

Food versus Biofuels: Dilemma in Agribusiness

**Agribusiness and Food industry in
Developing Countries: Challenges
and Opportunities**

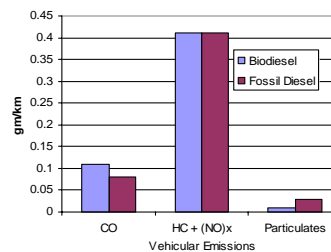
IIM Lucknow

**P.P. Bhojvaid, Senior Fellow, TERI
New Delhi**



Why biofuels

- Attain some level of energy security
- Environmental amelioration: relatively cleaner fuel compared to fossil fuels (reduction in particulate matter, SO₂ and CO).
- Has the potential to generate large scale employment especially in rural areas
- Save foreign exchange reserve.





Biofuels: Some International trends



- EU: 5.75 share in transport sector (2010) and 10% by (2020)
- US: 35 billion Gallons by 2017
 - Global productions
 - Ethanol: doubled
 - Biodiesel: 4 folds
 - Estimated half the corn production of US will be consumed in this



Characteristics:



- Political Impetus :Subsidized by national Governments
- Cost of wheat and corn increased in the last decade: further increases projected
- Italy: biofuel crops Vs Wheat
 - 22 Euro 11 Euro/100kg
- Changes in crop preferences
- Climate Change: extreme events



Consequences:

- Global food security and prices
- India, Brazil, China
- Africa: malnutrition
- Mexico: Tortillas
- UN: WFP
 - Contributions enhanced
 - Cut back on aids

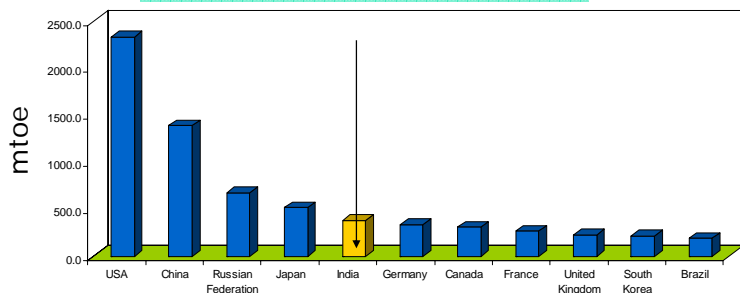


- Indian perspectives:

Energy Demand

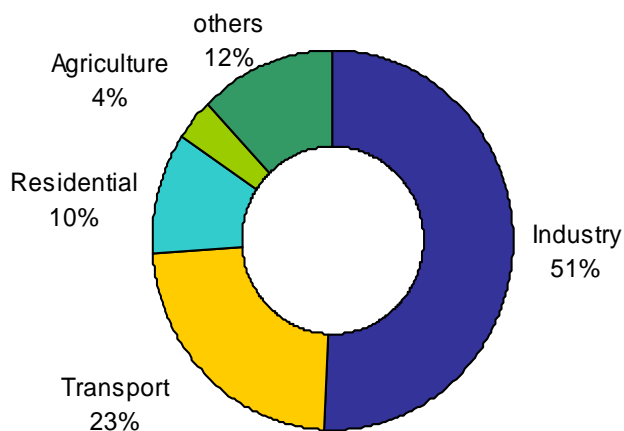
2004

India is the Fifth Largest Energy Consumer



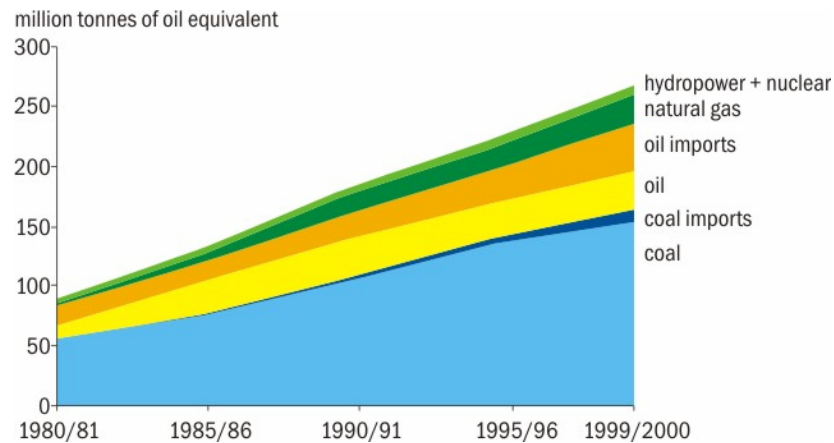
Source: BP Stats 2005

Commercial Energy Consumption Profile



Source: Compiled by TERI

India's Primary Energy Supply



Source. Compiled from various editions of TERI Energy Data Directory & Yearbook.

