

Biofuels Training Workshop

Morogoro

21 -22 August, 2008



Training Objectives

At the completion of this training, participants will be able to:

- **Describe what biofuels are and the two principle types;**
- **Name the most common feedstocks and those most appropriate to Tanzania;**
- **Name at least three of the GoT policies that are relevant to biofuels;**
- **Name at least three of the drivers motivating the increasing interest in biofuels in Tanzania and worldwide;**

Training Objectives.....

- **Name three of the countries leading in the development of biofuels worldwide;**
- **Name at least three of the Tanzanian biofuels initiatives;**
- **Name three advantages to biofuels development in Tanzania;**
- **Name three risks to biofuels development in Tanzania;**
- **Name five necessary investment criteria for sustainable biofuels projects.**

WELCOME TO THE TRAINING



What are Biofuels?



What are biofuels?

"Biofuels are defined as energy carriers derived from the conversion of biomass to provide sustainable inputs for heat, power and transport applications".

(UNIDO, 2004)

What are biofuels?...

Biofuels are predominantly or exclusively produced from biomass.

- **Solid biofuels**

Example woodfuels (charcoal, firewood), crop residues, sawdust, etc

- **Liquid biofuels**

Mainly ethanol and biodiesel

Liquid biofuels are used to replace or supplement petrol and diesel and can be used in existing vehicles with little or no engine modifications and fueling systems.

- **Gaseous biofuels**

– Biogas

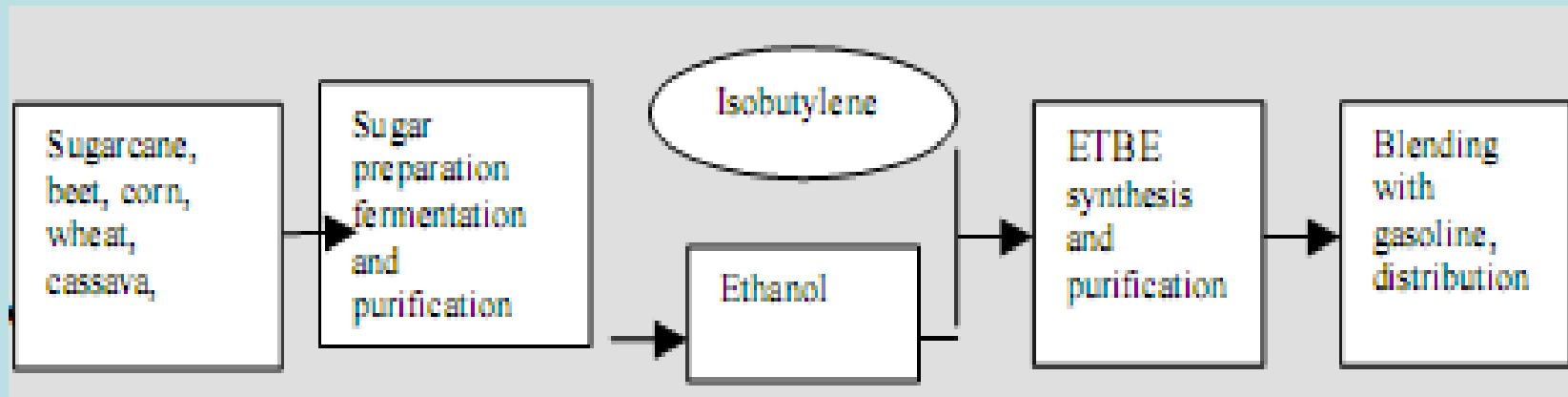
What are the two principle kinds of Liquid Biofuels? How are they different?



Types of Liquid Biofuels

Ethanol

Ethanol is an alcohol based fuel produced from sugarcane, sugar beets, corn, wheat, sorghum, cassava, etc).



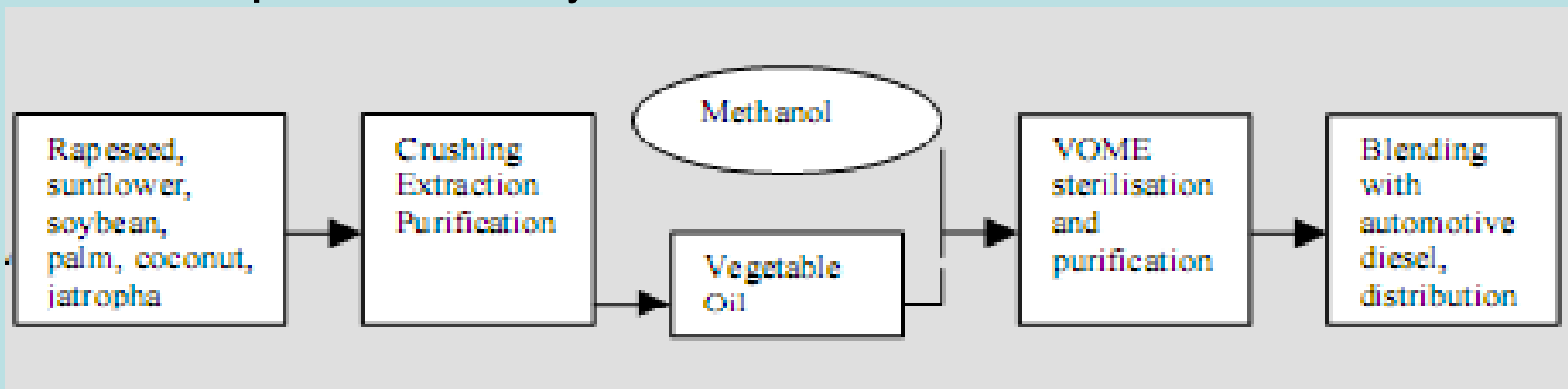
Ethanol is blended with petrol, the mixture is called gasohol. Gasohol containing 10 % ethanol is referred to as E10. E10 is possible for all gasoline vehicles without engine modification.

