

**THE AGROFUEL INDUSTRY IN TANZANIA: A CRITICAL
ENQUIRY INTO CHALLENGES AND OPPORTUNITIES***

A RESEARCH REPORT

FINAL VERSION

* Study carried out on behalf of Land Rights Research and Resources Institute (LARRRI) and OXFAM Livelihood Initiative for Tanzania (JOLIT), March 2008

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DGEMENT

According to the term of references, this study report was to be finalised in 30 days. In order to beat this harsh deadline, but also on account of a dearth of Tanzania specific literature, the vast, and multidisciplinary nature of the question of agrofuels, it became necessary to enlist the support and assistance of countless individuals and institutions. It is the collective effort of all these, which has finally brought the work to fruition.

In recognition of their special role I wish to acknowledge the invaluable input of Ms Erasmina Apolnary Massawe and Mr. Godfrey Mpandikizi. They were, in turn, overseen by Dr. Opportuna Leo Kweka, who in addition, brought to bear, her exceptional organisational skills, focus and analysis.

Haki Ardhi afforded me the opportunity to take on the task of undertaking the study. Its indefatigable Executive Director, Yefred Myenzi kept pushing me to the limits but also generously shared whatever reference materials or other pertinent information which came his way. *Haki Ardhi* in collaboration with **OXFAM** facilitated three workshops (Landmark Hotel, Mbezi Garden Hotel and Bagamoyo Millenium Sea Breeze Hotel) to which I was kindly invited, thus enabling me obtain rare insights from, and interact with experts and stakeholders, from rural Tanzania as well as those from far off lands. I in particular want to thank Robert Bailey, advocate William Ole Nasha, and Silas Olang' in this regard.

Athuman Kagomba, who heads the Legal Division at the Tanzania Investment Centre (TIC) readily gave me an interview, shared documents and introduced me to his colleagues.

Prof. J.H.Y. Katima (Department of Chemical and Process Engineering, University of Dar es Salaam) led me to highly pertinent web based information.

As with all undertakings of this nature, errors and flaws, including the inadvertent, are inevitable. And the only person who should take responsibility for that, is the undersigned.

Khoti Chilomba Kamanga, *Ph.D.*
Dar es Salaam
May 28, 2008

TERMS OF REFERENCE

The present study was commissioned to look into the following key issues:

- Identify stakeholder interests;
- Analyse the relevant national policies regarding bio-fuels;
- Examine the land tenure and use system in respect of bio-fuel development;
- Draw a list of land concessions for bio-fuel industry;
- Discuss the socio-economic implications of bio-fuel investment, on such groups as peasants, pastoralists, artisan miners, women and youth;
- Assess the value addition of bio-fuel industry to national development; and
- Examine potential policy gaps in the bio-fuel industry especially with regard to possible conflicts with the existing legal and policy framework.

EXECUTIVE SUMMARY

Agrofuel (more popularly known as biofuel) can be broadly defined as solid, liquid or gas fuel consisting of, or derived from biomass, primarily for use in the transportation sector. Most transportation vehicles require high power density provided by internal combustion engines derived from clean burning fuels, usually, in liquid form, since liquids can be handled more easily and be pumped.

In its liquid form, two broad categories exist, bioethanol and biodiesel. Ethanol is produced from either sugar crops (sugar cane and sugar beet) or starch (maize, cassava) which are fermented with the help of yeast, while biodiesel is obtained from oil producing plants such as algae, and more commonly, *jatropha curcas* and palm oil. By subjecting these oils to a process of *transesterification*, their viscosity is reduced rendering them capable of being burned directly in the diesel engine.

In so far as key actors and their motives are concerned, the biofuel discourse and related developments is taking place in an atmosphere largely dominated by foreign based business companies. In a functionally, secondary role, is Government, with the leading institutions being the Office of the President, Ministry of Energy and Minerals (MEM), along with Ministry of Finance and Planning. It is worth stressing that the State President has personally taken a high profile role by, among others, visiting and calling on MEM to take initiatives, undertaking familiarisation tours to Sweden and the US, as well as to those areas of rural Tanzania, earmarked for the production of biofuel related crops.

Two further central government agencies are pivotal. The *Tanzania Investment Centre* (TIC), which under the terms of the Tanzania Investment Promotion Act (TICA) is vested with powers to, among others (and within the context of this study), facilitate the acquisition of land by investors. In this regard, the office of the *Commissioner of Lands*, is fairly strategic, and by implication, the principal statutes regarding land, that is, the Land Act and the Village Lands Act, 1999.

Another significant constituency is that arm of the private sector with an interest in the transport sector, comprising, first and foremost, those engaged in selling and marketing of oil products for the transport sector. Beyond Government (central and local level), foreign investors, oil marketing and trading companies, are research and academic institutions. Given their conventional role of teaching, research, consultancy and outreach activities, they could prove critical in several ways. Some are engaged in conducting Environmental Impact Assessment (EIA), while others have been involved in conducting quantification for compensation of the villagers whose land has been dispossessed. Yet others, have responsibility for training manpower in the disciplines of chemical processing, and energy engineering, besides providing consultancy services to stakeholders and thus positioned to influence public opinion and policy.¹

Another key but less visible constituency, is civil society organisations and the media. In the earlier category, are such NGOs as *Faida Mali Market Link*, *Haki Ardhi*, *Jatropha Products Tanzania Ltd*, LHRC, LEAT, and TaTEDO. From an environmental perspective, the most prominent forum for the media is the organisation ‘Journalists for the Environment’ (JET).

The diplomatic community (Belgium, Brazil, Canada, Japan, Germany, India, Malaysia, Switzerland, UK, USA) international development agencies (CIDA, DfID, EU, GTZ, JICA, ILO, SIDA, UNDP, UNEP, USAID) and International Financial Institutions (AfDB, IMF, World Bank) with a presence in the country, and often termed as ‘development partners’ are another key constituency. For example, SIDA has provided the funding which has enabled the National Biofuel Task Force (NBTF) to conduct initial meetings, while GTZ has commissioned the first ever comprehensive study on the prospects of biofuels (for the transport sector) in Tanzania.²

As the report would reveal, the peculiar manner in which investors are accessing village lands for biofuel development, has catapulted Village Councils and Village Assemblies (along with the

¹ Among them are the Sokoine University of Agriculture, University College of Lands and Architectural Studies Institute of Resource Assessment (IRA), the Departments of Chemical Process & Engineering and Energy Engineering, both of the University of Dar es Salaam.

² GTZ 2005. Liquid biofuels for Transportation in Tanzania: Potential and Implications for Sustainable Agriculture and energy in the 21st Century.

respective Members of Parliament) into centre stage of the ongoing expansion of the biofuel industry in Tanzania.

At the operational level, however, the institutional locus within government is the National Biofuel Task Force (NBTF). The finding of this study is that the institutional, legal and policy framework governing biofuels is weak, fragmented, and/or ill equipped. In particular, research reveals an acute and prevalent lack of awareness of the law and procedures, within rural communities and their leadership, regarding land.

Bashiru et als (2007) while interviewing villagers and leadership in Rufiji District, found out that there wasn't sufficient awareness about the law, procedures regarding land transfer, nor about the investors seeking land. Among the participants at a workshop on agrofuels, held in Bagamoyo on March 13, 2008, were members of several Village Councils from Bagamoyo District. In ensuing discussions, none of them could recall with any certainty the exact quantum of land, their respective village government bodies had transferred to agrofuel investors. The Village Act, 1999 is however explicit. It confirms that the management of village land shall be within the powers of the Village Council. Moreover, and more importantly, the law directs the Village Council, to observe among others, the principle of sustainable development in the management of village land. In particular, the relationship between land use, other natural resources and the environment in and contiguous to the village and village land.³

At the other extreme, there appears to be a departure from established practice as regards land acquisition by non-national investors who instead of channelling their requests for land through TIC, are enjoying direct access to village communities. This situation exposes unsophisticated rural community members to foreign investors, typically, with the later being in a far more privileged position, be it financially, technical know-how and influence.

Tanzania has the potential of becoming a world leader in biofuel production from its 88 million hectares reserve, none of which is "virgin forest or environmentally sensitive" (Kearney, 2006). But there are less ostentatious claims. They include the following potential benefits: Increased income for smallholding farmers; Introduction of agro-processing industries; reduction of

³ Section 8

greenhouse gas emissions (and other pollutants); access to modern technology (Ministry of Energy and Minerals: 2006; *Rasimu ya Waraka wa Baraza la Mawaziri*: 2006; TaTEDO: 2008).

However caution is necessary. Most if not all the ‘strengths’ of biofuels are subject to numerous ‘conditionalities’. Reduction of carbon emissions, for example, is neither automatic, nor generic to all biofuel products. Indeed in November 2007, Nobel Laureate Paul Crutzen published findings according to which, the release of Nitrous Oxide from rapeseed oil and maize can contribute as much or more to global warming than the fossil fuels they displace.

Equally, whether marginalised rural communities would stand to benefit is contingent upon the chosen mode of production, that is, plantation, or smallholder farming. But at the second level are considerations of the likely socio-economic impact of biofuels. It is worth recalling that biofuel development is a labour, land and water intensive, an essentially, agricultural enterprise. That being the case it is fair and reasonable to make a projection of the land and water resources required, as well as the most direct and indirect consequences of such demands on resources which are undoubtedly strategic.

Often, Tanzania is presented as possessing abundant idle land suitable for biofuel development. One study places, suitable agricultural land at 88 million hectares, of which it is claimed, less than 6% is currently utilized. The study in question points to another advantage. Besides underutilisation, the vast majority of land in Tanzania that is available for cultivation, it is argued is “not virgin forest or environmentally sensitive”, suggesting minimal damage to the environment, from biofuel cropping. (Kearney 2006)

But as this study shows, viewed from a number of criteria,⁴ land availability is not as liberal as portrayed. Areas of the country most likely to be targeted for biofuel cropping can barely be described as underutilised. Indeed, the areas so far identified for biofuels are characterised by a fairly high rainfall, water resources, rich soils, and naturally, are fairly densely populated. For example in so far as sugar cane is concerned, the primary sites are Kagera region (Kagera Sugar Limited), Moshi (Tanganyika Planting Company), Morogoro (Mtibwa Sugar Estate) and

⁴ Rainfall, soil fertility, infrastructure

Kilombero (Kilombero Sugar Company), already the site of huge plantations (GTZ 2005 and Hellin).

In other words, we are likely to see, increased land disputes as investors succeed to penetrate these areas. Such penetration in turn, is likely to be accompanied by human displacement and disruption of livelihood supporting activities as land is alienated.

In this regard, we should expect the highest possible penetration in areas growing crops of relevance to agrofuels or enjoying climatic and other such qualities conducive to agrofuels. For example, Arusha, Biharamulo, Kagera, Rukwa, Ruvuma, Shinyanga, Tanga, Tabora are known to be national focal areas in the growing of legumes. Likewise, the Coast Region, Lindi and Mtwara Regions provide the bulk of the nation's crop of cashewnut, coconut and cassava. Finally, are those areas engaged in the growth of rice and sugar cane.

A matrix showing the aggregate land requirements of investors is presented in this study.

Besides land alienation and displacement, another likely socio-economic impact of biofuel development seems to be the accentuation of food insecurity, and the right to food by marginalised populations in urban and rural areas in what is popularly referred to as the '*food v fuel*' duel (Runge *et al*:2007; OECD-FAO:2007; *The Economist*: 2007; Bailey: 2008).

The consensus among experts is that there is a direct correlation between biofuel production and the global food market. 'Biofuel mania' or 'biofuel craze' (Runge *et al*, June 2007) has given rise to the extraordinary phenomena of 'agflation' (*Economist*, December 6, 2007) in which sky high food prices sit side by side with phenomenal abundance of grain stocks.⁵ This is happening on account of 'reckless' subsidies given to farmers by countries of the North.⁶ More directly, as a consequence of the resulting diversion of food crops (maize, in this particular case) to the production of biofuels, which in the case of the US, means directing one third of the US maize

⁵ In the opinion of the London based International Grains Council, the 2007 total global cereal crop was an estimated 1.66 billion tonnes, the largest ever recorded and what is more, represented an increase by 89 million tonnes when compared to the previous year's harvest.

⁶ According to the *Economist*, 2007, US Federal Government subsidies per annum in this area are in the region of US \$ 7 billion (while at the other extreme are over 200 kinds of protectionist tariffs)

harvest to the production of bioethanol. The more maize is diverted to ethanol production, the less of it is available on the food market.⁷

Ethanol production impacts indirectly on food prices on account of the fact that farmers find the attraction offered by Federal subsidies too irresistible, and therefore are switching from growing other food crops, to maize. It is common knowledge that the scarcer a commodity is, the more costly it also becomes. Costly food has profound implications. It will hurt urban consumers through food price increases despite the obvious advantage for farmers who stand to gain more from increased earnings.

