

REPORT NO 4

DECEMBER 2003

GAIA-MOVEMENT PROJECT:

**“Rehabilitation of mopane woodlands in Namibia by
planting live hedges,
and introducing a simple biogas system”**



Report no. 4 from GAIA-Movement Project in Namibia - December 2003

“Rehabilitation of mopane woodlands in Namibia by planting live hedges and introducing a simple biogas system”

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The Background

Most of the Northern Namibia has already been deforested and the problem is increasing. This means that less water from the scarce rainfall is absorbed by the soil and more of the water runs away and evaporates. There are not enough plants to maintain the soil with their roots, and the fertile soil is moved away by the wind. This makes it more difficult for new plants to start growing - a cycle of problems is created.

The local population uses many products from the woodlands such as firewood, poles, bark, fruits, animal fodder, medicine, mushrooms and honey. People are dependent on their environment. With enough woodlands the resources can be used in a sustainable manner. Currently the resources are overused because of the population growth and uncontrolled livestock.

The GAIA-Movement Project Idea and Objectives

There are alternative methods for cooking and construction, so that people don't have to cut down so many trees for firewood, buildings and fences for their fields and homesteads. The next step is to develop these methods to be practical and then to demonstrate them convincingly to people in the area.

The erosion can be stopped by using the correct species, and agroforestry methods such as alley cropping. Vetiver grass is known worldwide to be a good plant against erosion and to increase water infiltration into the soil. Research work needs to be done in the northern part of Namibia. Similarly the species for live fences in the dry area can only be found through trials.

The GAIA-Movement project in Namibia is closely connected to DAPP Namibia's Treeplanting & Environment Project, which was started in 1990. Its workers use their experience in planning and implementing GAIA activities. The project gets information and ideas from the GAIA-Movement through pamphlets and constant communication.

Project Summary Sheet

1	Name of the Project	“Rehabilitation of Mopane Woodlands in Namibia by planting live hedges and introducing a simple biogas system”
2	Operation Area	Omusati Region, Namibia
3	Project Responsible	Celestinus Ndongi
4	Address	DAPP Treeplanting & Environment, P.O.Box 135, Outapi, Omusati Region, Namibia
5	Telephone - Fax e-mail	+ 264 65 250063 - 251179 treeplan@osh.namib.com
6	The Project Idea and who the Project Reaches	<p>The idea of the project is to preserve the mopane woodlands in northern Namibia by planting live hedges and by introducing and spreading a biodigester system.</p> <p>This project will benefit:</p> <ul style="list-style-type: none"> ✍ the environment - in less woodlands being cleared for firewood and fencing material ✍ the people - by reducing the workload of making fences around their fields as well as restoring mopane woodlands with all the benefits in the form of products derived from these.
7	The People at the Project	<p>1 project leader (part time) 1 nursery production manager (part time) 2 nursery employees (part time) 3 extension workers (part time)</p> <p>People from Tsandi and Onesi Constituencies involved in mopane management and live fencing. The project however also interacts with professionals from all 13 regions of Namibia.</p>
8	Partners	<p>- The Gaia-Movement Living Earth Green World Action USA, Inc. - DAPP Treeplanting, Namibia in cooperation with the Directorate of Forestry of Namibia in Oshakati</p>
9	Funding	12,500 USD
10	Time Frame	August 2002 - July 2004
11	Gaia Responsible	Christian Fenger
12	Telephone e-mail	00 263 91 444 128 chrhf@gaia-movement.org

Status of Implementation - 2003 DAPP Treeplanting & Environment, Namibia

	Planned	Achieved	Completion
Jatrophas planted	8,000	6,460	Families will be mobilised to multiply more jatrophas
Parkinsonia planted	2,000	800	
Sisals planted	1,000	572	
Moringa planted	1,000	458	
Meters of jatropha hedges planted outside the nursery	Not defined	1,500	More jatropha hedges will be planted in the next rainy season
Meters of sisal planted outside the nursery	Not defined	300	More hedges will be planted next rainy season
Number of households participating in live fencing trial	40	41	
Number of biodigesters installed	3	3	Trials with various covering systems
Nursery of Vetiver grass for rainwater harvesting trials	Not defined	1	2 farmers will make trial of vetiver+crops
Trial area for management of mopane	2	2	5 new areas are planned for 2004
GAIA pamphlets distributed to 25 schools	100	100	

The systems that are being tested

Find alternatives to the cutting down mopane trees for fencing poles, which farmers use to protect their crops against the many loose cattle, donkeys and goats.

