



Assessment of Public Perceptions on Biofuels and Bio-Products in Tanzania

FINAL REPORT



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Executive Summary

1. Study Context and Methodology

Thirty five stakeholders (35 percent) with varying expertise, involvement and experience in biofuels in Tanzania were purposively selected and interviewed to assess the public perceptions on the biofuels initiatives in Tanzania. Criteria for selection included the extent of involvement and experience, age, location, gender, roles and responsibilities among others. A combination of participatory data gathering methods were used including consultative individual experts and focus group discussions, direct observation, stakeholder and matrix ranking, SWOT analysis and others.

The mainly qualitative data were analyzed in collaboration with the stakeholders. The results/findings were triangulated and verified using complementary quantitative data from documented expert case studies conducted in different districts including Bagamoyo, Kisarawe, Bahi, Monduli, Morogoro, Muheza as well as the Katani Ltd biogas project in Tanga region and FELISA palm oil biodiesel in Kigoma region and the relevant nationwide biofuels studies.

2. Stakeholder Mapping

Informal consultative interviews and other PRA techniques such as matrix ranking and focus group discussions were used to assess the roles, functions, contributions/support and perceptions of the stakeholders in the development, promotion and dissemination of biofuels initiatives in Tanzania.

2.1 Own Analysis and Complementary Inputs from Other Experts / Studies

The biofuels stakeholders and actors in Tanzania are performing different roles and functions along the value chain. The interviewed stakeholders are actively engaged in different functions related to biofuels research and development; technology generation, testing, dissemination, scaling up and marketing; policy, development of legal and institutional regulatory framework; quality standardization, price regulation and environmental impacts mitigation and certification; as well as technical and business development and investment support services.

To a large extent, the public perception on biofuels initiatives in Tanzania has been influenced by the choice of the production system and the procedures for land acquisition. In a few cases where the biofuels investors used the win-win pro-poor outgrower production system and right procedures for land acquisition, for example FELISA palm oil biodiesel in Kigoma, Diligent jatropha biodiesel in Arusha and Katani Ltd¹ sisal biogas, biofertilizer and bioelectricity, TaTEDO MFP, the biofuels initiatives have been favourably received and have initially contributed to improved livelihoods of the rural communities through employment creation, income generation, improved household food and energy security as well as nature and environmental conservation hence complementing the national, regional and global development strategies for poverty reduction and mitigation to climate change effects among others.

The majority of the biofuels investors have used export-oriented large-scale irrigated plantation system involving non-transparent acquisition and long-term (up to 99 years lease) ownership of large tracts of land from the rural communities and use of upstream irrigation has adversely affected the livelihoods of the rural communities², the natural ecosystems (forests and wildlife reserves) and biodiversity. In this approach, the initiatives are contrary to the national development strategies and therefore have been totally rejected.

¹ The Katani Outgrower model is based on 100% outgrower production of feedstocks.

² Biofuels investments have caused social conflicts, threats to household food and energy security, land alienation (or grabbing) and hydrological imbalance.

Lack of awareness and knowledge, specific policy and regulatory framework for biofuels have also adversely affected the public perceptions and acceptance of the biofuels investments. Although the biofuels investments are at the initial stages, the lack of specific strategies and targets, supportive institutional frameworks and knowledge base has increased the risk of the investments, discouraged the potential investors and the expectations of the stakeholders and the general public.

The adverse initial socioeconomic and cultural impacts of some of the pilot biofuels investments in the coastal areas including for example adverse effects on the rural communities livelihoods in relation to land alienation and cases of biofuels-related divorces in the coastal areas particularly in Bagamoyo, Kilwa and Rufiji districts have negatively influenced the media who have in turn negatively influenced the public. In addition and to some extent, as a result of globalization, the local media's perceptions on biofuels have also been influenced by the foreign media. As a result, the biofuels initiatives in Tanzania have been sharply criticised and negatively promoted by the media to the extent that some of the biofuels investors have decided to wind up their business operations.

2.2 Actors Highlighted by Answers to Questionnaire

The stakeholders and particularly the policy makers, donors, investors and investment promoters including Tanzania Investment Centre (TIC) believe that supported, guided and regulated properly and monitored by specific, measurable, relevant and realistic strategies and performance targets, biofuels initiatives have great potential to significantly reduce the national dependency and use of imported hydrocarbon fuels, reduction in green house gas emissions, foreign exchange savings, job creation and income generation and hence contribution to the achievement of the national and global development goals including Vision 2025 and the MDGs.

To some extent, the public perceptions on biofuels in Tanzania have also been influenced by the socio-cultural parameters including 1) gender aspects 2) cultural beliefs and traditions 3) national, native and local laws and bylaws 4) socio-political aspects such as good governance, transparency and accountability.

Biofuels investments in the dominantly Moslem cultures along the Tanzanian coastal areas have positively or negatively influenced the religious beliefs and obligations. Cases of increase in the polygamy practices and divorces with adverse socioeconomic effects including further marginalization and increase in poverty for women and children have been reported and partly associated with biofuels investments in the coastal areas including Bagamoyo, Kilwa, Rufiji and Kisarawe districts. The foreign cultures that have been introduced into the predominantly Swahili traditional culture as a result of by the biofuels investments have resulted into what is termed as 'cultural erosion' characterized by behaviours such as prostitution and extramarital relationships which were hitherto considered as religious and socio-cultural taboos.

Inappropriate procedures used by some of the biofuels investors for land acquisition have caused adverse socio-political and ethical effects including further impoverishment and marginalization of the rural communities especially in the coastal districts of Kilwa, Rufiji, Kisarawe and Bagamoyo which has in turn negatively influenced the public perception.

Most of the biofuels investments in Tanzania are almost exclusively owned and operated by foreign companies against the national policy for integration and promotion of local companies and Tanzanians in the investment projects according to the national investment policy framework. The Tanzania Investment Centre (TIC) is vested with the mandate to enforce the policy. However, some of the biofuels investors have bypassed TIC contrary to the investment policy regulation particularly with regards to land acquisition for investment purposes.

According to the biofuels experts and technocrats interviewed, with the exception of a few poor small-scale biofuels projects such as the TaTEDO's projects, Katani Ltd biogas, Diligent Ltd and FELISA biodiesel projects, most of the biofuel investments are categorized as large-scale export-oriented catering mostly for the biofuels market demands in the western countries particularly the EU and USA. In that context, the local and national biofuels needs have not been mainstreamed into the investment plans.

2.3 Stakeholders / Beneficiaries Record

The majority of the rural communities overwhelmingly feel that they have been more marginalized by the large-scale plantation based biofuels investments and that their livelihoods have been adversely affected. With the exception of a few pro-poor outgrower-based pilot investments, the experts and the policy makers perceive the large-scale biofuels investments as export-oriented with limited impacts on the national development strategies including food and energy security and mitigation of the climate change effects.

Donors and developers/investors generally feel that supported by proper policies, institutions, regulatory and monitoring frameworks, the investments have potential to contribute to the national, regional and global development strategies including poverty reduction, improved rural livelihoods and mitigation to climate change effects. Similarly, the nature conservation and human rights advocacy organizations perceive the investments as a threat and predict very alarming socio-economic and catastrophic environmental consequences.

The rest of the biofuels value chain actors have mixed perceptions depending on the specific impacts. Some of the women groups that have been facilitated e.g. by TaTEDO, KAKUTE and Katani Ltd and other pro-poor initiatives to access affordable energy technologies and services and therefore opportunities for income generation, household food and fuel security perceive biofuels initiatives as 'mkombozi' meaning liberation from poverty and other factors that marginalized women economically, culturally and socially. They say the access to improved bioenergy technologies and services such as biogas and energy service platforms powered by Jatropha oil have enabled them to save a lot of time for other economic and social engagement.

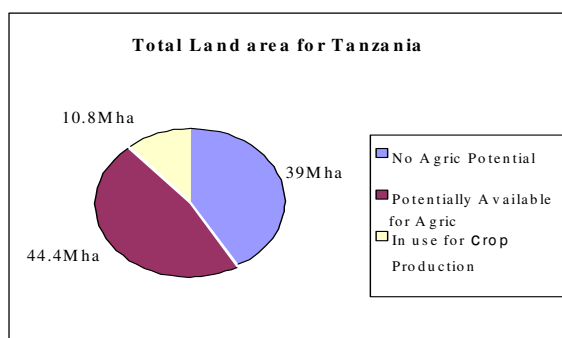
3. External Influence and Crisis

To a large extent, the biofuels investments are externally driven and therefore the public perceptions. The so called 'biofuel mania' in Tanzania as in other LDCs is particularly driven by an increase in market demand in Europe and USA for biodiesel and bioethanol for transport and industrial use. The market for biofuels has been largely driven by the EU renewable energy directives and UNCCC's concerns for climate change effects as were deliberated and concluded in the Kyoto Protocols.

3.1 Own Analysis and Complementary from Other Experts

On one hand, the external factors have triggered an increase in direct foreign government and private sector investments in Tanzania and on the other hand those external factors that have hindered the local and foreign biofuels investments. The escalating price of petroleum prices, need for protection of environment, rise in the economies of the BRIC countries, new developments in bio-fuel extraction technologies, changes in energy policies and regulations in the EU and low cost of labour and land in Africa and Tanzania for that matter have been the key driving forces. The biofuels investments have primarily targeted the export market without regards to the national strategies for energy self-sufficiency and import substitution which has therefore adversely influenced the public perception.

On the other hand, the factors that have discouraged investment in liquid bio-fuels are the perceptions that investments in liquid bio-fuels are contributing to food and energy insecurity, conflicts resulting from land grabbing, biofuels are actually not GHG neutral as popularly believed and hence the perceived adverse impacts on the mitigation of the climate change effects which has particularly adversely influenced the perceptions of the media, nature conservation experts and the human rights advocacy organizations.



Land in Tanzania is wrongly perceived by most of the biofuels investors to be 'idle' due to lack of a comprehensive land-use plan (Figure 1). The misconception that land has no market value and is owned by the government has also contributed to 'land grabbing' by the investors and the subsequent adverse socio-economic and environmental impacts and therefore the negative public perception.

3.2 Events Highlighted by Answers to Questionnaire

The external influences that have affected investment in liquid bio-fuels were investigated through search in secondary sources of information especially in the internet, news media, as well as well as to a lesser extent, through individual and focus group consultative interviews and discussions.

The strategies for energy self-sufficiency and petroleum import substitution including consideration for biofuels as an alternative was largely driven by the dramatic increase in the price of petroleum particularly in 2005 to 2010 which drastically affected the trade balance of payments and foreign exchange reserves. The concerns for depleting global hydrocarbon fuels reserves and effects of the use in climate change phenomena have also contributed to the 'biofuels mania' which is also considered by some of the stakeholders to contribute to the current global sharp increase in the price of food commodities dubbed 'agflation'.

4. Media Analysis

The media has constantly and sharply criticized the manner by which the biofuels initiatives are being implemented in Tanzania particularly the large-scale plantation and production approach land acquisition adopted by some of the biofuels investors that has caused adverse socioeconomic and environmental impacts.

4.1 Own Analysis and Complementary from Other Experts

Initially, the advent and evolution of the biofuels in LDCs and in Tanzania especially with regards to the potential of jatropha³ was well received and promoted by the renewable energy promoting organizations such as TaTEDO, KAKUTE, Diligent and others as 'green energy' an alternative source of low-cost, GHG neutral and environmentally friendly fuel and energy. The 'green' perception of biofuels has now turned 'red' or 'burning' source of energy?

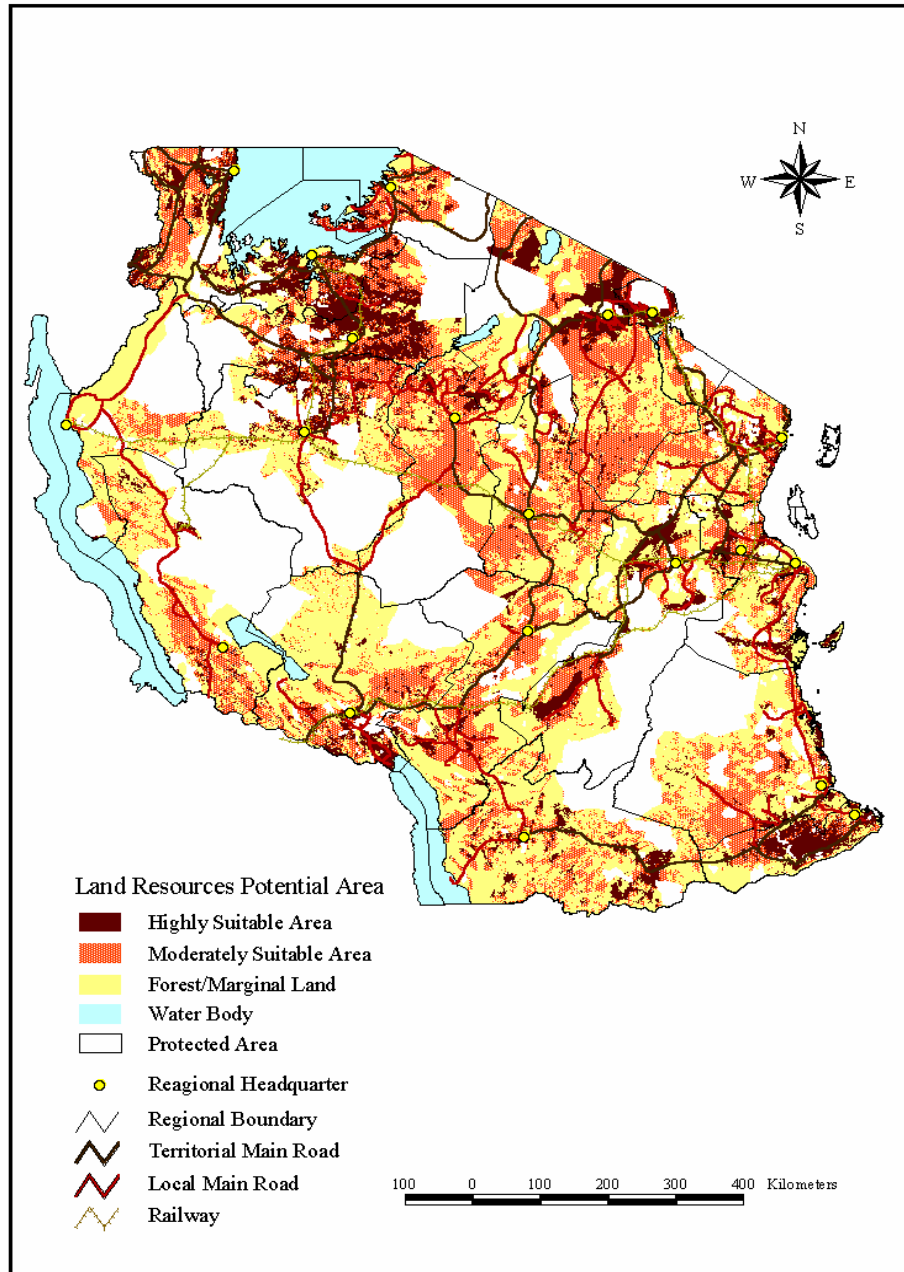
The adverse socioeconomic effects on the livelihoods of the rural communities, effects on the natural forests and biodiversity and the expert revelation of the GHG non-neutrality concept has to a large extent reversed the earlier perceptions particularly the media, human rights and nature

conservation advocacy organizations such as Land Rights Research and Resources Institute (HAKIARDHI), Legal and Human Rights Centre (LHRC), Lawyers Environmental Action Team (LEAT), World Wildlife Fund (WWF) and others.

Some of the stakeholders including the promoters believe that the adverse impacts of biofuels have been too generalized and over-amplified out of proportion. Whereas some of the claims and adverse impacts are true, they are often localized and judgement should be on a case by case. Similarly, the media has been blind and biased to also identify and promote a few successful bioenergy pilot investments such as the Katani biogas, biofertilizer and bioelectricity and the TaTEDO promoted and facilitated MFPs, improved woodfuel and biogas technologies to facilitate a balanced or a non-biased perception.

³ Jatropha (*Jatropha curcus*) was initially portrayed and perceived as a oil-rich drought-resistant crop that can be produced semi-arid areas

Figure 1: Land Resource Potential in Tanzania



Land Resources Potential Area

4.2 Media Influence Highlighted by Answers to Questionnaire

The main media influence as responded to by people interviewed in the media, has mainly been that of turning the issue of liquid bio-fuels into a villain as far as food security is concerned. While the majority of the media acknowledge 'land grabbing' and adverse effects on the livelihoods of the rural communities as the key factor influencing the public perception, the root causes of the 'land grabbing' such as inadequacy of the land laws, corruption, poor governance have not been adequately analyzed. Some journalists have also admitted that there are other factors that have equally adversely influenced the public perceptions on biofuels such as the choice of production system, lack of specific policy and institutional regulatory framework. The media's as well as the general public awareness and knowledge of biofuels, their benefits and implications is admittedly low which has also adversely influenced their perception, communication and dissemination of the biofuels message.

5. Socio-Cultural Parameters

Apart from the economic and environmental impacts, the biofuels initiatives have also affected the social and cultural aspects of the rural communities in particular and their perceptions on biofuels. Access to affordable biofuels technologies and services such as biogas and improved woodfuels stoves and ovens in the rural areas facilitated by the means of the pro-poor biofuels initiatives has improved the livelihoods of the communities particularly women. The economic and social empowerment has however unpacked the gender dimensions positively or adversely depending on men and women perceptions.

However, loss of land, water and forest resources as a result of biofuels investments has adversely affected the livelihoods of the rural communities particularly women and children who are responsible for collecting firewood, building poles and wild foods, raw materials for weaving. Loss of marginal land usually used by women for food and minor cash crop production hence denying them the critical sources of income and household food and energy security, loss of livelihoods and marginalization. Traditionally, men own land and other assets. In case of compensation benefits as a result of biofuels land acquisition, men have benefited at the expense of women. In some cases, the additional economic means exclusively accrued to men have enabled men to practice polygamy with adverse effects on social relationships including divorces.

5.1 Own Analysis and Complementary from Other Experts

Loss of land, water and forest resources as a result of biofuels investments has adversely affected the livelihoods of the rural communities particularly women and children who are responsible for collecting firewood, building poles and wild foods, raw materials for weaving.

Loss of marginal land usually used by women for food and minor cash crop production hence denying them the critical sources of income and household food and energy security, loss of livelihoods and marginalization. Under such circumstances and with the intrusion of foreign cultures and money economy, women are forced to engage in undesirable vices including prostitution as survival mechanisms.

5.2 Cultural References Highlighted by Answers to Questionnaire

With the emerging biofuels investment companies, smallholder mixed farming biofuels enterprises turned into large-scale monoculture plantations excluding subsistence food and cash production from the 'equation' reducing diversity of food, cash and energy sources leading to malnutrition and poverty especially women and children which is a social ridicule and loss of social integrity. The women empowerment which was brought by the pro-poor biofuels projects such as TaTEDO has now been counterfeited by M/S Diligent Energy Systems (T) Ltd et al.

Access to modern biofuels technologies (mentioned above) 'liberating' women and children from tedious and time-consuming water and firewood collection, milling and cooking on three-stone stoves with gaseous fumes and effects on health and saving time for other gainful economic activities hence increase in economic and social empowerment and social integrity.

6. Synthesis

6.1 Public Perceptions Based on Questionnaire Results

The stakeholders have suggested fast-tracking of the ongoing biofuels development process, comprehensive land use planning and mapping to safeguard the biodiversity conservation areas from land grabbing as well as strategic and investment plans to establish specific, measurable, achievable and realistic biofuels indicators and performance targets within a pre-determined timeframe. An effective monitoring framework should also be part of the strategic plan to ensure biofuels program management by results.

6.2 Analysis of Qualitative and Quantitative Data

Encroachment of the natural forests ecosystems and biodiversity by the biofuels monoculture cropping system, intensive use of agro-chemicals and industrial emissions leads to serious adverse irreversible environmental impacts including loss of biodiversity, hydrological imbalance, soil erosion, and increase in the noxious gas (CFC, methane, carbon dioxide) and hence an increase in the climate change effects. The vulnerable rural communities livelihoods has been adversely affected and have been further marginalized.

Although gross-margin analysis has shown that most of the jatropha-based systems are more profitable compared to other food crops, it may not be desirable it is likely to compete with food crops hence exerting pressure on household food security. The lack of specific policy and institutional regulatory framework for biofuels may lead to very serious socio-economic and environmental consequences. If well regulated by specific policy and institutions and supported by proper technical and socioeconomic studies, pro-poor biofuels initiatives based on win-win outgrower systems have potential to contribute to the national strategies for poverty reduction, food and energy security particularly in the rural areas as well as significant energy self-sufficiency, petroleum import substitution, savings in foreign exchange and contribution to mitigation of climate change effects at the national level.

Conclusions and Recommendations



The approach and the bioenergy production model chosen by the investor/developer, success or failure, that is the actual benefits or adverse effects to the rest of the value chain actors greatly influence the public perception, acceptance and active participation. The outgrower production model involving the smallholder farmers have been most successful, sustainable and viable investments which are in harmony with the local communities and the rest of the actors in the value chain.

In contrast, the large-scale monoculture biofuels plantation models that bypass the smallholders and other value chain actors have not fared well, created hatred perception of the biofuels initiatives, ended up in conflicts with the local communities and therefore negatively perceived by the public because they have not considered the needs, livelihoods and expectations of the rest of the value chain actors particularly the rural communities, nature and environmental conservation groups as well as the government and donor development strategies and priorities.



Except the media, the rest of the stakeholders and the general public are basically not against biofuels initiatives in Tanzania. However, they have expressed very serious concerns about the manner by which the biofuels initiatives are being implemented without specific policy, legal and institutional regulatory framework. The procedures followed by most biofuels investment companies (all foreign) which in some areas such as Rufiji, Bagamoyo, Kisarawe and Kilwa districts have displaced rural communities adversely affecting their livelihoods and causing political, social and cultural conflicts have been sharply criticized.

Categorically, the stakeholders are against the large-scale export-focused biofuel plantation model because it is likely to further marginalize the rural poor, will not contribute to the national, regional and global strategies for poverty reduction and mitigation of the climate change effects. Instead, the stakeholders support small-scale pro-poor biofuels investments with fossil fuel import-substitution, national energy self-sufficiency particularly focusing the rural areas to generate additional income, create employment and provide sustainable source of clean energy hence contribution to poverty reduction and environmental conservation.

The proposed investments should also promote public and private partnership and local investors should actively participate as equal partners in ownership. Examples of such production models include smallholder outgrower schemes, contract farming and nuclear plantation (as buyer and processor) outsourcing feedstock from satellite smallholder block farms or cooperatives. The models have been successfully practiced by Katani Ltd, FELISA and Diligent Energy Systems (Appendix 2).

Specific recommendations are the following:

1. Fast-tracking of the ongoing multi-stakeholder biofuels policy development process, comprehensive baseline and technical studies (appropriate production systems and value chains), agro-ecological zoning and biodiversity sensitivity mapping processes. It may be prudent for the government to suspend the approval of biofuels investments and land allocation until the processes are completed to minimize further conflicts.
2. Land acquisition for biofuels should be more transparent and need to be coordinated more effectively at the national level. The proposed 'national land bank' database development should be supported and to be functional as soon as possible to facilitate smooth land acquisition and allocation for sustainable development. Necessary amendments should be done on the existing land laws to safeguard the interests of the parties including the rural communities. Particularly, the transfer of village land ownership rights to general land is sensitive and delicate, should be done more carefully and diligently. Alternative land holding structure such as 'village land trusts' and equity-based joint ventures should be investigated.
3. Government and donors should increase investments in biofuels and food crops R&D activities to increase productivity per unit area (intensification) and hence optimal use of the available land to produce adequate food and biofuels feedstocks cost-effectively and sustainably. Priority and the rule of thumb should be 'household and national food self-sufficiency first'.
4. The key objectives of the national biofuels program should be national energy self-sufficiency (import substitution) and contribution to poverty reduction and mitigation of the climate change effects.
5. Stakeholder consultations should be facilitated to develop appropriate biofuels production models that will ensure win-win arrangements and sustainable development. Indigenous companies, farmer associations/cooperatives and outgrower schemes should be encouraged and supported to engage in biofuels joint venture projects, with a possibility of using their land as equity share capital. Appropriate financing mechanisms should also be promoted.
6. Intensive training and awareness creation involving all the stakeholders including media and the rural communities on the advantages, disadvantages and other implications of the biofuels program.
7. Public and private partnership should be promoted to ensure adequate biofuels production infrastructure.
8. Socio-cultural, economic and resource diversity characteristic of the rural areas should be taken into account when designing biofuels initiatives.
9. Stakeholders' active participation and win-win joint ventures in biofuels investments are necessary to minimize conflicts, ensure wider impacts and sustainability. Government support, incentives, awareness creation and promotion are pre-requisite for increasing stakeholder participation. Media is an important stakeholder for that matter.
10. Adequate capacity, institutional support and resource allocation at the local level is essential for successful and sustainable biofuels initiatives.
11. Multi-sector cooperation is necessary for planning, implementing and coordinating the biofuels initiatives.
12. Biofuels technology transfer and from the successful developing countries such as Brazil should be emphasized to speed up the biofuels development process.

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Abbreviations

AREED	African Rural Energy Enterprises Development
BDS	Business Development Services
CAMARTEC	Centre for Agricultural Mechanization and Rural Technology
CBO	Community-Based Organization
CDC	Community Development Centre
CDM	Clean Development Mechanism
CEEST	Centre for Energy, Environment, Science and technology
CFC	Common Fund for Commodities
CPCT	Cleaner Production Centre of Tanzania
COSEES	Community Centre for Sustainable Energy Enterprises Services
COSTECH	Commission for Science and Technology
CSDI	Centre for Sustainable Development Initiative
CSOs	Civil Service Organizations
DED	District Executive Director
DiSEDC	District Sustainable Energy Development Cluster
ESP	Energy Service Platform
EU	European Union
EWURA	Energy and Water Utilities Regulatory Agency
GDP	Gross Domestic Product
FAO	Food and Agriculture Organization of the UN
FELISA	Farming for Energy and Livelihoods in Southern Africa
GEF	Global Environmental Facility
GHG	Greenhouse Gases
GTZ	German Agency for Technical Cooperation
HAKIARDHI	Land Rights Research and Resources Institute
HIVOS	Humanist Institute for Cooperation with Developing Countries
IBEK	Improved Basic Earth Kiln
ISESPREC	Integrated, Sustainable Energy Services for Poverty Reduction and Environmental Conservation
IIEC	Integrated Energy Enterprise Centre
JET	Journalists Environmental Team
JOLIT	Joint Oxfam Livelihood Initiative in Tanzania
JPTL	Jatropha Products (Tanzania) Limited
KAKUTE	Kampuni ya Kusambaza Teknolojia (Company for Technology Dissemination)
LARRRI	Land Rights Research and Resources Institute
LEAT	Lawyers Environmental Action Team
LDC	Least Developed Countries
LHRC	Legal and Human Rights Centre

LPG	Liquefied Petroleum Gas
MAFS	Ministry of Agriculture and Food Security
MDGs	Millennium Development Goals of the United Nations
MEM	Ministry of Energy and Minerals
MFI	Micro-Finance Institutions
MFP	Multi-Functional Platform
MKUKUTA	Mkakati wa Kukuza Uchumi na Kupunguza Umasikini Tanzania (National Strategy for Growth and Reduction of Poverty)
MNRT	Ministry of Natural Resources and Tourism
MoU	Memorandum of Understanding
NEMC	National Environment Management Council
NGO	Non-Governmental Organization
NORAD	Norwegian International Development Agency
NSGRP	National Strategy for Growth and Reduction of Poverty
PRA	Participatory Rural Appraisal
REA	Rural Energy Agency
REF	Rural Energy Fund
RESCO	Rural Energy Services Company
SACCOS	Savings and Credit Cooperative Societies
SEDC	Sustainable Energy and Development Centre
SEECO	Sustainable Energy and Enterprise Consultancy Company
SIDA	Swedish International Development Agency
SMEs	Small and Medium Enterprises
SUA	Sokoine University of Agriculture
TANESCO	Tanzania Electric Supply Company Limited
TANGO	Tanzania Apex of Non-Governmental Organizations
TaTEDO	Tanzania Traditional Energy Development and Environment Organization
TFCG	Tanzania Forest Conservation Group
TIC	Tanzania Investment Centre
TPDC	Tanzania Petroleum Development Corporation
TREAP	Tanzania Rural Energy Access Partnership
TZS	Tanzanian Shilling
UDSM	University of Dar es Salaam
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
USA	United States of America
USAID	United States Aid for International Development
VPO	Vice Presidents Office
WWF	World Wildlife Fund

1. Introduction on the Methodology

1.1 Brief Description of Internet and Desk Review Methods

Study Context

The assessment of biofuels public perception study was undertaken using informal consultative interviews involving a purposive representative sample of biofuels stakeholders in Tanzania (Appendix 1). The active stakeholders (Appendix 3) were grouped into eleven categories (Appendix 2) including policy makers; implementing institutions; media; petroleum trading companies; regulatory and standardization institutions, R and D institutions, investor/developers; policy/civil rights advocacy and lobbying and awareness creation organizations; small-scale production, and processing and marketing SMEs and end-users (households and institutions). A total of 40 stakeholders (40%) were selected purposively (**purposive cluster sampling**) based on their extent of participation, knowledge and experience in biofuels, age, gender and location.

Prior appointments were made to arrange for the interviews. Most of the stakeholders based in Dar es Salaam were site visited and consulted using informal interview techniques including individual and focus group interviews using checklist of questions according to the TOR. Due to logistical limitations, the stakeholders based outside Dar es Salaam were consulted through telephone interviews. Limitations with telephone interviews include lack of facial expressions and body language and time limitation. Women participation in the biofuels program has not been very impressive particularly at the institutional level and hence low representation in the study.

Nevertheless, the study team was also involved in a recent final evaluation of a TaTEDO implemented biofuels program in Tanzania which was an opportunity to interview several women producer and end-user groups in over ten districts in Tanzania which was an exceptional experience and additional source of information (Ringia and Massawe, 2010)⁴ particularly the perceptions of women in the local government, household and institutional users and producers of the improved modern biofuels technologies and services. Similarly, due to logistical and time constraint, formal survey using structured questionnaires, random sampling and quantitative statistical analysis could not be accomplished.

1.2 Selected Experts for Interview

Criteria for selection of experts for interviews included extent of participation and knowledge of biofuels program in Tanzania and elsewhere, experience and key roles played. A total of 40 experts/stakeholders were selected (Appendix 1) out of about 100 stakeholders known to be involved in biofuels activities in Tanzania (Appendix 3), i.e. 40%. The actual numbers of experts/ stakeholders who turned up and were interviewed were 35 i.e. is 87.5 percent success rate.

1.3 Questionnaire Design and Sample Selection and Data Analysis

The list of biofuels issues and questions which were provided in the study TOR were used to prepare checklist for consultative discussion with the selected stakeholders.

In collaboration with TaTEDO⁵, typology of the known and active biofuels stakeholders was developed; and were grouped into twelve categories including policy makers; implementing institutions; media; petroleum trading companies; regulating institutions, R and D organizations, investment and business support organizations, donors; policy/civil rights advocacy and lobbying organizations; production, and processing and marketing SMEs and

⁴ Ringia O and W Massawe. 2010. Final evaluation of integrated sustainable energy program in Tanzania. HIVOS and EU.

⁵ Tanzania Traditional Energy Development Organization (TaTEDO) is the centre for sustainable modern energy expertise and focal point for biofuels initiatives in Tanzania.

end-users (households and institutions). A total of 40 stakeholders were selected purposively from the stakeholder categories for interview based on their extent of participation, knowledge and experience in biofuels, age, gender and location (Appendix 1).



A combination of participatory gathering and analysis methods were used including individual consultations and focus group discussions (FGD)/semi-structured interviews, stakeholder analysis and mapping, documentation review, direct observation of ongoing biofuels activities, review of case studies, expert brainstorming, simple ranking/comparisons, matrix ranking, SWOT analysis, drama and role plays, timelines and historical trends of biofuels development process, biofuels impact analysis, biofuels value chain analysis, socioeconomic wellbeing analysis, relative scales/ladders (progression of biofuels investments events) and others. The mainly qualitative data were analyzed in collaboration with the stakeholders. The results/findings were triangulated and verified using complementary quantitative data from documented expert case studies conducted in different districts including Bagamoyo, Kisarawe, Bahi, Monduli, Morogoro, Muheza as well as the Katani Ltd biogas project in Tanga region and FELISA palm oil biodiesel in Kigoma region and the relevant nationwide biofuels studies.

