Farming for Energy and Wealth

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Structure of talk

- Problems with Indian farming
- Problems in rural areas
- Energy from agriculture
- Biofuels strategy
- Strategy for agribusiness

Introduction

- Indian farming is in sorry state. Growth only 2-3% p.a.
- Large number of farmer's suicides. Almost unique in the history of farming in the world.
- We do not often think of welfare of farmers. Only when they commit suicide do they enter the vision field of our leaders.
- In last 10 years about 150,000 farmers have committed suicide. Poor support price, increased input costs and aspirations. Also no long term agriculture policy.
- Sops of loan waivers etc. are only short term and very uneconomic solutions. Chinese saying.
- Need for long range agriculture policy to create wealth in rural areas. Rural poverty is closely associated with the welfare of farming community.

Introduction (contd.)

- 60% of rural population (~ 400 million) in India live in primitive conditions. No electricity and primitive cookstoves. Around 300,000 deaths/yr take place because of pollution from these stoves. Modern technology has not touched their lives even after 60 years of independence.
- 54% of India's population is below 25 years of age and most of them live in rural areas with very little employment opportunities. Around 260 million people (1/4th of our population) live on less than Rs 50/day.
- Because of rural poverty large scale migration to cities takes place leading to serious urban problems.
- Mass media fuels aspirations. Leading to social unrest. Release of bottled-up emotions. Spark could be from any source.

Introduction (cont..)

- Serious energy crisis in India. In rural areas 250 kWh/yr per capita electricity consumption. This is 2% of that in US and lowest in the world.
- In Maharashtra alone ~ 6000 MW shortage resulting in 12-15 hours daily blackouts in rural areas.
- Last year India imported ~ Rs. 200,000 crores worth of petroleum products. By 2011 we will import 90% of our demand. Serious balance of payment problems. 8-9% p.a. growth in petroleum consumption.
- Above events are direct result of lopsided development. Based on 100 year-old centralized model of developed countries. Preference to software over agriculture and farmers.

Introduction (cont..)

- Centralized production and control inherently leads to corruption. Decentralization leads to accountability.
- Governance is the first casualty of corruption. All the above problems are result of non-governance.
- With proper governance, one of the best technological solutions for the above problems is energy production via agriculture.
- Energy from agriculture will provide rural wealth and create employment. Can bring 60% marginalized people into mainstream India, without which India cannot become an economic superpower.
- Energy is the basis of life. Lack of it produces economic stagnation and social upheavals.

Energy Production

- India produces ~ 600 million tons/yr of residues. Mostly burned in fields. Creates environmental pollution and loss of energy.
- From crops and residues three fuels can be produced:
  - Liquid fuels like ethanol, biodiesel or pyrolysis oil.
  - Gaseous fuel like methane (biogas).
  - Electricity via biomass-based power plants.
- Can take care of major fuel requirements of India.
- In any agriculture 25-40% of produce is food and rest are residues. No remunerations from residues, hence farming is uneconomical. No industry can survive on such norms.
- Residues for energy can give an extra income of Rs. 2000-4000/acre/season to the farmers. Insurance against distress sale.

Liquid fuel production

- Total demand for liquid and gaseous fuels in India in 2011-12 will be 200 MTOE. Includes transport and household fuels.
- Liquid fuels superior to other fuels because of high energy density, ease of transportation and storage.
- Residues can produce 156 b l/yr of ethanol which is 42% of India's oil demand in 2012; or 80% of oil demand via pyrolysis oil or 80,000 MW of electric power.
- With increased industrial demand for fuel and electricity, large tracts of farmlands may come under fuel crops only.
- Need to do R&D on multipurpose crops. NARI's work on Sweet sorghum.

