Food vs Energy:

Crops for Energy

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International Crops Research Institute
for the Semi-Arid Tropics

Outline of Presentation

- About ICRISAT
- Why Biofuels?
- Global scenario-Biofuels
- Food-fuel trade-offs
- Ethics
- Australian Scenario
- Pro-poor BioPower initiative
- Impact
- Conclusion

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Vision

A prosperous, food-secure and resilient dryland tropics

Mission

To reduce poverty, hunger, malnutrition and environmental degradation in the dryland tropics

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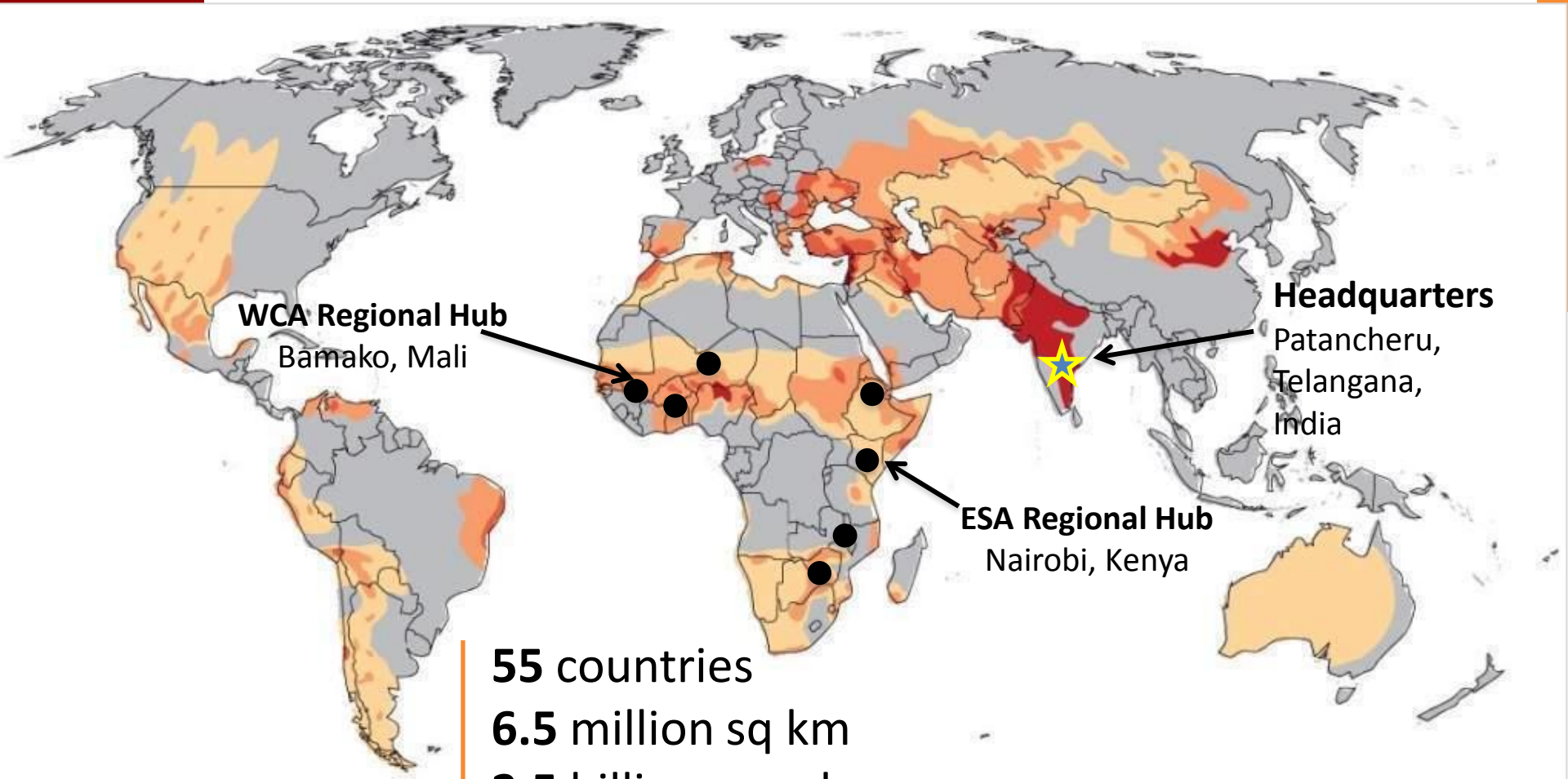
ICRISAT Locations