Types of Liquid Biofuels.....

Biodiesel

Biodiesel is a liquid fuel made from oil seeds such as rape, sunflower, jatropha, soya, palm, coconut, et.

The most economical process to produce biodiesel is transesterification of vegetable oils by an alcohol (usually methanol). The chemical reaction is catalyzed by an alkali such as potassium hydroxide



Biodiesel can be blended with diesel. B20 (20% Biodiesel) is possible without engine modifications – for high quality biodiesel.

Biofuels	Crop	Yield (liters/ha)
Ethanol	<ol style="list-style-type: none"> 1. Sugarcane 2. Sweet Sorghum 3. Cassava 4. Rice 5. Millet 6. Potatoes 	<p>4000-8000</p> <p>3000-6000</p> <p>1750-5400</p>
Biodiesel	<ol style="list-style-type: none"> 1. Oil Palm 2. Jatropha 3. Sunflower 4. Peanut 5. Soybean 6. Rapeseed 7. <i>Croton megalocarpus</i> 	<p>2500-6000</p> <p>400-2200</p>

Net Energy Balance

One of the key drivers for promoting biofuels is to replace dependence and use of fossil fuels.

But what if producing the biofuel uses more fossil fuels than the resulting output of biofuels?

Net Energy Balance

If more energy went into producing a biofuels than was contained in the final product, this would be a negative energy balance.

Ideally, a good biofuels product would have a very positive net energy balance, that is very little energy went into producing a product that in the end contained a good deal of energy.

For example, ethanol in Brazil has a net energy balance of 8.3 to 10.2 (meaning 8.3 joules of energy out for every one joule input).

Producing crops with fertilizer, petrol consuming tractors, irrigation, exporting to far away countries, etc. all affect the net energy balance of a biofuels, because these activities require energy input.

Biofuels Global Trend

Which countries are the worldwide leaders in biofuels development?

Brazil

- Brazil has been a pioneer in bioethanol production and consumption;
- The government has supported bioethanol from sugar cane since the 1970s, after the OPEC-induced oil price hikes of that decade;
- Sugar cane is the main feedstock and Brazil is the number one cane producer in the world, with the sugar cane industry employing one million people;
- The size of the domestic market was 18 GJ of ethanol in 2007, expanding to possibly 50 GJ by 2020. One GJ of biodiesel will be consumed in 2008;
- Flexible-Fuel Vehicles (FFVs) in Brazil can use different mixtures of ethanol and petrol.
- Competition between ethanol and food crops in Brazil is questionable. In the country only 1% of arable land is used for sugarcane production (ethanol), while land available for agricultural expansion is 50% greater than lands currently occupied with crops (90 Mha against 60 Mha).



USA

- The US is now the world leader in bioethanol production, recently overtaking Brazil;
- Maize is the main feedstock for ethanol;
- Production was estimated at 18 billion litres in 2006 and 23 billion litres in 2007;
- In 2007, the US Congress passed an ambitious new ethanol mandate, requiring over 56 billion litres of ethanol in the fuel supply by 2015;
- The US biodiesel industry is much smaller, producing one billion litres in 2006.



Sweden

- Sweden has utilized ethanol since the 1990s. Ethanol use was initially promoted in order to meet the environmental requirements for cleaner fuels;
- Initially, five hundred urban buses were introduced at the time, running on a blend of 95% hydrous ethanol and 5% ignition additive known as “beraid” (Worldwatch Institute, 2007);
- Today, there are over 1,000 fuel stations in Sweden selling bio-ethanol.



Malaysia and Indonesia

- Malaysia and Indonesia account for 84% of global palm oil production. Much of this palm oil production is now being used to produce biodiesel;
- Palm oil has been the main cause of deforestation in this region, resulting in the loss of 10 million hectares of primary rainforest. This has resulted in palm oil being named as “one of the most environmentally damaging commodities on the planet” according to Simon Counsell of the UK based Rainforest Foundation;
- New palm oil plantations are often established in primary rainforest rather than previously-cultivated agricultural land, as the soil productivity is higher and timber can be cut and sold for investment capital;
- Palm oil plantation expansion poses major threats to endangered biodiversity and mega fauna such as the Asian elephant, the Sumatran rhinoceros and tigers.



