

Visit Report
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Jatropha Oil for Local Development in Mozambique

Biofuel for development and Communal Energy Self Supply



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Introduction

This report is on a visit to the “Jatropha oil for local development in Mozambique” project, which is located in the Quirimbas National Park, Cabo Delgado, Mozambique, and is designed to improve the self sufficiency of local communities in terms of energy supply.

The park is relatively new – and was designated as such in 2002. To date most emphasis on the development of the park has been on the marine side and the only real tourist developments are on the islands and coast (Ibo, Quirimba, Matemo and on the coast at Guludo, with one bush lodge now under construction at Mipande).

I do not have information on the repercussions of the national park designation for the inhabitants of the area, but it does seem that it will have altered their automatic right to the land, which is enjoyed by small farmers and communities throughout Mozambique except in National Parks.

The traditional form of agriculture in the Park area is shifting cultivation based on slash and burn techniques. Due to the predominantly light surface soils there is a low build up of organic matter (there are also clay soils in the area but little in the way of loams), which is replenished by the encroachment of bush following a shift to a new plot. However, with increasing population and the use of land for multiple purposes (wildlife, tourism and subsistence farming) in the future, this practise is likely to be increasingly questioned.

There are already significant Human Animal Conflicts in the park area (specifically with Elephant) and while mitigation measures are being sought, it is generally recognised that as human impact increases, instances of conflict will also increase. This may eventually bring the relationship of the people in the park with their environment into question.

The project has a number of related activities which are aimed at increasing the sustainability of livelihoods within the park without increasing impact on the environment, and where possible reducing this impact through the fostering of conservation agriculture techniques.

One of the key activities is the planting of *Jatropha Curcas*, an oil bearing, toxic plant for use in fencing machambas, and growing mini plantations. The attraction of the plant is that as it is unpalatable (and poisonous) to animals, it will form a hedge which they are not tempted to eat their way through in order to reach the food crops inside. The oil is of sufficient quality to be used as a replacement for diesel in modified engines.

As part of the encouragement for participating in the activity of growing Jatropha, simple hand pumps are installed in villages. These are rope pumps, and work well in hand dug wells and in bore holes. Contact farmers are to be taught maintenance of the pumps, which are constructed at the project base at Bilibiza.

All the activities take place through the channel of the farmers’ club, which brings farmers together to learn conservation farming techniques and the cultivation of vegetable crops for home consumption and sale.

Itinerary

Arrived in Pemba on 19th October from Cape Town. Met Felicity in Pemba. Spent the night in Pemba. Jan de Jongh arrived on Saturday 20th at noon, and we departed at around 14:00 for Bilibiza, reaching the campus at around 17:30. Ate with Erik and Felicity.

21st Toured the area around the school. There is a machamba below the school next to the river, with a wind pump and a hand pump (both rope pumps). Jatropha – there are a number of Jatropha plants around a patch by the soccer pitch. The size is highly variable – they were planted around 18 months ago. Most of them have leaves at this point, some are beginning to flower but there are no fruits yet.

21st October, Ngeue demonstration garden of around .25 ha and ten farmers (there are 48 in the group, but not all have a plot in the demo garden).

22nd October, Pitolha – 1 rope pump working, used to irrigate the horticulture plot.

22nd October, 1 de Maio, Quite a large village with the machamba quite far out. They have planted Jatropha trees most of the way around the perimeter (242 plants around the machamba and another 89 at the school). The remarkable thing is that the plants at the school are only 8-9 months old and they are already producing seed. Variable in size, the largest are over 2m. The ones at the machamba are much smaller (20cm), though they were planted at roughly the same time. It seems that there was good rain just after the school plants were planted. The machamba is new (i.e they are clearing it now), but it is not clear how quickly farmers return to an old machamba, and the process of slashing and burning removes a lot of organic material which the encroached bush has built up.

The horticultural demonstration plot at 1 de Maio is approximately 1500 square metres. The water level is very close to the surface.

Sitate – we were welcomed at the machamba enthusiastically by members of the farmers group. They have seeded 1150 jatropha in bags, and have 251 established around the machamba. They are following conservation agriculture techniques, although they have not as yet started making compost. With the income from the vegetable plot they have bought 12 new hoes for the group.

Nsemuco Have planted 2000 jatropha in black bags. The rope pump is on an unlined well, but the water is extremely high – only 1m below ground level.

23rd October, At the workshop area on the school campus.

24th October, early departure to Pemba, met with Christian Fenger of the Gaia Movement Trust, and then on to Cape Town (via Maputo and Johannesburg).

