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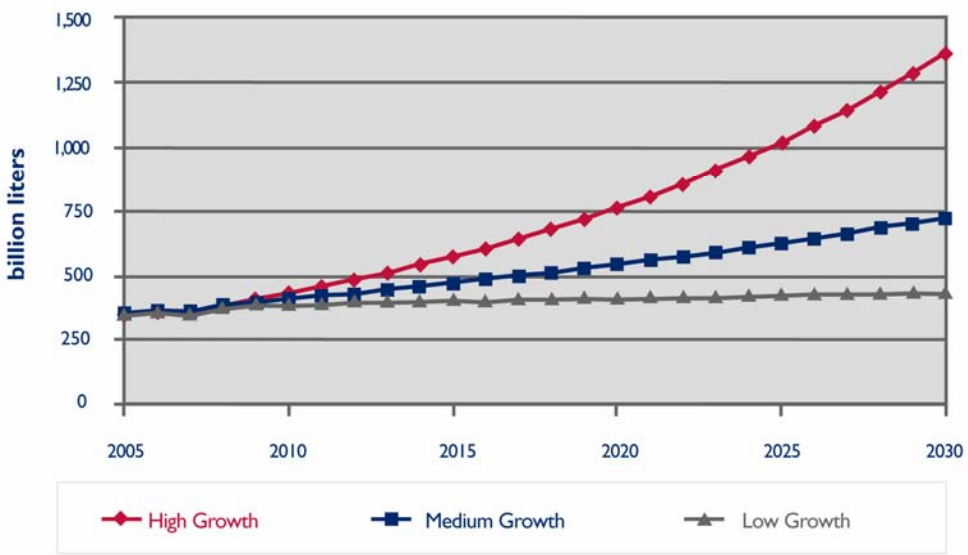
Biofuels in Asia
Key Trends and Implications

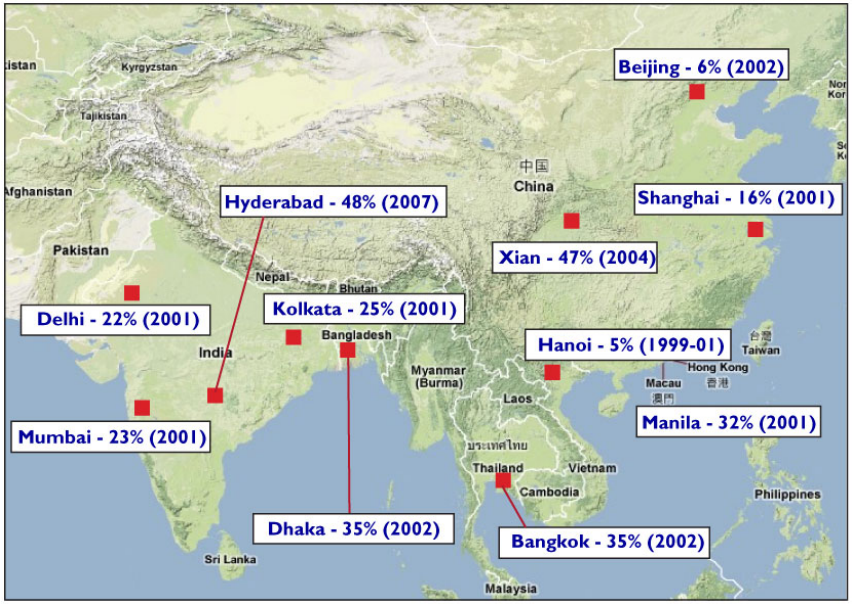
ECO-Asia Clean Development and Climate Program

