted for 24.6 percent of Tanzania's total GDP in 2007, second to the services sector which contributed 47.3 percent, followed by industry and construction which contributed 20.9 percent and fishing with the smallest contribution of 1.6 percent. While the agriculture sector grew at 4 percent per annum in 2007, it represents the slowest growing sector of

⁴ The sections of Agriculture are adapted from GoT 2006 and GoT 2007 unless stated differently.

Tanzania's economy below that of fishing which had a 4.5 percent per annum growth rate, services which had a growth rate of 8.1 percent, and industry and construction which had the fastest growth at 9.5 percent (Economic Survey, 2007).

According to Tanzania's Economic Survey 2007, 76.5 percent of Tanzania's population was employed in the agriculture sector during 2005/2006. With over 76 percent of the Tanzanian population relying on agriculture for their livelihood and the agriculture sector's 24.6 percent contribution to total GDP, the fact remains that despite decreasing annual growth rates, agriculture is an integral part of the Tanzanian economy. While most of Tanzania's population relies on agriculture for their livelihood, agricultural incomes remain low and are growing at a slow rate which partially explains the small effect that relatively large and consistent macroeconomic growth have had on poverty reduction and food security in Tanzania (Pauw and Thurlow, forthcoming). Stimulating growth in the agriculture sector, through means such as bioenergy development, would therefore have an impact on a large portion of the population, and is consequently essential in the government's goals of reducing poverty and increasing food security.

Of total land available, 9.2 million ha are cultivated annually (excluding permanent crops), 85 percent of which is under food crop cultivation. Food crop production dominates the agriculture economy in Tanzania. The major staples include maize, sorghum millet, rice, wheat, pulses (mainly beans), cassava, potatoes, bananas and plantains. The main export crops are coffee, cotton, cashew nut, tobacco, sisal, pyrethrum, tea, cloves, horticultural crops, oil seeds, spices and flowers. According to the ministry of agriculture, there are ten farming systems: (1) banana/coffee/horticultural; (2) maize/legumes; (3) cashew/coconut/cassava; (4) rice/sugar cane; (5) sorghum/bulrush millet/livestock; (6) tea/maize/pyrethrum; (7) cotton/maize; (8) horticultural based; (9) wet-rice and irrigated; (10) pastoralist and agropastoralist.

Agriculture is mostly characterized by rainfed crop production, thus output levels are very susceptible to rainfall variation and drought. Currently only about 150 thousand hectares are under irrigation, accounting for approximately 1.6 percent of cultivated land (GoT, 2007). Estimated irrigation potential is about 29.4 million hectares with varying potential levels. Attaining sustainable irrigation development is essential in order to assure basic food security, improve the national standards of living and to contribute to the overall economic growth of the country (Got, 2007). The National Irrigation Development Plan and Agriculture Policy are in place to address irrigation issues and the government is investigating the possibility of using irrigation water surcharges for revenues generation.

Only 22 percent of agriculture in Tanzania is commercial. The agriculture sector is dominated by subsistence farming which utilizes approximately 85 percent of the arable land. These small-scale farmers operate average plot sizes of between 0.2 and 2.0 ha and traditional agro-pastoralists keep an average of 50 heads of cattle.

Smallholder production is constrained by low levels of education with 31 percent of heads of smallholder households having received no formal education. Hand hoes are used to cultivate about 70 percent of Tanzania's crop area, ox ploughs are used for 20 percent, and tractors for 10 percent. Hand hoe cultivation is seen as both a cause and symptom of rural poverty (Got, 2007).

Modern inputs such as fertilizer, pesticides and improved seeds are scarcely used, and are in fact either not available or else very costly, reflecting poor infrastructure and high marketing costs. Lack of credit to purchase inputs is also a significant constraint. Most smallholders find that government regulatory boards, trade unions, farmers' associations and cooperatives are a hindrance to market access. Extension advice reaches few households – only 35 percent of 4.8 million smallholder households reported receiving extension advice in 2002/03. In addition, in 2005 less than 6 percent of Tanzanians had access to credit and less than 1 percent of those in the agricultural sector had access.

Agricultural performance

Growth of agricultural production averaged 3.9 percent between 1961 and 1970 and then dropped off in subsequent decades to 2.9 percent (1971-80), 2.7 percent (1981-90) and 1.4 percent in 1991-2000. In 2001-04 growth reached 2.3 percent. Food production followed a very similar pattern of growth. On a per capita basis, agricultural production either stagnated or fell in the years between 1961 and 2000. In 2001-04 per capita agricultural growth averaged 0.3 percent. Growth in per capita food production was similarly weak. Within the agricultural sector, fisheries registered the highest growth, followed by the crop subsector. However, policies relating to agricultural growth have not yet been sufficiently developed in order to realize the agriculture sector's full potential or to create the institutional frameworks needed to lead the process forward.

