



# Jatropha in India: promising bio-fuel crop for waste land



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# Content

Introduction

Importance of the Bio-diesel

Jatropha from press media

Production method

Various uses

Reasons for failure in some area???

Conclusion

References



# Introduction



# Importance of Bio diesel

- ❖ Environment friendly
- ❖ Clean burning
- ❖ Renewable fuel
- ❖ No engine modification
- ❖ Increase in engine life
- ❖ Biodegradable and non-toxic
- ❖ Easy to handle and store

# Jatropha may be the Answer

*Jatropha* (*Jatropha curcas*, Ratanjyot, wild castor) thrives on any type of soil

- Needs minimal inputs or management
- Has no insect, pests & not browsed by cattle or sheep
- Can survive long periods of drought
- Propagation is easy
- Yield from the 3rd year onwards and continues for 25-30 years
- 25% oil from seeds by expelling 30% by solvent extraction
- The meal after extraction an excellent organic manure (38% protein, N:P:K ration 2.7:1.2:1)

# Land option for Jatropha cultivation in India

Land category	Area(m/ha)
Cultivated lands	13
Strips boundaries	02
Degraded forest	36
Uncultivated degraded land	33
Total	84

Bhattacharya and Joshi, IIFM (2002)

# General Information regarding *Jatropha*

Scientific Name: *Jatropha Curcas*

English Name: Purging nut

Gujarati Name: Ratanjot, Mogali, Jangali Aerandi

Family: Euphorbiaceae

Avg. height: 3-4 m

Area under culti.: Waste land like...Salty soil, Sandy soil, Mountainous land, Dry and hard land, Forest land

Climatic condition: It can grow any adverse condition

Sowing: June- July

Flowering time: End of monsoon

Sowing method: 1. Seed (2 X 1 m) 2-2.5 kg/ha  
2. Cuttings (65-90 cm length)

Variety: Sardarkrushinagar bigger, Chhtrapati, Hansraj  
Fertilizer: No need but if possible than apply 25 kg N/ha for better growth  
Irrigation: No need but if possible than apply as per need  
Harvesting and production: 1100 kg/ha seed in dry land after 4-5 year  
6000 kg/ha seed in irrigated land after 5 year

# From Press Media

**18. 3. 2003 (The Hindu)**

### **Big Jatropha Initiative in India by Government**

The Government of India plans a big national effort for Jatropha plantation. The plan is that Indian Railways (owned by Govt. of India) will do plantation on waste land available with Railways and along the track. (hundreds of kilometers) Indian Oil Corporation will setup facility for Fuel Oil extraction and supply back to Railways with 10% blending with regular Diesel Oil.

**27. 3. 2003**

### **Jatropha oil for the Indian Railway ?**

In the Southern Railway, which covers the 4 south Indian states, plans are discussed to plant Jatropha along the railway tracks. The railways consumes 10% of the country's total diesel and is keen to blend Jatropha oil into diesel to minimize their petro-diesel consumption.

**27. 3. 2003**

### **Jatropha plantations in Tamilnadu state in India**

In Tamilnadu state the government is interested to encourage Jatropha cultivation. The farmers are interested, too, but they have problems to find enough material (seedlings) to establish big Jatropha plantations.

## 8. 4. 2003 (The Hindu)

### **Jatropha activities in India (a short summary)**

3. The Tamilnadu Government along with the Forest Department have planned a project for cultivation of Jatropha in 150,000 hectares in Tamilnadu. Any farmer with land can make their lands available for the Jatropha project and the seedlings as well as technical assistance for grow-out will be provided by the Forest Department.
4. The Indian Railway is to raise Jatropha along the railway track and plan to plant Jatropha along 25,000 route kilometers on two sides of the track. They plan to replace 10% of their total petro-diesel consumption by Jatropha. The project has been started on a pilot scale.
5. A Tamilnadu firm is working on a project to grow 600,000 hectares of Jatropha on lands owned by farmers in various parts of Tamilnadu. They will provide farmers with the seedlings and Rs. 3,000 per hectare for land preparation and planting. They will contract with farmers to buy out their entire production of Jatropha seeds.
6. The Maharashtra agro-forestry Department has been actively encouraging the raising of Jatropha in watershed development projects
7. A similar project as in Maharashtra is being attempted in the State of Madhya Pradesh.