in the Semi-arid Tropics



55 countries

6.5 million sq km

2.5 billion people

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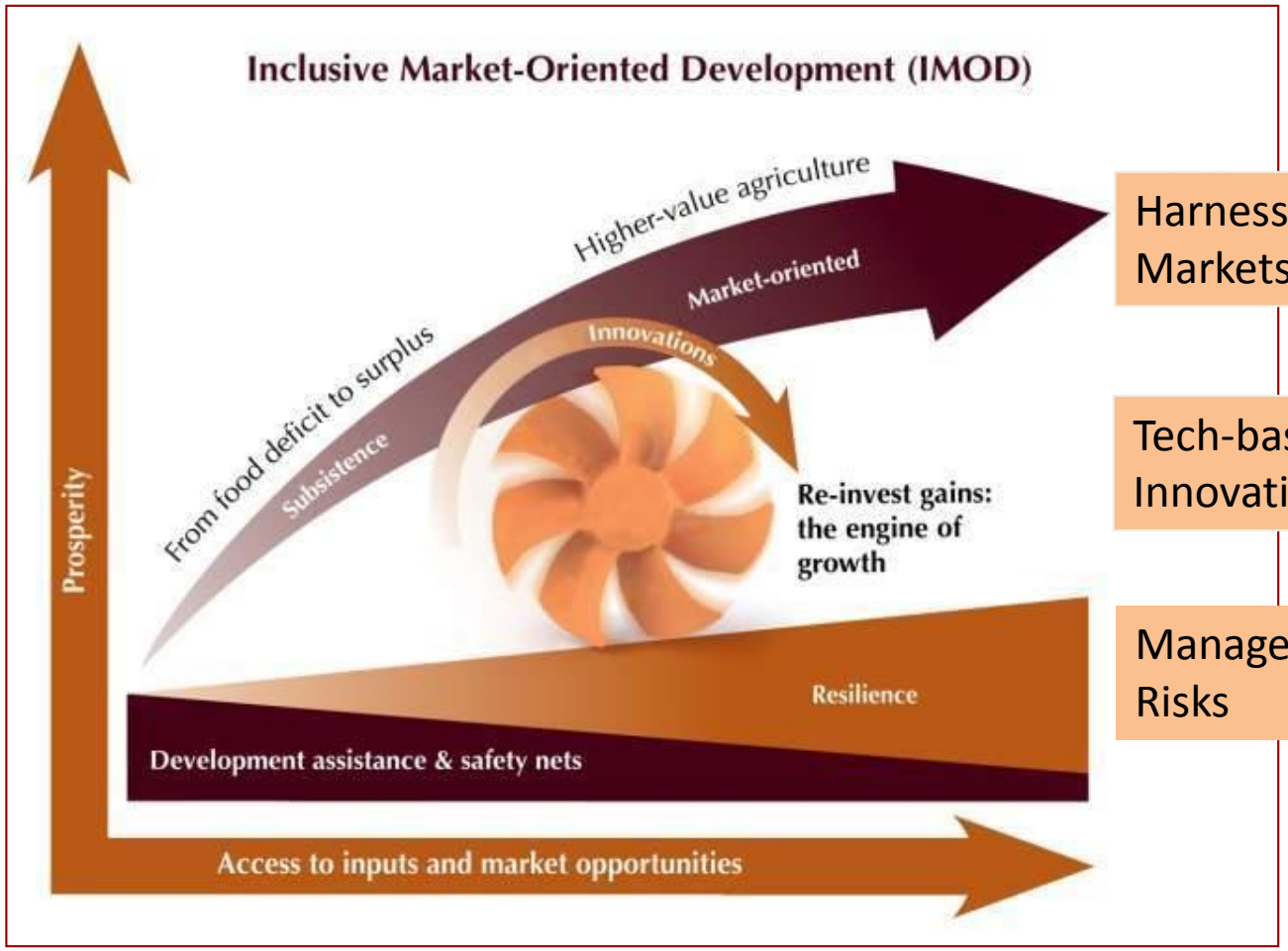
IMOD: A New Strategic Framework

Inclusive Market-Oriented Development (IMOD)



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Why Biofuels?