BIOFUELS – GoI Programme

- GoI: Committee on Biofuels, Planning Commission, July 2002.
- Report sub. April 2003
- Recommended :
 - Ethanol [sugarcane (molasses)] for blending with petrol (gasoline)
 - Biodiesel (*Jatropha curcas*) for blending with HSD (High Speed Diesel).

Current Status: Ethanol

- **2003**
 - 5% ethanol blending in petrol made mandatory in 9 states and 4 UTs w.e.f January 2003.
 - Around 0.2 million kl of ethanol procured during 2003-04
- **2004-05**
 - Sugarcane production suffered due to drought conditions in several parts of the country
 - Mandatory blending later made subject to availability.
- **2005-06**
 - Ethanol supply expected to improve during 2005-06
 - Procurement of ethanol to restart

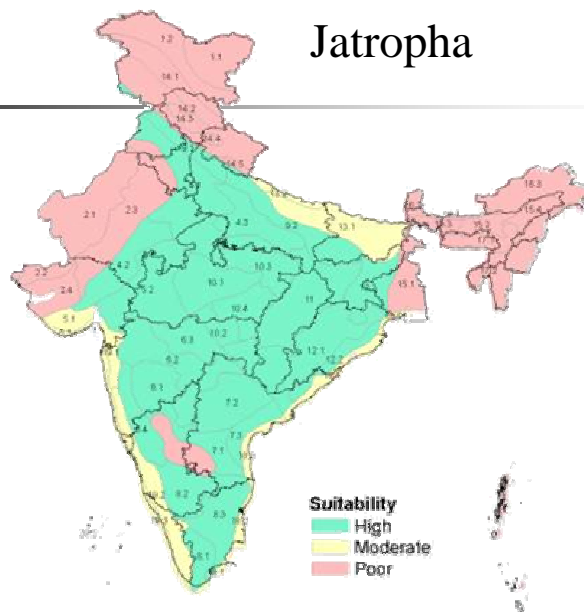
Jatropha for Bio-diesel Production

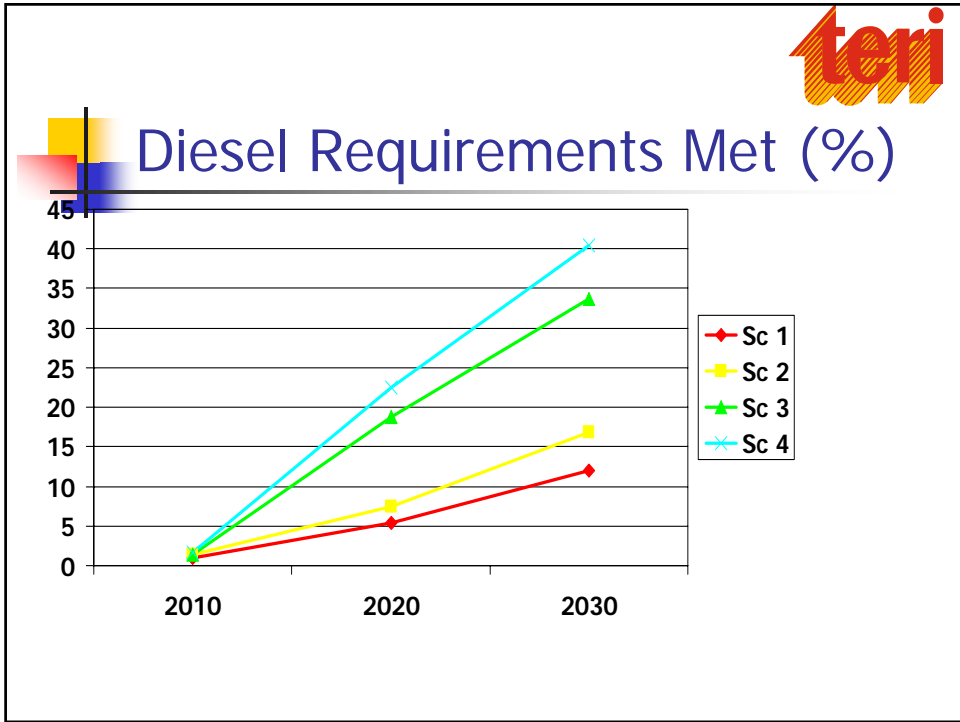
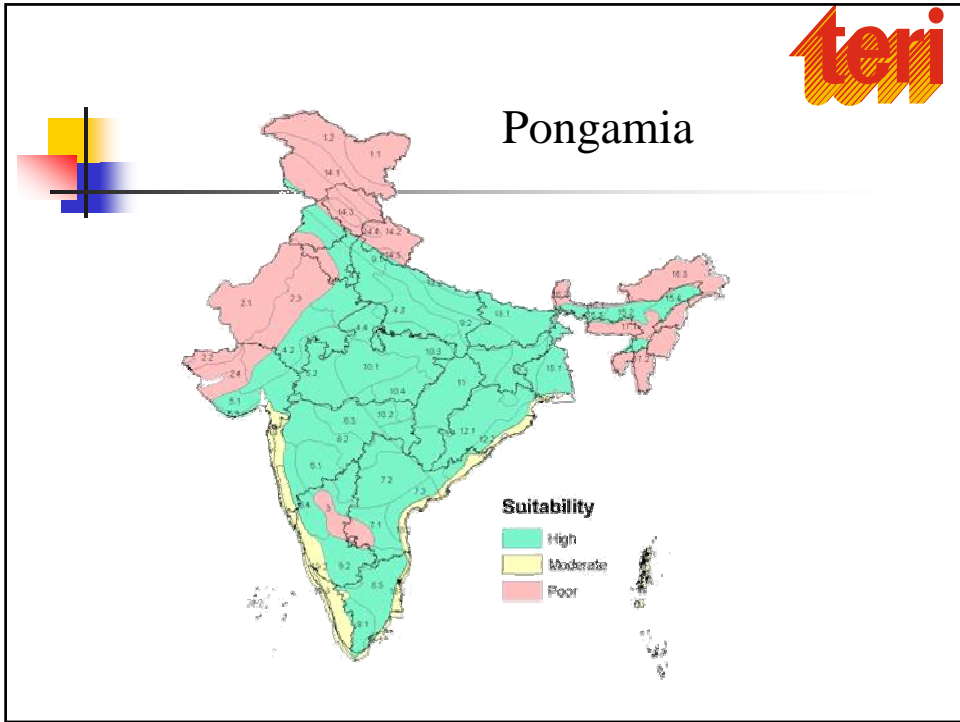
- Unlike Europe & USA India does not find it feasible to **grow bio-diesel crop on agricultural land as it may jeopardize National Food Security.**
- India is already **deficient in edible oils** and is importing the same.
- Jatropha cultivation **proposes to use wastelands. A 20.16 % of total geographical area (63.85 million hectares of India) classified as wasteland or un-cultivated land.**
- Jatropha has low gestation period, is drought hardy, not grazed, high oil content & yield and is easily propagated both by seed and cuttings.

