

# Jatropha Pro-Poor Investments

## *Biodiesel Initiatives*

Bulk Agro (India) Pvt. Ltd. Consultation on Jatropha  
Rome, November 17<sup>th</sup>, 2008

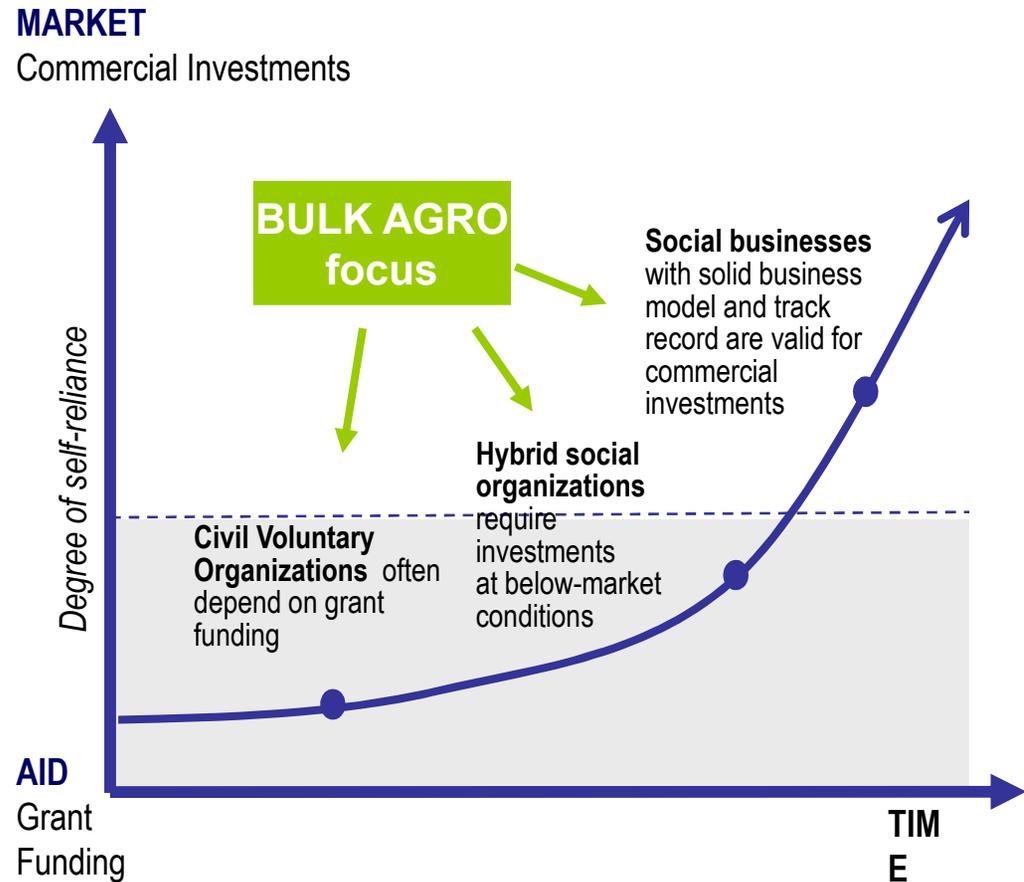


Manoj Raj Purohit  
Bulk Agro (India) Pvt. Ltd.

# About the Company

BAIPL

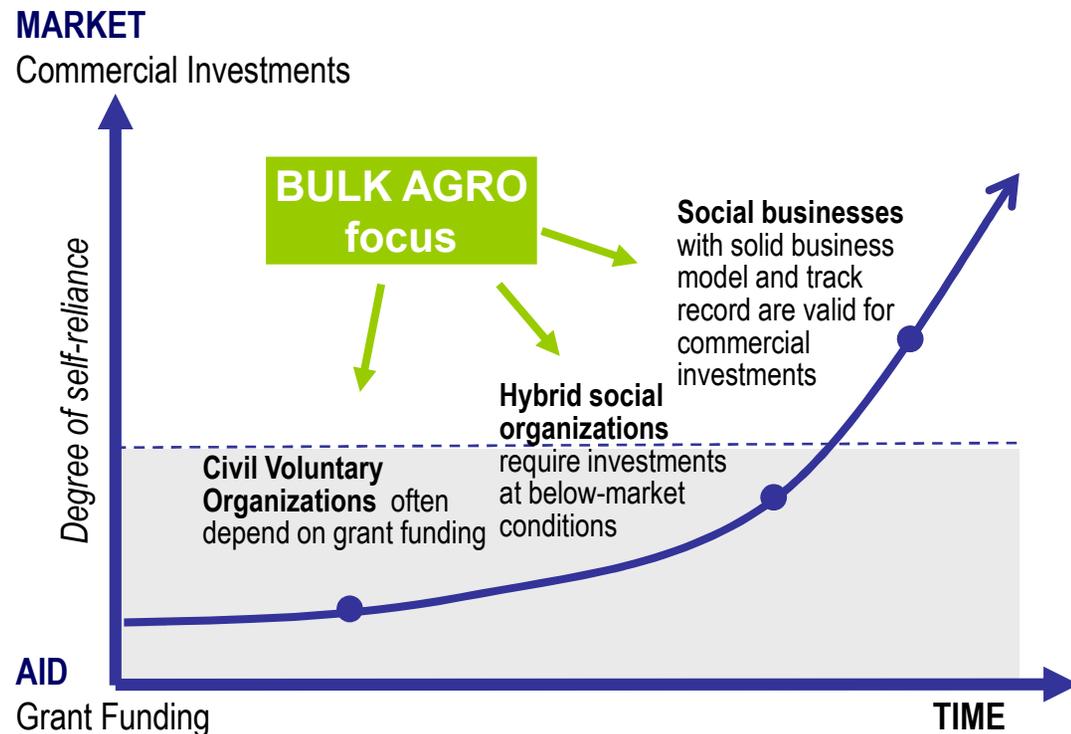
- **Mission: Become the company, most known for changing the world wide image of Indian Agriculture.**
- **From the city of lakes, Udaipur, are entering in the plantation of Jatropha Plants**
- **Our head office is at Udaipur and we are having two regional offices, one at international level at Mexico city and the another in Krishi mandi at Udaipur only.**
- **We are having a lot of pieces of land in Udaipur and near by places.**
- **We are also engaged in Contract Farming, i.e. we will be giving land for the plantation on contract.**



## Our background: Enhancing pro-poor investments

**BULK AGRO assists social entrepreneurs and social purpose businesses in developing countries to move „from aid to market“ by**

- Providing technical expertise in business planning and investment structuring
- Locating financing that meets the needs of the enterprise in accordance with its business development stage – arranging for below-market or full-fledged commercial investments
- Facilitating networking, mentorship and exchanges of information and expertise



## Jatropha Curcas

- Known as Ratanjyot, physic nut
- Fruiting 2-4 yrs.
- Maturity 5-10 yrs.
- Life 50 yrs. Productive life
- Small plant, 1100-2500 plants/ ha
- Seed Yield 3-5 tones /ha
- Oil content 30-40%
- Good boundary plantation



## About Jatropha Curcas Plant



I. It's a woody crop easy to set up, requires only 600-650 mm of rainfall annually.

II. Seeds production starts in the second year of life, it reaches maturity after 5 years old and it remains in constant production for 40 - 45 years long.