- Alternative to oil based fuels (95%) for the transport sector
- Solution to global environmental concerns about climate change, energy security and reduction in oil imports
  - Environmentally superior fuels with lower CO_2 emissions
- Potential source of income for the poor

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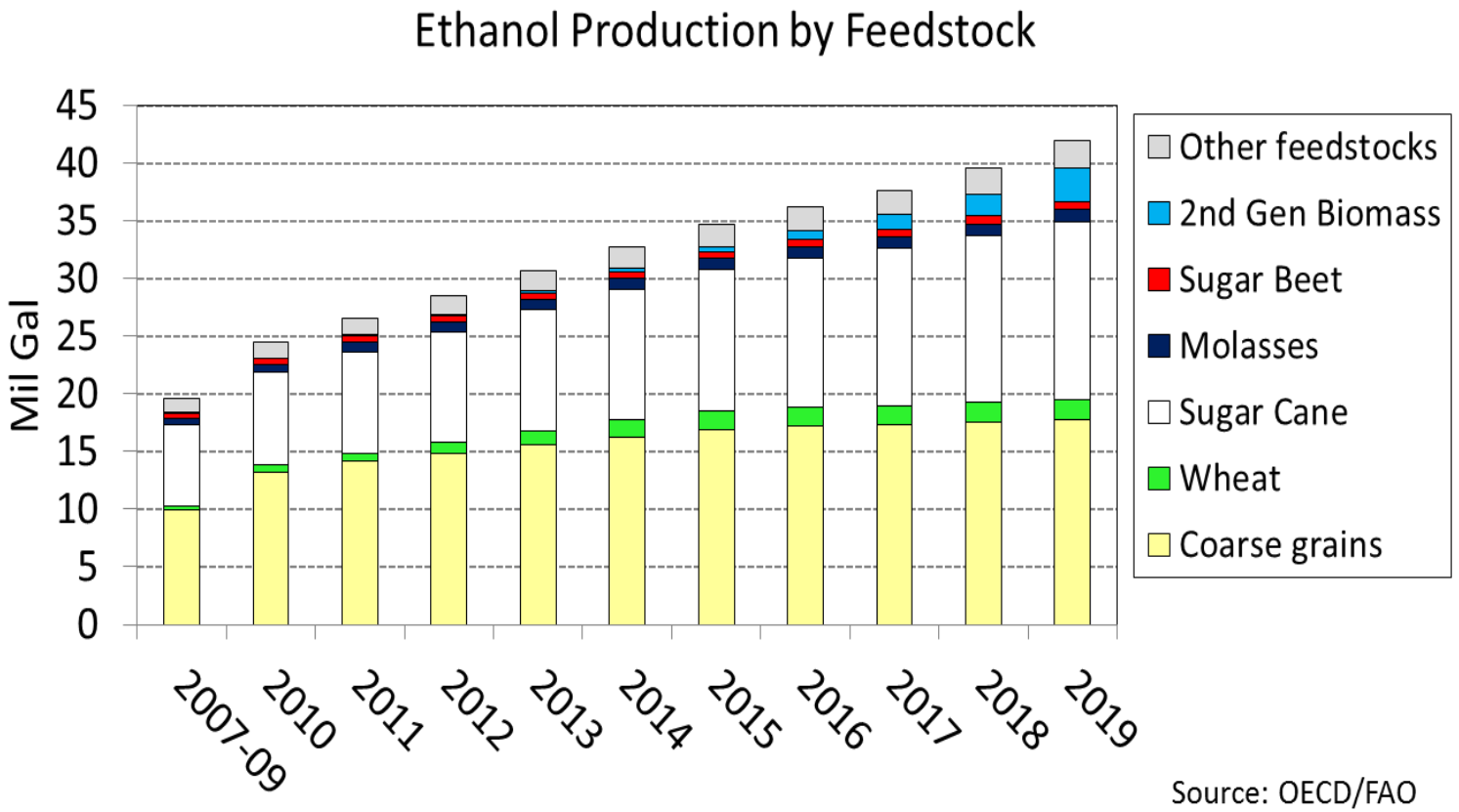
Major Biofuel Feedstocks



