

## GeeBiz 2011 Competition



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# Table of Contents

Overview..... 3

Goals..... 3

The Jatropha Tree..... 3

Business Concept..... 4

Market environment..... 5

Impact..... 5

Financial..... 6



## Overview

BioDiesel Nigeria (BDN) is a company that will provide jobs for Nigerians by farming *Jatropha* seeds. The company will employ those living in poverty in the cities and relocate them to *Jatropha* farms in the north. Here they will be trained to farm *Jatropha* trees and be paid a decent wage. Once they have worked for BDN through one harvest they will become part owners of the business, giving them the right to a share of the profits. In this way, BDN ensures that control of the business stays with the workers and the profits go to the local community. The *Jatropha* tree grows well in arid land unsuitable for food crops and can help combat desertification, making it well suited to the north of Nigeria. There is a significant market for the seeds that sell for approximately US\$140 per tonne.

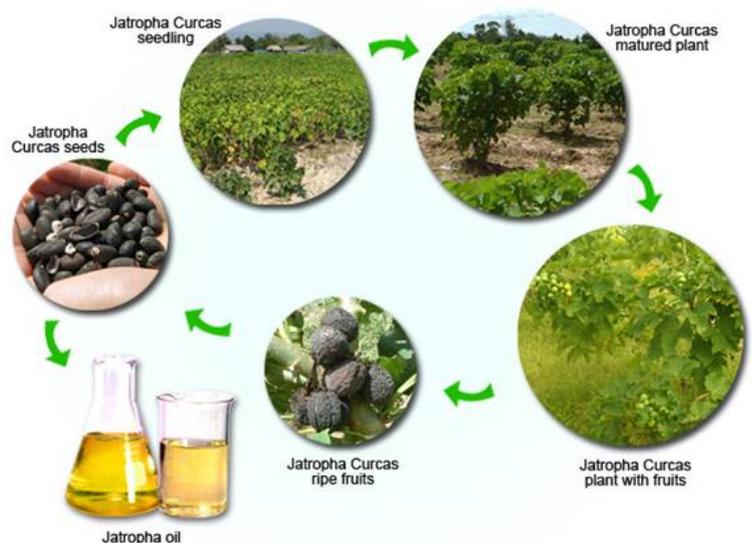
## Goals

BioDiesel Nigeria has multiple goals for improving Nigeria:

- Reduce poverty levels through worker owned *Jatropha* farms. By recruiting directly from those living in poverty and their families, BDN will be making an immediate impact on poverty in Nigeria.
- Create a sustainable business; keeping the profits in Nigeria by distributing them between the workers and reinvesting to grow the size of plantations. This will ensure the profits are not being taken overseas; they are directly benefiting the local community.
- Provide a source of income for the country that does not rely on the oil industry. The international demand for *Jatropha* oil is growing, giving Nigeria the chance to reduce its dependence on the oil companies for income.
- Help to halt desertification by planting large volumes of *Jatropha* trees along the edges of encroaching desert. This will benefit farmers growing south of the *Jatropha* farms by protecting them from decreasing soil quality. This will give them the opportunity to improve their soil quality and growing potential.

## The *Jatropha* Tree

The *Jatropha curcas* tree is a small perennial tree that grows well in barren land and is drought tolerant. It can grow almost anywhere and it sheds its leaves in the dry season creating mulch around the base of the tree. This mulch encourages earthworm activity, coupled with the nitrogen fixing qualities of the tree this helps to improve soil quality. The tree produces seeds once a year and starts to produce in the first year with yields increasing as the tree ages. The *Jatropha curcas* can live for up to 40 years so there is no need to replant each year.



Jatropha seeds contain roughly 28-30% of non-edible oil that burns with a smoke-free flame. This oil is one of several different types that can be used in creating biodiesel. It is also useful for indoor cooking and lanterns due to the lack of smoke. Prior to being processed, the seeds must be removed from the fruit pods and dried. Exposure to sunlight during drying tends to degrade quality and storage life of the seeds so it is important to have covered areas for drying. If dried correctly the seeds can be safely stored for up to 15 months.

Seed yields vary significantly due to growing conditions such as moisture, spacing, fertilisation, and soil quality. It is claimed that sandy soil can produce the best results if fertiliser is added. In more tropical environments with regular rainfall, the Jatropha tree is capable of producing seeds every four months instead of once a year. Some sources claim that at a spacing of 3m X 2m (1600per hectare), each tree can yield between 0.5 -1kg of seeds per tree, resulting in 1.6-4 tonnes/hectares. Seed yields increase as the tree ages resulting in higher productivity per hectare.

## Business Concept

BioDiesel Nigeria will be run by Nigerian businessmen/women who already have knowledge of the agriculture industry. It will hire those living in poverty in the cities and help relocate them to northern Nigeria. They will receive training on Jatropha farming and start planting the farms. Any employee, farmer or not, who has worked for the company through their first harvest will then be considered a shareholder. This will entitle them to an equal share in the company's profits, making sure the money stays in the community.