With the entry of China and India, two prosperous, largest growing economies the world is witnessing an increasing demand for meat which in turn presents demands on the supply of feedstock. If in 1985 an average Chinese consumed 20 kg in a year, the present consumption is upward of 50 kg.

And the difference between consuming plant based calories from their animal (beef, poultry, pork) equivalent is considerable. Calorie by calorie, you need more grain if you eat it transformed into meat, than if you eat the grain in the form of, say, bread. To produce a kilogram of pork requires 3 kg of cereals and 8 kg must be expended to bring a kilogram of beef to the table. Not surprisingly, the shift of diet (cereals to meat) as witnessed in China and India, is multiplied many times over on the global grain market. And yet the diet switch is generally slow and incremental and is therefore does not sufficiently explain the rather dramatic price changes noticeable on the market.

It would seem the explanation lies in the extraordinary demand for grain based ethanol by the US. In 2000, nearly 15 million tonnes of maize were sent into producing ethanol. By 2007, the volume of maize for the purpose had shot up to 85 million tonnes. It should be borne in mind that the US is the world's largest exporter of maize, and uses the bulk of its reserves for biofuel production, than for export. This leads to the conclusion that ethanol production is the dominant

⁷ Filling the 25 gallon tank of an American made SUV vehicle with ethanol, illustrates the point in ways no other approach can improve. Those 25 gallons are the calorific equivalent of one person's food needs for an entire year.

reason for global grain (and other crop and foods) price increase. Over one half of world's unmet needs for cereals results from US ethanol program alone.

Increased demand for ethanol would mean that harvests have to become bigger. This in turn would necessitate allocating new lands for cultivation or enhancing yields. But much of new land located is in remote parts. Their development would entail huge investments in roads and other infrastructure. This would evidently take decades to accomplish and therefore could make clearing forests an attractive option. And this latter approach is widely associated with global warming, a phenomenon lying at the root of the projected world farm output decrease of one sixth by 2020.

At any rate, *agflation* is likely to peak at between 10 – 20% or higher by 2016-2017.

What is the likely impact of biofuels development on food prices in Tanzania? It is worth noting that Tanzania falls in the list of Low Income Food Deficit Countries (LIFDC), experiencing an ever increasing dependence on imported food items. Increase importation of food will deepen the imbalance of trade that Tanzania is already facing. This also means that more and more foreign exchange will be used to import food. This is likely to increase after displacement of farmers from cultivation of food crops. That this is the reality ahead of the emergence of an entrenched biofuel cropping industry, is instructive. This is so on account of the proven experience that biofuel production entails a competition for resources between biofuels and food production, both in terms of land use (food crops or biofuel crops) but also as regards whether a crop such as sugar cane, should be directed to producing crystalline sugar, or to a bio-refinery.

There are four key factors driving interest in bioenergy: rising energy prices, in particular oil prices; energy security; climate change; and rural development (GBEP: 2007: 19, TaTEDO: 2008). These determinants are to a strikingly large extent pertinent to Tanzania. The world price of oil presently stands at over US \$ 108 a barrel and is projected to continue rising at an annual rate of 5%, an ominous trend for an underdeveloped, net importer, of oil. In 2006 Tanzania's oil import bill was US \$ 1.3 - 1.6 billion.⁸ Tanzania is on the list of Least Developed Countries (LDC), Highly Indebted Poor Country (HIPC) and equally pertinently, Low Income Food Deficit

⁸ Ministry of Energy and Minerals, Briefing Note, May 3, 2006

Country (LIFDC) and therefore the oil imports represent a substantial drain on foreign reserves, diverting funds from countless national priorities, such as education, health infrastructure, and combating such calamities as malaria, tuberculosis and HIV/AIDS. One of the most serious challenges facing the education sector, for example, is to attain a 12% enrolment into university of students who have completed secondary school level education.

With the highest power tariffs in the region, electricity remains inaccessible not only to those in the rural areas but even to urban poor, the consequence of which is overdependence on woodfuels, predominantly firewood and charcoal. Dar es Salaam's daily consumption of charcoal is estimated to be 20,000 tons contributing directly to a loss of around 92,000 hectares of natural forests per annum, when reforestation is at the rate of 25,000 hectares per year.⁹ This situation (of spiralling oil prices, resulting energy insecurity, environmental degradation and stifled rural development) renders the search for alternative sources of energy, as an indisputable national priority. And theoretically, biofuel development holds the promise of addressing this challenge in an innovative manner.

Indeed the Ministry of Energy and Mineral's (MEM) Strategic Plan recognises this, as does *Chama cha Mapinduzi* (CCM), the ruling party's election manifesto. And yet it is the observation of this study, that the pre-eminent driving force in the current biofuel development, is external, rather than internal and national. The foremost factor would seem to be interests of key global biofuel players in Asia, Europe, and the USA, who on account of largely, limited opportunities of production expansion at home, are attracted to Africa's endowment with what is perceived as abundant idle land and water resources. Characteristic of this category of interests in biofuel development, is a preoccupation with 'strengths' and 'opportunities', as opposed to widely acknowledged 'weaknesses' and 'threats' of biofuel development.

Notable also, is the glossing over of 'environmental' as well as 'social sustainability criteria' applicable to biofuel development. Quiet striking is the lack of emphasis on environmental impact assessment (EIA) compliance of envisaged and ongoing projects. In summary, an EIA is

⁹ Quoted in "Dar Researchers Make Breakthrough in Use of *Jatropha*..." *The Guardian* (Tanzania), July 4, 2006.

required, among numerous laws and policy documents, under the terms of the National Environmental Management Act, 2004 (NEMA) and Regulations thereto.¹⁰ NEMA explicitly prohibits implementation of any project “likely to have a negative environmental impact” just as it proscribes the issuance of a “trading, commercial or development permit or license for any micro project activity” in the absence of a “certificate of environmental impact assessment issued by the Minister” responsible for matters relating to the environment. The Regulations mentioned, proceed to lay out the procedures to be followed in obtaining the said certificate. Of particular relevance is the duty to engage a duly registered EIA expert, public hearings and posting of details of the project along with information on “the economic and socio-cultural impacts to the local community and the nation in general”.¹¹

Finally, is the critical issue of public awareness, popular participation. Biofuel development is a labour, land, forests and water intensive enterprise and therefore, involves exploitation of arguably the 4 most strategic resources at the disposal of any nation. This being the case, plunging the nation into the exploitation of these resources before release of results from sustained, comprehensive studies and national consensus have been attained, would seem reckless, improper and unsustainable.

Accordingly, the study observes and recommends that:

Biofuel development in Tanzania places at stake 4 highly strategic national resources: land, water, forests and labour, and for generations to come. This alone is sufficient reason for the Tanzanian general public and rural communities in particular, to wrestle back the initiative and seek direct engagement in determining the best way forward for the nation. Such engagement if it is to be undertaken from a position of informed opinion and in the context of transparent, purposeful and meaningful debate, has to be preceded by the most sustained and comprehensive study as to the strengths, weaknesses, opportunities and threats, biofuels are known or likely to be associated with.

The following threats deserve particular attention:

- Dispossession of village land in questionable circumstances

¹⁰ In particular, the Environmental (Registration of Environmental Experts) Regulations, 2005, and The EIA and Audit Regulations, 2005,

¹¹ Rule 6 (1) (i)

- Access and affordability of food
- Protecting livelihoods of rural communities
- Protection of smallholder farmers from exploitation
- Environmental impact assessment of projects
- Preservation of biodiversity and natural resources
- Plantation workers' rights

Deliberate efforts should be taken to identify all the major constituencies with an interest, direct or otherwise, in the biofuel industry, just as business interests are galvanized in a proposed *Tanzania Biofuel Producers Association*.

The notion that Tanzania embrace biofuels in response to the mandatory targets set by such external interests as the EU (10% biofuel blend by 2020) should not only be exposed as unsustainable.¹² Illustrations of countries which have not resorted to this questionable approach, such as Russia, should be borne in mind. At any rate, introduction of biofuels should be subjected to an adapted version of the EU '*social and environmental sustainability*' test.

Consistent with the Tanzania National Investment Promotion Policy:

- promote, adopt energy systems of production, procurement, transportation, distribution and end-use which are efficient and not detrimental to the environment
- encourage expansion in irrigation agriculture which uses environmental sound technologies;
- promote a land tenure system which tempers the maximum use of land resources with broad-based social and economic development;
- promote a growth of the national economy which is balanced and equitable;
- stimulate productivity of women by encouraging investments into areas where women are active;
- Promote the development and growth of small and medium scale industries which serve both the domestic and export markets;

Review existing laws, national policy and institutional frameworks accordingly.

¹² There are reports however that the EU has since retreated from this directive. For details see 'EU Set to Scrap Biofuels Target Amid Fears of Food Crisis' *The Guardian* (UK), April 29, 2008, p 1.

LIST OF ACRONYMS

ADM	Archer Daniels Midland Company
LARRI	Land Rights Research and Resources Institute
JOLIT	OXFAM Livelihood Initiative for Tanzania
TIC	Tanzania Investment Centre
TICA	Tanzania Investment Promotion Act
MEM	Ministry of Energy and Minerals
US	United States
EIA	Environmental Impact Assessment
LHRC	Legal and Human Rights Centre
LEAT	Lawyers Environmental Action Team
TaTEDO	Tanzania Traditional Energy Development and Environment Organisation
JET	Journalists for the Environment
CIDA	Canadian International Development Agency
DfID	UK Department for International Development
EU	European Union
GTZ	German Technical Cooperation
JICA	Japan International Cooperation Agency
ILO	International Labour Organization
SIDA	Swedish International Development Cooperation Agency
UNDP	United Nations Development Programme
UNEP	<u>United Nations Environment Programme</u>
USAID	United States Agency for International Development

NBTF	National Biofuel Task Force
AfDB	African Development Bank
IMF	International Monetary Fund
IRA	Institute of Resource Assessment
SUA	Sokoine University of Agriculture
UCLAS	University College of Lands and Architectural Studies
LIFDC	Low Income Food Deficit Countries
HIPC	Highly Indebted Poor Country
LDC	Least Developed Countries
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
CCM	Chama cha Mapinduzi
OPEC	Organization of the Petroleum Exporting Countries
N ₂ O	Nitrous Oxide (N ₂ O)
FAO	Food and Agriculture Organization
MDGs	Millennium Development Goals
KAKUTE	Kampuni ya Kusambaza Teknolojia
NGOs	Non Governmental Organizations
FTI	Fuel Tax Incentives
CBFT	Carbon-Based Fuel Taxes
VTs	Vehicle Taxes and Subsidies
COT	CO ₂ Trading
CDM	Clean Development Mechanism
IIBPF	Incentives for Investment into Biofuel Production Facilities

TBPA	Tanzania Biofuels Producers Association
EA	East Africa
CFC	Community Finance Limited
AG	Attorney General
MPEE	Ministry of Planning Economy and Empowerment
STEM	Swedish Energy Agency, Sweden
MoU	Memorandum of Understanding MoU
UNFCC	UN Framework Convention on Climate Change
UNCTAD	UN Conference on Trade and Development
BAFF	BioAlcohol Fuel Foundation
SEKAB	Svensk Etanolkemi AB
FELISA	Farming for Energy, for better Livelihood in Southern Africa
JPTL	Jatropha Products Tanzania Limited

TANZANIA AND THE GLOBAL BIOFUEL CONTEXT

Historically, while the use of biomass fuels goes back to the early days of the automobile industry, that is to say, the period 1903 – 1926, it wasn't until 2000 when we see a truly global upsurge in interest in this source of energy, and especially for the transportation sector. Several factors have interplayed to foist biofuels onto the priorities of nations, multinationals, business as well as research and development institutions.

There are four key factors driving interest in bioenergy: rising energy prices, in particular oil prices; energy security; climate change; and rural development (GBEP: 2007: 19).

The geopolitical conflict in the Middle East in 1973 and in 1979, in which OPEC cut exports brought about an 'energy crisis' manifested in severe shortages and a sharp increase in demand for oil-based products, most notably, petrol (gasoline). It is around this time that nations like Brazil and US embarked on a more focussed and elaborate path towards seeking alternative energy sources, biofuels, in particular.

World wide interest in agrofuels/biofuels has also been fuelled by the profound realisation that fossil fuel reserves (and on which depend practically all known strategic sectors within nation States) are not unlimited. Vagaries of the world oil market, and which have given rise to the notion of 'energy security' are another factor. Thirdly, besides being limited in terms of quantity, the use of fossil fuels is a source of far reaching harm to the environment, largely in the form of climate change, global warming and related deleterious phenomena.