2. Stakeholder Mapping

Informal consultative interviews and other PRA techniques such as matrix ranking and focus group discussions were used to assess the roles, functions, contributions/support and perceptions of the stakeholders in the development, promotion and dissemination of biofuels initiatives in Tanzania.

2.1 Own Analysis and Complementary Inputs from Experts/Studies

The roles and functions of the stakeholders individually or as a group in modern biofuels technology/services development and research; dissemination and promotion of the use; policy support and advocacy and their perceptions on the national and bilateral biofuels development programs in Tanzania were assessed and documented. The interviewed stakeholders are actively engaged in different functions related to biofuels research and development; technology generation, testing, dissemination, scaling up and marketing; policy, development of legal and institutional regulatory framework; quality standardization, price regulation and environmental impacts mitigation and certification; as well as technical and business development and investment support services.

Stakeholders have contributed resources in-kind including land, labour and knowledge for the production of biofuels feed-stocks; government and donor funds, physical and human resources for biofuels technology generation, promotion, dissemination and marketing. The government has directed specific efforts be undertaken to mainstream biofuels crops in the national research and extension systems while donors such as Sweden (SIDA), Norway (NORAD), Netherlands (HIVOS), Germany (GTZ) etc have contributed resources for initial studies, establishment of policy, training and awareness creation activities (Appendix 2).

Existing Nationwide Biofuels Development Studies

Reference has been made to several national and local/district thematic case studies on biofuels development in Tanzania that wholly are partially focused on public perceptions on biofuels in general and liquid biofuels in particular. Amongst the national studies, "Liquid biofuels for transportation in Tanzania: Potential and implications for sustainable agriculture and energy in the 21st century" which was conducted by GTZ and TaTEDO⁶ is the most comprehensive. The study noted gaps and weak areas in the biofuels development program

⁶ GTZ. 2005. Liquid biofuels for transportation in Tanzania: Potential and implications for sustainable agriculture and energy in the 21st century. GTZ, Munich, Germany.

including lack of specific policy, strategies and performance targets, legal and institutional frameworks; need to establish a national biofuels task force (high-level institution dedicated to biofuels) and establishment of biofuels producer association; need to promote public and private partnership to improve infrastructure and institutions to increase the use of blended biofuels; landuse plan to ensure sustainable crop production including biofuels; initiatives and investment incentives.

Another nationwide study assessed the decade-long evolution of the *Jatropha*-based biofuels sector in Tanzania between 2005-2009 (Marjolein and Romijn, 2010) which assessed the biofuels historical timelines, key events and evolutionary trend describing the successes and weaknesses of the pioneer biofuels investment companies in Tanzania including SEKAB and Bioshape as well as small-scale *jatropha* production and biodiesel production activities in Arumeru and Monduli districts in Arusha region. The study outlines the operations of KAKUTE and smallholder farmers mainly women groups producing biodiesel for fuelling multi-functional platforms (MFPs) for milling, lighting and pumping water.

According to the study, the small-scale *jatropha*-based biofuels projects which were partly supported by McNight Foundation and TaTEDO have significantly improved the livelihoods of the rural communities in the pilot districts. However, the large-scale plantation model used by some of the biofuels investors including SEKAB, Sun Biofuels and Bioshape and the procedures followed to acquire land has caused adverse effects on the forest and other natural resources as well as adverse effects on the livelihoods of the rural communities particularly in Bagamoyo, Rufiji, Kisarawe and Kilwa districts.

The study concludes that the biofuels sector in Tanzania has evolved from an embryonic stage (2005) to a sizeable industry (2009); the pioneer investment companies rushed into the biofuels without regards to the long-term social and environmental effects; the sector is unstable and the future outcomes are unpredictable; economic viability is not certain and more investments and efforts are needed to improve knowledge, create awareness and participation of the smallholder farmers and the rural communities in the initiatives. The general perception is that the public is unlikely to have enough patience to wait for the promised/expected outcomes. The authors express serious concerns on the adverse effects of large-scale multi-national biofuels investments on the national food security, socioeconomic marginalization of the rural vulnerable rural communities and environmental impacts on the sensitive biodiversity and nature conservation.

"Bioenergy and Food Security in Tanzania" (FAO, 2010) analyzed the impact of biofuels initiatives in Tanzania. Similar to the above studies that portray a gloomy picture of the impact of biofuels, the study includes a precautionary statement that biofuels initiatives can easily bypass the smallholders and vulnerable poor rural communities in favour of the large-scale farmers and the biofuels investors, all of them foreign-owned. FAO's general perception is that it is difficult to predict whether the current modalities of most of the large-scale bioenergy investments can act as a catalyst for improving the agricultural productivity. The study recommends that the government should carefully select a bioenergy pathway that is consistent with the existing development strategies (MKUKUTA and Vision 2025) which emphasize national and household food and energy self-sufficiency, poverty reduction and mitigation of the climate change effects. The study concludes that the initial bioenergy trials in Tanzania have shown that smallholder cassava can be an optimal bioenergy pathway and the concerns that cassava and other bioenergy crops may compete with food production and hence a possible threat to food security can be minimized through increased public and private investments targeting to increase the productivity/yield of the food crops that characterizes the agricultural sector.

Lastly but not least, the sensitive issues of land acquisition and impact on the livelihood of the rural communities were addressed in a study "Biofuels, Land Access and Rural Livelihoods in Tanzania" (Sulle and Nelson, 2009). The study enumerates the consequences of the land acquisition for biofuels investments including water scarcity, deforestation and loss of biodiversity especially in the coastal miombo forests, scarcity and increase in food prices, land alienation and loss of rights over customary lands and adverse socioeconomic effects on the rural communities. The land that has so far been requested by the biofuels investors for *jatropha*, sugarcane and palm oil is over 4 million ha targeting land that is reserved for forests and nature conservation. The size of investments are in the range of several billions Tanzanian shillings projected to 10-20 billion in and several million hectares of land in 10-20 years which is an indication of large-scale operations. The study recommends among others, the outgrower production model (example is the model used by Diligent Energy Systems

Tanzania) Ltd) which promotes a win-win arrangement between the investors and other parties including the smallholder farmers. Alternative models recommended include village land trusts and land equity-based joint ventures which are believed to promote sustainable and mutually beneficial biofuels investments. The study lists several other recommendations to improve and harmonize the biofuels land acquisition.



Local studies include smallholder farmers biofuels case studies conducted in Bagamoyo, Monduli (Engaruka village), Kisarawe, Bahi and Mpanda districts of Tanzania (section 7). In general, the local communities view the biofuels initiatives as a threat to their livelihoods particularly because the land acquisition procedures are not transparent and the deals are not fair, the process is not well regulated leading to 'land grabbing' by foreign biofuels investment companies, loss of village land for food production, loss of virgin forests and sources of wild foods, building poles, firewood and medicine. The villagers feel

that they have been more marginalized and impoverished. The findings of the current study support the local communities' perceptions as portrayed in the above studies especially on account of the incidences/crises in Kilwa, Rufiji, Kisarawe and Bagamoyo districts involving biofuels investment companies including SEKAB, Sun Biofuels and Bioshape.

Except for the media that is bitterly against biofuels initiatives as a result of what is described as 'land grabbing and speculation' by the foreign biofuels investment companies⁷ that is adversely affecting the livelihoods of the rural communities, the rest of the stakeholders view and support biofuels initiatives as necessary strategies to reduce dependency on imported hydrocarbon fuels considered to contribute to the greenhouse gases (GHG) emissions and depletion of the scarce foreign exchange (Appendix 2).



Biofuels technologies are also considered to significantly contribute to reduction in environmental degradation caused by increased use of woodfuels. Electricity generated from biofuels has been used in **multi-functional energy service platforms** (MFPs/ESPs) to provide power for small-scale rural industries such as the value-addition agro-industries. Biofuels initiatives are therefore considered necessary to mitigate climate change effects, increase employment, income generation and environmental conservation.

However, all the stakeholders are sceptical about the manner by which the biofuels investments are being implemented without proper policy, legal and regulatory institutional framework. The stakeholders are even more concerned with the land acquisition process by the foreign biofuels investors, termed as 'land grabbing and speculation' which has already adversely affected the livelihoods of the rural communities, for example in Kilwa, Kisarawe and Rufiji districts. Fast-tracking of the biofuels policy development process has been suggested alongside with comprehensive baseline studies, agro-ecological and biodiversity sensitivity mapping and landuse planning to ensure sustainable land allocation for food, cash and biofuels crop production but at the same time conserving the environment, biodiversity and the livelihoods of the rural communities.

2.2 Actors Highlighted by Answers to Questionnaire

Stakeholders' involvement in biofuels initiatives is direct and or indirect ranging from policy advocacy, lobbying to coordination, technology generation, dissemination, promotion, scaling-up as well as business and investment support services (Appendix 2). With the exception of the media, the rest of the stakeholders are in support of the biofuels initiatives undertaken in Tanzania by different actors. However, all the stakeholders are sceptical about the manner by which the program is implemented. They recommended fast-tracking of the ongoing process to develop specific biofuels policy, legal and institutional regulatory framework.

⁷ Most popular biofuels investment companies in Tanzania include M/S Sun Biofuels, Bishape, SEKAB, Prokon, Diligent, FELISA and Katani Ltd

The stakeholders and particularly the policy makers, donors, investors and investment promoters including Tanzania Investment Centre (TIC) believe that supported, guided and regulated properly and monitored by specific, measurable, relevant and realistic strategies and performance targets, biofuels initiatives have great potential to significantly reduce the national dependency and use of imported hydrocarbon fuels, reduction in green gas emissions, foreign exchange savings, job creation and income generation and hence contribution to the achievement of the national and global development goals including Vision 2025 and the MDGs.

2.3 Stakeholders/Beneficiaries Record

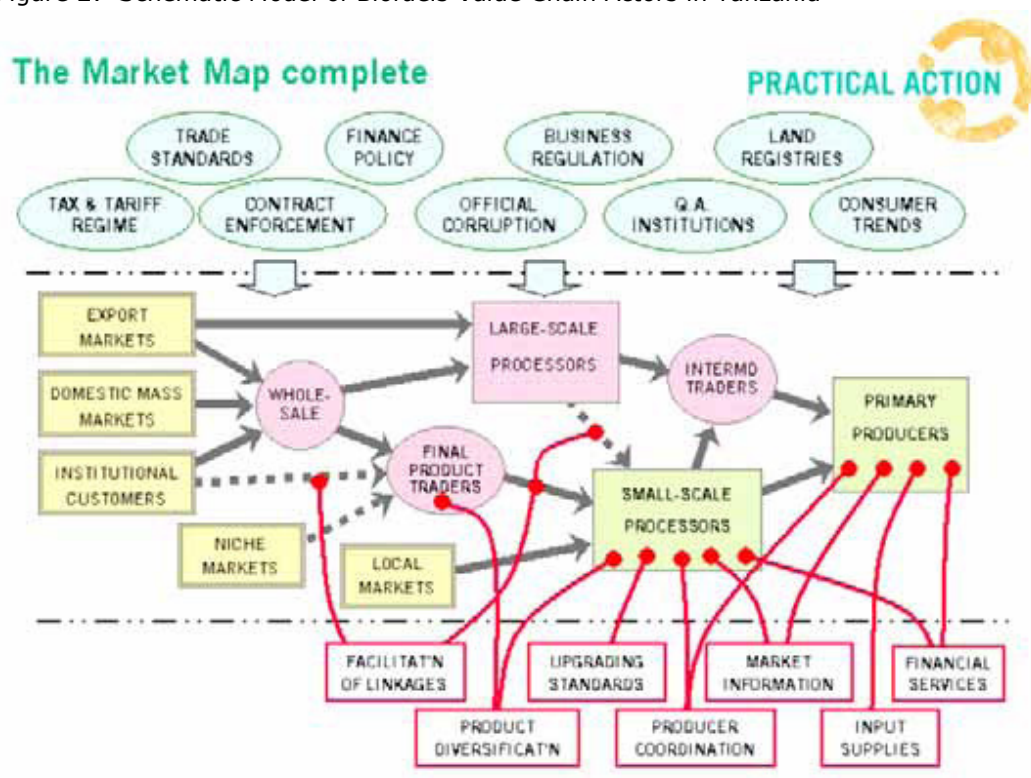
Apart from roles, contributions and perceptions, the stakeholders were also asked to assess the strengths, weaknesses and threats/challenges. Despite the fact that the biofuels program in Tanzania is still at its infancy stage compared to other countries such as Brazil, the government and the participating ministries have achieved a significant milestone in infrastructure and institutional setup including the establishment of a National Biofuels Task Force, National Biofuels Technical Advisory Group, Biofuels Development Guidelines and five year strategic plan and biofuels policy is at an advanced stage (Appendix 2).

Several improved biofuels technologies such as improved woodfuels stoves and ovens, biogas plants, multi-functional platforms (MFPs/EPS) and charcoal production kilns have been developed, tested, promoted and marketed by TaTEDO and other partners such as CAMARTEC, COSTECH, Crop Research and Development of the Ministry of Agriculture and others are in the process of wider replication and scaling up. Access to the technologies and services has significantly improved the livelihoods of the producers and end-users particularly women (Ringia and Massawe, 2010). Most stakeholders mentioned the lack of the policy, legal and institutional regulatory framework, infrastructure for distribution and scaling up particularly in the rural areas, incentives for investment and resources for R and D as the greatest challenge and threat hindering the biofuels development progress (Appendix 2).

Apart from specific stakeholders' expectations, the overarching expectations of most of the stakeholders is a sound and sustainable national biofuels program properly guided and regulated by specific policies, strategies and measurable and realistic performance targets. The stakeholders also expect to see strong, motivated and committed public and private partnership to oversee and ensure existence of the necessary infrastructure and institutions promoting market-driven and oriented biofuels investments with wide range of production models and ownership arrangements that will facilitate participation by small, medium and large local and foreign companies. Priority should be the national energy self-sufficiency and oil import substitution.

Production models that promote active participation by the smallholder farmers and particularly women groups in the rural and urban areas were also mentioned as additional expectations and were particularly emphasized. Examples of such models include the smallholders outgrower models such as Katani Ltd sisal and biogas and FELISA palm oil biodiesel production (large-scale/medium buyer/processor with satellite smallholder block farms, contract farmers or small cooperatives); small-scale processors producing biofuels for village-level end-users market and excess for sale to large processors and exports such as Diligent Energy Systems (T) Ltd, KAKUTE and JPTL model (Figure 2).

Figure 2: Schematic Model of Biofuels Value Chain Actors in Tanzania



3. External Influences and Crisis

3.1 Own Analysis and Complementary From Other Experts

The recent global economic crisis was expected to adversely affect the growth of the Tanzanian economy via slowdown in direct foreign investment, trade and tourism. Year-on-year inflation has been rising steadily since 2008 to 13.5% in 2010, it's highest since 1998 which was by large extent driven by rising food and fuel prices. However, inflation was expected to ease in the following years as food prices fall as a result of reasonable harvest and fall in food prices in line with global trends. Economic forecast shows annual real GDP growth 5.7% in 2009 and 6.1% in 2010.

There are a number of external influences that have specifically triggered investments in liquid biofuel industry development in Tanzania. These can be put into two categories: (i) factors that have triggered investments in liquid bio-fuels (ii) factors that have discouraged direct foreign and local investments in bio-fuels.

Under the first category examples are: (a) The escalating price of petroleum prices (b) Need for protection of environment (c) The rise in the economies of the BRIC countries (d) New developments in bio-fuel extraction technologies (e) changes in energy policies and regulations in the EU. (f) Low cost of labour and land in Africa.

On the other hand, the factors that have discouraged investment in liquid bio-fuels are the perception that (a) Investment in liquid bio-fuels is contributing to food insecurity because of producing the fuels from human food, as well as use land that would have been used for food

production (b) Conflicts resulting from land grabbing in the developing countries (c) New developments and changes in the technologies used to assess impact of liquid bio-fuels e.g. from energy experts point of view, biofuels GHG emissions particularly CO₂ and CH₄ neutrality is questionable because it is claimed that forest land clearing/burning and bioenergy processing releases more GHG to the atmosphere than it replaces (LARRRI and JOLIT, 2008; Eijck, 2006; Marjolein and Romijn, 2010) and therefore biofuels are likely to result into adverse environmental impacts than gains.

The best case of bio-fuel investments known in Tanzania is that of Brazil's successful production of bio-ethanol from sugar cane as well as South Africa's. As regards bio-diesel from jatropha, the best known examples are those of India and Pakistan where this industry is advanced, and technologies developed in production and processing so far have been applied in Tanzania successfully.

External influences come from various countries and are caused by a variety of reasons. While such influences can have far reaching impact on a certain industry to many areas, their impacts can not be felt in the same way to all countries. To some it can be a blessing while to others it can be a curse. The issue of development in liquid bio-fuels industry can also be analysed along this logic. Therefore, policy makers as well as investors should treat with caution external influences that are normally applied generally by key stakeholders such as the governments, donor organizations, and major investors. For example, Tanzania, investments in bio-fuel production would have more benefits than detriment, if proper policies and regulations are followed. This is because of the country's unique endowment with natural resources especially fertile land masses and abundant water resources.

The biofuels initiatives in Tanzania were also to a large extent motivated by the global upsurge of bioenergy interests in the USA and Europe following the UNCCC influenced Kyoto Protocol that emerged as strategies to mitigate the climate change phenomena. Following the ratification of the protocol, the UN member countries including Tanzania were required to comply to the mandatory 10% blending of hydrocarbon fuels with biofuels to reduce carbon emissions (LARRRI and JOLIT 2008; Marjolein and Romijn, 2010; Ngoo, 2011).

The induced increase in demand for biofuels as a result of increase in prices of biofuels (bioethanol and biodiesel) coupled with limited production resources including land and labour, forced the USA and European biofuels companies to rush to LDC's including Tanzania (situation termed as 'biofuels mania' and 'agflation') where it was perceived to have 'idle' land and labour (LARRRI and JOLIT, 2008). The available statistics indicate that there are a total of 55.2 million ha of arable land and about 44.4 million ha are potential for crop production including biofuels. Land needs for biofuels investors currently range from 400,000 to 4 million ha. The land need for food and cash crop production to meet the current and future food, cash, energy, forests, wildlife needs for Tanzanian population is not immediately known.

The development, dissemination and use of sustainable bioenergy technologies has an important impact on the economic situation because of 1) the loss of income, as the productivity of land is reduced and 2) the costs for reclamation of the degraded natural resources and their environment increases. Over 40% of the annual household income is spent on energy mostly woodfuel. For example, by increasing the use of improved bioenergy technologies promoted by TaTEDO, has contributed to a reduction in consumption of charcoal and firewood by an average of 71% and 67% and therefore annual average household savings of TZS 311,624. By contributing to the development of sustainable woodfuels technologies and practices, in the long-term, the proposed programme will contribute to national goals to alleviate poverty and improve food security.

The interviewed stakeholders including the key ministries of land, energy and natural resources admits this fallacious perception which is attributed to the fact that most of the LDC's including Tanzania have not developed comprehensive land use plans. According to WWF and other stakeholders, the so called 'idle' land that has been the targets of the foreign biofuels companies is in fact reserved land for forests, wildlife parks and hyper-sensitive land for biodiversity conservation. The National Land Bank Agency (NLBA) has been proposed which in collaboration with the ministries of agriculture, energy and natural resources are expected to undertake a comprehensive land use planning and agro-ecological zoning to enable sustainable land allocation including land required for biofuels production. The mandate for creating land bank for investors was hitherto under the Tanzania Investment Centre (TIC) whose other roles include promotion of investment including biofuels.

To some extent, the local media's perception on biofuels initiatives in Tanzania has been influenced by the foreign media. Apart from 'land grabbing' by the foreign biofuels investors which has actually happened in Tanzania (OXFAM, 2008; LARRRI and JOLIT, 2008) and specifically in the cases of Bagamoyo and Kisarawe districts (Kashigili and Nzunda, 2010) and Mpanda district (GTZ, 2009).

The stakeholders whom we consulted, particularly HAKIARDHI, JET, WWF and LEAT have also narrated the 'land grabbing' incidences in Kilwa and Rufiji districts, another justification given by the local media for their stand against biofuels is diversion of food grains to biofuels creating food scarcity, high prices and therefore food-fuelled inflation. There is no data or proof whatsoever that the latter has not happened in Tanzania, although it is an alarming issue in the USA and EU countries according to the foreign media (LARRRI and JOLIT, 2008) which may have influenced the local media's perceptions. Land grabbing for biofuels contravenes the European Commission Roadmap, USA Energy Independence Act of 2007 and the Global Bio-Pact MoU that call for mandatory certification of the biofuels schemes to ensure that they include socio-economic and environmental sustainability criteria to mitigate any anticipated adverse environmental and social consequences including displacement of local communities, loss of livelihoods and food insecurity which according to the stakeholders, it is happening in Tanzania particularly in Kisarawe, Kilwa, Rufiji and Bagamoyo districts.

Although it is claimed that Tanzania stands to have a comparative advantage in the production and export of biofuels (Sulle and Nelson, 2009), the existing facts do not support the assumption. Total market share of biofuels for North and South America and EU is over 60% dominated by USA, EU, Brazil and Asia while ACP countries share is less than 23% including significant players such as Malawi, Kenya, Rwanda etc. The USA and EU biofuels producers are heavily subsidized to a tune of USD 7-8.9 billion/year while debilitating market protection and stringent tariffs (USD 45 cents/gallon) are imposed on imports of biofuels (LARRRI and JOLIT, 2008) it is very unlikely that Tanzania will have a comparative advantage to export biofuels into the USA and EU which is the bulk of the biofuels markets.

The stakeholders interviewed (for example the ministry of agriculture) perceive and attribute the current observed changes in cropping systems including shift to biofuels to low performance in cash crops such as cotton, coffee, tobacco to weak institutional framework including cooperatives and crop authorities, decrease in world market demand due to shift in the consumption patterns and therefore price which has forced smallholder farmers to turn to biofuels as alternative sources of cash income, the trend which has also been verified by other studies (Eijck, 2006; LARRRI and JOLIT 2008; Marjolein and Romijn 2010).

Availability of donor support (such as SIDA, NORAD, FAO, HIVOS, GTZ, UNDP/GEF and others) in form of biofuels development grants and technical support is also an external factor that is influencing the biofuels development.

3.2 Events Highlighted by Answers to Questionnaires

The external influences that have affected investment in liquid bio-fuels were investigated through search in secondary sources of information especially in the internet, news media, as well as well as to a lesser extent, through individual interviews. These are discussed below, through two categories, i.e. the events that were pro-investment in liquid bio-fuels and those that had a negative effect in this investment.

(i) Events that were pro- Investment in Liquid bio-fuels.

The most cited external event is the dramatic **increase in the price of petroleum** in the world market, or also referred to as the oil crisis. For example in 2008, the price of one barrel of oil exceeded US\$ 140. This dramatic increase in the price of petroleum puts a big pressure in the fragile economies of the developing countries. This is because it drastically affected the balance of payments, hence depreciation of the local currencies, as well as the whole energy sector that touches every sector of these economies in that it increases production and transportation costs.

This event has necessitated key energy stakeholders public and private alike, to view investment in bio-fuels as the most opportune way of revamping the economies of the developing countries as well as a great business opportunity.

The second event most cited was the environmental regulations in the western world especially the EU, where regulations have been passed on the proportion of bio-fuels that

should be used in the EU countries. Specifically it has been agreed in the EU member countries that by year 2020, at least 10 % of the diesel used in these countries should be biomass. This has triggered energy companies especially from UK, Switzerland and Sweden to mobilize investments in Tanzania. Examples of these are D-oil, Sun biofuels, BP, SEKAB, etc.

(ii) Events that were/are against investment in Liquid bio-fuels.

One most cited external event in the interviews was the **Land grabbing movement**. The rise in the price of petroleum and food in the world market has triggered a big rush for foreign companies to look for big chunks of land in the developing countries en masse. One good example is the Korean conglomerate (Daewoo) which acquired over 1m ha of land for food production in Madagascar. This resulted in a major political crisis ending up in unseating the incumbent president. In Tanzania, the recent land crisis involving Bioshape, a Dutch company which acquired 80,000ha of land in Lindi for jatropha production but ended up harvesting hard wood is still unresolved (IPS/Free reporter March 2011). The same case goes for SEKAB which had planned to invest in bio-ethanol production against directives from its owners in Sweden is still unresolved. These scandals have negatively affected the pace of investment in bio-fuels, but also have sent warning signals to the governments to organize themselves better when promoting investments in liquid bio-fuels.

The second event cited is the new developments at assessing and measuring the impact of green fuels in general as being environmentally friendly. New technologies and methodologies on measuring the impact of using bio-fuels vs fossil fuels on the environment have revealed that they are not "that green" any way. For example a lot of forest land is being cleared to plant these crops, they are using water and fertilizers for production, therefore their net effect on environmental protection is very minimal or not there at all.

The other external influences and crises related to biofuels initiatives highlighted by the stakeholders include 'biofuels rush' by foreign investment companies such as SEKAB, Bioshape, Sun Biofuels and others that came with ambitious investment plans that never took off partly due to adverse publicity by the media and environmental blogs (Marjolein and Rimijn, 2010). Instead, what has transpired is what has been termed 'land grabbing' and speculation for example in Kilwa and Rufiji (as narrated by HAKIARDHI, LEAT, JET and WWF), Kisarawe and Bagamoyo (DED Offices). In another incidence, in 2009 the villagers in Kisarawe blocked the approval of land lease applied by M/S Sun Biofuels because the process for land acquisition was not transparent and mechanisms for compensation were not clear.

4. Media Analysis

The media has constantly and sharply criticized the manner by which the biofuels initiatives are being implemented in Tanzania particularly the large-scale plantation and production approach land acquisition adopted by some of the biofuels investors that has caused adverse socioeconomic and environmental impacts.

The liquid bio-fuels subject is fairly new to the news media in Tanzania. It started catching the attention of the media in late 1990s and early 2000s, however frequency of coverage started increasing dramatically in the second half of the 2000s. To analyse the role of media in liquid biofuels, the researchers did an intensive literature review in the internet, followed by direct visit to three popular media houses in Tanzania i.e. Tanzania national newspapers (TNS) the publishers of Daily News and Sunday newspapers, IPP media (Publishers of at least nine newspapers, e.g. The Guardian, The guardian on Sunday, three TV stations, and three radio stations). Our research on IPP focussed on the Guardian newspaper, and ITV) We also visited Mwananchi Communications the publishers of the Citizen weekly newspaper, and Mwananchi, the Swahili daily newspaper.

In this research, a total of 39 news articles were collected, reviewed and analyzed (Appendix 4) and six news media people/journalists were interviewed (Appendix 1). The liquid bio-fuels that are mostly covered are (i) Jatropha (ii) bio-ethanol from sugar cane (iii) bio-diesel from edible oils especially palm oil.

4.1 Own Analysis and Complementary From Other Experts

In general, the coverage of the news in the liquid bio-fuels just like news on other alternative energy news, are highly influenced by international events in these sectors. However in the

early days when the subject started gaining popularity, bio-fuels were identified as a great opportunity for creating income and improving livelihoods in the developing countries. Therefore, a number of promotional articles were written in the features sections of the papers, outlining this as a great opportunity for the economies of this country.

Of particular interest was jatropha as it was a well known plant, only valued as fencing plant and not an economic crop. Coverage continued as news reports on the local initiatives promoting this crop as a number of local companies and institutions both local and international started investing in the planting and processing of this crop both at large scale and small scale. Examples of these were Sun bio-fuels, TaTEDO, Kakute, D1-Oil, etc.

Therefore, the perception of the media by then was that they were writing to promote a major breakthrough in the energy sector for this developing country. This interlude was followed by a period of second thoughts regarding this sector as massive investments got underway. This went hand in hand with acquisition of large parcels of land. This is the period when the issue of bio-fuels turned into an issue of land and food security for the developing countries, and escalating prices of food globally. The price of petroleum also contributed a lot in stimulating investments in liquid bio-fuels.

The news media in Tanzania has mainly played a role of a sounding board for international events on liquid bio-fuels, i.e. just echoing what has been happening or what is perceived to happen on the world arena and reporting, in local media without much analysis on the country specific situation. However, the local media has played a role in criticising authorities for not putting clear policies and regulations on investments in this sub-sector.

Recently, in the local Guardian Newspaper (Carrington and Valentino, 2011) carrying the title "Biofuels boom: Another curse to Tanzania or a blessing?", the authors claim that the biofuels crops are linkage to rising food prices and hunger as well as an increase in greenhouse gas emissions. They ascertain that the biofuels investors have amassing millions of hectares on the east and west coasts of Africa including Tanzania. A UK company Sun Biofuels has acquired over 8,000 ha in Kisarawe for the production of jatropha for the production of biodiesel for export to the EU market. Most biofuels companies have no plans neither they are obliged to construct refineries in Tanzania and supply to the domestic market. The biofuels investors in Tanzania have targeted the high productive lands including forest and wildlife parks threatening loss of biodiversity and increasing the climate change effects. With this trend, the authors cite a report by the Institute for European Environmental Policy which has predicted that carbon released from deforestation linked to biofuels could exceed carbon savings by 35% in 2011 rising to 60% by 2018. The article urged the western governments to end the biofuels policies that divert food to fuels for cars and concludes by saying "we are sleepwalking towards an age of avoidable crisis"

Another article in the same newspaper (Guardian) with a title "Reaction to biofuels production in Tanzania" by a special Correspondent (March 30, 2009) describes the fate of SEKAB a Swedish biofuels investment company that operated in Tanzania. The investment project is both controversial in both Tanzania and Sweden. SEKAB's biofuels investment activities in Tanzania have been perceived by the media and the public at large as causing adverse socioeconomic and environmental impacts particularly on the livelihoods of the rural communities.

Our own opinion is that not all the negative aspects of bio-fuel investment are true or applicable to a huge country like Tanzania. The Western media that are setting agenda for what is written or covered in the local press tend to generalize the situation in Africa. For example ...articles that were highly critical on bio-fuel investment, and quoted in the local media portrayed investments in bio-fuel as detrimental to food security. This could be true to other countries but not to Tanzania as there are large chunks of land that are not used for any agricultural activity, while majority of the people are languishing in poverty. In addition to this, some liquid bio-fuel sources like jatropha, can thrive on marginal land that is not suitable for growth of other crops.

Local media's awareness on biofuels is extremely limited hence falling victims of influence by the foreign media, global political and economic propaganda. For that matter, the ministry of energy and other stakeholders such as WWF, HAKIARDHI and others with generous support from donors (SIDA, GTZ, NORAD have indicated interest to support) are planning to undertake comprehensive awareness creation campaigns on biofuels initiatives, efforts aimed to inform

the public and increase participation. MEM has planned a semina which will involve the media among other stakeholders as part of awareness creation. Awareness creation is also being undertaken by CSOs and NGOs such as HAKIARDHI, LHRC, WWF and others. What is also required is a clear investment policy in land use and investment policy outlining clearly through guidelines on the areas earmarked for production and processing of liquid biofuels, investment incentives and ownership arrangements. This is well articulated in a cartoon in Guardian Newspaper (Appendix 6).

4.2 Media Influence Highlighted by Answers to Questionnaire

The main media influence as responded to by people interviewed in the media (annex II), has mainly been that of turning the issue of liquid bio-fuels into a villain as far as food security is concerned. Interviewees quote papers as source of information regarding land grabbing, food shortages as now food crops like grains sugar, oil seeds are a source of making bio-fuels.

A typical influencing news article is depicted on annex IV with heading " Why Biofuels is highly barricaded in Tanzania" (The Citizen Jan 7th 2011)

Two journalists interviewed (Annex II) expressed their concern as regards the issue of land grabbing which was fuelling conflicts in the villages where investments on massive land areas have taken place like Coast and Lindi regions. In these regions one investor was investing in more than 5,000ha of land to plant jatropha and oil palm trees. (examples are Sun bio-fuels, Felisa, Bioshape and D-oil).

While it is true that, conflicts have arisen as result of these investments, the perception falls short of identifying the root cause of the conflicts as well as underlying factors such as bad or lack of procedures for land acquisition, type of investors, poor governance and corrupt elements in the whole issue of land acquisition and investment (Appendix 4).