Source: OECD/FAO

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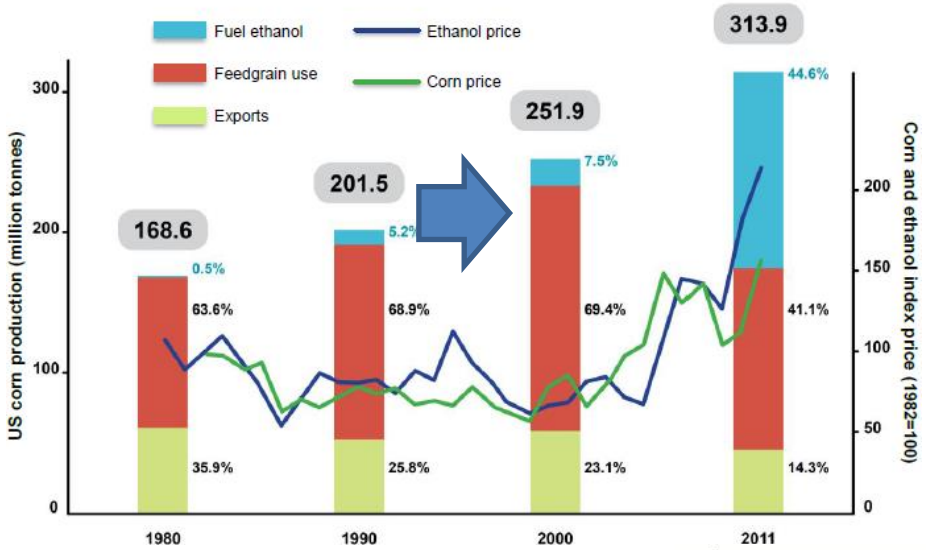
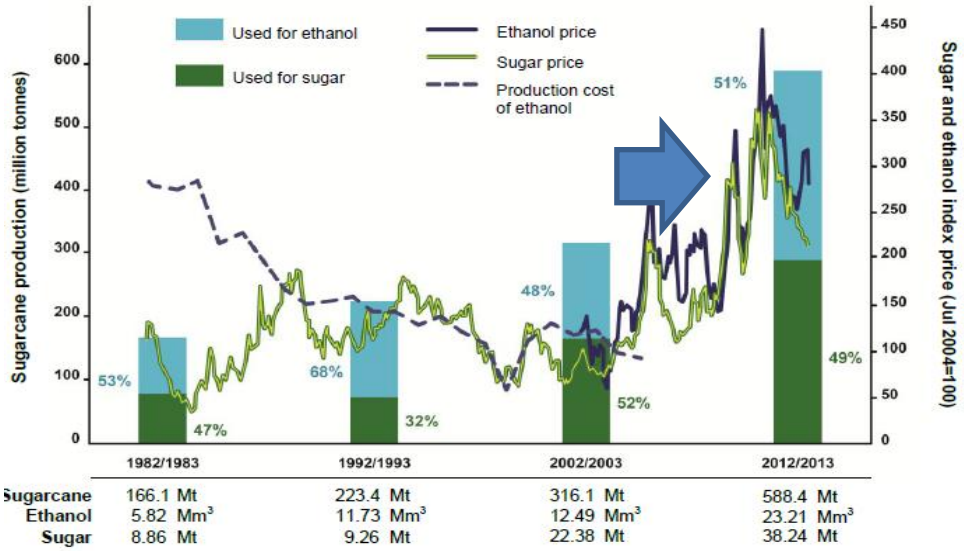
US-Corn and Brazil-Sugarcane vs Food Prices



