

## Good Practice Assessment for Bioenergy Projects

### General data

1. Name of Assessor: Francesca Farioli & Elisa Portale
2. Institution: CIRPS – Sapienza Università di Roma
3. Date of Assessment November 18 2009 with data collected in June 2008 and June 2009
4. Name of Project: Diligent Tanzania Jatropha oil production
5. Contact name at project: Janske van Eijck (former Manager)
6. Place of Project: Monduli-Babati district, Tanzania
7. Characteristics of Project

Tick if project is an initiative from:

Private  community  government  NGO  other

### 8. State how do you know the project

Information a)  field trip  a) and b)  other   
in Reference b)

specify other:

9. After reading the characteristics of the project (in Annex) please assess the following principles according to the scale:

- 1 The project does not consider this principle (0%)
- 2 The project covers this principle partially <30%
- 3 The project covers partially this principle in 30-70%
- 4 The project covers partially this principle in <70%
- 5 The project fully covers the principle (100%)

Principle	Name	Score
1. Good agro-ecological and forestry practices (biodiversity, soil)		5

### Comments

This study focuses on two districts respectively in the Arusha and Manyara regions in northern Tanzania. Those are two of the areas where the project is implemented. Monduli District is in Arusha region and Babati District is in Manyara region. The districts are located at the base of the Rift Valley near three Lakes (Natron, Manyara and Babati). Monduli district is characterised by relatively low lying land with numerous volcanic hills and mountains. The main tribes in the district are the Masai and Waarusha. The major economic sectors in Monduli are livestock keeping and agriculture. In Monduli district, pastoralism is the main land use activity of the Masai. These Masai communities have ever since used the Rift Valley Lakes and Wetlands as a source of water and pasture for their livestock. Also Babati is a land used by Masai. The wetlands are the main grazing areas for the communities living around. Therefore livestock keeping is an important economic activity that has to be guaranteed in the project.

According to the classification taken by the Ministry of Agriculture Food security and Cooperatives, these areas belong to Agro-Ecological Zones N6 for Engaruka in Monduli district, E2 for Mamira-Riroda in Babati district (Milingano 2006). *Jatropha* is suitable for the characteristics of those Agro-Ecological Zones.

From a crop suitability study, the two areas are identified as follows: low suitability for agriculture with a too short growing period in Monduli District; and poor moisture soil suitable to few varieties of beans in Babati District.

From this analysis, *Jatropha* is the most suitable crop for those areas because of water scarcity and the frequent presence of droughts. Soil management in these areas is usually very scarce.

In the project areas, *Jatropha* is planted as a perennial crop to avoid soil erosion and protect food crop from wind and animals. *Jatropha* is most commonly planted in hedges and in some case intercropped with other local crops (maize, sweet potatoes, onions and sunflower). Diligent suggests a 4 meters spacing between rows and 3 meters between the trees for a successful intercropping. *Jatropha* is rarely planted as a plot in marginal land with 3 by 3 meters of lines.

No chemicals are used or provided by Diligent and farmers commonly use organic fertilizer (manure). Farmers sometimes apply ash to the base of the plant and seeds' shells as natural fertilizer. Diligent foresees to produce biogas from the residues of oil production. This biogas could be used in kitchens as a fuel and the nutrients from the digesting could be used in agriculture as fertilizer. Diligent monitors productivity and management practices since they started the project. To monitor the environmental impact as much as possible, a database was designed for Babati district (not for Engaruka) although it is in an initial phase. This database will combine range of data, such as pictures of the plants (ideally every year), an overview picture of the farm (to be able to see crop management, other crops planted etc.) and additional questions concerning water use, harvest and food production.

Crop rotation is used to control pest. Press cake is used for manure improving the quality of soil by completing the nutrient-cycle.

The area is characterized by a remarkable fauna and flora ecosystem, in fact some areas of the Rift Valley Lakes are well endowed with varieties of wild games and host numerous bird species -both resident and migrant species- that make a wide diversity of ecological habitats. Forest resources surround the Rift Valley and wetlands are used as the main source of fuelwood and building materials for the communities living around. This fragile ecosystem is already menaced by 1) a degradation processes due to water pollution, siltation and sedimentation and the consequent weed growth aggravated by agricultural wastes, resulting from

agriculture expansion and the use of fertilisers and pesticides; 2) population increase; 3) Wetlands are rapidly increasing leading to further environmental impacts and effect on the biodiversity conservation and management like blockage of game corridors (Shechambo, 1998). So, an expansion of agricultural land, without taking into consideration soil conservation measures, would lead to the disappearance of natural vegetation (deforestation), thus exposing soil to water and wind erosion. Therefore, the agriculture practices promoted by Diligent that do not foresee use of fertilizer nor pesticide, nor agro-chemical are positive for environmental conditions since they do not endanger the ecosystem equilibrium of the area.

