

Miti

- >> Mukau: A Kenyan drylands tree with a bright future
- >> Yatta farmer makes tree farming big business
- >> Interview with Ugandan farmer, George Mayanja

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THE TREE BUSINESS MAGAZINE FOR AFRICA

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Issue No. 0001 January-March 2009

The billion tree race

We need to plant trees on millions of hectares

Eucalyptus

A blessing or a curse for Africa?

From

Dryland

to

Greenland

How Better Globe is planting a new green future for Africa



Contents



- 2 **Editorial**
- 4 **From Dryland to Greenland**
Better Globe Forestry Ltd plans to convert arid and semi-arid lands into productive areas
- 8 **Eucalyptus:**
A blessing or a curse for Africa?
- 10 **Fighting poverty in Africa**
Better Globe's three-pronged approach
- 12 **Better Globe Forestry's pilot plantation in Kiambere**
A trial ground for future expansion
- 15 **Milestones in forestry in Kenya**
Our very survival depends on the survival of our forests
- 16 **The Kenya Forestry Research Institute**
KEFRI conducts and disseminates forestry research findings
- 18 **The story of mukau**
A tree species of Kenyan drylands with a bright future
- 20 **Managing forests in Uganda**
The National Forestry Authority is formed
- 22 **The billion tree race**
Kenya's forest cover is severely depleted. We need to plant trees on millions of hectares
- 24 **Scaling new heights**
Kakuzi takes to agro-forestry with vigour
- 26 **A safe food additive**
Acacia senegal is a dryland tree species with many industrial uses
- 28 **Cloning trees for forestry**
Is it the way forward?
- 30 **Water management in the drylands**
Why it is of utmost importance
- 32 **Reaping in semi-arid areas**
With proper soil conservation efforts and irrigation, drylands can be made productive
- 34 **Composting**
The way forward for increased yields in semi-arid areas
- 36 **Leading the way**
Yatta farmer makes tree farming big business
- 38 **Put integrity first**
Can a new FREE e-book change Africa's corruption problem?
- 40 **Interview**
George William Mukasa Mayanja, a farmer in Uganda, East Africa
- 41 **Keep the memories alive**
Plant a tree to mark family events



Editorial

MITI means “tree” in Swahili, the most extensively spoken language in Africa. As from today, *Miti* it is also the name of this new, high quality and full colour tree business magazine. It is the first of its kind in East Africa, with the aim of informing and entertaining all, professional or not, with articles about or related to afforestation in Africa.

This publication targets all tree lovers, business people, farmers, ecologists, scientists, investors, students, NGOs, government policy makers and readers at large who wish to know how important afforestation is for present and future generations.

Each issue will have recurrent departments aimed at enlightening readers on the challenges and rewards related to tree planting in Africa. Apart from business articles and news updates related to afforestation, *Miti* will also give information on controversial tree issues, the historical use of trees, water management, tissue culture etc.

We will run interviews of farmers, individuals and companies with successful afforestation stories so that readers may benefit from these experiences. Moreover, the magazine will tackle issues like improving techniques and will give advice to readers, while local institutions will have the opportunity to present themselves and their work in East Africa.

Miti is more than just a magazine. It is a continuous positive training programme on how people can save the environment and make more money through tree planting. It is therefore essential for us to get feedback from you. Whether you are a professional in the forestry field, a farmer or just interested in trees, you are welcome to send us articles of interest.

In this first issue, we wish to delight our readers with articles about tree-planting in general, prices of wood, presentations from various partners, informative articles about tree-planting and water management, tissue culture, interviews with successful farmers and finally, a presentation of the Better Globe and Child Africa projects, all of this related to afforestation in dry lands. *Miti* will be published on a quarterly basis.

Karibu.

JEAN-PAUL DEPRINS

Miti magazine



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From Dryland to Greenland

Better Globe Forestry Ltd plans to convert arid and semi-arid lands into productive areas.

By Jean-Paul Deprins

Better Globe Forestry Ltd was incorporated in Kenya in 2004 and is part of The Better Globe Group from Norway, which focuses on the need to help fight poverty. The organisation does this through promoting massive tree planting and sustainable agricultural programmes through microfinance schemes, educational programmes and building schools

The mission of Better Globe Forestry Ltd is to make Kenya a greener and healthier place in which to live by focusing on the development of profitable, commercial tree plantations that will deliver environmental as well as humanitarian benefits.

