



CONSERVATION





## JATROPHA CURCAS: WONDER PLANT OR WEED?

*Jatropha Curcas* is being presented as the new wonder crop. Many East African farmers are excited about the idea of cultivating diesel fuel from their land. In the ever-hungry energy market, demand seems limitless and prices remain less sensitive than with traditional crops.

The current excitement is neither based on practical experience, nor science. Nobody has the experience of commercial farming of *jatropha* in East Africa to give definitive information about its yields, profit, and, most importantly, sustainability. The science behind the technology also requires refining.

This lack of experience has been a major factor preventing *jatropha* from otherwise becoming a fuel of choice for the future.

However, there are a number of things that can be said with a high degree of certainty. *Jatropha* does work. Essential to its success are the yearly yield of seeds per tree on maturity. This is the key viability test for *Jatropha Curcas*. For instance, it takes four kilos of seeds to make one litre of oil- a substantial ratio. There are around 1,200 seeds per kilo.

*Jatropha* hype is based on wishful thinking about reducing green houses gases while also helping to fight poverty. There is nothing wrong with enthusiasm, but unrealistic assumptions will disappoint farmers and investors alike. The positive and negative aspects with *Jatropha Curcas* can be summarised in the following way:

On the positive side:

- *Jatropha Curcas* could provide opportunities for farmers.



- If the price is right, farmers will sell the oil, if not they may use it themselves for lighting and in stoves.
- It is easier and cheaper to adopt a new oil crop, than it is to change to other renewables, like the sun or wind. Agriculture is already a developed sector in East Africa, so an introduction of a new crop in farmers' existing land is easier, than introduction of a new technology (e.g. sun, wind).
- Existing machinery e.g. generators and vehicles, may with slight modifications, run on raw jatropha oil, thus there is no need to import expensive technology from overseas, e.g. hybrid vehicles.
- Depending on the scale of production, there could be market opportunities on many levels. From the small scale, as a paraffin substitute, to straight jatropha oil for mixing in diesel engines, or to use on slightly modified engines (with a two-tank system), all the way to large-scale biodiesel production.
- *Jatropha Curcas* complements the effort to plant more trees in Kenya. Jatropha is not an alien and/or invasive species and has been used for hundred of years in East Africa for medicinal purposes.
- Jatropha oil, as a paraffin substitute, burns twice as long as paraffin, and is many more times cleaner, reducing indoor pollution and thereby respiratory illness. It is also a good mosquito repellent.
- All parts of the seed can be utilised-after pressing the oil out, the seed cake may be turned into a potent fertiliser or briquettes for cooking.
- Jatropha oil is not a fire hazard like paraffin or petrol; it will not cause fires if overturned or spilled by accident. A major cause of fires in the region.
- *Jatropha Curcas* trees/shrubs may live and produce seeds for 40 years.
- Used as a living fence, it reduces



Top: **Jatropha nursery and pressing oil in Shimba Hills**

Far right: **Jatropha berries ripening**

Pictures by: **Eirik Jarl Trondsen**

### Despite its importance for water catchment, for neighbouring communities and for plant and animal diversity, Dakatcha Woodland has no formal protection status

- erosion and retains soil. It is also a cheap and available shrub/tree for fencing. It is especially useful to grow in areas with elephant intrusion, as elephants will eat food crops but will avoid jatropha.
- It has been intercropped with great success, diversifying agricultural production, and eventually increasing the income for the farmer in which they can tap into both food and energy needs.
- It may grow on marginal land with little rainfall, although it will not give a high yield unless it is fertiliser and irrigated.

On the negative side:

- Yield expectations are overly optimistic, agronomical data lacking and knowledge of the species as a commercial plant limited. Thus current plantations are in most cases not viable and only future yields from modified and/or improved

seeds may determine if it ever will be.

- Seed merchants, selling seeds without know how to care for the plants, have caused farmers much disappointment and wasted effort.
- Currently there is limited availability of the proper equipment. Harvesting, pruning and weeding require much time and physical labour. Labour is required for all months of the year, adding a high cost to production.
- Jatropha is sometimes grown in areas of food production, thus creating competition for prime land. It should not be grown in competition with food production.
- In many places lack of access to a ready market prevents famers growing jatropha.

Currently there are no clear Government guidelines, and different ministries are giving



conflicting messages about the use of jatropha and what role the Government will play.

## CONCLUSION

The Food vs. Fuel debate is raging; jatropha grown with irrigation, in a monoculture and on a large scale may challenge food security. On the other hand, there are vast areas of marginal land available in Kenya, and if jatropha is grown in the appropriate way, it could generate income that may well go into increasing food production and improved agricultural production in general - but only if it is irrigated and fertilised. Given the current regional water scarcity, it is not an appropriate crop for marginal land and will only realise its potential on well-watered and tended land.

Jatropha provides a fuel burning several times cleaner than fossil fuel. Increased tree cover will improve the microclimate in dry areas.

Jatropha may provide a viable new crop, but the road is long. NGOs promoting it may not require viability to satisfy their donors, but unless jatropha is introduced on a commercially viable basis, the jatropha dream will not be sustainable. A development project

in Kwale district is a living example, buying jatropha seeds at 10 times the market price, undermining sustainable production in the area.

The company Energy Africa Ltd. in Kenya/Uganda has four years of practical jatropha experience ([www.energy-africa.com](http://www.energy-africa.com)). Our findings from Shimba Hills, Kenya, and Mukono and Moyo in Uganda show that for jatropha to be productive it needs proper and timely care. Weeding, pruning and pest control is key to a viable yield. Thus the road ahead for jatropha is long and challenging.

The plant should be grown in conjunction with food crops; it also should be promoted as a live fence/hedge to reduce erosion and improve land management. The 100 farmers Energy Africa have contracted all have food crops as their main source of income, but growing jatropha as a long-term investment requires less effort than annual food crops.

Working in close collaboration with institutions like ICRAF, GEF/UNDP and the University of Life Sciences in Norway, gives a very different picture to the pro-jatropha hype in some newspapers and on the internet.

In marginal land, substantial manure/fertiliser and water is needed to get good seed production; pests are a major challenge; yields

take time to develop; continuous pruning is key, and there need to be as many as 150 branches.

Weeding and harvesting of seeds is labour-intensive. Harvesting is labour demanding, as the seeds do not all yield at the same time, requiring continuous harvesting. In one day a farmer may collect from 30 to 50 kilos depending on the number of seeds per tree.

There is no doubt that biofuel production could offer great potential for East Africa. It could become a key cash crop, and help lift local farmers out of poverty. East Africa has agricultural land, as opposed to

marginal land, but the current market is local rather than national. But fossil fuel is in short supply and diminishing, and prices will be rising. There may therefore be more emphasis on environmentally friendly alternatives to fossil fuel.

For jatropha to become the crop of the future, a clear and conducive government policy with an implementation plan is needed and resources to go with it. Tax and/or VAT incentives are critical.

Eventually pest-resistant and high-yielding seeds may be developed. Plant science development takes time, and patience is required. We need to be realistic about what is required to develop a viable biofuel industry, one which grows hand in hand with food production, and conservation. There is space for more agricultural production in Kenya, but more facts and a sensitive and collaborative approach is required.

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