## 2. Not affecting water supply and quality

5

### Comments

The areas of Monduli and Babati are water constrained since rainfall is low (400-500 mm/year in Monduli district, <500 in some areas, 800-1000 in Babati district) and expansion of agriculture puts a pressure on the quality and quantity available in the area.

Irrigated farming is important for the economy of the area since the rainfall it receives is low and cannot adequately support the water needs of agricultural activities. Onion cultivation contributes significantly to the economy of the people in the area. It is mainly irrigated using spring water

Declining discharge of water from dependable rivers has been reported in some areas particularly during the dry season when demand for water is the highest (Mwalyosi and Yanda, 1989). This situation signals an unbalance between water demand and supply in the area. It calls for a sustainable water management plan to ensure biodiversity conservation in the area. The Rift Valley Lakes and Wetlands serve as sources of drinking water to the population living around. All the river networks that drain into the lakes provide the mostly needed water for domestic uses. Although the quality of water varies from source to source, still these remains to be important sources of water for the local communities and their livestock.

In the areas where Diligent operates, Jatropha is rain-fed. There are very basic irrigation systems to provide water to food crops. In Monduli area analyzed, the only land that is viable for growing crops is that which can be irrigated by the river. Jatropha is grown as hedges then for those fields provided with irrigation Jatropha can benefit from the food crop irrigation but the quantity of water devoted to Jatropha is marginal and very little compared to quantity to irrigate the food crop. Water pollution is not the case because only organic fertilizer is used by farmers in the analyzed areas. Water supply and quantity are therefore not affected by biodiesel feedstock cultivation and the priority of water use is for human consumption and for food crops.

Although the project doesn't impact on the quantity and quality of water in the area, a sustainable water management plan for the area will be needed, in order to avoid possible conflict on water use deriving from expansion of agricultural activities that will require substantial irrigation.

## 3 No land use change that detrimentally affects food security

5

**Comments**

Farmers grow Jatropha around their fields as fences in addition to food crops or most common cash crop (sunflowers, onions, beans). This activity was undertaken to ensure no conflict between food and fuel. Moreover the harvesting period of Jatropha is different from that of other food crops so main Jatropha farming activities don't compete with food production.

Tanzania Government is encouraging to avoid land use change and food crop replacement. Jatropha is grown as a plot only in marginal and semi-arid lands where no other crop could be cultivated.

Outgrower scheme implemented by Diligent enables farmers to maintain their own land title and to have a direct control of their land. Therefore farmers can practice their traditional subsistence farming not displacing food crop and ensuring high level environment damage monitoring.

The final draft of the "Guidelines for sustainable liquid biofuels investments and development in Tanzania" requests to investor that up of 5% of land acquired for biofuel production will use to grow relevant food crops. This last requirement is not explicitly indicated by Diligent..

**4 Community participation (from planning)**

3

**Comments**

Diligent interacts with community based organizations as local SACCO (microfinance group, farmers group, farmers cooperatives) and NGOs, local politicians (District and Regional level) and village representatives since the early stage of the planning process. Community members are chosen to be trained as local field officers and being able to recruit, train and advice farmers continuously. A training course is organized at the beginning to explain to farmers in detail Jatropha farming best practices and benefits in terms of income and soil erosion problems. Then farmers sign the contract and free seeds are provided to them. Diligent covers seeds transportation costs. Price of purchased seeds is determined by Diligent per Kg and offers to farmers a minimum price guarantee for Jatropha despite the market fluctuations in order to offer them protection from speculative traders but it doesn't protect from competitors who offer higher prices.

Purchasing the seeds from local communities has many benefits, notably it creates trust between the communities and the company, and it generates a cash flow for the community.

Diligent declares that establishment of trust relationship between field officers/project and farmers, is very important for examples through continuous and regular visits to farmers.

On the other hand, evidence shows that there isn't a direct bottom up participative approach which includes farmers in the decision-making process and it has been shown by the scarce farmers' awareness regarding the project implementation stage in the villages. Most of the farmers report that they do not have any contractual power.