Regional suitability for biofuel plantations

- Identification of suitable regions for Jatropha and Pongamia
- Agro-ecological approach
 - Soil, climate and physiographic parameters
 - High , moderate and poor
- Semi-arid and sub-humid tropical areas suitable for Jatropha and Pongamia

Jatropha





Projected cost of Bio-diesel

- Large uncertainties in key variables
 - Seed procurement price (Rs 6-9/kg)
 - Selling price of de-oiled cake (Rs 2-6/kg)
 - Selling price of glycerol (Rs 10-60/kg)
 - Scale of production: direct effect on investment as well as efficiency
- Projected production cost
 - Bio-diesel: Rs 22 – 40/litre

Current status: Bio-diesel: production models in vogue

State Government Initiatives

- Formation of nodal agencies for bio-diesel development/ draft bio-diesel policies
 - e.g. Chhattisgarh, Uttaranchal, Rajasthan, A P, TN etc.
- Plantation programmes
 - Uttaranchal Bio-fuel Board: 10,000 ha (2005) of Jatropha
 - Chhattisgarh: 80 million saplings of Jatropha
 - A.P (16,000 ha planned during 2005) of Jatropha
 - Forest department AP- 33 million Pongamia saplings
 - Forest department Karnataka- 20 million Pongamia saplings
- Different Approaches
 - Uttaranchal – un-irrigated degraded forest land – JFM model
 - Chhattisgarh – Waste land, fallow land, agriculture land – JFM, contract farming
 - AP
 - Jatropha – agriculture land
 - Pongamia – Forest department