The agricultural sector grew at a rate of 4 percent in 2007, with subsector growth of 4.5 percent for crops, 2.4 percent for livestock, and 2.9 percent for hunting and forestry. The fishing sector grew at a rate of 4.5 percent in 2007 (Economic Survey, 2007). The production of both food and cash crops fluctuates yearly as do their respective yields. However, a general trend of stagnation in cereal yields is evident with yields hovering just above 1 100 kg per ha from 2001 to 2007, which is down from a peak of 1 506.2 kg per ha in 1990.

With regard to the key food crops, production growth for maize has been fairly steady at 4.5 percent and 6 percent respectively in the 1980s and 1990s and 5.7 percent in the period 2001-05. This translates to about 86 kg/capita between 1990 and 2004. Maize yields rose only slowly from 1.2 tons/hectare in 1975 to 1.7 tons/ha in 2006. Production of cassava stagnated in the 1990s and the 2001-05 period. Per capita production fell from a high of 380 kg/capita in 1983 to 163 kg/capita in 2004. A downward trend in per capita production is also evident for sorghum after 1979 (22 kg/capita in 2004), rice after 1990

(16kg/capita in 2004) and plantain after 1977 (16kg/capita in 2004). These developments are reflected in an across the board gradual decline in per capita food production since about 1980.

Key cash crops had a more mixed performance. Tea production grew fairly steadily from 4.5 thousand tons in 1961 to just over 30 thousand tons in 2004. Sisal production fell from a peak of 234 thousand tons in 1964 to 30 thousand tons in 1986 and has since fallen gradually to about 24 thousand tons. Only cotton and cashews recorded significant jumps in production. Cashew nut production fell from a peak of 145 thousand tons in 1973 to 17 thousand tons in 1990 and subsequently recovered to 121 thousand tons in 2000 after which production again fell off to average 82 thousand tons between 2001 and 2005. Cotton production gradually declined from 79 thousand tons in 1966 to 35 thousand tons in 1985. Thereafter production fluctuated between 40 and 80 thousand tons and in 2004 jumped to 118 thousand tons and 126 thousand tons in 2005. (FAO, 2009)

Food imports, in particular wheat, rice and palm oil, increased after 1992. Maize imports averaged 82 thousand tons between 1981 and 2004 but with considerable fluctuation. Wheat imports started rising in the second half of the 1990s and averaged 107 thousand tons in the 1990s, after annual imports in the 1980s of 25 thousand on average. In 2001-04 Tanzania imported 470 thousand tons annually with a steep upward trend. In 2004 imports stood at 617 thousand tons. Also imports of palm oil have increased markedly in the 1990s and again in the 2001-2004 period. (FAO, 2009)

Explaining poor agricultural performance

This general trend in the stagnation of agricultural yields is indicative of Tanzania's, as well as most of the rest of Africa's, pervasive problem of decreasing agricultural productivity. A number of factors contribute to and affect agricultural production and productivity.

1. **Water:** Access to water as well as the ability to effectively use water resources is an increasingly important issue in agricultural production. Water limits agricultural development. Without irrigation, interventions used to increase food production may not realize their full potential. Efforts are being made to increase irrigation schemes to supplement the rainfed crop production. Irrigated land as a percent of cropland has barely increased for the past 25 years with 1.3 percent of croplands irrigated in 1980 and 1.8 percent in 2005 (WDI, 2009).
2. **Agronomic management:** Tillage-based agriculture which causes considerable damage to the soil and affects future yields is prevalent in Tanzania. Conservation agriculture must become normal practice in Tanzanian agriculture in order to create a sustainable agricultural sector. The application of poorer quality inputs has also impeded productivity. Although for smallholders, poor access to credit or microfinance has been

the determining factor in this.