III. Optimal yields are obtained from the fifth year, and spaced at 2 meter intervals; around 2500 plants can be cultivated per hectare.

IV. In good conditions it produces 6 Ton seed per hectare, i.e. 2 – 3 kg per plant.

V. Seeds contains approximately 35 - 40% of non-edible oil, high quality as biodiesel.

VI. About 3 Kgs of seeds give 1 Kg of oil.

VII. 1.05 Kg of oil is required to produce 1 Kg of Biodiesel.

## Cultivation Timings



- I. Nursery raising time: Feb- March, Sep- October
- II. Transplanting of saplings: February - April , In monsoon months
- III. Direct seeding sowing: After good rainfall
- IV. Direct planting by cuttings: Two month before monsoon
- V. Manuring time: On transplantation and after one year
- VI. Pruning time: March-May
- VII. Flowering time: May - September,
- VIII. Fruiting time: July- November
- IX. Harvesting time: August- December (North India)

## Factors Influencing



- I. Climate
- II. Quality of the soil
- III. Irrigation
- IV. Weeding
- V. Use of fertilizer
- VI. Crop density
- VII. Inter-cropping
- VIII. Picking
- IX. Processing and Handling
- X. Storage and Viability

Jatropha Crop Yielding  
(Without Irrigation)



Jatropha Crop Yielding  
(With Irrigation)



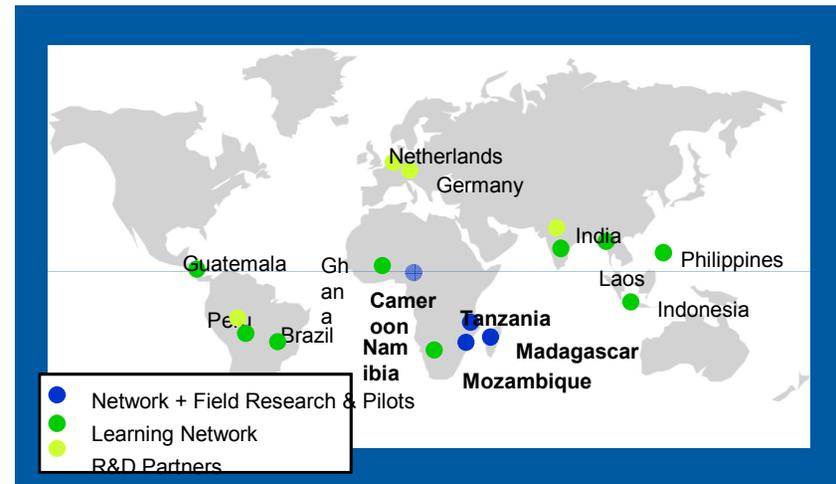
DRY (MT/HA)	Low	Normal	High
Year 1	0.10	0.25	0.40
Year 2	0.50	1.00	1.50
Year 3	0.75	1.25	1.75
Year 4	0.90	1.75	2.25
Year 5	1.10	2.00	2.75

Irrigation (MT/HA)	Low	Normal	High
Year 1	0.75	1.25	2.50
Year 2	1.00	1.50	3.00
Year 3	4.25	5.00	5.00
Year 4	5.25	6.25	8.00
Year 5	5.75	8.00	12.25

## Jatropha Learning Network

Since 1998, BULK AGRO has started to build up a jatropha learning platform which will be further refined in 2009:

- **Coaching and Mentoring** of local jatropha entrepreneurs in Asia, Africa, and Latin America
- **Pro-poor investing:** Project Development and Implementation of a 2905 ha jatropha pilot plantation.
- **Research:** Facilitation of Exchange of Know-How between Projects

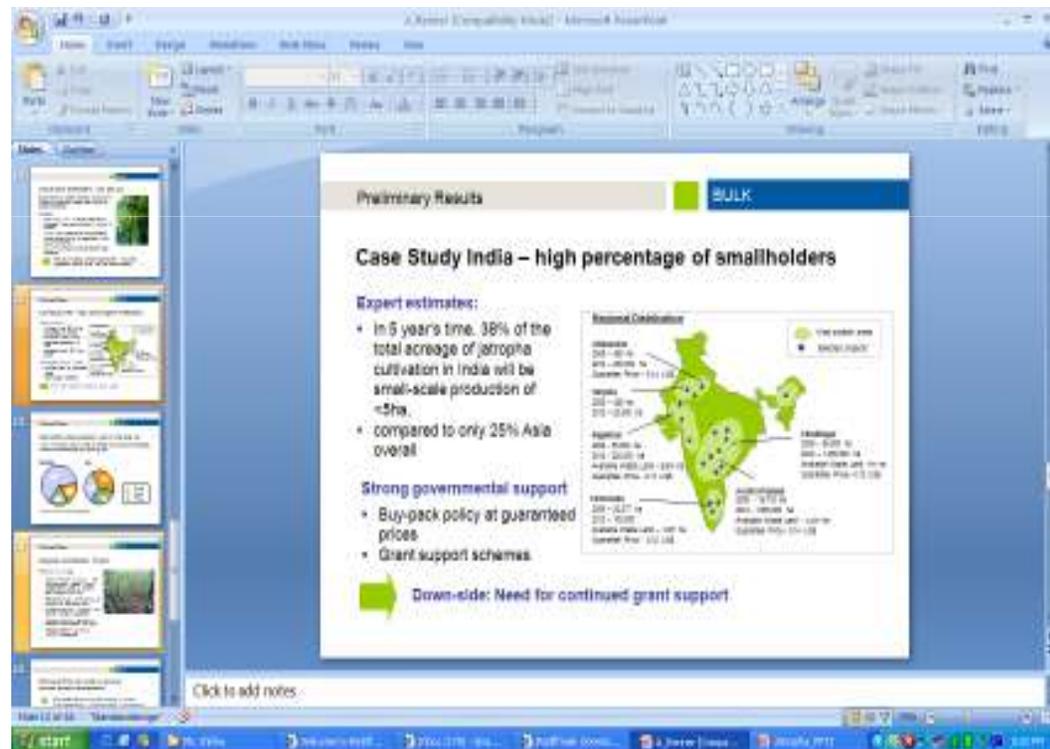


## Rajasthan Market Study on Jatropha

BULK AGRO has been contracted by GOVT. undertake a stock-taking on the development of jatropha projects – Rajasthan wide.