- by finding the best plants suited for living fences. That is plants which are not browsed by animals and which grow quickly.
- plants which at the same time give additional value in the form of firewood, oil from seeds, material for compost (green manure). So that the farmers have a further incentive to plant them.

Find alternatives to the use of firewood

- by spreading the use of a simple biodigester system, which produces cooking gas and at the same time gives the full fertiliser value of the manure.
- by introducing the system of cultivation between rows of vetiver grass. If this system is found efficient, it will provide fuel or thatch material, while allowing more of the rainwater to enter the ground instead of running off.

Demonstrate that it pays to have a sound management system of the mopane woodlands. Agreements are made with the village headmen to fence in some wasteland areas with hedges, in order to give the mopane a chance to grow up again without being eaten or cut down unsustainably.

The Programme Elements Realised in the Year 2003

Trials for live fencing

It is almost one year since the GAIA activities were implemented in Omusati together with the communities of Tsandi and Onesi Constituencies. Since the project started these activities, the community has shown interest in taking part in the programme, and 41 households take part in the trials, where live fences are planted. Four species have been tested for these live fences - jatropha, sisal, parkinsonia and moringa.



The jatropha fence at the Kapanda family at Ombadhiya in Tsandi Constituency



The nursery has 458 moringa seedlings. The leaves are very nutritious and available during the dry period.

The parkinsonia has however shown not to do well in the field, and it has been taken out of the trials. The moringa seeds were acquired quite late in 2002, and they were not ready to plant out during the rainy season. They will be planted around homesteads in the region during this rainy season. They do not form a closed fence like the sisal and jatropha, but a great plus is that they provide green and nutritious leaves throughout the dry season.

6,460 jatrophas and 572 sisals have been planted at the homesteads for live fences. There are 28 community members who are taking care of these trials in Tsandi constituency. As planned they have only watered them a couple of times each month, and they are doing fine in spite of receiving very little rains after they were planted. This is a very good demonstration of how the jatropha can grow up without being eaten by the many goats,



Mr Kalola taking cuttings from his jatropha planted last year

cattle, donkeys and horses. This is important in an area where there is great lack of fodder during the dry season.

Furthermore two trial plots of jatropha have been set up to test how the plants manage, when they are not watered at all. The jatropha fences have been planted around plots of 4 x 4 m in the mopane management area. Only one plant of the 80 is suffering - a cow had stepped on it, but again - they have not been eaten by the livestock.

The idea was to plant millet inside the fenced areas - to demonstrate the efficiency of the live fence. This must wait one more year, as the plants are still too small.

It can be seen from the pictures that it will take some time for the plants to form a closed fence. But the mopane trees which are now cut down for the fences take much longer time, and need a much larger area, so there is no doubt that this is the right way to go.

A total of 572 sisal plants, have been planted in various villages, and most of these are also doing fine. At the nursery a further 515 sisal cuttings were planted to make sure that these are available for people. They will be distributed during this rainy season.

The sisal will also take some years to form a closed fence, but just as the jatropha, the sisal spreads easily from cuttings, and in the villages where it has been planted people now have their own supply.

An inspection group from the local Outapi Forestry Office have made an assessment report on the GAIA project activities in Northern Namibia. They have visited 17 of the 41 households participating in the trial and have planted sisal and jatropha along their homestead fences. They have checked how many of the trees were doing well. Their report concludes that most of the plants which have survived the dry conditions are doing well. They found 871 plants growing well out of the 2,200 which had been planted by these households. In some areas the plants were destroyed by termites and mice, and others died because they were planted as very young seedlings.



The trial fence of sisal at Tsandi after one year. It is a long term project.



5,000 jatrophas and 1,000 sisals are ready to be planted out at new homesteads and schools

The report also confirms that many community meetings have been held, where the advantages of live fencing have been explained. 49 such meetings have been held in different communities during 2003.

The inspection report concludes that the participating families are interested in the programme and that they would like to get more plants for further trials.

The nursery has produced 5,000 jatrophas and about 1,000 sisal plants, which will be planted out during this rainy season.

The experiences until now show that the selected plants are suitable for live fencing under the climate in our operational area, provided they are not planted too young.

Mopane Management

The mopane management trials are showing good results. The idea of the system is to cut the mopane trees in a systematic way, so that one of the stems is left to grow big, while the smaller ones are cut annually and used for fencing or firewood. The impact of the mopane management trials can already be seen in the community. Some members of the community have started to practice this management system at their farms or fields. There are two trials of mopane management - each of one hectare - are doing well. DAPP workers are carrying out the monitoring system to check how the trials are doing, and to collect information on what the community thinks of the programme. The trials are not fenced in, but the community members are taking good care of the areas, and there has been no problems with animals or with illegal cutting.