Biofuel demand does affect food commodity prices

Moderate effect on sugar prices

(Bastianin et al 2013)



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Biofuels and Land Use Change (LUC)

- Direct and indirect
- With present technology, 100 billion litres require 2-3% of global arable land (OECD, 2006)
- Striking differences between the percentages of cropland need be dedicated to biofuels in Brazil (3%) and the EU (72%)
- Environmental benefits vis-a-vis LUC poorly understood

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Ethical Principles in Biofuels Development

- Should be environmentally sustainable
- Should contribute to a net reduction of total greenhouse gas emissions
- Should not be at the expense of people's essential rights
- Should involve women and smallholder farmers
- Should adhere to fair trade principles

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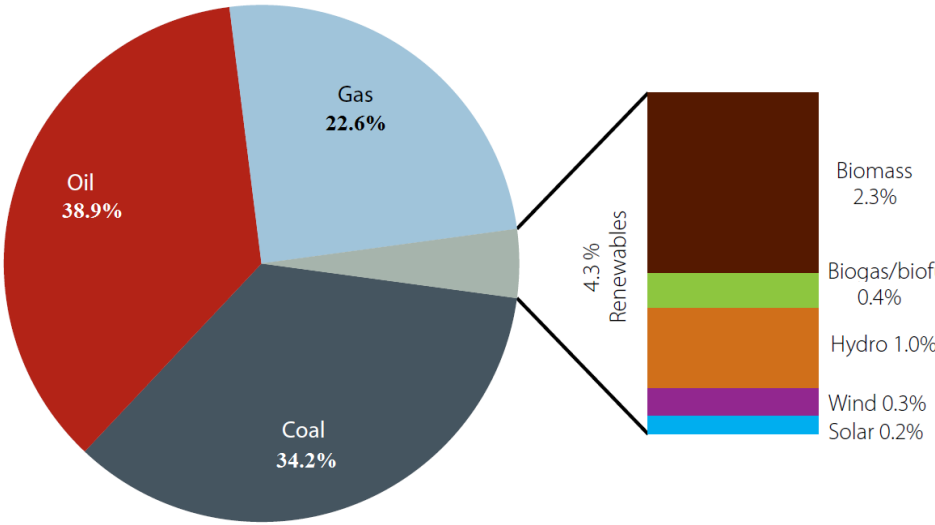
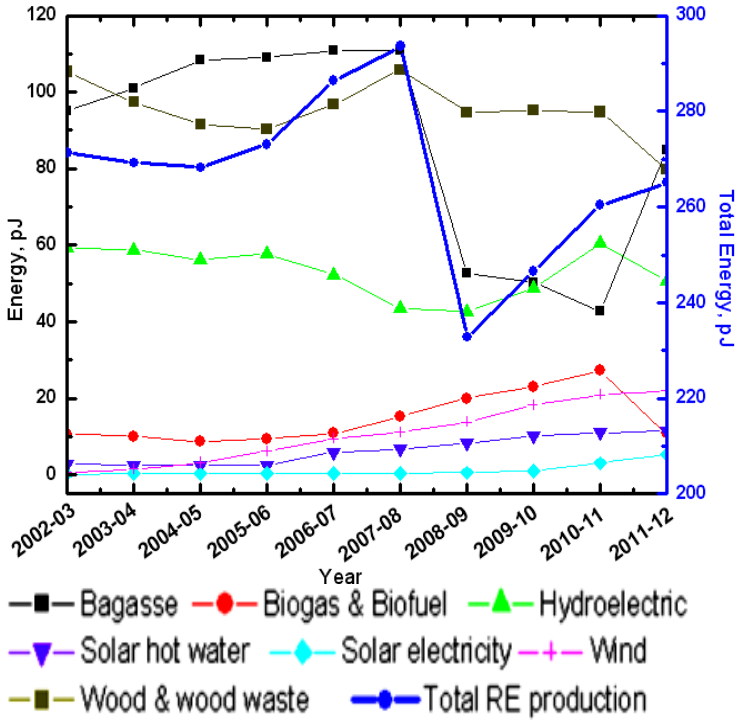
Australia- Energy Scenario