**5 Women's participation (from planning)**

3

**Comments**

Diligent devotes special attention to women involvement, in fact most of the collecting centres in the villages are managed by women. The initial training course is taken by a large number of women and they are the ones to manage the Jatropha growing care and especially the harvesting and seeds cleaning process which takes long time. Anyway, the involvement of women is limited to the production of feedstock and the management of collection centres and not in the decision making process at household level that is controlled by men. Men in fact take the money

for the seed collected. There is not a special program to verify direct gender benefits to women and usually benefits are undertaken by men in the household.

#### **6. Skills transfer (management, business, agriculture)**

3

##### **Comments**

Government provides extension service but it is not enough to solve everyday problems that farmers face.

Diligent field officers provide training and education to farmers and give precise guidelines on how to plant and keep Jatropha. Field officers visit farmers especially after harvesting time and report production situation to Diligent. Monitoring on Jatropha land management is constant. Diligent contracts small farmers who usually own small field (1-2 ha) and their production activities are limited to subsistence agriculture.

Diligent aims to train farmers to become risk taker and be more willing to innovate and enter in the Jatropha business. Management and business skills transfer related to Jatropha business is provided during the training but lack of information and transparency on revenue, trading and clear business opportunities is reported by farmers in the interview.

Diligent doesn't provide skill transfer related to Jatropha transformation process as oil extraction from seeds because Diligent wants to check the quality of seeds before making oil.

#### **7. Community inclusion in business or economic model (Contract with investor or NGO).**

3

##### **Comments**

The business model used by Diligent Tanzania consists of two main activities. One is to buy all existing Jatropha seeds through collection centres and the other activity is to train contracted farmers to plant Jatropha following the outgrower model. In some villages where it operates, Diligent has established a collaboration with local SACCO and NGOs working on the area to implement farmers recruitment process or for the mediation to reach all farmers interested in starting Jatropha business. Then farmers sign the contract with Diligent and free seeds are provided to them. Diligent covers seeds transportation costs. Price of purchased seeds is determined by Diligent per Kg. The length of the contract has been negotiated to 10 years to protect farmers' investment. Contract is signed among Diligent, farmers and village representatives who ratify commitment between the parts. Contract enforcing is only based on trust between the parts because for the farmers the contract doesn't have any legal validity. Monitoring is continuous and farmers need to be visited often to maintain their commitment.

Field officers are selected and contracted among persons suggested by local actors in the community in order to establish trust relationship among farmers and field officers to enforce the contract and assure that farmers are willing to sell seeds to Diligent. Also collector centres are managed by community members, usually shop owners with a central location in the village. Collection centres are established in areas with many Jatropha trees. These collection centres consist of a 'main' collector who is often well-known in the region, usually a village chairman or elder. The only requirement is that there is a room available to store the seeds, and preferably they need to have a bank account to be able to coordinate seed purchasing from one central point. The coordination is done from Arusha where a field coordinator regularly contacts the collector to gain information on the amount of seeds collected and identify any problems experienced. The Jatropha oil is currently

sold for around US\$ 2,11/litre, while prices paid for seeds to farmers range between 0,09-0,12 US\$/kg (in Babati) and 0,15-0,19 US\$ (in Monduli)<sup>1</sup>. However, once availability of seeds (and so oil) is higher, the price for Jatropha oil will be substantially lower, due to economics of scale. The minimum price for farmers as stated in the contract is 0,08 US\$ per Kg. Different regions may have different purchase prices related to the transport price incidence for Diligent (the higher the expenses for transport, the lower the price for the seeds). Diligent organizes and pays for the transport of the seeds to the factory in Arusha.

Diligent tries to include local actors (District level, village level and civic society) in the business model as counterpart in the start up phase in order to involve community in the process. Every change in the model has to be discussed with the counterpart in the village.

But actually Diligent run the business with no formal mechanism to comply with principles 6 and principle 8.

The government of Tanzania encourages investors to specify the role of outgrowers in the production chain and the benefit that they will have and boots outgrowers to be more involved in the value adding activities related to biofuel also forming association-cooperatives that may enter into contract agreements.

### **8. Added value in the community (individual, money, assets, land, co-products)**

3

#### **Comments**

The harvesting period (January-April) for Jatropha is different from the other food crops (maize, cassava, beans) or cash crops (sunflower). Jatropha can bring an important additional income to farmers because it is easy to manage and does not compete with other crops for labour needs. Jatropha has a continuous, long harvesting period.

Jatropha production is a low input crop, this is a very important aspect, since the farmers cannot afford to buy inputs for production.

Collection centres in the villages are provided with cash in advanced. Therefore, payment for Jatropha occurs at the moment of delivery at the collecting center while for most of the other crops revenues are collected in a deferred period. Revenues from Jatropha can potentially contribute to create money availability for investing in the production of other crops or in other activities (as livestock) and therefore help in developing a more entrepreneurial attitude.