5. Socio-cultural Parameters

The absence of the affordable alternative modern energy services means that the basic needs of over 80% of the Tanzanians, majority of them low-income people living in the rural areas are not met. According to the household budget survey report of 2005, about 18.7% of Tanzanians live below food poverty line and 35% live below basic needs. Poverty is more severe in the rural areas compared to the urban areas. Therefore, the biofuels initiatives being implemented by TaTEDO and other stakeholders such as FELISA and Katani Ltd is an appropriate entry point for reduction of poverty, improving the livelihood of the rural communities particularly women, children, disabled and other disadvantaged ethnic minorities such as the pastoralists (e.g. Maasai, Kwavi, Sukuma, Iraq, Hadzabe and Tindiga) who depend on the natural forests for their survival.

Apart from the technical and environmental impacts, the biofuels initiatives have also affected the economic, social and cultural aspects of the people in general and the rural communities in particular and their perceptions on biofuels. The biofuels investments have so far been carried out mainly in the rural areas where culturally the communities tend to avoid the risks associated with trying a new or non-familiar technology or practice which was also confirmed by a study in Tanzania (Eijck, 2006; PAC, 2009). Hitherto, biofuel crops and specifically Jatropha was being cultivated in very small scale as hedge around homesteads.

5.1 Own Analysis and Complementary Input from Other Experts

Some of the biofuels investors have targeted land covered by natural green forests that are used to perform special rituals for some tribes (e.g. Morogoro, Coast, Rukwa regions) disrupting sacred places believed to be home for sacred spirits with the associated consequences such as prolonged droughts and floods events (climate change?). The stakeholders mentioned such incidences occurring in Rufiji, Kisarawe, Kilwa and Bagamoyo districts involving biofuels investment companies including Bioshape, SEKAB and Sun Biofuels. Case studies conducted in Bagamoyo and Kisarawe districts (Kashagili and Nzunda, 2010) and Mpanda district (GTZ, 2009) and nationwide study of challenges and opportunities of biofuels program in Tanzania (LARRRI and JOLIT, 2008).

Women accessing employment in the biofuels plantations tend to become economically and socially empowered in decision-making and contribution to the family livelihoods which is somehow shaking the male dominance. Some of the male counterparts have a feeling that they are no longer getting respect and obedience from their women counterparts. It is claimed that women employed in the biofuels plantations are abandoning and or paying lesser attention to their traditional household chores, the situation which is associated with an increase in marital conflicts and divorces in the areas with high influx of the biofuels investment companies such as Kilwa, Rufiji, Kisarawe and Bagamoyo. This was mentioned by some of the stakeholders but also supported by a case study in Bagamoyo and Kisarawe districts (Kashagili and Nzunda, 2010).

Traditionally for most tribes in Tanzania, men own land and other assets excluding women. Land compensation benefits are therefore automatically controlled by men some of them tend to misuse the benefits with adverse consequences on women and children. In some instances, the resources have been used to promulgate polygamy and extra-marital relationships (termed 'nyumba ndogo' in Kiswahili) leading to marital conflicts and increased incidences of divorce and therefore social unrest.

Loss of land, water⁸ and forest resources as a result of biofuels investments has adversely affected the livelihoods of the rural communities particularly women and children who are responsible for collecting firewood, building poles and wild foods, raw materials for weaving.

Loss of marginal land usually used by women for food and minor cash crop production hence denying them the critical sources of income and household food and energy security, loss of livelihoods and marginalization. Under such circumstances and with the intrusion of foreign cultures and money economy, women are forced to engage in undesirable vices including prostitution as survival mechanisms.

Increase in market demand for biofuels likely to influence diversion of food stocks (e.g. sugarcane) and or competition for resources (land, labour, water) between food and fuel production leading to scarcity of food, food insecurity and possible political and social conflicts.

In the case of palm production by FELISA in Kigoma region, women are doing the activities which were restricted to men such as palm oil pressing as a result of improved and simplified technology with consideration for gender.

Increase in demand for biofuels following the 'invasion' by the large-scale commercial biofuels investment companies and therefore price has turned the hitherto women's crop to men's cash crop hence denying them sources of income with deleterious socio-cultural effects mentioned above. This scenario was echoed by women groups in Engaruka and Leguruki villages in Monduli and Arumeru districts in Arusha. Before the emergence of the companies, local small scale processing companies such as KAKUTE and Jatropha Products Tanzania Ltd (JPTL) used to buy small quantities of jatropha seeds produced/collected by women to produce biodiesel for the local MFPs and soap manufacturing. Demand for jatropha seeds has increased following investments of large companies including Diligent Energy Systems (T) Ltd which has completely changed the modes of production and processing from small-scale to plantations, jatropha is now a cash crop owned by men and processed by large mills. Women and small-scale processors have been driven out of the economy and market.

With the emerging biofuels investment companies, smallholder mixed farming biofuels enterprises turned into large-scale monoculture plantations excluding subsistence food and cash production from the 'equation' reducing diversity of food, cash and energy sources leading to malnutrition and poverty especially women and children which is a social ridicule and loss of social integrity. The women empowerment which was brought by the pro-poor biofuels projects such as TaTEDO has now been counterfeited by M/S Diligent Energy Systems (T) Ltd et al.

It is not all that bad, the representatives of the Engaruka women groups said. With all the adverse social impacts we have mentioned, there are also a few positive impacts. The influx of the foreign-dominated biofuels companies into the rural areas opening up and increasing social interactions leading to modernization and reduction in undesirable traditional cultural

⁸ In the case of sugarcane production which requires a lot of upstream water for irrigation denying essential water for human and other users including biodiversity downstream

norms, beliefs, behaviours such as witchcraft, laziness etc which has been a driving force for accelerated rural development.

Access to modern biofuels technologies (mentioned above) 'liberating' women and children from tedious and time-consuming water and firewood collection, milling and cooking on three-stone stoves with gaseous fumes and effects on health and saving time for other gainful economic activities hence increase in economic and social empowerment and social integrity.

In Tanga region, women farmer groups were encouraged /guaranteed by Katani Ltd to form and register solidarity groups that enabled them to access credit facility from financing institutions to cultivate sisal the by-products of which are used to produce biogas and bioenergy. Hitherto, women particularly in the coastal area could not access credit because they are not allowed to own assets such as land and house that are used as collateral. Increase income for women and household food security as a result of Intercropping of sisal with food crops. Sustainable alternative energy/electricity for cooking, lighting, milling generated from biogas from the sisal bio-refuse saving women time for economic activities further empowering them economically and socially.

5.2 Cultural References Highlighted by Answers to Questionnaire

In response to the question "**which cultural parameters determine the different standpoints in the public opinion on biofuels**", the people interviewed listed the following key socio-cultural parameters:

- **Gender factor** including aspects such as gender division of labour and equitable allocation of resources (land, labour, water, food, fuel feedstocks, development funds/resources, etc) and benefits (cash and in-kind income, food, generated power, firewood/energy forest products—such as building/weaving materials, traditional medicine, traditional vegetables, honey, etc).
- Cultural **beliefs and norms** including religious beliefs, traditions, and others.
- **Native laws and bylaws** related to aspects such as inheritance and ownership of production resources such as land, forests/woodlots, assets/properties (e.g. biofuels extraction equipment), seeds/inputs; allocation of resources and benefits (as above) vis-à-vis gender equity, for example allocation of land and labour for food, fuel and cash crops production. Similarly, native laws/bylaws regarding natural resources (forests, streams/water sources, national parks, burial sites) and environmental conservation. The bylaws also influence the allocation of produce/grains for food, fuel, local brew, social and cultural aspects such as dowry, gifts and ceremonies/celebrations (rituals and 'ngoma ya mwali' etc)
- Socioeconomic and political aspects including good governance issues, leadership accountability to people (political/election/constituency obligations), compliance to the laws of the land (e.g. land access and ownership) as well as the accountability on the national, regional and global dimensions including progress in the achievement of the millennium development goals (MDGs), national strategies and goals such as poverty reduction (MKUKUTA and Vision 2025) and compliance to regional/international environmental conservation such as the Kyoto Protocols and Convention of which has been ratified by the Tanzania government.

In one way or another, the biofuels public perceptions (support or rejection of the initiatives) in Tanzania has to some extent, been influenced by the above socio-cultural parameters. Similarly, the above responses also confirm the hypothesis that the biofuels initiatives in Tanzania have either been favoured or rejected partly on the basis of the above socio-cultural parameters including religious/moral beliefs, local/national/regional/global political and ethical issues (good governance and accountability, natural resources and environmental conservation, health and hygiene) as well as the socioeconomic aspects (food and energy demand/price crises, poverty reduction).

The interview also verified "to what an extent the biofuels public perceptions have been influenced by some cultural parameters including religious, ethical, moral and socio-historical

standpoint". The responses together with the analysis of the findings of the case studies documented reports findings are summarized below:

Religious/Moral Influence: Most of the biofuels investments so far in Tanzania have targeted the coastal areas (Bamoyo, Kilwa, Rufiji and Kisarawe districts) for obvious reasons including availability of large tracts of fertile and 'idle' land and labour, reliable rainfall and easy accessibility among other factors (Figure 1). The coastal people are dominantly Moslems. Polygamy constitutes part of the Moslem culture and obligations. The additional income as a result of biofuels investments (sales from selling of biofuels feedstocks to investors/processors, compensation for biofuels land acquisition, employment etc), is believed to have enabled men to marry additional wives (Kashaigili and Nzunda, 2010) thus fulfilling the religious obligation, for some of such men beneficiaries, biofuels investments are perceived as a blessing and are therefore favourable initiatives and investments.

However, the additional wives as a result of the fulfilment of the polygamy culture has meant dividing the small cake/income among larger families (more wives and children per family) accentuating the poverty dimension. To some of the critics of polygamy and some of the affected families, the biofuels investments are seen as 'not-so-good' and therefore not so readily supported.

The biofuels investments in the coastal areas have also opened up and created employment⁹ and additional income to women. Traditionally, the Moslem women are not expected to be employed and earn an income that is controlled by the women themselves. Hitherto, the biofuels such as jatropha were considered as 'women enterprise' vis-à-vis the traditional cash crops such as cashew nuts, coconuts, cotton, etc. With the advent of the biofuels investments, the coastal women have also been enabled to earn an additional income from selling of biofuels feedstocks to the investors. 'Unfortunately' the additional income has empowered the coastal women economically and socially which is culturally considered to be insubordination to men. For such men, it has been enough cause for divorce blaming biofuels investments as a contributing factor. For such men who have been thus affected, biofuels is perceived as a curse rather than a blessing. The rate of divorce in the coastal areas is said to be on the rise partly attributed to the introduction of biofuels investments (correctly or wrongly)¹⁰. Some of such women who have been divorced on such grounds have been marginalized and socially ridiculed. For them, the biofuels investments are perceived as a 'blessing in disguise'.

The biofuels investments particularly into the coastal rural areas have opened up the areas economically but also socio-culturally introducing the 'western cultures, into the hitherto exclusively the Swahili coastal culture. Together with the 'money economy', some girls and women have been attracted to engage in prostitution and other 'foreign' cultures which as considered immoral by both the Christian, Moslem and other traditional religious beliefs termed as 'cultural and attitudinal erosion'. Together with the land acquisition social injustices also being observed by some of the religious clerics as a result of the 'biofuels mania' has made them partly reluctant and hesitant to comfortably support the current biofuels investments without the evidence of a standalone concrete national biofuels strategic framework and policy as well as the environmental, socioeconomic and cultural adverse impacts mitigation plans.

Socio-Political and Ethical Issues: The biofuels land acquisition procedures by the investors has been criticized to have further marginalized the rural communities annexing from them the means for livelihoods including land for food and energy production and forests for the collection for wild foods (honey, meat), water, medicine and shelter building materials. This concern was strongly echoed by the interviewed affected residents from Bagamoyo, Kilwa, Rufiji and Kisarawe. The concerns were also sharply raised by the civil rights advocacy associations including the Land Rights Research Organization (HAKI ARDHI) and Legal and Human Rights Centre (LHRC) and WWF. Some of the local government leaders and district land offices are blamed to have sided with the investors, betrayed and failed to protect the

⁹ Note: Most biofuels feedstocks production and processing are women-labour intensive

¹⁰ This is subject for more comprehensive study

rights of their own people which has created hatred and alienation between the rural communities and their political leadership.

Most of the biofuels investments in Tanzania are almost exclusively owned and operated by foreign companies against the national policy for integration and promotion of local companies and Tanzanians in the investment projects according to the national investment policy framework. The Tanzania Investment Centre (TIC) is vested with the mandate to enforce the policy. However, some of the biofuels investors have bypassed TIC contrary to the investment policy regulation particularly with regards to land acquisition for investment purposes.

According to the biofuels experts and technocrats interviewed, with the exception of a few pro-poor small-scale biofuels projects such as the TaTEDO's projects, Katani Ltd biogas, Diligent Ltd and FELISA biodiesel projects, most of the biofuel investments are categorized as large-scale export-oriented catering mostly for the biofuels market demands in the western countries particularly the EU and USA. In that context, the local and national biofuels needs have not been mainstreamed into the investment plans. This has been attributed to the fact that there is no biofuels strategic plan and policy framework to properly guide the investments. As such, biofuels are politically perceived as 'right option but in the wrong direction' particularly considering the biofuels large potential as alternative cleaner sources of energy that can contribute to the national energy self-sufficiency, petroleum imports substitution, rural electrification and energy self-sufficiency, Agriculture First and climate change effects mitigation strategies.

Finally, the biofuels experts, practitioners and technocrats were asked to respond to the question "**what are the social and cultural arguments mostly used in the construction of public perception of biofuels innovations, changes of habits and customs, opening to international markets**"

Poverty reduction, conservation of the natural resources and environment through production and use of cleaner energy free from chlorofluorocarbons (CFCs) emissions are the common techno-socio-cultural arguments for supporting and promoting biofuels initiatives in Tanzania. As explained above, Tanzania has officially ratified the Kyoto Protocols Conventions and is actively collaborating and contributing to the achievement MDGs. Tanzania is also committed to its own poverty reduction strategy, MKUKUTA and Vision 2025 which also includes among other strategies poverty reduction and environmental conservation. These are therefore the major political and social driving force for promoting the biofuels investments which also to some extent influence the political and social public perceptions.

The biofuels therefore constitute some of the national strategies and agenda for the mitigation of the climate change effects according to the Kyoto Convention. However, from the technical point of view, there are currently counter arguments e.g. from energy experts point of view, biofuels GHG emissions particularly CO₂ and CH₄ neutrality is questionable because it is claimed that forest land clearing/burning and bioenergy processing releases more GHG to the atmosphere that it replaces (LARRRI and JOLIT, 2008; Eijck, 2006; Marjolein and Romijn, 2010) and therefore biofuels are likely to result into adverse environmental impacts than gains.

Regarding the biofuels impacts in poverty reduction, some case studies conducted in Tanzania (for example Ringia and Massawe, 2010; PAC, 2009; Kashagili and Nzunda, 2010) have demonstrated that small-scale pro-poor biofuels projects that have been implemented in collaboration with the rural communities under smallholder outgrower schemes have significantly increased the rural incomes and therefore a substantial contribution to the national poverty reduction strategy. The positive outcomes (a few of them success stories) have positively influenced the public perceptions on biofuels.

The rest of the cultural factors influencing the biofuels innovations (e.g. MFPs supported by TaTEDO, sisal biogas and bioelectricity piloted by M/S Katani Ltd) have been explained in sections two and four above.

6. Synthesis

6.1 Public Perceptions Based on Questionnaires Results

Most of the stakeholders and the general public for that matter are unlikely to have enough patience to wait for the expected/promised benefits and outcomes of the biofuels initiatives unless specific policy, legal and institutional regulatory framework is in place to avert the expected adverse socioeconomic and environmental impacts.

The stakeholders have suggested fast-tracking of the ongoing biofuels development process, comprehensive landuse planning and mapping to safeguard the biodiversity conservation areas from land grabbing as well as strategic and investment plans to establish specific, measurable, achievable and realistic biofuels indicators and performance targets within a pre-determined timeframe. An effective monitoring framework should also be part of the strategic plan to ensure biofuels program management by results.

6.2 Analyzing Qualitative and Quantitative Data

Quantitative and qualitative data were collected through informal surveys conducted as part of this study, informal and formal surveys conducted by the consultants in previous related assignments as well as data collected and presented by other expert national and case studies (section 7).

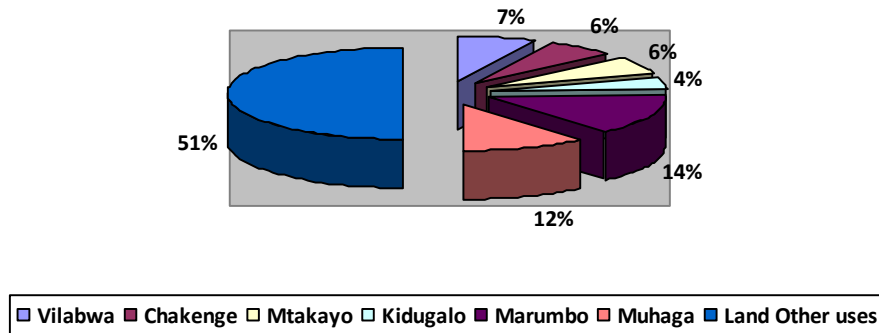
Biofuels Development Case Studies

The Bagamoyo and Kisarawe districts biofuels case study (Kashagili and Nzunda, 2010) supports the above public perceptions on biofuels particularly the marginalization and socioeconomic adverse impacts on the vulnerable rural communities in the study areas. The rural communities are extremely bitter about the non-transparent and inequitable land acquisition and compensation procedures (described as '**land grabbing**') as well as poor governance and lack of accountability by the local government regarding the interests and rights of the villagers. The villagers have lost access to livelihood resources including land, forests and water as a result of the biofuels investments; their income, food, health and energy security has been threatened. Women and children are the most affected. Incidences of social conflicts including divorces and loss of cultural norms and traditions have been reported. The study concludes that replacement of the natural miombo forests ecosystem and biodiversity with biofuels monoculture cropping system, intensive use of agro-chemicals and industrial emissions leads to serious adverse irreversible environmental impacts including loss of biodiversity, hydrological imbalance, soil erosion, and increase in the noxious gas (CFC, methane, carbon dioxide) and hence an increase in the climate change effects. The vulnerable rural communities livelihoods has been adversely affected and have been further marginalized.

Another case study evaluated the socioeconomic impacts of jatropha on the livelihood of smallholder farmers in Mpanda district (Kagiso, 2009). Similar to conclusions of the above case studies, the study concludes that at an average gross margin of TZS 820,100/ha it is only maize that is less profitable compared to jatropha-based cropping systems; all the rest of the crops including rice, sunflower and groundnuts are more profitable although it is less risky.

A case study of biofuels investments and implications of the land acquisition in Kisarawe and Bahi districts (habib-Mintz, 2010), the so called land grabbing has been verified. In the case of Kisarawe, some villages like many other villages that have fallen the victims of the biofuels land grabbing in the coastal miombo woodland areas have allocated close to half (49%) of their food/forest land to biofuels investors; area left for other land-use (food and cash crops, grazing, forests, wildlife, residential etc) is 16,988 ha or 51% of total land (Fig. 3). The majority of the villagers have complained that they no longer have enough arable land for food, cash and livestock production even for the current population which has adversely affected their livelihoods and income generation strategies, natural resource and biodiversity conservation as well as other socio- cultural aspects and hence their harsh perceptions on biofuels investments.

Figure 3: Biofuels Land Grabbing in Kisarawe District



Contrary to the gloomy biofuels perceptions described above, there are also a few cases of successful biofuels investments in Tanzania that have been analyzed and presented including the Tanzania Sisal Biogas and Mini-Grid Electricity Project (Katani Ltd Cleaner Integrated Utilization of Sisal Waste for Biogas, Mini-Grid Electricity and Biofertilizer” and Tanzania Palm Oil Biodiesel Project “Farming for Energy for Better Livelihoods in Southern Africa” (Practical Action Consulting, 2009).

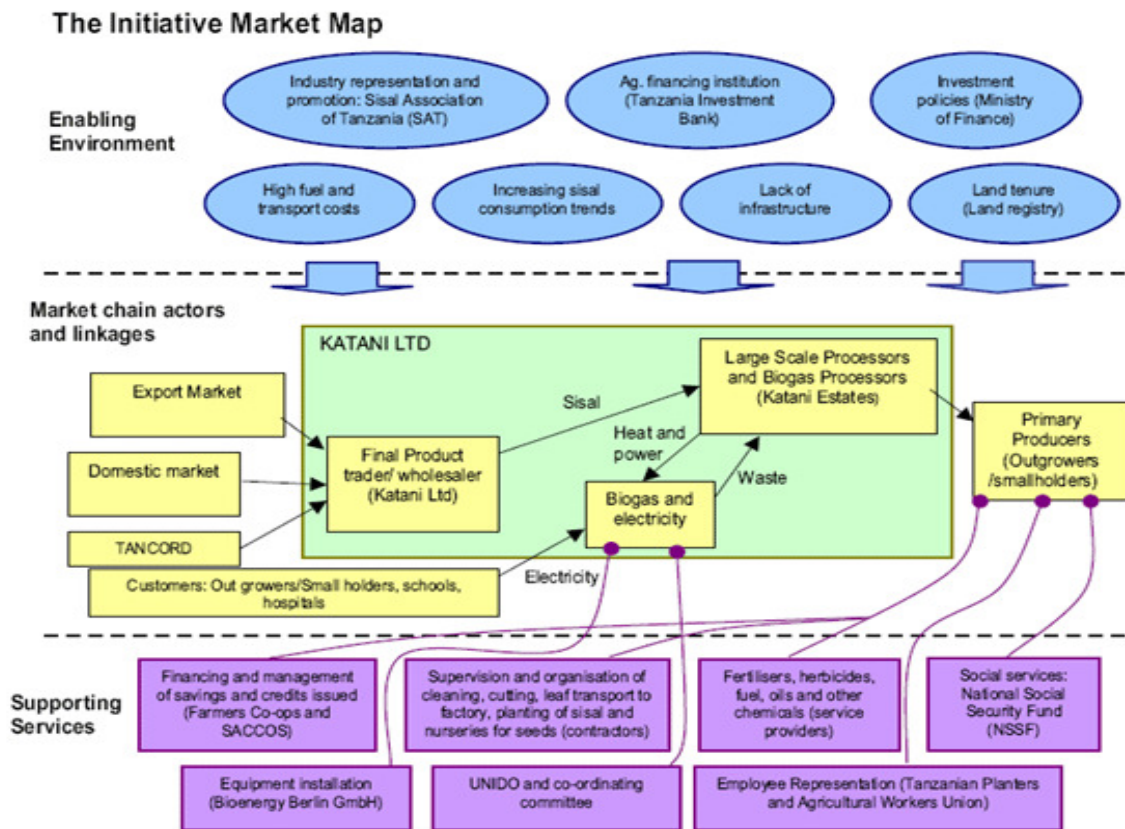


In the case of Katani Ltd¹¹, smallholder outgrower farmers produce sisal to complement the company plantation sisal production. According to the **Katani Outgrower Model** (Fig. 4), the smallholder farmers intercrop food crops with sisal (inter-row cultivation) hence producing food and fibre alongside. The company produces biogas from the sisal wastes which hitherto were an environmental hazard producing GHG into the atmosphere. Biogas is used for drying sisal yarn, cooking and heating at the factory and over 2,000 families in the neighbourhood. Up to 10 MW electricity is also generated from the biogas to provide power for running the machines at the factory and domestic use in the surrounding communities; excess electricity is sold to the national electricity company (TANESCO) to boost up the electricity national grid.

Some of the impacts of the project on the communities include over 80% increase in the number of children attending school and access to healthcare, increase in food crops yields from an average of 400 kg/ha to 1,200 kg/ha hence assured food security and income, improved health, ownership of assets such as bicycles, mobile phones, better clothing, nutrition and housing. Access to sustainable energy and electricity has also stimulated development of small-scale industries providing additional employment and income hence reducing the rural-to-urban migration. Reduction in GHG, use of biofertilizer and reduced dependence on woodfuels have contributed to soil conservation, reduced pressure on forests and hence mitigation of the climate change effects. The formation of the sisal farmers’ savings and credit cooperatives and other groups by the smallholders and outgrowers has increased social capital, hence social and economic empowerment which has also contributed to improvement in livelihoods of the communities.

¹¹ Katani Ltd is a private investment company in Tanzania producing sisal fibers, biogas, bio-fertilizer and mini-grid electricity using outgrower schemes; it falls under the CDM projects in Tanzania.

Fig. 4: The Katani Sisal Biogas and Mini-grid Electricity Outgrower Model Value Chain



Overall, the case study concludes that the sisal and biofuels scheme has maximized its potential to support rural communities' livelihoods. The Katani outgrower model has demonstrated great potential to produce large quantities of bioenergy in a socioeconomically and environmentally sustainable manner and has significantly contributed in the national poverty reduction strategies, which is a crucial success factor. Since the market demand for natural fibres including sisal is huge and growing, there also great potential for sustainable production of bioenergy using sisal wastes.

The innovative win-win bioenergy production model, the only one of its kind in the world is considered as the perfect bioenergy strategy which has the support of the government, donors, rural communities, MFIs, indeed all the value chain actors (Fig.2) are benefiting and are happy. In this case, the public perception on bioenergy is exceptionally supportive.

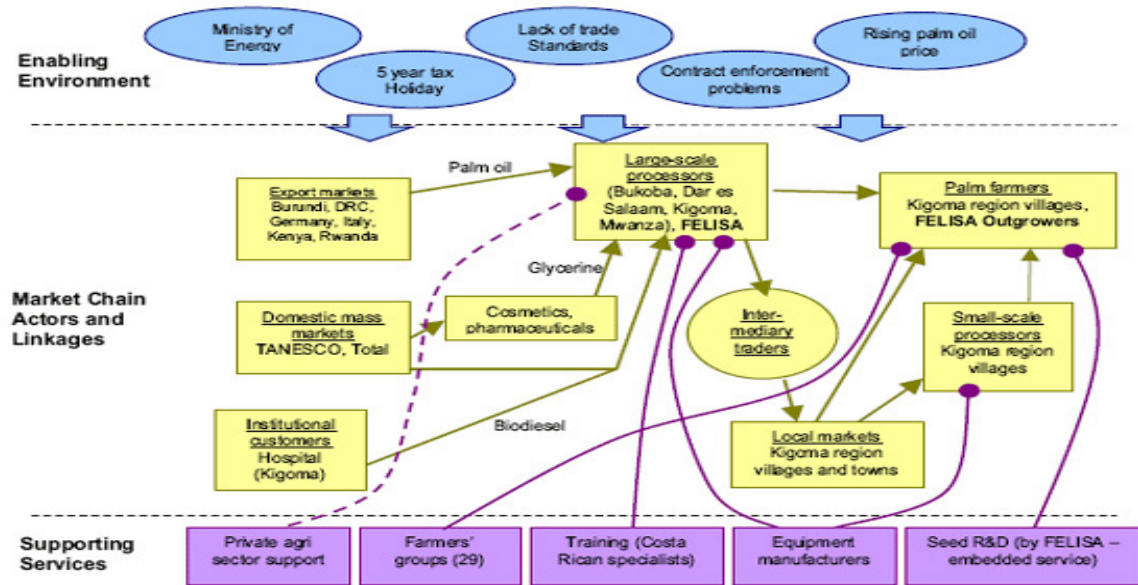


The **FELISA biodiesel production model** (Fig. 5) is very similar to the Katani Model. The company provides improved high yielding hybrid seedlings; extension, credit and other technical services to supports palm oil outgrowers produce more and better quality palm oil to complement the company's own palm oil and biodiesel production. The company main target for biodiesel is the domestic market (transport and mini-grid electricity generation) hence contribution to the national cleaner energy self-sufficiency. FELISA has also facilitated the outgrowers to form farmer groups (e.g. Wabango Palm Producers and 29 others) to facilitate delivery of extension and credit services. The outgrowers sell palm kernels and or crude oil to FELISA. Over 1,000 farmers have benefited in terms of employment and additional income.



Some of the impacts on the livelihoods include better palm oil production knowledge, access to energy (firewood and charcoal) from palm biomass has reduced pressure on forests, better prices for palm kernels and crude oil and hence income. Overall, the case study concludes that the palm oil has high production potential among the bioenergy crops, at up to 6,000 litres/ha/year. FELISA has opened up market for the outgrowers and expected to contribute to the national strategies for cleaner energy, mitigation of climate change and poverty reduction. Similar to the Katani model, having been influenced by the initial success of the investment approach, the stakeholders particularly the rural communities and the general public in the area are supportive of the investment and the biofuels initiatives in general.

Fig.5: FELISA Palm Oil Biodiesel Outgrower Production Model Value Chain



TaTEDO Improved Charcoal Oven

An assessment of the uptake and impacts of the improved modern biofuels technologies was undertaken last year in Tanzania by the consultants of this study (Ringia and Massawe, 2010). Over 50 women groups in more than 15 districts in Dar es salaam, Coast, Kilimanjaro, Arusha and Shinyanga and who have been facilitated by TaTEDO to access the improved sustainable biofuels modern services such as woodfuel ovens and stoves for baking and food vending enterprises; solar PVs and biogas plants for cooking,



lighting and , refrigeration and cooking; improved charcoal production kilns (Ringia and Massawe, 2010) strongly appreciate and support the biofuels initiatives because their incomes have increased more than tenfold, time for collecting water and firewood has been reduced by 60-70 percent from an average of 6 hours/day to less than 2 hours/day hence saving time for economic generation activities (Fig 6).



TaTEDO Improved IBEK Kiln

Despite their concerns on the land acquisition process, the local governments appreciate the initial impacts of the small-scale, affordable and appropriate biofuels technologies promoted by TaTEDO (and other partners with similar approach such as FELISA and Katani Ltd) particularly the improved woodfuel stoves and ovens, biogas, biofertilizers and charcoal production kilns which have significantly reduced household and institutional firewood and charcoal consumption, reduced pressure on the forests and therefore contribution to reduction in GHG emissions, reduction in climate change effects and health risks associated with the prolonged use of three-stone firewood stoves. TaTEDO has assessed the impact of the improved biofuels technologies particularly the improved woodfuels stoves and ovens on the

household indoor gases pollution (Table 1).

Table 1: Effects of Improved Woodfuels on Indoor Gas Pollution

BIOFUELS TECHNOLOGY	EXTENT OF REDUCTION IN INDOOR POLLUTION
Mud Household Firewood Stove (without chimney)	41%
Mud Firewood Stove (with chimney)	70%
Improved Household Charcoal Stove	66%

Source: Sawe et al (2005).

Apart from the above environmental impacts, the improved biofuels technologies have also contributed to income generation and poverty reduction through employment creation, energy cost-savings and support to direct income generation activities (Table 2). Such positive impacts have significantly influenced the public perceptions on biofuels particularly in the rural and peri-urban areas.

Table 2: Impacts of Biofuels Technologies on Rural Communities Energy Savings in Tanzania

DISTRICT	END-USER / LOCATION	AVERAGE REDUCTION IN FIREWOOD USE (%)	FIREWOOD COST SAVING (TZS/YEAR)
Morogoro	Lubungo Village	66	69,316
	Muhunga-Mkola Village	86	104,025
	Kifuru Village	71	130,305
	Ms Asia Makumu	80	228,125
	Mama Kulwa	43	82,125
	Mehayo Mentally Retarded	75	1,825,000

	Children Centre		
Muheza	Ms Mwanahamisi Maumba	80	109,500
Kisarawe	Kibasila Primary School	80	1,460,000
	FDC	50	750,000
	Hegongo Sec School	50	780,000
	Sir John Primary School	50	1,825,000
	Duga Elderly Care Center	56	766,500
	Household Average	71	120,566
	Institutions Average	52	1,234,417

Source: Impacts of Biofuels on Rural Livelihoods in Tanzania (Ringia and Massawe, 2010)

Except the media, the general public therefore perceives biofuels initiatives in Tanzania as a necessary strategy to reduce dependency on imported hydrocarbon-based fuels that is depleting the foreign exchange, energy insecurity and adverse impacts on the environment including climate change effects. The previous expert findings are similar to the findings of the current study. The local media possibly influenced by the foreign media perceives biofuels initiatives in Tanzania as undesirable due to uncertainties surrounding the expected and or 'promised' benefits, possible tarmois and social conflicts as a result of non-transparent land acquisition procedures and perceived adverse impacts of biofuels on the social, economic and environmental aspects that are likely to happen due to lack of specific policy, legal and institutional regulatory mechanisms.