6. The Planning Board of Haryana Government are planning to grow *Jatropha* on 50,000 acres (5,000 acres every year) to attract farmers to Crop Cycle Diversification.
7. The Rural Community Action Center (RCAC) in Tamil Nadu State is promoting the plantation and use of *Jatropha*.
8. The Gujarat Agricultural University is planning the plantation of *Jatropha* on wasteland for income generation.

**18. 4. 2003 (The Hindu)**

### ***Jatropha* activities in Tamil Nadu State, India**

The Government of Tamil Nadu is to implement a developmental scheme on *Jatropha curcas* and has a programmed to cultivate in 4 lakh ha (1 lakh is 100.000). (from the Tamil Nadu Agricultural University).

**22. 4. 2003 (The Hindu)**

### ***Jatropha* in India by RCDC (Rural Community Action Center, Tamil Nadu State)**

RCAC took the *Jatropha* activities recently, but they already multiplied 100.000 *Jatropha* plants, mainly as living fences. Last season 2 tons of seeds were crushed on demonstration purposes, to show the use of the oil as diesel substitute.

## Trains may soon run on bio-diesel

*Business Standard, July 15, 2003*

The railways have successfully tested bio-fuel on a Shatabdi Express between New Delhi and Amritsar, while stationary locomotives are gearing up to run on the eco-friendly fuel.

### 19-03-03

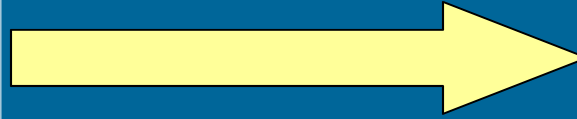
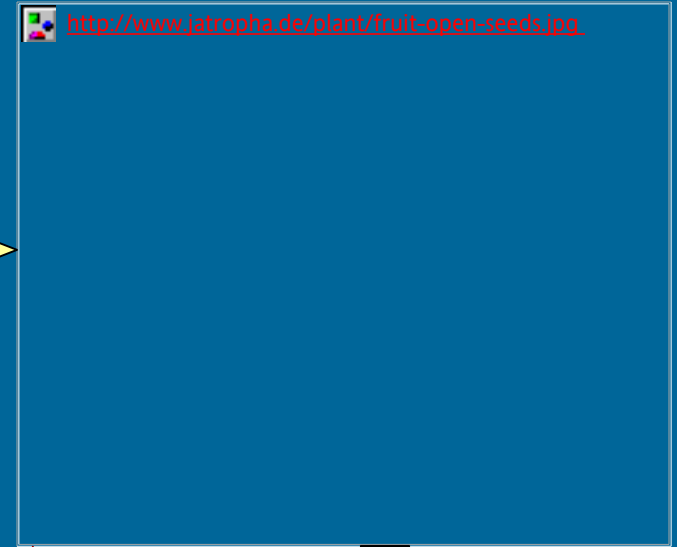
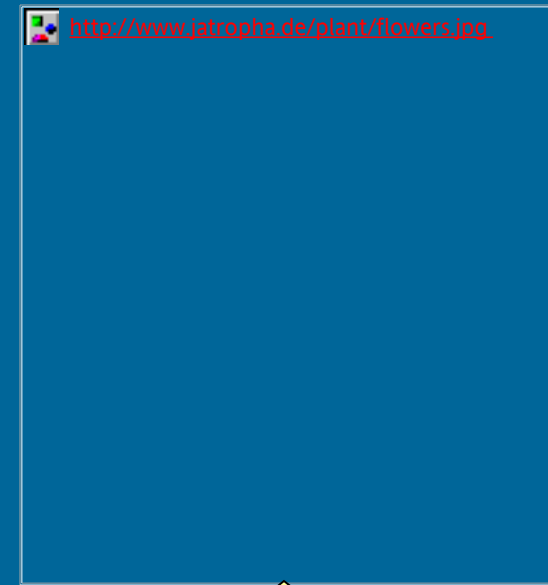
**Standard Chartered Opens Branch:** Standard Chartered Bank opened its second Gujarat branch at Vadodara on 17th March. The bank will remain open 365 days a year.

**Bio-Diesel Plant At Vadodara:** Automobile maker Mahindra & Mahindra Ltd. has set up a 300 tonnes-per-annum bio-diesel manufacturing plant at Vadodara on a pilot basis. The company expects the project to be commercially viable within two years. Research indicates that blending bio-diesel with regular diesel reduces the emission of particulate matter and harmful gases like carbon dioxide, nitrogen dioxide and sulphur dioxide. It is mandatory for vehicle owners to blend bio-diesel with diesel in western countries, but not yet so in India. The company makes bio-diesel by using oil from the seeds of the Jatropha plant (commonly known as Rattan Jyot and scientifically called Jatropha Carcus). The company plans to acquire 750 hectares of wasteland in Gujarat to grow Jatropha.