9th largest energy producer
17th largest consumer of non-renewable energy

Portfolio: 96% Non-renewables
4% renewables

Renewable energy consumption is rising
Biofuel/gas share: 0.4% ONLY
Bioethanol: internal consumption (440 ML)
Biodiesel: Exported (10 ML out of 350 ML)



(2013 Australian Energy Statistics)

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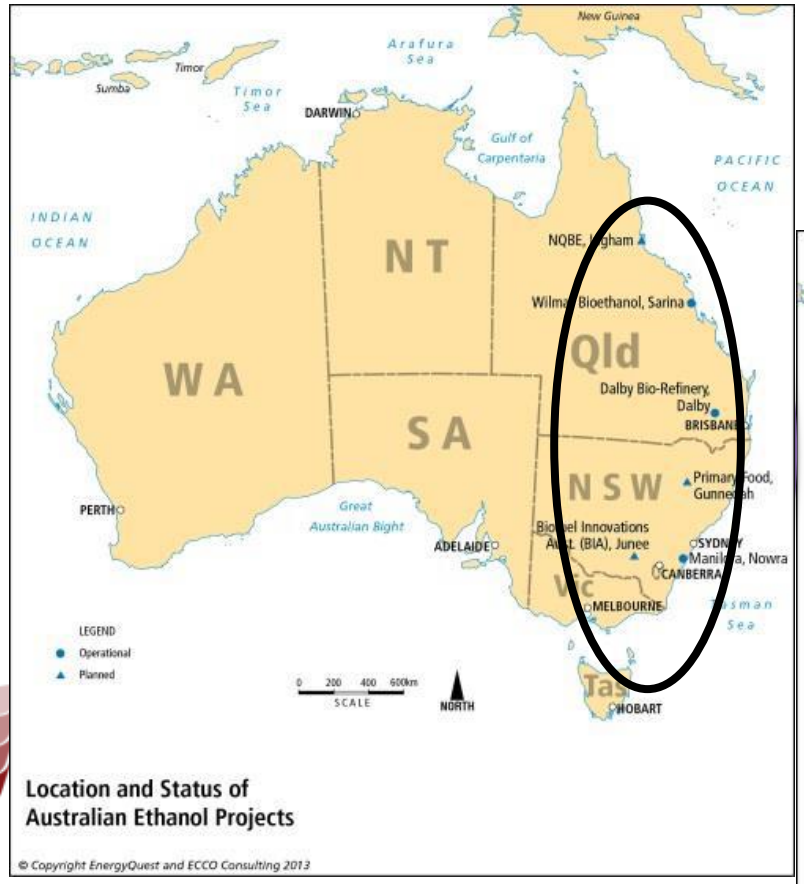
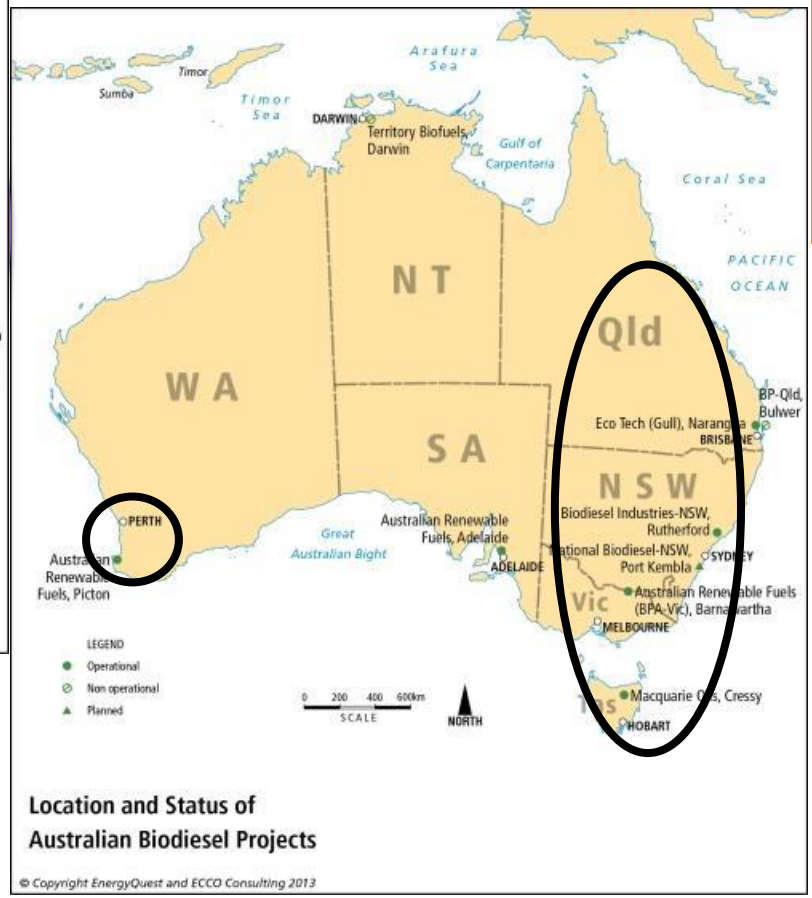
Australia- Biofuel Production Facilities