Today, revenues from Jatropha are used to buy food and not yet to buy land, livestock or fertilizer or to develop any other form of business.

Not even co-products business coming from Jatropha has been encouraged and farmers are not well trained in using seed waste as fertilizer or as charcoal. Added value at individual level is quite tangible, and potentially can be enlarged with better revenues management program that it is not currently in place. Planting Jatropha trees can potentially increase the value of land that can be sold at higher price. Diligent factory processes, in little ratio, the Jatropha oil (SVO, Straight Vegetable Oil) in a mixture with diesel and biodiesel for safari users and for airplane engine (pilot activities). Also, they process part of the seedcake in biogas digester, to generate biogas (only for the use in the factory). The seedcake of Jatropha could be processed into Jatropha briquettes and Jatropha charcoal and it could also be sold directly, if there is a need to use it as biomass directly, one possible use is in boilers. These activities have not been starting yet in a commercial way but only in demonstration initiatives, but represent potential added values that could derive from the project activities.

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<sup>1</sup> Data are referred to June 2009

### **9. Improvement in services and infrastructure (energy supply, health) reinvestment of revenue within the community**

#### **Comments**

Diligent doesn't have a specific program to improve community added value for example investing in facilities for the village as schools, roads, transports, access to health services etc. At community level there are indirect benefits as land value increasing but no specific investments program in order to reinvest or share part of the revenues to improve village life conditions.

Energy supply is not yet in the plan of most of the communities where Diligent operates probably because most of the villages are at early stage in Jatropha production. Education on use of Jatropha waste as fertilizer should be provided.

Delocalization in different regions of oil extraction is in place in the near future and it could drive improvement in services and infrastructure at the local level.

### **10. Compliance with National policies and/or guidelines for bioenergy projects in place**

4

#### **Comments**

The National Energy Policy of 2003 boots investments in renewable energies and appropriate and efficient technologies and underlines the need to implement use of indigenous sources of energy. In 2005 the Rural Energy Act establishes the Rural Energy Board, Fund and Agency, institutions responsible for energy access in rural area and for modern energy services development. In 2006 the Tanzanian government formed the National Biofuel Task Force. The final draft of the "Guidelines for sustainable liquid biofuels investments and development in Tanzania" has been issued in March 2009 and a final version is under parliament revision. The task force recognizes the risks of people displacement due to the large scale plantations investments and in this regards affirms. The draft guidelines encourage investors to use out-growers model or hybrid model i.e. plantation and out-growers schemes and to define the best crop for the area. The guidelines request to specify the role of outgrowers in the production chain and the benefit that they will have and boots outgrowers to be more involved in the value adding activities related to biofuel. Moreover, the document presents guideline to address the sustainability of bioenergy production and in particular it refers to the need of controlling land use to avoid food production substitution, deforestation or biodiversity reduction. Diligent complies largely with the Guidelines draft because implements outgrower scheme and uses a non food crop for the biofuel production with no food substitution practices.

Moreover according to the Draft Guidelines the investors are requested to totally involve local stakeholders as local authorities (regional, district, village), as well as people, in the project design and implementation since the first phase of the project . In addition the project should contribute at least 2% of revenues in improving social services, economic and environment at the project area. This last requirements are not currently taken into consideration by Diligent

### **11. Compliance with Local programmes, regulations and/or plans in place**

4

#### **Comments**

The Tanzania government has established a Task Force to elaborate a biofuel policy for Tanzania, but this body has not provided guidelines yet (although draft guidelines have been written). Participatory stakeholder meetings have been held to discuss these guidelines.

The following stakeholders are members of the National Biofuel Task Force:

- Ministry of Planning, Economy and Empowerment (Chair),

- Ministry of Energy and Minerals (Secretary)
  - Ministry of Agriculture, Food Security and Cooperatives,
  - Ministry of Labour, Employment and Youth Development,
  - Ministry of Finance,
  - Vice President's Office –Division of Environment
  - Ministry of Water and Irrigation
  - Ministry of Lands, Housing and Settlement Development
- Government Institutions and Private sector representatives:
- Attorney General's Chambers
  - Tanzania Investment Centre (TIC)
  - Tanzania Petroleum Development Corporation
  - Community Finance Limited
  - Tanzania Sugar Producers' Association

National/local programmes aimed to stimulate agriculture sector and assist local population could contribute to the development of bioenergy in the country.

