Report from Conference

"Towards Biofuel Self-Supply -
Smallholder production and local use of jatropha oil for community development"

Held on September 5, 2007, at Children's Town, DAPP, Malambanyama, Chibombo District, Zambia.

Program for the conference:

11:00	Welcome and introduction to DAPP activities in Chibombo District
11:30	Tour to jatropha nursery, rope pump workshop, demonstration of irrigation with rope pump on a manually drilled borehole, demonstration of oil filtering machine, demonstration of oil press, and demonstration of Lister engine running on dual fuel system.
13:00	Lunch
14:00	Discussions: - problems and solutions in jatropha cultivation, - is the food versus biofuel discussion relevant? - presentation of preliminary conclusions of the dual fuel endurance tests - using plant oil or biodiesel
15:00	Visit to jatropha production sites at Malambanyama School and at the farmer Michael Shichongwe.
17:00	Conclusions and ending of conference.

40 participants, with representatives from:
- Biofuel Association of Zambia,
- Bruno´s Jatropha Ltd
- ILO - International Labor Organization
- D1 Oil,
- Block Agricultural Extension Officer, Kembe, Chibombo District
- Ministry of Community Development, Kembe Block, Chibombo
- ECOSASA, South Africa,
- Shakapopela Women's Group (Hammer mill owners)
- Mr. Mangwere (by representative (Hammer mill owners),
- 3 other hammer mill owners/operators,
- Headmen from three villages
- farmers

- Agricultural Support Program, Kembe Block, Chibombo District,
- Conservation Farmers Union. Kembe Block, Chibombo District,
- Keembe Farm Training Institute,
- Malambanyama School, Mumangwa School, Children's Town,
- Staff of the DAPP Child Aid Chibombo Project
- Representatives from Child Aid Mkushi, Central Province and Child Aid Mazabuka, Southern Province.
- The GAIA-Movement

Introduction to DAPP activities in Chibombo District.
The project leader of DAPP Children's Town, Annie Mulongwe, explained shortly about the history of the Children's Town and the current activities.
Ivy Choombe, Project Leader of Child Aid Chibombo, explained about the various projects in the local area. The project "Pumps for Trees" has during the last year established 40 farmer groups who have received rope pumps for small scale irrigation and started vegetable production. Each group has produced 2,000 trees as "payment" for the pumps.

Ivy Choombe, Project Leader explaining about the Project and DAPP Child Aid activities in Chibombo District.

28 Agricultural Loans Committees have been trained to manage revolving funds, and 20 loans have been established for individual farmers and women Self Help Groups for rope pumps. The farmers send in applications and the Committee selects the farmers who are most likely to pay back the loan fast, so that a new loan taker can be chosen.

20 women Self Help Groups have been trained and as they prove that they are productive (they have wells and areas for gardens), they will receive loans for rope pumps.
The “Pumps for Trees” has been combined with the Biofuel Project, so that many of the trees produced as repayment have been jatrophas.
Finally the conference was informed that 10 extra bicycles have been purchased, and that these will be distributed to the Agricultural Loans Committees to assist them in monitoring the production and the repayment of the loan takers.

The participants were then shown the jatropha nursery at Children’s Town, where about 700 jatropha seedlings are being produced. Morris Tembo, the Co-project Leader, explained about production from seeds and cuttings. The seedlings are produced as bare root seedlings, and it is here important not to water too much, since the root will become too deep, and the seedling will suffer when transplanted.
The project is recommending to plant the seeds directly as fencing or in the field, since this will give the most drought resistant plants.
Cuttings will develop plants that are less drought resistant, since the roots do not go so deep. The plants produced from cuttings also have a shorter life (15 years) than plants grown from seeds (50 years).
Cuttings can very well be use for fences, since it will be easy to take new cuttings, if some of the plants die.

Morris, the Co-Project Leader, explains about jatropha production in the nursery at Children´s Town.

He also explained about some of the problems farmers had with termites and rats. After the first experiences with losing cuttings to termites, the project had found out that the problem could be reduced by applying wood ash in the planting hole and around the cutting.
Mr. Tyson Chisambo from Bruno´s Jatropha contributed by recommending to use the nursery area more intensively by reducing distances between the rows. He also explained that they have good experiences with selling bare root jatropha seedlings.

The participants were then presented for the rope pump at a vegetable garden at Children's Town (CT). This pump has been installed in a 12 m deep borehole, drilled with manual drilling equipment during a training workshop in 2006.
Two kinds of rope pumps are being produced at the CT workshop. The cheapest model is the windlass model (pi/π model) where the handle is placed on two poles that are fixed in the ground.
The A model has a metal frame that is fixed in concrete. The models can be used with either a borehole or a well. They can pump up water for small scale irrigation from depth down to 2-30 meter. Treadle pumps can only go down to 6-7 m.