Motivated by a desire to insulate themselves from an ever dwindling, ever costly source of energy which at the same time lies at the root of one of the world's worst environmental disasters, efforts began to be directed to sources of energy, other than fossil fuels. Biofuels, if harnessed well, present an alternative that can combat greenhouse gas (GHG) emissions, improve balance of payments, create employment opportunities in rural areas, bring energy to less privileged households and ultimately, mitigate mass poverty. If on the other hand, an unbridled development of the biofuel industry is allowed, the cost in terms of its socio-economic

impact can be overwhelming. This is so, in particular as regards, land scarcity and related conflicts arising from land alienation and displacement, as well as the 'food v fuel' crisis as biomass production gobbles up food producing land.

Consequently, intense divergences have emerged as regards the suitability, in the long term, of this new, alternative source of energy. For example, while its advocates laud biofuels as having the potential to reduce GHG emissions, and therefore considerably check global warming and climate change, Nobel laureate Paul Crutzen, published findings indicating that “release of Nitrous Oxide (N₂O) from rapeseed oil and corn can contribute as much or more to global warming than the fossil fuels they displace”.

Figure 1 shows that the two leading nations in the production of bioethanol are the US (19.85 in 2007) and Brazil (17.82 in 2007). Between them they account of over 90% of global production. Whereas the annual production in Brazil stands at 20 billion litres, the US produces around 26 billion litres (2007 estimates). (FAO & GBEP) In the US, the largest producer is Archer Daniels Midland Company (ADM), whose annual production is 1.07 billion gallons, which is four times that produced by its nearest rival, *VeraSun Energy*. According to Runge et al, ADM is not only well connected politically, but that half of ADM's profits are derived from products which the US government either subsidises or protects.

Figure 1: Top Producers of Bioethanol (in billion of litres)

Country/Region	2004	2005	2006
Asia	5.93	5.81	6.43
Brazil	14.66	16.06	17.82
Canada	0.23	0.25	0.57
China	3.5	3.5	3.55
EU	2.45	2.79	3.44
France	0.83	0.91	0.95
Germany	0.23	0.35	0.76
India	1.23	1.1	1.65
N & C America	14.96	16.86	20.85
USA	14.31	16.21	19.85
South America	15.14	16.57	18.59
World	40.71	44.29	51.32

Source: Extracted from FAO & GBEP (2007), Bioenergy Development in G-8 +5 Countries p 9

The US biofuel industry is subsidised by the US Federal Government to the tune of between US \$ 7 – \$ 8.9 billion per annum (Runge et als). While oil imports attract zero tariff, bioethanol is confronted with a tariff of 54 cents a gallon, which partly explains why, Brazilian bioethanol, which in the assessment of many, is far more cheaper, environmentally friendly and technically far superior in terms of efficiency, is unable to find its way into the US market.

But *protectionism* is common in Europe too. The highly subsidised nature and fierce protectionism surrounding the global biofuel market is a critical factor for countries such as Tanzania, who are being wooed into the industry with promises of becoming a notable ‘global producer’. A consultancy report commissioned by the Tanzania Investment Centre, claims that “Tanzania has exceptional potential to become a **major supplier to world markets**” (emphasis provided). But there is further reason for adopting guarded optimism.

While there are many sound reasons for Tanzania to set on the path of biofuel production, the conceptual initiative, technological basis and thrust, and more importantly, capital, are all external, predominantly, Western Europe and North America, all of whom are not motivated by considerations of philanthropy but predominantly, self-interest and business. This being the case,

and given Tanzania's (and indeed that of much of the Third World) experience with the so called cash crops, our collective sense of alertness should switch from guarded optimism into high gear. As in the case of cash crops, the greatest profits from the crops earmarked for biofuel production would come from processed commodities (that is, bioethanol and biodiesel) rather than raw biomass. Unfortunately, this aspect is not always easy to ascertain from the 'business plans' of a number of investors in Tanzania. At any rate, the GTZ study notes that the last few decades has witnessed a relentless decline in the global market value of agricultural commodities, with ominous implications for trade in primary biomass. From this analogy, the study cautions against export of primary biomass and instead advocates for the local conversion of biomass and export of processed, value-added products (GTZ: 97).

In addition to heavy subsidies and protectionism, the global biofuel industry is also characterized by concerns over the environment as well as social and economic dimensions and one illustration is the European Union. Following the controversial European Commission '*Renewable Energy Roadmap*', the European Parliament directed that a mandatory certification scheme be devised so as to ensure that biofuels do not cause, directly or indirectly, social problems such as rising food prices and the displacement of people.

It is also important in this regard, to draw attention to one particular initiative by OXFAM, which has put forward the following 4 clusters of principles to guide the biofuel industry:

1. Workers Rights (including, wages, safety standards, right to collective bargaining);
2. Averting Harm to Proximate Communities (land rights, consultation, water access);
3. Fair Treatment of Smallholder Biomass Suppliers (fair prices, transparent contracts, humane repayment schemes); and
4. Mitigate competition between biofuel and food production (avoid displacing food production, use idle land for biofuels, special case of LIFDCs)

The configuration of the global market in biofuels is worth taking into account for countries, such as Tanzania, where the rationale for developing biofuels is partly grounded in the desire to penetrate the global market. As a leading consumer of bioenergy, the US presents itself as the

most attractive destination for Tanzania biofuel. The reality, however, is that on top of ‘reckless subsidies’ the US market is notable for debilitating protectionism.

Last year, Washington initiated the U.S. Energy Independence and Security Act, to which *Food First*, and the *Institute for Food and Development Policy* (based in Oakland, California,) responded in a poignant way. Among others, Eric Holt-Gimenez and Isabella Kenfield¹³ focus on the wider implications of the Renewable Fuels Standards (RFS) articulated by the Bill, and reveal two ‘inconvenient truths’ about RFS implications. Firstly, is the impact of the RFS mandates on food prices and supplies. In their opinion, “[p]eople around the world **are already** experiencing the food price and supply shocks that the spike in U.S. ethanol demand and consumption is causing”.

The second inconvenient truth is that, while the Bill aims at giving the U.S. ‘independence and security’ in so far as energy sources are concerned, RFS mandates create undue pressure on the global South to join the fray. And as experience has shown, this has led to “massive environmental destruction, loss of livelihoods, increased human rights abuses and threatens further economic and political instability” in the global South.

The next largest market is Europe. Germany, in particular, “is likely to develop into the most active bioethanol consumer in coming years (FAO & GBEP, 2007:17). Although to a lesser degree, protectionism is a common feature of the European market. Furthermore, Europe is also the home of at least 2 major exporters: France and Spain. Between whom, they exported respectively, 320 million and 190 million litres in 2006 alone.

The total market share of North and South America is a staggering 60%. Besides the US and EU countries, Tanzanian biofuel producers will have to contend with the world’s largest exporter of bioethanol, Brazil and whose total global output for 2006 was 3.5 million litres. Another region with a notable share of the global bioenergy market is Asia, at 17%. This in summary is the

¹³ In their joint report, titled ‘*When Renewable Isn’t Sustainable: Agrofuels and the Inconvenient Truths Behind the 2007 U.S. Energy Independence and Security Act*’ For details see <http://www.pambazuka.org>. Visited March 30, 2008

configuration of the global market in bioenergy, and into which the TIC commissioned study claims, Tanzania is in a unique position to capture.

Energy is an essential service whose availability and affordability determines levels of development endeavors. Tanzania faces the challenge of accelerating its economic growth. This has been the stimulus for formulating and reviewing policies and strategies that aim at reducing poverty in the context of Development Vision 2025 that envisage ‘sustainable socio-economic development by the year 2025’. The Vision is linked with the Millennium Development Goals [MDGs], which emphasize on Environmental Sustainability and Poverty Reduction. The success of all these ambitions depends on reliability, affordability and sustainability of modern energy services.

Petroleum products are among important energy source for transportation and running stationary engines. Tanzania is completely dependent on imported petroleum products which cost the country more than 25% of its foreign earnings. Equally importantly, the oil bill is projected to continue rising at an annual rate of 5%. The transport sector is the main user of petroleum products with 40% of the market, followed by manufacturing industry using 25% and households 10%. The balance is accounted for by agriculture, and commerce. Petroleum accounts for 7% of primary energy consumed in Tanzania.

Biomass is by far the most used sources of energy in Tanzania, with woodfuel accounting for about 90% of the total energy consumption. The country, due to its climate has a high potential for a variety of energy plants/crops. Other sources of energy include electricity which account for about 1.2%, of the primary energy used. Coal, solar and wind account for less than 1% of total energy consumed in the country.

KEY ACTORS AND INTERESTS¹⁴

At the more general level it is worth appreciating that biofuel production entails the exploitation of 4 principal resources: land, forests, water resources and labour. Given the strategic

¹⁴ For a detailed list see Appendix 1

significance for any nation of these resources, it is plain common sense to proceed cautiously, paying particular attention to the sustainability of the enterprise. One should therefore approach with great concern opinions, such as those contained in the GTZ study, **calling on the Government of Tanzania to “take immediate action to enter the learning-by-doing process – and not wait for results and policy advice from the [National Biofuel Task Force]”** (GTZ:5) In so far as this study is concerned, **‘sustainability’ connotes the exploitation of resources in such a way that present day needs are satisfied without denying future generations, of a similar capacity.**

Besides the predominance of foreign capital, the Tanzania biofuel discourse is also characterised by a distinct absence of public awareness let alone informed, purposeful debate. And this is perhaps not accidental given the opinion of the dominant and vocal foreign investors, as exemplified by the GTZ study. Indeed, in the same report, public engagement is confined to **“informing the population about the significant benefits and opportunities offered by biofuels as alternative transport fuel”**. (GTZ: 123).

A third characteristic of the biofuel discourse is, surprisingly, the glossing over if not eschewing of the issue of environmental impact assessment (EIA), which is provided for under laws and various national policy documents of Tanzania.¹⁵

A final observation with regard to the biofuel discourse in Tanzania is a dearth of home grown, local, sustained and comprehensive studies, with the dominant theme in existing literature and policy statements, according inordinate attention to ‘strengths’ and ‘opportunities’ while paying lip service to the many and real ‘weaknesses’ and ‘threats’, biofuels are justifiably associated with. Questions are raised about the supposedly ‘carbon neutral’ nature of biofuel production such that some are left convinced that biofuel contribution in reducing carbon emissions (hence combating global warming and climate change) is modest and limited. (Runge et al: 2007). The authoritative review of the current state of bioenergy development indeed questions the environmental sustainability of biofuels where it states that biofuels “can provide dramatic environmental gains but also has the potential to cause great harm if not produced in an appropriate way” (FAO et GBEP, 2007: 36). As for bioethanol production in the US, it has

¹⁵ In particular by the Environmental Management Act, and the National Forestry Policy.

achieved the modest reduction of GHG emissions of no more than 15% (OXFAM Biofuel Policy Reactive, 2008:4)

Biomania argues that biofuel production has the potential for bringing employment opportunities, and hence increasing personal income to the rural poor, the ultimate result being poverty reduction. The situation in Brazil is illustrative. The first bio-diesel co-operative was launched in 2005, has provided improved livelihoods for around 25,000 families as well as increased access to energy for marginalised communities. (OXFAM Briefing Note, November 1st 2007: 2) But experts also point out that Brazil distinguishes itself for its “clear pro-poor, environmental social objectives”. Indeed the influential joint FAO and Global Bioenergy Partnership review approvingly observes that the Brazilian Federal Government *Agroenergy Policy Guidelines* and the *Brazilian Agroenergy Plan* adopted by the Ministry of Agriculture, Livestock and Food Supply have as their goals, ensuring support for specific public policies, such as social inclusion, regional development and environmental sustainability (FAO & GBEP, 2007:65). Contrary to advise given to the Tanzania Government as regards disregarding comprehensive feasibility studies and environmental impact assessment, a key plank of the *Brazilian Agroenergy Plan* is to provide direction for the efforts of Brazilian science, technology and innovation organisations, given further articulation in guidelines under the aegis of the *Research, Development and Innovation Programme*.

The impact of biofuels on livelihoods and food supply and availability, is another fundamental matter, deserving priority attention as Tanzania makes its debut into the biofuel industry. The GTZ Report disputes this causal link. However, beyond this lone voice, there are many other voices presenting almost unassailable evidence that biofuels have the real potential to wreck havoc on food security and livelihoods, particularly for the poor in rural, and urban areas as well.

In summary the following actors seem to have the greatest interest and are indeed active:

- Government of Tanzania (both central and Local, including at Village level) & its Agencies;
- Investors (existing & prospective; local & foreign)

- Foreign Diplomatic Missions /International Development Agencies
- Local and International Financial Institutions
- Civil Society Organisations (local and international)
- Oil Trading & Marketing Companies
- Media

The biofuel industry has attracted a wide array of investors. Besides a handful of local firms, the terrain is dominated by firms from Europe, USA, Japan and the Far East.