3. **Agricultural investment:** Decreasing government expenditure on agriculture has been a significant factor explaining poor yields. The sector relies heavily on public investment. The significant decline in world food prices from the 1970s until about 2000 meant that there was little incentive to improve yields. Cheap food imports allowed food needs to be met. By 2008 the picture had changed dramatically and Tanzania, faced with a rising food import bill, understood alongside many food importing countries the need to improve national food yields.
4. **Availability of credit:** Agriculture in Tanzania suffers from lack of credit availability. Where loans are available the interest tends to be very high and beyond the reach of poor farmers.
5. **Infrastructure:** Tanzania has an inadequate road network. This has been a major problem in getting crops to markets. Moreover, irrigation infrastructure remains weak and agricultural productivity is constrained by the reliance on rainfall.
6. **Market access:** Lack of market access both for buyers of agricultural products as well as sellers is a major constraint for agricultural development in Tanzania. This access issue is affected by lack of infrastructure as well as lack of markets.
7. **Plant disease:** Inadequate investment in agricultural research and development has limited progress on controlling crop disease and resistance to pests. For example, cassava, one of the main food crops in Tanzania, suffers huge crop losses because of Cassava Mosaic Disease (CMD) and Cassava Brown Streak Disease (CBSD). These are viral diseases that stunt the growth of cassava crops and rot the roots, respectively. Investment is needed to help smallholders understand the epidemiology of plant disease and how to control it.

3.3.1 AGRICULTURAL POLICY

The Agricultural Sector Development Strategy (ASDS), enacted in 2001, is a strategy for “coordination of participatory planning and implementation and monitoring and evaluation of the agricultural development processes in Tanzania”. The objective of the ASDS is to make sure that the agriculture sector grows *at least 5 percent per year*, mostly through the transformation of subsistence agriculture to commercial agriculture. The Agricultural Sector Development Programme (ASDP) is an “operational framework” enacted in 2006 whose main purpose is to implement the ASDS through funding programmes. In support of agricultural policy, the National Strategy for Growth and Reduction of Poverty (NSGRP) places agriculture at the heart of efforts to reduce poverty.

The ASDS sets out the aims of the government for agriculture. The aims suggest a very comprehensive strategy to overhaul the sector in order to improve efficiency. The key aims

are listed below:

- To ensure a sustained agricultural growth rate of 5 percent per annum primarily through transformation of subsistence farming into commercial agriculture.
- To create an enabling environment to improve agricultural productivity and competitiveness and to facilitate improvements in farm-based incomes and thus contribute to reducing rural poverty and to improve household food security.
- To strengthen public-private-partnership.
- To increase contract farming (vertical integration).
- To improve delivery of supportive services.
- To promote favourable environmentally sustainable use of new land under production by either medium- or large-scale private investors.

The ASDP sets out the operational aspects of the ASDS. That is, it identifies the mechanisms that will encourage improved productivity in agriculture (see the main elements of the ASDP presented below).

- The use of public investment to achieve faster growth in agriculture to raise incomes and reduce poverty directly by targeting growth bottlenecks and indirectly by improving agricultural business environment and stimulating and facilitating private investment.
- Increase access to rural microfinancial services for subsistence farmers, particularly targeting youth and women.
- Improve transport systems, thus lowering transport costs, and improve marketing to ensure higher profit margins for producers.
- Invest in infrastructure and widen access to markets within the country, region and internationally.

The design of the ASDS and the ASDP illustrate a real commitment to tackle the constraints that have hindered productivity in agriculture over the last 30 years. The policy is an ambitious one but one that recognizes that long-term food security needs to be enhanced by better national food production.

3.4 FOOD SECURITY POLICY

The National Strategy for Growth and Reduction of Poverty (NSGRP) 2005 or Mkukuta as it is known in its Swahili acronym builds on the Poverty Reduction Strategy Paper (PRSP) of 2000. The Mkukuta represents a new, more comprehensive approach to poverty reduction. Although an extension of the PRSP, the Mkukuta puts greater focus on issues such as environmental sustainability that contribute to both poverty reduction and growth. The NSGRP provisions regarding *food security* are within Cluster I, Growth and Reduction of Income Poverty. The emphasis is on improving food *availability* and *accessibility*.

The emphasis of Cluster I is to improve food security through increased per capita

production of food crops, to ensure adequate income at the household level and to provide in times of shocks enough reserves to minimize vulnerability. The Strategic Grain Reserve (SGR) is intended to cater for shocks that lead to food insecurity. Operational targets for this goal are:

- increase food crops production from 9 million tons in 2003/04 to 12 million tons in 2010;
- maintain Strategic Grain Reserve of at least four months of national food requirement.

Under the NSGRP, the following strategies will be implemented in order to ensure availability and accessibility of food in both urban and rural areas:

- improving rural roads for access to health care facilities and markets;
- improving access to inputs by subsistence farmers through targeted inputs-subsidy to selected food crops and increasing accessibility to microfinance credit;
- improving stock management and monitoring of food situation;
- reviewing the maize supply chain, management and monitoring of emergency food supplies, including further clarification of regulation and means of enhancing trade;
- encouraging production of crops with high returns; increase access to mechanization and use of appropriate technologies, including rural energy services, that reduce drudgery.