South Africa

- South Africa accounts for 70% of total ethanol production in Africa;
- The Government of South Africa is planning three large biodiesel plants with a total production of more than 300 million litres per year;
- South Africa has biofuels targets of 2% of petroleum consumption in five years, based on a blending ratio of 2% for biodiesel and 8% for ethanol;
- It is expected that biofuels will create 25,000 jobs;
- Sugarcane and sugar beet are the proposed crops for ethanol, with sunflower, rapeseed and soya for biodiesel.



Ethiopia

- Ethiopia currently produces eight million litres per year of bioethanol;
- Ethiopia's main feedstock is molasses, the national sugar industry's main crop;
- They are aiming to blend 5% ethanol into country's petrol pipeline;
- The UNDP have initiated a project looking at using ethanol for home cooking;
- The Ethiopian government wants to commit 24 million hectares of land (more than 20%) to Jatropha, although currently there is less than 1,700 hectares committed by plantation developers.



Kenya

- In 1978, Agro Chemical and Food Cooperation opened and began producing ethanol from molasses. However, this collapsed in the 1990s due to low government controlled retail prices, resistance from multinational oil companies and inadequate plant maintenance and operation;
- In 2001 the sector was revived and current production is 60,000 litres per day of industrial ethanol, which is being sold on the local market and in Uganda, Rwanda and Central Africa;
- There has been recent cause for concern about the impact of biofuels on Kenya's wetlands. The Kenyan government recently approved a biofuels project that will convert 20,000 hectares of wetlands in the Tana River Delta into sugar cane plantations (Wetlands International 2008, RSPB 2008);
- The Tana Delta is one of Kenya's largest wetlands, and contains a variety of habitats, including forests, beaches, lakes, and mangrove swamps. This could lead to at least one third of the water being diverted, with serious implications for local people and wildlife in the area. The wetland supports the livelihoods of thousands of local herdsman, agriculturalists and fishermen.



Biofuels Policy Environment in Tanzania

In your opinion, what government Ministries should be involved in developing biofuels policy in Tanzania?



What government Ministries should be involved in developing biofuels policy in Tanzania?

- The Vice President office – Directorate of Environment
- Ministry of Energy and Minerals
- Ministry of Agriculture, Food Security & Cooperation
- Ministry responsible for Trade and Industry
- Ministry responsible for Lands
- Ministry of Natural Resources and Tourism
- Ministry responsible for Planning,
- Ministry of Finance
- Ministry of Labour
- Ministry of Water and Irrigation



What are the relevant GoT policies?



What are the relevant GoT policies?

- **Energy Policy 2003**
- **National Land Policy 1997**
- **Environmental Policy 1997**
- **Agriculture and Livestock Policy 1997**
- **Transport Policy 2003**
- **National Forest Policy 1998**



**Why is the Energy Policy
relevant to biofuels?**

This is what the Energy Policy says relevant to biofuels:

- The Energy Policy calls for efforts to promote fuel switching from petroleum to other alternative, environmentally friendly fuels;
- There is no mention of biofuels in the policy document, because biofuel production was barely considered at the time of the policy's drafting;
- However, MEM recognized the momentum towards biofuels within the country and promoting biofuels development has become a critical strategy within the Ministry and government for reducing dependence on imported fossil fuels;
- MEM is the Secretariat of the National Biofuels Task Force (NBTF).

**Why is the National Land
Policy relevant to biofuels?**

This is what the National Land Policy says relevant to biofuels:

- **The overall aim of the Land Policy and its implementing legislation is to ensure a secure land tenure system and encourage the optimal use of land resources, while promoting community ownership and management of land and without endangering the environment;**
- **The relevant objectives and goals of the National Land Policy are:**
 - **Village Councils shall administer Village Lands in consultation with Village Assemblies;**
 - **To protect village land rights and promote better and sustainable use of natural resources within the villages, the government will assist villages in demarcating their boundaries and implementing their management authority over these lands;**
 - **Village Land Use Planning will be simplified for speedy execution;**
 - **Government will ensure that permits and licenses for natural resources exploitation will be made with regard to land use polices and environmental and conservation policies.**
- **Implementing legislation confirming these principles were enacted, namely the Land Act 1999 and the Village Land Act 1999, following the issuance of the policy;**
- **These laws legally confirmed most of the principles outlined above and created firm legal footing for community ownership and management of local lands and natural resources. if followed and respected, these laws offer important protections for individuals and villages facing land acquisition pressures from biofuels production.**

**Why is the Environment Policy
relevant to biofuels?**

This is what the Environment Policy says relevant to biofuels:

- The National Environment Policy of 1997 articulates well the relationship between poverty and environmental degradation, and by inference poverty and bioenergy production and consumption;
- It states “*Satisfaction of basic needs is therefore an environmental concern of relevance to environmental policy. Investment in development is vital for environmental protection because the environment is the first victim of acute poverty, urban overcrowding, overgrazing, shrinkage of arable land and desertification.*”
- The Policy does not, however, promote development at all cost, as a means of addressing poverty. It advocates economic development in a sustainable manner and in a way that does not degrade the environment;
- More specifically, the National Environment Policy addresses policy objectives relevant to bioenergy. Objectives to be pursued include minimizing wood fuel consumption through the development of alternatives, wood fuel energy efficiency, the promotion of sustainable renewable energy resources, and energy conservation.