Better Globe Forestry Ltd is totally committed to extensive commercial tree planting in ASALs (arid and semi-arid lands) as part of its overall environmental and social mission. As such, Better Globe Forestry Ltd has developed a whole range of interventions to cooperate with communities and individuals neighbouring its plantations. Better Globe Forestry Ltd recognises that a good neighbour policy is the best way to protect its plantations.

As a fundamental business principle, Better Globe Forestry Ltd conducts all its transactions with integrity and in accordance with good business ethics and practices.

In November 2006, Better Globe Forestry Ltd started a pilot tree-planting project on 100 hectares

– the first phase of a major tree plantation of 5,000 hectares in the area around Kiambere dam on the Tana River. The land is in the custody of the Tana and Athi Rivers Development Authority. Over 65 per cent of the people in the area are counted among the absolute poor, with very high unemployment.

Ecologically, the area around Kiambere dam is situated in semi-arid lands (ASALs), with an average rainfall of about 600 mm a year. Altitude varies between 700-800 m,

making for a hot tropical climate where evaporation exceeds rainfall by far. Rainfall is however, erratic and completely dry years do occur. So far, large-scale tree plantations in ASALs do not exist in Kenya and BGF is pioneering the field.

Tree species planted in the Kiambere drylands, to produce economically strong products are *Melia volkensii* (mukau) for high-quality timber, *Azadirachta indica* (neem) for oil and *Jatropha curcas* for bio-diesel.

Where are we now?





In May 2008, Better Globe Forestry Ltd signed a memorandum of understanding (MOU) with the Sosoma Ranching Co-op Society Ltd. The ranch occupies 60,705 hectares and had been allocated by the Ministry of Land to the Sosoma Cooperative Ranching Society (SCRS) in 1991. It is located in eastern Mwingi district, some 200 kilometres east north east from Nairobi. In 2005, SCRS had a membership of 769. However, it was considered dormant, as no organised activities were taking place. In the early years of the Society, ranching proved impossible as all the cattle died.

The place is really hot and dry as the following data demonstrate. The average yearly rainfall is between 300-500 millimetres, decreasing from west to east. The expected annual rains, with a 60 per cent probability (six years out of 10), for the western half of the ranch would be between 300-400 millimetres, and less than 300 millimetres for the eastern side of the ranch. In fact, November is the only month with reliable rain in all years, with 90-115 millimetres in 60 per cent of all years.

The average annual evaporation is between 1,900-2,400 millimetres.

Temperatures are high, with a mean annual 24-30°C, and an absolute minimum of 10-16°C. Average monthly temperatures range from 27-29°C (March) to 24-26°C (July).

However, the place also offers some advantages. Topography is flat, favouring mechanised work. The area mostly has deep soils with very little rock, allowing for soil improvement practices. In addition, it is a big, continuous area, alongside the major Nairobi-Garissa highway. Currently, studies are being conducted for water supply, as through boreholes, and location of earth dams. The local authorities, up to Vice President Kalonzo Musyoka, the area Member of Parliament, (who is also a member of the Society) receive regular briefs on the progress of the project, and fully approve of our intervention. Feasibility studies are taking place, and an environmental impact assessment is in the pipeline.

This project focuses on planting mukau (*Melia volkensii*) and *Acacia senegal* and the production of gum arabic, as a way of extracting value out of drylands with harsh climatic conditions. It is complementary to another BGF project in the same Eastern Province, where other species like *Jatropha curcas* and

Azadirachta indica (neem) have been planted for production of bio-diesel, glycerine and oil for plant protection.

In February 2008, Better Globe Forestry Ltd signed an MOU with the Witu-Nyongoro Ranch Directed Agricultural Company Ltd, about the establishment of an industrial plantation of 23,000 hectares of *Jatropha curcas* in Kenya's Lamu district, in the coastal lowlands alongside the Indian Ocean. The project includes an out-growers scheme for an additional 12,000 hectares, to be planted by smallholders in the buffer zone around the plantation.

The area to be planted is in a semi-arid zone, with rainfall decreasing rapidly from 1,000 millimetres to 500 millimetres from the coastal strip towards the interior. As year-round planting operations are planned, including during the dry season, the project will require the establishment of water infrastructure to allow additional watering of the young seedlings during their first year in the field. Currently, talks are being conducted with the ranch management committee for the location of the nursery and centre of operations. Simultaneously, the project is being presented and



Rino Solberg, Chairman of Better Globe Group standing under a mukau tree in Kiambere

discussed with the local authorities, which have to give their approval.