The food security situation in Tanzania is still a critical balance between production and needs. Food production in the country has often failed to meet demand relying on imports and food aid to meet its production shortfalls. Tanzania has enormous agricultural potential given the vast areas of fertile arable land, good climatic conditions, and water resources. Importantly, the NSGRP as well as the ASDS have both recognized the central role of improving agricultural productivity and management as central to the promotion of long-term food security.

3.5 ENERGY POLICY

The National Energy Policy in Tanzania was adopted in 2003 and replaced the previous energy policy from 1992. The policy from 2003 takes into account the structural changes that occurred over the last decade in terms of changes in the economy and political transformations at national and international levels (Arvindson and Nordström, 2006). The national policy objective for the development of the energy sector 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 main elements of the Energy Policy and strategy are to:

- develop domestic energy resources which are shown to be least cost options;
- promote economic energy pricing;

- improve energy reliability and security and enhance energy efficiency;
- encourage commercialization and private sector participation;
- reduce forest depletion;
- develop human resources.

The Ministry of Energy and Minerals (MEM) drives all energy policy including biofuels.

3.5.1 THE NATIONAL BIOFUEL POLICY AND THE BIOFUEL GUIDELINES IN TANZANIA

Tanzania is in the process of developing a comprehensive biofuels policy. Initially Tanzania had established a National Biofuel Taskforce. The National Biofuel Taskforce had the mandate of developing the National Biofuel Policy. Originally, the National Biofuel Taskforce was formed by a range of representatives, including:

- The Ministry of Planning, Economy and Empowerment (chair of taskforce);
- The Ministry of Energy and Minerals (secretariat of taskforce);
- The Ministry of Agriculture, Food Security and Cooperatives;
- The Ministry of Industry, Marketing and Trade;
- Farmer organizations;
- Representatives from the private sector.

As the development of a biofuel policy would take at least two years and as there was an urgent need to have clear guidance for the developing biofuel industry, the taskforce decided that it would first develop biofuel guidelines. The institutional difference between the Biofuel Guidelines and the Biofuel Policy is that the guidelines are approved by the cabinet and that the policy is to be approved by the parliament. The Biofuel Guidelines are interim guidelines that will be used until the Biofuel Policy is fully developed.

The Government of Tanzania presented the first draft guidelines in a workshop in September 2008. Stakeholders were invited to provide comments to the guidelines. The BEFS project made several contributions to the drafts. In March 2009 the final draft guidelines were submitted to the cabinet for approval. The guidelines were approved in December 2009.

The guidelines address amongst others the following key issues:

- institutional framework;
- application procedures for investors;
- land acquisition and use;
- contract farming;
- sustainability of biofuel production.

The guidelines focus on the institutional framework, the application procedures and key

considerations for investors, including land acquisition, contract farming and sustainability.

As the current institutional framework was found not to be conducive for the development of the biofuels industry in Tanzania, the guidelines propose an improved institutional framework. The improved institutional framework will exist of the following:

- A Biofuels One Stop Center will be established under the Tanzanian Investment Center (TIC) which will be responsible for coordination, endorsement and monitoring of biofuel investments.
- A Biofuels Steering Committee (chaired by the Ministry of Energy and Minerals) will be established. The Biofuels Steering Committee shall consist of Permanent Secretaries from ministries that are directly involved in biofuel developments. The Steering Committee will guide TIC and approve biofuel projects.
- The Steering Committee will be assisted by the Biofuels Technical Advisory Group (BTAG). The BTAG will consist of experts from ministries related to energy, agriculture, natural resources (forestry, wetlands), land, land use planning, food security, employment, investment, water, industry and environment, and will be responsible for reviewing all projects related to biofuels.
- A Permanent Secretariat to the Steering Committee will be established led by the Ministry of Energy and Minerals. The members of the Permanent Secretariat shall draw members from sectors of energy and agriculture.

Further details are discussed in Box 1.

BOX 1

THE TANZANIA INVESTMENT CENTRE AND INVESTMENT PROCEDURES IN TANZANIA

1. The Tanzania Investment Centre (TIC)

Foreign investors are referred to the Tanzania Investment Centre (TIC), which was established under the investment act of 1997. The TIC is the primary government agency that coordinates, encourages, promotes and facilitates investment in Tanzania and that advises the government on investment related matters. The TIC was established with the intention that it be the one stop facilitative centre for all (foreign and local) investors.