The company will start with a plantation size of 2,000 hectares and aim to hire 4,000 farmers. Farming practices vary significantly around the world, with some sources claiming one farmer per four hectares and others citing four farmers per hectare. BDN has chosen to trial the middle ground with two farmers per hectare and will have the flexibility to modify this ratio if needed.

Large drying sheds will be set up in a central location to facilitate the extraction of the seeds from their pods, drying, and packing for shipment to buyers. This will provide the complete service from growing to shipping to processors. There is a Jatropha oil-processing plant currently being built that will be operational by the time our first harvest is ready to be sold. Due to goals of BDN we would prefer to find local buyers for our seeds in order to keep as much of the profits within Nigeria as possible.

If there is insufficient capacity for seed processing within Nigeria we would set up a plant of our own. This will provide us with a higher value product and an extra revenue stream from processing other growers Jatropha seeds. As our company grows, some profits will be

reinvested in expanding the number of hectares under cultivation, providing more jobs for those in poverty. Some profits will also be invested in technology such as drip irrigation to boost the productivity of the farms.

## Market Environment

Nigeria is reliant on the oil industry for the vast majority of its exports; it is the 12th largest producer of petroleum in the world and the 8th largest exporter. These earnings do not tend to trickle down the economy and the poor are getting poorer. However, in 2005 Nigeria paid off its international debts, freeing up roughly \$1.15 billion per year for poverty reduction programs. Agriculture is a very important sector of the Nigerian economy; it used to be the world's largest exporter of groundnuts, cocoa, and palm oil. About 60% of Nigerians work in the agricultural sector but there are still large areas of underutilised land available.

The Nigerian government is trying to promote the farming and processing of Jatropha seeds. As the industry is only just getting started, there is little competition and a lot of support from the government. There has been N50 billion set aside for commercial farming including Jatropha and is offering special low interest loans for investors in the bio-fuel industry. The Federal Ministry of Science and Technology is supporting Jatropha farming, offering training workshops and other services.

There is an established demand internationally for biodiesel and it continues to grow due to environmental concerns. The worldwide market was \$18.4 billion in 2010 and is estimated to increase to \$71 billion by 2020. A significant part of this growth is due to many major airlines pledging to source up to 10% of their fuel needs from bio-fuels by 2017.

## Impact

BioDiesel Nigeria has the chance to significantly improve the lives of thousands of Nigerians living in poverty. It can directly affect the quality of life of its employees by providing a decent income and profit sharing, and can indirectly affect the lives of thousands more Nigerians as earnings are spent within the local communities. As the operation expands, the direct impact will increase and the trickle-down effect will become more and more pronounced. Because the company is owned and operated by Nigerians it increases these effects by keeping all the profits in the country, further increasing its ability to increase the standard of living of many Nigerians.

BDN will also help to increase activity in the bio-fuel industry within Nigeria and raise the non-oil contribution to GDP. This will help the economy break free of its reliance on the oil industry and foster a sense of pride within those working for BDN.



By planting *Jatropha* along the arid northern borders of Nigeria BDN will play a significant role in slowing and possibly halting desertification. Once the plantations become irrigated, this impact will be further increased; having the effect of improving the soil quality of the surrounding areas. This will aid the country as a whole due to larger areas of farmable land and reducing the worry of losing land to the encroaching desert.

## Financial

2000 ha plantation						
US\$	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Seeds (tonnes)	3,200	4,000	5,000	8,000	10,000	10,000
Sales	448,000	560,000	700,000	1,120,000	1,400,000	1,400,000
Wages	387,000	387,000	387,000	387,000	387,000	387,000
Gross Profit	61,000	173,000	313,000	733,000	1,013,000	1,013,000

There will be other overhead costs and setup costs with initial planting and land purchasing, but at this stage, it is hard to estimate. BDH is not expecting to make a profit in the first year, as seed yields will be quite low, however the standard model for *Jatropha* farms shows profits in the second or third year. As the table shows, profits increase rapidly as seed yields increase. This will allow investment in irrigation technology at the end of the third year, significantly increasing yields in the following years. At the end of the 4th year we will look



at expanding the number of hectares under cultivation to capitalise on the market and push growth.

We will pay our farmers N30,000 per year. This is above the average agricultural wage of N10-20,000 and almost double the minimum wage of N18,000 but still N3,000 less than the per capita income of N33,000. We do expect their income to increase substantially after a few years due to profit pay-outs from BDN. Because the company will not be profitable for the first 1-2 years, the wage needed to be set at a reasonable rate but not so high as to cripple reinvestment opportunities.

Our start-up capital will be secured from low interest government loans as part of their initiative to promote the agriculture sector and *Jatropha* farming in particular. If we decide to build a processing plant funding is available from the government, they have put aside N10 billion for low interest loans available to investors in bio-fuel distilleries.