

JATROPHA REPORT

CULTIVATION

Currently there is over 3 million hectares of Jatropha cultivation, particularly in Eastern and West Africa, SE Asia and China. Significant advances in Plant Science have led to selected strains of Jatropha from extensive breeding practises which have been supported with improved bio fertilisers and bi o pesticides. Much of the Jatropha being cultivated today has been bred from wild seeds and lacks the advancements that have taken place over the last 4 years of plant breeding programs.

Cultivation has focused on regions where there is sufficient rainfall in order to avoid the infrastructure costs of irrigation, semi arable land and supported by a large supply of agricultural labour for planting, pruning and harvesting.

ECONOMICS

Selected strains of Jatropha will yield between 5-7 tonnes of seedcake per hectare (per annum) provided that the following techniques have been adopted:

1. Selection of mother stock that have been bred from strains suitable to the soil and climatic conditions of the country where it is being cultivated.
2. The planting of saplings that have been bred from stem cuttings rather than directly from seed during the nursery stage of cultivation.
3. Application of bio pesticides and bio fertilizers during the planting stage
4. Adoption of stick agronomy techniques during the first year of cultivation, in particular the pruning of the stems,
5. The use of drip irrigation for cultivation.
6. The establishment of bee colonies in order to increase the pollination rates and increase pollination rates and balance ration of male and female flowering stigma.
7. The use of efficient extraction equipment for removing the crude vegetable oil from the nit Kernel.

Current estimations of oil extraction have shown approximately 1.5-2 tonnes of crude vegetable oil extracted from 7 tonnes of oil (30%). The market value for supplying non edible vegetable oil (gate price) ranges from \$300-\$500 per tonne. Of the seedcake remaining between 3-5 tonnes can be sold as fertilizer for a market value of between \$30-\$50 per tonne.

A farmer owning one hectare can expect to earn between \$550-\$1,250 providing the above farming techniques are followed and subject to the market conditions of non edible vegetable oils and fertilizers, less the cost of cultivation (bio pesticides, bio fertilizers, labour, oil extraction, transportation and storage).

TECHNOLOGY ADVANCEMENTS.

There are emerging significant developments in biotechnology, extraction technology and harvesting which will have a major impact on the viability and economics of Jatropha. Jatropha has yet to be proven economically viable in regions where water irrigation is required (such as India). The following technical advancements provide the farmer the opportunity to produce up to 10-12 tonnes per hectare a value of between \$2,200-\$5000 based on the following developments which are expected to be commercially viable within the next 2-3 years:

1. The breeding of Micro Propagated saplings from selected root cuttings which will be genetically identical and supplied to the nursery in sealed containers, hardened over a 3 month period and acclimatised to the region where the saplings will be planted. Tissue culture applications and trials started in 2006 and expect and reach commercial viability by 20011.
2. The adoption of correct pruning techniques on a regular annual basis will create increased lateral branching and consequently a significant increase in the number of nuts produced.
3. Detoxification of the seedcake, which has already been scientifically proven and is now at the controlled trial stage will allow for the seedcake to be sold as high protein animal feed, generating a primary source of income from the cultivation of Jatropha (between (\$200-\$300) per tonne.
4. Advancements in mechanical harvesting technology will significantly reduce the requirements for manual labour.
5. Improved designs of extraction technology combined with increased girth of the Jatropha nuts and kernel have demonstrated the potential of extracting between 35-40% `crude oil content.
6. Equipment for mechanical harvesting will result in significantly reduced labour costs for harvesting, since Jatropha has intermittent harvesting requirements throughout the year.
7. Improved degumming processes in refining have reduced the cost of biofuel refining operations.
8. Advancements in extraction technology have resulted in the extraction of up to 40% extraction of non edible crude vegetable oil.