Pradeep Tharakan

Asia's Future Round Table

Growth in Transport Fuel Demand and Implications

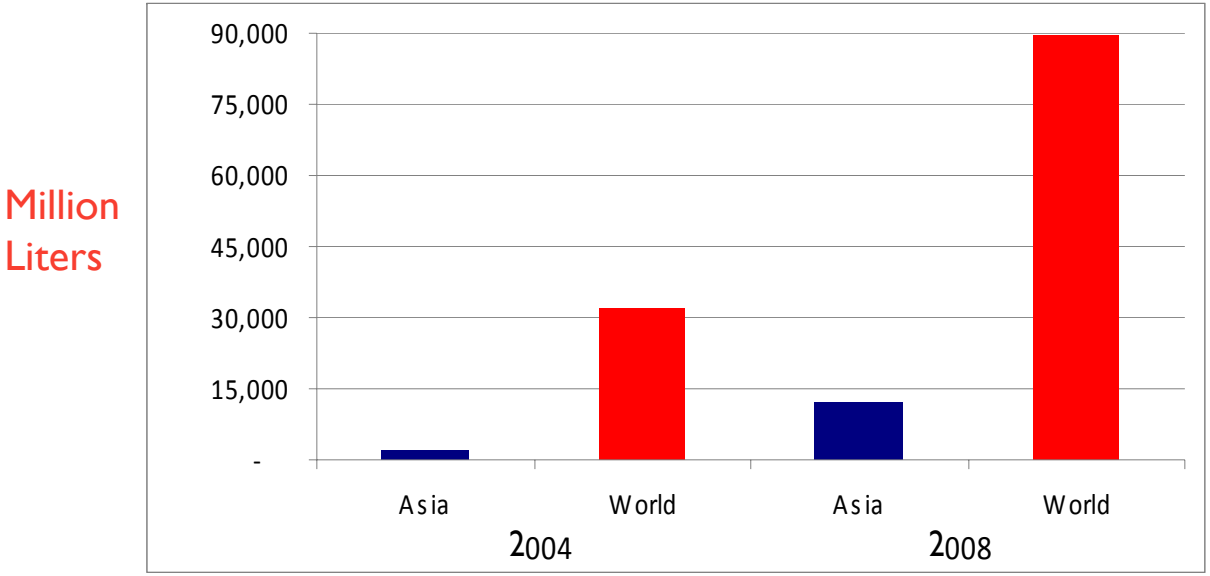




- Transport demand to increase 15 – 350% by 2030.
- Fossil fuels currently contribute 5 – 48% of total particulate matter in Asian cities.
- Biofuels are roughly 3% of current transport demand in developing Asia (1% globally).

Boom (2004-2005) and Slump (2007-2008)

- Introduction of targets and incentives in the US and EU
- Asia starts to produce biofuels for export and countries create targets/mandates of their own
- Current feedstock and oil prices erode producer profitability – a current slump



Ambitious Targets and Mandates Set

Country	Ethanol Target	Biodiesel Target
China	10 MMT by 2020	2 MMT by 2020
India	20% by 2017	20% by 2017
Indonesia	20% by 2015	10% by 2010
Malaysia	na	5% by 2009
Philippines	10% by 2011	2% by 2009
Thailand	10% by 2011	10% by 2012
Vietnam	500 ML by 2020	50 ML by 2020

In other words…

INDONESIA (Ethanol)

- CURRENT: 215 Thousand kL/year;
- 2010: 4 million kL/yr
- 2025: 17.3 million kL/yr

INDONESIA (Biodiesel)

- CURRENT: 2.9 Million kL/year;
- 2010: 5 million kL/yr
- 2025: 25 million kL/yr

- INDIA – TO MEET 20% NEED FOR FUEL BY 2017

Life cycle assessment of biofuels

Indicative Ranges of Net Energy and GHG Balances of Biofuels from Selected Biofuels Feedstocks without Land Use Change