Accessing data on these firms has presented a significant challenge. Government agencies are cagey and investors in their majority are thrifty in sharing information, necessitating the gleaning of information from a myriad of often, disparate information sources. For example, it has not been possible to determine the critical question of the preferred model of production (plantation or smallholder/outgrower) of a particular investor just as it has been difficult to ascertain the environmental impact assessment (EAI) compliance of a specific biofuel enterprise. Equally, accessing data and information with regard to the mode and quantum of compensation awarded to villagers from whom land has been acquired, has been constrained. An overview of actors also reveals a divergence of motives and interests. Besides the general bifurcation between those interested in biodiesel and bioethanol, there are also significant differences in commitment to supporting proximate local communities. Some are non-committal, others make blanket pledges and yet others are more focussed and explicit.

The shared, institutional forum for stakeholders would seem to be the *National Biofuel Task Force* (NBTF). In the opinion of investor interests, the seat of power within the Task Force should lie with the Task Force Chairman who should be “the main driver of the Task Force activities” and a person “independent from the Tanzanian Government” (GTZ : 119). A second pillar of the Task Force, according to the Report is the task Force Secretariat, which like the office of the Chair, shall also be “established independently from the Tanzanian Government” and will be responsible solely for the day-to-day work of the Task Force and administrative support to the Chairperson as well as to Task Force members. (GTZ: 119). The report further recommends the establishment of a Tanzania Biofuels Producer Association to serve as a focal point for advancing common causes especially within the *National Biofuel Task Force*.

To obtain an insight into the approaches, priorities and interests of this category of stakeholders (that is, investors) it is proposed that we examine the relevant parts of a 2005 study (the most extensive thus far) commissioned by the German Technical Cooperation (GTZ)¹⁶ into the possible opportunities of biofuel use in the transportation sector. Also included is a second study commissioned by the Tanzania Investment Centre (TIC).

There is acknowledgement that biofuel production is associated with food insecurity but asserts that this is an unfounded linkage. According to the GTZ Report such coupling of global food stocks to bioenergy is a result of restructuring of the highly inefficient agricultural production subsidies in Europe and USA, rather than a consequence of competition for land between food and bioenergy production.¹⁷

The Report contests the *food v fuel* argument on the additional ground that biofuels need not necessarily originate from the major food crops but instead be extracted from non-food crops. Such non-food crops, it is claimed, may be grown on land that is not capable of supporting food cropping, thus precluding competition. Perennial non-food energy crops have the potential and additional advantage of not only facilitating rehabilitation of degraded and abandoned land. Land rehabilitated through dedicated bioenergy cropping land, the Report contends, is capable of increasing acreage of land for food production.

The Report cites a further and third benefit. Agro-processing facilities could be organized in such a way that rather than producing one or two products, the facility produces a range of up to 28 items. But the Report is quick to acknowledge that this has rarely been achieved, even in the developed countries since bio-refineries are a fairly complicated business model.

The Report isolates one specific bottleneck/restriction. The Report repeats an often heard 'strength' and that is, availability of suitable land, which is put at 55 million hectares, none of

¹⁶ In partnership with WIP-Renewable Energies(Munich, Germany), Themba Technology (Uxbridge, UK), Tanzania Traditional Energy Development and Environment Organisation (TaTEDO – Tanzania), and Integration Umwelt und Energie GmbH (Grafenberg, Germany)

¹⁷ The Report relies for authority on the Stockholm/Partners for Africa debate on 'Food v Fuel' and cited in Morales, M.M. (ed) (2005) Policy Debate on Global Fuels Development

which is being used for agriculture. However, this translates into a ‘strength’ only if sustainability criteria sit at the core of the country’s development policy. More importantly if the following constraints are addressed:

- Absence of coherent long term national policy;
- Fragmented industry approach to biofuel;
- Low recognition of the potential of biofuels to national development;
- Complex land tenure systems; and
- Lack of appropriate capacity among existing stakeholders.

The GTZ Report observes that despite the exceptionally large potential area of land available for biofuel production, Tanzania does have a complex and highly *biodiverse* ecology to protect. This situation dictates that environmental concerns form part of the sustainability test for any bioenergy programme. So critical is this aspect that despite the poor appreciation of sustainability criteria, the welfare of future generations of Tanzanians demands that environmental concerns around bioenergy are prioritized. In so far as the EU is concerned, one key aspect of a sustainable bioenergy system is the conduct of an EIA.

The GTZ study acknowledges the impact bioenergy production is likely to have on biodiversity, *water, soil, forestry and nature conservation* in Tanzania. Tanzania has access to 3 of the world’s largest lakes and therefore the potential for irrigation is substantial. However, sugar cane, for an example, can require up to 10 millimeters of rain equivalent water per day to meet the crops evapo-transpiration requirements. The exploitation of water resources for irrigation, therefore, needs careful planning. At the other extreme, sugar mills and ethanol plants require substantial amounts of water and can emit significant volumes of liquid pollutants with high biological and chemical oxygen demands. This is in addition to possible negative impacts on local and regional hydrology arising from the introduction of energy crops.

The use of perennial crops has several merits in so far as soil conservation is concerned. However, great care has to be taken in monitoring the recycling of ash and other nutrient-rich waste streams from the conversion facility, back to the fields. Plants are known to selectively and

actively absorb toxins, including heavy metals, resulting in toxins finding their way into the bioenergy plantation soil.

The GTZ study casts serious doubts about the benefits to society, in the absence of meaningful involvement of local communities. Agriculture mechanization, with which plantation produced biofuels are associated involves the intensive use of mechanized systems, resulting in a decrease in labour requirements. At the same time, HIV/AIDS, malaria and other similar diseases have already seriously impacted on the productivity of the labour force in affected areas. No wonder, the study points out, that “large scale, foreign-owned, highly mechanized agro-industries bring little micro or macro-economic benefits to the local communities with which they are associated with the singular exception of tax revenues put to proper use”.

The biofuel landscape, is in this respect, characterized by contrasting conceptual outlooks and focus. Existing local NGOs and companies seem determined to promote local farmers already engaged in the area. KAKUTE, in particular, which is mainly working with small farmers growing *Jatropha*, works with smallholder farmers. In partnerships of this nature, human displacement or shattered livelihoods are unlikely to occur.

While employment benefits are often harped upon by politicians as the key benefit, one needs to look beyond the numbers of direct jobs created, and consider such factors as job quality and worker welfare. Other social criteria of a socially sustainable bioenergy project include the following:

- ILO Standards
- Forced Labour prohibition
- Health & Safety Requirements
- Freedom of Association
- Right to Collective Bargaining
- Fair Remuneration
- Non-discrimination
- Disciplinary Practices
- Governance

The GTZ study advocates against the exportation of raw, primary biomass feedstock. It firmly argues for building local capacity to engage in the international trade in processed, value-added products.

Finally, are the study's policy recommendations: Firstly, is a recommendation in respect of '*Fuel Tax Incentives*' (**FTI**). While serving as a "very effective tool for encouraging the use of biofuels" it entails two major constraints: loss of revenue for Government, and politically unpopular periodical adjustment of taxes.

'*Carbon-Based Fuel Taxes*' (**CBFT**) is the second policy recommendation. Another potentially "effective stimulant" to biofuel development to the extent it is economically sound and environmentally friendly. But (for it to be operationalised) presupposes that a system capable of capturing well-to-wheel (as opposed to only tailpipe) emissions is in place. The study, therefore, concludes that like FTI, CBFT "seems to be of limited immediate importance".

Thirdly, are '*Vehicle Taxes and Subsidies*' (**VTS**) which seek to encourage the purchase of vehicles running on certain type of fuel, or with reduced carbon emissions. Since biofuel use has an insignificant impact on CO₂ emissions this "approach provides little incentive"

Fourthly, is '*CO₂ Trading*' (**COT**), an emissions trading system. But for this system to function and with the desired results, a well-to-wheel GHG monitoring system must be operational.

The *fifth* policy recommendation is the '*Clean Development Mechanism*' (**CDM**), provided under the Kyoto Protocol. Despite its 'promise' it is an inapplicable option for a host of reasons. On the one hand it is crippled by the "limited experience and methodologies for estimating, monitoring and certifying potential well-to-wheel emission reductions. But secondly is the "lack of a commonly agreed CDM methodology and data for estimation of emissions baselines".

At *sixth* place, are '*Fuel Standards*' (also called, Blending Mandates). The Government is expected to use its regulatory powers to require that fuels meet a specified blend/mix level. While the approach succeeds in creating a guaranteed market share for biofuels, it suffers the

disadvantage of compelling “fuel providers to comply regardless of costs” besides imposing on Government the onus of conducting a detailed pre-production “estimate of biofuel production costs”.

Seventh, are ‘*Incentives for Investment into Biofuel Production Facilities*’ (**IIBPF**). Since the investor will be confronted with an “uncertain market” incentives have to be offered. These range from: investment tax credits, loan guarantees and tax free debt bonds.

Eighth, is the ‘*Removal of Barriers to International Biofuels Trade*’. The study suggests that there are “substantial potential benefits” from the international trade in biofuels despite strong ‘protectionism’. There is, therefore, a supposition that Tanzania is realistically placed to overcome the well entrenched protectionism in potential markets, namely Europe and USA. At the other extreme, the study recommends that Tanzania adopts protectionist measures of its own, for the benefit of local manufacturers, as is the practice in developed countries.

At *ninth* place, is the establishment of a ‘*National Biofuels Task Force*’ (**NBTF**), the only policy recommendation to have been implemented. Conceptually, the NBTF is presented as “a body independent of, but with strong co-operation links to the Tanzanian Government”. Administratively, it shall comprise of a Secretariat (established independently of Government), Members (drawn from Government, Associations & Utilities), and Producers and other stakeholders). The focal point shall be the Chair, “the main driver of Task Force activities” and shall be a person independent of Government.

Tenth, along with a NBTF, the study proposes the establishment of a ‘*Tanzania Biofuels Producer Association*’ (**TBPA**).

The recommendations are striking in four main ways. Scant if any attention is given to the critical issue of *Environmental Impact Assessment* (EIA) despite repeated acknowledgement of serious environmental concerns that biofuel development raises for Tanzania. It is also noteworthy, that *consultation* with local communities in the affected areas and the general public appears not to be a priority, when application of the social sustainability criteria, seems to

suggest otherwise. The third general observation is the inordinate attention given to *strengths and opportunities* at the expense of threats, some of which are evident even ahead of biofuel development, and especially as regards the standard of living, food security, access to land, and rural poverty. Fourthly and lastly, is the study's intriguing recommendation and it reads as follows:

“In order to quickly proceed with the introduction of biofuels in Tanzania, the Government should take immediate action to enter the learning-by-doing process – **and not wait for results and policy advice** from the Task Force”.

It is instructive to also review another study, this time, commissioned by the government agency, Tanzania Investment Centre.¹⁸

Judging from its focus it is evident that the primary concern of the study's author is to dwell on strengths and opportunities rather than synchronising these with known weaknesses and threats. Accordingly, the study is premised on the following 5 factors or observations:

- a) Global demand outstrips supply, especially tropical grown
- b) Tanzania is well placed to become a major global producer
- c) Foreign investors confirm Tanzania's potential
- d) Convergence between GoT and international donors
- e) Favourable business environment

a) Global Supply & Demand in Biofuels

Projected deficit of fossil fuels has pushed **demand** for **bioethanol** and hence the ambitious mandates (10% by 2020 in EU). Use of **biodiesel** is also projected to grow by 8.9%. The Eastern Africa region and its environs constitute net oil importers, thus opening an opportunity for Tanzania biofuel exports, the study argues. But since Tanzania is itself a net importer, biofuel exports would substantially boost foreign currency reserves.

¹⁸ A.T. Kearney, (September 2006), Briefing Note on Why Tanzania Should Embark on Biofuel Production.

Global **supply** in oil palm dominated by Malaysia and Indonesia (85%) and can't be expanded any further on account of land constraints. Likewise, global oil seed production trailing behind by 2.3% of demand, generating pressure on price and availability.

Situation Analysis of EA Region

It is claimed that being located in a region with several net oil importers places Tanzania in a unique position to be the regional major supplier.

The high population growth (2 to 6 times higher) parallel with a rapidly expanding Industrial Production Growth Rate of countries in this region, are pointed out as other advantages.

b) Tanzania and Global Leadership in Production

“Tanzania is ideally placed to become a leader in biofuel production globally”.

- Ideal geographic and climatic conditions
- Land:
 - 88 million hectares of suitable agricultural land.
 - Less than 6% utilised.
 - Not virgin forest or environmentally sensitive
 - Rather, is disused from previous nationalisation
 - Or, open scrub
- Abundant water resources: 3 large lakes, rivers offering irrigation schemes
- Sufficient ground work conducted: a study has been carried out by GTZ and a Task Force established
- Presence of and interest among local business entities

c) Attractive Irrigated Lands & Oil Seeds Production

Significant potential for Irrigated Land & Production of oil palm and *jatropha*.