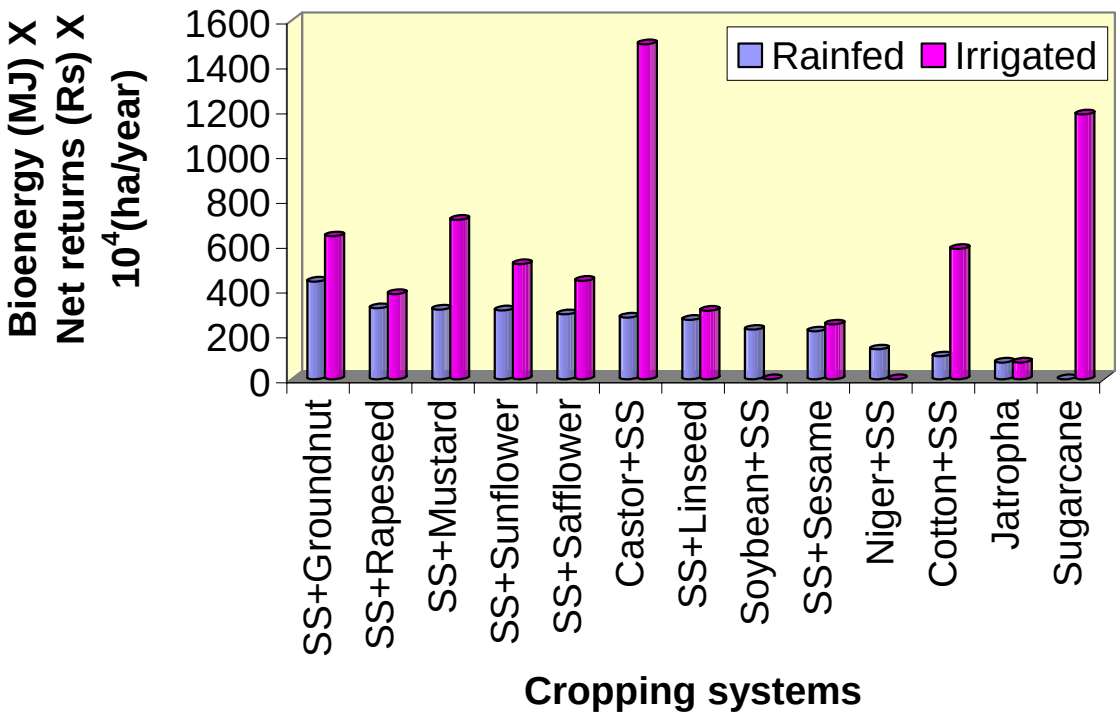
Biofuels

- Ethanol, biodiesel and pyrolysis oil can be excellent substitutes for fossil liquid fuels.
- Ethanol can be mixed with or substituted for petrol. Low concentration ethanol is an excellent fuel for rural households.
- Biodiesel and pyrolysis oil as good substitutes for diesel. Pyrolysis oil is produced by rapid combustion of agricultural residues. Biodiesel is produced from vegetable oils.
- Biodiesel fuel for cooking and lighting in rural households is not yet suitable.

Strategy for biofuels

- Land should be utilized year round for food and fuel production.
- For farmers important thing is maximization of profit (net returns).
- For planners need for maximization of energy/ha (bioenergy).
- Need to maximize bioenergy (BE) X net returns (NR) or maximizing BENR.
- Various crop combinations evaluated for this strategy.
- Whole plant approach used. All parts of plants utilized for food and liquid fuel production.
- Best strategy appears to be castor planted in monsoon followed by winter sweet sorghum.

Fig. 3. Bioenergy X net returns from sweet sorghum and oilseed-based cropping system under rainfed and irrigated conditions.



Optimum biofuels strategy

- Ethanol from sweet sorghum planted in existing sorghum area can take care of 5% of total oil requirements for 2011-12.
- Same area planted under castor in monsoon will further take care of 5% oil requirements.
- Total of 10% of liquid and gaseous fossil fuel requirements can be met by this strategy.
- Substantial energy gain for India without any food sacrifice.
- Food vs. fuel issues to be resolved immediately.

Water Issues

- Increased farming for energy production will require adequate water supply.
- Already water shortage though adequate rainfall.
- Rainwater harvesting provides the best solution. Need for setting up private rural water utilities.
- Issues of ownership of water bodies need to be resolved. Water Act similar to Electricity Act needed.
- Use of flue gases from power generation can provide potable water. Combined electricity and water plants will improve efficiency.

Energy Industry from Agriculture

- Energy production from agriculture alone can be of the order of Rs. 30-40,000 crore/yr industry. Similar numbers may exist for water utilities in rural areas.
- Will also create about 30 million jobs in rural areas. Could increase large number of industries in these areas.
- Will supply liquid, gaseous fuels and electricity from biomass.
- Wealth of a country comes from its land. Farms and farmers are the backbone of any nation since they can produce food, fuel and hence wealth from the land. Country suffers when farmers are neglected.
- Need for enlightened agriculture policy which has energy production as its cornerstone.

Strategy for agribusiness

- Private/public/NGO partnership for energy farming.
- NARI/NFCL partnership. Similar partnership with Tata group.
- Need to educate politicians and policy makers on energy from agriculture.
- New electricity act allows large scale power plants on biomass.
- NARI's 500 kW strategy for villages.

Thank you

Useful sites

www.nariphaltan.org

www.nariphaltan.org/writings.htm