The TIC is tasked with the following roles:

- Assist in the establishment of enterprises, e.g. incorporation and registration at the Registrar of Companies.
- Obtain necessary licences, work permits, visas, approvals at the line ministries, facilities or services.
- Sort out any administrative barriers confronting both local and foreign investors.
- Promote both foreign and local investment activities.
- Secure investment sites and assist investors to establish EPZ projects.

- Grant Certificates of Incentives and investment guarantees and register technology agreement for all investments which are over and above USD300 000 and USD100 000 for foreign and local investments respectively.
- Provide and disseminate up-to-date information on existing investment opportunities, benefits or incentives available to investors.
- Assist all investors whether or not registered by TIC.

One of the functions of the TIC is to facilitate the acquisition of land for investors. TIC has a land bank in which districts have indicated the amount of land that they have available for investors. The land in the land bank is all village land. The TIC assists investors in the acquisition process of the land. As foreign investors are not allowed to own land in Tanzania, the acquisition of land refers to the acquisition of a lease or a right of occupancy of the land. According to the TIC, the acquisition of village land by a foreign investor consists of the following nine steps:

1. Land identification by Ministry of Lands, Urban Authority, District Authority, TIC or an investor.
2. Land gazettelement by the Ministry of Lands.
3. Land designation to TIC by the Commissioner for Lands.
4. Submission of application to the Executive Director of TIC.
5. Application approved or rejected by TIC.
6. Notification of investor(s).
7. Preparations of Derivative of Rights for approved application.
8. Registration of Derivative Title.
9. Transfer of Duplicate Derivative Title to occupier of land.

2. Application procedures for investors

The Biofuel Guidelines give a clear description of the application procedures for investors in biofuels, namely:

- All applications for biofuel investments and development will be submitted to the Biofuels One Stop Centre.
- The applications will be screened at the Tanzanian Investment Centre (TIC) and by the Biofuels Technical Advisory Group (BTAG) within ninety days and presented to the Biofuels Steering Committee. The Steering Committee will issue a letter of no objection to the investor once the project is cleared.
- Once no objection is granted the investor will conduct a feasibility study and an Environmental and Social Impact Assessment. The feasibility study will be submitted to the Biofuels One Stop Centre and the Environmental and Social Impact Assessment to the National Environmental Management Council (NEMC) for approval. When the project application is approved by the Biofuels Steering Committee, the applicant will be issued with the endorsement letter by the Biofuels One Stop Centre.

In order to establish the National Biofuel Policy, the Ministry of Energy and Minerals has initiated a project which will develop the Biofuel Policy. The project will not only address the Biofuel Policy, but will also strengthen the legal, regulatory and institutional frameworks to support the development of a sustainable biofuel industry in Tanzania.

The Biofuel Policy Project consists of four components, namely:

1. **Organizational capacity**
Development of **organizational capacity** of the government – to coordinate, regulate and support the development of plans and legal instruments relevant to the biofuel industry sector.
2. **Assessment capacity**
Development of the **assessment capacity** of the government and financial institutions – to assess the biofuel industry from a fiscal and financial perspective.
3. **Biofuel policy**
Development of **policy and legal instruments** – to support and regulate the development of a sustainable biofuel industry.
4. **Public support**
Promotion of **public support**, participation and awareness regarding the biofuel industry.

The project will be managed by the Ministry of Energy and Minerals, but the implementing team will consist of specialists from the ministries that are involved in the biofuel development, such as the Ministry of Agriculture, Food Security and Cooperatives, the Ministry of Industry, Trade and Marketing and the Ministry of Natural Resources and Tourism. The project team will be trained on the BEFS methodology, described in this assessment, such that the modules as developed under the BEFS project will inform the policy development process.

The capacity of organizations involved in the implementation of the biofuel guidelines need to be developed in order to ensure successful implementation of the guidelines. For instance, the capacity at the National Environmental Management Council (NEMC) needs to be strengthened in order to assess the Environmental and Social Impact Assessments (ESIA) for biofuel projects. There are a number of biofuel investors active in Tanzania. Most of the biofuel investors are developing jatropha projects for biodiesel production, while one is looking at sugar cane for ethanol production. The projects of these investors are currently ongoing in the absence of biofuel guidelines or policy as they started before the drafting of the biofuel guidelines had been initiated. The government has indicated that no new biofuel investments will be approved until the Biofuel Guidelines are passed.

The main current biofuel investors in Biofuels in Tanzania are listed in Table 3.2. The selected investors provide an overview of the different crops, feedstock models, land ownership models, perspectives and potential risks of five biofuel projects in Tanzania.