- Waste land models:

Nursery of Jatropha in fly ash



Revenues from polluting chimney' s at Korba



Jatropha plantation at VTPS



Plantation at Alkali Chlore sludge dumps



Reclamation of Lagoon





Concerns in wasteland model

- Estimated: 75 to 98 m ha
- Availability: encroachments
- Medicinal plants, bamboo, fodder
- Yield
- Standardization of cultural practices
- Funds



Agricultural land

- Better fertility status
- Moisture regime
- Post planting care
- Better yields
- Income generation
- Models

**Block Plantations: large
absentee farmers**



Plantation models: block plantation



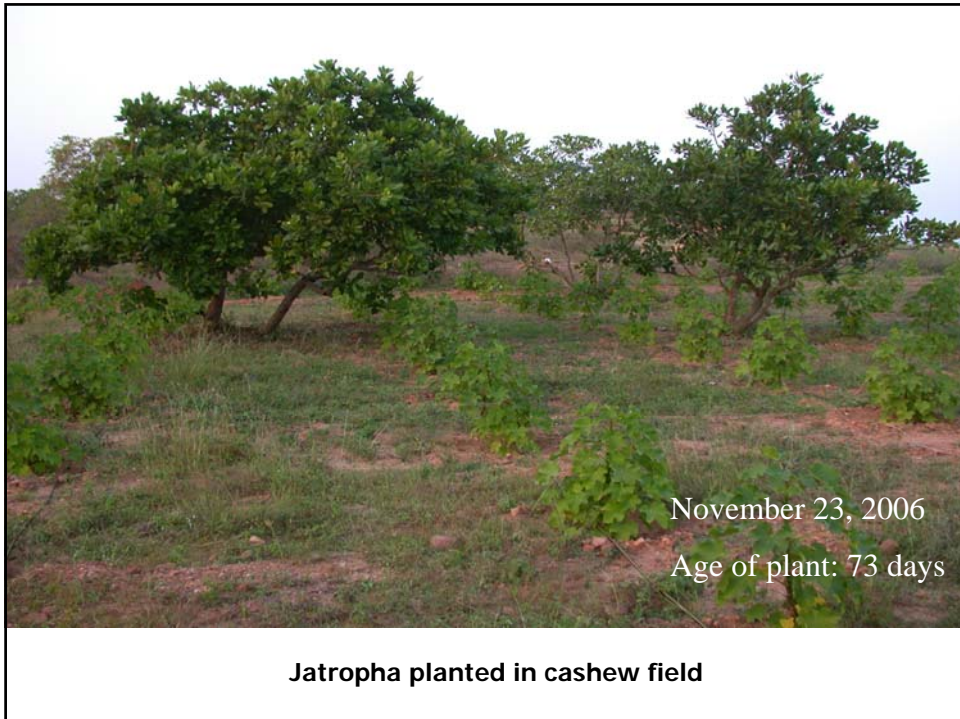
Plantation model :intercropping



Intercropping with agricultural crops



Jatropha planted in mango field





Sustainability

Impacts on agriculture and food production

- Positive:
 - Would help arrest degradation of soils in waste lands.
 - Additional land may come under the food crops.
 - Availability of cheaper fuel for irrigation and mechanical power.
 - Additional income to farmers by growing Jatropha/ pongamia on farm bunds, fallow land, etc.
- Concerns:
 - If large-scale food grain areas shift to bio-diesel plantations
 - Feedback from farmers at Nashik and Krishna district (A.P) shows that Jatropha is still not remunerative for this to happen on good agricultural lands

Sustainability

Environmental Impacts

- Positive:
 - Greening of waste lands
 - Reduction in air pollution from engine exhaust
 - Nutrient recycling:
 - De-oiled cake is a good manure;
 - Pongamia leaves is a nitrogen fixer
 - Reduction in GHG emission
- Concerns:
 - Toxicity of Jatropha seed and oil
 - Remedies: Detoxification, Awareness among general public
 - Threat to bio-diversity if mono-culture Jatropha is promoted
 - May not be an immediate concern
 - Remedies: inter-cropping; promoting multiple species

Thank you.

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