Figure 2: Areas in Tanzania with High Irrigation Potential

REGION	HIGH IRRIGATION POTENTIAL LAND (Hectares)
Arusha	410,700
Coast	83,000
Dar	8,000
Dodoma	10,000
Iringa	163,000
Kagera	95,300
Kigoma	107,400
Kilimanjaro	238,500
Mara	210,000
Mbeya	285,000
Morogoro	376,000
Mtwara	14,000
Mwanza	98,500
Rukwa	11,000
Ruvuma	23,200
Shinyanga	80,400
Singida	10,000
Tabora	25,000
Tanga	30,000
Lindi	19,600
TOTAL	2,300,000

d) Institutional & Legal Framework

A detailed study by GTZ (2005) has been carried out to ascertain the country's assets, potential, and demand. A National Task Force was created in 2006 with the goal:

- Developing suitable policies and regulations
- Inter-Ministerial coordination
- Information Shop
- Demonstration facilities
- Promoting sale of flex-fuel vehicles

- Designing financing schemes and incentives for investors
- Drawing Fundraising strategies
- Promotion R & D
- Promoting awareness of benefits of biofuels

e) Leadership Commitment & Donor Interest

- President and Cabinet have lent their support to the biofuels industry, presenting it as a priority and willing to facilitate creation of a conducive investment climate.
- TIC facilitates land acquisition
- Land Policy confers right to buy and sell land
- TIA (1997): VAT exemptions, profit/investment repatriation, investor protection
- International donor interest and assistance (DfID, WB, USAID)
- Acceptable infrastructural development

The Government of Tanzania explicitly recognizes the importance and need to develop alternative fuels such as biofuels. In his programme of visiting Government Ministries, the newly elected State President, Jakaya Mrisho Kiwete, called on Ministry of Energy and Minerals (where he once served as Minister), and stressed the importance of developing a strategy to promote biofuels with emphasis on bio-ethanol. He returned to this theme in a subsequent monthly televised address to the nation. He is also known to have made familiarization visits to bioethanol plants in Sweden and US. Finally, he is on record as visiting the Rufiji delta area exhorting villagers to embrace Swedish investors with an interest in bioenergy development.

In the absence of an appropriate system to coordinate development of biofuels in Tanzania, a mechanism to ensure a shared understanding and setting a framework for the development of National Biofuel Platform in Tanzania was put in place. Therefore, in March 2006 the Government decided to establish the *National Biofuel Task Force* with the primary task of formulating and preparing an enabling environment to facilitate the development (promotion and utilization) of biofuels in Tanzania through putting up the required regulatory frame work.

Members were from MPEE (Chair); MEM (Secretary); Ministry of Agriculture Food Security and Cooperatives; Ministry of Labour, Youth Development and Employment; Ministry of Finance; Vice President's Office - Division of Environment, TIC, AG Chambers, TPDC and Community Finance Limited (CFC) of Tanzania. Later, based on the need, members from Ministry of Water and the Sugar Producers Association were incorporated in the Task Force. The Secretariat includes members from Ministry of Energy and Minerals, Ministry of Agriculture and Ministry of Planning, Economy and Empowerment.

Though biofuels is an energy related issue, it is crosscutting in nature dictated that it should be coordinated by the (then) Ministry of Planning, Economy and Empowerment (MPEE) including signing related agreements on behalf of the Government.

The specific Terms of Reference (ToR) for the Taskforce are to:

- a) Facilitate the ongoing and potential Biofuels initiative in Tanzania, e.g. those of BAFF, SEKAB and CFC.
- b) Conduct a Policy and Regulatory Environmental Scan – a review of the existing policy and legislation with a view to ensuring that a facilitative policy and legal environment on the biofuels is in place;
- c) Develop well defined, coordinated and integrated modalities, procedures, code of conduct, and guidelines of dealing with biofuels in Tanzania;
- d) Prepare a coordinated and integrated programme for the development of biofuels in Tanzania that takes into accounts socio-economic dimensions, community developments as well as poverty reduction and empowerment aspirations of the nations;
- e) As part of the Biofuel Development Programme, identify and map-out suitable areas/land for Biofuel Development in Tanzania.

To date, the Biofuels Task Force has carried out a number of key activities including conducting of a 'SWOT Analysis' and Prioritized Strategic Actions, preparation of the Draft Biofuels Guidelines for biofuels development and action plan.¹⁹

¹⁹ A draft Guideline does exist, but beyond the reach of the Research Team.

A number of priority activities have been identified and include:

- a. Legal and regulatory environmental scan, with an aim to ascertain what is required to be in place in term of policies, laws, institutional frameworks, regulations and standards.
- b. Study Tours to countries with a rich experience and notable for their best practices. Limited knowledge on biofuels is considered to be a barrier to the Task Force members in effectively developing the urgently needed inclusive, integrated, and sustainable National Biofuels Development Programme.
- c. Hire a Biofuels Expert who will work full-time during the infancy stages
- d. Finalization of draft biofuels development guidelines.

The Ministry of Energy and Minerals (MEM) and the Swedish Energy Agency, Sweden (STEM) expressed their intention to cooperate on the development and deployment of bioenergy and biofuels options in Tanzania. The cooperation is being developed based on the formal request by the Ministry of Energy and Minerals to the Swedish Embassy in Tanzania on 20th April 2007.

The Government has concluded a Memorandum of Understanding (MoU) with Swedish Energy Agency (STEM) to assist in implementing the already identified biofuels development activities specifically reviewing policies, laws and institutional arrangements relevant to biofuels.

This MoU that was signed has been seen as the first phase of a long-term cooperation and will last for the period of six months from the 1st of July to the 31st of December 2007.

During the first phase, STEM will support and facilitate the Tanzania Biofuels Task Force to implement biofuels activities including but not limited to:

1. Development of a two-year workplan on bioenergy and biofuels in Tanzania;
2. Implementation of the first phase of an environmental scan to provide inputs to the two-year workplan;
3. Recruitment of a biofuels expert to coordinate the implementation of the workplan under the supervision of the Tanzania Biofuels Task Force (contracting will be subject to approval of the work plan).

The actual implementation of the assignment is being carried out by ECON who were subcontracted by STEM. The work plan agreed upon between MEM and STEM/ECON required the outcomes for the first phase to include conducting of an environmental scan. With regards to the draft biofuels guidelines, the objectives of the environmental scan are to:

- Identify any inconsistencies between the biofuels guidelines and existing legislations, policies and standards.
- Identify whether the biofuels guidelines in any way may hinder potential future investments in biofuels development in Tanzania.

An agreement was reached regarding the ECON proposal, confirming the following actions:

- Review of current interim guidelines and other relevant work in progress.
- Review of legislation, policies and standards to identify areas of potential conflicts/incoherence with investments in biofuels development during the interim period prior to finalization of the policies, legislation and standards.
- Identify gaps and synthesize the environmental scan to provide i) input to the NBTF and ii) input to the Programme Document formulation.

The process for developing the second phase Programme Document, 2008-2009, was presented by ECON. It was agreed by the parties (MEM and STEM/ECON) that the Programme document should outline:

- Plan for updating and revising the biofuels guidelines.
- Plan for continuous monitoring and evaluation of biofuels development projects, and for integrating lessons learnt and issues encountered.
- Plan for amendment of existing policies, regulations, standards and guidelines, or drafting of new policies, regulations, standards and guidelines as deemed necessary.
- Plan for capacity development of relevant entities, to be identified and prioritized during the programme formulation process, including the biofuels advisory position

Way forward:

- Convene a wider stakeholders workshop to deliberate on the draft biofuels development guidelines and to chart out the next practical steps in developing the right environment for sustainable biofuels development in Tanzania.
- Conduct a policy, legislation and institutional framework review.
- Based on the outcomes of the review, develop appropriate policy, legislation and institutional framework.

Ministry of Energy and Minerals (MEM)

The Ministry's Strategic Plan (MEM 2003/2004 – 2005/2006) declares the Ministry's core mission as being to “create conditions for the provision of safe, reliable, efficient, cost-effective and environmentally appropriate energy services to all sectors on a sustainable basis”. MEM hosts the National Biofuel Task Force (NBTF) and has hosted a number of meetings, mostly with potential investors but other far more broad based gatherings such as National Stakeholder Workshops. A key and pertinent official text is the 2003 National Energy Policy.

Within the Ministry, the locus of policy initiatives and recommendations is the Energy and Petroleum Division. In the opinion of the Division's experts, biofuels are capable of meeting all the nation's energy needs. In their briefing note on ‘Biofuels Development in Tanzania’ of May 3, 2006, no potential or real threats are acknowledged. Instead, they point to “very positive trend (*sic*) in terms of technological interventions and commercialisation” the world over. It does at the same time make an oblique reference to safeguarding “national interests”, and to the desirability of ensuring benefits “are retained in the country”.

To the contrary, the briefing note argues that the use of biofuels does not contribute to net emissions of greenhouse gases nor, therefore, to global warming. Biofuels are also seen as contributing to the eradication of poverty, reducing greenhouse gas emissions, reducing oil imports (hence savings on foreign currency reserves), increasing employment opportunities, improving public health, enhancing energy security and offering a new paradigm for international cooperation.

Justification for the development of biofuels in Tanzania is in the context of resolving energy needs in the following areas:

- Transportation fuel
- Power generation
- Household cooking and lighting;
- Mitigating climate change; and
- Poverty reduction

A second justification lies in the challenge presented by ever spiralling fossil fuel importation costs presently (that is, 2006), standing at more than US \$ 1.3 billion. World crude oil prices are likely to scale up to US \$ 100 a barrel. *Thirdly*, is the desire to confront devastating deforestation arising from an over reliance on woodfuel. Firewood and charcoal production alone, forest cover to the magnitude of over 90,000 hectares annually. *Fourthly*, are international obligations arising from treaties and other international arrangements. They include the UN Framework Convention on Climate Change (UNFCCC) and the UN Conference on Trade and Development (UNCTAD) Biofuels Initiative of June 21, 2005.

According to the Note, the impulse to the biofuel initiatives in Tanzania has its origins in formal inquiries and expressions of interest from a variety of parties, most eminently, investors. MEM initiatives in biofuels go back to September 2005 when, with the support of the German Technical Cooperation agency, GTZ, the first ever National Workshop on Biodiesel for Transportation was held. On its heels (October 2005), MEM hosted the Chairman and Chief Economist of the Japan Development Institute. The meeting, also attended by representatives of the Office of the President of Tanzania (Planning and Privatisation) focussed on the promotion of mass production of biodiesel within the larger context of the Mini Tiger 2020 Special Economic Zones vision. A third initiative occurred in November 2005 at a stakeholders meeting at the Embassy of Sweden at which a proposal for a joint venture between a Tanzanian registered company, and two Swedish organisations²⁰, was presented. The joint venture was for producing ethanol for local as well as export purposes and beginning with a capital outlay of no less than US \$ 1.5 billion for the initial cluster to be located in the Coast Region on land measuring 400,000 acres.

²⁰ Swedish Ethanol Chemistry (SEKAB) and BioAlcohol Fuel Foundation (BAFF).

A fourth initiative, in a meeting at the Ministry of Planning, Economy and Empowerment (MPEE) in March 2006, was marked by another joint venture proposal from a Tanzanian consultant firm, and a Dutch organisation on the production of bio-diesel on 75,000 acres of land and entailing an investment of US \$ 60 million. A fifth initiative, was the Arusha National Stakeholder Workshop which examined the potential for producing biofuels from jatropha plant (seed oil).

Two successive meetings were held in May 2006. The first was on May 2, 2006. Hosted by MEM, it brought together representatives from Ministry of Agriculture, Food Security and Cooperatives, Ministry of Water, Ministry of Justice and Constitutional Affairs, National Environmental Management Council, and National Land Use Commission. The meeting reviewed a proposed MoU between Government on the one hand, and CFC, BAFF and SEKAB on the other, as a precursor to a subsequent meeting between the investors and the State President.

The Meeting agreed to facilitate a gathering between the investors and the State President (May 6-9, 2006) but not before expressing a number of concerns, both procedural and substantive, as regards the proposed MoU. Among these, were the mismatch of the signatories, potential for violations of the Tanzania Investment Act and Land Act, ostentatious land demands, multiplicity of regulatory bodies, claim of monopoly status, and potential of dragging nation into international debts.

A second meeting in the month was that of National Stakeholders and took place on May 18, 2006.

Other activities include:

- Establishment of the Biofuels Project Management Unit (PMU).
- Prepare a well defined, coordinated, integrated, inclusive and sustainable Programme for the Development of Biofuels in Tanzania.