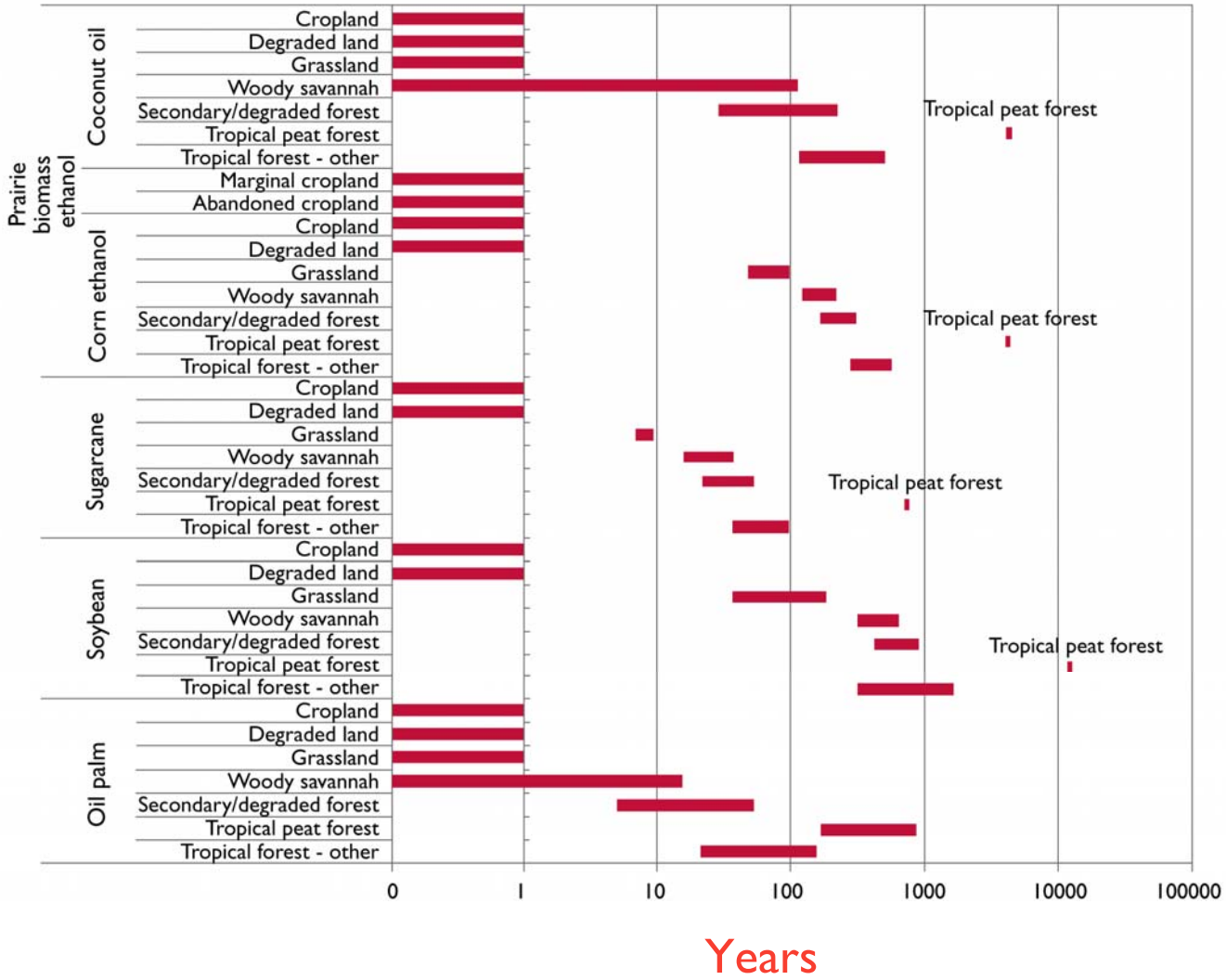
Crop	Energy Balance*	GHG Savings**
Sugarcane	-0.6 to 0.8 MJ	78–133 %
Sweet Sorghum	-0.6 to -0.3 MJ	67–133 %
Cellulosic Ethanol	-0.2 to 0.4 MJ	67–111 %
Corn	0.4 to 1.2 MJ	11–56 %
Oil Palm	-0.3 to 0 MJ	122–156 %
Jatropha	-0.5 to 0.4 MJ	100 –144 %
Coconut	-0.1 to 0.4 MJ	56–86 %

* By way of comparison, the energy balance of fossil fuels is 1.2 MJ of fossil fuel inputs to produce 1 MJ of energy output. Therefore, biofuels with net energy balances of <1.2 MJ produce net energy savings compared to fossil fuels.