Achievements

During a short field visit to a project covering a large area it was clearly not possible to visit all of the farmers clubs. However a good impression of the progress was gained from the five that we did visit.

Regular progress reports are produced by the project and are posted on the FACT foundation website as well as the Arrakis website.

The fact that the farmers clubs have been established is promising. This means that there are around 1,250 farmers directly involved in the project and at least being exposed to conservation agriculture techniques, vegetable production, jatropha use and to rope pumps and lined wells which could all have major benefits for the communities.

As of the last report there were three extension workers which means that they each have 400-450 contact farmers. This is a high number and funding is available from three sources it is expected that this ratio is improving. Working with the EPF teachers will reduce the burden on the extension workers as long as the teachers prove themselves to be committed to the extra task that they are being given (certainly the teacher in 1 de Maio seems committed).

Transport for the extension workers was a problem and the difficulty in obtaining driving licenses continues to be an issue. Although it is not necessary to have a drivers license for a 50cc motorcycle (moped), it is questionable whether a 50cc machine is capable of everything that will be required of them by extension workers who presumably often carry people or other loads on them, and are often on poor roads.

Progress has been made towards the establishment of the clubs vegetable plots. Not all farmers have individual plots at the group location, and this is not necessarily a bad thing, but it would be useful for the extension workers to ensure that they do visit any other farmers' vegetable plots to get an idea of the spread and the success of the concept.

Conservation agriculture techniques are being taught. It requires quite a shift in thinking to move from slash and burn agriculture to composting and use of intercropping and IPM to keep yields up. There is little doubt that yields of most crops could be improved if conservation techniques are well implemented. The fertility of newly cleared plots does not appear to be very high (though we did see clearing at the end of the dry season, i.e. plots looking at their worst). Careful monitoring of the implementation of new farming techniques will be required, it is suggested that monitoring is not carried out by extension workers in their own contact areas. Monitoring should include productivity indicators (proxy indicators such as sales volume can also be used), as well as incidence of pest and diseases amongst farmers crops.

Jatropha nurseries of >1000 plants have been established in all of the villages that we visited, as well as by the other farmers clubs. Initial price of seed in Litimanda was 5 MTn per kilo, but when the second batch was bought the farmers had increased the price to 10 MTn. This equates to USD 400 per tonne, before transport and processing. The minimum price of the oil from such seed would thus be USD 1,400 per tonne, which is clearly too high. It is therefore important that the difference between seed and grain is made very clear. If farmers start to think that they will be able to get USD 400 per tonne of grain, there is a danger that they would start planting Jatropha preferentially to food crops. Since there is no one who will buy the crop at that price, and since the value to them is relatively limited (they use little in the way of diesel and kerosene as it is) this would result in a net decline in livelihoods.

Up until March of 2007, 103,000 jatropha seeds had been planted. Jatropha plants which have been established for between 8 months and 18 months are showing promising signs of growth and production. The variation between plants, even in the same location and from the same batch of seed is enormous however, which makes drawing concrete conclusions quite difficult. Since an element of the project is research, and this is now being carried out with one research plot in each district, excellent record keeping is required (the monitoring system has been developed by Flemming Nielsen).

Training in the construction of lined wells, including construction of "manilhas" (rings to line the wells) has commenced and this activity is well underway in the villages. Experimentation has resulted in the development of a lighter weight manilha which is reinforced with bamboo instead of steel and which is thinner walled than the one

commonly found in Mozambique. Training needs to emphasise the importance of uniformity and the extension workers should be capable of quality control of manilhas, as if they are not uniform in size, they will not perform as well as they should. Additionally it is important that the installation technique used is safe. Hand digging under installed manilhas can be risky, however digging an entire well with unsupported sides may also be unsafe. There are a number of techniques including use of a cutting ring for the lowest manilha which might be used. The project should investigate the options from ADPP's and others experience¹ and give clear guidance for excavation under various conditions (soil type, depth and above or below water table).

Observations

There are 25 farmers clubs operating throughout the five districts which are covered by the Quirimbas National Park, with the new USDA project this number will increase. The mode of implementation is to use extension workers who are based in the district and they cover a number of clubs each. The clubs were established within reach of an ADPP Escola Professores de Futuro primary school. The clubs are not necessarily legal entities, although they are encouraged to draw up a constitution. Farmers clubs receive training both from the extension workers as well as from the teachers in the schools. Once the clubs are producing sufficient volumes of any product for sale, or are in a position to want a bank account, it will be necessary to formalise them by registering them. So far it seems unnecessary to do so.