As of today, we have

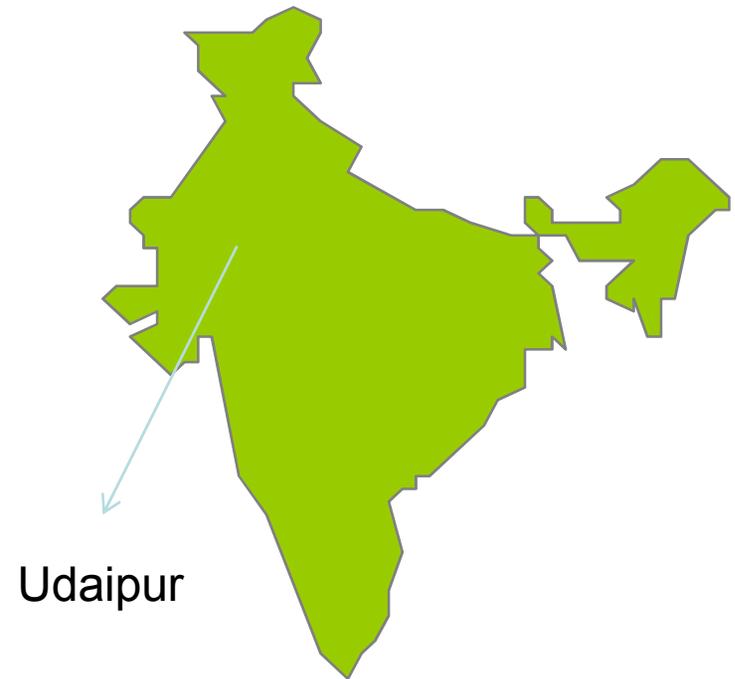
- Identified and processed data of **28** jatropha projects
  - Interviewed more than **17** experts in **5** countries
  - Our Mexico jatropha plantation also going on
- We have prepared
- **2** country profiles



We currently evaluate the data and finalize the report.

## • Rajasthan Land

- I. In total we are having about 7200 acres of land.
- II. We are also engaged in Contract Farming, i.e. we will be giving lands for the plantation on contract.
- III. All the legal papers of these land is available to us.
- IV. All the poor people in these places and the land owners are ready to support us.
- V. Also the higher authority persons are ready to give their land for the plantation.
- VI. We are having a lot of pieces of land for plantation in Udaipur and the near by places like Sirohi, Banswara, Udaipur and Chittorand in Badmer.



What organizational and cultivation schemes prevail?

## Case Study India – high percentage of smallholders

### Expert estimates:

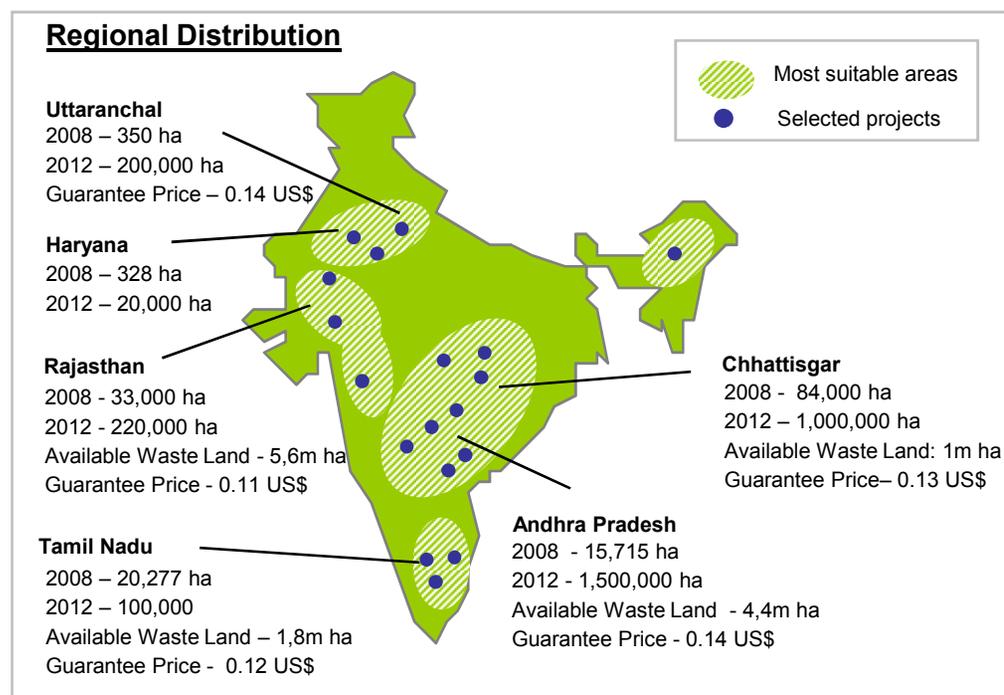
- In 5 year's time, 38% of the total acreage of jatropha cultivation in India will be small-scale production of <5ha,
- compared to only 25% Asia overall