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Australia- Biofuel Plans

- **Federal:** ***Clean Energy Future Plan***
  - **$17 billion over the next 10 years**
  - **$20 million to the Advanced Biofuels**
  - **$23 per ton carbon tax on emitting firms**
- **New South Wales:** **6% ethanol and 5% biodiesel blending mandatory**
- **Queensland:** **goal to become a leader in bio-based industrial products and technology by 2020**
- **Queensland Alliance for Agriculture and Food Innovation (QAAFI) is working on sugarcane, eucalyptus, *pongamia*, sorghum**
- **Western Australia:** **13,400 ha in the Ord river area is allocated to grain sorghum for biofuels**
- **Pilbara region as an ideal location for algae production**

ICRISAT's Pro-poor BioPower Initiative

- BioPower empowers the dryland poor to benefit from emerging bioenergy opportunities
- Ensures both food and energy security
- Focuses on biomass, juice and grain yields
- Greater smallholder incomes
- Sustaining environments

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Sweet Sorghum: Food-Feed-Fuel

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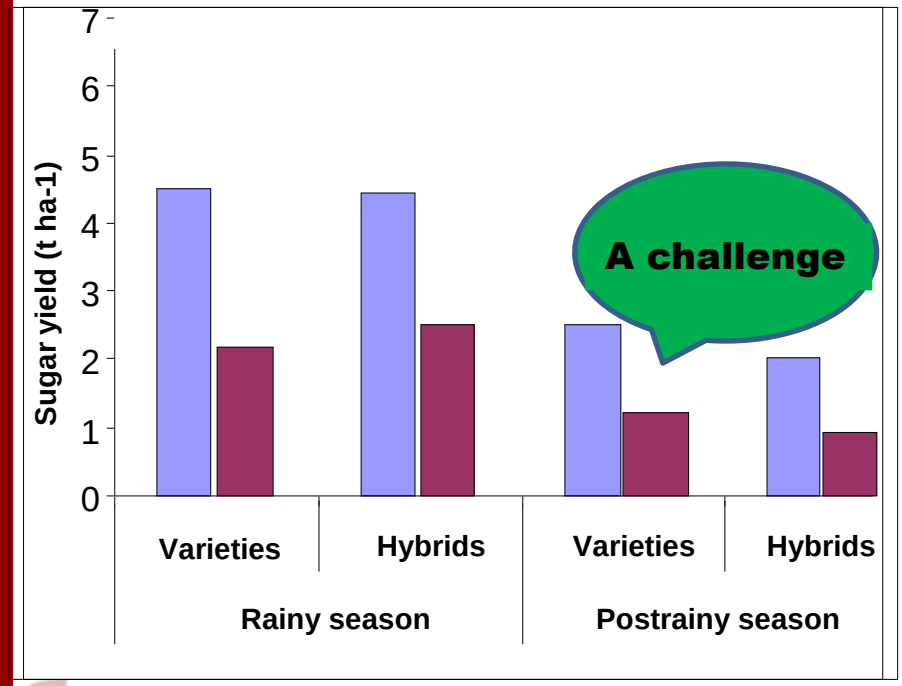
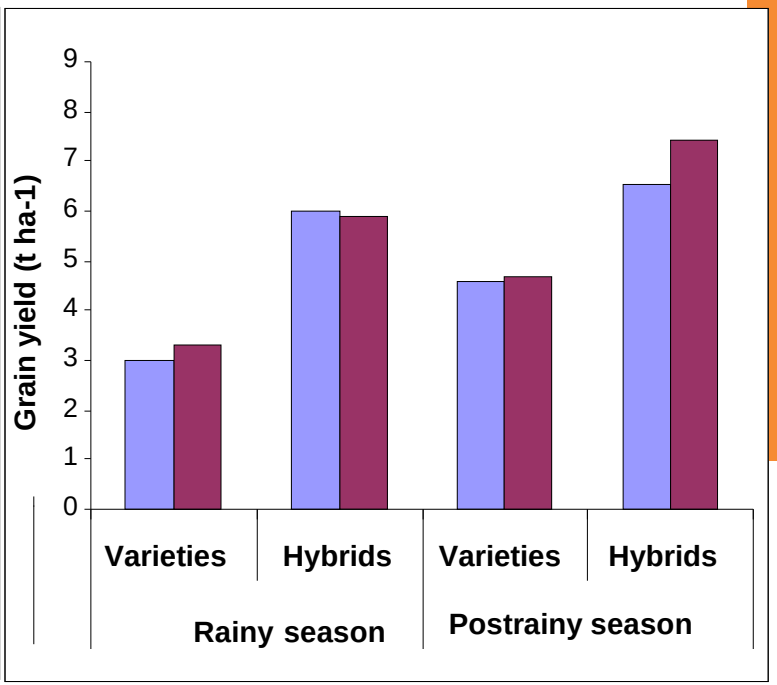
Food-Fuel Tradeoff