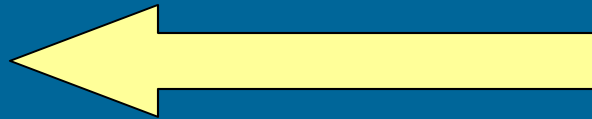
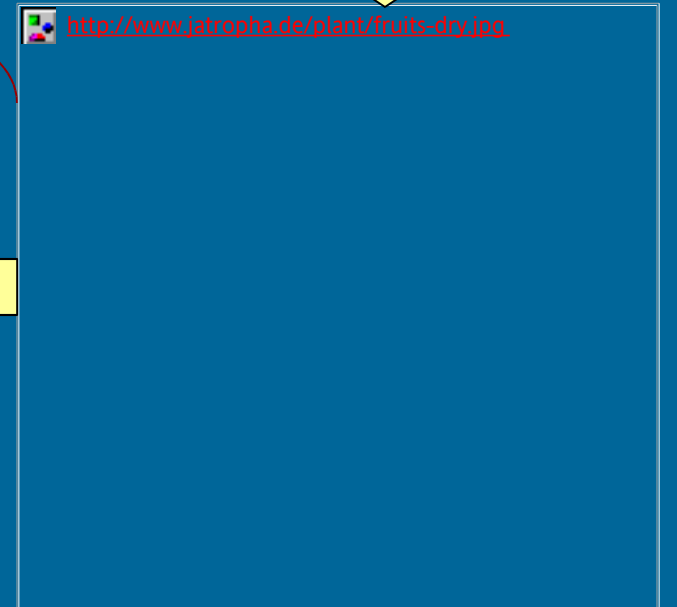
**Ahmedabad: State promotes 'ratanjot' oil as 'bio-diesel':**

**The Gujarat State Forest Department has recommended the exploitation of various species of trees to produce bio-fuel. A department spokesman said that 'bio-diesel' is a possible alternative keeping in view the rising demand for crude oil. 'Bio-diesel' is obtained from the seeds of various trees, including 'ratanjot' (jatropha), 'karanj' and 'mahua'. These species can be easily grown and crude oil obtained from their seeds can be used as engine fuel. Of these trees, 'ratanjot' is the most important one and its seeds can be used to produce bio-diesel. The forest department has prepared a project report for the implementation of a 'bio-diesel' programme and submitted it to the National Oilseed and Vegetable Oil Development Board, Gurgaon, which works under the Union Agriculture Ministry.**

