Agriculture & the Economics of Ecosystems & Biodiversity

Pavan Sukhdev
Founder & CEO, GIST Advisory,
Study Leader, TEEB
& UNEP Goodwill Ambassador
“Valuation” is not just “Markets”...

- Recognizing value
- Demonstrating value
- Capturing value
- Regional Plans...
- Legislations...
- P.A. Evaluation...
- Certification...
- PES...

Norms, Regulations & Policies
Economic Mechanisms
Markets

TEEB on Valuation... Ch.5 Ch.4 Ch.3 Ch.3
INRA, CNRS, & UFZ scientists (2008) estimated worldwide economic value of pollination service provided by insect pollinators, mainly bees, was €153 billion in 2005 (i.e. 9.5% of the total value of the world agricultural food production).

The study also determined that pollinator disappearance would translate into a consumer surplus loss estimated between €190 to €310 billion.

“Vulnerability Ratio” (economic value of insect pollination / total crop production value) varied considerably among crop categories:

- 39% for stimulants (coffee and cocoa are insect-pollinated)
- 31% for nuts and
- 23% for fruits

Source:
“Biodiversity” is the Living Fabric of this Planet

Biodiversity’s economic reflection is “Natural Capital”

The CBD definition of Biodiversity includes all its strata including “Ecosystems” (table below) but common usage differentiates Ecosystems…

<table>
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<th>Biodiversity Strata</th>
<th>Quality dimensions</th>
<th>Quantity dimensions</th>
<th>Ecosystem Services (some examples)</th>
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<td>Ecosystems</td>
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<td>- Disease resistance</td>
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<td>- Crop strains / adaptive capacity</td>
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Projected Food Insecurity... Is in the same Regions

- CGIAR Study Horizon: 2050
- Food security: availability, access, utilization
- Vulnerability: exposure, sensitivity, coping capacity
- Length of Growing Period (LGP) declines by >5% across tropics
- Expectations: Temperatures >30 C and LGP <120 days across tropics
- Mexico, N/E Brazil, South & West African countries, India

Source: CGIAR Study: http://ccafs.cgiar.org/sites/default/files/assets/docs/ccafsreport5-climate.pdf
Agriculture & Biodiversity
Share Six Planetary Boundary Risks
1. Biodiversity Loss
2. Nitrogen Cycle
3. Phosphorous Cycle
4. Freshwater Use
5. Land Use Change
6. Climate Change

Source: www.ieet.org
The Ecological Footprint
Common but Differentiated Responsibilities towards SDGs:

1. **Green Development** in Low-HDI Countries
2. **Reducing Footprint** in High-Footprint Countries

- World average biocapacity available per person, ignoring needs of wild species
- Within biosphere's average capacity per person, low development
- Meets minimum criteria for sustainability
- Exceeds biosphere’s average capacity per person, high development
Green farming practices have increased yields, especially on small farms, between 79% (Pretty et al., 2006) and 180% (FAO, 2009).

- 10% increase in farm yields => 7% reduction in poverty in Africa & => 5% poverty reduction in Asia (UNEP, 2011)

- Green farming practices have increased yields, especially on small farms, between 79% (Pretty et al., 2006) and 180% (FAO, 2009).

- Approximately 2.6 billion people rely on agricultural production systems for their livelihood (FAO, 2009)

- Of 525 million small farms worldwide, 404 million are less than two hectares (Nagayets, 2005)

- Small farms cultivate 60% of arable land (Herren et al. 2010)

... for hunger, poverty, employment, ecosystems
Example of Ecologically Friendly Farming:
System of Rice Intensification (SRI)

- SRI is a set of practices which include using less seed, water and fertilizer, & increased spacing to **grow more rice with less labor input** & cost
- Ecologically friendly, cheaper option for higher yield
- No chemical crop protection measures
- Farmyard manure (FYM) is applied to SRI fields, not chemical fertilizers
- Soil pH is in neutral range; no water-logging is permitted
- SRI fields served by **sprinkler irrigation**, & crop received about one-third as much water during the growing season as with flood irrigation
- Estimated **4 to 5 million farmers** in **51 countries** around the world variations of this technique, and are seeing **yield increases of up to 200%**

**SOURCES:**
http://sdtt-sri.org
SRI Benefits demonstrated in India...

**Record Yield:** Sumant Kumar, a farmer in Nalanda District, Bihar set world record for highest rice yields (22.4 tons/ha) using SRI techniques, Kharif, 2011

**Scalability:** Four other farmers in the village, also first-time SRI practitioners, achieved paddy yield levels of 18 or 19 tons/ha

**Labour Saving:** 40 man-hours/ha for nursery management, plus 50 man-hours for pulling out & transporting seedling bundles from nursery to field

**Water Saving:** Less water used for growing rice with SRI, resulting in less incidence of arsenic contamination and reduction in methane release

**Cost Saving:** Farmers in Goa found they spent 70% on seed with SRI to grow up to twice as much rice
Thank You!

www.gistadvisory.com

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