6.3 Main Variables Influencing Public Perceptions on Biofuels

The public perception on biofuels in Tanzania is to a large extent influenced by the following variables:

- Type of biofuels production model, appropriate technology choice and the effects on the socioeconomic aspects (food, energy and income security) of the people particularly the vulnerable rural communities, the government and global development strategies and priorities.
- Success or failure of the current biofuels investments in relation to peoples' expectations.
- Procedures used for land acquisition and effects on the livelihoods of the rural communities, natural resources and conservation of biodiversity.
- The media
- External factors such as escalation of fuel prices and effects on inflation and cost of living; concerns for climate change effects on the livelihoods of people

6.4 Main Cultural Parameters Influencing Public Perceptions on Biofuels

The public perception on biofuels in Tanzania is to a large extent influenced by the following socio-cultural variables:

- Effects on the gender dimensions including the potential to provide sustainable and affordable energy for cooking, heating and lighting; effects on the time used by women and children for collecting firewood and water
- Effects on the cultural norms, beliefs and traditions such as social division of labour
- Effects on social ties and institutions such as marriage, religion, clans, and so forth

- such as marriage, religion, clans, and so forth
- Appropriate modern bioenergy technologies such as the improved woodfuels stoves and ovens and biogas have increased the cooking efficiency and improved the kitchen environment which has attracted men who are now willing to participate in cooking which was traditionally considered to be exclusively women's responsibility.

6.5 Conclusions and Recommendations

The approach and the bioenergy production model chosen by the investor/developer, success or failure, that is the actual benefits or adverse effects to the rest of the value chain actors greatly influence the public perception, acceptance and active participation. The outgrower production model involving the smallholder farmers have been most successful, sustainable and viable investments which are in harmony with the local communities and the rest of the actors in the value chain.

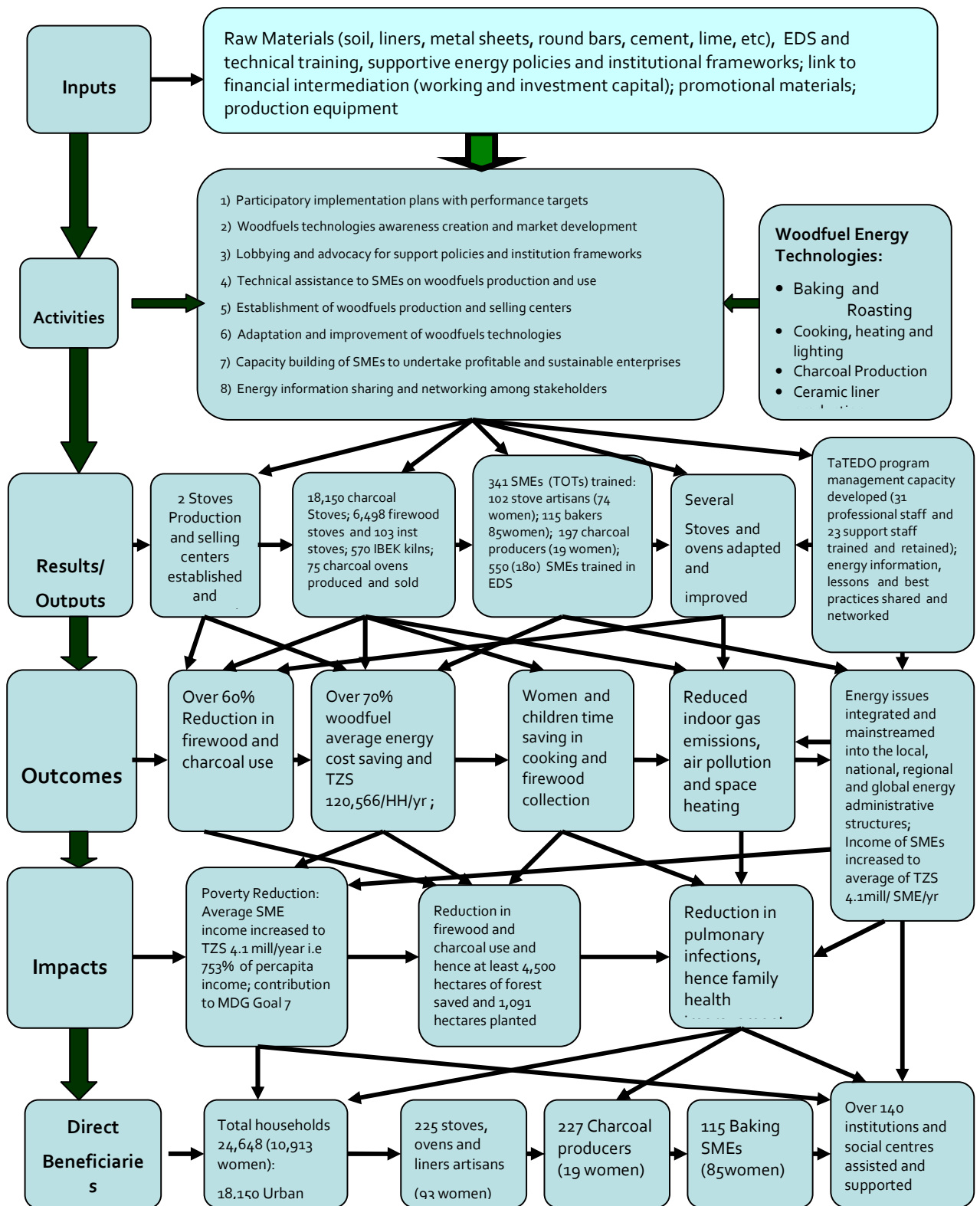
In contrast, the large-scale plantation models that bypass the smallholders and other value chain actors have not fared well, created hatred perception of the biofuels initiatives, ended up in conflicts with the local communities and therefore negatively perceived by the public because they have not considered the needs, livelihoods and expectations of the rest of the value chain actors particularly the rural communities, nature and environmental conservation groups as well as the government and donor development strategies and priorities.

Except the media, the rest of the stakeholders and the general public are basically not against biofuels initiatives in Tanzania. However, they have expressed very serious concerns about the manner by which the biofuels initiatives are being implemented with specific policy, legal and institutional regulatory framework. The procedures followed by most biofuels investment companies (all foreign) which in some areas such as Rufiji, Bagamoyo, Kisarawe and Kilwa districts have displaced rural communities adversely affecting their livelihoods and causing political, social and cultural conflicts have been sharply criticized.

Categorically, the stakeholders are against the large-scale export-focused biofuel plantation model because it is likely to further marginalize the rural poor, will not contribute to the national, regional and global strategies for poverty reduction and mitigation of the climate change effects. Instead, the stakeholders support small-scale pro-poor biofuels investments with fossil fuel import-substitution, national energy self-sufficiency particularly focusing the rural areas to generate additional income, create employment and provide sustainable source of clean energy hence contribution to poverty reduction and environmental conservation.

The proposed investments should also promote public and private partnership and local investors should actively participate as equal partners in ownership. Examples of such production models include smallholder outgrower schemes, contract farming and nuclear plantation (as buyer and processor) outsourcing feedstock from satellite smallholder block farms or cooperatives. The models have been successfully practiced by TaTEDO, Katani Ltd, FELISA and Diligent Energy Systems (Appendix 2).

**Fig 6: TATEDO RENEWABLE BIOENERGY PROGRAM
INTEVENTION LOGIC**



Specific recommendations are the following:

13. Fast-tracking of the ongoing multi-stakeholder biofuels policy development process, comprehensive baseline and technical studies (appropriate production systems and value chains), agro-ecological zoning and biodiversity sensitivity mapping processes. It may be prudent for the government to suspend the approval of biofuels investments and land allocation until the processes are completed to minimize further conflicts.
14. Land acquisition for biofuels should be more transparent and need to be coordinated more effectively at the national level. The proposed 'national land bank' database development should be supported and to be functional as soon as possible to facilitate smooth land acquisition and allocation for sustainable development. Necessary amendments should be done on the existing land laws to safeguard the interests of the parties including the rural communities. Particularly, the transfer of village land ownership rights to general land is sensitive and delicate, should be done more carefully and diligently. Alternative land holding structure such as 'village land trusts' and equity-based joint ventures should be investigated.
15. Government and donors should increase investments in biofuels and food crops R and D activities to increase productivity per unit area (intensification) and hence optimal use of the available land to produce adequate food and biofuels feedstocks cost-effectively and sustainably. Priority and the rule of thumb should be 'household and national food self-sufficiency first'.
16. The key objectives of the national biofuels program should be national energy self-sufficiency (import substitution) and contribution to poverty reduction and mitigation of the climate change effects.
17. Stakeholder consultations should be facilitated to develop appropriate biofuels production models that will ensure win-win arrangements and sustainable development. Indigenous companies, farmer associations/cooperatives and outgrower schemes should be encouraged and supported to engage in biofuels joint venture projects, with a possibility of using their land as equity share capital. Appropriate financing mechanisms should also be promoted.
18. Intensive training and awareness creation involving all the stakeholders including media and the rural communities on the advantages, disadvantages and other implications of the biofuels program.
19. Public and private partnership should be promoted to ensure adequate biofuels production infrastructure.
20. Socio-cultural, economic and resource diversity characteristic of the rural areas should be taken into account when designing biofuels initiatives.
21. Stakeholders' active participation and win-win joint ventures in biofuels investments are necessary to minimize conflicts, ensure wider impacts and sustainability. Government support, incentives, awareness creation and promotion are pre-requisite for increasing stakeholder participation. Media is an important stakeholder for that matter.
22. Adequate capacity, institutional support and resource allocation at the local level is essential for successful and sustainable biofuels initiatives.
23. Multi-sector cooperation is necessary for planning, implementing and coordinating the biofuels initiatives.
24. Biofuels technology transfer and from the successful developing countries such as Brazil should be emphasized to speed up the biofuels development process.

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APPENDICES

Appendix 1: List of Interviewed Stakeholders and Criteria for Selection

	Name of Expert	Institution	Roles and Functions	Other Criteria
1	Estomih N. Sawe	TaTEDO	Executive Director	Pioneer and authority in biofuels in Tanzania, SADC and global; based in Dar
2	Leonard Pesambili	TaTEDO	Head of biofuels department	Long experience and knowledgeable, middle age, based in Dar
3	Mrs Gissela Ngoo	TaTEDO	Biogas Department	Knowledge and long experience in biofuels gender issues; based in Dar
4	Jensen Shuma	TaTEDO	Coordinating the Bio-Pact study;	knowledge and experience in IT and biofuels; based in Dar
5	Paul Kihwele	Ministry of Energy and Minerals	Principal Energy Officer	Over 50 years; senior energy policy adviser/policy maker; based in Dar
6	Victor Stephen Labaa	Ministry of Energy	Renewable Energy Engineer	Coordinating a biofuels project; knowledge of biofuels policy issues; in 40's; based in Dar
7	Salvatory Mushi	Tanzania Commission for Science and Tech (COSTECH)	Senior Research Officer/Bioenergy Analyst	Biofuels research and development; testing and dissemination of biofuels technologies; biofuels policy adviser; long experience; in his 50's; based in Dar
8	Bakari Omari	National Environmental Management Council (NEMC)	Engineer; Biofuels Technologies Commercialization and Marketing	Biofuels research and development; testing and dissemination of biofuels technologies; biofuels policy adviser; long experience; in his 40's; based in Dar
9	James Ngeleja	National Environmental Management Council (NEMC)	Principal Environment Officer; verification and certification of biofuels projects EIA	In his 60's; long experience in biofuels EIA; Bioenergy Engineer; environmental policy and legal issues
10	Dr Oscar Kibazohi	University of Dar es Salaam	Industrial biotechnology, biofuels and environmental management research	Knowledge in biofuels processing and blending; experiment in recycling of vegetable oils as source of biodiesel; participated in the FAO Bioenergy and Food Security Study in Tanzania
11	Eng. Bengiel Msofe	Rural Energy Agency (REA)	Director of Technical Services	Knowledge and experience in bioenergy /biofuels programs in the rural areas; policy issues; technical aspects of biofuels; rural energy technical and business support services
12	Eng. Godwin Samwel	Energy and Water Utilities Regulatory Authority (EWURA)	Commercial Manager Petroleum	Biofuels policy advisory services; blending of biofuels with fossils fuels; middle age; based in Dar es Salaam; experience and knowledge in biofuels standards and regulatory framework

	Name of Expert	Institution	Roles and Functions	Other Criteria
13	Maynard Lugenja	Centre for Energy, Environment, Science and Technology (CEEST)	Executive Director; biofuels/environment research and development	Knowledge in the national policies and strategies for combating climate change; policy advice; NGO perspectives
14	Cuthbert Tomitho	Land Rights Research	Program Officer Land and civil rights advocacy; legal support	Knowledge of village land laws; biofuels-related land conflicts; legal support to community land conflicts in Kilwa, Rufiji, Bagamoyo etc; biofuels awareness creation
15	Emmanuel Massawe	Lawyers Environmental Action Team (LEAT)	Environmental/bioenergy legal adviser/Activist; Attorney	Young (30's); environmental impacts of biofuels and legal implications; experience in biofuels land and environmental impacts/conflicts
16	Charles Meshack	Tanzania Forest Conservation Group (TFCG)	Executive Director	Biofuels and effects on forest conservation;
17	Modest Nyimbile	Muheza District Forest Officers	Conservation of natural forest resources; coordination of TaTEDO projects in Tanga region	TaTEDO Projects Coordinator in Tanga region; long experience in biofuels project implementation, technology dissemination and transfer
18	John Kabamba	Muheza District Natural Resources Officer	Natural resources management; forest conservation; renewable energy /biofuels promotion	Local government policy advisor; support to TaTEDO biofuels projects in Muheza district
19	Peter Sumbi	World Wildlife Fund (WWF)	Forest Program Officer	Biofuels stakeholders policy coordination; conservation of biodiversity (flora and fauna); advocacy and lobbying
20	John Salehe	WWF Eastern and Southern Africa Regional Program Office	East and Southern Africa Regional Forest Advisor	Biofuels program policy coordination; based in Nairobi (coincidentally visiting WWF Tanzania Office)
21	Isaac Malugu	WWF Representative Kilwa District	Conservation of biodiversity/wild life	Impacts of biofuels investments on the Kilwa district local communities livelihoods; based in Kilwa
22	Richard Komba	WWF Representative Rufiji District	Conservation of biodiversity/wild life	Impacts of biofuels investments on the Rufiji district local communities livelihoods; based in Rufiji district
23	Charles Sangwene	Tanzania Petroleum Development Corporation (TPDC)	Senior Research Officer	Technical aspects of biofuels blending with bioethanol/biodiesel pilot projects in Tanzania;
24	Leo Lyayuka	Tanzania Petroleum Development Corporation (TPDC)	Principal Marketing Officer	Business/commercial aspects of biofuels blending with bioethanol/biodiesel pilot projects in Tanzania;
25	Kabenga Kaisi	Tanzania Investment Centre	Biofuels Investment promotion Advisor	Biofuels investment projects business support; socio-economic impacts of biofuels investment projects; age in 30's

	Name of Expert	Institution	Roles and Functions	Other Criteria
26	Geoffrey Kirenga	Ministry of Agric and Food Security	Director Crop Development	Biofuels program development, R and D aspects; policy advisory services; national perspectives; participated in FAO Bioenergy and Food Security Study in Tanzania
27	Ester Mfugale (Mrs)	Ministry of Agriculture/MEM	Coordinator of Biofuels Program	Biofuels Program Development Coordination, national perspectives; participated in FAO Bioenergy and Food Security Study in Tanzania
28	Ms Ellasy Mujillah	Ministry of Natural Resources and Tourism	Principal Forest Officer	
29	Francis Nkuba	Katani Sisal Waste Biogas and Bioelectricity Project	Project Manager	Over 10 years experience in biogas and bioelectricity generation
30	Edward Qorro	The Citizen Newspaper	Editor	Interest in Biofuels news and issues
31	Swedi B	New Habari Corporation	Editor	Interest in Biofuels news and issues
32	Shermax Ngehemera	New Habari Corporation	Chief Editor	Interest in Biofuels news and issues
33	Hawa	The Guardian	Librarian	Interest in Biofuels news and issues
34	Mwanahamisi	ITV and Radio One	Receptionist	Interest in Biofuels news and issues
35	Ali Mshamu	Daily News	Librarian	Interest in Biofuels news and issues

Appendix 2: Tanzania Biofuels Stakeholder Mapping¹²

Biofuels/Bioenergy Stakeholder Group	Resources; Mandate, Roles and Functions in Biofuels Development	Strength, Weaknesses, Opportunities and Threats/ challenges (SWOT Analysis) in Biofuels Development	Biofuels/Bioenergy Interests/Needs/Expectations	Biofuels Development Perspectives/ Perceptions
<p>Tanzania Government: Ministry of Energy and Minerals (MEM); VPO/Environment; Ministry of Agric and Food Security (MAFS); Ministry of Finance; National Biofuels Technical Advisory Group (NBTAG) and National Biofuels Task Force (NBTF)</p>	<ul style="list-style-type: none"> ⇒ Biofuels policy, legal and institutional regulatory framework ⇒ Biofuels policy, legal and institutional regulatory framework ⇒ Biofuels production, processing, distribution and marketing infrastructure ⇒ Resource mobilization ⇒ Investment incentive schemes 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Establishment of National Biofuels Task Force ⇒ “Strengthening Policy, Legal, Regulatory and Institutional Framework for Sustainable Biofuels Industry Development” (2010-2012). ⇒ Establishment of National Biofuels Technical Advisory Group (NBTAG) ⇒ National Biofuel Sustainable Development Guidelines (November 2010); ⇒ MEM 5-Year Strategic Plan (2003/04 – 2008/09) with emphasis on sustainable renewable modern energy development including biofuels. ⇒ SIDA/NORAD support to the ongoing biofuels policy development process ⇒ Availability of ample land away from nature reserves (55 mill ha? Only 6% under cultivation) <p><u>Challenges/Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Increasing demand for biofuels leading to competition of biofuels feedstock production with food production on resource use threatening food security ⇒ Increase in demand for and price of bioethanol triggering possible diversion of food crops (e.g sugarcane) to bioethanol and possible scarcity and escalating prices of the food commodities ⇒ Weak monitoring of EIA and legal guidelines compliance and possible social conflicts and adverse environmental degradation 	<ul style="list-style-type: none"> ⇒ Availability of affordable and sustainable biofuels technologies contributing to fossil fuels import substitution; ⇒ Alternative source of energy for transport and power generation to ensure energy self-sufficiency and compliance to Kyoto and other national and international environmental conservation strategies ⇒ Reduction in oil imports that consume over 25% of foreign exchange leading to trade imbalance through various strategies including exploration of local sources of oil, blending imported fossil fuels with locally grown biofuels etc ⇒ Rural electrification to promote agro-industrialization ⇒ Rural energy and electrification for lighting, cooking, preservation of vaccines etc and therefore reduce dependence on woodfuels (90% energy source) and therefore reduce rate of deforestation (90,000 ha/year), mitigation of climate change and global warming effects (compliance to UNFCC, UNCTAD Biofuels Initiative, Kyoto Protocols) ⇒ Nationwide awareness creation on biofuels development opportunities, weaknesses, risks/threats and challenges to 	<ul style="list-style-type: none"> ⇒ National food self-sufficiency should be the national development priority. Optimal resource allocation to ensure adequate food production and then biofuels ⇒ Supported with sound policies, legal and regulatory institutional frameworks, biofuels can contribute to creation of rural employment, income generation and therefore poverty reduction; improved rural livelihoods (health, education, food and energy security, entertainment/ socialization) and hence reduction in rura-to-urban migration. ⇒ Supported by adequate technical, business and financial services, biofuels investments can be profitable comparable to any other investments. ⇒ Access to sustainable and affordable biofuels and other modern energy services especially by the rural communities has significantly improved the livelihoods particularly that of women and children, reduced environmental degradation and increased energy security .

¹² Stakeholders meetings and interviews held in Dar es Salaam May 19-June 1, 2011

Biofuels/Bioenergy Stakeholder Group	Resources; Mandate, Roles and Functions in Biofuels Development	Strength, Weaknesses, Opportunities and Threats/ challenges (SWOT Analysis) in Biofuels Development	Biofuels/Bioenergy Interests/Needs/Expectations	Biofuels Development Perspectives/ Perceptions
		<ul style="list-style-type: none"> ⇒ High inflation and depreciation of shilling, escalating oil prices and hence low viability of biofuels investments ⇒ Biofuels industry dominated by foreign investment companies threatening sustainability and or national interests ⇒ Weak /fragmented biofuels institutional and legal framework and guidelines; ⇒ Land acquisition by investors is not transparent, coherent and consistent with existing land laws (Land Act of 2005; Village Land Act of 1999) ⇒ Tanzania has complex and highly bio-diverse ecology to protect, yet biofuel investment projects (with potential adverse environmental and social impacts) screening criteria does not emphasize environmental and social impact assessment (ESIA) 	<ul style="list-style-type: none"> ⇒ increase participation, acceptance and popular support ⇒ Establishment of agro-ecological zones as basis for allocation of land for biofuels to minimize resource competition with food and other cash crops ⇒ Strengthening multi-sectoral monitoring mechanisms to ensure compliance to the existing legal and policy frameworks under ongoing special project (2010-2012) supported by NORAD and SIDA. ⇒ Ministry in the process of conducting a comprehensive environment and socioeconomic impact assessment of biofuels industry in Tanzania ⇒ The government (under VPO and NEMC) has reiterated the importance of EIA as a key criteria for approval of biofuels investment projects. At the project level, the responsibility for conducting EIA lies with the investor. ⇒ Developed economies (USA, EU) and UN organizations support for for developing countries appropriate technology transfer, biofuels trading incentives (removal of tariffs and subsidies in Europe) to increase competitiveness. 	<ul style="list-style-type: none"> ⇒ Although there are internal driving forces (such as the need for energy self-sufficiency, oil import substitution, implementation of Kyoto Protocol etc), the national biofuels initiatives are to a large extent externally driven and motivated. ⇒ Biofuels is a global initiative being part of UNFCCC mitigation for climate change and global warming phenomena and the ensuing Kyoto Protocol, Tanzania has no choice other than to be an active partner. ⇒ Investors not abiding to biofuel development guidelines including use of pro-poor production models and land acquisition procedures, hence likely to lead to unsustainable development and undesirable social-economic conflicts ⇒ Low public awareness and participation in biofuels development at all levels ⇒ Biofuels development resources (land, water for irrigation, labour, forest) inadvertently perceived to be idle, cheap ⇒ Unwillingness of biofuel investors to invest in infrastructure development; ambition to maximize productivity and

Biofuels/Bioenergy Stakeholder Group	Resources; Mandate, Roles and Functions in Biofuels Development	Strength, Weaknesses, Opportunities and Threats/ challenges (SWOT Analysis) in Biofuels Development	Biofuels/Bioenergy Interests/Needs/Expectations	Biofuels Development Perspectives/ Perceptions
<p>TaTEDO¹³ and Associated institutions (TREP, AREED/ FRED,EASE, SEECO, SEDC)</p>	<p><u>Resources:</u></p> <ul style="list-style-type: none"> ⇒ Experienced modern energy professional staff (engineers, renewable energy experts, environmental experts, business development experts etc) ⇒ Modern energy piloting projects and prototypes that have been tested, ready for scaling up ⇒ Modern energy library and reference documentation <p><u>Mandate and Functions:</u></p> <ul style="list-style-type: none"> ⇒ TaTEDO's mission strategy and core business is "Advancing popular access to sustainable modern energy technologies in marginalized communities in Tanzania through technology adaptations, community mobilization, capacity building and advocacy for 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Qualified, experienced and motivated multi and interdisciplinary team of professionals and practitioners in modern bioenergy services; ⇒ Successful modern energy technology prototypes including efficient woodfuel cook stoves and ovens, improved charcoal production kilns (IBEK), retort kiln (from agric byproducts/residues) multi-functional platforms (MFPs), solar PV systems, solar phone multi-chargers, wind technologies (wind turbines), micro-hydro technologies, biogas plants, biodiesel reactor for processing biodiesel, solar crop driers and multi-purpose tree production techniques; ⇒ The pilot projects have demonstrated significant technical and financial viability and contribution to poverty reduction through savings on energy expenditures, additional income generation through 	<ul style="list-style-type: none"> ⇒ TaTEDO's expectation is to enhance and promote pro-poor smallscale production and processing of feedstocks as alternative source of renewable modern energy services and rural electrification ⇒ TaTEDO becoming a national and regional world class modern renewable energy center of excellence; adequate human, physical and financial resources to successfully implement its mission strategy by supporting community-based, entrepreneurial and integrated initiatives which aim at reducing poverty, reversing climate change effects and contributing to achievement of the MDGs. ⇒ In collaboration with other partners, facilitating establishment of supportive institutional framework, policies and strategies promoting 	<ul style="list-style-type: none"> ⇒ returns in the short-term ⇒ Farmers have not readily accepted jatropha as a source of feedstock for biofuels due to lack of alternative use (in case of market failure; recalling similar incidence involving production of multi-purpose Moringa tree which was strongly promoted by the government but later the market collapsed ⇒ Largescale monoculture production of biofuel crops by multi-national companies and investors often do not promote participation of smallholder producers and are likely to cause adverse social, economic and environmental adverse effects ⇒ Although there are internal driving forces (such as the need for energy self-sufficiency, oil import substitution, implementation of Kyoto Protocol etc), the national biofuels initiatives are to a large extent externally driven and motivated. ⇒ Supported by sound policies and regulatory institutional frameworks, biofuels can contribute to creation of rural employment, income generation and therefore poverty reduction; improved rural livelihoods (health, education, food and energy

¹³ Formerly known as Tanzania Traditional Energy Development Organization

Biofuels/Bioenergy Stakeholder Group	Resources; Mandate, Roles and Functions in Biofuels Development	Strength, Weaknesses, Opportunities and Threats/ challenges (SWOT Analysis) in Biofuels Development	Biofuels/Bioenergy Interests/Needs/Expectations	Biofuels Development Perspectives/ Perceptions
	<p>increased access to sustainable energy services, poverty reduction, environmental conservation and self reliance”</p> <p>⇒ Core responsibility is implementation of the renewable modern energy program strategy,</p> <p>⇒ Specific roles and functions include</p> <p>a) awareness creation and demonstration of modern energy technologies</p> <p>b) capacity building for disseminating sustainable modern energy technologies c) community mobilization to increase participation</p> <p>d) modern enterprise and business development</p> <p>e) renewable bioenergy research and development</p> <p>f) modern energy-related consultancy services</p> <p>g) modern energy information management</p> <p>h) modern bioenergy networking and partnership development</p> <p>i) modern bioenergy services monitoring and evaluation</p> <p>j) business support services and financing.</p>	<p>production and employment creation;</p> <p>⇒ Over 110 households and businesses connected to electricity, over 5,000 villagers are accessing electricity for charging, grain milling and grain dehusking, oilseed pressing;</p> <p>⇒ Strong modern bioenergy networking and partnerships (local, national, regional and international public, private, CBOs, NGOs);</p> <p>⇒ Expensive yet adulterated/ low quality of the fossil fuels hence triggering demand for alternative modern biofuels;</p> <p>⇒ Establishment of rural institutional frameworks for accelerating biofuels-based rural electrification such as Tanzania Solar Energy Association (TASEA), Village Electrification Cooperatives (VECs); formation of private rural energy companies for example Umeme Jua, Zara Solar Company, Battery and Solar Power Centre; SACCOS financing schemes such as Magadini Village and District Sustainable Energy Development Clusters (DISEDcs)</p> <p><u>Weaknesses/Threats:</u></p> <p>⇒ Lack of sound policy, guidelines and institutional frameworks for biofuels and/ or lack of institutionalized monitoring mechanisms</p> <p>⇒ Non-profit NGO status that hindered investment in profitable enterprises and hence sustainability; inadequate office space limiting expansion of activities;</p> <p>⇒ Depreciation of the local currency affecting the profitability of the bioenergy investments;</p>	<p>profitable and sustainable biofuels technologies and services;</p> <p>⇒ Scaling up and dissemination of pilot projects including MFPs/SVOs, improved woodfuels stoves and ovens and IBEK kilns in other villages in Tanzania.</p> <p>⇒ Empowering farmers to take a leading role in biofuels development through extension services, training and facilitation for access to affordable inputs to increase food and biofuels crop production;</p> <p>⇒ The ministry is planning to host a stakeholder workshop to collect views to finalize the ongoing biofuels policy development process but also to clarify procedures and rights for land acquisition and ownership by prospective biofuels investors.</p> <p>⇒ Ministry and stakeholders to establish biofuels quality certification criteria and standards in accordance to USA and EU guidelines and market requirements</p>	<p>security, entertainment/ socialization) and hence reduction in rural-to-urban migration.</p> <p>⇒ Supported by adequate technical, business and financial services, biofuels investments can be profitable comparable to any other investments.</p> <p>⇒ As users of improved biofuels technologies and services, women entrepreneurs (bakers, food vendors, biofuels producers etc) have and stand to benefit more compared to their men counterparts.</p> <p>⇒ Potential users of improved biofuels/bioenergy technologies and services particularly in the rural areas are not aware of the availability and benefits—hence more efforts needed in promotion, awareness creation, marketing and distribution of the successful and tested biofuel technologies and services on the shelves.</p> <p>⇒ Participatory biofuels development approach is necessary to create and facilitate dynamic, sound and flexible partnership between stakeholders (TaTEDO, policy makers at central, district and village governments, SMEs, CBOs, advocacy CSOs, producer groups and users)</p> <p>⇒ There is no perceived competition between feedstock biofuels production and food production except where large companies and</p>

Biofuels/Bioenergy Stakeholder Group	Resources; Mandate, Roles and Functions in Biofuels Development	Strength, Weaknesses, Opportunities and Threats/ challenges (SWOT Analysis) in Biofuels Development	Biofuels/Bioenergy Interests/Needs/Expectations	Biofuels Development Perspectives/ Perceptions
		<ul style="list-style-type: none"> ⇒ Tanzania is a huge country with under-developed infrastructure which is a challenge for TaTEDO to ensure adequate access to modern energy services in the rural areas; ⇒ Slow adoption of improved modern energy technologies; ⇒ National biofuels guidelines promoting largescale feedstock production for export rather than promoting smallscale feedstock production for smallscale production of biodiesel contributing to import substitution and energy self-sufficiency and generation of rural electricity; 		<ul style="list-style-type: none"> taking up large mechanized plantations for biofuels at the expense of food production e.g. Kisarawe, Rufiji, Kilwa, Bagamoyo etc ⇒ Large companies taking best arable land hence competition with food production contrary to guidelines ⇒ Low compensation for land taken from villagers for biofuels investors hence the feeling that they have been cheated ⇒ Inadequacy of land laws in safeguarding interests of villagers ⇒ National biofuels policy development taking too long considering the high speed of biofuels investments ⇒ Smallholder farmers are rational beings and experience has shown that their production systems and investment plans very well integrates household income, energy and food requirements regardless of external factors; including mitigation measures for external shocks such as droughts, floods, pests and diseases.
Commission for Science and Technology (COSTECH)	<ul style="list-style-type: none"> ⇒ Research, development and testing of technology prototypes ⇒ Dissemination of successful technologies e.g. improved woodfuels stoves and ovens in collaboration with TaTEDO ⇒ Technical advisory services to the government, investors, producers, processors (Biofuels R and D Committee) 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Ditto (as TaTEDO above) ⇒ Extensive network of R and D institutions in Tanzania, regionally and internationally. ⇒ -- <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Lack of sound policy, guidelines and 	<ul style="list-style-type: none"> ⇒ COSTECH's expectation is to enhance and promote pro-poor smallscale production and processing of feedstocks as alternative source of renewable modern energy services and rural electrification ⇒ In collaboration with other partners (TaTEDO, MEM etc), facilitating establishment of supportive institutional 	<ul style="list-style-type: none"> ⇒ Largescale monoculture production of biofuel crops by multi-national companies and investors often do not promote participation of smallholder producers and are likely to cause adverse social, economic and environmental adverse effects ⇒ Supported with sound policies and regulatory