The project aims at producing:

- fruit coats: to be used for electricity production
- seeds: for oil production and eventual refining into bio-diesel
- press cake, to be fermented into biogas and afterwards to be used for soil improvement.

However, before planting properly can start, various studies need to be done. These include feasibility studies, an environmental impact assessment, a soil survey, a topographical survey, a base line to establish existing vegetation, a base line in the buffer zone (see below), for defining community development action and an overall management plan.

Lamu district is at Kenya's north coast, bordering Somali. It has 6,814 sq km, of which 308 sq km are islands (the Lamu archipelago). It has a population of 72,509 people as per the 1999 census, with a low population density of 10.6 people per sq km. Most people live along the coastal strip and Lamu island.


The area's absolute poverty index in 1999 was 42 and 58 per

cent of the population for Lamu West and Lamu East constituencies respectively. Absolute poverty had increased since 1994, when it stood at 29 per cent and 1997, when it was 39 per cent. (The Little Fact Book).

Better Globe Forestry Ltd will establish its processing industry for this raw material in the immediate surroundings of its plantations, creating employment in the countryside.

Better Globe Forestry Ltd, supported by top experts in agro-forestry, is also taking on consultancy, implementation and training services in different fields related to agro-forestry in drylands and has an established forestry and agricultural test and training centre in Kibwezi for that purpose.

The Better Globe Forestry Mukuyu Farm is a model dryland farm, excelling in integrated farming techniques for ASAL with emphasis on tree planting, water management and soil fertility for increased productivity. Water management and the efficient use of water are demonstrated through a variety of techniques including low-pressure drip irrigation for fruits and vegetables.

The whole concept is based on long-term thinking. It involves big investments and a great deal of research. However, taking on the many challenges for the many years to come is the only way to change what has become dryland to "Greenland". 



East African drylands in Kitui District in Kenya

FOREST PRODUCTS MARKET INFORMATION

TIMBER

Species	Size	Price (Ksh)						
		Coast	Nairobi	Central	Western	Rift Valley	Eastern	Nyanza
Cypress	2"x2"	25	28	25	15	16	24	18
	3"x2"	30	32	30	23	22	32	26
	4"x2"	40	34	32	25	25	36	27
	6"x2"	52	52	48	30	32	42	34
	6"x1"	42	34	32	25	26	32	30
	8"x1"	52	42	40	33	34	38	34
Pine	2"x2"	22	26	24	14	15	20	18
	3"x2"	28	30	28	21	21	30	24
	4"x2"	30	32	30	22	22	34	25
	6"x2"	52	48	45	26	30	40	32
	6"x1"	30	32	32	24	26	32	28
	8"x1"	48	45	36	32	32	36	32
Grevillea	2"x2"	20	18	15	12	13	17	14
	3"x2"	22	19	17	15	15	19	18
	4"x2"	25	22	20	17	17	22	18
	6"x2"	30	30	28	22	21	30	23
	6"x1"	26	24	22	18	17	24	20
	8"x1"	34	30	28	22	20	30	24
Eucalypt	2"x2"	20	18	15	12	13	17	14
	3"x2"	22	19	17	15	15	19	17
	4"x2"	25	22	20	17	17	22	18
	6"x2"	30	30	28	20	20	30	23
	6"x1"	26	24	22	18	17	24	20
	8"x1"	34	30	28	22	20	30	24

CHARCOAL

species	price/bag (Ksh)						
	Coast	Nairobi	Western	Central	Rift Valley	Eastern	Nyanza
acacia	600	750	650	700	550	450	650
black wattle	600	750	650	700	550	450	650

INDUSTRIAL FIREWOOD

species	price/m3 (Ksh)						
	Coast	Nairobi	Western	Central	Rift Valley	Eastern	Nyanza
Eucalyptus/Others	1,100	1,500	1,250	1,250	1,200	900	1,300

SEMI-PROCESSED TRANSMISSION POLES (EUCALYPTS)

species	price/piece (Ksh)			
	Western	Central	Rift Valley	Nyanza
Farm gate	1,400	1,400	1,300	1,300
Factory gate	2,200	2,200	2,200	2,200

TREATED TRANSMISSION POLES (EUCALYPTS)

species	price/piece (Ksh)						
	Coast	Nairobi	Western	Central	Rift Valley	Eastern	Nyanza
Tender prices*	12,000	12,000	12,000	12,000	12,000	12,000	12,000