### Strong governmental support

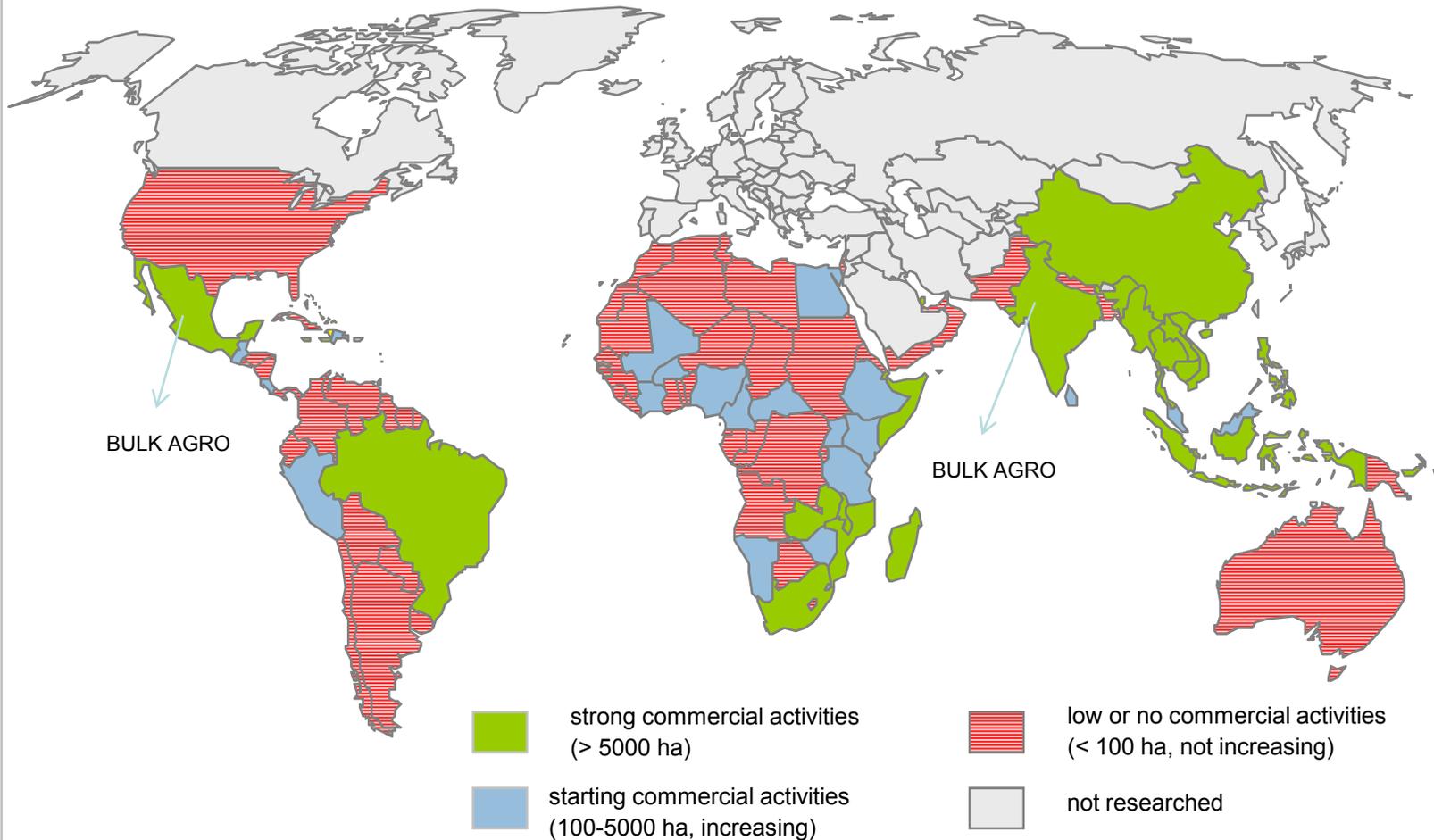
- Buy-pack policy at guaranteed prices
- Grant support schemes