**Why is the Agriculture and Livestock
Policy relevant to biofuels?**

This is what the Agriculture and Livestock Policy says relevant to biofuels:

- **Objectives of the policy are to:**
 - **Assure food security for the nation, including improvement of national standards of nutrition;**
 - **Improve standards of living in rural areas;**
 - **Increase foreign exchange earnings;**
 - **Produce and supply raw materials and expand the role of the sector as a market for industrial outputs;**
 - **Develop and introduce new technologies for land and labor productivity;**
 - **Promote integrated and sustainable use and management of natural resources (environmental sustainability);**
- **The policy recognizes edible and non-edible oils. Non-edible oils are regarded by the policy as industrial vegetable oils which could be viewed as a precursor to biofuels.**
- **The Agriculture Sector Development Strategy (2001) promotes creating a favourable environment to bring new land under production by either small farmers or large private investors;**
- **One of its strategic statements says "Government will work towards creating an enabling environment for medium and large-scale investors to make use of the abundant land resource in the country". In this way, the strategy supports large and small investment for biofuels production in Tanzania, so long as those investments are environmentally sustainable.**

**Why is the Transport Policy
relevant to biofuels?**

This is what the Transport Policy says relevant to biofuels:

- The current Tanzanian transport policy has the objective to “*facilitate sustainable development by ensuring that all aspects of environment protection and management are given sufficient emphasis at the design and development stages of transport infrastructure and when providing services*”;
- It further emphasizes selecting appropriate technologies by setting standards and enforcement mechanisms through suitable regulations;
- The policy does not directly mention alternative fuels such as biofuels as a substitute technology in the transportation sector, but certainly provides ample authority for designating biofuels as an “appropriate technology” to support and diversify the transportation sector.

**Why is the National Forest Policy
relevant to biofuels?**

This is what the National Forest Policy says relevant to biofuels:

- **The policy seeks to achieve the goal of “*enhancing the contribution of the forest sector to the sustainable development of Tanzania and the conservation and management of natural resources for the benefit of the present and future generations*”.**
- **The National Forest Policy recognizes that the sector’s principal challenge is the sustainable management of the country’s 33.5 million hectares of forest. Although the policy supports the sustainable development of forest resources, it places a higher emphasis on the development of “forest-based” industries or ecotourism, rather than agricultural development;**
- **Moreover, it recognizes that uncontrolled and unwise development has had devastating effects on Tanzanian forests, which are some of the most important, from a biodiversity perspective, in the world.;**
- **The policy estimates deforestation at between 130,000 to 500,000 hectares per year, caused by clearing for agriculture (food and cash crops), overgrazing, bushfires, charcoal burning and over-exploitation of wood resources.**
- **As with the Land Act and Land Policy, the Forest Policy recognizes the environmental, economic and social benefits of empowering communities by recognizing their ownership and management authority over large amounts of forest land;**
- **Because current biofuels investments are likely to have direct impacts on forests, these activities, if improperly planned or where targeting important forest areas, could come into conflict with the principles of the National Forest Policy.**

Here are some other national policies relevant to biofuels:

- Wildlife Policy (1998)
- National Investment Promotion Policy (1996)
- The Sustainable Industrial Development Policy (1996)
- National Gender Policy (1999)
- National Water Policy (2002)

The policies that we have just discussed have resulted in the following Acts:

- Revised Petroleum Act 2008
- Land Act 1999
- Village Land Act 1999
- Tanzania Investment Act 1997
- Environmental Management Act 2004

Environmental Impact Assessment (EIA) Process



The EIA process is the heart of the Environment Management Act (2004).

EIA guidelines and procedures:

1. Identify key issues of concern (screening and scoping exercise);
2. Preparation of ToR;
3. Conduct EIA study;
4. Prepare Environmental Impact Statement (EIS)
 - Baseline survey and inventory
 - Proposal options
 - Potential impact identification and prediction,
 - Mitigation consideration and commitments
 - Environmental management plans, etc
5. Approval of the EIS;
6. Project implementation;
7. Monitoring;
8. Environmental auditing;
9. Decommissioning.



GoT Initiatives

- GoT is promoting biofuels with ambitious goals to:
 - Improve energy security (e.g. reducing oil imports and foreign exchange savings);
 - Improve livelihoods (e.g. introduction of alternative cash crops to farmers, employment and income opportunities, etc.), and;
 - Promote rural development (e.g. creating new rural industries, improved infrastructures, etc.).

Terms of Reference for the National Biofuels Task Force

- Review the existing environment in the biofuels sub-sector [policies, legislation (laws & regulations), strategies, programmes, standards, etc.];
- Prepare an enabling environment to facilitate the sustainable development, promotion and utilization of biofuels in Tanzania;
- Develop well defined, coordinated and integrated modalities and procedures for dealing with the development of biofuels;
- Develop a sustainable programme for the biofuels industry, catering for community, commercial and national interests and linked to economic growth, poverty reduction and economic empowerment, and;
- Prepare modalities for immediate facilitation of biofuels developers/investors.