* To supply to KPLC depots throughout the country

LOGS

species	price (Ksh/m3)			
	Central	Western	Rift Valley	Nyanza
pine	2,800	1,500	2,500	1,500
cypress	3,200	2,000	2,000	2,000
grevillea	2,000	1,200	1,500	1,200
eucalypt	2,000	1,200	1,500	1,200

EUCALYPT CONSTRUCTION WOOD

item	length (m)	price (Ksh/m3)			
		Coast *	Rift Valley	Eastern	Nyanza
Withies	3	30	15	20	20
Small	6	60	40	60	65
Medium	10	200	60	70	85
Large	15	300	80	80	100

* Mangrove poles

EUCALYPT FENCING POSTS

species	length (m)	price (Ksh/m3)				
		Coast *	Western	Rift Valley	Eastern	Nyanza
Small	3	80	40	45	50	60
Medium	3	120	60	70	80	80
Large	3	170	70	80	100	100

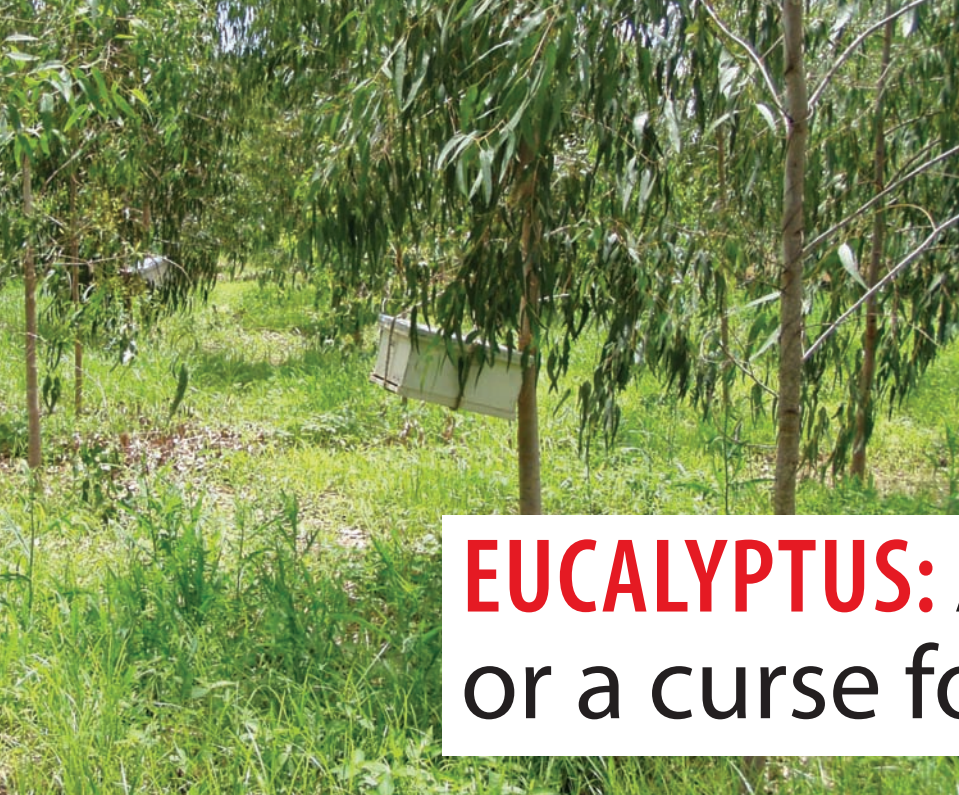
* Mangrove poles

KENYAN MARKET FOR FOREST PRODUCTS

This section of Miti intends to give market information for the main forest products regarding prices, and also volumes and trends. For this first issue, the information is focusing on timber, logs, eucalyptus construction wood and fencing posts and transmission poles.

The information has been supplied by Dr Joshua K Cheboiwo, Centre Director of Londiani Station of Kenya Forest Research Institute (KEFRI). Dr Cheboiwo has been doing research on markets of forest products for several years and is very knowledgeable in this field.

In the next issue, we will include other forest products like gum Arabic and seeds of oil producing species (neem, Jatropha curcas, and Croton megalocarpus). The prices provide a starting point for future trends, as changes will occur once the ban on logging is lifted.



A two-year-old eucalyptus plantation in Makueni District

EUCALYPTUS: A blessing or a curse for Africa?

