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PILOT PROJECT; MOZAMBIQUE

Jatropha oil for local development in Mozambique

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Solidaridad

FACT PILOT PROJECT Mozambique

Introduction

The project goal is to develop a local market for pure plant oil (PPO) derived from *Jatropha* seeds produced by subsistence farmers in remote rural areas in northern Mozambique. The project targets to grow 250 hectares-equivalent of *Jatropha* in hedges and to adapt 20 diesel engines in use by small enterprises and schools for operation on PPO. Organization and training of farmers and technicians is an important component of the project.

The subsistence farmers in the region work together in 32 *farmer's clubs* supported by a team of the local project counterpart ADPP. The project is coordinated by Arrakis for FACT Foundation and is financially supported by Stichting DOEN, HIVOS and Solidaridad. In 2008 two new persons joined the ADPP team in Bilibiza.

The project design faces major challenges, including: (i) stimulate local farmers to abandon traditional shifting cultivation (slash and burn); (ii) ambitious project goals to be realized in only three years; (iv) develop a profitable Biofuels Center; (v) produce PPO of acceptable quality; (vi) to find additional uses for *Jatropha* oil and residues; and (vii) to demonstrate the viability of income generation from *Jatropha* oil production to local farmers. This will provide a basis for a sustainable local market for *Jatropha* seeds and oil.

General appreciation

In general, the project is advancing at a slower rate than planned. As a pilot project to approach the use of biofuels (*Jatropha*) for local development, it has to deal with experiences that are new and on which little existing knowledge is available. ADPP's project team is apparently understaffed as - in spite of hard work - they have not been able to push all activities conform the work plan (especially dissemination and upscaling are lagging). The procurement of the oil press and diesel generator (for the Bilibiza Biofuel Center) from Tanzania has been delayed due to a lack of knowledge on the import/export procedures.

The lack of clear communication protocols between the ADPP project team in Bilibiza and ADPP HQ in Maputo was another limitation. Agreements have been made to improve this. Due to the remote location of the project, it is difficult to find good staff; a director for the BBC, able to transform it into a good running business, was only found by October 2008 (anticipated was January).

A mid-term project evaluation was executed by Ruaraidh Petre (SSCD) in November 2008.

Scheduled activities

The project achievements over 2008 are briefly described below for the main activities: *Jatropha* production: market creation; research; dissemination; proposals for upscaling; production expansion; development training center; and exchange with other countries.

Jatropha production

At present some 95,000 *Jatropha* plants are growing (the equivalent of 95 ha); seeds have been bought (1,800 kg) to attain the envisaged 250 ha. Acceptance among the rural communities is good: a total of 32 farmer's clubs is now producing *Jatropha*, which exceeds the target of 25. The nursery at the EPF school in Bilibiza is doing well and has opened 25 ha of *Jatropha* demonstration and trial plots on which 16,000 seedlings are planted.

The project duration of three years is too short to obtain oil seeds from all 250 ha. Seedlings planted in 2008 do not produce yet. To meet the project's objective, three rainy season should be covered ideally.

Market development

A major constraint for market development is the capability of local engines to run on PPO. This aspect was identified once the project had started and activities to address this issue were included early 2008, involving some budget adjustments. It was investigated whether a generic modification kit for diesel engines can be developed. Surveys of diesel engines in 2007 (in Quirimbas) and 2008 showed that a variety of engines is used, including Chinese clones (Feidong) of the 2-cylinder Lister Petter, which prove quite reliable in the field. The development of a modification kit was assigned to the firm Groeneveld PPO (Netherlands) and is well underway with several engines under testing now. After these tests, the technical and economic viability of the kit will be assessed. For details refer to the FACT website.

The project partner GAIA Movement (Christian Fenger) is following a similar development path together with Delhi College of Engineering (India) using different kind of small engines used in Africa. They have achieved co-funding for the Zambian biofuel project (USD 117,000) which includes funding for conducting systematic endurance tests in India with both direct and indirect diesel engines. Knowledge between all experts involved is exchanged.

Sales in *Jatropha* seeds and seedlings is taking off and several companies and projects have oil presses in place. Also, the quality of water wells and locally produced pumps is improving.

Research on *Jatropha*

Research on *Jatropha* in Mozambique, led by Flemming Nielsen, is focused on implementation aspects, plant growth and yields under field conditions, and pest prevention. Several trial plots are operated to measure yields and to experiment with plantation forms and conditions.



Hedge trial plot being planted.



Trial plot with different varieties

Important findings are:

- Seeds are best planted directly (without pre-treatment);
- In nurseries shading is not needed;
- Pruning the shrubs 2-3 times over 80% more yield;
- The time of planting has large effect on sensitivity to pests (planting in February-March gave the highest pest incidence);
- Growth rates vary highly for different areas. Best conditions are: sandy soils and high temperatures with sufficient rain (like Cabo Delgado and the southern part of Manica and Tete);

- Direct seeding is best done before the start of the rainy season (November); and
- No cases have been reported in which severe pests (mosaic virus) were transmitted from *Jatropha* to cassava.

Dissemination of experiences

A seminar to exchange experiences between various organisations in Mozambique was successfully held from 7-8 November 2008 in Chimoio (see FACT website).



Participants of the Seminar in Chimoio

Additional proposals

Links have been established with SSDC Botswana to access EU funding. ADPP Bilibiza will be the partner for Cabo Delgado, while FACT will give technical advice and will monitor experiences. Relations have also been established with the GTZ-Ames and ProBec.

Extension to other provinces

This activity has started only late 2008 and is lagging behind. As a result, very little *Jatropha* will there be available in 2010; the most realistic strategy for these provinces is to concentrate first on oil production (lamp oil) and soap making.

Developing the training center

This activity has made important progress during 2008. The building for the oil production facility at the Bilibiza Biofuel Centre is nearly completed, including the workshop for production of water pumps. Also the guest rooms for trainees are being improved. The oil press and diesel generator have been purchased in Dar es Salaam (Tanzania) but have not arrived yet in Bilibiza due to complications with the export and import procedures.



The nearly completed workshop (photo November 2008).

Exchange with other countries

An expert meeting was held in the Netherlands on 24 September 2008 to exchange the experiences with the FACT Jatropha projects in Mali and Honduras (see the FACT website for more information).

Conclusions and lessons learned

The following summarises the most critical issues concerning implementation of the project:

- It is recommended to extend the project with ½ year till end 2010;
- It is recommended to expand project staff with two technical leaders for specific project activities;
- It is recommended to increase the working budget on the project's bank account to avoid demotivation of project staff and avoid delay in the execution of the project;
- In spite of good intentions, current Government (DPA) donations tend to interfere with the sustainability approach of the project. Streamlining the support to the farmer's clubs by dialogue can solve this issue;
- The introduction of biofuel production for local energy supply requires careful embedding. The farmer's clubs with their typical organizational structure, introduced by ADPP, are crucial counterparts in the project to achieve a transformation in traditional agricultural methods;
- Growing Jatropha as a protective hedge around field with food crops is a “conditio sine qua non” for smallholders to value Jatropha and maintain the seedlings and adult plants. Intercropping results up to now have been positive.

More detailed information can be found in the publications on the FACT website www.fact-fuels.org