**Down-side: Need for continued grant support**

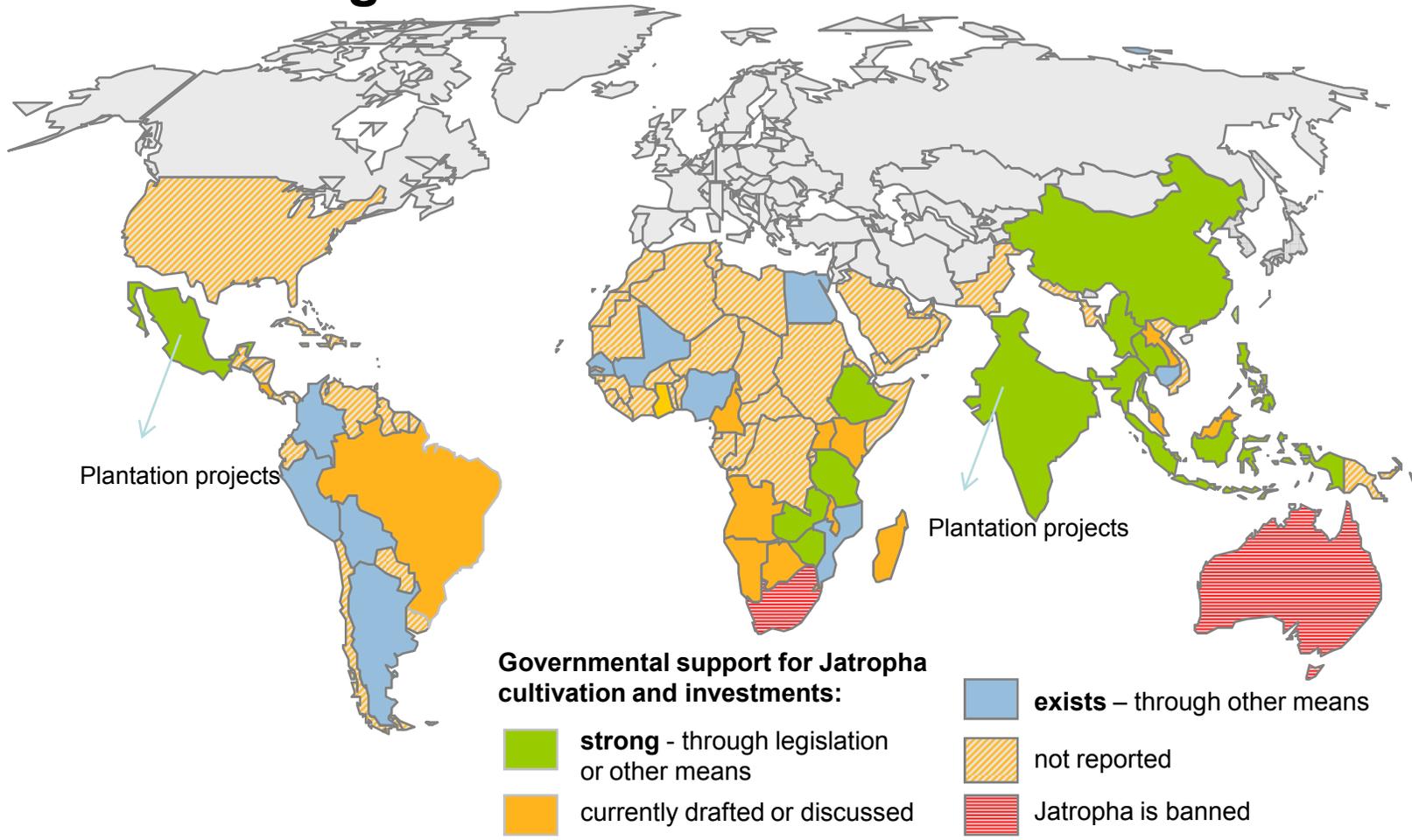


# Jatropha has been discovered as a future energy crop and will be farmed at large scale





# Jatropha cultivation is supported by a growing number of governments

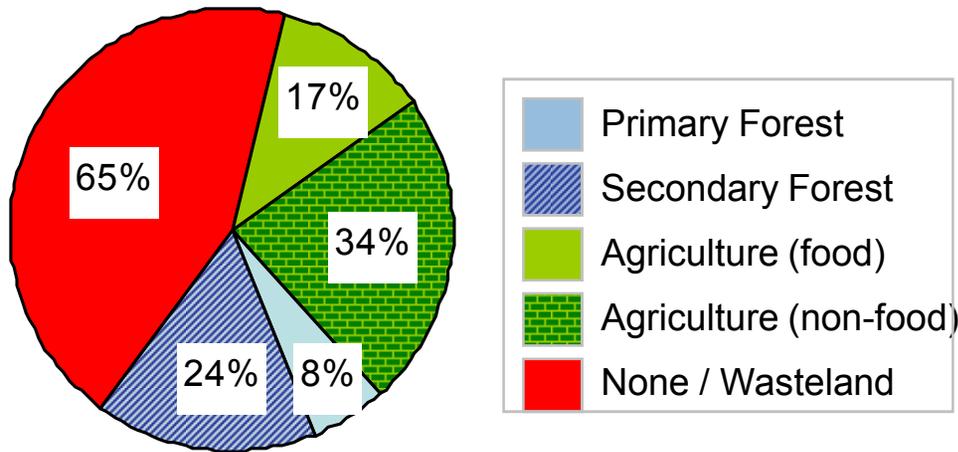


# Will Jatropha be grown in a sustainable manner?

## Sustainability Issues: Food, Rainforest

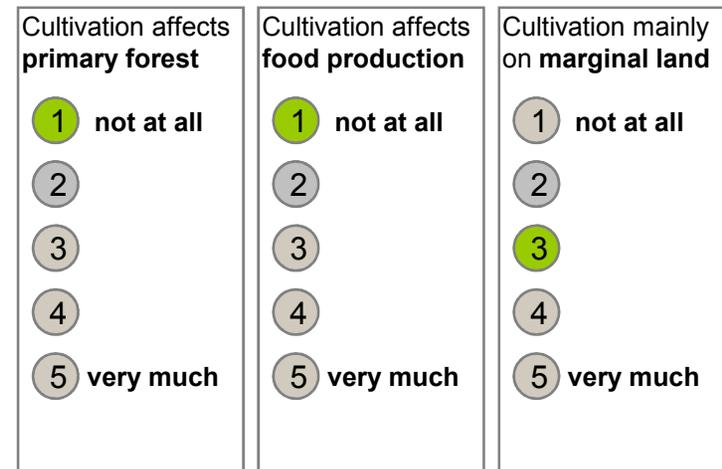
- Food versus Fuel – conflict is not seen as major issue for jatropha
- Rainforest: Conflicts mainly seen in South-East Asia

### Project Data



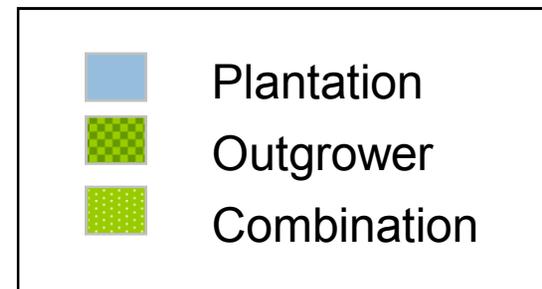
Percentage of projects which referred to type of use

### Expert Interviews

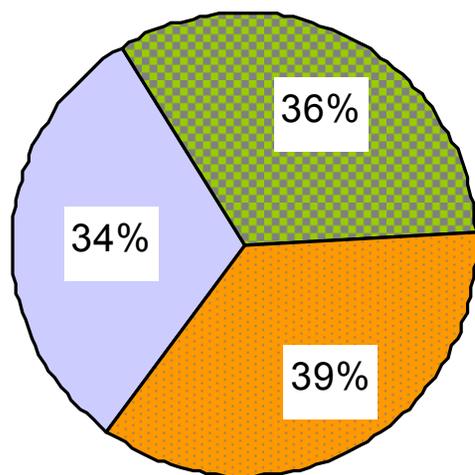


## Smallholder outgrowers play an important role

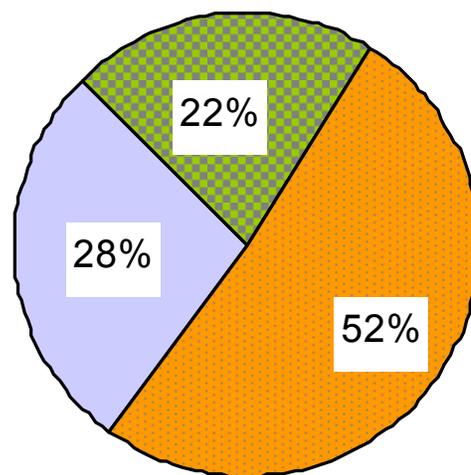
- Inclusion of smallholder farmers takes place in most regions and independent from project type and size
- Only very few pure outgrower schemes in Latin America



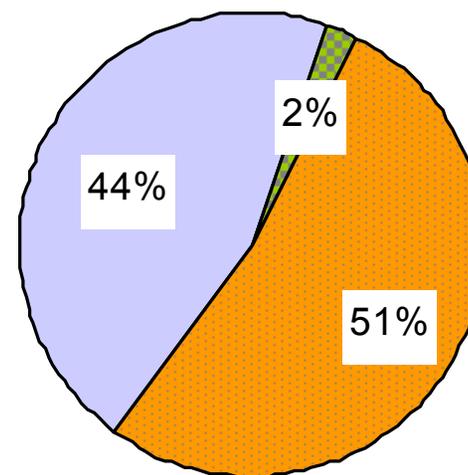
**Africa**



**Asia**



**Latin America**



Project Data (aggregated)