Eucalyptus originate from Australia, Tasmania, New Guinea and some South Pacific islands, with roughly 400 species, and have been introduced in all other continents. This is because such a variety of species is suited to a wide range of climatic conditions, from hot and tropical to rather cold and supporting freezing temperatures. It is also suited to moist and humid as well as semi-arid environments. The species are not always easy to identify, and colour and texture of bark, and size and shape of fruits are important characteristics.

Actual African distribution and use

Almost all African countries count with more or less sizeable presence of eucalyptus. Most plantations are found in Ethiopia and South Africa with a significant presence in Kenya, Zimbabwe and Tanzania. The importance and use of eucalyptus in Africa is difficult to overestimate. Not only does the tree provide poles and timber, firewood and charcoal, but also ornamental flowers and essential oils for medicinal use. Eucalyptus rank among the best honey plants in the world. Timber production requires careful seasoning of the wood, otherwise it splits easily.

Characteristics of eucalyptus

Eucalypt species mostly seed in abundance, and are easy to raise in nurseries. They can be cut and grow back as coppice, allowing several yields without new planting. Their root systems are strongest close to the stem, but roots have been found in light soils to extend to over 30 metres both horizontally and vertically. Some species, like *E. grandis*, however have comparatively shallow root systems.

Discussion

Eucalyptus are being blamed for a great many evils, notably the drying up of water courses, suppression of other vegetation, as a cause of erosion and adversely affecting nutrient cycling and soil properties. These are serious accusations and they must be looked into. Various studies have been carried out on water consumption of eucalyptus. One such study was done by the Forest Research Institute of Dehradun, India¹. Several tree species were studied regarding water consumption and relation biomass production:

Tree species	Water consumption (ltr/year)	Biomass produced (g/ltr of water)	Water consumed per g of biomass (ltr/g)
Eucalyptus hybrids	2526	2.06	0.48
Dalbergia sassoo	1534	1.31	0.77
Albizia lebbek	1284	1.83	0.55
Acacia auriculiformis	1232	1.39	0.72
Syzigium cuminii	1190	2.00	0.50
Pongomia pinnata	459	1.13	0.88

¹ Vinayakrayo Patil. Local communities and Eucalyptus - An experience in India.



A four-year-old, well-managed clonal eucalyptus plantation in Murang'a District

From this study, it emerges that eucalyptus are indeed big consumers of water, but also the most efficient producers of biomass per unit of water consumed. This is an important fact, and what matters then is the economic return per unit of water consumed. Another study by Davidson (1989, in Tesfaye Teshome 'Is Eucalyptus ecologically hazardous tree species?')², mentions a consumption of 0.77 litres of water consumed per gram of biomass produced, and compares this with consumption for maize, coffee/tea/banana at respectively 1.00 and 3.20 and other food crops which are all higher.

That fast growing species like eucalyptus consume high levels of soil nutrients seems logical and sensible. This requires an appropriate management system to replenish the nutrient bank of the soil, just like in agricultural production. That soil properties are negatively influenced by eucalypt plantations is a controversial claim, while blaming eucalypt plantations for erosion has to be examined carefully.

It is true that lack of ground covering vegetation under a plantation will favour erosion, but a mature eucalypt plantation will not behave very differently

² The eucalyptus dilemma. Arguments for and against eucalyptus planting in Ethiopia. The Forestry Research Centre Seminar. Note Series No 1.A.A.

from a mature pine or cypress plantation. In fact, *Eucalyptus globulus*, with a strong taproot and a well-developed lateral root system, is seen in Ethiopia as a very reputable species for catchment protection. One can argue that Kenyan and Ethiopian conditions are different, but one has to be careful about blaming planting of eucalyptus for the drying of watercourses in Kenya. All trees, whether indigenous or not, do consume water, and the continuous and indiscriminate clearing of forest and woodland for agriculture, regardless of slope, location and soil type, might be a bigger factor in drying of local streams than eucalyptus planted too close to the water course.

It is however, a best and safe practice to recommend the maintenance of indigenous vegetation at both sides of a watercourse and have eucalyptus planted at least 30 - 50 metres away.

In view of efficiency of biomass production, their ease of management and variety of products on offer, eucalyptus have their place in the rural landscape and economy, alongside indigenous forests, plantations and species with their own products and values. **M**

Fighting poverty in Africa

Better Globe's three-pronged approach

By Julie Solberg, PR Director, Better Globe

THE BETTER GLOBE VISION

We are going to do more to eradicate poverty in Africa in the next 20 years than any other single organisation has ever done before.