- Identify and Map-out suitable land for Biofuels development in Tanzania (As part of the National Biofuels Development Programme).
- Prepare and implement initial awareness creation and sensitization programme,
- Prepare Information Education and Communication (IEC) strategy customised to needs of different target groups.
- Prepare Capacity Building Programme in line with the need assessment findings (in the feasibility study and Biofuels Development Programme)
- Sourcing Funds to implement the National Biofuel Programme, the National Biofuels IEC strategy, and Capacity building activities.
- Implementation of the National Biofuels Development Programme, IEC Strategy and Capacity Building Programme.

*Private Companies*²¹

Nearly 37 entities of varying types are engaged in differing ways in bioenergy development in Tanzania at the moment with a significant presence of foreign capital. In contrast, wholly Tanzanian owned companies are few and far apart. Typically, the proposals from these prospective investors entail capital outlay ranging from US \$ 60 million to \$ 1.5 billion to produce biomass for either ethanol or bio-diesel on land measuring from 30,000 to 2,000,000 acres.

In the case of the joint venture proposal from CFC Ltd, with BAFF and SEKAB, the intention is to engage in the production of ethanol from sugarcane or cereals by small scale farmers for whose benefit extension services, credit, education and health facilities will be made available. The proposal includes a projection of the land size required which is 200,000 ha for a 'Nucleus Estate' and another 200,000 ha of land to be developed by small scale farmers.

While the local partner, that is, CFC assumes responsibility for local capacity building and community services, BAFF and SEKAB pledge to inject the US \$ 1.5 capital outlay for the establishment of the first cluster. The expectation is that the project will provide employment to

²¹ Information gleaned from MEM Briefing Note

at least 60,000 but impact on lives of at least 200,000. The Swedish partners pledge to purchase all the ethanol produced in excess of local demand. Once completed and operational, the projected annual earnings from exports are expected to be about US \$ 1.2 million. Power generated from the biofuel platform will benefit the local community and excess power exported into the national grid.

As noted earlier, besides Sweden, interest has been expressed by North American, Dutch, Belgian, German, Japanese, Swiss, and UK firms. The implications of a national industry in which there is a predominance of foreign capital may not be an issue to belabour. More pertinently, if the plantation model of growing bioenergy crops is adopted (as opposed to a pre-eminently smallholder/outgrower system) in Tanzania, it is wise to bear in mind the experiences elsewhere with multinationals, especially in the area of labour rights and work standards and safety. It is perhaps instructive to note the caution with which the GTZ Report approaches this question. The relevant part of the Report reads:

Large scale, foreign-owned, highly mechanised agro-industries bring little micro or macro-economic benefits to the local communities with which they are associated with except [sic] where tax revenues are used to their [sic] benefit” (GTZ: 96).

Instead, the Report finds merit in focussing on small-holder production as a more tested means for Tanzania of “how large agro and forestry industries can bring benefits to local communities”.

As we would shortly show (see section entitled ‘Land’), the pattern of acquisition of land by investors can barely be described as transparent, coherent, or entirely consistent with applicable laws and policy directives. Quiet surely the emerging trend does not suggest, as in the case of Brazil, that the interests of the most marginalised are an underpinning concern. It is not uncommon to see humble, unsophisticated rural community members being directly exposed to individual foreign investors in a ‘*David v Goliath*’ fashioned negotiations for land acquisition.

LAND AVAILABILITY

This section of the report attempts an estimation of the amount of land available for biofuel in Tanzania with the aim of projecting areas that will be targeted or places where competition is

likely to occur. *Secondly*, it examines the land use type to determine the changes in land use that are likely to occur as a result of introduction of biofuel activity and the consequences of such land use change. *Thirdly*, it identifies areas that are currently being targeted, number of people occupying the land and their livelihoods in order to provide a cost benefit analysis. *Lastly*, the process of land acquisition by investors and associated problems are examined.

At the outset it, it must be pointed out that the established procedure for land acquisition by foreign investors, seems to be through the good offices of the Tanzania Investment Centre (TIC) and from previously identified land tracts constituting what is termed as the 'Land Bank'. However in practice, this is not happening with satisfactory consistence and as we have pointed out earlier, it is not uncommon for foreign investors to directly approach village authorities.

There would also seem to be misconceptions on the part of some observers as regards land ownership in Tanzania. Kearney for example, asserts that Tanzania's land policy confers on investors the "right to buy and sell land". Thirdly, better clarity, consistency and transparency should be brought into the identification and alienation of land for bioenergy needs if social conflict is to be avoided. One of the biggest and real threats of bioenergy is land grabbing and the resultant displacement of village communities along with shattered livelihoods. And this is not accidental. Bioenergy development is not only a land intensive activity. Save for *jatropha*, which may does grow in semi-arid areas and rainfall of 250 mm, the remainder of bioenergy related crops are known to grow well in areas endowed with regular rainfall, fertile soils, access to water, factors essential to growing food crops and other important agricultural commodities, as well as for human settlement.

The potential conflict between bioenergy, and say, for example, food production, is hardly far fetched and is captured by our analysis in the next part of this report. Often, one encounters the claim that Tanzania has abundant idle land (Kearney). The GTZ study extensively surveyed Tanzania's Agro-ecological Zones, and found the greatest underutilisation of land in Government owned large farms in Kilimanjaro, Mbeya, Rukwa, Ruvuma and Kigoma. It is these land tracts which the report identifies as the most suitable for bioenergy cropping and, therefore idle, for sale to private farmers. (GTZ: 50)

Estimation of Land Available for Food and Fuel Production

For the purposes of our discussion (that is to say, bioenergy cropping), Tanzania's Agro-ecological Zones may be categorized as either:

- Highly-likely
- Likely; and
- Less Likely.

In turn, a Region would be classified in respect to the following criteria: Amount of Rain; Availability of Pertinent Infrastructure; Type of Soil and Soil Nutrients; and experience in growing biofuel crops. Figure 3 shows the degree of likeliness based on the amount of rainfall. Regions that are listed as highly likely for biofuel production are those with an average rainfall of 1,000 mm per annum. Those in the 'likely' class enjoy rainfall ranging from 500-1000 mm while in the third category ('Less-Likely'), are found those regions whose annual rainfall falls below 500 mm. That said, it is possible to find a region falling in more than one of the three categories. This phenomenon arises from the fact that certain regions have within them localities with dissimilar rainfall patterns and intensity.

Figure 3: Degree of Likelihood Based on Availability of Rain

Degree of Likelihood	Regions
More Likely	North Morogoro, Iringa, Mbeya, Sumbawanga, Kigoma, Kagera, Kilimanjaro, Arusha, Tanga, Mara.
Likely	Tanga, Dar es Salaam, Coast, Lindi Mtwara, Tabora, Rukwa, Mbeya, Kigoma, Mara, Ruvuma, Morogoro.
Less Likely	Arusha, Dodoma, Singida, Iringa, Shinyanga, Morogoro, Lindi, Mtwara

Source: Data base on Agro-ecological Zones in Tanzania

Figure 4 shows degree of likelihood of introduction of bioenergy crops, based on soil fertility and availability of soil nutrients of the region in question. Regions with high soil fertility present

themselves as ‘highly likely’ while those endowed with moderate soil fertility are categorized as ‘Likely’ with areas characterized by infertile soil or susceptible to high soil erosion, as ‘Less Likely’. Again, we are bound to encounter the same overlap we mentioned earlier. Some regions have areas associated with more than one of the categories.

Sun biofuel has identified areas that are suitable for investment for biofuel production, on grounds of this indicator (Figure 6) and *Kakute* a national NGO is working with small farmers in areas identified on Figure 7. Figure 6 1 is based on rainfall availability and areas that received 800 mm and above (marked by pink) have been identified as potential areas for biofuel. These include the North eastern and southern and the North western part of Tanzania around Lake Victoria and Tanganyika. *Jatropha* can grow on dry land but this is considered to be uneconomic and also it does not do well in swampy, and clay soils. Most parts of Tanzania consist of *cambisoils* that form about 35% of the eastern and western part.

Figure 4: Degree of Likelihood Based on Type of Soil and Nutrients

Degree of likelihood	Regions
More Likely	Tabora, Rukwa, Mbeya, Kigoma, Mara, Ruvuma, Morogoro, Kilimanjaro, Arusha, Tanga
Likely	Iringa, Mbeya, Sumbawanga, Kagera, Kigoma, Coast, Morogoro, Mbeya,
Less Likely	Tanga, Coast, Dar es Salaam, Lindi, Mtwara, Arusha, Dodoma, Singida, Morogoro, Lindi, Mtwara, Shinyanga, Iringa,

Source: Data base on Agro-ecological Zones in Tanzania

Figure 5 shows the degree of likelihood based on a locality’s experience in growing agrofuel crops. From the Table it shows that areas that are ‘More likely’ can grow at least 7 of the biofuel crops, areas identified as ‘Likely’ can grow from 4-6 crops of the biofuel and areas identified as ‘Less likely’ can grow 4 or fewer crops.

Table 5: Degree of Likelihood based on Experience in the Growing of Biofuel Crops

Degree of likelihood	Regions
More likely	Coastal, Tanga, Arusha, and Kagera
Likely	Dodoma, Kilimanjaro, Shinyanga, Tabora, Mwanza, Dar es Salaam, Mbeya
Less likely	Iringa, Ruvuma, Mtwara, Lindi, Singida, Mara

Source: Data base on Agro-ecological Zones in Tanzania

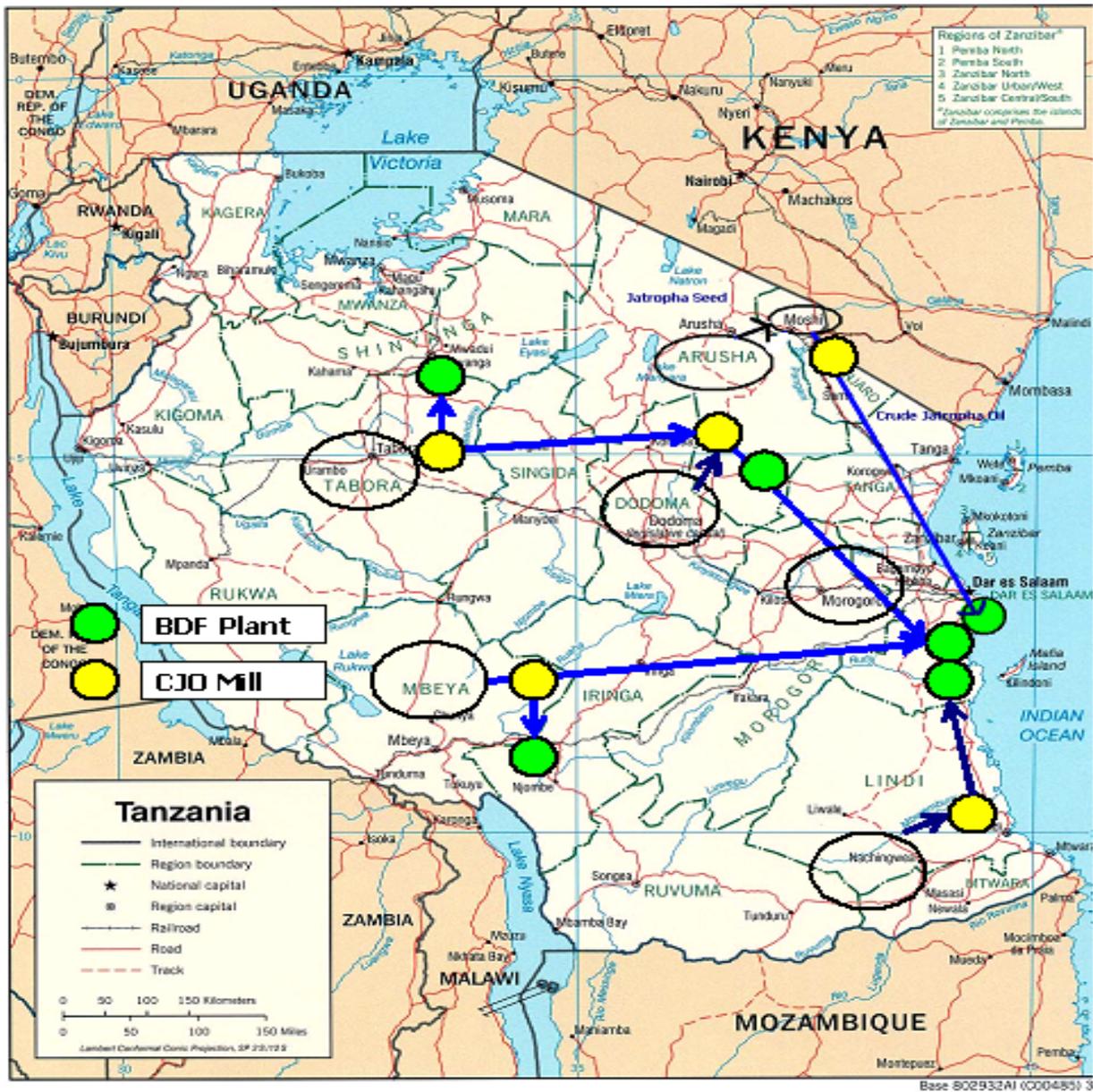
The other factor that has been taken into consideration by investors is the availability of infrastructure, transport and communication, in particular. In this respect Tanzania's coastal swathe tops the list. In addition to all other dimensions of transport and communication, here also are found port facilities (Dar es Salaam, Bagamoyo, Tanga, Mtwara as well as Zanzibar), a factor which has not escaped those investors with an eye to export.

