Development of Biofuels: The cases of China, India and the Philippines

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Why developing biofuels

\textit{Rising energy requirements}

- Energy consumption has been rising rapidly in China, India and the Philippines due to economic growth and changes in lifestyle.
- World energy requirements are likely to be 50% higher in 2030 than today and 45% of this is likely to originate from China and India together.
- China and India have become major importers of energy in the world.
  - In 2007, China imported 163 million tons of crude oil at a cost of $79.8 billion.
  - India imports more than 70 percent of its oil needs with an import bill at $61.2 billion (April-February 2007-08).
- The rate of energy self-sufficiency in the Philippines is even lower.
- Such a situation causes concern on energy security as the world oil market is highly unstable and volatile.
- Energy security is crucial for supporting socioeconomic development in long term.
Why developing biofuels

~ Other considerations

- Address global environmental and climate change through mitigating greenhouse gas emissions
- Increase rural employment and income
  - Poverty alleviation
- Rural electrification
- Provide clean energy to rural residents
- Rehabilitate wastelands through greening
- Instrumental in carbon trading
Biofuel policies in China

- Research on technologies for bioethanol production began in the late 1990s with government funding.
- Grain-based bioethanol production plants were constructed during 2001-03.
  - The project aimed also at disposing overstored grains;
  - The preferential policies to the bioethanol plants include refund of VAT and cost subsidies;
  - Price of bioethanol is linked to price of gasoline.
- E10 program was trailed firstly in selected cities in 2002 and then extended gradually.
  - E10 gasoline is given exemption of the 5% consumption tax;
  - Distribution of E10 gasoline is monopolized by SOEs as well.
Biofuel policies in China

- Government revised the bioethanol programs in 2006 in responding to perceived shortage of grains.
  - Ban on construction new bioethanol production plants using grains as feedstock;
  - Ban on capacity expansion of the existing plants.
  - A cassava-based plant was given approval in 2006.
  - The plan covers both commercial and non-commercial biofuel production.
- Some regional governments initiated their programs for biofuel production using non-grain feedstocks.
Biofuel policies in India

- As a policy decision, vegetable oils or any food grain crop shall not be used for biofuels purposes to avoid stress on food scenario.

  **Bioethanol Policy**

- Government had launched the 1st phase of ethanol-doped-petrol program in 2003.
- Mandatory 5% blending was introduced in certain areas of 9 major sugarcane growing states and 4 union territories.
- This was extended to all states in October 2007.
- 10% blending is likely to be announced in October 2008.
Biofuel policies in India

**Biodiesel Policy**

  - to achieve 20% blending of biodiesel with HSD by 2011-12
  - to produce 13.38 million tons of biodiesel annually through plantation of Jatropha on 11.19 million hectares particularly wasteland areas.

- Given the present level of activities, this seems difficult to be achievable.
Biofuel policies in the Philippines

The Congress in 2006 adopted an act for the national biofuel program (Biofuels Law).

- Outlines the roadmap leading to attainment of 60% energy self-sufficiency by 2010
- Mandates at least 5% blending of bioethanol upon Biofuels Law comes into effect and 10% within four years thereafter.
- Mandates at least 1% blending of biodiesel within three months Biofuels Law comes into effect and 2% within two years thereafter.
- Provides zero specific tax on local and imported biofuel component of blended fuels.
- Exempts VAT of raw materials used in production of biofuels.
- Exempts of wastewater charges for water effluents from biofuel production that are reused for agricultural purposes.
- Grants high priority in financial services from government financial institutions.
Common characteristics

- Strongly inward oriented development strategies intending to reduce dependence on oil import;
- Strict restriction on production of biofuels using food grain crops as feedstocks;
- Based on mainly long-term strategic considerations rather than short-run responses to the surging oil prices.
Some variations in coverage and approaches

- China
  - Supplying biofuels to rural households is specifically considered.
    - By nature, the extended technologies (such as biogas, firewood saving stoves, power and electricity generation) focus on improvement in utilization of the existing biomass.
  - State owned enterprises play a major role in bioethanol production and E10 gasoline distribution.
    - Government exercises price control on gasoline and diesel oil.
  - The government funded R&D place high priority on the “next-generation” biofuel technologies.
    - Limited potential to use grain and non-grain crops as feedstocks due to land and water constraints.
    - Importing feedstocks in large volumes may have notable impacts on world market prices and thus may not be economically viable.
Some variations in coverage and approaches

- India
  - Supplying biofuels to rural households is also considered.
    - Biodiesel engines as an option of decentralized, reliable and affordable electricity in the rural areas.
  - Multiple stakeholders at the central, state, public and private agencies and academic institutions are involved to work together on relevant issues.
    - Commercial enterprises are actively involved in biofuel production, including foreign ventures (e.g. British Petroleum).
  - Priority is placed on development of locally available feedstock.
    - Sugarcane and molasses, sweet sorghum for bioethanol;
    - Large scale cultivation of Jatropha (and Pongamia pinnata) in wasteland regions for biodiesel.
Some variations in coverage and approaches

- The Philippines
  - Supplying biofuels to rural households is also considered.
    - Biodiesel engines as an option of decentralized, reliable and affordable electricity in the rural areas.
  - Commercial enterprises are actively involved in biofuel production, including foreign ventures.
  - Priority is placed on development of locally available feedstock.
    - Sugarcane and molasses, sweet potatoes and cassava for bioethanol;
    - Coconut and palm oils, and oil-rich seeds from trees (Jatropha and Moringa) for biodiesel.
    - Economic viability of biodiesel from tree seeds is still uncertain.
Barriers to development of biofuels

- Low availability of feedstock due to limited resource endowments.
  - All of the three countries have high population density.
  - To a large extent, the existing biomass are already fully used for food, feed, raw materials or fuels.
  - The “wasteland” regions are usually too remote and too environmentally fragile to support commercially viable feedstock production.
- Weather-related large variations in feedstock supply.
- Inadequate rural infrastructure.
- Poor public and corporate governance.
  - Lack of institutional arrangements that protect the interests of the farmers and address the concerns of the companies.
Prospects

- None of the three countries can become large producer of biofuels without significant technical breakthroughs.
  - China plans to produce 10 million tons of bioethanol and 2 million tons of biodiesel by 2020.
  - India has a more ambitious target of 13.38 million tons biodiesel by 2011-12, however, whether it can be achieved is doubtable.
  - Philippines?
- Economic viability varies notably, depending on feedstocks and oil prices.
The way forward

- Comprehensive and cohesive policies on biofuels should be considered.
  - Identify major trade-offs clearly
  - Develop a doable national development strategy to address food security, energy security, renewable energy, rural income and global warming
  - Determine realistic targets on the basis of likely market situation and technical breakthrough
  - Create institutional framework to ensure appropriate incentives to both commercial firms and farmers
  - Consider in a balanced way both commercial and non-commercial biofuel production
  - Avoid government failures related to inappropriate use of the state subsidies
The way forward

- Development of biofuel production is just a minor remedy for energy shortage and environmental problems.
- In long run, it is necessary to change the current mode of economic growth and lifestyle in order to avoid crises.
- Although developing countries are accountable for the growing world energy consumption and GHG emissions, they have legitimate rights for improving their people’s welfare.
- Therefore, it is unfair to require developing countries maintain the current low living standards for the purpose to solve the problems.
- On the other hand, developing countries should not copy the lifestyles in developed countries as well.
- The problems can be solved only through collaborative efforts.
  - Transferring knowledge and suitable technologies to developing countries is a good starting point.
Thank you for attention!