** GHG savings are relative to fossil fuels

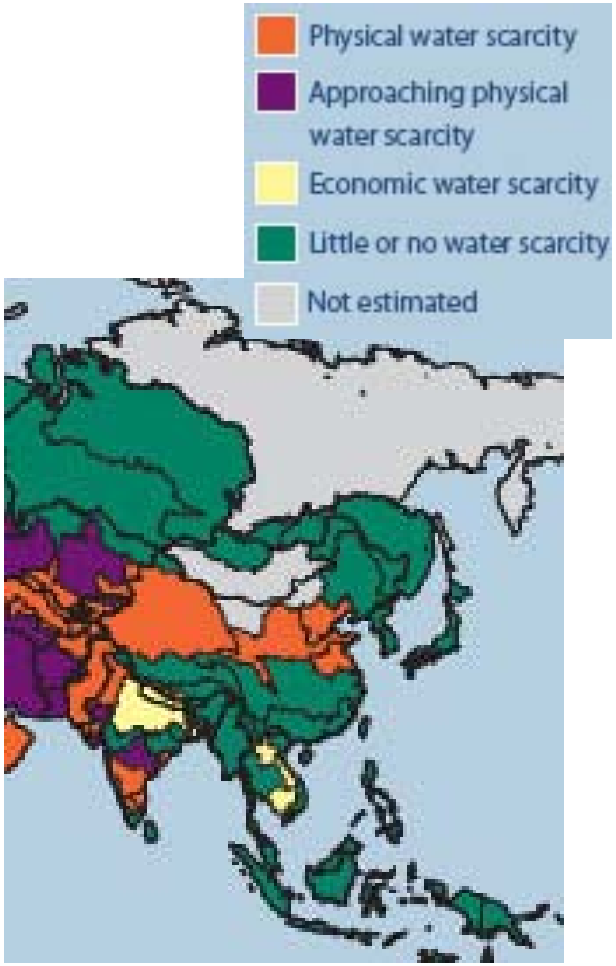
Carbon payback analysis

- Carbon Debt
- Carbon Payback Time



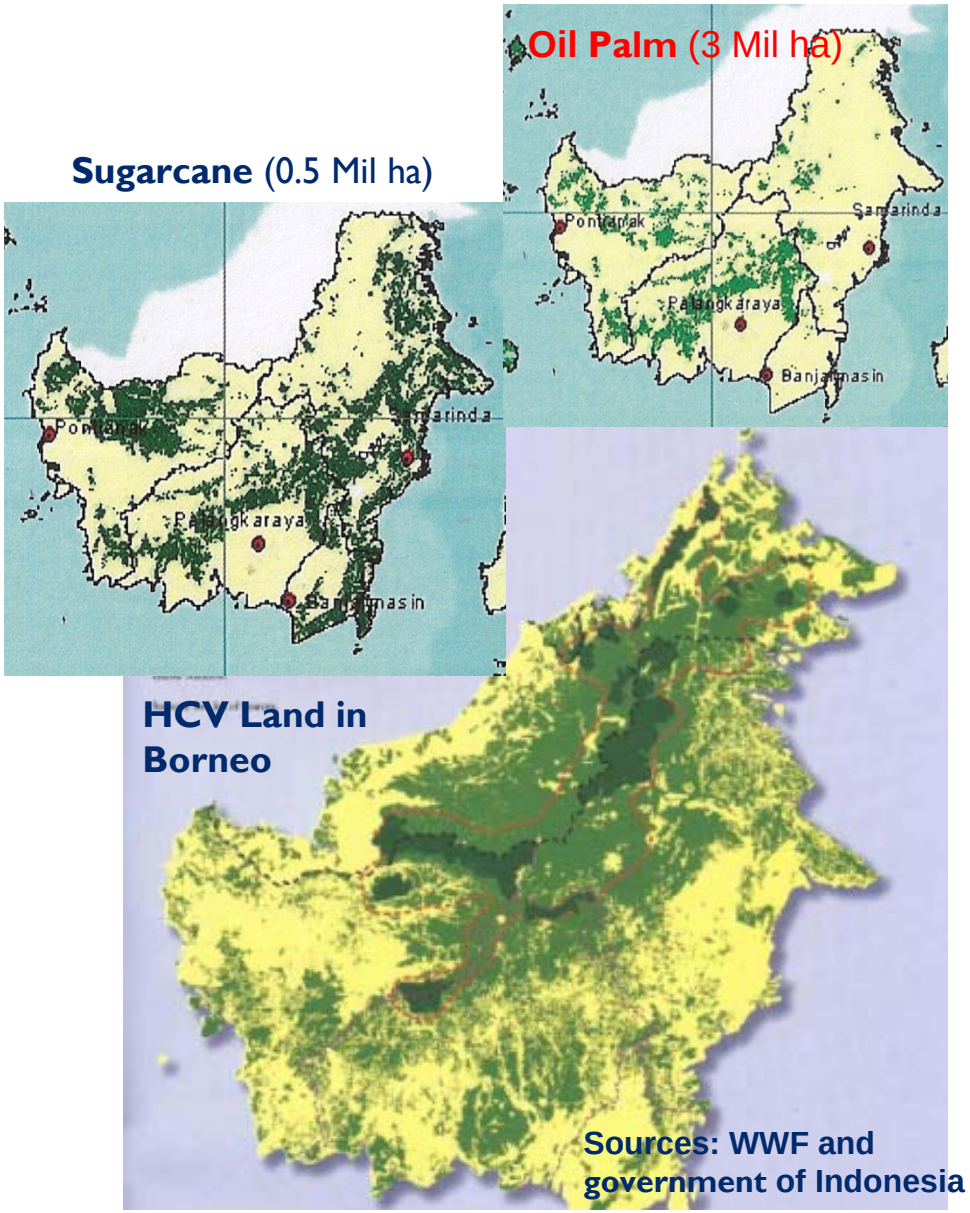
Impacts on air, soil, and water quality and quantity