Biofuels/Bioenergy Stakeholder Group	Resources; Mandate, Roles and Functions in Biofuels Development	Strength, Weaknesses, Opportunities and Threats/ challenges (SWOT Analysis) in Biofuels Development	Biofuels/Bioenergy Interests/Needs/Expectations	Biofuels Development Perspectives/ Perceptions
	<p>⇒ In collaboration with Ministry of Agriculture, monitoring safety (e.g. phytosanitary, germplasm/GMO) of biofuels technology transfer and use</p>	<p>institutional frameworks for biofuels and/ or lack of institutionalized monitoring mechanisms</p> <p>⇒ Lack of public awareness of biofuels program and hence low/weak participation, engagement and Lack of social accountability</p> <p>⇒ Lack of transparency in the land acquisition for biofuels leading to social conflicts</p> <p>⇒ Potential threat of competition for resources (land, labor, water, reserved land for forests/parks) between food crops and fuel crops production</p> <p>⇒ Dominance of foreign companies in the biofuels investment project threatening sustainability and achievement of national/global development strategies including poverty reduction.</p>	<p>framework, policies and strategies promoting profitable and sustainable biofuels technologies and services;</p> <p>⇒ Scaling up and dissemination of pilot projects including MFPPs/SVOs, improved woodfuels stoves and ovens and IBEK kilns in other villages in Tanzania.</p> <p>⇒ Empowering farmers to take a leading role in biofuels development through extension services, training and facilitation for access to affordable and appropriate technologies such as inputs to increase food and biofuels crop production;</p> <p>⇒ COSTECH actively participating in ongoing stakeholders dialogue in collaboration with MEM the concerned ministries (MEM, MAFS, VPO/Environment) to finalize the ongoing biofuels policy development process</p> <p>⇒ In collaboration with stakeholders, contribute to the process to establish biofuels quality certification criteria and standards in accordance to USA and EU guidelines and market requirements</p>	<p>institutional frameworks, biofuels can contribute to creation of rural employment, income generation and therefore poverty reduction.</p> <p>⇒ Supported by adequate technical, business and financial services, biofuels investments can be profitable comparable to any other investments.</p> <p>⇒ Potential users of improved biofuels/bioenergy technologies and services particularly in the rural areas are not aware of the availability and benefits— hence more efforts needed in promotion, awareness creation, marketing and distribution of the successful and tested biofuel technologies and services on the shelves.</p> <p>⇒ There is potential competition between feedstock biofuels production and food production especially the existing trend of large companies taking up large farms for biofuels at the expense of food production without following the right procedures</p> <p>⇒ Low compensation for land taken from villagers for biofuels investors</p> <p>⇒ Inadequacy of land laws in safeguarding interests of villagers</p> <p>⇒ National biofuels policy development taking too long considering the high speed of biofuels investments</p> <p>⇒ Blending of fossil fuels and</p>
Petroleum Oil Trading	⇒ Importation and distribution	⇒ Several companies operating in a	⇒ Regulated, competitive and	

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and Marketing Companies (Shell BP, GAPCO, ENGEN, Petro-Oil, etc)	⇒ of petroleum products ⇒ Distribution of blended fuels (gasoline and diesel)	⇒ competitive market ⇒ Efficient fuel distribution networks ⇒ Weak fuel quality and price regulatory mechanisms leading to incidences of poor quality fuel products and unregulated price variations	⇒ profitable oil business ⇒ Oil business in compliance with environmental conservation (e.g Shell BP's motto)	⇒ locally produced biofuels has great potential for enhancing national energy self-sufficiency and foreign exchange saving through import substitution
Tanzania Petroleum Development Corporation (TPDC)	⇒ Research and development of the petroleum sector including energy exploration to ensure national energy diversity, self-sufficiency and sustainable availability ⇒ Energy ventures environmental compliance ⇒	<u>Strengths/Opportunities:</u> ⇒ Adequate national capacity and infrastructure for undertaking fuel blending experiments (already 36 gasoline engines modified and using blended bioethanol in a pilot project). More engines being modified in collaboration with Prokon Ltd and TANESCO. In another ongoing project. ⇒ Successful fossil fuel/biofuel blending technologies(in neighboring Malawi as well as Brazil, Mexico) that can be transferred and adapted to the Tanzanian situation cost-effectively. ⇒ Tanzania (TPDC) collaboration with Brazil (Petrobras) in an ongoing pilot project for fossil fuel/biofuel blending; blending up to 10% successful and complying with Tanzania Bureau of Standards (TBS) quality criteria using existing engines. ⇒ Potential for blending of fossil fuels with locally produced biofuels to enhance national energy security, self-sufficiency and foreign exchange saving ⇒ Efficient (fossil) fuel distribution and marketing infrastructure and institutional framework ⇒ Currently, efficient energy business mechanism to ensure high quality,	⇒ Reliable and technically proven biofuels technologies (agro-ecological zones and landuse plans) and investment information available as a matter of urgency ⇒ Appropriate biofuels policy, legal and regulatory institutional framework process fast-tracked ⇒ Government to establish clean bioenergy investment incentives to motivate and increase the pace of investments ⇒ Developed economies (USA, EU) and UN organizations support for developing countries appropriate technology transfer, biofuels trading incentives (removal of tariffs and subsidies in Europe) to increase competitiveness ⇒ Tanzania reaching blending of fossil fuels with biofuels up to 20% including the necessary heavy oil and gasoline engines modifications in 10 years period ⇒ Government, donors and private sector providing adequate incentives to enable effective engagement by	⇒ Supported by adequate technical studies, legal and institutional regulatory frameworks, biofuels has great potential to reduce oil imports, forex savings and improvement in balance of trade and enhancement in national energy diversity and security, ⇒ Negative perceptions on biofuels particularly impacts on food security by the media (especially the local media) is lack of awareness and influence by foreign media but also scepticism due to lack of necessary policy and regulatory legal frameworks ⇒ The government to ensure biofuels production and processing is done locally to contribute to employment creation and national energy security multiplier effects ⇒ Low engagement by the public (especially smallholder farmers and feedstock producers) due to lack of awareness and knowledge on biofuels issues ⇒

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		<p>price and environmental compliance and sustainability</p> <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Un-regulated biofuels investments dominated by foreign companies threatening sustainability ⇒ Lack of comprehensive technical and economic studies on biofuels leading to low performance, possible adverse social and environmental impacts and hence unsustainable investments 	<p>stakeholders (especially local companies and R and D institutions) in a sustainable biofuels investment program</p> <ul style="list-style-type: none"> ⇒ Government and stakeholders to support and accelerate operationalization of CDM projects in Tanzania ⇒ TIC will be supported and or adequately empowered by legal instruments to exercise its role and mandate as a "one stop center" for biofuels investment processes ⇒ Establishment/transfer of biofuels production and processing standards ⇒ TPDC's vision is to become a one stop shop for bioenergy/biofuels technologies and information 	
Energy, Water and Utilities Regulatory Authority (EWURA)	<ul style="list-style-type: none"> ⇒ Technical (quality standards), socioeconomic (price, competition and value for money) and environmental (mitigation of adverse impacts) regulation of all fuels and energy services including bioenergy 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Legal and institutional regulatory frameworks (EWURA Act of 2001 Revised 2006 Cap 414; Petroleum Act of 2008 Cap----; ⇒ Qualified and experienced staff; systems and processes for energy regulation ⇒ Pilot fuel blending program assessing viability and technical efficacy ⇒ Global standards for fuels blending exist that can be adapted for Tanzania <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Un-regulated biofuels investments dominated by foreign companies threatening sustainability 	<ul style="list-style-type: none"> ⇒ Establishment of the necessary legal and institutional frameworks for bioenergy to empower EWURA fast-tracked to enable EWURA exercise its mandate and roles ⇒ Reliable and technically proven biofuels technologies (agro-ecological zones and landuse plans) and investment information available as a matter of urgency ⇒ Establishment of a Bioenergy master Plan with performance targets and monitoring mechanisms ⇒ Tanzania may consider establishing a national bioenergy think tank to coordinate required technical, 	<ul style="list-style-type: none"> ⇒ EWURA believes that bioenergy in Tanzania is still at its infancy /exploratory stage and when commercialization stage will be reached EWURA will be more involved ⇒ Bioenergy initiatives in Tanzania originates from the perception that fossil hydrocarbon fuels are depletable/not renewable, environmentally undesirable and hence mitigation strategies for alternatives sources ⇒ As Tanzania moves forward with bioenergy development, issues of balance between food, fuel and cash crops production systems balance

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Tanzania Investment Centre (TIC)/Biofuels One Stop Center (BOSC)	<ul style="list-style-type: none"> ⇒ One stop center for bioenergy services ⇒ Promotion and investment support to potential entrepreneurs interested in biofuels investment and development (technical and administrative support including land acquisition, business registration) 	<ul style="list-style-type: none"> ⇒ Lack of comprehensive technical and economic studies on biofuels leading to low performance, possible adverse social and environmental impacts and hence unsustainable investments ⇒ There are no bioenergy commercial operations licensed in Tanzania (if any are not legally recognized) <p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Tanzania Investment Promotion Act (TIPA) providing legal framework for investment in Tanzania including biofuels <p>⇒</p> <p><u>Weaknesses/Threats:</u></p>	<p>environmental, and socioeconomic studies to generate right information for the stakeholders</p>	<p>and environmental consequences need to be considered carefully</p>
Centre for Environment, Science and Technology (CEEST)	<ul style="list-style-type: none"> ⇒ Bioenergy and environmental research and development ⇒ Bioenergy policy research and advocacy ⇒ Bioenergy and environmental consultancy and advisory services 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Published studies and reports on bioenergy and environment ⇒ Professional staff and experience ⇒ Local and global effective bioenergy/environment networks and collaborative efforts ⇒ UNFCCC and Kyoto Protocol and as ratified by Tanzania <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Scarce resources for R and D due to limited national budget allocation and decreasing donor funds ⇒ Polluters (industrialized countries) avoiding responsibility for shouldering the costs of conservation ⇒ Lack of legal and institutional regulatory framework for environmental conservation including mandatory EIA 	<ul style="list-style-type: none"> ⇒ Increase in national budget allocation for R and D particular in bioenergy and environment. ⇒ Establishment of the necessary legal and institutional frameworks for bioenergy to promote clean and sustainable production and environmental conservation ⇒ Smallholder farmers empowered to take a leading and active role in biofuels development through extension services, training and facilitation for access to affordable and appropriate technologies such as inputs to increase food and biofuels crop production; ⇒ Government and stakeholders to support and accelerate operationalization of CDM projects in Tanzania 	<ul style="list-style-type: none"> ⇒ Government should support smallscale, appropriate technology labor-intensive bioenergy projects in the rural areas which are more likely to generate income, create rural employment opportunities and complementary to food production and value-adding processing

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Cleaner Production Centre of Tanzania (CPCCT)	<ul style="list-style-type: none"> ⇒ Bioenergys and environmental research and development ⇒ Bioenergy policy research and advocacy ⇒ Bioenergy and environmental consultancy and advisory services 	<p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Local and global effective bioenergy/environment networks and collaborative efforts ⇒ UNFCCC and Kyoto Protocol and as ratified by Tanzania <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Scarce resources for R and D due to limited national budget allocation and decreasing donor funds ⇒ Polluters (industrialized countries) avoiding responsibility for shouldering the costs of conservation ⇒ Lack of legal and institutional regulatory framework for environmental conservation including mandatory EIA 	<ul style="list-style-type: none"> ⇒ Establishment of the necessary legal and institutional frameworks for bioenergy to promote clean and sustainable production and environmental conservation ⇒ Smallholder farmers empowered to take a leading and active role in biofuels development through access to affordable and appropriate technologies such as inputs to increase food and biofuels crop production; linkage to buyers, processors and exporters; ⇒ Government and stakeholders to support and accelerate operationalization of CDM projects in Tanzania 	<ul style="list-style-type: none"> ⇒ Government should support smallscale,appropriate technology labor-intensive bioenergy projects in the rural areas which are more likely to generate income, create rural employment opportunities and complementary to food production and value-adding processing
Civil Rights Advocacy Organizations (CSOs/NGOs): Land Rights Research and Resource Institute (HAKIARDHI), Legal and Human Rights Centre (LHRC), EnviroCare, Lawyers Environmental Action Team (LEAT),Journalists Environmental Action Team (JET) etc;; Research for Poverty Alleviation	<ul style="list-style-type: none"> ⇒ Advocacy and lobbying for human, civil and land rights; ⇒ Legal support and advisory services to land civil rights litigation; interpretation of biofuels related laws, policies and guidelines for appropriateness in environmental conseration, rights of ownership and access by the marginalized communities; ⇒ Review of land laws amendment proposals and litigations; 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Biofuels industry/sector has significant potential for national energy self-sufficiency ⇒ Sound knowledge and experience in the local laws and regulatory frameworks particularly related to biofuels land acquisition e.g. HAKIARDHI Fat Finding Missions in Kilwa, Rufiji, Bagamoyo, Kisarawe, Mpanda ⇒ Research reports and case studies related to biofuels social, cultural and economic impacts in tanzania ⇒ Collaborative projects/activities with other institutions such as University of Dar, SUA, REPOA, WWF, LEAT, JET etc <p><u>Weaknesses/Threats:</u></p>	<ul style="list-style-type: none"> ⇒ Transparent and accountable leadership; good governance and leadership that addresses peoples needs and expectations ⇒ Fast-tracking of the process to develop bioenergy legal and institutional regulatory framework ⇒ TIC will be legally empowered to act as "one stop center" for biofuels investment processes including creation of "land banks" to minimize the current land grabbing by foreign companies and possible social and political conflicts ⇒ Government to hasten the planned agro-ecological zoning and landuse planning exercise as basis for sustainable 	<ul style="list-style-type: none"> ⇒ Big biofuels investments companies production models are likely to be mechanized plantations, capital intensive and hence unlikely to generate the expected job creation ⇒ Due to high tariffs (US Cents 54/gallon), subsidies provided to European/USA producer companies (USD 7-8.9 bill/year), Tanzania's competitive advantage and penetration to the US and EU markets is quit limited ⇒ Biofuel investors targeting easily accessible and high productivity arable land (Coast, Mtrwara, Kilimanjaro, Arusha, Morogoro, Kagera, Rukwa, Ruvuma regions) also earmarked for food crops

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		<ul style="list-style-type: none"> ⇒ Lack of sound policy, guidelines and institutional frameworks for biofuels and/ or lack of institutionalized monitoring mechanisms ⇒ Lack of public awareness of biofuels program and hence low/weak participation, engagement and Lack of social accountability ⇒ Lack of transparency in the land acquisition for biofuels leading to social conflicts ⇒ Potential threat of competition for resources (land, labor, water, reserved land for forests/parks) between food crops and fuel crops production ⇒ Dominance of foreign companies in the biofuels investment project threatening sustainability and achievement of national/global development strategies including poverty reduction. ⇒ Biofuels companies business models (e.g. large mechanized plantations and production of raw feedstocks for export and processing in Europe) appears to be contrary to the national sustainable energy self-sufficiency, job creation, promotion of value-adding processing, import substitution and environmental conservation development strategies. ⇒ Rural communities relinquishing large tracts of land to foreigners with long-term (99 years) ownership title deeds affecting their livelihoods 	<ul style="list-style-type: none"> land allocation including balance between biofuels and food crop production ⇒ Joint venture biofuels investment projects between the foreign biofuels companies and local companies/farmers outgrower groups; the former contributing investment capital and technology while the later contributing land and labor 	<p>production; creating competition for land, labour, water, forests; accentuating food and energy insecurity; land alienation and displacement of rural communities</p> <p>⇒ The foreign biofuels investment companies strategies include feedstocks are planned for processing in Europe hence the expected multiplier effects such as employment creation, energy self-sufficiency may not materialize</p> <p>⇒ Most advocacy CSOs are not totally against biofuels initiatives and investments, but they are advocating for free, fair and transparent processes complying to the laws of the land and sensitive to possible social and environmental adverse impacts.</p>

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World Wildlife Fund (WWF); Tanzania Forest Conservation Group (TFCG);	<ul style="list-style-type: none"> ⇒ Conservation of the 'hyper-sensitive ecosystems' and biodiversity ⇒ Policy, legal and regulatory framework advocacy and lobbying ⇒ Sustainable management of natural and wildlife resources for sustainable environmental and biodiversity conservation; ⇒ Development of environmental and social assessment (SEIA) criteria and guidelines for sustainable wildlife and natural resources management; ⇒ Fund raising for nature conservation activities 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Coordination of NGO Platform for promotion of sustainable bioenergy development ⇒ WWF in collaboration with FAO "Bioenergy and Food Security Analysis Report for Tanzania" that is basis for landuse map to guide sustainable bioenergy investments ⇒ WWF has development of "Proposed Guidelines and Criteria for Biofuels Investment in Tanzania" that has been adopted as blue print for the National Guidelines for Sustainable Biofuels Development in Tanzania ⇒ Sweden and Norway (SIDA and NORAD) have contributed adequate resources for the biofuels policy development process <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Biofuels investment land acquisition without regards to sensitive ecosystems and biodiversity ⇒ Adverse effects of land grabbing for biofuels investments adversely affecting livelihoods of the rural communities ⇒ Weak enforcement and monitoring of compliance to land and environmental conservation laws threatening wildlife and livelihood systems (loss of wild sources of food and energy) particularly for pastoralist tribes including Hadzabe, Maasai etc 	<ul style="list-style-type: none"> ⇒ Government to hasten the planned agro-ecological zoning and landuse planning exercise as basis for sustainable land allocation including balance between biofuels and food crop production ⇒ Joint venture biofuels investment projects between the foreign biofuels companies and local companies/farmers outgrower groups; the former contributing investment capital and technology while the later contributing land and labor ⇒ Transparent and accountable leadership; good governance and leadership that addresses peoples needs and expectations ⇒ Fast-tracking of the process to develop bioenergy legal and institutional regulatory framework 	<ul style="list-style-type: none"> ⇒ Largescale monoculture production of biofuel crops by multi-national companies and investors often do not promote participation of smallholder producers and are likely to cause adverse social, economic and environmental adverse effects ⇒ Biofuel investors targeting easily accessible and high productivity arable land (Coast, Mtrwara, Kilimanjaro, Arusha, Morogoro, Kagera, Rukwa, Ruvuma regions) also earmarked for food crops production; creating competition for land, labour, water, forests; accentuating food and energy insecurity; land alienation and displacement of rural communities ⇒ There is potential competition between feedstock biofuels production and food production especially the existing trend of large companies taking up large farms for biofuels at the expense of food production without following the right procedures ⇒ Inadequacy of land laws in safeguarding interests of villagers <p>National biofuels policy development taking too long considering the high speed of biofuels investments</p>
TANGO	<ul style="list-style-type: none"> ⇒ Advocacy and lobbying for civil rights; ⇒ Legal support and advisory 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Collaborative projects/activities with 	<ul style="list-style-type: none"> ⇒ Transparent and accountable leadership; good governance and leadership that addresses 	<ul style="list-style-type: none"> ⇒ As in CSOs/NGOs above

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	<p>services to land civil rights litigation; interpretation of biofuels related laws, policies and guidelines for appropriateness in environmental conservation, rights of ownership and access by the marginalized communities;</p> <p>⇒ Business and technical support services to increase productivity and efficiency</p>	<p>other institutions such as University of Dar, SUA, REPOA, WWF, LEAT, JET etc</p> <p>⇒ Donor support for resources</p> <p>⇒ Large membership and therefore bargaining power</p> <p><u>Weaknesses/Threats:</u></p> <p>⇒ Lack of public awareness of biofuels program and hence low/weak participation, engagement and Lack of social accountability</p> <p>⇒ Lack of transparency in the land acquisition for biofuels leading to social conflicts</p> <p>⇒ Potential threat of competition for resources (land, labor, water, reserved land for forests/parks) between food crops and fuel crops production</p> <p>⇒ Dominance of foreign companies in the biofuels investment project threatening sustainability and achievement of national/global development strategies including poverty reduction.</p>	<p>peoples needs and expectations</p> <p>⇒ Fast-tracking of the process to develop bioenergy legal and institutional regulatory framework</p> <p>⇒ Joint venture biofuels investment projects between the foreign biofuels companies and local companies/farmers outgrower groups;</p>	
<p>District Councils/DED (Kisarawe, Kilwa, Rufiji, Muheza, Bagamoyo, Morogoro, Arumeru, etc)</p>	<p>⇒ Support to biofuels investors in land acquisition and supervise proper compensation and or alternative land allocation</p> <p>⇒ Support and linking of smallholder biofuels groups to extension and business development services, buyers</p> <p>⇒ Linking SMEs to financial institutions</p> <p>⇒ Establishment of by-laws for natural resources and environmental conservation</p> <p>⇒ Litigation and conflict resolution for biofuels cases</p>	<p><u>Strengths/Opportunities:</u></p> <p>⇒ Knowledge of local culture, norms and traditions</p> <p>⇒ Availability of central government, donor, NGOs (e.g. TaTEDO, HIVOS, UNDP, SIDA, NORAD) and private sector support for biofuels development</p> <p>⇒ Bioenergy pilot programs and prototypes for upscaling</p> <p>⇒ Experienced farmer groups/outgrowers or contract growers interested and or involved in biofuels feedstock production</p> <p>⇒ NGOs/SMEs promoting biofuels investments in the rural areas</p> <p>⇒ District councils integrating</p>	<p>⇒ Awareness creation for biofuels at all levels</p> <p>⇒ Joint venture biofuels investment projects between the foreign biofuels companies and local companies/farmers outgrower groups;</p> <p>⇒ Fast-tracking of the process to develop biofuels policy and legal/institutional regulatory framework</p> <p>⇒ Fast-tracking of the agro-ecological zoning and landuse planning as a basis for land allocation for sustainable food and fuel crops production</p>	<p>⇒ Local government is in general supportive of the biofuels initiatives in the rural areas but there is a need for legal and institutional regulatory framework</p> <p>⇒ Small labor-intensive biofuels projects and industries that will promote employment creation and income generation; alternative sustainable energy for rural households</p> <p>⇒ Modern sustainable renewable energy technologies including biofuels have improved</p>

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		<p>environment and biofuels development plans and hence budget allocation ensuring sustainability</p> <p>⇒ Some of the biofuels crops such as jatropha improves soil fertility and conservation</p> <p>⇒ Improved woodfuels/charcoal stoves and charcoal production technologies contributing to forest /wildlife conservation and therefore reduction in environmental degradation</p> <p><u>Weaknesses/Threats:</u></p> <p>⇒ Lack of public awareness of biofuels program and hence low/weak participation, engagement and Lack of social accountability</p> <p>⇒ Lack of transparency in the land acquisition for biofuels leading to social conflicts</p> <p>⇒ Potential threat of competition for resources (land, labor, water, reserved land for forests/parks) between food crops and fuel crops production</p> <p>⇒ Dominance of foreign companies in the biofuels investment project threatening sustainability and achievement of national/global development strategies including poverty reduction.</p> <p>⇒ Unreliable market for biofuels/modern energy services particularly in the rural areas</p> <p>⇒</p>	<p>⇒ Diversified sustainable and affordable modern rural energy services (solar PV, mini-hydro, biogas, multi-functional platforms, improved / efficient woodfuels stoves/ovensdriving force for rural electrification, value-added agricultural processing</p> <p>⇒ Increased support for resources from the local government, donors and private sector to promote scalling up and sustainability of the successful biofuels technologies and modern energy services</p>	<p>the livelihoods of the rural communities</p> <p>⇒ Land acquisition procedures should be revised to avoid biofuels investors grabbing land from villagers threatening balance between food and feed crops production</p>
Commission for Science and Technology (COSTECH)	<p>⇒ Biofuels R and D in collaboration with national agricultural and natural resource research institutions</p> <p>⇒ Testing of successful technologies and prototypes and therefore wider</p>	<p><u>Strengths/Opportunities:</u></p> <p>⇒ Adequate capacity for R and D</p> <p>⇒ Biofuels prototypes and successful technologies and services for dissemination, market promotion and scalling up</p>	<p>⇒ Establishment of incentive mechanisms to motivate biofuels investments at all levels</p> <p>⇒ Fast-tracking of the process to develop policy, legal and institutional framework</p> <p>⇒ Support comprehensive</p>	<p>⇒ Tanzania has no option but to actively participate in the biofuels initiatives because she has ratified the UNFCCC and Kyoto Protocol but needs to proceed more cautiously</p>

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	<ul style="list-style-type: none"> ⇒ replication, use and scalling up ⇒ Biofuels technical advise to government and other stakeholders ⇒ Training and consultancy services to interested stakeholders 	<ul style="list-style-type: none"> ⇒ Wide network of national research systems equipped with R and D capacity ⇒ <u>Weaknesses/Threats:</u> ⇒ Weak technology transfer mechanisms ⇒ Limited market demand for the for the modern energy technologies and services due to lack of regulatory frameworks and incentives ⇒ Lack of infrastructure especially in rural areas to promote efficient scalling up, distribution and marketi ng of biofuels technologies 	<ul style="list-style-type: none"> ⇒ baseline studies as basis for biofuels policy and masterplan including performance indicators and targets ⇒ Government and donors to invest in the critical infrastructure for transport, distribution etc to promote biofuels investments particularly in the rural areas ⇒ Government to develop incentive mechanisms to promote biofuels investment particulrly in the rural areas ⇒ More government and donor support and commitment for biofuels initiatives ⇒ UN organizations expected to provide support to developing countries such as Tanzania in biofuels R and D, technology transfer and scalling up 	<ul style="list-style-type: none"> ⇒ and prepared ⇒ Lack of transparency and good governance in land acquisition for biofuels creating social conflicts, loss of livelihoods for the rural communities ⇒ The government need to support biofuels development awareness creation to promote public participation and support ⇒ Biofuels should be promoted first to contribute to national energy self-sufficiency, import substitution and foreign exchange saving/balance of payment ⇒ Government and donors to strongly support the ongoing TPDC /TANESCO fossil fuels blending with biofuels and use of natural gas in the industrial and automobile engines to stimulate demand ⇒ Diversification of sources of renewable energy sources including mini-hydro, wind, solar and biofuels to ensure national energy security and sustainable development
<p>Farming for Energy and Livelihood in Sub-Saharan Africa (FELISA) www.felisatz.com</p>	<ul style="list-style-type: none"> ⇒ Outgrower training/extension services ⇒ Market information and access ⇒ Sustainable biodiesel, eletricity generation and biofertilizer production and marketing ⇒ Financial/credit services 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Biodiesel/palmoil production capacity over 10,000 ha (5,000 ha) and outgrowers 5,000 ha ⇒ Increase in crop yields as a result of use of biofertilizer/compost manure from palmoil processing wastes ⇒ Biodiesel processing plant 	<ul style="list-style-type: none"> ⇒ Public/private partnership to facilitate access to affordable loans/credit by the smallholders ⇒ The role of the government should be to invest in infrastructure and institutional support framework including appropriate policies and regulations and incentive 	<ul style="list-style-type: none"> ⇒ Initially farmers were very reluctant to participate due to uncertainties with land acquisition and ownership issues ⇒ Use of outgrower approach attractive to farmers ⇒ The outgrower approach

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<p>Contact Person: Dr Hamim Hongo (+255 758 ; 255 28 2804904)</p>	<ul style="list-style-type: none"> ⇒ Palmoil plantation to ensure adequate supply of feedstock ⇒ Creating/promoting social and human capital (formation and registration of CBOs/farmer groups) 	<ul style="list-style-type: none"> ⇒ Increase in food security as a result of intercropping of young palm trees with other food crops ⇒ Forest conservation as a result of use of palm oil dried leaves as source of firewood ⇒ Additional income from sale of palm wine (marovu) ⇒ Improved livelihood (better housing, nutrition, school fees, and so forth) ⇒ Rural small scale industries generation income and employment ⇒ Increase in agric profitability due to reduced costs of production and better prices of palm oil ⇒ Reduced rural-to-urban migration <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ By producing both crude palm oil (CPO) and biodiesel, the company could force up the local price of CPO ⇒ No guarantee that FELISA will continue to target the domestic market for CPO/biodiesel ⇒ Lack of supportive policies and institutional frameworks discouraging investors and farmers 	<p>schemes</p> <ul style="list-style-type: none"> ⇒ Biogas-driven mini-grid electricity generation plant expected to be installed which will use the palm oil processing wastes 	<p>in biofuels development proving sustainable and viable contributing to both food and fuel security at the household and national levels</p> <ul style="list-style-type: none"> ⇒ Biofuels investments should contribute to the national energy self-sufficiency apart from export orientation ⇒ Land acquisition procedures should be revised to more efficient but safeguarding the interests of all parties
<p>Katani Limited; Mkonge Energy Systems Ltd (MESL) www.katanitz.com</p> <p>Contact Person: Francis Nkuba (+ 255 784 260263)</p>	<ul style="list-style-type: none"> ⇒ Outgrower training/extension services ⇒ Sustainable biogas, electricity generation and biofertilizer production and marketing ⇒ Financial/credit services ⇒ Sisal plantation to ensure adequate supply of sisal ⇒ Creating/promoting social and human capital (formation and registration of CBOs/farmer groups) 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ 100% outgrower sisal production; intercropping with food crops (maize, beans, peas) ⇒ Tanzania's market share of sisal fibre is over 15% ; Katani Ltd has 30% of Tanzania's share and growing. ⇒ Up to 6 MW mini-grid electricity generation (when fully operational); 30% own factories consumption and 70% to TANESCO national grid ⇒ Commercial production of biofertilizer (in 2 years period) ⇒ Participation in CDM project in 	<ul style="list-style-type: none"> ⇒ As above 	<ul style="list-style-type: none"> ⇒ As above

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		<p>Tanzania expect to produce 329,054 tCO₂ in ten years period contributing to mitigation of climate change effects.</p> <ul style="list-style-type: none"> ⇒ Over 20% increase in income of the outgrowers ⇒ 80% increase in children enrolled and attending school and access to health care ⇒ Institutional energy self-sufficiency and sustainability ⇒ Increase in crop yields from 400 kg/ha to 1,200 Kg/ha due to biofertilizer, extension services ⇒ Reduced health problems associated with woodfuel for cooking and lighting ⇒ Improved livelihood (better housing, nutrition, school fees, and so forth) ⇒ Rural small scale industries generation income and employment ⇒ Increase in agric profitability due to reduced costs of production ⇒ Reduced rural-to-urban migration ⇒ Reduced GHG and climate change effects ⇒ Soil and forest conservation ⇒ Model being replicated in other sisal estates including Magoma, Magunga, Mwelya and Ngombezi as well as in other regions including Kisapu district in Shinyanga region <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Limited accessibility to financing ⇒ Monopoly of the Tanzania Electric Supply Company (TANESCO) ⇒ Poor energy distribution infrastructure ⇒ Lack of regulation and policy for industrial and transportation vehicles use of blended biomethane limiting market demand opportunities 		

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Crop Authorities (Tanzania Sugarcane Growers Association, TASGA; Sugar Board of Tanzania, SBT; Tanzania Sisal Authority, TSA; Tanania Sisal Board TSB)	<ul style="list-style-type: none"> ⇒ Regulation of production, promotion and pricing ⇒ Production of feedstocks ⇒ Advocacy and lobbying to safeguard outgrowers interests ⇒ Marketing and export of products ⇒ Alternative sources of energy from by-products for industrial use ⇒ Training, extension, credit/financial services (e.g. Mkonge Umoja Savings and Credit Cooperative; KIRUVI SACCOS etc) 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Potential for sugarcane and sisal byproducts contribution to biethanol and electricity regeneration and environment conservation ⇒ Potential of oilseeds producing plant oil/biodiesel for blending with fossil diesel ⇒ High bioenergy/electricity demand <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Lack of infrastructure for efficient transport of biofuel feedstocks e.g. mollasses ⇒ Lack of demand and or incentives and guarantee for bioenergy /biofuels 	<ul style="list-style-type: none"> ⇒ Government incentives, policy and regulatory framework for mandatory bioethanol and biodiesel blending to create demand ⇒ Biofuels production models that involve partnership/joint venture between foreign biofuel companies and biofuels outgrowers associations ⇒ Public/private partnership and investment in bioenergy infrastructure improvement 	<ul style="list-style-type: none"> ⇒ Bioenergy will substantially contribute to cleaner and sustainable production and reduction in environmental degradation ⇒ Bioenergy has the potential to improve the livelihoods of rural communities ⇒ Proper landuse plan is necessary to avoid undesirable adverse social, economic and environmental impacts of biofuels initiatives
SMEs (KAKUTE, Engaruka Jatropa Women Group, Jatropa Products (T) Ltd; African Rural Energy Enterprises Development; FAIDA MALI (AREED/FRED; Integrated Energy Enterprise Centre (IEEC) and Producers of feedstocks	<ul style="list-style-type: none"> ⇒ Promotion of investments leading to increased access to sustainable bioenergy services/products in the rural areas; ⇒ Alleviation of constraints leading to low access to modern bioenergy services through capacity building of stakeholders (producers, processors, promoters, marketers and end-users); ⇒ Support SMEs in sustainable income generation investments and hence poverty reduction; ⇒ Scaling up modern energy 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Capital, entrepreneurial skills) leading to low access to modern bioenergy in the rural/peri-urban areas through capacity building of stakeholders (TaTEDO, producers, processors, end-users, promoters/marketers); ⇒ Increased technical capacity (production, processing, packaging, delivery, storage)of entrepreneurs in the production and marketing of clean bioenergy products and services; for example locally adapted VACVINA biogas systems; ⇒ Capacity building in non-technical 	<ul style="list-style-type: none"> ⇒ Training and capacity building of partners (ToT) including TaTEDO staff to provide effective technical and business development services to the entrepreneurs; ⇒ Evolution in MFI lending policies and or establishment of other appropriate MFIs with affordable lending policies (such as VICOBA, FINCA, PRIDE, AREED/FRED)¹⁴; increase in technical and business support services especially in the rural areas; ⇒ Promotion of investments leading to increased access to 	<ul style="list-style-type: none"> ⇒ Alleviation of constraints leading to low access to modern bioenergy services through capacity building of stakeholders (producers, processors, promoters, marketers and end-users); ⇒ Support SMEs in sustainable income generation investments and hence poverty reduction; scaling up modern energy technologies and services;