To date, the NBTF have accomplished the following:

- A SWOT analysis workshop for biofuels development in Tanzania was organized;
- SWOT analyzed, prioritized and strategic actions prepared;
- Draft Action Plan and draft budget prepared;
- Draft Biofuels Development Guidelines prepared;
- Inclusion of biofuels in Petroleum Supply Bill;
- Preparation of two years biofuels project document on “Strengthening the policy, legal, regulatory and institutional framework to support the development of a sustainable biofuels industry in Tanzania”.

This is the actual composition of the NBTF.
Do you see any important omissions?

- Ministry responsible for Lands
- Attorney General's Chambers
- Tanzania Investment Centre
- Tanzania Petroleum Development Corporation
- Community Finance Company Ltd
- Tanzania Sugar Producers' Association
- Ministry responsible for Planning
- Ministry of Energy and Minerals
- Ministry responsible for Agriculture
- Ministry of Labour, Employment and Youth Development
- Ministry of Finance
- Vice President's Office –Division of Environment
- Ministry of Water and Irrigation

THE DAY IS OVER



Tanzanian Biofuels Projects

Name of the company and Origin	Year started	Purpose	Location	Ha of land targeting	Estimated production
<u>Diligent Tanzania Limited</u> is a Dutch Eindhoven-based company with branches in Tanzania and Columbia.	2004	Production of jatropha oil - local consumption and export	Based in Arusha has collection points for Jatropha in Arusha, Coast, Tanga and Singida regions.	Buys seeds from farmers	Current production is 1500 lt of oil per day
<u>PROKON</u> is a Germany based company	2005	Production of plant oil and biodiesel from jatropha and rapeseed - export	Mpanda district, Rukwa region	The cultivation is carried out by several thousand farmers on a total area of 10,000 hectares through contract farming.	-
<u>D1 Oils Tanzania Limited</u> This is a subsidiary company of D1 Oils, a UK company based in Newcastle,	2003	Biodiesel production from plant oil particularly <i>Jatropha curcus</i> and <i>Moringa oleifera</i> - export	-	-	Defunct, project moved to Mozambique
<u>Sun Biofuels Tanzania Limited</u> It is a UK based international company	2007	Planning to plant Jatropha for biodiesel production – export (Final EIS submitted to NEMC already)	Kisarawe district, Coast region	The company has already acquired 9,000 ha	-
<u>SEKAB BioEnergy Tanzania Ltd.</u> The company formed following signing of MoU between GoT, Swedish Ethanol Chemistry (SEKAB), BioAlcohol Fuel Foundation and Community Finance Company (CFC)	2007	To produce ethanol from sugarcane– for export (EIA for sugarcane plantation; seedcane farm started in Sept. 2007 without EIA)	Bagamoyo, (Rufiji and Kiliwa ??) districts	400,000 ha (acquired 200ha for seedcane farm and 20,000ha for sugarcane plantation in Bagamoyo)	-

Tanzanian Biofuels Projects

Name of the company and Origin	Year started	Purpose	Location	Ha of land targeting	Estimated production
<u>Kikuletwa Farm.</u> The farm is owned by Peter Burland (British farmer)	2004	Production of oil from jatropha and Aloe vera - local consumption and export	Located at TPC area in Moshi town..	1000 acres	Promoter changing plans from jatropha to aloe vera
<u>Africa Biofuel and Emission Reduction Company (Tanzania) Ltd</u> It is a joint venture between TTT-WILMA Biofuels and Emission Reduction Company, part of WILMA Group of the USA and the National Investment Company Limited (NICOL) of Tanzania.	2007	Production of biodiesel from <i>croton megalocarpus</i> trees, a species indigenous to the area.	Biharamulo district, Kagera region	The company have acquired 20,000 ha	103 million litres of biodiesel per year.
<u>Donesta Ltd and Savannah Biofuels Ltd.</u> This is a local company .	2007	Biodiesel production from sunflower and jatropha - export	Dodoma	The company has already acquired 2000 ha and established 100,000 jatropha seedlings. Already planted 200 ha of sunflower	-
<u>Farming for Energy for better Livelihoods in Southern Africa (FELISA)</u> This is a local company with Belgian partners.	2005	Production of biodiesel from oil palm and edible oil.	Kigoma region	8000 ha, but little planted to date	40 million litres of palm oil per year.
<u>Bioshape.</u> It is a Dutch company	2006	Production of biodiesel from Jatropha – for export (EIA Certificate granted)	Kilwa district	81,000 ha	-

Tanzanian biofuels projects

Name of the company and Origin	Year started	Purpose	Location	Ha of land targeting	Estimated production
<u>InfEnergy</u> . A UK based company	2005	Originally a biofuels project, but now production of palm oil and food crops only – no biodiesel. (EIA studies in progress)	Mngeta farm– Mvomero district	5,818	–
<u>BioMassive</u> . It is a Swedish based company	2006	Biodiesel production from jatropha and Pongamia	Lindi region	50,000 ha	Initial production of over 100 000 tons per annum of biofuel
Bioenergy Resource, Tanzania Limited, P.O. BOX 909, DAR ES SALAAM	2007	Plant jatropha for biodiesel production. EIA Registration	Coast and Morogoro		
Kapunga Rice Project Ltd. P.O. BOX 63154, DAR ES SALAAM	2008	Demonstration jatropha (<i>curcas</i>) plantation (EIA Registration)	Mbarali, Mbeya	50,000ha	Abandoned/registration cancelled
Africa Green Oil, P.O. BOX 34463, DAR ES SALAAM	???	Oil palm plantation (EIS studies in progress)	Rufiji district	5 ha	