We don't believe in just charity, except during catastrophes, but we believe strongly in systems of "self-help" and will support poor people in Africa based on principles of profitability. This way they can be self-sustained and able to work themselves out of poverty.

1 Tree planting

The desert in Africa is moving south very fast and without massive forestation, in the next 20 - 30 years, most land suitable for farming will be gone. Massive tree planting will also hinder global warming, which is one of the biggest threats in our world today. The company Better Globe Forestry Ltd will focus on massive tree planting in East Africa, mainly in Kenya, Uganda, Tanzania, Ethiopia and Sudan over the next 20 - 30 years. We will plant different trees for different purposes, like bio fuel, rubber, timber and different medicinal and other products. Better Globe also plans to set up production plants on site in order to build stronger communities, wherever we have tree plantations.

However, we are specialising in planting trees in arid and semi arid lands (ASALs), where the trees are not competing with food production. (See the article about this on page 12.) This way, we secure work for many people who otherwise do not have many alternatives for getting a job. In addition, we are able to stop migration of people from rural to

urban areas, where they mostly live in slums.

2 Microfinance for agriculture

About 70 - 80 per cent of the people of Africa are poor farmers, surviving on less than US\$ 1 a day. If we are ever to eradicate poverty in Africa, we have to help poor farmers make more money for themselves. Wherever Better Globe has a tree plantation, there are many small farmers in the buffer zones around the plantations who have no money to buy seeds, no money for good farming equipment, no money for modern farm education and even more important, often no markets for their products. From 2009, Better Globe will therefore start giving small loans to farmers in the different areas where the company is planting trees. We will have a "Microfinance bank"

for poor farmers, where they can borrow money needed to increase their crop and their income.

MICROFINANCE GOAL: We are aiming at becoming the biggest "Microfinance bank" for poor farmers in Africa, by the year 2026.

3. Education through Child Africa

Child Africa is a non-profit organisation (NGO) which originated from Norway. It works closely with and is supported by Better Globe as a big part of the Better Globe vision. Since 1991, Child Africa's vision has been "to help disadvantaged children in East-Africa to enhance their lives through education".

www.childdafrica.org

Poverty is common in Africa. Many children are orphaned due to AIDS and other diseases. We have

TREE PLANTING GOAL: WE ARE GOING TO PLANT 5 BILLION TREES IN AFRICA, BY THE YEAR 2026.



Julie Solberg on a tour with children from the Child Africa school in Kabale, Uganda



Deaf children performance in Kabale school

made it our mission, with support from “sponsor parents”, to help thousands of children in East Africa with food, clothing, medication, education and homes. Increasing support from around the world will enable us to help many more children in the years to come.

All over the world, children’s joyful laughter and songs are the same, yet the children behind them are so different. The sound of children’s laughter anywhere in the world brings a thrill of happiness in our hearts, for we love children, we love to make them happy, we enjoy seeing their big bright eyes, their smiles and their cheekiness. In short, their joy is our joy.

However, the little beings behind these laughter and songs are in two different worlds, it is like day and night. The children of the developed world cannot even comprehend the pain and difficulties most of their fellow playmates in the developing part of the world go through. It is indeed like day and night, for the light is very slow in reaching the majority of children in the third world, and for many, this means death.

If children in Africa do not get free primary education, there is no way any African country will be able to eradicate poverty. Education is the basis for all development and democracies and should therefore be the birthright of every human being, wherever they are born in the world. Very few countries in Africa offer free primary education so they need all the help they can get.

We believe that the only sure cure for poverty is education, which is why we put school first. “Help people to help themselves” through education is the main purpose of Child Africa.

We are a charity organisation undertaking school projects to give poor children in African countries care and high quality education. By building our own schools from donations and fund-raising, among others, we will be able to have good nutritious food, good teachers, a good curriculum where children will be taught ethics and morals and how corruption can devastate a country and its people. We will guide them to be self-sufficient and self motivated and have a will power to overcome any difficulties.

CHILD AFRICA SCHOOL PROJECT FOR DEAF CHILDREN

The first Child Africa school was started in Kabale Uganda. This school is unique because 20 per cent of

CHILD AFRICA GOAL: WE WILL BUILD MORE SCHOOLS IN AFRICA THAN ANY OTHER SINGLE ORGANISATION HAS EVER DONE BEFORE.

the children are deaf and it teaches sign language to all the pupils and teachers in the school. A research done in Cambridge University in England shows that deaf children who are integrated with normal children learn much faster and enjoy their stay in school. By incorporating

deaf children in the school, we teach both the speaking and non-speaking to tolerate each other and by teaching sign language to the whole school, we make communication easier for both parties.