As illustrated partially in Table 3.2, the investors have different approaches for their feedstock supply model. Some are developing an estate, some are using exclusively outgrowers and some are implementing a combination of estate and outgrowers.

Table 3.2

Five major biofuel investors in Tanzania

Company	Origin Country	Location	Outgrower Scheme	Feed-stock	Land Area Request (ha)	Land Concession (ha)
Sunbiofuels	UK	Kisarawe	Planned	Jatropha	18 000	8 000
Sekab	Sweden	Bagamoyo / Rufiji	Planned	Sugar	20 000 / 200 000	20 000
Diligent	Netherlands	Arusha / Tanzania	Only outgrowers	Jatropha	N.A.	N.A.
Bioshape	Netherlands	Kilwa	No	Jatropha	81 000	37 000
Prokon	Germany	Mpanda	Only outgrowers	Jatropha	N.A.	N.A.

There are three feedstock production models, namely estate, outgrowers and a combination of estate and outgrower schemes. In the production of ethanol, the constant supply of the feedstock is very important as the investment in ethanol production facilities is very high. Therefore investors that intend to produce ethanol will require an estate in order to secure feedstock supply to the plant. Between 30 and 50 percent could be supplied by outgrowers, depending on the financing of the project. In this context, sugar cane is not a very suitable outgrower crop as it requires investment in irrigation infrastructure. Other crops such as cassava and sweet sorghum are better suited to outgrower schemes as they do not require irrigation and smallholders are familiar with growing these crops.

As investments in biodiesel facilities are much smaller, the feedstock supply for a biodiesel facility is not as critical. Also biodiesel facilities can be expanded at a later stage with lower costs compared to an ethanol plant. This allows biodiesel investors to start with a small plant and expand it when more feedstock becomes available. This makes it possible to have a feedstock production model based exclusively on outgrowers.

3.5.2 LAND ACQUISITION FOR BIOFUEL INVESTORS IN TANZANIA

For the development of an estate biofuels investors need to acquire land. There are two types of land in Tanzania that are available for the development of an estate, namely: Village land and General land.

Village land

Village land is under the administration of the village and village land cannot be titled for investors. For an investor to get access to village land, the village land needs to be converted from village land to general land. This process is facilitated for investors by the TIC. At the end of the process TIC gives a derivative title to the investor. Once village land is converted to general land, it is most likely that the land will not be converted back into village land, implying that the village has “lost” control over the land. The village does not receive compensation for the change of village land to general land. Compensation of the villagers for the land that they were using is done according to the regulations established under the laws of Tanzania. The villagers are not compensated for their land according to the market price for land. When village land is converted to general land, the rent that is paid for the land by the investor will go to the central government and not the village government. In the conversion process from village land to general land it should be ensured that sufficient village land should remain available to the village for future expansion and requirements. The term of lease of village land that has been converted to general land is maximum 99 years, which is perceived by the government and civil society organizations to be very long. The draft Biofuel Guidelines states that for the production of biofuels the lease of village land that has been converted to general land is maximum 25 years. The lead time for the acquisition of village land is very long. In the case of Sun Biofuels it took over three years. For investors this is too long.

General land

General land is under administration of the National Government, more specifically the Ministry of Lands. The issues as described under village land are not as prominent for general land. Sometimes local communities have settled on general land. If this is the case it is essential that the investor engages with the local communities on the land and come to a mutual agreement on the way to proceed with the project. For instance, relocation should be agreed upon and be implemented according to international standards. Furthermore, the affected people should be the first to benefit from jobs that will be provided at the estate. Acquisition through Ministry of Land is possible with assistance from TIC.

3.5.3 THE EXAMPLE OF A BIOFUEL INVESTOR IN THE KISAWARE DISTRICT OF TANZANIA

As an example of a real case scenario, this chapter provides a description of the biofuel project that Sun Biofuels is developing. Sun Biofuels is developing a jatropha project in the Kisarawe district, about 40 km from Dar es Salaam. The project is divided into two phases. The first phase consists of the development of an estate of 8 000 ha. In addition to the estate Sun Biofuels intends to develop an outgrower scheme. In the first phase an outgrower scheme of 8 000 ha is planned. In the second phase the estate will be expanded to 18 000 ha. Depending on how things go, in phase II another area of 8 000 ha outgrower scheme will be developed.

The land acquisition process that Sun Biofuels has gone through and the issues related to the land acquisition process are highlighted. Information from the local communities and from Sun Biofuels has been acquired through interviews of a team⁵ from the BEFS project.