An issue which I believe to be important is the level of participation of the farmers clubs in determining the course their clubs will take. I realise that the project was started with the premise that it would undertake certain activities and therefore works towards the achievements of results based on those. However, I think that it is important in building the capacity of civil society or grassroots groups that the people themselves are fully engaged in the process. In this project the farmers clubs are certainly involved in the execution of activities, which should lead to expected results. That is not questioned. However, my impression was that the farmers clubs were formed with that specific task in mind, and I am not sure how much of a role they played in the selection of the activities. The building of strong farmers groups, and involving them in participatory development is a difficult and lengthy process. It is also one which may not be emphasised in the training of extension workers. However, it is much more likely to result in sustainable groups which continue to function after the project cycles than groups which are simply implementing external suggestions.² While undoubtedly there is an element of action research in the current activities (farmers are experimenting with techniques and crops, some of which will be more successful than others), my concern relates to the process of engagement with communities, and I feel that a longer period of building rapport and exploring issues with the farmers may lead to a greater sense of ownership on their part.

Structure; In principle, below the project leader, there are a number of technicians, and the next level is the extension workers who work with the farmers clubs directly. The main horticulturist in the project team, Ernesto is due to leave at the end of the year to be replaced by Henderson (from Malawi).

Quite intensive training has been provided to some staff members (in manufacture of rope pumps etc). It is important that once staff members return from training there is

¹ See for example WaterAid technology notes:
http://www.wateraid.org/documents/plugin_documents/technology_notes_07_web_1.pdf

² A similar finding in the Mozambican cashew industry is detailed here:
www.iied.org/pubs/pdf/full/9554IIED.pdf

a quality control system to ensure that they are putting what they have learned into practise fully. The hand pump installed at the school vegetable garden was used very intensively by students, but unfortunately broke within one week of its installation; this was more an issue of quality control than overuse.

To date it seems that roles and responsibilities are not always clearly understood, or if they are, not always adhered to. It is important that a structure of who is responsible for which aspects of the project is explained to all of those involved. This relates to looking after inventory and maintaining equipment as much as to administering the project funds.

Felicity is managing three separate projects (this, an EC funded project and a USDA one). While many of the projects activities of the three projects are carried out with the same farmers clubs this is not exclusively the case, and whatever the case the administrative burden is high. It is suggested that some of her duties could be assumed by another administrator, giving Felicity more time to keep in touch with practical and field activities, which is an important function of project leadership.

As was discussed at the time Giuseppe could play an important role in the practical implementation of the project, not by taking charge of this aspect, but by working alongside the local staff and helping them to develop their quality control systems as well as honing their skills in community mobilisation and participation and in how to keep equipment and activity planning well ordered.

Romalio has been given charge of the workshop. This should also entail ensuring that the full inventory of tools is looked after and stored in the right way. The construction of the new workshop as planned by Giuseppe and Jan should result in a space which is easier to manage. As that is ready, an inventory system must be introduced at the same time.

With regard to the Human Elephant conflicts within the park I have forwarded information to Felicity and Jan from Elephant pepper.org, which details a integrated approach to dealing with elephants. One point made clear to me by Elephant pepper is that it is not possible to completely overcome the issue, but if an integrated approach is used it should help to mitigate the problem.

We discussed the issue of expenditure of funds from Solidaridad. There is no objection to these funds being utilised over a period of three years rather than the two originally planned. If this is required, please submit a revised expenditure plan together with a request for the change. At the same time any changes in major budget lines should also be informed, or in the case of changes of more than 10%, requested.

The matter of written warnings to staff was touched upon. Due to stringent employment law and protection of employees in Mozambique it is essential to follow the correct procedures in these cases and to start early if it is felt that it may become necessary.

Recommendations

- Research participatory methodologies and provide training to extension workers and technicians. Empowerment of farmers and ownership of the process (and hence sustainability) will come from the people themselves being responsible for the way in which the project works in each of their communities. This will of course require some flexibility. I recognise that as this was not part of the original plan there may be some difficulties involved.
- Establish a quality control system whereby any activity can be assured to have been implemented according the training that staff have received. I think

that Giuseppe can be involved in this, naturally it needs to be structured in a constructive relationship.

- I assume that each member of staff does have a written job description. I suggest that these are periodically reviewed with staff members to ensure that responsibilities are being adhered to. Where gaps are identified, these should be assigned to the appropriate people. This should simplify for example, maintenance of the inventory etc.
- Appoint another administrative staff member to remove some of the burden from Felicity. It is important to find a candidate who has some experience, as someone without skills will actually add to the burden.