Figure 6 1 is based on rainfall availability and areas that received 800 mm and above (marked by pink and purple colors) have been identified as potential areas for biofuel as identified by Sunbiofuel. These include the North eastern and southern and the North western part of Tanzania. These areas have also been identified as likely areas on account of the 'soil factor'. Incidentally, they also constitute an area of significant human settlement, in fact, with a high population density. However, if we factor in the infrastructure factor, Tanzania's coastal swathe tops the list on account of superior transport infrastructure and in the particular case where export is anticipated. Figure 7 shows areas where *KAKUTE* is working with small farmers.

Figure 6: Areas Targeted for Biofuel Based on Availability of Rainfall

Source: Sunbiofuel Tanzania 2007.

Figure 7: Proposed areas for *jatropha* based Biodiesel Plant



Source: Construction Project Consultants, Inc.(CPC), Japan Weather Association (JWA), Association for African Economy and Development (AFRECO). 2008.

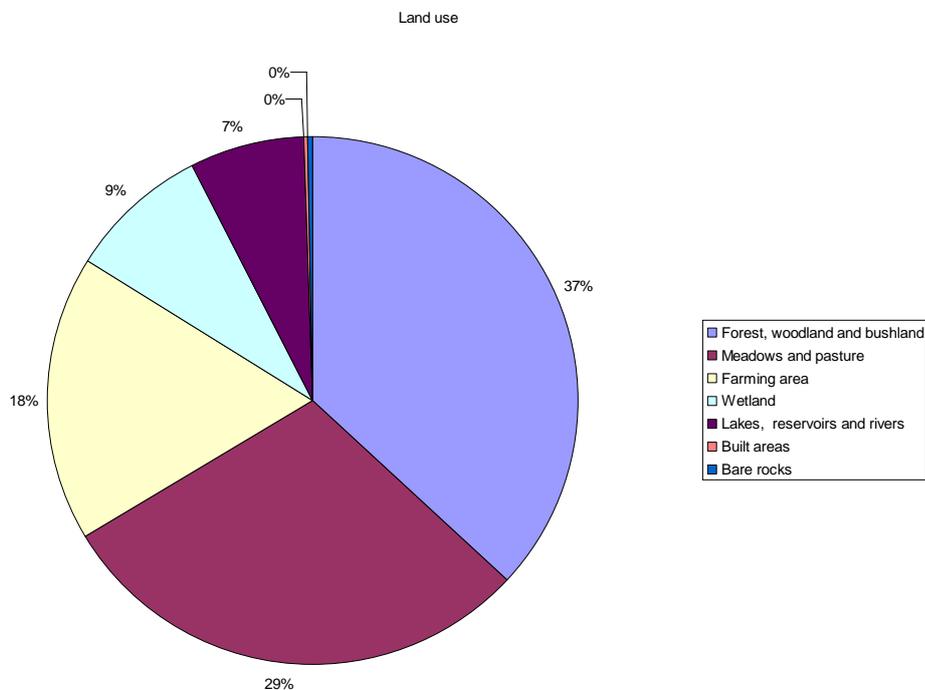
Land for Biofuel and Land use in Tanzania

Tanzania's economy is heavily dependent on agriculture. Approximately 86% of the country's [37 million] population is involved in agriculture and depends on farming for their livelihood (National Bureau of Statistics 2004). Tanzania has an area of 945,000 square kilometers of which 59,000 km squares are inland lakes (6% of the total area cover). The remaining 94% or 88.6 million hectares are agro-ecological zones (National Bureau of Statistics, 2004). FAO identified only 55.2 million hectares of potential area for rainfed crop production, a figure shared by several sources. About 10.8 million hectares are used for crop production leaving 44.4 million hectares potentially available for food and non food production. Heavy dependency on rain fed agriculture, land degradation, and soil nutrients depletion, lack of efficient infrastructure, work to increase prices of inputs and low prices of agricultural crops. Vagaries of the global market along with an unfair international trading system have aggravated the condition of the peasant dominated agriculture economy.

From **Figure 1** the following broad land uses can be identified from land use categorization of the Ministry of Agriculture and Food Security: farming and livestock (47.5%), forest, bush land and woodland (37.1%), Water resources (7%), d) wetland (8.6%), built areas are only (0.3%) and bare rock are only (0.2%). It is very clear that three main potential land uses will be threatened with the introduction of biofuel industry. These are farming (17.5%), and areas that are pastures and meadows suitable for livestock keeping (29.4%), but also forest, woodland, bush land and grassland areas (37%) are likely to be used if not encroached by farmers and livestock keepers who will be displaced. Agriculture and livestock keeping together form 46.9% of the land use and of the 17.5% farmers, 12.7% are small farmers.

The struggle between land for crops and increased food security is inescapable and lessons from South Africa show that the country is running a deficit in its maize production. Maize prices have increased by fourfold leading to increased food insecurity for the poor (Socialist Banner, Friday, June 29, 2007).

Figure 8: Land Use in Tanzania.



Source: Based on Ministry of Land & Human Settlement Development data on Land use in Tanzania.

Areas Currently Identified for Biofuel Development

There are now about 37 companies that have shown interest in investing in biofuel as registered with the Ministry of Energy and Minerals (MEM) [Appendix 1]. According to the data, 13 of these companies are foreign, 6 are local, 4 are mixed/joint ventures between foreign and local interests, and the rest are of an unspecified nature. While the majority of these investors are planning to grow jatropha, and have identified the amount of land they require, only 2 have indicated their intention to also help small farmers in growing the crops. Three of the companies are planning to work on promotion, processing and supplying seeds and not necessarily require large portions of land for their activities. One company is still in the planning phase. The total

land area sought by only 16 of the companies, totals 641,170 hectares and 1150 acres.²² Detailed information on these companies and their needs is shown in [**Appendix 1**].

Investors have identified several regions/land areas for biofuel development. Sunbiofuel Tanzania Limited, for an example, has just secured land for jatropha farming in Kisarawe District, Coast Region. The determining factor being rainfall, soil nutrients and infrastructure. Two Tanzanians hold shares worth 1% while the remainder is held by British entities and persons. *Sunbiofuel* applied for 20,000 hectares of land but has received only 9,000 hectares. This land [is home] to 11 villages including: Muhaga, Matamba, Marumbo, Paraka, Kidugalo, Kului, Mtakayo, Vilabwa, Mitengwe, Mzenga A and Chakaye (Edwin, Wilfred, *The East African*, August 7th 2007).

According to *Sunbiofuel* this land is not habited. But there is admission that it supports livelihoods of about 250,000 households on account of which, affected villagers became entitled to compensation. But in a questionable development, the compensation awarded was based on planted trees and not on the commercial/market value of the land being dispossessed. According to *Sunbiofuel* the analysis of the costs and payment was conducted by UCLAS.²³ As a result, the maximum amount paid is Tanzanian shilling 250,000 (roughly US \$ 250) for giving up livelihood supporting land. It is not stated as to whether *Sunbiofuel* is planning to employ the farmers or assist them in their livelihoods in any way whatsoever. According to initial media reports, a total of 2,840 households were entitled to compensation. However, our enquiries at the *Sunbiofuel* offices revealed that only 250 households were actually compensated. Details of names and quantum of the respective awards are available from the *Sunbiofuel* office in Dar es Salaam.

The State President has on several occasions directly exhorted villagers to identify village lands to be put to use by investors in mutually beneficial arrangements, thus in a way exposing unsophisticated rural people to advances from persons possessing far more strategic information as to land value and implications of the land alienation. At any rate, in so far as investment on

²² Note that 21 of the entities have unspecified land needs.

²³ University College of Lands and Architectural Studies, a constituent college of the University of Dar es Salaam, now Ardhi University.

land is concerned, foreign investors are required to have a share with Tanzanians. However, the amount of share Tanzanians have been given, for example, in the case of *Sunbiofuel* in Kisarawe is 1% for two Tanzanians (All Africa.com, 2007).

In the specific case of *Sunbiofuel*, the land acquisition process began by approaching the village authorities in the designated area. Once 'approval' was obtained from the assembly of villagers, matters were taken up at the District, and subsequently Regional level. According to *Sunbiofuel* this land was used to support livelihoods of the villager's livelihood though not directly cultivated but activities such as charcoal making, collection of cashew nuts were conducted by villagers. Therefore, the compensation which based on calculations done by the UCLAS was on trees and not the land. We were made to understand that the matter is now at the Office of the President. Following Presidential approval, the land acquisition will be published in the Government Gazette to allow any person with an objection to the grant of Letter of Offer, to so declare, but within 90 days from the date of publication. The *Sunbiofuel* company is expected to begin the investment between 2008-2009. It has also emerged that despite this particular investor having acquired land independently of the TIC 'Land Bank' procedures it was nevertheless required to pay TIC a hefty commission.

As indicated earlier, the biofuels industry is envisaged to adopt the plantation and small holder/outgrower type of production. It would also seem that whereas local actors, and NGOs in particular have their sites on the smallholder, foreign investors and local based big business, explicitly or otherwise, prefer the plantation model. Local NGOs appear conscious of the threat of displacement of rural communities as well as food security for the marginalized. TaTEDO, for an example, have been experimenting with intercropping, with the possibility of planting food crop together with energy crops. Indeed they have pointed out that large scale biofuel production would require supportive policies and regulations (TaTEDO 2007). In their view the better arrangement when rural land is alienated for use of plantations, is to make members of the local communities, shareholders, rather than awarding them compensation, often in amounts that are a pittance.

Table 1: Summary of Gaps and Opportunities in the Land Acquisition Process Involving Sun Biofuel

WHAT SHOULD HAVE HAPPENED	WHAT HAS ACTUALLY HAPPENED
TIC required to have earmarked 'Land Bank' (i.e., land identified by villagers for potential use by investors). Investor approaches TIC and subleases land from 'Land Bank'	Investors directly approach Villagers. Ensuing negotiations notorious for their situation of 'Inequality of arms' between the parties. Ironically, even some investors find this system cumbersome and time-consuming.
Questionable mode of determining the quantum of compensation. Calculation should have been based on the loss of livelihood which Villagers are going to sustain as a direct consequence of land alienation, and therefore resultant loss of livelihood and related benefits. This mode of calculating the compensation quantum should have been incorporated into the project agreement.	Villagers were compensated for mango and cashew nuts trees found on the land and without regard to the market price of the land on which the trees were standing.
The land users should have been recognized as shareholders in the company, their contribution being the land they were giving up for use by Sun Biofuel Company.	Only two Tanzanians have the status of shareholders, each holding 1% shares, and none of whom is a village resident.
Information about the allocated land should have been first published in the Government Gazette (to allow contestation) in the earliest possible stages of the land alienation process) ahead of the State President's assent.	The land acquired by the Sun Biofuel will be published in the Government Gazzette after the President has approved the land allocation and therefore presenting any possible contestants of the transaction with the daunting task of challenging the holder of the highest office, in what is a <i>fait accompli</i> .
An Environmental Impact Assessment (EIA) is required under various enforceable laws of the country, among others, to assess the costs and benefits of the project prior to land acquisition by the investor.	There is no evidence that an EIA was conducted by Sun Biofuel.
There is a duty to make the villagers fully aware of such issues as the genuine value of their land and consequences of giving it up.	The decision to give up land seems to have been made on the basis of informed opinion.

CONCLUSION

It has been acknowledged that interest in agrofuels has been dictated, primarily by: rising energy prices; energy security; climate change and rural development (FAO & GBEP: 19). This is true for Tanzania as well, a net oil importer. Tanzania is on the official UN lists of Least Developed Countries (LDC), Highly Indebted Poor Countries (HIPC), and more pertinently, Low Income Food Deficit Country (LIFDC) with the majority of its over 34 million people living in poverty. Her development challenges are compounded by a debilitating annual oil import bill in excess of US \$ 1.6 million, prohibitive power tariffs and overdependence on woodfuels among the majority of the population.

