India 1960-2010: Structural Change, the Rural Nonfarm Sector, and the Prospects for Agriculture (Binswanger-Mkhize 2012)

Discussion: Perspectives for 2011 – 2050

Marianne Banziger, CIMMYT
Discussion – Concerns or Opportunities?

- Limited urban labor absorption OR decentralized rural development
- Few formal sector jobs OR self employment and rural innovation
- Feminization of agriculture OR women at the basis of India’s future food security
- Part-time farmer OR risk management
- An agricultural sector that is ill prepared to address future challenges OR a sector that still “holds its breath”.

Key Question: “As for the future, will the urban and landless poor be held hostage by part-time farmers?”
Climate change will strongly impact South Asia

India in 2012

Wheat self-sufficient
Climate change will strongly impact South Asia

By 2050, one quarter of the world population will live in South Asia

India in 2050

- 20-30% reduction in wheat production due to climate change
- Demand increase at current prices: 40%

• 3 IPCC Climate Models
• 17-38% Reduction in High Potential Zone
A tremendous gap in food production on the backdrop of rising global food prices

- Demand >> Supply
- Financial and market realities in the first world no longer tally with what the poor in the developing world can pay for food.

Slone, 2011
Wealth & Biofuel – drivers of global food price increases

- People in emerging economies change to an animal based diet.
- Today, “green” ethanol uses grain that could feed 350 million people. Lester Brown, Earth Policy Institute.
And if it were not enough ...

- **Peak oil >> Food prices ↑**
- **Fertilizer prices ↑**
  - Profitability ↓ Ag Production ↓
  - Inability to increase nutrient cycling in disadvantaged production systems (eg Africa)
- **Over-pumping**: 175 million people in India are sustained with grain from over-pumping (Worldbank 2010)
- **However, high prices are good news for farmers**
In the next 20 years, food and energy price inflation will likely exceed the income growth of the urban poor.
Food price increases pushing net consumers back into poverty

Before

Staples
Non-staple plants
Fish + Meat
Non-Food

After

Staples
Non-staple plants
Fish + Meat
Non-Food

Income use after 50% food price increase in Bangladesh (Bouis, 2011)
How much more do we have to produce?

For food prices to remain constant, farmers yield gains would have to increase

- From 1.2% to 1.7% for maize
- From 0.8% to 1.2% for rice
- From 1.1% to 1.7% for wheat
- On essentially the same land area, with less water, nutrients, energy, labor and as climates change

The more we delay investments, the steeper the challenge
Where will productivity increases come from?

Farmers in Canada & US: Wheat is a “rotation” crop – other crops more profitable.

Farmers in South Asia
- Opportunities to increase productivity
- Climate change impact
- Small land holdings
Annual yield increase of 20 major wheat producers

Productivity increases in first world “bread baskets”

Productivity increases in emerging economies including India

Graph showing percent change in productivity increases for various countries, ranked from lowest to highest.
New technologies targeted at smallholders
Precision agriculture mediated by cell phone technology

Farm-level nutrient management:
=> Increase in farmer income and nutrient use efficiency

Source: Ortiz-Monasterio, Raun, Lobell
Size-neutral interventions: Heat tolerant wheat

Using water differently and at different locations

During the last decade Northern India’s ground-water levels have fallen as much as 30 cm per year.

Gravity Recovery and Climate Experiment (GRACE), T. Shindler and M. Rodell (UMBC), NASA/Goddard

“... Our government wants a food safety net in which no citizen of ours would go hungry.

This requires enhanced agricultural production which is possible only by increasing productivity.

Our country has not witnessed any big technological breakthrough in agriculture after the Green Revolution.

We need technology which would address the needs of dry land agriculture. In addition, our agriculture should also be able to deal with new challenges like climate change, falling levels of ground water and deteriorating quality of soil.”
Perspectives for India in 2011 – 2050

• Even with relatively small income increases, demand increases for basic food staples will exceed supply, mostly due to the underlying metrics (population, land area).

• Imports might not forestall major food price increases due to logistical constraints (volumes) and farm income realities in high income countries.

• New technologies are available to support productivity increases in smallholder farmer environments.

• With appropriate support, smallholder women farmers can become the engines for agricultural productivity growth and contribute to avoiding a food crisis.
We act: Borlaug Institute for South Asia

- Joint initiative between CIMMYT and the Government of India
- Signed 5 Oct 2011
- Co-location of international and South Asian scientists for joint research on the tremendous food security challenges facing South Asia

1 billion people = 1/7 of the world population affected