The deaf children at the Child Africa school have changed positively. When they first came to us, they were both scared and shy with very little self-esteem and practically no self-confidence. We were amazed at the change after just a few months. They are now very outgoing and they smile, dance and learn very well.

The next school that we are building will accommodate some 1,500 children, with 200 to 300 places reserved for deaf children.

TREE PLANTING IN SCHOOLS

As depletion of tree cover in many African countries is a big and serious problem, Child Africa will have a special emphasis on teaching children how and why to plant trees at home. We will make an effort to plant indigenous trees in and around our schools so the children can get to know the different tree species. Child Africa schools will also mark and attend the national tree-planting day in each country where we operate, in order to make the children aware of the importance of planting trees both for the local and world environment.

Because of the relationship to and support from Better Globe, Child Africa will be able to help

some of the children make a career as carpenters, craftsmen, furniture makers or in other wood processing jobs. Better Globe will be a major player in the forestry sector in East Africa and will therefore provide thousands of jobs in different fields within this sector in the years to come. 



Left: *Jatropha curcas* at the end of the dry season (Sept 2008) almost completely defoliated and seriously stressed by drought. Right: The same *Jatropha curcas*, two weeks after two downpours, of 76 and 14mm respectively, completely recovered and flowering (Oct 2008).

Better Globe forestry's pilot plantation in Kiambere

A trial ground for future expansion

By Jan Vandenabeele, Executive Director, Better Globe Forestry Ltd

Background and the working environment

Kiambere is located 130 kilometres northeast of Nairobi, Kenya's capital, in a semi-arid zone where average yearly rainfall fluctuates between 500-700 millimetres. Potential evapotranspiration however exceeds 2,000 millimetres per year. Better Globe Forestry (BGF) has set up a pilot plantation by Lake Kiambere, an artificial water body created by damming river Tana for electricity generation, at 750masl.

The Kenya Government has created a buffer zone around this lake, for its protection and for security

reasons, under the tutelage of the Tana and Athi Rivers Development Authority (TARDA). TARDA and its parent Ministry of Regional Development are BGF's partners in this undertaking. As long as no works were going on in the buffer zone, it farmers repeatedly invaded and occupied it, cultivating subsistence crops like maize, millet, sorghum and cowpeas.

Aware of their status as illegal squatters, the farmers never invested in anti-erosion measures and soil fertility management, as they knew they could be evicted any day. Consequently, fertile top soil has been washed away by erosion, and the soil's fertility is seriously depleted. This is particularly serious as the

washed away soil ends up in the lake, contributing to its silt load and diminishing the lifetime for the power generation facility.

Poverty is rampant in the area, with over 65 per cent of the population living below the absolute poverty line, defined at an income of US\$1 per day.

Against this background, BGF is rehabilitating the area, with a plantation that is about 100 hectares, meant as a trial ground for planting and management practices. A tree plantation in a semi-arid zone on this scale is a novelty for East Africa, and BGF's work is truly groundbreaking.



The plantation in October 2008, with trees approximately 1 year and 10 months old, mukau on the left, neem on the right.

The plantation

BGF started working in Kiambere in November 2006, with preparatory work resulting in the first plantations in December 2006 and January 2007. The tree species planted are *Jatropha curcas* (physic nut), *Azadirachta indica* (neem) and *Melia volkensii* (mukau). *Jatropha* is planted on 55 hectares, making this the single largest plantation of the species in Kenya.

As this is the first time that *Jatropha* has been planted on a large scale, the tree poses some challenges regarding its silvicultural practices, and Kiambere has proven to be an excellent training ground. Several trials have been executed, including different planting/sowing methods, seedling propagation in nursery, planting density and dry season planting with different watering intensities.

Experiences and lessons

Planting in ASAL poses special challenges and leaves no room for error. In a high rainfall area, minor mistakes can be allowed, but in a hot dry area, a mistake may mean losing the seedling.