Instead, Government agricultural assistance has been limited in the last few decades, and where extension officers have been appointed they do not have the means to operate effectively. Moreover, farmers in Tanzania are poorly organised, in part due to negative experiences in the past with 'farmer cooperatives' that were imposed by governments and did not work in the interests of farmers...

Tax regime is open to various interpretations with regard to the local use of vegetable oil as a fuel. This can significantly impact the market price that Diligent can assume for the future, and makes it more difficult to invest in such a long-term project as Jatropha biofuel. The market for Jatropha oil produced by Diligent at the moment is still mainly represented by clients who want to have a 'green image' (Safari). The local market in Tanzania could be expanded only with assistance from the Tanzanian government. There have been talks of blending biofuel with fossil diesel at the fuel station that would open up a huge local market. Diligent is a stakeholder in the National Biofuel Taskforce and contributes actively to the consultations organised by the government aimed identify appropriate policies for promoting bioenergy sector in the Country. Once finalised the biofuel guidelines should clarify the tax regime to be applied to biofuel so to allow the development of pricing models for the local market. The creation of a National Biofuel producers Association would encourage industry cooperation and therefore facilitate the development of bioenergy in the country.

## 12. Respect Land rights and avoid displacement

4

### Comments

All land requirements for biofuels investments shall be reviewed and endorsed by Biofuels Steering Committee. Land for investment is formally allocated to TIC (Tanzania Investment Centre) and investors/developers are given a derivative right for a specified period of time. Long term derivatives rights and leases range between 5 to 98 years. Land can be acquired through Village Land Act, 1999. However, due to the challenges and controversies around biofuels investments/developments, the Village Authorities shall be guided by biofuels one stop centre once the biofuels project is approved to their areas by Biofuels Steering Committee (The United Republic Of Tanzania Ministry Of Energy And Minerals, Guidelines For Sustainable Development Of Liquid Biofuels And Co-Generation, Draft 2008).

The land is owned by the Government who makes assignment through the local authorities. Diligent contracts small holder farmers who own the land title to cultivate and manage their land, so displacement is completely avoided in Diligent model. Diligent's decision to work with outgrower contract farmers had several reasons.



Firstly obtaining land as a foreign company is very difficult in Tanzania. Land issues are politically sensitive and there are examples of foreign companies waiting three years before they can lease land. Working with outgrowers avoided this problem. The outgrowers involved in Diligent project were already cultivating their land, and since Diligent asked them to cultivate mainly as a fence, or in some cases intercropping, the project has not led to any change in land use. A third reason was that the initial investment costs are much lower while working with outgrowers than when working on large scale plantations. However, as declared by Diligent, the negative side of working with outgrower farmers is that it has a higher risk of not getting enough feedstock to run the processing unit. Therefore acquiring small plots of land, for example 50 acres in each region or village, would be the ideal combination according to the lessons learned. These plots could also serve as a demonstration plot for farmers in the direct neighbourhood of this field. Diligent has so far established around 3 demonstration plots, whereby Diligent pays for maintaining the field (weeding, harvesting). These plots are about 1 to 3 acres in size.

### Overall assessment

45
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Out of 60
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### Additional comments on the project:

The following comments are taken from “Case Study: The Smallholder Model of Biofuel”, Janske van Eijck, 2009. The experience of Diligent Tanzania Ltd reflects a commercial project. The company’s vision is to generate enough cash flow from selling biofuel and other derived products to be financial viable. However, since this is hard to realize from the beginning, the project started using PSOM3 funding provided by the Dutch government. This funding was established to focus help on projects in new, difficult and emerging markets. The funding paid for the creation of a pilot project, after which follow-up financing would be required to allow further company growth.

In 2005 the company was registered in Tanzania as Diligent Tanzania Ltd. The be eligible for the PSOM subsidy it was required to have a local business partner, Multiflower, a flower company with more than 10 years of experience in Tanzania fulfilled this role. The funding covered 60% of all hardware investments and a significant proportion of operating overheads and other expenses. The total project investment is around € 1M.

After four years of operation there is a substantial cash flow generated, which covers part of the costs made by the project. However, the break even point has not yet been reached. More biomass on land is generated, this leads to a positive greenhouse emission balance. The Dutch National Institute for Public health and the Environment used Diligent as a case study for calculating the greenhouse gas balance, using Diligent oil to generate electricity in the Netherlands. Calculations show a reduction of greenhouse gas emissions of at least 60% compared with more conventional energy sources. The general conclusion is that the model used by Diligent is positive for environmental conditions and meets the Cramer criteria for sustainability.

**References:**

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