Foresight Exchange Workshop

“How to integrate agriculture and environmental stakes in foresights?”

Presentation n°10 (H. Herren, Millennium Institute)
UNEP Green Economy Report – Agriculture chapter

With the support of the following institutions:

Beijing, 16th October 2011
UNEP Green Economy Report

Agriculture chapter

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Millennium Institute
Foresight Exchange Workshop
Beijing, October 16, 2011
www.Millennium-Institute.org
NfP R&D and Service Organization

• SD models, tools, capacity & institutional development in support of sustainable development policy development (empowerment)

Global Models:
• UNEP Green Economy Report
• GEO V

Regional Models:
• ECOWAS

National Models:
• over 40 countries T21 Integrated SD scenario models

Sector Models
• steel, agriculture, cement, aluminum, population, etc....
Agriculture's environmental impacts are substantial and are getting worse:

- High external input conventional farming has high GHG emissions (14%)
- Industrial food system: 44-57% GHG
- Low input, traditional farming: lower yields driving deforestation (18%)
- Both farming systems lack adequate CC stress resilience
- Water pollution by fertilizer/pesticide runoff and soil erosion

1. To what extent an agriculture-environmental stakes nexus was incorporated;
2. The reasons for it (or why it was not).
Human conditions increasing demand for food

1. to what extent an agriculture-environmental stakes nexus was incorporated;
2. the reasons for it (or why it was not)

- Humanity will grow to 9 - 9.5 billion by 2050
- Rising affluence brings diet demands for more meat, dairy & fish - more crops per kilocalorie
- Greatest population growth in the tropics where CC impact is expected to be worst
Today's food production should be sufficient for 9bn people (already is for 12 to 14 billion) but:

- Post harvest losses >30%
- Significant retail and home losses approx. 40%
- 1 billion hungry
- 1 billion obese

Why agriculture transformation is needed:

1. to what extent an agriculture-environmental stakes nexus was incorporated;
2. the reasons for it (or why it was not)

Barilla, 2011
3. what was the methodology used to deal with this nexus
System Dynamics models, understand connectivity & complexity
3. what was the methodology used to deal with this nexus

The forward looking scenarios: Approach and methodology
3. what was the methodology used to deal with this nexus
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The forward looking scenarios: analysis and investments

Global investments across sectors (1% and 2% of GDP); 0.2% and 0.32% of GDP invested in AG and fisheries (50-50).

- **Pre harvest losses** (training activities and effective bio-pesticide / natural product use)
- **Ag management practices** (costs to transition from till to no till / agro-eco / organic agriculture, training, access to small mechanization)
- **R&D** (research on crop improvement, soil science and agronomy, appropriate mechanization, and more)
- **Food processing** (better storage and processing in rural areas)
4. what were the resulting new ideas/reflections/outputs

Investing between 0.1% and 0.16% of total GDP ($83-$141 Billion) / year

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Unit</th>
<th>2011</th>
<th>B2</th>
<th>B1</th>
<th>BAU</th>
<th>G1</th>
<th>G2</th>
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<td></td>
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<td>2050</td>
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**Agricultural sector variables**

<table>
<thead>
<tr>
<th></th>
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<th>BAU</th>
<th>B2</th>
<th>B1</th>
<th>BAU</th>
<th>G1</th>
<th>G2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop production</td>
<td>Bn $/Yr</td>
<td>449</td>
<td>570</td>
<td>538</td>
<td>500</td>
<td>550</td>
<td>593</td>
</tr>
<tr>
<td>Livestock production</td>
<td>Bn $/Yr</td>
<td>313</td>
<td>498</td>
<td>499</td>
<td>499</td>
<td>502</td>
<td>506</td>
</tr>
<tr>
<td>Employment</td>
<td>M people</td>
<td>1087</td>
<td>1689</td>
<td>1610</td>
<td>1533</td>
<td>1653</td>
<td>1732</td>
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<tr>
<td>Soi quality</td>
<td>Dmn</td>
<td>0.92</td>
<td>0.73</td>
<td>0.75</td>
<td>0.81</td>
<td>0.98</td>
<td>1.03</td>
</tr>
<tr>
<td>Agriculture water use</td>
<td>KM3/Yr</td>
<td>3423</td>
<td>5365</td>
<td>5209</td>
<td>4929</td>
<td>3220</td>
<td>3221</td>
</tr>
<tr>
<td>Harvested land</td>
<td>Bn Ha</td>
<td>1.20</td>
<td>1.33</td>
<td>1.32</td>
<td>1.30</td>
<td>1.25</td>
<td>1.25</td>
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<tr>
<td>Deforestation</td>
<td>M Ha/Yr</td>
<td>15</td>
<td>25</td>
<td>21</td>
<td>15</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Calories per capita per day (available for supply)</td>
<td>Kcal/P/D</td>
<td>2787</td>
<td>3178</td>
<td>3273</td>
<td>2981</td>
<td>3238</td>
<td>3382</td>
</tr>
<tr>
<td>Calories per capita per day (available for household consumption)</td>
<td>Kcal/P/D</td>
<td>2081</td>
<td>2476</td>
<td>2406</td>
<td>2227</td>
<td>2414</td>
<td>2524</td>
</tr>
</tbody>
</table>
4. what were the resulting new ideas/reflections/outputs

- Brown scenarios support growth but show increased pressure on natural resources, higher emissions and low economic resilience.

- Green investments support social, economic and environmental growth (restoration):
  - Resource efficiency makes the economy more resilient;
  - Lower carbon development reduces energy costs and lowers risks related to climate change;
  - Jobs are both created and lost, transition strategies need to be designed and implemented;

- Investments have to be carefully allocated and behavioral changes might be needed in support of public policies and private investments.
5. …some elements of expectation from this Foresight Exchange Workshop, and discussion topics

- What about developing a road map and policy interventions for the implementation of the IAASTD; understand what the roadblocks are; IAASTD II

- What about linking in an integrated framework the many initiatives that are trying to look ahead (modeling, metrics, etc.) and provide the knowledge base to inform the much needed policies in an convincing manner

- Time to act more forcefully…we do know a lot already, next road stop is Rio+20
You cannot solve the problem with the same kind of thinking that created the problem. *Albert Einstein*

Thank you
The way ahead: More diversity (plants & animals and better nutrition-health and environment)

Encouraging a wider genetic base in agriculture...trees, fruits, grains, vegetables, lost crops, animals for nutrition and health, cultural diversity, incomes, pest control, resilience to climate change.