The investor and the Kisarawe village

Sun Biofuels applied for 18 000 ha of land to cultivate jatropha for the production of biodiesel. This land is located around 11 villages in Kisarawe. For phase I of the development, of approximately 8 000 ha, the company selected and acquired land from six villages, namely Chakenge, Mtakayo, Kurui, Mtamba, Kidugalo, Muhaga, and Majumbo (Table 3.3).

Table 3.3

Sun Biofuels land acquisition for phase I of development

Village	Village Area (ha)	Area for Jatropha (ha)	Village area for Jatropha (%)
Vilabwa	3 637	379	10
Chakenge	3 074	1 094	36
Mtakayo	3 154	1 546	49
Kidugalo	2 254	216	10
Marumbo	7 316	3 268	45
Muhaga	5 761	1 705	30
Total	25 198	8 210	30

Source: Kisarawe District Office

The TIC investor facilitation process and the procedures for land acquisition run less smoothly than expected. According to TIC the acquisition of land is done in nine straightforward steps. In reality, Sun Biofuels had to take at least 20 steps before it received the right of occupancy. The whole process of land acquisition has taken Sun Biofuels three years. Sun Biofuels has documented the steps that were required in the process of acquiring land. A flowchart of the steps is presented in Appendix 3A.

The issue of compensation was discussed with the villagers and with Sun Biofuels. Nevertheless the interviews showed that the villagers could not give concrete information about compensation by Sun Biofuels. Some of the affected villagers only knew their names were on a list and they were not clear about their possible compensation. No contract had been written and no discussions with the village council to conduct any form of negotiation had yet taken place.

The compensation to the villagers was further discussed in an interview with Sun Biofuels. It transpired that 152 people have received compensation for the land that has

⁵ Implemented by Ms Nazia Habib-Mintz under supervision of Rommert Schram with kind assistance from the Ministry of Agriculture and Food Cooperatives of Tanzania.

been converted from village to general land. A total of 1 765 acres (ca 700 ha) of village land that has been converted to general land was being used by villagers (almost 9 percent). The compensation for this land is based on the land law, the values for the land and assets on the land that are gazetted.

According to Sun Biofuels, each individual who had indicated to Sun Biofuels that he owned land in the area, had been compensated. The calculation of the compensation was based on the size of the land, the value of the crops and the value of a structure on the land. Based on the calculated value, each individual had received a personal cheque with the compensation. According to the information provided by Sun Biofuels, the average compensation per person was USD1 644. This is about USD350 per ha. An official at the Ministry of Agriculture indicated that the market value of the land should be worth around USD570 per ha. However, this could not be verified.

Despite the global concern over food versus fuel, the villagers do not perceive a conflict between food crop and jatropha production. The company supporters in the villages expect that jatropha will earn them a high income and a stable market in comparison to cassava and other food crops. Farmers indicated that they will intercrop jatropha with cassava and even monocrop. They believe that growing jatropha is less labour intensive and moreover provides additional time to devote to working for the estate. Others thought if income from jatropha seeds is much higher than producing food crops, they will devote 100 percent of their land in the outgrower scheme and live off the income.

The focus group participants were unaware of the employment promises Sun Biofuels made in 2006, despite the fact that the company made its promises publicly, in the presence of a political figure. According to the focus group participants Sun Biofuels promises to create employment, however confusion arises over the exact number of jobs that will be offered. Figures ranging from 1 000 to 4 000 jobs were mentioned. In an interview with Sun Biofuels it was stated that the company estimates to provide 1 500 permanent jobs. The daily fee that is going to be paid is 5 000 TZS, which is above the minimum wage of 65 000 TZS per month. During the establishment of the estate the number of jobs will be higher as Sun Biofuels will employ people for land clearing and construction.

The land acquisition process in the case of Sun Biofuels has taken over three years. On one hand this long procedure ensures that village land cannot easily be converted to general land (to protect the village), but on the other hand the foresight of going through a procedure which takes three years before they can start their project is not very appealing to investors. The TIC land bank only includes village land, so when an investor is interested in land from the land bank, he will have to go through the same time consuming process as Sun Biofuels.

Table 3.3 shows that out of six villages, two gave up more than 40 percent of their land. Most of the land that is being given away is land where trees have been cut to produce charcoal.

At the moment most of this land is not being used for agriculture. The average percentage of the land that is being given away over the six villages is roughly one third. It can be questioned whether this percentage is not too high as the land is given away for 99 years and the village population will grow considerably in that period. Also it is not sure whether after 99 years the land will return to be village land. Based on the 2.1 percent yearly population growth rate in Kisarawe, the village population is likely to double in 33 years. At this rate, demand and pressure on available land will probably grow.