Sugar yield

Grain yield

Rainy: Higher sugar yield, No trade-offs

Post-rainy: Lower sugar yield and high grain yield,
Negligible trade-off in sweet sorghum hybrids

(ICRISAT sweet sorghum trials 2011-13)

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Economic Assessment

- Biofuels will take off in countries where subsidies on fuel are low to medium.
- Low feedstock costs are important component of over all cost of biofuels
- Studies in India, China, Brazil indicate that whole plant utilization of sweet sorghum and by-products from processing leads to positive economic returns.

Feed block

Favourable policy environment required

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Partnerships for the Poor

ICRISAT, Rusni Distilleries & TCL tie-up through ABI

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China- Exploring Sweet Sorghum

Crushed 25000 t of sweet sorghum in 2013 and forging ahead

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Bapamin Enterprises- Philippines

Pioneers in by-product utilization!

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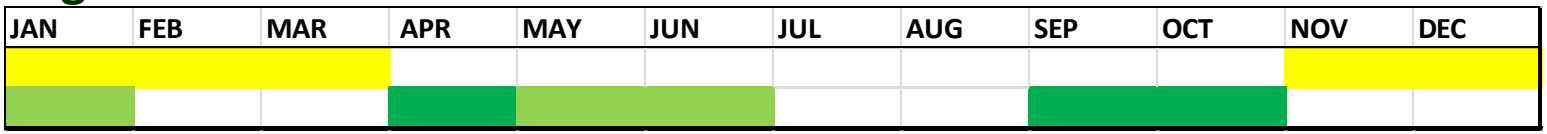
One Practical Approach in India

A demo of sweet sorghum as feedstock in two sugar mill areas promising

Proposed Bioenergy Calendar

Sugarcane season: Nov-Mar



- Sugarcane harvesting
- Sweet sorghum planting
- Sweet sorghum harvesting

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Conclusions

- Food security is paramount over energy security
- Need to balance food security and energy security to mitigate food price volatility
- Biofuel development offers both opportunities and risks
- Sweet sorghum is a competitive feedstock
- Policy and R4D are essential
- Smallholder participation and gender inclusiveness are key to success

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YES!
We can ensure food- energy-environmental security, together!

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