Tanzanian Biofuels Projects

Name of the company and Origin	Year started	Purpose	Location	Ha of land targeting	Estimated production
<u>Kampuni ya Kusambaza Teknolojia Limited (KAKUTE)</u> . Is a local non-profit making company based in Arusha promoting Jatropha and rural technologies.	2000	Piloting projects focusing on the production, processing and use of Jatropha aims at controlling soil erosion and management of natural resources, promotion of economic activities for women, poverty reduction and the creation of rural industries as well as the promotion of renewable household energy for rural communities.	Have projects in Monduli and Arumeru districts.	-	-
<u>Jatropha Products Tanzania Limited</u> . It is a local non-profit making company based in Arusha	2005	To develop knowledge, skills, information and technologies to small holder farmers and SMEs interested in jatropha plant, seeds and products.	Have projects in 5 regions	-	-
<u>The Tanzania Traditional Energy and Environment Development Organization (TaTEDO)</u> . This is a local NGO based in Dar es Salaam working in more than 10 regions of Tanzania.	1990	Sensitizing rural and urban communities on the potential use of Jatropha. The main focus has been to provide information and extension services to smallholders' farmers	Have projects in more than 10 regions	Have acquired 50 ha in Kisarawe district to set-up Jatropha demonstration farm	-

Sun Biofuels

- Sun Biofuels Ltd is a UK-based biofuels company operating predominantly in the developing world;
- The company's strategy is to cover all areas of the biofuels industry from growing and production to processing and marketing;
- Sun Biofuels is targeting 18,000 hectares in Tanzania. In 2007, the company identified 11,226 hectares in Kisarawe District in Coast Region and is currently in the process of finalizing the acquisition of the land. Once finalized, planting of jatropha for biodiesel production will begin.
- Much of the land targeted by Sun Biofuels is miombo woodland, and they have reached tentative agreements with villages to purchase community-managed productive forest for clearing and planting of jatropha;
- They intend to compensate the communities with Tsh 400 million, and create 5,000 jobs for local community members;
- The company plans to promote out-grower schemes and train local farmers in jatropha production;
- There is evidence that there would be some displacement of households in at least one village;
- A final Environmental Impact Assessment report has been submitted to NEMC for review;
- The project is being actively promoted by a MP from Kisarawe District.
- Sun Biofuels is also active in Mozambique.

PROKON

- PROKON PV is a Dutch company that started working in the field of biofuels in 2001, focusing on the use of pure plant oil to run diesel engines;
- PROKON's activities in the field range from the production of plant oil to the retrofitting of engines and their maintenance;
- In 2005, PROKON established a project in Mpanda District to cultivate jatropha for biodiesel production;
- Currently, cultivation is carried out by more than 2,000 farmers on a total area of 10,000 hectares through contract farming. The farmers are supplied with jatropha seeds and receive extension services.
- One of the markets targeted by PROKON is generating power from jatropha-fueled generators and selling the power to Tanesco.

FELISA

- **The multi-year project is at a very early stage of development but will eventually include several components:**
 - **Installation of hybrid oil palm nurseries; Establishment of two palm plantations; Promotion of hybrid oil palm cultivation by out-growers; Production of Crude Palm Oil (CPO); Transformation of CPO into biodiesel; Digestion of processing waste to produce biogas and generate power.**
- **The project is a Tanzanian-Belgian private sector partnership;**
- **Original project planning for FELISA began in 2004 with concrete activities beginning in 2005;**
- **To date, FELISA has established its administrative infrastructure and one large oil palm nursery (42,000 seedlings), mobilized and organized farmer out-grower groups (990 individuals), planted a small part of its plantation land (150 hectares out of 4,658), and installed and began using processing equipment for the production of palm and palm nut oil.**
- **FELISA targets 10,000 hectares, with half coming from a company oil palm plantation and half supplied by out-growers; This would result in a potential output of 40 million litres of palm oil per year;**
- **At the moment some of the land acquisitions are in the courts under a land dispute;**
- **Only 150 hectares of the company land is under palm, which is expected to begin production by the end of 2009.**
- **The company originally intended to produce biodiesel to power the region's Tanesco generators (6MW in the center of Kigoma town) and has been in discussions with Tanesco about supplying it with either CPO or biodiesel. (Gensets could be converted to CPO or biodiesel progressively as FELISA capacity increases.)**