Conference participants testing the rope pump installed on a manually drilled borehole of 12 m at the vegetable garden.

Alex Ntambo, the water technician of the Child Aid project, explained about the manual drilling and the rope pump production, and he showed

the various parts and how the wheel and the washers are made from used tyres.
It was stressed that it is important to get a thorough training to produce pumps that will work long time with little maintenance, and that it is important to train local village pump menders, who can install and maintain the pumps. The big advantage is that everything can be done with local materials.
DAPP Zambia has by now produced and installed over 300 rope pumps, and is/will be training staff from other organizations such as PLAN International and Water Aid.

Alex Ntambo, the water technician, explaining about DAPP´s rope pump production. Over 300 pumps installed so far.

A number of pumps have been given out to local Agricultural Loans Committees, who have been trained to manage revolving funds of loans for rope pumps. They select viable farmers, and when the loan has been repaid - after 1-2 years due to income generated from garden production - they can give a loan for small-scale irrigation to a new farmer.

Children's Town has for a number of years pressed oil from sunflower seeds to generate income and provide a market for local farmers. The oil press is normally run by an electric motor, but the project had just purchased a second hand 2-cylinder Lister engine, and to be sure that the engine was strong, it had been connected to the oil press. This was also an opportunity to show the participants how the dual fuel system functioned. The engine is started on diesel. When it is hot (at least 10 minutes) fuel supply is switched to plant oil. Before shutting down, the

engine is again run on diesel to clean out the filters and the injectors. Some sunflower seeds were pressed while the engine ran on cottonseed oil.

Demonstrating the pressing of oil from sunflower seeds on a press powered by the 2-cylinder Lister engine run on cottonseed oil in the dual fuel system.

An oil filtering machine has been acquired for the project, and the participants were shown how it produces clean sunflower oil from the oil pressed in the CT.

Back in the meeting hall there was time to discuss some of the jatropha issues before lunch.
The participating farmers were asked on their views on the food versus biofuel discussion. Would they need to reduce their area for food production to produce jatrophas. The farmers were not in doubt that this was no problem in their area. There was ample land available, and they could also use the land between the jatropha trees for intercropping. One farmer explained that he had 2,000 jatropha, and was growing maize in between the rows. He had achieved good maize yields.

The Agricultural Extension Officer from Kembe Block would like to hear if there was anything to the rumors that jatropha cultivation was spoiling the soils. The representatives of the Biofuels Association of Zambia (BAZ), answered that it was actually the farmers who could answer this. Some farmers replied that they had not experienced any problems, but that it was also short time they had grown jatrophas. The director of BAZ,

Mr. Andrew Chitembo, told how he new of many places had been growing for many years. He had just seen a jatropha tree in Choma which must be over 50 years old, and he had never heard of any damages due to jatropha.
The participants were also told how the jatropha leaves actually improve the soil under the trees.
The issue of prices for jatropha seeds was also discussed. Prices are very high now, because there is a demand for seeds to start up new production. These high prices, however, will not continue. The prices will always be linked to prices of diesel. With the current price of diesel at 5,600 Kw. (USD 1. 40) the farmers should not expect a price of more than 1,000 Kw., since about 4 kg of seeds are needed to produce 1 l of oil.
It was also stressed that one should look at the other benefits, such as having oil for lamps, for soap production and press cake which is a valuable fertilizer.

A member of a Woman Self Help Group explaining her experiences with growing jatropha.

After lunch, the General Manager of The GAIA-Movement made a short presentation on the overall issues related to use of biofuel and the GVEP funded project.
The idea of this biofuel project is to develop a system of decentralized energy generation which will benefit off-grid communities in:

1. generating energy for local development,
2. generating income opportunities and,
3. improving the local (improving tree cover) and global (reducing greenhouse gas emissions) environment.

Demonstrating how a very simple "lamp" can be made from jatropha oil and some cotton to replace candles and kerosene.

Global warming was briefly explained. The farmers agreed strongly that rainfalls had become more irregular and that it was more difficult to predict the planting times. Africa will be the worst affected, and especially the farmers who depend totally on rainfed agriculture. This is also why there is a great need for systems such as rope pumps to mitigate the effects of the unpredictable climate.
To demonstrate the energy in jatropha oil, a very simple jatropha "lamp" was used. A piece of cotton, formed like a small pyramid, dipped in jatropha and placed on a small plate. This can easily replace candles or kerosene lamps.
This was also used to explain the difference between using fossil fuels and biofuels.
Deforestation was brought in as a contributing factor to global warming, which again stresses the importance jatropha cultivation can have in turning this tide.