## Integration of smallholder farmers:

### Elements of a strategy

- Work with **(social) businesses** who have a long-term interest in further developing the outgrower scheme; allow for growth over time.
- Provide **Coaching and Mentoring** of Farmers (via „techniciens“ etc.)
- Involve **Bulk Agro (India) Pvt. Ltd.** as partners wherever appropriate
- **Advanced purchase agreements:** Reliability more important than price
- Integrate scheme in **agronomic calendar** of outgrowers



## Critical issue: Smallholders may lose out

Expert Interviews indicate that there may be a shift towards pure plantation models due to failure of outgrower schemes.

### Problems

- **Opportunity costs:** What are incentives to participate if there are no harvests in the first 2-3 years?
- **Loyalty:** How to ensure that the participating farmers actually sell to the organization which set up the scheme?
- **Agronomy:** Difficulty to provide efficient pest control etc.

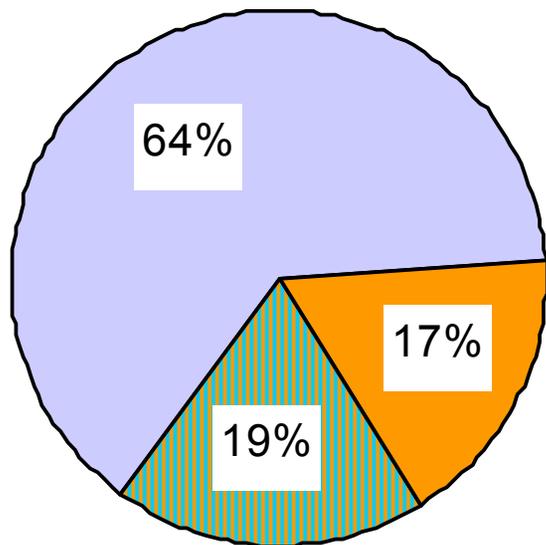


There exist numerous different organizational / institutional approaches; need for further test trials and showcases!