Bioshape Tanzania

- Bioshape is the sister company of Bioshape Holdings bv Holland;
- The company started operating in Tanzania in 2007 with the objective of developing a large-scale jatropha plantation for production of biodiesel for export;
- Bioshape seeks to acquire about 81,000 hectares from four villages in Kilwa District, Lindi Region, but according to land officials they have only processed the purchase of 34,736 hectares;
- They are in the process of paying Tsh 250 million to the District Council, and the funds would be shared 60% for the District council and 40% for the local communities. If they were to acquire the total 81,000 hectares they would pay Tsh 1.023 billion;
- Bioshape is planning to use 60% of the total land in plantation batches of 200ha plots and maintain a 40% buffer zone of natural vegetation, animal free zones, hills and wetlands as well as thick forest;
- The company has developed a trial farm (76ha) and planted jatropha;
- The company would eventually employ 10,000 people in ten years, and currently is employing 600, the majority being casual labor (90 permanent);
- The company has made verbal promises to invest in social infrastructure in the communities (roads, schools, wells, etc.);
- Bioshape has applied for a logging license, but indications are that the company has already installed a saw mill and begun logging;
- The company's business plan also includes its intention to export seed for processing in Europe, though current Tanzanian law prohibits the export of any type of seed;
- Bioshape has completed its Environmental Impact Assessment and been granted a certificate by the NEMC. However, the integrity of this EIA is questionable. There is no mention of coastal forest and the land targeted is described as degraded Miombo woodland. Site visits indicate that the woodland is not degraded.

BioMassive

- BioMassive is a Swedish company operating in Tanzania since 2006;
- The company targets over 50,000 hectares of viable land for the development of biofuels from jatropha and pongamia, leased from local communities spread throughout Lindi Region;
- It envisages the development of an initial production of over 100,000 tons per annum of biofuels;
- This initiative will involve and create direct employment for over 4,000 people;
- BioMassive also operates a research and development facility in India, where they conduct jatropha testing on 138 acres of land.

SEKAB

- Swedish Ethanol Chemistry AB (SEKAB) is a large producer and distributor of ethanol. The company currently supplies 15% of the European and 75% of the Scandinavian ethanol markets;
- SEKAB is owned by three Swedish public utility energy companies and the largest oil distribution company in Sweden, a cooperative owned by 1.6 million motorists;
- SEKAB has a complete logistical infrastructure for the storage and distribution of ethanol, including storage facilities in European ports and an established retail distribution network.
- SEKAB BioEnergy Tanzania Ltd is a company that was formed following the signing of a MoU between the GoT, SEKAB, the BioAlcohol Fuel Foundation (BAFF) and the Community Finance Company (CFC);
- SEKAB and CFC formed SEKAB BioEnergy Tanzania Ltd in order to establish large-scale ethanol and electricity generation projects.
- Although the objective is to develop sugarcane plantations in Rufiji and Kilwa Districts, the company has selected Razaba Farm in Bagamoyo District as the first pilot site, eventually covering 15 – 30,000 hectares;
- The company has leased agricultural land from prisons in Bagamoyo in order to start seed cane multiplication (200 hectares), in preparation for planning on the Razaba Farm in mid 2008;
- They are in the process of completing their EIA for the Bagamoyo plantation project, but no EIA report has been initiated relative to the seedcane farm;
- Fourteen households and a number of pastoralists are being compensated for being displaced;
- Water is another critical concern relative to this Bagamoyo project, as sugar cane requires a great deal of water and much of the water existing in Bagamoyo is diverted to Dar es Salaam, supplying 80% of the city's consumption (Ruvu River).
- SEKAB BioEnergy has also initiated discussions with district and village authorities about acquiring land in Rufiji and Kilwa Districts;
- CFC is the only private sector member of the National Biofuels Task Force.

Diligent

- Diligent Energy Systems is a Dutch Eindhoven-based company with branches in Tanzania and Columbia;
- In Tanzania it is located in Arusha and it has contracts with more than 1,500 jatropha farmers from Babati, Engaruka, Chalinze, Pangani and Singida;
- At the moment the company is dedicated to the production of jatropha oil for local consumption (in stoves, modified engine vehicles);
- The company has an oil press with a capacity to extract 1,500 litres of oil per month, but due to the limited supply of jatropha seeds the current production is between 600 – 800 litres per month;
- Recently, Diligent has installed a biodiesel processing plant with a capacity of producing 300 litres per batch.
- Diligent's principal obstacles are the limited supply of pressing seed (much of the seed available in Tanzania is used for planting) and the cost of collecting seed from the many dispersed producers.

KAKUTE

- KAKUTE is a local private company based in Arusha promoting jatropha and rural technologies;
- Since 2000, the company has been involved in pilot projects aiming at controlling soil erosion, improving the management of natural resources, promoting economic activities for women, and fighting poverty through the creation of rural industries;
- It is also involved in the promotion of renewable household energy for rural communities.
- KAKUTE is not a company designed to produce or commercialize biofuels, but rather more of a development consulting firm;
- KAKUTE has trained more than 5,000 farmers in jatropha production.

KAKUTE.....