The participants were then explained about the dual fuel system, and the idea of the project - to produce energy and use it locally in the communities. Two hammer mills (grinding maize) had been adapted to use the dual fuel system and have run a total of 107 hours. The idea of this element was to demonstrate in practice that plant oil is an efficient fuel. Community members were in this way able to understand that oil from jatropha seeds or cottonseed could be used as fuel in stationary engines.

It is well known that engines can run a short time on plant oil with this system without problems. In order to ensure that the hammer mills can run for long periods, systematic endurance tests following international standards have been started at Delhi College of Engineering by Professor Naveen Kumar.
The preliminary conclusions of the dual fuel endurance tests using jatropha oil in a 1-cylinder Kirloskar engine were presented. After running 216 hours on jatropha, there were some deposits on the filters and the injectors, and some of the compression rings were sticking. They have now been changed and the engine is tested up to the standard 512 hours. Professor Kumar is optimistic that a viable system can be developed and recommends that new tests are made, where the oil is heated by being coiled around a hot engine part before being injected. The GAIA-Movement will secure funding for continued tests, until a viable and safe dual fuel system has been developed.

The representatives from BAZ received a copy of the preliminary findings from Delhi and the participants with access to computers were promised that a copy of the presentation would be sent to them by email or on a CD-Rom.

Visit to the jatrophas at Malambanyama School. The teacher and Ms. Mpala from ILO looking at the healthy plants.

The participants then drove to visit the jatropha production at Malambanyama School. The teachers of the school had organized the students to plant about 300 jatrophas in November 2006. The trees looked healthy. In a part of the garden vegetables were grown in beds together

the jatropha trees. These had been watered regularly, while the other half had received less water. The teacher was asked if they had experienced any problems with insects. There had been some, but not very much. The jatrophas had been sprayed when the vegetables were sprayed. Mr. Chisambo of BAZ explained that an efficient spray could be made by using wood ash, soap, kerosene. Chili or hot pepper could also be used. Christian Fenger told about Tephrosia, and how an efficient biopesticide could be made from the leaves.

Next visit was at the farmer Michael Shichongwe in Lonjofwa. He did not know how many jatrophas he had, but it could be close to 1,000. Some had been planted in the first half of 2006, and many of these were nearly 2 m tall. He had received these seeds as a "pass-on" loan from another DAPP project. The jatrophas had experienced cold spells the first year, which had resulted in many branches, and thus the possibility to produce many more fruits.
He had already harvested a few kg of seeds, which he had sold for 5,000 Kw per kg (USD 1.25).
Mr. Shichongwe explained that the land had not been used for some time before the jatrophas were planted.
It was asked when it would be best to prune the jatrophas and make cuttings to increase the production. Mr. Chisambo explained that one should count 9 nodes for each cutting. The first pruning should not take place until the plant is about 1.5 m high. Mr. Shichongwe was happy to learn that he could start to make cuttings, since he did not know this.

Mr. Chisambo from Biofuels Association of Zambia explaining to Mr. Shichongwe how to produce cuttings.

Back in the Children's Town, final comments were made. Ms. Mpala from ILO (International Labor Organization) explained that they were working with the biofuel issue as a way to promote employment. She was happy to have learned about the project and stressed that it was very important the progress and results were documented. She would also recommend to media people to visit the project.
Ms. Annie Sugrue from ECOSASA (South Africa) said it had been a very good experience for her, and that she could use this in her endeavor to get South Africa to approve jatropha cultivation as a way to create development for smallholder farmers.
Mrs. Chitembo was happily surprised to learn that many women were already involved in jatropha cultivation. She is planning to start up production and had not expected other women to be interested in producing jatropha.
Christian Fenger explained that the GAIA-Movement would continue to seek funding and support the biofuel activities in the project area, and that they was currently a good chance of getting funding to expand the activities in Chibombo District and start similar activities in Mkushi District. He also briefly explained about the carbon trading system, and that they were hoping soon to be able to obtain additional funds to support community biofuel and treeplanting activities.
Mr. Chisambo and Mr. Chitembo from BAZ gave some facts on the perspectives of biofuel production in Zambia. The country has 75 million ha land of which 42 million ha are arable. 38 million ha of these are not used. Only 1 million ha is needed to produce the biofuels necessary to replace Zambia's import of petrol (450,000 l/day), diesel (1,500,000 l/day) and kerosene (50,000 l/day).
They also informed that two groups were setting up biodiesel production units within the next months. Amanita will produce 15,000 l/day and Oval Biofuel would install a pilot plant to produce 3,000 l/day.
Marli investment would also soon install a production unit.

The farmers were told that there would be no problem selling the jatropha seeds. It was also recommended that they use as much of the oil as possible locally, since this will give the best economy.

With these remarks and comments the conference was terminated, and all participants left with the strengthened view that local biofuel production will influence and contribute to local development in Zambia.