¹⁴ Village Community Banks (VICOBA); Promotion of Rural Initiative and Dev Initiative (PRIDE); Foundation for International Community Assistance (FINCA); African Rural Energy Enterprises Development (AREED);

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	<ul style="list-style-type: none"> ⇒ technologies and services; ⇒ Local knowledge for the production and processing of biofuels; ⇒ Conservation of natural resources to enable sustainable production ⇒ Production of quality and enough feedstock according to market demand 	<p>areas (business management, promotion, marketing, M and E particularly evaluation, dissemination and replication of lessons learned and best practices.</p> <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Limited access to working capital/credit ⇒ Lack of biofuels policy, legal and institutional framework ⇒ Lack of public awareness of biofuels program and hence low/weak participation, engagement and Lack of social accountability ⇒ Lack of transparency in the land acquisition for biofuels leading to social conflicts ⇒ Potential threat of competition for resources (land, labor, water, reserved land for forests/parks) between food crops and fuel crops production ⇒ Dominance of foreign companies in the biofuels investment project threatening sustainability and achievement of national/global development strategies including poverty reduction. ⇒ Lack of market demand for modern energy services/inadequate market promotion ⇒ Technologies/equipment not appropriate to all users e.g. women; ⇒ Low technical, business and financial management capacity 	<p>sustainable bioenergy services/products in the rural areas;</p>	
National Environmental Management Council (NEMC)	<ul style="list-style-type: none"> ⇒ Environmental impact assessment and certification of bioenergy investment projects ⇒ Environmental advisory services ⇒ Environmental policy advice 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Legal framework underlying NEMC roles and responsibilities ⇒ Adequate technical, human and physical capacity ⇒ UNFCCC and Kyoto Protocol of 	<ul style="list-style-type: none"> ⇒ Government to hasten the planned agro-ecological zoning and landuse planning exercise as basis for sustainable land allocation including balance between biofuels and food crop production 	<ul style="list-style-type: none"> ⇒ Largescale monoculture production of biofuel crops by multi-national companies and investors often do not promote participation of smallholder producers and are likely to cause adverse social,

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<p>Media (newspapers: CITIZEN, East African, Daily News, TV, Journalists Environmental Action Team/JET)</p>	<ul style="list-style-type: none"> ⇒ Awareness creation on sustainable biofuels investment and development ⇒ Modern energy services promotion and dissemination ⇒ Information research and dissemination 	<p>which Tanzania has ratified</p> <ul style="list-style-type: none"> ⇒ Environmental conservation included in Vision 2025, MDGs and other national, regional and global development strategies <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Lack of policy, legal and institutional framework for biofuels investments ⇒ Potential environmental impacts of biofuels investments ⇒ Inadequate capacity for monitoring and enforcement of the existing laws and regulations for environmental conservation <p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Powerful means for advocacy and awareness creation ⇒ Technology promotion and marketing of successful technologies and services ⇒ Multiple media (private, government, local and international) and freedom of expression ⇒ Adequate capacity for research, IT, financial and other resources ⇒ Interest in biofuels and other environmental aspects of development <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Lack of sound policy, guidelines and institutional/legal frameworks for biofuels and/ or lack of institutionalized monitoring mechanisms ⇒ Lack of public awareness of biofuels program and hence low/weak 	<ul style="list-style-type: none"> ⇒ Transparent and accountable leadership; good governance and leadership that addresses environmental conservation needs and expectations ⇒ Fast-tracking of the process to develop bioenergy legal and institutional regulatory framework ⇒ Awareness creation on the potential environmental adverse effects of biofuels initiatives ⇒ Government to set targets and indicators for biofuels development program <ul style="list-style-type: none"> ⇒ Government to hasten the planned agro-ecological zoning and landuse planning exercise as basis for sustainable land allocation including balance between biofuels and food crop production ⇒ Biofuels production models that involve partnership/joint venture between foreign biofuel companies and biofuels outgrowers associations ⇒ Processing of biofuels to be done in Tanzania to maximize the multiplier effects ⇒ Priority for biofuels production should be for national energy self-sufficiency and security; only excess to be exported 	<p>economic and environmental adverse effects</p> <ul style="list-style-type: none"> ⇒ Biofuel investments encroaching hyper-sensitive green forests hence threatening environmental degradation and possible loss of diversity ⇒ There is potential competition between feedstock biofuels production and food production especially the existing trend of large companies taking up large farms for biofuels at the expense of food production without following the right procedures ⇒ Due to high tariffs (US Cents 54/gallon), subsidies provided to European/USA producer companies (USD 7-8.9 bill/year), Tanzania's competitive advantage and penetration to the US and EU markets is quit limited ⇒ Biofuel investors targeting easily accessible and high productive arable land (Coast, Mtrwara, Kilimanjaro, Arusha, Morogoro, Kagera, Rukwa, Ruvuma regions) also earmarked for food crops production; creating competition for land, labour, water, forests; with possible adverse impacts on household food and energy security; land alienation and displacement of rural communities and loss of livelihood

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<p>Institutions of Higher Learning /Service Providers (Sokoine University of Agric (SUA), UDSM/Dept of Chemical and Processing Engineering); UDSM/Institute of Production Innovation, IPI); UDSM/Institute of Resource Assessment (IRA); ARDHI University (AU); Research for Poverty Alleviation (REPOA); Sokoine University of Agric (SUA)</p>	<p><u>Resources:</u> Capable /experienced renewable modern R and D staff; ICT facilities;</p> <p><u>Mandate and Functions:</u> Leader in implementation of a systematic, comprehensive and proactive approach to modern renewable energy R and D, technology promotion, dissemination and marketing by harnessing and enhancing sustainable modern renewable energy development capabilities.</p>	<p>participation, engagement and Lack of social accountability</p> <p>⇒ Lack of transparency in the land acquisition for biofuels leading to social conflicts</p> <p>⇒ Potential threat of competition for resources (land, labor, water, reserved land for forests/parks) between food crops and fuel crops production</p> <p>⇒ Dominance of foreign companies in the biofuels investment project threatening sustainability and achievement of national/global development strategies including poverty reduction.</p> <p>⇒</p> <p><u>Strengths/Opportunities:</u></p> <p>⇒ Adequate capacity (human and physical resources) for R and D, technology prototype development, testing and dissemination</p> <p>⇒ Cost-effective services;</p> <p>⇒ Cost-effective, high quality and affordable services due to increase in the number of higher institutions of learning and hence competition;</p> <p>⇒ Training opportunities provided under some donor projects; existence of association of consultants (TACO);</p> <p><u>Weaknesses/Threats:</u></p> <p>⇒ Lack of sound policy, guidelines and institutional / legal frameworks for biofuels and/ or lack of institutionalized monitoring mechanisms</p> <p>⇒ Lack of public awareness on biofuels</p>	<p>Provision of high quality demand-driven services; profitable and sustainable business operations; accreditation /ability to deliver high quality services (certified/standardized); effective leadership training modules/curricula; leadership competence training/capacity development needs;</p>	<p>⇒ Biofuels accepted as alternative and sustainable source of renewable energy; right policy is however required</p> <p>⇒ If appropriate technology is not used in the processing of biofuels (bioethanol/biodiesel), the process is likely to produce more GHG (CO₂, CH₄, N₂O) than it is meant to displace hence accentuating the global warming and climate change effects</p> <p>⇒ Tanzania 'pulled into the biofuels' initiatives through pressure from the EU/USA as a result of increasing demand for bioethanol and biodiesel as mitigation measures for climate change</p>

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Rural Energy Agency (REA)	<ul style="list-style-type: none"> ⇒ Promotion, mobilization, coordination and facilitation of public/private sustainable renewable energy development and investment initiatives in the rural areas including technical and financial support services. ⇒ Specific roles and functions include: 1) to stimulate rural economic and social development through promotion, stimulation, facilitation and improvement of modern energy access for productive use 2) to promote rational and efficient production and use of energy in rural areas 3) to facilitate the identification and development of rural energy projects 4) to utilize the Rural Energy Fund (REF) to finance eligible rural energy projects that result in improvement in the livelihoods of rural people 5) to facilitate activities of key stakeholders (government, private sector, CBOs, NGOs, MFIs) interested in rural energy investments 6) advice government on rural energy policy matters 7) develop procedural guidelines for rural energy investments 8) facilitate coordination of rural energy programs 9) training and capacity building 10) R and D in appropriate rural energy technologies 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Preparation of Rural Electrification Maserplan (-----), ⇒ Establishment of REA (established by Rural Energy Act No. 8 of 2005) and REF that have contributed to an increase in the access to rural electrification expected to reach at least 25% by 2013 from 2% (2002). ⇒ TaTEDO's successful trials in biofuels powered multifunctional platforms (MFPs) and electricity generated by engines powered by locally produced by liquid biofuels or straight Vegetable Oils (SVOs) mostly from Jatropha used in un-modified Lister Diesel Engines in Engaruka and Leguruki villages in Arusha region; the projects have created rural labour for improved bioenergy technicians and sellers, income generation to users (women baking groups), better livelihood especially for women (lighting, milling, cooking, pumping water, refrigeration of vaccines etc) and generating income hence reducing rural poverty and rural-to-urban migration trends. REA/TaTEDO are developing joint strategies for scaling up the technologies/prototypes ⇒ Solar PV programme supported by SIDA and UNDP to accelerate rural electrification ⇒ Pro-poor win-win policies stimulating investment in rural biofuels production, processing and electrification. <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Lack of public awareness on 	<ul style="list-style-type: none"> ⇒ Establishment of Tanzania Rural Electrification Company (TARECO) that will specifically be responsible for accelerating rural electrification; ⇒ Preparation of Rural Electrification Master Plan (REMP); ⇒ TaTEDO scaling up access to integrated modern energy services programme through solar, micro-hydro and biofuels powered multifunctional platforms (MFPs) and SVOs in the rural areas as a source of electricity; ⇒ Piloting of biofuels technologies and prototypes ⇒ Integrated modern energy development program including mini-hydro, solar PV, wind and bioenergy 	<ul style="list-style-type: none"> ⇒ Biofuels are acknowledged as an alternative sustainable source of energy; need for policy, targets, comprehensive studies to generate appropriate knowledge and informed investment decisions ⇒ Integrated sustainable energy approach involving biofuels, mini-hydro, solar PV, biogas etc

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<p>Investors / Developers (Local and International companies): FELISA, Diligent Energy Systems (T) Ltd, Sun Biofuels, SEKAB, BAFF, etc; Tanzania Biofuel Producers Association of Biofuel (TBPA)</p>	<p>Private investment capital; key mandate is stimulation of economic development through investment in biofuels (research, testing, production, processing, marketing)</p>	<p>biofuels</p> <ul style="list-style-type: none"> ⇒ Inadequate resources for biofuels successful technologies dissemination and scalling up ⇒ Lack of market demand for modern energy services/inadequate market promotion ⇒ <p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Over 37 companies involved in biofuels investment; expected to generate jobs; foreign exchange earning and contribution to balance of trade; contribution to national energy and electricity security and reliability; ⇒ Large investment capital; willingness of MFIs to provide investment capital ⇒ Ample government and donor support <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Biofuels industry dominated by foreign companies threatening sustainability ⇒ Weak and fragmented investment policies, guidelines and institutional framework ⇒ Except a few investors such as SEKAB and KAKUTE using outgrower/block farm model; the rest of investors are using plantation model that does not result into the expected desirable social/economic impacts on the surrounding communities ⇒ Lack of sound policy, guidelines and institutional / legal frameworks for biofuels and/ or lack of 	<ul style="list-style-type: none"> ⇒ Manage vibrant, profitable and sustainable enterprise with stable cash flow, growing assets base and therefore creditworthy. ⇒ Ability to engage with the government and civil societies in promoting economic development in a win-win situation; job creation, rural communities supported in education, health; contribution to government revenue and foreign exchange; improvement in trade balance; improvement in national energy security; rural electrification and excess electricity sold to national grid 	<ul style="list-style-type: none"> ⇒ Biofuels policy, legal and institutional regulatory framework is necessary to minimize social conflicts and investment risks ⇒ Bioenergy will substantially contribute to cleaner and sustainable production and reduction in environmental degradation ⇒ Bioenergy has the potential to improve the livelihoods of rural communities ⇒ Proper landuse plan is necessary to avoid undesirable adverse social, economic and environmental impacts of biofuels initiatives ⇒ Integrated sustainable energy approach involving biofuels, mini-hydro, slar PV, biogas etc ⇒ Bioenergy will substantially contribute to cleaner and sustainable production and reduction in environmental degradation ⇒ Bioenergy has the potential to improve the livelihoods of rural communities ⇒ Proper landuse plan is

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		<p>institutionalized monitoring mechanisms posing risks/threats to the investments</p>		<p>necessary to avoid undesirable adverse social, economic and environmental impacts of biofuels initiatives</p>
<p>Modern bioenergy End-Users/Customers (exporters, oil/bioenergy retail companies, households, institutions)</p>	<ul style="list-style-type: none"> ⇒ Install energy efficient systems/use of energy diligently and sustainably to minimize losses and conserve the environment; ⇒ Prompt payment of energy bills; ⇒ Testing the new bioenergy technologies and feedback to R and D and technology developers for refinement/improvement 	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ High demand for bioenergy as alternative source of income especially in the rural areas other grid electricity is not readily accessible ⇒ Successful modern sustainable bioenergy technologies and services e.g. MFPs, solar PVs, mini-hydro etc ⇒ Donor support (SIDA, HIVOS, EU etc) for technology dissemination, scaling up and marketing of successful modern bioenergy technologies and services <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Limited access to credit/low income to afford initial cost of bioenergy services ⇒ Poor distribution infrastructure and hence availability of bioenergy services especially in the rural areas ⇒ Lack of biofuels quality standards to ensure value for money 	<ul style="list-style-type: none"> ⇒ Efficient energy use and conservation technologies/systems; ⇒ Public/private partnership to improve the bioenergy distribution and marketing infrastructure ⇒ Access to affordable modern energy systems installation loans; ⇒ Government subsidy to enable poor rural households and rural-based institutions to afford the installation cost and price of modern bioenergy services ⇒ Bioenergy quality standards to ensure value for money, environmental conservation and safety to users 	<ul style="list-style-type: none"> ⇒ Access to sustainable modern bioenergy services particularly by the rural communities has significantly improved their livelihoods (employment creation, income generation, energy security and energy cost saving), reduced environmental degradation and environmental conservation (contribution to achievement of MDGs, Vision 2025 targets). ⇒ Modern bioenergy services (e.g. MFPs, mini-hydro, solar PVs etc) has enhanced rural electrification and therefore smallscale agric value-adding processing, smallscale rural industries and therefore poverty reduction.

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<p>SADC, EU/EC, UNCTAD, JICA, AfDB; IMF, World Bank; Dfid; GTZ/WIP</p>	<p>modern bioenergy policy and institutional development; support to bioenergy research and development; bioenergy information technology;</p>	<p>least 120 villages in nine regions in Tanzania (Kilimanjaro, Tanga, Shinyanga, Manyara, Dar es Salaam, Rukwa, Cast, Arusha and Mwanza);</p> <p><u>Weaknesses/Threats:</u></p> <ul style="list-style-type: none"> ⇒ Many biofuels investment projects (like many multi-national agro-industries) are large-scale, foreign-owned, mechanized bringing little expected micro and macro-economic benefits to the local communities ⇒ Decline in donor funds (donor fatigue?); history of friendship/partnership with Tanzania in development agenda particularly training/capacity building; ⇒ Lack of sound policy, guidelines and institutional / legal frameworks for biofuels and/ or lack of institutionalized monitoring mechanisms making investments risky and questionable sustainability 	<ul style="list-style-type: none"> ⇒ Sustainable bioenergy development and investment regulated by sound policy, legal and institutional framework ⇒ Appropriate choice/size of biofuels investment models to ensure sustainable development and achievement of MDG and other development goals ⇒ Public/private partnership to ensure efficient resource mobilization and allocation as well as ownership and sustainability of the biofuels initiatives ⇒ Government to hasten the planned agro-ecological zoning and landuse planning exercise as basis for sustainable land allocation including balance between biofuels and food crop production ⇒ Fast-tracking of the bioenergy policy development process 	<p>sustainability and wider socioeconomic and environmental impacts</p>
<p>Banks/MFIs: Local and International such as: Community Finance Company Ltd (CFC);</p>	<p>Capital injection to support bioenergy investments e.g. to RESCOs/ contractors/SMEs; business oversight and support services; management of donors management of bioenergy revolving loan funds;</p>	<p><u>Strengths/Opportunities:</u></p> <ul style="list-style-type: none"> ⇒ Establishment of economic development fund (EDF) by the government with donor support to boost MFIs lending to SMEs including biofuels; ⇒ AREED II focused to provide targeted grants to development-focused rural SMEs seeking to venture into modern bioenergy investment projects and linking SMEs to MFIs for end-user financing to stimulate derived demand for bioenergy products and services in the rural areas (e.g. SIDA/UNEP/ TaTEDO/ VICOBA and PRIDE partnership initiatives). 	<ul style="list-style-type: none"> ⇒ Availability of information on bioenergy technologies/ systems technical and commercial viability; existence of sound national policies, institutional frameworks and strategies governing and safeguarding investments in bioenergy development; ⇒ Strong donor support for modern bioenergy R and D and infrastructure development to augment commercialization of the existing bioenergy prototypes; ⇒ Strong national policies on bioenergy intellectual property 	<ul style="list-style-type: none"> ⇒ Most banks/MFI perceive bioenergy investments as risk prone and low profit; lack of bankable financial/ business analysis and plans; weak cashflow and therefore high risks of default on bank loans (hence un-affordable high interest rates); ⇒ Bioenergy investments require long gestation period and therefore long payback period which is mismatch with many MFIs existing traditional loan products; MFIs have better

Biofuels/Bioenergy Stakeholder Group	Resources; Mandate, Roles and Functions in Biofuels Development	Strength, Weaknesses, Opportunities and Threats/ challenges (SWOT Analysis) in Biofuels Development	Biofuels/Bioenergy Interests/Needs/Expectations	Biofuels Development Perspectives/ Perceptions
<p>Competence Platform on Energy and Agro-Forestry Systems for Arid and Semi-Arid Ecosystems (COMPETE)/Tanzania; Project coordinated by WIP Germany and Partners/Consortium implemented by TaTEDO</p>	<p>⇒ COMPETE's overarching objective is to identify pathways for increasing access to bioenergy which will improve quality of life and create alternative sources of income for the rural poor.</p> <p>⇒ Key roles and functions include 1) bringing together world leading scientists, researchers, donors and practitioners in modern bioenergy 2) enhancement of equitable exchange of knowledge between EU and developing countries in bioenergy policy and methodology aspects 3) identify pathways in the provision of bioenergy to improve the quality of life for the rural communities 4) exchange of knowledge on the management and conservation of intact and delicate arid/semi-arid ecosystems</p>	<p><u>Weaknesses/Threats:</u></p> <p>⇒ Lack of sound policy, guidelines and institutional / legal frameworks for biofuels and/ or lack of institutionalized monitoring mechanisms making investments risky</p> <p><u>Strengths/Opportunities:</u></p> <p>⇒ COMPETE successfully convened an international Conference and Policy Debate on "Bio-energy Sustainability schemes and African Perspective";</p> <p>⇒ Studies completed by COMPETE including 1) Energy crops and agro-forestry systems in arid and semi-arid areas in Tanzania 2) Policy implication in biofuels sector 3) Financial and land issues related to biofuels</p> <p><u>Weaknesses/Threats:</u></p> <p>⇒ Some of the constraints hindering successful development and transfer of bioenergy technologies include lack of comprehensive regional, regional and national biofuels policies, institutional frameworks and regulations to promote growth of the biofuels sub-sector and investment strategies (e.g. incentives for indigenous rural private entrepreneurs and smallscale producers to actively taking leading role;</p> <p>⇒ Resource constraints (financing);</p> <p>⇒ Lack of supportive regulatory and institutional frameworks and incentive structures;</p>	<p>rights (PRs) to stimulate innovation, R and D (PRs can be used as collateral for investment capital loans from MFIs.</p> <p>⇒ Establishment of strong national, regional and international cooperation in biofuels development;</p> <p>⇒ Creation of local regulatory and incentive structures which will promote production, processing, marketing of biofuels products and services for local use;</p> <p>⇒ Partner countries to develop the needed policies and institutional frameworks and investment policies and incentives to stimulate sound biofuels industry</p>	<p>loan recovery success rates compared to pure commercial banks due to innovative portfolio management systems</p> <p>⇒ If appropriate technology is not used in the processing of biofuels (bioethano/biodiesel), the process is likely to produce more GHG (CO₂, CH₄, N₂O) than it is meant to displace hence accentuating the global warming and climate change effects</p> <p>⇒ Biofuels accepted as alternative and sustainable source of renewable energy; right policy is however required</p>

Biofuels/Bioenergy Stakeholder Group	Resources; Mandate, Roles and Functions in Biofuels Development	Strength, Weaknesses, Opportunities and Threats/ challenges (SWOT Analysis) in Biofuels Development	Biofuels/Bioenergy Interests/Needs/Expectations	Biofuels Development Perspectives/ Perceptions
		⇒ Weak national, regional and international cooperation (north-South, south-south) in developing vibrant biofuels industry.		

Appendix 3: LIST OF BIOFUELS DEVELOPMENT ACTORS/STAKEHOLDERS IN TANZANIA

1	ACTOR	OWNERSHIP	LOCATION	TYPE OF BIOFUELS INITIATIVE	LAND AREA (HA) REQUIRED	CONTACTS
2	SEKAB BioEnergy Tanzania	Swedish /Tanzania	Bagamoyo and Rufiji delta	Ethanol production	400,000	Tel: 255 0754 321840
3	PROKON Renewable Energy Solutions and Systems Ltd.	Germany	Mpanda, Rukwa	Establish and operate facilities for producing Jatropha based biofuels estimated at 11008 litres 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: 255 0717821486

1	ACTOR	OWNERSHIP	LOCATION	TYPE OF BIOFUELS INITIATIVE	LAND AREA (HA) REQUIRED	CONTACTS
4	WILMA	USA	Biharamulo, Kagera	Production of biodiesel from <u>Croton megalocarpus</u> (<i>muhihi</i>)		
5	Mitsubishi Corporation of Japan	Japan	Arusha and Dar es Salaam	Establishing Jatropha farms and operate facilities		
6	Farming for Energy, for better Livelihood in Southern Africa (FELISA)	Belgium, Tanzania	Kigoma	Establishing palm plantations in Kigoma.		Kigoma-farmingforenergy@yahoo.com
7	KAKUTE in Arusha	Tanzania	Monduli, Arumeru, Manyara			S.L.P 13954, Arusha Tel.: 255 0754 662646 E-mail: kakute@tz2000.com
8	Sun Biofuel Tanzania Ltd.		Kisarawe	Production of biodiesel	18,000	
9	TaTEDO	Tanzania	Nationwide	Awareness creation, training and capacity building; promotion and scaling up of improved biofuels modern technologies and services		Estomih N Sawe P. O. Box 32794, Dar es Salaam, Tanzania . Tel: 255-22-2700438. Mobile: 255 0754 ----- Fax: 255-22-2774400 Tel:255 0786 10288
10	Diligent Tanzania Ltd from Netherlands.	Netherlands	Arusha, Manyara, Kilimanjaro and Singida	Processing Jatropha oil seeds		
11	J and J Group (Pty) Ltd Pretoria – South Africa.	South Africa	Kaliua in Tabora	Establish Jatropha plantations	20,000	
12	Kagera Initiative for Poverty Reduction Goals (Kinga)	Tanzania	Kagera.	Growing Jatropha for Nursing Vanilla plantations.		
13	KITOMONDO LTD		Bagamoyo - Coast Region at Makurunge Farm	Bio diesel Plantation	2,000	+255 0754 387 505 S.L.P 34037 Bagamoyo kitimondo.rem@gmx.com
14	DONESTER from Canada	Canada	Manchari and Banyibabyi – Dodoma and Chalinze in Coast	Planning to establish Jatropha demonstration farm for oil production.	100 Acres	Tel: +255 0787 468781

1	ACTOR	OWNERSHIP	LOCATION	TYPE OF BIOFUELS INITIATIVE	LAND AREA (HA) REQUIRED	CONTACTS
15	JKT	Tanzania	region Oljoro acres100, Mgambo acres 100, Chita acres 100, Maramba JKT acres 100 Mlale JKT acres 50, na Ruvu JKT acres 500	Growing Jatropha and staff training	950 Acres	Tel: +255 0717043355
16	AMMA (Amsha Mabadiliko ya Maendeleo Africa)		Lushoto, Kagera, Kateshi, Pemba, Lindi, Mtwara, Tanga, Iringa, Dodoma, Singida, Shinyanga, and Ruvuma.	Jatropha farming and awareness		S.L.P 13646, +255 276 2072, +255 748 453 860, ammaconsultgroup@yahoo.com
17	KIKULETWA FARM		Kikuletwa Moshi.	South African investor-Peter (Burland)		
18	Matrix Poverty Eradication Foundation (MPEF)		Kibaha.	Planning to establish Jatropha plantation		Tel: +255 0784 388512
19	EUROTECH from Korea	Korea		Planning to grow 100,000 ha of castor oil and Jatropha for biodiesel... Planning to invest more than USD 20 million.	10,000	Tel: +255 0784 751622
20	BP			Planning to invest in <i>bioethanol</i> . Insisting the Government to formulate biofuels policy.		Tel: 027 214082181_
21	Export Trading Co. Ltd			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:+255 022 2124473/75 Tel:+255 022 2124473/75 Tel: +255 0754 432883 E-mail: etcexprrtradinggroup.com
22	Luxevera Ltd		Shinyanga	Working in collaboration with their colleagues from UK and Netherlands. Planning to grow Jatropha and Sun Flower for biodiesel		Tel: +255 0787 098942
23	Mkamba Forest and Wildlife conservation			Group of 15 people 15 engaged in environment conservation. Wanahusika		SLP, 30 Mkuranga Pwani

1	ACTOR	OWNERSHIP	LOCATION	TYPE OF BIOFUELS INITIATIVE	LAND AREA (HA) REQUIRED	CONTACTS
24	Group (MFWC G) JCJ Co. Ltd		Mwanza, Mara, Shinyanga and Tabora.	pia na hifadhi ya mazingira. Working with people from Swaziland. Planning to establish Jatropha farm under NEPAD assistance		Te: +255 0754 445844 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 cfeeey@africaonline.co.tz
25	Tanzania Green			Planning to grow Jatropha	1000	Tel: +255 0784 279777 Tel: +255 022 286202144 Fax: +255 022 286 20214/5
26	Environmental and Economic Development (EDEN)		Wangingombe, Saja and Nyanyembe – Njombe District	Planning to grow Jatropha	100	Tel: +255 0786 363675
27	Social Services and Environmental Association. (SSEA)		Close to University of Dar es Salaam	Women group in Kinondoni District Planning to supply jatropha seedlings for sell. wengine.		Tel: +255 022 2851237 Tel: +255 0784 463965 Tel: +255 0754 309285 Tel: +255 022 2700580
28	Mbono Group			Farmers group Ilala District		Tel. +255 0786 542457
29	SAVANN BIOFUELS		Kongwa Dodoma	Plan to grow Jatropha and have planned to grow 2500 in this season Babati	50	Tel : +255 0754 273336

1	ACTOR	OWNERSHIP	LOCATION	TYPE OF BIOFUELS INITIATIVE	LAND AREA (HA) REQUIRED	CONTACTS
				Wlayani Kongwa.		Email: canppro@rogers.com
30	USANGU Jatropha Project		Usangu	Planning to establish Jatropha farm	100	Tel: +255 0754 494910
31	Mahenge ????????		Mahenge	Planning to establish Jatropha farm	100	Tel: +255 0787330211
32	Edward Sanda		Dodoma	Planning to grow Jatropha	100 Acres	Tel: +255 0754 210155
33	UBUMWE		Kibondo	Group with 100 members with plan to grow Jatropha.		UBUMWE S.P. 140 Kibondo
34	Tanzania Moringa Farmers Association (TAMOFA)		Morogoro and Dar es Salaam.	Plan to establish Jatropha farm	20	Tel. +255 0754 306881
35	Enviro-Technology Fuel		Tanzania/ British and S Africa	Producing biofuels		P.O. Box 42355 DSM
36	Africa Biofuel and Emission Reduction (T) Ltd.	USA, Tanzania	Biharamulo Kagera	Bio-Fuel Product	60,000	P.O. Box 14317, Kagera
37	TM Plantations Ltd.	Malaysian	Kigoma	Oil Palm plantation		P. O. Box 772, Kigoma
38	Sivas Africa Ltd. P.O. Box 15398 DSM	Indian/ Tanzania	DSM	Agriculture Biodiesel		P. O. Box 15398, DSM
39	Bio Shape (T) Ltd	Dutch	Lindi	Jatropha Plantation		
40	Arusha Cuttings	Netherlands	Arusha	Jatropha growing	10,000 hectare are already grown	
41	Dutch Agricultural group		Bagamoyo	jatropha		
42	Illovo of South Africa and ACSL and CIEL Groups of Mauritius	South Africa Mauritius		Invested in sugar cane plantations in Tanzania are producing ethanol and generating power for their own use and sell surplus to the national grid.		
43	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.		
44	Sithe Global Power, LLC	US		Has announced plans to develop 50,000 hectare of oil palm plantations and refineries in Tanzania		

1	ACTOR	OWNERSHIP	LOCATION	TYPE OF BIOFUELS INITIATIVE	LAND AREA (HA) REQUIRED	CONTACTS
45	InfEnergy	UK		Has optioned a 10,000 hectare site for an irrigated oil palm plantation		
46	Palm Oil Group	Malaysia		Expects to develop 40,000 ha in Kigoma to complement production in Malaysia		
47	Ministry of Energy and Minerals	Tanzania	Dar es Salaam	Policy, legal and institutional regulatory framework		Paul Kiwele, Principal Energy Officer (255 0655 380680)
48	Ministry of Agriculture and Food Security	Tanzania	Dar es Salaam	R and D (Biofuels Crops Development); policy and institutional regulatory framework		Geoffrey Kirenga (255 0756 480 069) Ester Mfugale (255 0754 579489)
49	COSTECH	Tanzania	Dar es Salaam	R and D (Biofuels Crops Development); policy and institutional regulatory framework		Salvatory Mushi (Director, Renewable Energy) 255 0754 753 245)
50	Ministry of Natural Resources and Tourism	Tanzania	Dar es Salaam	R and D (Biofuels Crops Development); policy and institutional regulatory framework		Ellasy Mujilla (Principal Forest Officer)/ Dr Aloo (255 0754 289 109); Dr F. Kilahama (255 0784 007400)
51	Rural Energy Agency (REA)	GoT	Dar es Salaam	Promotion, technical and financial support		Eng Bengiel Msofe (255 784 969 313)
52	HAKIARDHI	NGO	Da es Salaam	Policy advocacy/lobbying, awareness creation, land rights research		Cathbert Tomitho (255 712 831979; 787 292 224)
53	CEEST	NGO	Dar es Saam	R and D; policy research, awareness creation		Maynard Lugenja (255 754 408 916)
54	WWF	CSO	Dar es Salaam	Biodiversity and nature conservation; policy advocacy/lobbing; awareness creation		Peter Sumbi; Tanzania Program Forest Officer (255 784 415 159) John Salehe; East and S Africa Regional Program Officer (254 20 387 7355)
55	UDSM/CoET	Tanzania	Dar es salaam	R and D (Biofuels Crops Development); policy and institutional regulatory framework		Dr Oscar Kibazohi; Senior Lecturer Industrial Biotech, Biofuels and Environmental Management (255 713 296 883)
56	Envirocare	NGO	Dar es Salaam	Nature and environmental conservation; policy advocacy/lobbing; awareness creation		Loyce Lema (255 22 2701407)
57	TPDC	Parastatal	Da es Salaam	Bioenergy development, policy and regulatory framework		Sangwene/Leo Lyaruka; Principal Marketing Officer (255 715 218155; 784 218 155)