However, as part of the land acquisition procedure the Ministry of Lands has verified that the villages will still have sufficient land after the transfer of the earmarked village land to general land. The question is how the Ministry of Lands has assessed the future land requirements for the villages, which method they used and whether this procedure was transparent. A clear and transparent procedure should be used to prevent future problems due to land shortage. As the perception in the village is that land is abundant and little knowledge exists on how much land actually is owned by the village, local communities will not be able to make an informed decision on how much land can be given away.

In one instance, in the case of Chakenge Village, villagers filed a formal objection when they found out that more land than anticipated was earmarked for the Sun Biofuels development. The villagers were concerned that the village would not have sufficient land in the future. District officials reviewed the case. Due to bureaucratic time lag nothing was done for a year, until a new District Commissioner took the matter seriously and unilaterally renegotiated the contract again and reduced the land allocation.

The interviews with the villagers on one hand and the interview with Sun Biofuels on the other hand suggest that there are controversies on compensation of land as well as on employment. For instance, the villagers stated in the interviews that they had not been compensated while Sun Biofuels claims to have compensated all individuals who were using village land that was going to be converted to general land. Perhaps there was a misunderstanding among the villagers of which land would come into consideration for compensation, or perhaps the compensation took place after the interviews of the BEFS team with the villagers. In any case, the villagers were not aware of the compensation they could expect. Also in the case of employment the villagers were not aware of the number of possible jobs that would be created by Sun Biofuels. This can be attributed to poor communication between Sun Biofuels, the district government, the village government and the communities. This could be a basis for social unrest and negative sentiment towards the company.

Finally, monocropping jatropha at the household level may impact the food security when the land formerly under food crops is 100 percent converted into jatropha. Jatropha only yields oilseeds after three years. Also as the Jatropha plant is a new cash crop, the yield levels that can be expected are uncertain. Therefore it is uncertain if the household will be able to purchase sufficient food from the revenues of the jatropha seeds. Literature suggests that

jatropha could be a host of the cassava mosaic virus as jatropha and cassava are from the same family of euphorbia. This could have negative impacts on food security as cassava is one of the main food staples in Tanzania.

It could be questioned whether it should be the investor who should go through this procedure. It may be more suitable if the Government of Tanzania would identify agricultural areas and in consultation with the local communities set aside village land and initiate the conversion process. In this way, the government would be made responsible for the whole process, including the issue of compensation. This way the government could also ensure that investments in biofuels are made in areas which they think are suitable. In this the BEFS project could assist the Government of Tanzania.

3.6 CONCLUDING REMARKS

Rising fossil fuel prices, concerns over the increased CO₂ and other greenhouse gas emissions, climate change, and concerns over the depletion of global oil reserves have all contributed to interest in bioenergy developments. There has been a growing interest in liquid biofuels, in Tanzania and worldwide, because they can be blended with fossil fuels and are compatible with current transport structures. Biofuel developments have enormous potential to contribute to the Millennium Development Goals (MDGs) by providing greater energy security and reducing poverty through improved agricultural productivity of (energy) crops.

The most significant benefit of biofuels will be enabling the poor rural to have access to modern energy services using their land and labour capacity. Access to modern energy services could enable the rural poor to be more productive. However, while biofuels offer potential in terms of growth and poverty alleviation, it is important that Tanzania implements appropriate biofuel policies and regulations that complement the food security goals of the country. Particularly important is the need to integrate biofuels with other development initiatives aimed at self-sufficiency in food and fuels at the national levels.

Investment in biofuels is risky in Tanzania because the returns on the investment as well as the socio-economic impacts have not been fully explored. Given its potential for biofuels production and the lack of biofuels policies and regulations, Tanzania is a good example for a variety of developing countries worldwide, which currently are in the early stages of investigating the biofuels option. At present, however, the development of the bioenergy sector in Tanzania is restricted by a lack of information about biofuels at all levels from government to the general public. This, in part, explains the absence of clear policies and regulations for biofuels production and use in Tanzania although the biofuel guidelines have recently been approved. The Biofuels Task Force was set up precisely to develop a framework that is the outcome of close cooperation between different government departments and other stakeholders engaged in the promotion of liquid biofuels in Tanzania. The BEFS assessment and the tools provided by the analytical framework provide a strong basis on which to formulate a biofuels policy that is consistent with the existing development strategies of Tanzania while also promoting a more sustainable energy sector.

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