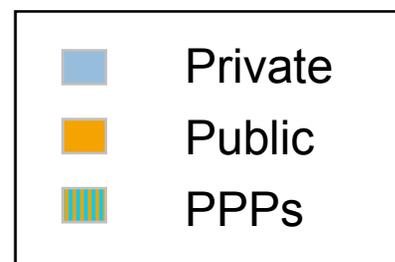
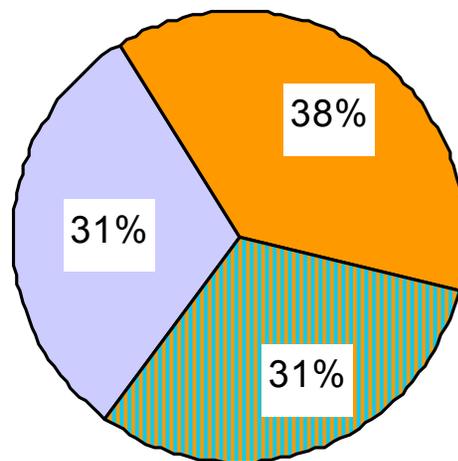
## Only market based solutions work in the long run

Work with the market player in order to enhance the inclusion of smallholders.  
Public Private Partnerships as a promising path.

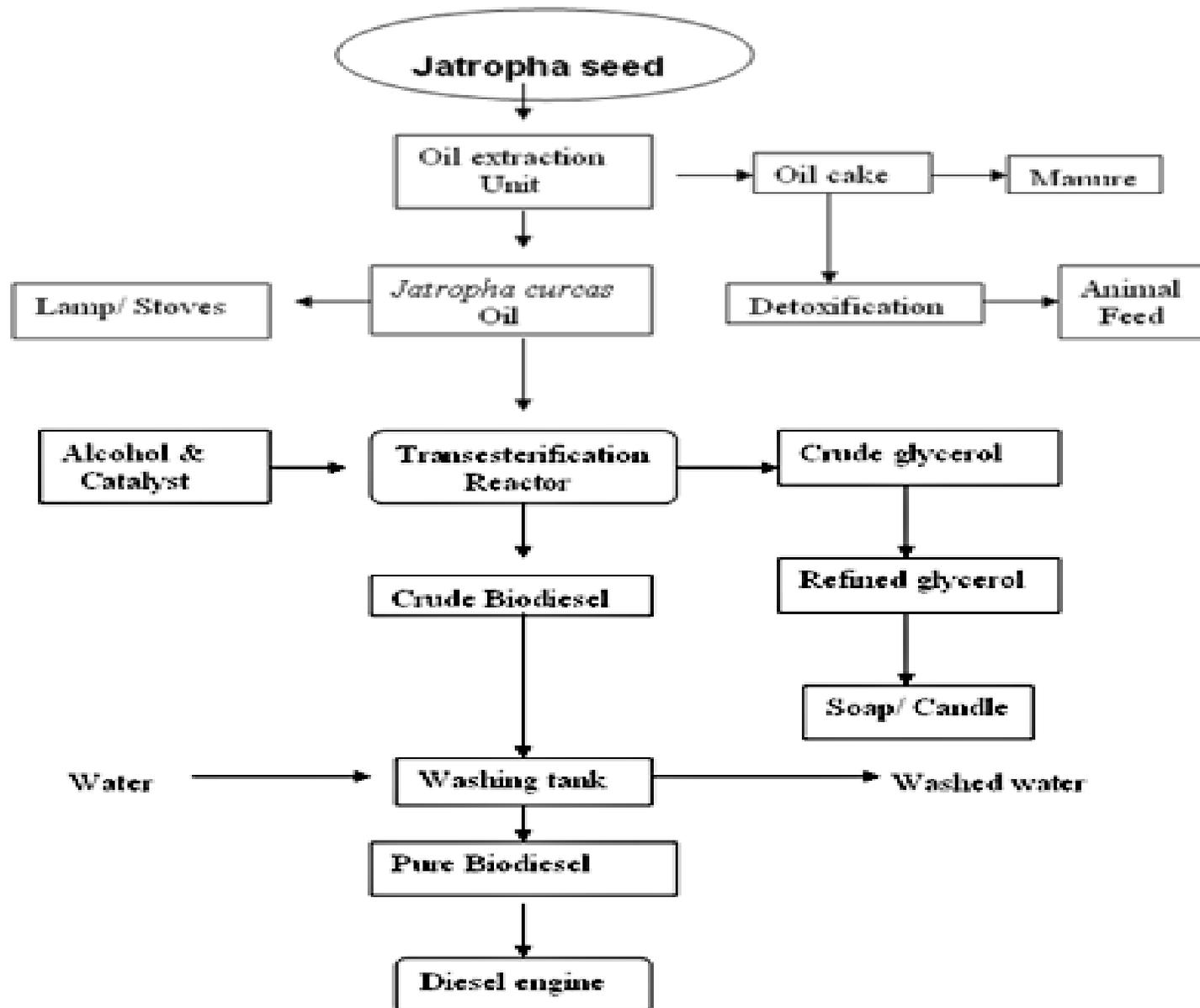
### Worldwide

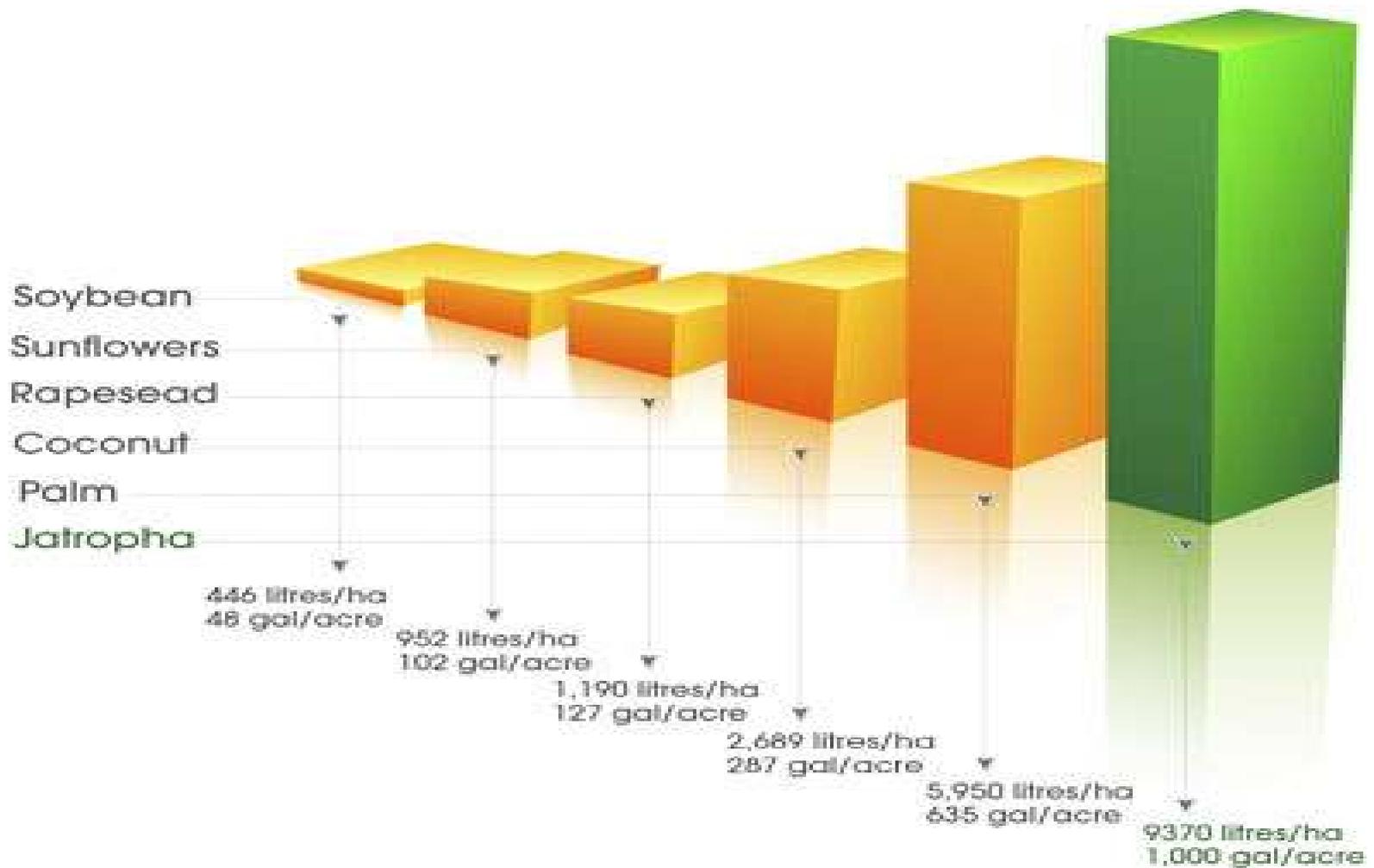


### India



Indicative Figures (double aggregation)

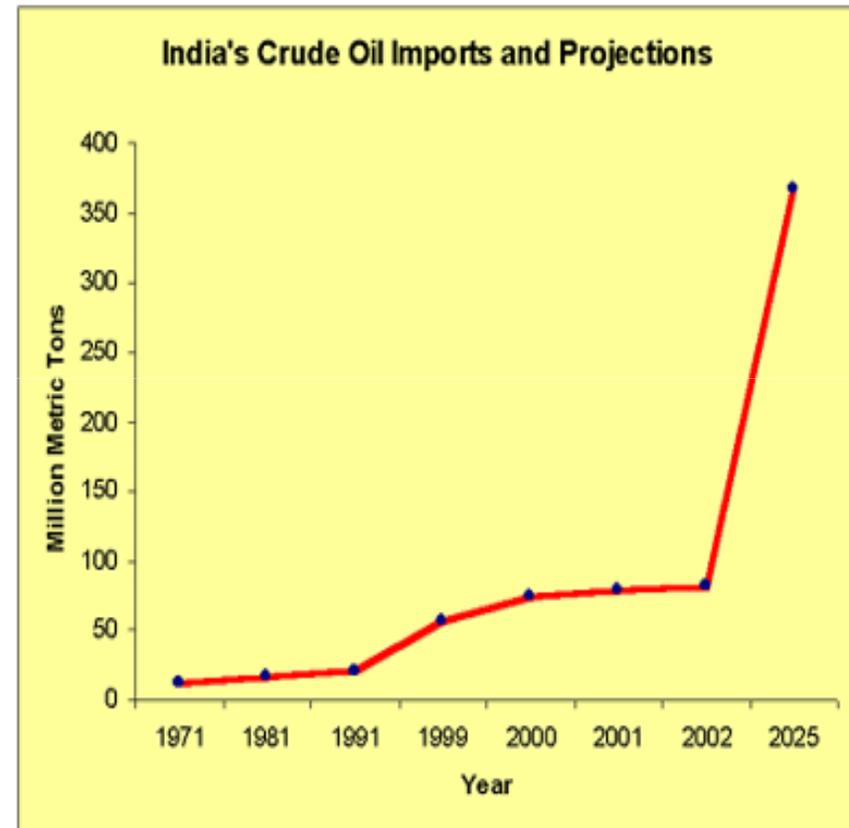




## Current Indian Import

- Current Oil Consumption – 130 MMT
- Current Oil Production – 32 MMT
- Import Bills - \$ 42.6 Billion

With continuous increase in demand, imports are set to rise further.