Even though the areas still give very little yield, there is clearly an interest among local community members to manage their natural resources sustainably. These trials give them a tool for this.



*Mopane restoration by organised management in the Omusati Region.
Notice the growth of grass under the well managed mopane trees.*

The Tubular Plastic Biodigester

Three plastic biodigesters have been established in the Omusati Region. One was set up at the DAPP Centre Nursery in Onambelela last year. Two new ones have been put up in Tsandi and Onesi constituencies, at the homesteads of two families participating in the programme.

All three started very well, but have encountered problems since. The one at the DAPP Nursery stopped working when the tubular plastic burst due to the fact that only a single layer of plastic had been used for this first model. It was then repaired and started to produce gas again. Once again the plastic broke and the whole system went down again. We have now repaired it, and we expect it to produce gas some times in January 2004. (It takes 4-6 weeks for the microorganisms to produce enough gas to fill the tube and create enough pressure, so that the gas can be used for cooking.)

The two other biodigesters have also experienced some problems. The one in Onesi constituency started very well, but a cat jumped on it and the system went down again. It has been repaired as well, and we are motoring its progress. We think it will be in operation by the end of January 2004. The one in Tsandi constituency is producing gas. However, the pressure has until now been too low to be used for cooking.

We have to find out how to get a gas stove, which can work at a low gas pressure. We can then start to measure how many hours of cooking it is possible to get out of a certain amount of animal manure.

It is clear from these problems, that we need to find some good and simple systems to protect the plastic biodigesters. The advantage of the system is that it is cheap and easy to install. But if the plastic bursts all the time, no one will use it. One system we will try in 2004 is to cover the biodigester with mats made of leaves from the local palm. This is cheaper than protecting the digester with roofing iron.

In spite of not yet getting many hours of cooking out of the biodigester, the families have produced much good fertiliser, which they have used around their homesteads. Every day new cow dung mixed with water is filled into the system, and the liquid flowing out of the biodigester is used for example in the nursery as a very good fertiliser.

Vetiver Grass

We were happy to get seeds of vetiver grass as a donation from a local farmer and they were planted at the nursery in order to multiply them. It is not the same variety of vetiver which is used around the world to reduce erosion, and for many other purposes, since these do not produce fertile seeds. In many areas spreading of plants can become a problem, and the seedless variety is therefore preferred.

This vetiver variety is however also growing in Southern Africa – especially in the Zambezi River system - and it is therefore also found in Namibia. These varieties produce fertile seeds.

Under the very dry conditions of Owamboland, there is however no risk of these vetiver grass becoming a problem.

Experience has shown us that the vetiver grass needs to be watered from time to time. We have tried not to water it for weeks, but it started to dry up. In order to produce as much planting material as possible, we have then kept it irrigated until now, when it has started to rain again.

We will however try to keep some of the vetiver without irrigation during the next dry season. This is crucial for the use, we want to test in the area. The vetiver grass is here planted in rows, with the traditional crops planted in between. The reasons for having vetiver are several. One is that the roots can penetrate the hard subsoil layers. This means that more of the rain water will sink down into the ground instead of flooding the fields (strangely enough, this is actually a problem in the dry Namibia). Another advantage is that less of the soil nutrients are washed or blown away from the field - an important thing with the poor soils of the region.



Vetiver grass in the nursery. To be planted out against wind erosion and to secure better storing of rainwater in the soil

Under good conditions one plant can produce 40-50 tillers (new shoots) every year. These can then be planted out. There are many low lying areas in Northern Namibia – the *oshanas* – which can not be used for agriculture because they are flooded during the rainy season. And the sand does not store enough water, so they could be used in the dry season. Since the vetiver grows well under wet conditions, the idea is to use these oshanas to further multiply them.

Planned activities for 2004

- To start up 5 more trials of mopane management of 1 ha.
- To plant all the remaining live fence plants.
- To involve schools, preschools and more families in planting live fences for future production of plant cuttings.
- To get two families to plant vetiver grass together with their crops.
- To secure that the established biodigesters are well functioning, and continue to promote the use of biogas.

DAPP Treeplanting & Environment wishes with this report to express our deep thanks for the support of The GAIA-Movement Living Earth Green World Action USA, Inc., and the many people who have donated clothes.

Signed: Date:
Christian Fenger
Director General