- Severe water shortages projected for India and China – may not support biofuels production.
- Reduction in CO, particulates and volatile organics but ozone and NOx are increased
- Water quality impacted by synthetic fertilizer run-off and waste water from processing



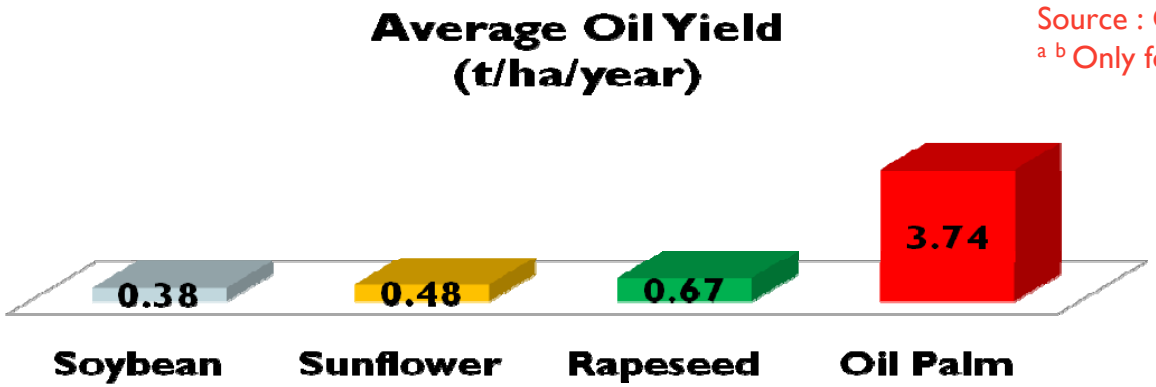
Biodiversity impacts

- High density of species in rainforests of Malaysia and Indonesia
- Peatlands
  - Indonesia has recently lifted ban on peatlands
- Poor governance
- Indirect loss of forest (e.g. timber extraction, forest fires)



Sources: WWF and government of Indonesia

Oil Palm Expansion – An almost certain outcome



Source : Oil World 2007
[a] [b] Only for the 7 major oils

Demand for Edible Oil

Demand 2007	Demand 2050	Plantation 2007	Plantation 2050
121 Mt (37 Mt)	240 (120 Mt)	11 Mha	+12 Mha

Source : Crowley (2009)

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Social Impacts

- Smallholder schemes have shown mixed results
  - → small-scale systems preferable
- Employment potential needs to balanced with efficiency and mechanization
  - Potential problems supplying the infrastructure for plantation expansion (e.g. jatropha and oil palm expansion in Indonesia)
- Large-scale biofuels can result in infringements on indigenous peoples and labor rights
  - → need enforcement of rights, avenues for conflict resolution and participation mechanisms

From global transport fuels to decentralized energy – from Cars to People

- More than half a billion people in Asia lack access to modern electricity
- Negative environmental, economic, and social impacts from large-scale biofuels
  - → decentralized energy using non-food crops can reduce soil erosion, improve soil fertility and improve water quality and reduce deforestation with careful planning and management
- Biofuels on a smaller, decentralized scale can provide energy for cooking and transport, and electricity
- Biofuels for decentralized energy can provide greater social benefits than biofuels for transport.

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Future Priority Areas

- Policy Development Needs
- Support for Sustainability Standards and Certification
- Support scale-up of decentralized biofuels
- Assess and map land resources
- Support agronomy research and crop improvement
- Tech Transfer on cellulosic ethanol
- Technical Assistance on life cycle analysis

Thank You

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Background

- 3-year program, launched Oct 2006
- Active in 6 largest developing Asian economies: China, India, Indonesia, Philippines, Thailand, and Vietnam
- USAID-led program with additional funding from Dept. of State (APP)
- Areas of focus: Cleaner Coal, CFLs, Clean Energy Finance, and now biofuels.