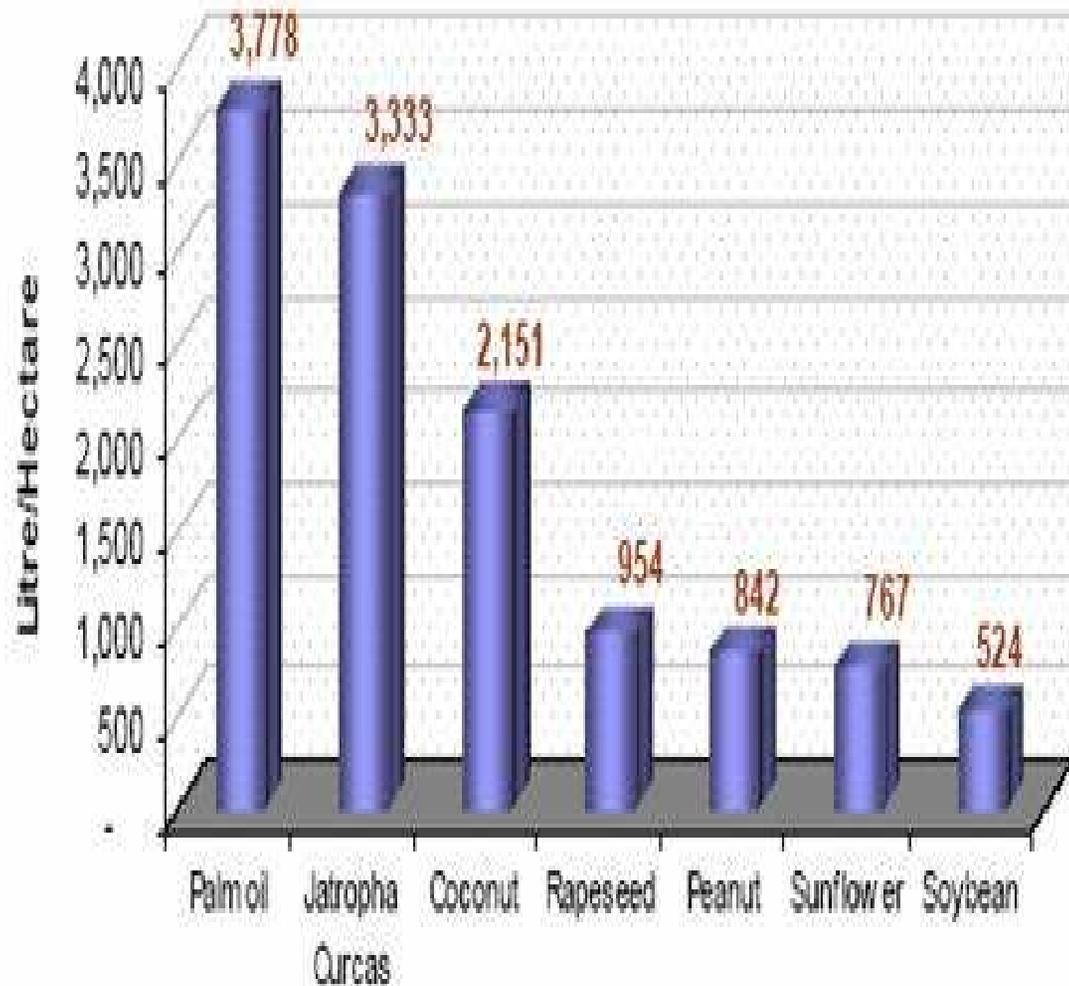


## Alternative For Meeting Future Energy Requirements

- New oil finds – Limited
- Biofuel – Ethanol and Biodiesel
- Wind Energy
- Solar Energy
- Hydrogen energy, Tidal energy, etc.

Earliest substitute in the near future would be biofuel. They are also environmental Friendly.

Plant Productivity for Bio-Diesel, Bio-Oil, Bio-Kerosene



## INITIATIVES

- Countries like India, Brazil, Malaysia, have potentials to export bio – fuels in the short and the medium term.
- Both US and Europe have launched massive bio – fuels programs.
- Brazil has a very large bio – fuel program.

## Significance of Biodiesel In India

- Diesel consumption is around 50 MMT which is 5 times more than the petrol
- With growing environmental concerns over global warming, fuel substitution to plant based oils is almost a necessity.
- Equal importance should be laid both on biodiesel along with ethanol blending in petrol.

## Global Feed Stock Options

### Edible Oils:

Rapeseed, Canola – EU & Canada

Soya – USA, Brazil, Argentina, China, India

Sunflower – S. European Countries, Italy, Spain, Greece

Palm – Malaysia, Indonesia, Tropical Africa.

### Non Edible Oils:

Jatropha Curcas – India, Central America, Africa

Castor – India, Brazil

Karanja (Pongamia) - India

## Land Resources for Feedstock

- It has been estimated that there are 55 million ha of waste lands as per the Wasteland Atlas of India 2005
- Out of this 32 million ha are potential lands where plantation of trees such as Jatropha and Karanj can be undertaken
- There is 15 mill ha of land with scrub while there is 11 mill ha of degraded forest with scrub which hold good potential
- It should therefore be possible that 10 to 20 million ha can be made available & is fit for plantation of non-edible seeds

## Jatropha – The Answer To India

*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
- Yield from the 3rd year onwards & continues for 25-30yrs
- Yield from established plantations in Brazil, 1.5 to 2.3 tons/hect.
- 25% oil from seeds by expelling; 30% by solvent extraction
- According to the National Mission on Bio Fuels out of 197 million hectares, 13.4 MH available for Jatropha plantation.

## Factors Affecting Biodiesel Project

- Feedstock availability - Plantation, supply contract –own/through joint venture-Low cost feed stocks-Long term Contracts
- Technology - Proven technology-Low cost of conversion - Ability to process cheaper feed stocks-Product quality of acceptable level-Consistency of quality-Value added by-products
- Off take security
  - Long term supply contracts
  - Quality discounts
  - Acceptable profit margins

## Cultivation For Feedstock

Analysis done by agri experts say that income Rs.15,000 is a sustainable income for farmers

### Average Income of farmers : Per Acre / Year

- The average income of our farmers in many states is Rs. 10,000/-to Rs. 15,000/-per Acre / Year ( from traditional Crops )
- For Lakhs of farmers in the country A regular income of Rs. 10,000/-+ Per Acre / Year would be “sustainable ”income.

## Cost Effective Measure In Setting Extraction Unit

### Locating Oil Extraction unit in rural areas

- For 1 KIBio-diesel -4 Tons Jatropha Seeds are required.
- 4 Tons of SEED must be transported FROM villages and 3 Tons of OIL CAKE Transported BACK to villages.
- If extraction unit is located near seed collecting centre, transport Cost on 7 Tons will be saved for every 1 Kl of Bio-diesel
- It will save Transport cost by 85 %.

## Most Important Requirements

- Assured Supply Of Seeds
- Fixed Rate Of Seeds For 3 Years
- Efficient Plant
- Maximum Conversion & Minimum Methanol loss.

## Factors Affecting Project Viability

MANUFACTURING BIO-DIESEL IN VERY SMALL QUANTITY IS NOT FEASIBLE

- Seed Cost.
- Bio-diesel purchase price

Rs 25/-per Lt includes Taxes + Transport

- Change in Government Policy.

## Enhancing Profitability of Jatropha Biodiesel

- Value added products from Jatropha Oil like phytochemicals for pesticides can be a viable value added option
- Detoxification of Oil cake
- Glycerin conversion
- Carbon Credits



## Recommendations

- Long-term Govt. policy on Biofuel
- Policy framework for promoting the manufacture and use of Biofuel.
- Facilitating the allotment of suitable waste degraded land for Jatropha cultivation to public/private entrepreneurs
- Policy on seed procurement, incentives to farmers for cultivation/upkeep.
- Tax incentives on Biodiesel.
- Necessary directives for Use of biodiesel.
- Regulatory framework for storage/handling transportation of biodiesel.
- Generous support for R&D for developing superior planting material.
- Government support for speedy approvals for bio-diesel projects for CDM.

## JATROPHA PLATFORM

- We are in the process of further expanding our jatropha related services
- Contact us for further questions:  
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