It is very important to select seedlings in the nursery before planting, eliminating weak, badly formed and undersized ones. Eliminating 10-20 per cent of the seedlings in the nursery might seem wasteful, but is in fact more profitable as it leads to higher survival rates and better growth and yields. Planting must be done after thoroughly briefing the labour force on best practices. These include planting immediately after transportation (not leaving the polythene bags lying in the sun for hours), minimal exposure of the rooting system to the sun, watering of the seedlings in the nursery before transport, and – very important – mulching of the immediate surroundings of the seedling without the mulch touching the stem. This mulching decreases



Sunburn on stem of young *jatropha* seedlings, caused by heating of the soil

evaporation of water and diminishes the soil temperature that can lead to sunburn on the stem resulting even in mortality (see photo above).

Anti-erosion measures are very important, if only for maintaining the little soil fertility left, and certainly to conserve the top soil from being washed away and having stones "grow". Soil work like ripping and ploughing, as well as weeding, should be done along contour lines. In addition, where gullies exist, construction of check-dams has proved very effective in putting a brake on erosion (see photos below).

In most of the plantation area, soil erosion has been diminished by

over 90 per cent, after barely two years of intervention.

Soil conservation is truly important, as soil quality is more important than rainfall. The point has been driven home by different thriving patterns of *Jatropha* bushes, depending on the planting site, all receiving the same amount of rain. The bushes do significantly better where soils are slightly more fertile.

Weeding and clearing of bushes: The competition was eliminated through weeding and removing of bush. This was done both manually and chemically, with the manual treatment proving superior from a financial point of view and also



Anti-erosion measures: Checkdams constructed with sticks and stones, along the course of a gully, and a gully showing the extent of soil being washed away.

giving better results. Mechanical weeding was not used. The chemical used was Glyphos (same as Round-up) with glyphosate as an active ingredient. Concentrations for weeding were 2 per cent as a spray, and 10-15 per cent for killing bush, applied with a brush. Results depended on the bush species. Some were killed, but four species proved to be resistant: *Acacia tortilis*, *Dicrostachys cinerea*, *Combretum aculeatum* and an unknown one.

Watering: In these ecological circumstances, *Jatropha* needs watering to survive the first year. A weekly dose of 5 litres is sufficient, but this can be fine-tuned to a lesser quantity depending on the season. During the dry season, even when watered, *Jatropha* is prone to stress and sensitive to attacks by a large number of pests and diseases. Once the root system is firmly established during the second and following years, the long dry season will affect the plant. It will defoliate to protect itself, but survive and re-grow immediately after the first rains (see photos above on page 12).

Pests and diseases: Contrary to naïve expectations, *Jatropha* is quite sensitive to a range of pests and diseases. This has important consequences for a cost-benefit analysis. BGF has been cooperating with the Kenya Forest Research Institute (KEFRI) for identifying and managing insects and pests that attack the plant.

It is crucial to identify the presence of a pest/disease fast, to avoid contamination over a big area, while limiting the costs of intervention. Ideally, intervention by a stand-by team takes place a few hours after detection. Manual sprayers are effective when spraying small seedlings, while motorised ones work better with bushes.

Yield figures on *Jatropha* are still sketchy, but seemingly, with the right care and management practices, it seems that even on marginal sites like Kiambere, *Jatropha* might become a profitable crop. M

This table gives a summary of our experiences in Kiambere

Insect/pest	Chemical	Active ingredient	Remarks
Blue shield bug - <i>Calidea dregii</i>	Lebaycid	Fenthion	Feeds on flowers, affecting yield seriously
Thrips - Heliiothrips haemorrhoidales, <i>Scirtothrips kenyensis</i>	Biomet	Dimethoate	Important agricultural crop pests. On young seedlings. Biomet is effective against sucking pests in general
Striped mealy bug- <i>Ferrisia virgata</i>	Lebaycid	Fenthion	Hosted by coffee, sorghum, millet. Favoured by drought
Sucking bugs like cotton strainer	Lebaycid, Imoxi	Fenthion, Imidacloprid	Lebaycid is a contact chemical; Imoxi is systemic.
Small unidentified caterpillar	Diazinol	Diazinon	
Bigger unidentified caterpillar	Triger	Lambda-cyhalothrin	Eats leaves and doubles as a stem borer. Triger is better against caterpillars than Diazinol
Mildew	Ridomil, Antracol, copper	Metalaxyl, mancozeb, propineb	
Root rot- <i>Phytophthora</i>	Copper, ridomil		On previous agricultural sites (like old bomas)



Left, above and below: An unidentified caterpillar eating the leaves and doubling as a stem borer, on *Jatropha curcas*. A spraying team with a motorised sprayer.