1	ACTOR	OWNERSHIP	LOCATION	TYPE OF BIOFUELS INITIATIVE	LAND AREA (HA) REQUIRED	CONTACTS
58	EWURA	GoT Agency	Dar es Salaam	Bioenergy policy, institutional regulatory framework		Eng Godwin Samwel; Commercial Manager (255 782 110 062)
59	VPO/Environment	GoT	Dar es Salaam	R and D (Policy and institutional regulatory framework; environmental conservation)		N Mwhava (255 754 542832)
60	NEMC	GoT	Dar es Salaam	Policy and institutional regulatory framework; environmental conservation; EIAs		Eng James Ngeleja (255 0713 785 193)
61	Sugar Board of Tanzania	GoT/Parastatal	Dar es Salaam	Bioenergy policy, institutional regulatory framework; biofuels production and processing		Mathew Kombe (255 22 2110595)
62	TANGO	NGO Apex	Dar es Salaam	Policy advocacy/lobbying, awareness creation, land rights research		Executive Director (255 713 619 187; 784 286507)
63	LEAT	NGO	Dar es Salaam	Policy advocacy/lobbying, awareness creation, environmental and nature conservation		Emmanuel Massawe (255 22 2780859)
64	Donors (UNDP, EU, GEF, SIDA, NORAD)	Foreign Missions/NGOs	Dar es Salaam	Resource mobilization; technical/financial support; policy/institutional framework awareness creation, environmental and nature conservation		
65	CAMCO/CSD	NGO	Dar es Salaam	Nature and environmental conservation; policy advocacy/lobbying; awareness creation		Francis Songela (255 0783 492 601)
66	CPCT	NGO	Dar es Salaam	Nature and environmental conservation; policy advocacy/lobbying; awareness creation		Cleophas Migiro (255 22 2602338)
67	EPMS	NGO	Dar es Salaam	Nature and environmental conservation; policy advocacy/lobbying; awareness creation		Rose Mero (255 22 2120429)
68	TFCG	NGO	Dar es Salaam	Nature and environmental conservation; policy advocacy/lobbying; awareness creation		Charles Meshack (255 22 2669007)
69	Leguruki Village	Local Gov	Monduli District	Jatropha/MFP Pilot project		Goodluck Mangusha (255 0784 514 927)
70	Muheza DED	Local Gov	Muheza District	Biofuels technology testing and dissemination		Modest Nyimbile (255 0784 675 647)
71	Kisarawe DED	Local Gov	Kisarawe District	Biofuels technology testing and		Leonard Alinanuswe (255 0712 784 375)

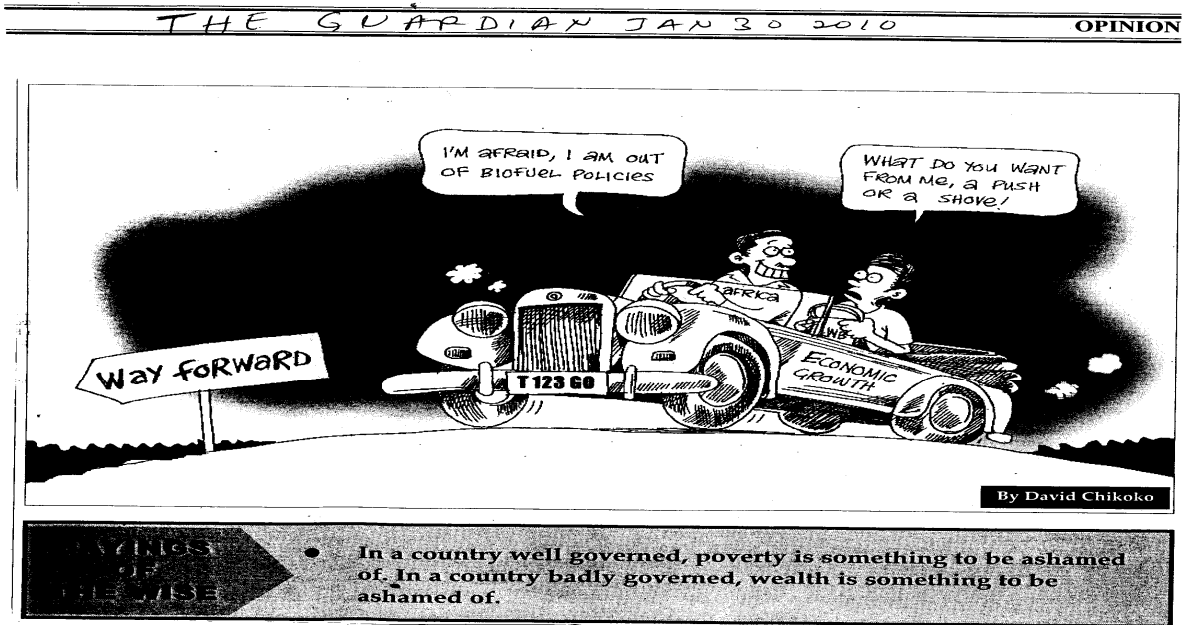
1	ACTOR	OWNERSHIP	LOCATION	TYPE OF BIOFUELS INITIATIVE	LAND AREA (HA) REQUIRED	CONTACTS
72	Kilwa DED	Local Gov	Kilwa District	dissemination Biofuels technology testing and dissemination		DED (255 23 2013005); WWF Office (255 0784 775877)
73	Rufiji DED	Local Gov	Rufiji District	Biofuels technology testing and dissemination		WWF/Rufiji (255 0756 902081)
74	Bagamoyo DED	Local Gov	Bagamoyo District	Biofuels technology testing and dissemination		DED Office (255 23 2630420)
75	Mpanda DED	Local Gov	Mpanda District	Biofuels technology testing and dissemination		DED Office
66	Arumeru DED	Local Gov	Arumeru District	Biofuels technology testing and dissemination		Arumeru DED
77	FELISA	NGO	Kigoma	Biofuels production and processing		Dr H. Hongo (255 0758 406688)
78	KAKUTE	NGO	Arumeru	Biofuels production, processing, marketing; coordination		Manyanga (255 0754 662446)
79	Guardian Newspaper	Tanzanian	Dar es Saam	Biofuels promotion, policy advocacy and awareness creation		Felix Andrew (255 0713 654505) Lucas Mkumbo (255 0755 996019)
80	East African	Tanzanian	Dar es Salaam	Biofuels promotion, policy advocacy and awareness creation		Modest Nyimbile (255 0784 675 647)
81	The Citizen Newspaper	Tanzanian	Dar es Salaam	Biofuels promotion, policy advocacy and awareness creation		Leonard Alinanuswe (255 0712 784 375)
82	The Daily News	Tanzanian	Dar es salaam	Biofuels promotion, policy advocacy and awareness creation		Editor (255 22 2110595)
83	JET	Tanzanians	Dar es salaam	Biofuels promotion, policy advocacy and awareness creation		
84	SUA	Tanzania	Dar es salaam	R and D (Biofuels Crops Development); policy and institutional regulatory framework		Dr Mzunda; Senior Lecturer Biotech, Biofuels and Environmental Management Prof Emmanuel Luoga
85	SPARKNET	Tanzania	Dar es salaam	Biofuels networking, advocacy/lobbying		

Appendix 4: List of News Articles Analyzed

S/N	Date	Title of article	Newspaper	Section
1	Wednesday 30th July 2008	Biofuels down, energy saving up EU climate plan	The Guardian	
2	Tuesday 19th Aug 2008	Biofuel production guidelines coming	The Guardian	
3	Friday 21 st January 2008	New launched liquid biofuels development guidelines received with guarded optimism	The Guardian	Features
4	Friday 21st January 2008	Biofuels in a nutshell	The Guardian	Features
5	Friday 7th January 2011	Why biofuel is highly barricaded in Tanzania	The Citizen	Local features
6	Tuesday 12th October 2010	New biofuel development guidelines unveiled in Dar es Salaam	The Guardian	National news
7	Sunday 20th Nov 2010	Oil will run out 100 years before new fuels developed	The Citizen	Opinions
8	30th Jan 2010	WB: Biofuels Africa's future clean energy	The Guardian	International Business news
9	30th March 2009	Reaction to biofuels production in Tanzania	The Guardian	Opinions
10	Thursday 24th July 2008	Jatropha: Possible solution for domestic rural energy production	Daily news	
11	Sunday 5th June 2011	Bio-fuels boom: Another curse to Tanzania or a blessing?	The Guardian	News
12	Tuesday 7th June 2011	Golden age for Brazil ethanol? Not quite	The Guardian	
13	Sunday 10th April 2011	Sh600tr 'needed yearly to cut oil use'	The Citizen	Business news
14		Biofuel use likely to cause food crisis		
15		Harakati za TATEDO kuhamasisha kilimo cha nishati uoto nchini		
16		Handeni and Muheza farmers form groups to grow jatropha		
17		Govt warns against misuse of land in food growing regions		
18		Halt-Bio-fuel investments		
19		The new green gold: Jatropha		
20	March 9 th 2011	Tanzania Biofuel Project's Barren Promise	IPS/Free reporter	
21	14 th Oct 2009	Tanzania Suspends Biofuels Investments		

22	2 nd April 2011	Bio-fuel investments in Tanzania: There was little involvement of people in decision making – Study	The Guardian
23	4 th May 2011	Lack of clear policies marginalizing bio-fuel production`	The Bioenergy Site News Desk
24	15 th Feb 2010	8. Jatropha bio-fuels: the true cost to Tanzania	Freelance Journalist
25	25 th Jan 2010	9. Jatropha biofuels: the true cost to Tanzania	This day Newspaper
26	4 th June 2006	Bio-fuels and neo-colonialism	Pambazuka.org
27	15 th Feb 2009	Growing 'land question' alarm over foreign bio-fuel investors in Tanzania	IPP media
28		Tanzania: NGO calls for useful policy on bio-fuels	The Citizen
29	23 rd April 2011	INSIGHT: Land ownership question key in clamour for change	The Citizen
30	5 th Oct 2009	Tanzania: Public Fury Halts Bio-fuel Onslaught On Farmers	The East African
31	13 th July 2010	Study: Tanzania has big bio-fuel potential	The Citizen
32	Feb 2009	Laws needed to guide bio-fuels development	Business Daily
33	2 nd May 2010	Ethanol can bring \$30 million annually	Piga Hodi.com
34	15 th Dec 2009	Cassava bio-fuel production denies Coast residents food	The Guardian
35	6 th January 2010	Experts: Do more research on bio-fuel business	The Guardian
36	17 th January 2011	Pangani resorts to develop biofuels from coconuts	The Citizen
37	20 th Sept 2010	Demand for biofuel to hit food supplies	The Citizen
38	25 th Aug 2010		The Citizen
39	8 th July 2010	We can learn from Brazil's big success	The Citizen

Appendix 5: Biofuels Media Perception Cartoon in the Guardian (Tanzania) Newspaper



Appendix 6: Typical Biofuels Newspaper Articles: The Citizen of Tanzania (www.Citizen.co.tz)

Why biofuels Issue is Highly Barricaded in Tanzania

Friday, 07 January 2011 11:01



Jatropha farm

By **Timothy Kitundu The Citizen Correspondent**

Dar es Salaam. The production of biofuel in Tanzania has been meeting obstacles day come day go. Critical thinkers, academicians and experts have in most cases discovered that nonchalantly, it is believed by the majority Tanzanians that it is a blessing and a means of alleviating poverty whereas it is the opposite.

The advent of biofuel production was introduced using sweet languages by investors and Tanzanian politicians, of good-looking promises of supporting important sectors such as social services development and other make-believe offers that later on were never implemented.

It is essential that before embarking on the cons and pros of biofuels production in Tanzania, its better to know what in reality biofuels are.

Biofuels are broadly defined as liquid, solid or gaseous fuels that are predominantly or exclusively produced from biomass. The main types of biofuels include biodiesel, ethanol, or purified biogas derived from crops, plant residues or wastes. All of these can be used as a substitute or supplement for the traditional fossil fuels used for transportation, domestic, and industrial uses.

Having known that let us touch on the reasons of the spread of biofuel production in Africa especially in Tanzania. External interest in biofuel production in African countries is driven largely by the low cost of land and labour in rural Africa.

Investors are targeting many areas of land which are perceived as being 'unused' or 'marginal' in terms of their productivity and agricultural potential. With interest in allocating such areas for biofuel increasing, the security of land tenure and access or use rights on the part of local resident communities across rural African landscapes is potentially at risk.

Land tenure in rural Africa is often characterised by a high level of insecurity, as a result of the colonial legacy of centralised ownership of land by the state, coupled with weak mechanisms for accountability and enforcement of land rights.

As the commercial potential of marginally productive rural lands increases across Africa due to growing interest in biofuels, the risk of large-scale dispossession of customary lands belonging to farmers and pastoralists may increase.

In addition, expansion of biofuel production may lead to other negative impacts such as environmental damage, for example due to deforestation or industrial pollution, and indirect impacts from rising food prices where food crops are cultivated for biofuel production.

As a result of these manifold factors, there is widespread concern about the adverse impacts of commercial biofuel production in rural Africa. The concerns by civil society organisations (CSOs) about the adverse impacts of biofuel projects, as well as continuing private interest in biofuel investments, have led to a substantive dialogue between CSOs and government in Tanzania about the development of policy guidelines for biofuels.

There has also been a flurry of applied research reports produced by CSOs on biofuel development in Tanzania, some of which focus on land tenure concerns and others which provide broad overviews of the full spectrum of social, ecological, financial, and policy issues surrounding biofuel development.

A special interview conducted to farmers in Kisarawe district under a special TMF funded programme reveals some shocking findings which the villagers, who are the land owners faced some sort of being 'conned' through a hail of promises of employment creation, construction of schools and health centres that proved futile.

According to Athumani Mkambala the Chairman of Muhaga village Kisarawe district Coast region, the biofuel investors arrived in October 2006 and made a series of promises purporting to develop them in the forms of construction of deep well, building of hospital structures and schools and improvement of roads.

The said promises have never been fulfilled even partially. The investor's sites are different from the villagers'. This means that they have all better facilities that include clean water, medical facilities and good infrastructure – drivable roads.

"When we query about the unfulfilled promises, the investors stay mum, whereas their deputy employees in the mid-cadre say that the issue of promises made is complex as it involves budget matters that are done abroad, so be patient on that," Mkambala said.

According to him, a total of 1,705 hectares have been leased to these investors out of a total of 8,000 hectares, a property of the 11 villages but he says the total focus of the investors is to own 4,000 hectares as the project of biofuel (jatropha) crop growing is expanding in the said villages.

According to him, the worst thing that pressed for the investor's to be given were local politicians who emphasized that if the villagers wanted development in social services, and alleviate poverty, they should give the land to these investors.

The push for land to investors was, according to Mkambala, was also advocated by a voters' representative (MP) a factor which motivated villagers to give out their land without thinking of the aftermath of the impact thereof.

A reputable academician and adamant advocate against land grabbing in Tanzania, also a former lecturer of the University of Dar es Salaam Prof. Issa Shivji recently said that it is worse because after privatizing other property we have now turned to the most precarious thing – food, which is depended upon by every human being. Players in the agricultural sector recently advised the government to suspend biofuel production pending establishment of suitable legal framework that will govern investment decisions and the energy's overall generation process.

Actionaid Tanzania, Oxfam and Haki Ardhi delivered the advice in Dar es Salaam on at the launch of a report titled: "Implication of biofuels production on food security in Tanzania." The organizations said formulation of a policy and legislation was important to ensure sustainability of biofuel production in Tanzania.

"Biofuel production should not compete with food security in terms of land, water and labour force. There should be clarity on the procedures of investment," the organizations noted in their joint statement.

In the absence of a policy and legal framework, biofuel production will have direct

implication on food security, land rights, the socio-economy and the environment.

The three organizations demanded, during the function which coincided with the World Food Day, that the government should increase its budget for the agricultural sector to at least 10 per cent as per the Maputo Declaration, as currently, the government allocates 9 per cent of its national budget to agriculture.

A study conducted by a team of experts from Sokoine University of Agriculture (SUA) in six districts including Kisarawe, Rufiji, Lindi, and Kilwa in Tanzania on biofuel production reveals one crucial issue is the country allowed investment in area 'blindly' or 'hurriedly'.

This means that Tanzania gave a green light to biofuel investors without formulating a proper policy framework to guide development of the sub-sector. In the absence of guidelines on how the investments should be established, the projects undertaken so far have resulted into more problems than it was expected, the study reveals.

Recently, the government formed the National Biofuels Task Force (NBTF) under the ministry of Energy and Minerals aimed at navigating a process of formulating biofuel guidelines as an ad-hoc resolution while waiting for the process to formulate a national policy.

According to the study, the NBTF that took off in 2008 released draft guidelines for sustainable development of liquid biofuels and co-generation in Tanzania which are still subject to discussion in order to solicit more contribution from various players.

The borrowed policies contain "blanket statements" that have no action plans and do not pinpoint a specific organization vested with coordinating biofuel production. Moreover, there is no solution aimed to regulate the already haphazard nature of biofuel production.

The Global Change Course Students of 2010 (Action aid Tanzania) who recently made a field research in the Kisarawe and Rufiji districts where a huge chunk of land has been grabbed by biofuel investors for producing biofuel have advised the government to stop allocating land for biofuel production without a policy that ensures food security and that is implemented.

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Appendix 7: Summary Notes of Field Discussion/Consultations with Key Stakeholders

Consultative Discussion/ Interview Checklist of questions

1. What is your/institution's role or function/responsibility in relation to biofuels?
2. Do you/your institution stand in favour or against biofuels?
3. Is your/institution's contribution in biofuels initiatives direct or indirect?
4. At which level do you/your institution involvement take place: in policy areas or in project initiatives? Please detail
 - Policy areas: climate, rural development, renewable energy ...
 - Projects initiative: please characterize in a few words its scale, if successful...
5. Who are the main actors influencing the public perception of biofuels?
6. What are main incidents influencing public perception on biofuels?
7. How are biofuel issues treated in the media?
8. Which cultural parameters determine the different standpoints in the public opinion on biofuels?
9. Which cases of biofuel development in other countries are most known in your country? In each case, does it represent a good practice or a negative example?¹⁵
10. Which **crises** have occurred in the last 5 years that may have affected the perception of biofuels?

NB: a crisis is defined as "an unstable condition, as in political, social, or economic affairs, involving an impending abrupt or decisive change." Examples: food price crisis, oil price crisis, more locally: water shortage

For each crisis, please detail:

- how hard it hit the country or the local economy
- how it affected the perception of biofuels
- if this influence was local, national or international
- if national, whether there has been some national or local specificities
- to what extent is the country perceived as vulnerable to future crisis

Media analysis

The objective is to characterize the frequency and depth with which biofuel issues are treated in different types of media. Thereby the following questions shall be answered:

- How much attention is given by media to biofuel development, energy crop extension, innovations in the energy and transport sectors?
- What have been the major media of general information on biofuels?
- In what sections of newspapers and TV news information on biofuels is mainly found (science, environment, economy, events, etc.)?

For each case study country, examples for media coverage of biofuels should be collected and included in the report.

¹⁵ Examples for Costa Rica are: Brazil is described as ethanol success story, Colombia for adapted small-scale technologies and the United States for trade and agricultural policies.

Cultural parameters

Cultural parameters are important in explaining why some of the above-mentioned variables have more influence than others on the public perception of biofuels. The following questions shall be answered:

- Did any group take position in favour or against biofuels from a religious, ethical, moral, or socio-historical standpoint?
- What are the social and cultural arguments mostly used in the construction of public perception of innovations, changes of habits and customs, opening to international markets?

Examples of social and cultural arguments are progress, economic growth, natural capital, livelihoods, etc.

Questions on biofuel initiatives:

Do you know about biofuel projects?

- locally?
- in the country?
- In other countries?

Are they successful?

Questions on the role of public policies

What do you think is a priority for your region/your country? What are the main issues that policies should address first?

Please carefully note the order in which issues are mentioned if any is mentioned spontaneously. Otherwise propose a list and ask the interviewee to rank policy areas. Ex.: air quality, climate change, rural development, non fossil energy development...

Questions on appreciation of biofuels

How do you appreciate biofuels? Do you think biofuel development is sustainable? Are you in favour or opposed to biofuel development? Why?

Please evaluate the precision of the answer, whether a specific type of biofuel is mentioned

Questions on criteria

What aspects of biofuel development do you think are critical?

Please carefully note the order in which issues are mentioned if any is mentioned spontaneously. Otherwise propose a list and ask the interviewee to rank the issues. Ex.: competition with food production, fuel quality for the motor, climate change mitigation, deforestation...

Final open question

What would you like to add on biofuels?

Stakeholder Mapping of Biofuel

For each stakeholder or category of stakeholder, please detail:

- What is his/her role or function/responsibility?
- At which level does his/her involvement take place: in policy areas or in project initiatives? Please detail
 - Policy areas: climate, rural development, renewable energy ...
 - Projects initiative: please characterize in a few words its scale, if successful...
- Is this contribution direct or indirect?

- Does (s)he stand in favour or against biofuels?

TaTEDO

Date of Interview: May 20, 2011)

Participants:

- i) Estomih Sawe (Executive Director)
- ii) Jensen Shuma (Head of IT Department)
- iii) Ms Upendo Kavalambi (Librarian and IT)
- iv) Ms Gisella Ngoo (Head of Liquid Biofuels Department)
- v) Leonard Pesambili (Head of Biomass biofuels Program)
- vi) Luta
- vii) Daulinge
- viii) Busiga
- ix) -----
- x) -----

Discussion Notes Summary

- There are about 100 known stakeholders actively participating in biofuels initiatives in Tanzania in different functions and responsibilities including policy development, R&D, resource mobilization, production of feedstocks, processing and marketing of biofuels, quality control and standardization etc (refer to the list of biofuels stakeholders);
- TaTEDO's roles and responsibilities include R&D; technical support, technology testing and scaling up, promotion and marketing; business and financial support; advocacy, lobbying and advisory services.
- TaTEDO is a key supporter and promoter of the sustainable pro-poor rural-focused appropriate biofuels initiatives aiming to contribute to poverty reduction, energy self-sufficiency, environmental conservation and mitigation of climate change effects.
- TaTEDO's contribution to the biofuels initiatives is direct in the form of resource mobilization, technology generation and dissemination, technical and business support services as well as advisory roles and functions
- TaTEDO is a biofuels initiatives national, regional and global focal point. We are intervening in the policy areas including climate change mitigation aspects, rural development, renewable energy development, etc
- TaTEDO is a pioneer of the biofuels initiatives in Tanzania. TaTEDO has implemented over ----- successful renewable energy projects including improved woodfuels stoves and ovens, biogas plants, solar systems, -----
- The main biofuels actors categories influencing the biofuels impacts and perceptions in Tanzania includes: a) media b) investors/developers c) R&D organizations d) donors/foreign government missions e) R&D higher institutions f) biofuels quality and standards regulatory institutions g) petroleum oil traders h) government/policy makers i) advocacy and lobbying civil and non-governmental organizations j) environmental conservation and impact regulatory organizations h) natural resources and biodiversity conservation organizations
- Several incidents have influenced biofuels public perceptions including:
 - ⇒ Climate change effects and global warming phenomena
 - ⇒ Oil crisis in 1973 onwards and escalating price of petroleum oil products hence petroleum oil rationing and limited driving in weekends
 - ⇒ Electricity power shedding and rationing, 2004 onwards

- ⇒ Extended and recurrent drought and food shortage and escalating prices of food products, 2004-2006
- ⇒ Economic Down-turn and drastic increase in food and petroleum product prices (2009 onwards)
- ⇒ TaTEDO/GTZ biofuels for transport study in Tanzania in 2005
- ⇒ National workshop on biofuels was conducted in Tanzania
- ⇒ Establishment of biofuels taskforce and biofuels users association in Tanzania
- ⇒ Establishment of national biofuels guidelines
- ⇒ WWF survey and establishment of biofuels guidelines blue print
- ⇒ COMPETE organized a biofuels workshop in Ngurdoto, Arusha in 2007.
- ⇒ The ministry of energy and minerals organized several biofuels workshops
- ⇒ FAO workshop and study on bioenergy and food security in Tanzania in 2010.
- ⇒ In-coming of pioneer biofuels investing companies in Tanzania (SEKAB, Sun Biofuels, Diligent, Bioshape etc); 'land grabbing' and using large-scale plantation approach requiring large tracts of land, use of agro-chemicals including pesticides, water for irrigation and therefore displacing rural communities without regards for their livelihoods.
- The media has adversely affected the public perception on biofuels, sharply criticising the manner by which biofuels investing companies have acquired land which has marginalized the rural communities creating social and political conflicts. The public including the media awareness of biofuels is low which has also contributed to the negative publicity.
- TaTEDO's perceptions on biofuels initiatives in Tanzania are the following:
 - Although there are internal driving forces (such as the need for energy self-sufficiency, petroleum oils import substitution and foreign exchange saving, rural development and industrialization, Kilimo Kwanza and the need for rural energy electrification), the current biofuels strategy in Tanzania is to a large extent externally driven and motivated;
 - Biofuels is a global initiative following the UNFCCC concerns for climate change effects and global warming phenomena and hence the Kyoto Protocols. Tanzania has ratified the Kyoto Protocols and therefore has no option but to actively participate and support the mitigation efforts including biofuels initiatives. Tanzania is also part of the global economy which in one way or another has included biofuels as a trading commodity.
 - It is unfortunate that the biofuels policy development has lagged behind the implementation process. Supported by upfront sound policy, legal and institutional regulatory framework, biofuels initiatives are likely to positively impact on the economic and social development in Tanzania, global environmental conservation and contribution to the efforts to mitigate the climate change effects. For instance there are large quantities of molasses (over 20,000 tons/year) produced from in the sugar processing factories whose disposal is currently an environmental problem but which is a good feedstock for the production of bioethanol;
 - Access to appropriate modern sustainable biofuels technologies and services particularly in the rural areas has significantly improved the livelihoods of the rural communities (women and women in particular) economically (energy cost-saving and income generation), socially (empowering women and unpacking the adverse gender relationships), environmentally (affordable and sustainable alternative energy sources hence reducing pressure on the natural forests; bioenergy leading to soil conservation), health status (reducing household gas emissions and bronchitis problems).
 - Biofuels initiatives were hurriedly introduced in Tanzania without adequate groundwork in terms of policy, strategies, performance targets and monitoring framework; inadequate knowledge base and public awareness; mechanisms for implementation, standards and environmental compliance criteria;

- Bioethanol /biodiesel appears to be promising economic opportunities in Tanzania, but requires a lot of groundwork technical and business studies to ensure a smooth take-off. With sound landuse plans, up to 10% of the land may be used for biofuels without any adverse effect on food and cash crop production.
- There are successful biofuels technologies developed in LDCs such as Brazil, South Africa, Malawi, Kenya etc; Tanzania only needs to transfer and adapt the technologies to hasten the biofuels development process.
- TaTEDO supports and promotes small-scale, pro-poor biofuels modern technologies and services focused on the rural areas to increase sustainability and affordability of clean energy. National self-sufficiency in clean energy, production of feedstocks and bioenergy processing in Tanzania; petroleum oil import substitution, foreign-exchange saving and export of surplus biofuels should be the over-riding priorities guiding the strategy.

Ministry of Energy and Minerals (MEM)

Date of Interview: May 23, 2011)

Participants:

1. Paul Kiwele (Principal Energy Officer)
2. Victor Stephen (Energy Engineer and Head of Biofuels Project)
3. Ms Upendo Kavalambi (Librarian and IT)
4. Ms Gisella Ngoo (Head of Liquid Biofuels Department)

Discussion Notes Summary

- Biofuels actors in Tanzania includes the Ministry of Agriculture and Food Security (MEM), MAFS, Ministry of Finance, TIC, MNRT, National Landuse Planning Commission, private sector companies, petroleum traders, biofuels investing companies, TPDC, advocacy and lobbying CSOs/NGOs etc
- Biofuels historical events and timelines include the following:
 - Concerns for depleting petroleum oils, scarcity of supply and escalating prices, depletion of national foreign exchange and hence need for alternative sources of energy/fuel; presidential directive to MEM to promote biofuels as an alternative;
 - Emergence of co-generation e.g. production of electricity from bagass, molasses, sisal wastes, crop residues etc;
 - Economic crisis, change in consumption patterns and low world market demand for the traditional cash crops (tea, sugar, coffee, tobacco, cotton, etc) and need for alternative cash crops such as jatropha, sugarcane for bioethanol, plant oils from oilseeds such as sunflower, cottonseed, etc;
 - Kilimo Kwanza (Agriculture First Strategy); opportunities for agriculture modernization and therefore need for rural electrification and industrialization (value-adding processing) for job creation, income generation, poverty reduction;
 - 'Agrofuels mania' and rush for investment in biofuels in Tanzania; European and USA companies quest for production and processing of biofuels in Africa and Tanzania which are conceived to have adequate resources, comparative and competitive advantage;
 - Brazil as LDC successful model of biofuels programme, has developed and tested several technologies including petroleum oil blending with biodiesel and bioethanol; engine adaptations and or fabrication of existing motor engine to use blended fuel i.e. 'flexi-fuel' engines and a national mandatory blending up to 25%. The model and technologies can be transferred and adapted for use in Tanzania cost-effectively.
 - Brazil's market share of biofuels exceeds 60% yet has used only about 3% of its land for biofuels. The outgrower schemes are most common biofuels production systems.

- Over 50 companies have shown interest to invest in biofuels in Tanzania, some have started operations and others are in different stages.
 - Some investors' approach in land acquisition has caused social conflicts with the rural communities; leading to adverse media publicity; some have decided to wind up operations;
 - Biofuels policy development process ongoing, donor such as Sweden and Norway have indicated their support to hasten the process;
 - Some investors earmarking high productivity areas conflicting/competing with food, cash and nature conservation land use needs;
 - Most investors have concentrated in jatropha as a source of feedstock but the ministry is also promoting investment into other sources such as palm oil and other oilseeds as a source of plant oils particularly because they have other economic uses in case the biofuels chain breaks;
 - Petroleum Act 2008 recognises blending of petroleum oils with biodiesel and bioethanol. TPDC in collaboration with Brazilian company Petrobras undertaking initial petroleum blending pilot studies which will guide the government to develop appropriate mandatory blending percentage;
 - Biofuels specific policy in advanced stage with generous support from Sweden and Norway. Delays in the policy process due to technical aspects and the need to involve all the stakeholders (multi-stakeholder process);
 - National Biofuels Task Force was established in 2006 with the ministry of planning, MEM, MAFS in the secretariat. Biofuels Technical Advisory Group was also established in 2010 to provide guidance in the technical aspects.
 - Tanzania Investment Centre (TIC) was given the role and mandate as a 'Biofuels One Stop Centre' to provide support in all aspects related to biofuels investments in Tanzania including land acquisition.
 - MEM has supported ongoing multi-stakeholder workshops to speed up the policy development process but also to create public (including media) awareness on biofuels countrywide;
- Cultural parameters influencing biofuels public perception includes:
- Cultural barriers in some tribes for using biofuels alternative sources such as biogas from human faeces which is a feedstock available in albitum in schools, prisons and other social centres;
 - Impacts of access to biofuels technologies (MFPs, improved fuelwood stoves/ovens, biogas etc) by women and hence economic and social empowerment becoming a threat to men (unpacking the gender dimensions);
- Government perceptions in general on biofuels initiatives:
- Supported by appropriate policy, legal and regulatory institutional frameworks, the biofuels program can contribute to the national energy security, poverty reduction and environmental conservation strategies;
 - Multi-stakeholder involvement is necessary to ensure a viable and sustainable biofuels program;
 - Effective biofuels strategy implementation, monitoring and impact assessment framework is necessary with multi-sector participation to ensure results-oriented program approach.
 - The negative impacts and media publicity of some of the pioneer biofuels investment companies such as SEKAB, Sun Biofuels, Bioshape, Agro-eco-Energy has negatively influenced the public perception and participation. A nationwide awareness creation campaign has been launched together with fast-tracking of the biofuels policy, establishment of a 'National Land Bank Agency', agroclimatic zoning and comprehensive land use planning are some of the government efforts to rectify the anomalies.
- Wayforward in the biofuels development initiatives includes land use and biodiversity sensitivity mapping to enable sustainable land use planning for food, cash and fuel crops alongside sustainable nature reserve conservation. Tanzania expects to collaborate with Brazil to transfer and adapt the blended fuel and flexi fuel technology;

- Similarly, so far, most biofuels investors have earmarked jatropha and sugarcane as key sources of biofuels specifically biodiesel and bioethanol. However, the government is also promoting other biofuel crops such as palmoil and other oilseeds such as sunflower, cottonseed, etc as alternative biofuels feedstocks which also have alternative uses in case the biofuels value chain breaks to minimize risks (the ministry notes the case 'Mlonge' a multi-purpose tree crop which was promoted for medicinal, water purification and nutritional purposes but the value chain broke which is a bad incidence that farmers always remember and recount;
- The government is also gathering lessons learned and conducting additional studies to enable appropriate decisions with regards to the most beneficial biofuels production and processing models that will ensure a win-win arrangement between the government, farmers/rural communities, investors and other actors in the biofuels value chain.