TaTEDO

- TaTEDO is a local NGO based in Dar es Salaam, registered in 1990 and working in more than ten regions of Tanzania;
- TaTEDO is widely sensitizing rural and urban communities on the potential use of jatropha;
- The main focus has been to provide information and extension services to smallholder farmers;
- The organization has acquired 50 acres in Kisarawe District to set-up a jatropha demonstration farm.
- TaTEDO has also installed three multifunctional platforms (MFP) in Arusha and Dar es Salaam regions;
- The platforms are designed to operate on jatropha oil. However, due to the limited availability of seed, they often operate on traditional diesel fuel;
- TaTEDO has a longterm project with the EU to install eleven MFP in eleven different districts in six regions (in addition to the three existing sites).

TaTEDO.....

Multifunctional Platform (MFP)

MFP is a simple diesel engine that can power different tools,

Normal diesel and SVO (e.g. jatropha oil, palm oil, etc) can be used to run MFP;

TaTEDO has installed 2 MFPs in the rural areas of Arusha region. More than 100 households have been electrified.



What are some of the key issues that need to be examined to determine the sustainability of a biofuels investment?



- **Impact on Forests and biodiversity**

- Clearing of large areas of natural forests habitats to give way to biofuels crop farming,
- Miombo woodlands and coastal forests are at risk,
- Risks of promoting invasive crops.

- **Impact on water and water catchments**

- Contamination of water sources – discharge of effluent,
- Depletion of water sources,
- Water use conflicts (food and biofuels water needs)

- **Indirect land use change**

- Occurs when one form of land use is displaced to another area.
- For a viable biofuels industry, the land must also be capable of supporting sufficiently high crop yields for production to be economic. This means arable land is also target for biofuels production.

- **Land ownership**

- Biofuels farming may result in the concentration of land ownership and land access into fewer hands of investors.

- **Land acquisition process**
 - Transparency,
 - Schemes for compensation,
- **Community relations and rural development**
 - Improve rural employment and livelihoods,
 - Working conditions for workers,
 - Out growers schemes
 - Fulfilling promises – bidding documents

- **Food security**

- Impacts of crop production away from food and only to produce biofuels.
- Fear of invasive crops and GMO

- **Displacement of communities**

- Large scale may force communities out of their territories.

- **Impact on Soils**

- Use of agrochemicals in large-scale biofuels plantations will obvious affect the soils.

Systems for Promoting Sustainable Development

The Roundtable for Sustainable Biofuels Principles

This is an international initiative bringing together farmers, companies, non-governmental organisations, experts, governments, and inter-governmental agencies concerned with ensuring the sustainability of biofuels production and processing.

The Roundtable on Sustainable Palm Oil (RSPO) Principles

RSPO is a WWF led initiative started in 2001 and originally consisted of Aarhus United UK Ltd (a European vegetable oil producer), Golden Hope Plantations Berhad, Migros, Malaysian Palm Oil Association, Sainsbury's and Unilever as the main stakeholders together with WWF. This initiative was started as a result of the negative environmental and social impact that palm oil plantations have had in countries such as Malaysia and Indonesia.

The Roundtable for Sustainable Biofuels Principles

1. **Legality** Biofuel production shall respect all applicable laws of the country in which they occur, and all international treaties and agreements to which the country is a signatory.
2. **Consultation** Biofuel projects shall arise through fully transparent, consultative and participatory processes that involve all relevant stakeholders.
3. **Climate Change and Greenhouse Gases** Biofuels shall contribute to climate stabilization by reducing GHG emissions as compared to fossil fuels. Emissions shall be estimated via a consistent approach to lifecycle assessment, with system boundaries from “root to tank”. This shall include direct and indirect GHG emissions, for instance from fossil energy used in growing, transporting and processing biofuels. It shall also include GHG emissions resulting from land use changes as land is converted to biofuel crop production, or as other production is displaced.
4. **Human and labor rights** Biofuel production shall not violate human rights or labor rights, and shall ensure decent work and the well-being of workers.
5. **Socio-economic development** Biofuel production shall not violate land or water rights, and shall contribute to the social and economic development of local, rural and indigenous peoples and communities.
6. **Food security** Biofuel production shall not impair food security.
7. **Conservation** Biofuel production shall not directly or indirectly endanger wildlife species or areas of high conservation value.
8. **Soil** Biofuel production shall not directly or indirectly degrade or damage soils.
9. **Water** Biofuel production shall not directly or indirectly contaminate or deplete water resources.
10. **Air** Biofuel production shall not directly or indirectly lead to air pollution.
11. **Biotechnology** If biotechnologies are used in biofuels production, they shall improve the social and/or environmental performance of biofuels, and always be consistent with national and international biosafety and transparency protocols.

The Roundtable on Sustainable Palm Oil (RSPO) Principles

Principle 1: Commitment to transparency

Principle 2: Compliance with applicable laws and regulations

Principle 3: Commitment to long term economic and financial viability

Principle 4: Use of appropriate best practices by growers and millers

Principle 5: Environmental responsibility and conservation of natural resources and biodiversity

Principle 6: Responsible consideration of employees and of individuals and communities affected by growers and mills

Principle 7: Responsible development of new plantings

Principle 8: Commitment to continuous improvement in key areas of activity

What is SWOT analysis?

**Looks at the strength, weaknesses,
opportunities and threats of a given
project**