It is against these major challenges that one should situate Tanzania's search for sources of energy that are more affordable, less prone to vagaries of the global market and have a potential of lifting the marginalized from sinking further into poverty and desperation. At the same time it is prudent to appreciate that the global agrofuel industry is characterized by subsidies, protectionism and a dominance of big business, and whose interests, are rarely known to be pro-poor. In these circumstances, and except for the naïve, it is advisable to take precautions offered by experts, such as those in the Global Bioenergy Partnership (2007:19) who draw attention to the need for decision makers to develop a thorough understanding of:

- Government priorities
- Forces driving bioenergy development;
- Policies and their social, environmental and economic impact; and
- Which other related policies (Agricultural for example) are influencing biofuel markets.

A common assertion among experts is that the biofuel industry holds a real promise of addressing such key challenges as energy insecurity, job creation and increasing individual income of marginalized rural communities, reduction of greenhouse gas emissions, dramatically reduce the national oil bill and hence boost foreign reserves and improve balance of payments. But the contrary can also be the truth, that is to say, biofuels are associated (not only with strengths and opportunities) but are known for their weaknesses and threats as well. Indeed the

GTZ study on Tanzania (2005:86, 87) implicitly acknowledges the probability of a *food v fuel* duel as a result of a competition for resources between the biofuel industry and food production.

This study report was asked to address itself to the following cluster of issues:

- Map the key actors, forces involved in the emerging industry.
- Analyse the relevant national policies regarding bio-fuels.
- Provide a synopsis of land ownership, tenure and use in Tanzania with emphasis on how this interfaces with bio-fuel development.
- Compile a detailed dossier of land concessions for bio-fuel industry.
- Explore the socio-economic implications (the opportunity cost, in particular) of bio-fuel investment, on such groups as peasants, pastoralists, artisan miners, women and youth.
- Assess the value addition of bio-fuel industry to national development; and
- Examine potential policy gaps in the bio-fuel industry especially with regard to possible conflicts with the existing legal and policy framework.

In the following section a number of recommendations are offered based on the preceding discussions in respect of the study's ToR.

RECOMMENDATIONS

Biofuel development in Tanzania places at stake 4 highly strategic national resources: land, water, forests and labour, and for generations to come. This alone is sufficient reason for the Tanzanian general public and rural communities in particular, to wrestle back the initiative and seek direct engagement in determining the best way forward for the nation.

Such engagement if it is to be undertaken from a position of informed opinion and in the context of transparent, purposeful and meaningful debate, has to be preceded by the most sustained and comprehensive study as to the strengths, weaknesses, opportunities and threats biofuels are known, or likely, to be associated with.

The following threats deserve particular attention:

- Dispossession of Village Land in questionable circumstances
- Access and Affordability of Food
- Livelihoods of Rural Communities within biofuel crop growing areas
- Protection of smallholder farmers from exploitation
- Environmental Impact Assessment of projects
- Preservation of Biodiversity and Natural Resources
- Plantation Workers' Rights

The notion that the best way forward for the nation is to proceed head long without a thorough situational analysis, policy advice and public debate (GTZ: 5, 128), must be rejected as reckless, improper and unsustainable.

Deliberate efforts should be taken to identify all the major constituencies with an interest, direct or otherwise, in the biofuel industry, just as business interests are galvanized in a proposed *Tanzania Biofuel Producers Association*.

The notion that Tanzania embrace biofuels in response to the mandatory targets set by such external interests as the EU (10% biofuel blend by 2020) and the U.S. Energy Independence and Security Act, should not only be exposed as unsustainable. Illustrations of countries which have not resorted to this questionable approach, such as Russia, should be borne in mind.

At any rate, introduction of biofuels should be subjected to an adapted version of the EU '*social and environmental sustainability*' test.

Consistent with the Tanzania National Investment Promotion Policy:

1. Promote, adopt energy systems of production, procurement, transportation, distribution and end-use which are efficient and not detrimental to the environment.
2. Encourage expansion in irrigation agriculture which uses environmental sound technologies.
3. Promote a land tenure system which tempers the maximum use of land resources with broad-based social and economic development.
4. Promote a growth of the national economy which is balanced and equitable;
Stimulate productivity of women by encouraging investments into areas where women are active.
5. Promote the development and growth of small and medium scale industries which serve both the domestic and export markets.

Appendix I: TABLE OF BIOFUEL DEVELOPMENT ACTORS

ACTOR	OWNER SHIP	LOCATION	STATUS	INITIATIVE	LAND AREA (HA) REQUIRED	CONTACTS
SEKAB BioEnergy Tanzania	Swedish /Tanzania	Bagamoyo and Rufiji delta	Feasibility study and land acquisition phase	Ethanol production	400,000	Tel:0754321840
PROKON Renewable Energy Solutions and Systems Ltd.	Germany	Mpanda, Rukwa	Out grower to grow Jatropha	Establish and operate facilities for producing Jatropha based biofuels estimated at 11008 liters per year. Contracting 3000 out growers 7,000 ha have been planted with Jatropha. Planning to plant 30,000 ha of Jatropha in Mpanda. Planning to construct jatropha oil processing plant at Mpanda.	30,000	Tel:0717821486
WILMA	USA	Biharamulo, Kagera		Production of biodiesel from <u>Croton megalocarpus (muhihi)</u>		
Mitsubishi Corporation of Japan	Japan	Arusha and Dar es Salaam	Project formulation phase	Establishing Jatropha farms and operate facilities		
Farming for Energy, for better Livelihood in Southern Africa (FELISA)	Belgium, Tanzania	Kigoma	Land Preparation phase, collection and processing of palm seeds.	Establishing palm plantations in Kigoma.		Kigoma-farmingforenergy@yahoo.com
KAKUTE in Arusha	Tanzania	Monduli, Arumeru, Manyara	Jatropha seed business			S.L.P 13954, Arusha Tel.: 0744662646 E-mail: kakute@tz2000.com
Sun Biofuel Tanzania Ltd.		Kisarawe	Land acquisition phase. Already secured 8,000 ha	Production of biodiesel	18,000	
TaTEDO in Dar es Salaam promoting Jatropha	Tanzania	Nation wide	Promotion and awareness creation	Promotion of oil plants		P. O. Box 32794, Dar es Salaam , Tanzania . Tel: 255-22-2700438. Fax: 255-22-2774400
Diligent Tanzania Ltd from Netherlands.	Netherlands	Arusha, Manyara, Kilimanjaro and Singida	Buying/Collection and processing of jatropha seeds from farmers	Processing Jatropha oil seeds		Tel:078610288
J&J Group	South Africa	Kaliua in Tabora	Land acquisition	Establish Jatropha plantations	20,000	

(Pty) Ltd Pretoria – South Africa.			phase			
Kagera Initiative for Poverty Reduction Goals (Kinga)	Tanzania	Kagera.	Selling Jatropha oil seeds to DILIGENT	Growing Jatropha for Nursing Vanilla plantations.		
KITOMONDO LTD		Bagamoyo - Coast Region at Makurunge Farm	Planning phase	Bio diesel Plantation	2,000	054 387 505 S.L.P 34037 Bagamoyo kitimondo.rem@gmx.com
DONES TER from Canada	Canada	Manchari and Banyibabiyi – Dodoma and Chalinze in Coast region	Land preparation phase	Planning to establish Jatropha demonstration farm for oil production.	100Acres	Tel:0787468781
JKT	Tanzania	Oljoro acres100 , Mgambo acres 100, Chita acres 100, Maramba JKT acres 100 Mlale JKT acres 50, na Ruvu JKT acres 500	Established	Growing Jatropha and staff training	950 Acres	Tel: 0717043355
AMMA (Amsha Mabadili ko ya Maendeleo Africa)		Lushoto, Kagera, Kateshi, Pemba, Lindi, Mtwara, Tanga, Iringa, Dodoma, Singida, Shinyanga, and Ruvuma.	Awareness creation	Jatropha farming and awareness		S.L.P 13646, +255 276 2072, +255 748 453 860, ammaconsultgroup@yahoo.com
KIKULE TWA FARM		Kikuletwa Moshi.	Planning phase	South african investor-Peter (Burland)		
Matrix Poverty Eradication Foundation		Kibaha.	Planning phase	Planning to establish Jatropha plantation		Tel:0784388512

(MPEF)						
EUROT ECH from Korea	Korea		Planning phase	Planning to grow 100,000 ha of castor oil and Jatropha for biodiesel.. Planning to invest more than USD 20 million.	10,000	Tel: 0784751622
BP			Introduction phase	Planning to invest in <i>bioethanol</i> . Insisting the Government to formulate biofuels policy.		Tel: 027 214082181_
Export Trading Co. Ltd			Planning phase	Planning to grow oil plant for <i>biodiesel</i> and <i>bioethanol</i> . Accompanied the President in his visit to Scandinavian countries.		SLP 10295 DSM Tel:022 2124473/75 Tel:022 2124473/75 Tel:022 2124473/75 Tel: 0754432883 E-mail: etcexpprtradinggroup.com
Luxevera Ltd		Shinyanga	Planning phase	Working in collaboration with their colleagues from UK and Netherlands. Planning to grow Jatropha and Sun Flower for biodiesel		Tel: 0787098942
Mkamba Forest and Wildlife conservation Group (MFWCG)				Group of 15 people 15 engaged in environment conservation. Wanahusika pia na hifadhi ya mazingira.		SLP, 30 Mkuranga Pwani
JCJ Co. Ltd		Mwanza, Mara, Shinyanga and Tabora.	Planning phase	Working with people from Swaziland. Planning to establish Jatropha farm under NEPAD assistance		Te: 0754445844 Fax +255 282541124 P. Box 1088 Mwanza, Tanzania Swaziland offices C/O Flecher electrical King Mswati 111 Ave West, Box 2022 Swaziland Phone /fax: +2686184471 Mobile: +2686023246 Email: invmco:ltd@africaonline.co.tz cfeey@africaonline.co.tz
Tanzania Green				Planning to grow Jatropha	1000	Tel: 0784279777 Tel: 022 286202144 Fax: 022 286 20214/5
Environmental and		Wangingombe, Saja and	Planning phase	Planning to grow Jatropha	100	Tel: 0786363675

Economic Development (EDEN)		Nyanyembe – Njombe District				
Social Services and Environmental Association. (SSEA)		Close to University of Dar es Salaam	Planning phase	Women group in Kinondoni District Planning to supply jatropha seedlings for sell. wengine.		Tel: 022 2851237 Tel: 0784463965 Tel: 0754309285 Tel: 022 2700580
Mbono Group			Planning phase	Farmers group Ilala District		Tel. 0786542457
SAVANN BIOFUELS		Kongwa Dodoma	Planning phase	Plan to grow Jatropha and have planned to grow 2500 in this season Baibai wilayani Kongwa.	50	Tel :0754273336 Email: canpro@rogers.com
USANGU Jatropha Project		Usangu	Planning phase	Planning to establish Jatropha farm	100	Tel: 0754494910
Mahenge ????????		Mahenge	Planning phase	Planning to establish Jatropha farm	100	Tel: 0787330211
Edward Sanda		Dodoma	Planning phase	Planning to grow Jatropha	100 Acres	Tel: 0754210155
UBUMWE		Kibondo	Planning phase	Group with 100 members with plan to grow Jatropha.		UBUMWE S.P. 140 Kibondo
Tanzania Moringa Farmers Association (TAMOF A)		Morogoro and Dar es Salaam.	Planning phase	Plan to establish Jatropha farm	20	Tel. 0754306881
Enviro-Fuel Technology		Tanzania / British and S Africa	New	Producing biofuels		P.O. Box 42355 DSM
Africa Biofuel & Emission Reduction (T) Ltd.	USA, Tanzania	Biharamulo Kagera	New	Bio-Fuel Product	60,000	P.O. Box 14317, Kagera
TM Plantations Ltd.	Malaysia	Kigoma	New	Oil Palm plantation		P. O. Box 772, Kigoma
Sivas Africa Ltd. P.O. Box 15398 DSM	Indian/ Tanzania	DSM	New	Agriculture Biodiesel		P. O. Box 15398, DSM
Bio Shape (T) Ltd	Dutch	Lindi	New	Jatropha Plantation		
Arusha Cuttings	Netherlands	Arusha		Jatropha growing	10,000 hectare are already grown	
Dutch Agricultural group		Bagamoyo		jatropha		
Illovo of South Africa and	South Africa Mauritius			Invested in sugar cane plantations in Tanzania are producing ethanol and generating power for their		

ACSL and CIEL Groups of Mauritius				own use and sell surplus to the national grid.		
Holcim Cement's Subsidiary of Tanga Cement	Tanzania			Is using biomass to generate power for its own use and sells the surplus to the national grid.		
Sithe Global Power, LLC	US			Has announced plans to develop 50,000 hectare of oil palm plantations and refineries in Tanzania		
InfEnergy	UK			Has optioned a 10,000 hectare site for an irrigated oil palm plantation		
A Palm oil group	Malaysia			Looking to develop 40,000 ha in the Kigoma area given land limitation in Malaysia		

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