Commission for Science and Technology (COSTECH)

Date of Discussion: May 24, 2011

Participants:

1. Salvatory Mushi (Director, Renewable Energy Program)
2. Eng. Bakari Omari (Technology Promotion and Commercialization)

Discussion Notes Summary

- There are several biofuels actors in Tanzania, the active stakeholders are over 100.
- Over 50 biofuels companies have shown interest and are in different stages of investment.
- COSTECH's roles and functions include technical and policy advisory services; member of the Biofuels R&D Advisory Committee, ten members from the key ministries (MEM, MAFS, MF, VPO)
- Other functions include R&D support related to biofuels including technology and prototype generation, testing, training, promotion and scaling up sometimes in collaboration with other actors such as TaTEDO, MAFS, CAMARTEC and private sector companies such as Tabata Space Engineering Company;
- Key constraints for biofuels development includes lack of the critical policy, support institutions (e.g. financing, business development services) and infrastructure for technology dissemination and scaling up of successful technologies particularly in the rural areas. Public, private partnerships need to be promoted to achieve an accelerated and balance biofuels development;
- Inadequate government support (only 0.3% of budget) and incentives, hence low competitiveness of the investments compared to their counterparts in Europe and USA;
-

Biofuels Perceptions

- Biofuels is a global initiative, likely to be mainstreamed in the global trade commodities in the very near future, Tanzania has also ratified the Kyoto Protocols and therefore can not act in isolation but to actively participate but needs to be more prepared in terms of policies, strategies, implementation and monitoring frameworks, standards and regulatory frameworks;
- The biofuels investment companies (all foreign) 'rushed' to Tanzania, when the government and the public was not aware. They did not follow the laid down guidelines for land acquisition ('land grabbing') which resulted in social conflicts with the rural communities; hence negatively perceived;

- The government is now acting in retrospective to develop the guidelines and procedures, which may possibly reverse the negative publicity, adverse perceptions and lack of active participation by the stakeholders particularly the rural farmers and communities;
- Although Tanzania has the resources for biofuels, the lack of policy, institutions and incentives particularly to support the local investments, the program is likely not viable, competitive and sustainable;
- With the right policies, institutions, strategies and implementation mechanisms, biofuels may be viable, sustainable and may contribute substantially in the national strategies for energy self-sufficiency, petroleum import substitution, poverty reduction and mitigation to climate change effects.
- COSTECH supports biofuels program, however we need specific strategies and guidelines on the scale of production systems, promotion of local ownership, win-win arrangements with the producers, processors, traders etc in the value chain. Small-scale outgrower models have been most successful, lessons learned need to be shared and promoted.
- The biofuels program need to be diversified—investigate and promote other sources of feed-stocks such as algae, croton, cottonseed, palm oil in addition to jatropha which has so far been the only major source. Similarly, biogas and other liquid and solid biofuels alternatives should be researched and promoted.

National Environmental Management Council (NEMC)

Date of Discussion: May 25, 2011

Participants:

2. Eng James Ngeleja (Principal Environmental Officer/Head of Biofuels Department)
2. Eng. Bakari Omari (Technology Promotion and Commercialization)

Discussion Notes Summary

- NEMC's roles and responsibilities regarding the biofuels initiatives includes regulatory and advisory specifically EIA scoping, monitoring and certification; policy advice particularly related to environmental and social impacts of the investments;
- Biofuels is an important alternative source of cleaner energy particularly in the rural areas where only about 2% have access to modern energy services compared to over 14% who have access to modern energy services in the urban areas;
- Harnessing up 50MW mini-grid electricity feeding to the national grid is possible through cogeneration from biofuels (sisal biogas bioelectricity, natural gas, bagass/molasses, crop residues etc);
- Tanzania is positioned to produce adequate feedstocks for biodiesel and bioethanol for petroleum fuels blending up to 25% and enormous surplus for export without adversely affecting food security and or affecting nature reserves (for example from sisal fibre, timber and sugar processing by-products and crop residues such as rice husks, cotton stalks, maize husks, coconut shells);
- Non-biomass renewable energy resources such as LPG and coal to generate cleaner electricity in the efforts to mitigate the climate change effects;
- Bio-cogeneration is a potential source of cleaner energy in Tanzania that can greatly contribute to a wide range/spectrum of national strategies including poverty reduction, national energy security and self-sufficiency, rural industrialization and agricultural modernization/value addition processing.
- Public awareness creation should be enhanced, fast-track the biofuels policy process, develop specific indicators and performance targets and monitoring framework.
- NEMC's perceptions vis-à-vis biofuels initiatives in Tanzania are the following:
 - Biofuels is basically a good idea (if well planned and managed) which has potential to significantly contribute to the national and global efforts for sustainable natural resource management, environmental conservation and mitigation of the climate change effects and

- the global warming challenges, petroleum import substitution and foreign exchange saving which will in turn contribute to the national strategies for poverty reduction, rural industrialization and agricultural modernization (strengthening the Kilimo Kwanza strategy);
- The current biofuels program is narrowly focused in the sense that it is almost entirely based on the jatropha and sugarcane as the only sources of feedstock, should be expanded to include other possibilities such as algae, Croton Megarocarpus, etc to minimize risk;
 - Similarly, other renewable energy sources such as bioelectricity mini-grid cogeneration from crop wastes, bio-refuse and by-products (e.g. sisal wastes, molasses, natural gas etc);

University of Dar es Salaam (Department of Chemical and Processing Engineering)

Date of Discussion: May 25, 2011

Participants:

Eng Dr Oscar Kibazohi (Senior Lecturer and Head of Dept)

Discussion Notes Summary

- UDSM (Chemical and processing Engineering) like other institutions of higher learning, are involved in biofuels R&D; technical and policy advisory services; business development support services;
- Other functions include R&D support related to biofuels including technology and prototype generation, testing, training, promotion and scaling up sometimes in collaboration with other actors such as TaTEDO, MAFS, CAMARTEC, IPI and private sector companies;
- The 'biofuels mania' started in Europe and USA following concerns for climate change effects and global warming phenomena that culminated in the Kyoto Protocols. LDC's and Tanzania in particular were perceived to have 'idle' resources including land, labour and water for irrigation and therefore comparative advantage as far as biofuels production and processing are concerned;
- Tanzania was unprepared in terms of policies, strategies and regulatory institutional frameworks when the biofuels investors from Europe 'stormed' into the country;
- 'Land grabbing' has caused adverse effects on the rural livelihoods. The large-scale plantation approach, export-oriented which was used failed to deliver the promises for job creation, income generation; the pioneer biofuels investments have not and will likely not contribute to the national strategies for energy security/self-sufficiency, petroleum import substitution, foreign exchange saving, poverty reduction strategies, environmental conservation and mitigation to climate change effects strategies.
- The UDSM and higher institutions of learning perceive the biofuels initiatives in Tanzania as:
 - A good idea but implementation based on adhoc strategies without specific policies and guidelines, SMART indicators, baselines and performance targets and there has initially failed and or it is bound to fail is the status quo continues;
 - Tanzania is positioned to produce adequate feedstocks for biodiesel and bioethanol for petroleum fuels blending up to 25% and enormous surplus for export without adversely affecting food security and or affecting nature reserves (for example from sisal fibre, timber and sugar processing by-products and crop residues such as rice husks, cotton stalks, maize husks, coconut shells);
 - If the existing potential is exploited in the right manner, the biofuels program may yield more benefits (national energy self-sufficiency/petroleum import substitution, forex saving poverty reduction) compared to the expected adverse impacts (environmental degradation, food

insecurity etc). According to the FAO study (BEFS in 2010)¹⁶ Tanzania is believed to have adequate resources (land, labour) to produce enough biofuels feedstocks without adverse effects on food and other cash crop production. Appropriate policies, legal and institutional regulatory frameworks with effective enforcement are however necessary. The national priority should be food first but also sustainability of the natural resources and the environment are crucial aspects.

- Tanzania is part of the global economy which has to some extent embraced the biofuels as a tradable commodity, we can not distance ourselves from the initiatives but we need to be better prepared in order to be in the winning side;
- If Brazil has made it with Flexy-Fuel system using 100 percent blended fuel, why not Tanzania. The government needs to improve and closely monitor an improved biofuels incentives package to stimulate investments particularly in the rural areas where business viability is relatively low. The stakeholders should also promote public and private partnership in biofuels win-win investment arrangements;
- Tanzania needs to invest more in biofuels R&D specifically transfer of successful technologies from LDCs such as Brazil and adaptation to the Tanzanian environment which will speed up the development process cost and time-effectively.

Rural Energy Agency (REA)

- REA's key roles and functions in relation to biofuels are:
 - Support to rural energy development and investments (private and public) including capacity building, business plans, financing/linking with financial institutions, EIAs and others;
 - Rural energy investment promotion e.g. mini-hydro electricity plants e.g. Kifaru bio-ethanol plant
 - Collaboration with TPDC in development of petroleum blending technologies and quality aspects
 - Bioenergy policy advisory services
 - Awareness creation on bioenergy technologies, e.g. World Bank supported Lighting Rural Competition.
- Key events in Tanzania related to biofuels include the following:
 - Energy Crisis in 1974/75 onwards
 - Government initiatives to promote search for alternative renewable energy sources
 - Global concerns for Climate Change effects and Global Warming and hence Kyoto Protocols
 - Tanzania National Electricity Supply Company (TANESCO) and EWURA promotion of small electricity power plants/cogeneration mini-electricity grids
 - Establishment of the Rural Energy Working Group (REWG) whose main role is to address cross-cutting issues
- REA's perceptions on biofuels initiatives in Tanzania are:
 - With proper strategies, policies and regulatory institutional frameworks, biofuels program in Tanzania has the potential to contribute to the national energy security as alternative source of renewable energy;
 - Public awareness and knowledge of biofuels is a challenge
 - Need for piloting the biofuels initiatives and technologies to minimize risks, increase resource allocation, effectiveness and impacts;

¹⁶ Dr Oscar Kibazohi was one of the participants in the BEFS conducted in Tanzania.

- Need for integrated modern energy program, a blend of biofuels, mini-hydro plants, electricity mini-grids based on cogeneration from renewable sources (crop residues, saw dust, sisal wastes and other industrial by-products; wind and solar technologies;
- There are gaps in the biofuels program in Tanzania including:
- Low capacity to develop bankable bioenergy business plans that can attract funding from international organizations including World Bank, UN-organizations and other donors;
- Inadequate promotion and scaling up of successful bioenergy technologies;
- Slow pace in developing appropriate policy, strategies and regulatory framework;
- Lack of investment incentive schemes and private investments;
- Cultural impacts of biofuels program include:
 - Due to some cultural norms, some people do not feel comfortable using energy from renewable sources such as human faeces which is available in albitum;
 - Increased access to bioenergy technologies such as biogas, MFPs, improved woodfuel stoves/ovens, solar panels etc has empowered women and therefore unpacking some of the gender dimensions
- Way-forward to increase the impact of biofuels initiatives in Tanzania:
 - Fast-tracking of the policy development process
 - Government/donors to support comprehensive bioenergy studies to evaluate potential for blending biofuels with petroleum, cogeneration electricity plants to strengthen the national electricity grid, ideal biofuels production systems to ensure win-win arrangements, impacts on climate change effects, poverty reduction and national energy security;
 - Speed up comprehensive landuse plans and biodiversity sensitivity to enable sustainable land allocation to food, cash and biofuels crops.

Energy and Water Regulatory Authority (EWURA)

- Key responsibilities and roles include energy technical regulatory functions (quality, standards, health, environmental conservation aspects) and energy-related economic regulatory functions (price, fair competition, investment support, policies and institutional frameworks);
- So far, biofuels investments in Tanzania are still at exploratory stage, EWURA has not approved/certified any commercial biofuels energy production and trading/marketing;
- EWURA's perceptions on biofuels initiatives in Tanzania include the following:
 - The fact that there are technical findings indicating that the hydrocarbon petroleum products reserves are depleting, it is about the right time that Tanzania should consider for alternative renewable energy sources;
 - However, as the government invests in the biofuels, there should be a balance between food crops and fuel crops production to ensure both the national food and energy security;
 - There is a need for establishment of a 'national Bioenergy Think Tank' and comprehensive studies to provide proper technical advisory services that will properly guide the national investments and interests (food and energy security, economic and environmental gains, and so forth);
 - The biofuels policy should have been in place before approval of biofuels investments
 - There is a need for a biofuels masterplan that integrates investment guidelines (production systems, land acquisition procedures, processing aspects, trading aspects), short and long-term food and energy security aspects, benefits and impacts to harmonize the investments.

Centre for Energy, Environment, Science and Technology (CEEST)

- Key roles and responsibilities include technical and socioeconomic advisory services to the stakeholders such as VPO, private sector investors, partnership with other promoters such as TaTEDO etc.
- Tanzania's involvement in biofuels is absolutely necessary considering the large amounts of foreign exchange used for petroleum imports, effects on the environment taking into consideration the climate change effects, global warming and the fact that the global hydrocarbon fuels reserves are fast depleting;
- Tanzania's justification for investment in Biofuels initiatives include lessons learned from other countries that have successful biofuels programs such as Brazil, India, Malawi; adequate land and other resources, ongoing biofuel trial investments including the jatropha and palm-oil-based systems; cogeneration mini-grids from crop residues etc.
- Key risks/threats include: competition with food crops, lack of adequate knowledge on biofuels pests and diseases which can be a threat to agriculture.
- Perceptions on the biofuels initiatives in Tanzania include the following:
 - Farmers may be attracted by the short-term benefits including high prices at the expense of the long-term effects such as food security.
 - Biofuels program has not been supported by appropriate specific policies and regulatory frameworks;
 - Tanzania need not re-invent the biofuels wheel, but invest in technology transfer and adaptations of successful technologies from countries such as Brazil, China, India, Malawi etc;

Land Rights, Research and Advocacy Organization (HAKIARDHI)

- Roles and responsibilities include research and studies in the socioeconomic and environmental impacts of biofuels e.g. land acquisition and impacts on the rural communities in Rufiji, Kilwa; training and public awareness creation; support in legal advice in land-related cases;
- While biofuels is a necessary strategy for Tanzania, it is supposed to be supported by sound policies, legal and institutional frameworks particularly the right procedures for land acquisition and allocation;
- There is also a need for fast-tracking the envisioned comprehensive landuse and biodiversity sensitivity mapping to ensure sustainable land allocation to food, fuels, nature reserves etc;
- Most villagers are not aware of the short and long-term implications for allocating their land to biofuels investors; and worse still, they are not getting market-value for their land;
- HAKIARDHI has been training villagers and creating awareness on the implications of giving away large tracts of their land to biofuels investors in many cases without consideration for the land needs of their villages for food and cash crops production;
- Examples of biofuels investors that have not followed proper land acquisition and compensation procedures according to HAKIARDHI's research (HAKIARDHI Fact Finding Mission in Rufiji, Kilwa, Bagamoyo, Mpanda, Rukwa, Kisarawe Districts, 2010) include Bioshape (in Rufiji and Kilwa districts), SEKAB (in Bagamoyo, Kilwa and Rufiji districts). Bioshape acquired land for biofuels in Rufiji and Kilwa districts, they have not developed the land according to the investment plans, and instead they have plans to abandon the investments, sub-leasing land etc after serious destruction of the natural forests.
- Villagers in the above areas are bitterly complaining about the adverse effects on the biofuels land acquisition on their livelihoods including decreased household food and energy security, water, building poles, sources traditional medicine and wild foods.
- It is not proper for the government to transfer large areas of the 'village land' to 'general land' without detailed study of the implications on the livelihoods of the rural communities;
- Way-forward includes intensive training and awareness creation campaigns in collaboration with the civil rights CSOs/NGOs such as LHRC, LEAT, JET and others. Win-

win biofuels investments between the investors and rural communities; fast-tracking of the ongoing biofuels policy process; comprehensive landuse plans.

➤ HAKIARDHI Biofuels Perceptions are:

- HAKIARDHI is not basically against biofuels, but it is advocating right land acquisition procedures, win-win investment arrangements and SMART strategies to safeguard the national interests.
- The procedures used by most of the biofuels investors have resulted in adverse effects on the livelihoods of the rural communities.
- Biofuels investments have encroached the village land meant for food, energy, nature reserve and other livelihood needs hence creating negative public perception on biofuels investments in general.
- In cases where the outgrower win-win investment approach have been adopted, there has been beneficial socioeconomic effects particularly on the rural women groups.
- HAKIARDHI is advocating win-win investments between biofuels investors (bringing capital and technology) and villagers providing part of their land as equity capital.
- There are advantages of biofuels including CDM, but we need better strategies, policies, technical knowledge and political will for the benefits to accrue to the public majority.
- As is currently is being implemented, it is naïve to expect any benefits of biofuels investments accruing to the people. Hence the need to speed up the ongoing policy development processes, studies, landuse planning and strategy development activities and processes.

Lawyers Environmental Action Team (LEAT)

➤ Key roles and functions include biofuels environmental impacts research, advocacy, lobbying and legal support to the affected communities and public;

➤ LEAT's perceptions on biofuels:

- Some of the biofuels investments in Tanzania failed before they even started due to lack of specific policies and institutional frameworks to guide proper land acquisition by the investors, production systems that does not guarantee win-win arrangements, lack of national biofuels strategies and measurable targets among other factors;
- The biofuels investments lack long-term sustainability—they almost entirely owned and externally-driven, there are no mechanisms to ensure win-win arrangements;
- Under the current approach, possibilities for adverse effects on the national food and energy security can not be ruled out and adverse impacts on the marginalized and impoverished rural communities are imminent;
- The objectives of the biofuels investors have not been transparent, we are observing them doing activities contrary to earlier expectations and or agreements with government and the local communities (e.g. in Rufiji, Kilwa, Bagamoyo districts);
- Tanzania stands to loose because there are no clear guidelines that biofuels processing and consumption have a national energy self-sufficiency focus;
- Biofuels technologies have proved not to be carbon-neutral as earlier claimed.
- EIA has not been strictly emphasized and enforced to ensure mitigation of the anticipated adverse environmental impacts due to negligence of the relevant authorities such as NEMC, VPO/Environment, TIC;
- Need to fast-track the policy, legal and institutional regulatory framework development processes;

- Way-forward to include emphasis on baseline studies on the anticipated benefits and impacts, fast-tracking of the groundwork including the policy development processes; enforcement of the existing EIAs requirements.

World Wildlife Fund (WWF)

- WWF's key roles in relation to biofuels is advocacy and lobbying for development of specific policy and institutional regulatory framework such that biofuels initiatives contribute more positively in the natural resource and nature conservation including the high biodiversity hot spots;
- WWF has been providing technical advisory services in support to the ongoing multi-stakeholder biofuels policy dialogue and awareness creation campaigns;
- Due to the absence of policy and investment guidelines, the mostly foreign biofuels investment companies have 'invaded' the country with biofuels projects some of them have adversely affected the livelihoods of the rural communities resulting in further impoverishment and marginalization, destruction of the high biodiversity and nature conservation areas;
- Villagers have unknowingly given away their land which they need for food and cash production without proper compensation according to the market value;
- For example companies such as SEKAB, Bioshape, Sun Biofuels and Prokon have invaded the natural forests in Kilwa, Rufiji, Bagamoyo, Kisarawe and Mpanda districts causing massive destruction;
- Whereas Tanzania may not afford to distance itself from the biofuels 'race', we need to be more prepared in terms of developing appropriate biofuels policies, strategies and institutional regulatory frameworks which will in turn guide successful and win-win investment arrangements;
- Hence the need for the stakeholders to speed up the ongoing policy development processes. Several policy blue prints already exist which can be used to develop the required policy fairly quickly;

Tanzania Petroleum Development Corporation (TPDC)

- TPDC is a one stop shop for bioenergy consulting services.
- TPDC is involved in a research project being conducted jointly with Petrobras company from Brazil evaluating the efficacy of using plant oils in the existing engines in Tanzania. Brazil has over 40 years experience in bioenergy; they have fabricated diesel and gasoline engines using 100% biofuel (bioethanol and biodiesel). Brazil have agreed to collaborate with Tanzania to share her rich biofuels experience to hasten the process of biofuels blending and other pertinent biofuels research agenda.
- Tanzania is currently experimenting between 7-10% blended biofuels using the fossil fuels with locally produced biofuels. The 2008 Petroleum Act includes a provision for biofuels blending and use.
- There are costs involved with the blending which should be incurred by the government to reduce price as an incentive to promote use of blended biofuels.
- Tanzania has the potential to produce enough feedstocks, for example the sugar factories are producing large amounts of molasses which currently have no use and in some areas it is an environmental problem. Brazil is producing enough feedstocks to feed a mandatory 25% blended biofuels and are using less than 3% of their land. Tanzania needs a comprehensive landuse plan and agro-ecological zoning information to avoid adverse effects of biofuels on food security, natural resources and biodiversity conservation. Specific technical studies are needed to evaluate the efficacy of different feedstocks, e.g. sweet sorghum, algae, croton etc.
- The government and stakeholders should work towards enacting a legal framework for mandatory blending and use of blended fuels to combat the climate change effects head on.

- Sweden, India, Brazil and our neighbours Malawi and Kenya have made a lot of progress towards this end.
- There is an investor from Malaysia interested to produce biodiesel from palm oil in Tanzania, we therefore expect that more such investments will be promoted to provide enough feedstocks for the anticipated mandatory blending.
- TPDC is also evaluating the possibility of using by-product of LPG (conenset/thinner) as an ingredient to be used to mix with biodiesel for direct use in the existing diesel engines.

Tanzania Investment Centre (TIC)

- Among TIC's mandate and roles include promotion, incentive and appraisal of biofuels and bioenergy investments in Tanzania including business plan development support, land acquisition and other investment formalities.
- TIC is also part of a multi-sector dialogue to speed up the ongoing process to develop specific biofuels strategic framework and policy. It is expected that before 2012, the framework and policy will be in place. The policy and framework is essential for the regulation of the investments. Comprehensive agro-ecological zoning is necessary to ensure sustainable land allocation. Lessons learned from the successful biofuels programs such as Brazil shows that specific policy and strategic framework is necessary for sustainable biofuels development.
- In the case of biofuels investment proposals, TIC is working closely with the ministry of energy and minerals.
- Biofuels in Tanzania are inevitable considering the high costs (in foreign exchange) used for the importation of petroleum fuels let alone the environmental effects. The fossil fuels reserves worldwide are also believed to be dwindling, hence the need to start planning on the alternative cleaner sources of energy including the biofuels. Tanzania has adequate potential and resources for the production of biofuels.
- TIC has proposed to the government to ensure that all biofuels feedstocks produced in Tanzania should be processed within the country as a strategy to ensure that the investments contribute in job creation, value-addition processing and therefore foreign exchange generation as well as contribution to the national cleaner energy self-sufficiency. Biofuels have been legitimized by WTO as global tradable commodity. However, standard quality guidelines are not yet in place.
- The other justification for Tanzania to invest in biofuels is the impending energy and food crises (which are related).
- It is true that some of the biofuels investors have bypassed TIC particularly in the issues of land acquisition (has been termed as 'biofuels land grabbing') which has created problems and negative public perception particularly in the coastal areas including Bagamoyo, Kisarawe, Kilwa and Rufiji districts which such incidences are said to have adversely affected the means of livelihoods of the rural communities hence further marginalization and impoverishment. According to the existing land laws, foreign investors are not allowed to transact directly with villagers in acquiring land.
- TIC has proposed to the government to establish a 'National Land Bank' with derivative rights to allocate land for investors in Tanzania to avoid the above embarrassment.
- TIC is also advising the government to carefully look into the issues of ownership of the biofuels to promote and ensure joint ownership with Tanzanian investors. In such arrangement, villagers' land can be considered as an equity capital for joint investment with the biofuels investors in a win-win arrangement. There are also ongoing government efforts to formalize the informal assets including village land. This complements well the joint venture proposal.
- The government is expected to play a crucial role of providing an incentive package to minimize the risks involved with biofuels investments as a promotional strategy.
- TIC is also collaborating closely with the National Environmental Management Council (NEMC) to ensure that the biofuels investments in Tanzania meet the minimum criteria required under the SEIA regulation.

Ministry of Agriculture and Food Security (MAFS)

- The role of the ministry as far as biofuels is concerned is mainly research and technology generation (R&D) and dissemination, policy advisory services, quality standardization and regulation, capacity building, awareness creation.
- Biofuels is quite recent industry not only in Tanzania but also globally, and therefore it is also about the right time to now consider policy and strategic planning issues. Tanzania has the advantage of incorporating in its policy lessons learned from other more successful countries such as Brazil, India and Malawi. Biofuels have evolved according to both domestic and international market demand.
- Tanzania is being eyed by the western economies as the potential biofuels investment region, hence we need to fast-track the policy and framework processes such that we are not overtaken by such events. Otherwise Tanzania stands a risk of being a loser, for example the current incidences of villagers land being grabbed by such investors without following the right procedures.
- Through the ministry and the rest of the multi-stakeholder biofuels task force, a lot of groundwork has been accomplished towards development of the specific biofuels strategic framework and policy. For example the biofuels guidelines have been produced.
- Tanzania and MAFS in particular participated in a comprehensive biofuels study supported by FAO (BEFS).
- MAFS sees opportunities in the biofuels investments but not quite aware of the possible consequences, for example on food security, germplasm importation and the associated risks and other pertinent unanswered technical issues which therefore calls for yet additional comprehensive technical and socioeconomic studies. Tanzania also needs to invest into biofuels 'cut-edge' research, but we are facing a problem of inadequate budget allocation and dwindling donor funds.
- Tanzania also needs to be better organized: who is doing what, where

Ministry of Natural Resources and Tourism (MNRT)

- The role of the ministry as far as biofuels is concerned is mainly research and technology generation (R&D) and dissemination, coordination, policy advisory services, capacity building, awareness creation.
- In collaboration with other stakeholders such as MEM, WWF, NEMC etc, the ministry is also responsible in ensuring that the biofuels investments do not lead to adverse effects on the conservation of the forests and its biodiversity.
- So far, the ministry is closely following up the allegations of some of the biofuels investment projects that have been a threat to the mangrove and miombo forest reserves along the Indian Ocean coastal areas including Bagamoyo, Rufiji, Kisarawe and Kilwa districts. Unless the investments are closely regulated through proper institutional frameworks and policy, there are an obvious risks and adverse effects on our forests and biodiversity conservation efforts.
- The ministry is aware and is part of the ongoing multi-stakeholder process development process. The ministry would wish to suspend the biofuels activities unless such policy is ready to ensure sustainable biofuels and other natural resources conservation and development.
- What has happened in the above districts by some of the biofuels investors (Bioshape, SEKAB, Sun Biofuels etc) is contrary to the ministry's current campaigns for joint forest management with the local communities. The companies are said to be responsible for deforestation of hard woods including black mahogany (Mpingo) which take over hundred of years to establish.

- Earlier perception and understanding was that the biofuels investments will be undertaken in areas not targeted for food and cash crop production, but the contrary has been the case, the investments have targeted the areas earmarked for food production and nature reserve conservation which is unethical and totally unacceptable.
- The biofuels investments should therefore be closely regulated and monitored, EIA compliance should be strictly enforced by NEMC and other authorities to avoid any adverse environmental and socioeconomic effects.

Tanzania Forest Conservation Group (TFCG)

- Key roles and functions of TFCG is advocacy and lobbying, awareness creation and promotion of bioenergy technologies to enhance forest and biodiversity conservation
- Biofuels in Tanzania if well regulated have great potential for reducing pressure on forests, contribute to environmental conservation and mitigation of the climate change effects as well as increasing the national energy self-sufficiency;
- If not well regulated as it is the current situation, biofuels can cause irreversible adverse effects on the forest and nature conservation also adversely affecting biodiversity and the livelihoods of the rural communities.

Katani Limited Biogas Bioelectricity Pilot project

- Katani Ltd is the pioneer of mini-grid electricity generation from biogas generated from the sisal wastes, the plant is unique in Africa;
- The production model is 100% outgrower system. Smallholders intercrop sisal with food crops such as maize, beans, peas etc which contributes to improved household food security and nutritional status of the communities;
- Biofertilizer is also produced on commercial scale from the biogas and other sisal wastes also contributing to soil and environmental conservation but also household food security.
- The bioelectricity and biogas project is part of the national CDM projects expected to produce up to 329,054 tCO₂ in ten years period.
- The successful project in Hale Sisal Estate (Tanga region) is now being replicated in all other sisal estates in Morogoro, Shinyanga, Coast and other regions.
- Over 8.100 smallholder farmers have benefited directly.
- The potential for sisal production and hence biogas is great; an average of 2,700 metric tons/year is produced in Tanzania, Katani Ltd's share is 30%.

CAMCO/CSD

- Key roles and functions of CAMCO is promotion, business and technical support to modern energy services including bioenergy;
- Small-scale pro-poor biofuels initiatives (outgrower schemes) such as the ones promoted by TaTEDO have shown to have beneficial impacts particularly on the livelihoods of the rural communities and women groups;
- Similarly the medium scale projects e.g. KAKUTE, Diligent and Prokon has also contributed to an increase in jobs and income to the rural communities;
- However, the biofuels dealers have created a 'monopoly', fixing prices lower than the market value hence low prices to the smallholders;
- Most of the biofuels investments in Tanzania are export-oriented with little impact on the national energy self-sufficiency strategy;
- Tanzania should also investigate and support the use of plant oils as biofuels, which can be used directly without the need to modify the existing engines;

- The government should tighten the procedures for biofuels land acquisition by the large-scale investors to safeguard the interests of the rural communities; otherwise the biofuels will continue to receive negative public perceptions;
- The government and other stakeholders need to speed up the policy and institutional support frameworks;
- Investigate other biofuels sources such as croton, algae which may be cheaper to produce and less impact on the environment.

Muheza District Council (DED)

- The key roles and responsibilities of the district council and the natural resources department in particular is development of policies and bylaws for the conservation of the reserve forests and other natural resources; resource mobilization; demonstration and promotion of the successful biofuels technologies and services;
- The District (Natural Resources Dept) is collaborating with TaTEDO to promote and scaling up of the improved woodfuels stoves, ovens and IBEK charcoal kilns particularly among women groups in Muheza and other districts in Tanga region (over 60 groups involved);
- TaTEDO is also promoting production and processing of jatropha biodiesel for use in MFPs, soap and candle making; MFPs installed in Moshi, Korogwe and Muheza;
- Public perceptions on biofuels is very positive because the people have seen the good results and benefits e.g. electricity for lighting, milling, pumping water etc;
- Villagers are however not sure of the long-term jatropha market availability due to bad experience with 'Mlonge' which was popularly promoted in the district but the market chain failed/broken;
- The district has allocated funds and other resources for demonstration and support of scaling up the modern biofuels technologies (woodfuels stoves and ovens, biogas, jatropha-based MFPs, solar panels and improved IBEK kilns) in 10 villages in Muheza district and several other villages and institutions (schools, dispensaries) in Korogwe and Handeni districts involving over 120 beneficiaries most of them women;
- Improved access to improved woodfuels stoves/ovens and IBEK charcoal production kilns, reduced use of firewood and charcoal for cooking and increased efficiency in charcoal production has reduced pressure on the Usambara natural Forest and therefore contributing to nature conservation;
- As a result of the impacts of biofuels technologies, the District Councils and particularly Muheza also with support from donors and other partners have allocated more resources to biofuels initiatives in Muheza district in particular and in Tanga region in particular.

KAKUTE

- The organization has been playing a leading role in the support of rural-based smallholder biofuels projects in Arumeru district.
- KAKUTE has also been piloting and demonstrating the MFPs which have significantly contributed to the improvement of the livelihoods of the rural communities through increased access to affordable and clean energy.