**Source: The Times of India, Ahmedabad, 16/09/2003**




Jatropha



 <http://www.iatronha.de/plant/bld-hedge-around-field.jpg>

## Hedge around a field

 <http://www.aloverandia.com/istroyhanewl.jpg>

## 35 years old hedge

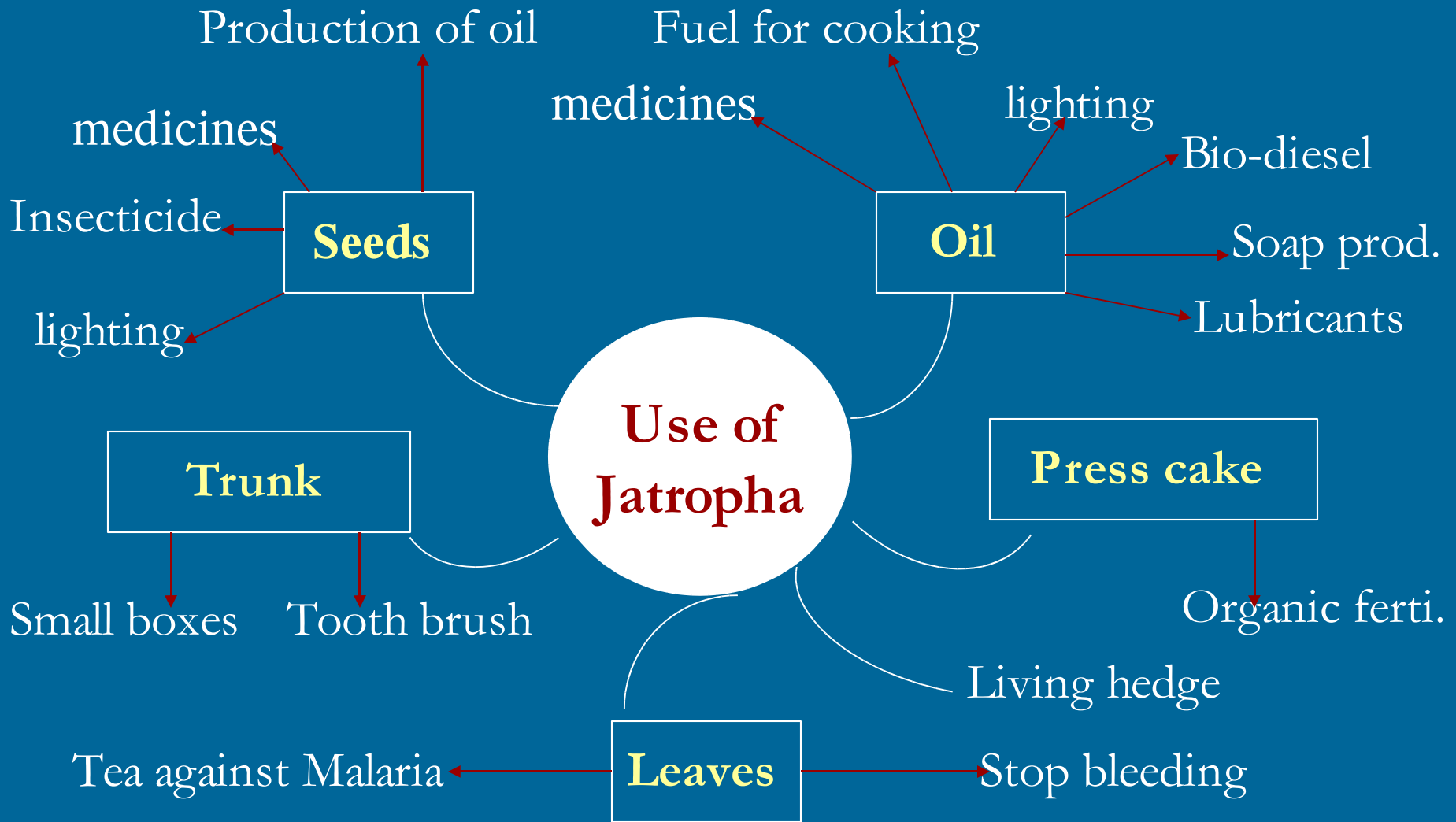
 <http://www.iatronha.de/plant/trees-35y.jpg>



[http://www.nifm.net/nifm\\_c.jpg](http://www.nifm.net/nifm_c.jpg)

<http://www.jatropha.de/zimbabwe/sum-exp-makona.jpg>


## A simple production flow chart and figures for Bio-fuel



**Uses of  
Jatrofa  
Oil**





 <http://www.iatropia.de/zimbabwe/baum-fertiliser-tes-1.jpg>



## Jatropha price at Dahod (Guj) market

<b>Year</b>	<b>Price (Rs./q)</b>
<b>1998-99</b>	<b>676</b>
<b>1999-00</b>	<b>606</b>
<b>2000-01</b>	<b>549</b>
<b>2001-02</b>	<b>577</b>
<b>2002-03</b>	<b>782</b>

Nandakumar (2003)

## Reasons for Jatropha failure in Maharashtra

- ✓ Poor yield about 1 kg/tree at the age of 2-3 years
- ✓ Lot of labor requirement in fruit plucking and clearing
- ✓ Less uniform and less promising planting materials
- ✓ Lower price to grower ie 10 rs/kg seeds

## Reasons for failure in A.P.

- ✓ Frequent drought year after initial sowing of Jatropha
- ✓ Termite attack
- ✓ Very late fruiting period
- ✓ Poor exposure to the farmers

## Conclusion

The future of *Jatropha* seems to be promising. The time is ripe for expanding *Jatropha* oil base to enhance the availability of this useful oil as raw material for industrial use and for generation of electrical power in a decentralized manner. There is need to promote the species on marginal or waste land only and establish processing units of low to medium size, preferably run by local entrepreneurs. Genetic improvement of particular species should be taken as future aspect.

# References

- <http://www.jatropha.de/>
- N M Patel (2003) Ratanjot: A promising biofuel crop of dryland. *Krushi Govidhya*,4 (56). SK Nagar (Guj.).

**Thanks to all**