International Co-operation on Adaptation to Global Environmental Change: Earth System Science Partnership (ESSP) and Earth System Analysis

Martin Rice¹, Rik Leemans² & Ann Henderson-Sellers³

NCCARF International Climate Adaptation Futures Conference
Gold Coast, Australia, 29 June – 1 July 2010

¹ ESSP Coordinator / PhD Candidate, Dept of Geog & Env, Macquarie University
² ESSP Chair / Wageningen University
³ Professor, Dept of Geog & Env, Macquarie university
1. Collaboration enhances adaptive capacity to global environmental change (GEC)

2. Earth system analysis is a powerful tool

3. Case study: bioenergy
The Earth System Science Partnership (ESSP) and its partners help facilitate international co-operation and contribute to science in support of adaptation.
1. Collaboration enhances adaptive capacity to global environmental change (GEC)

2. Earth system analysis is a powerful tool

3. Case study: bioenergy
"Earth system analysis...is a transdiscipline striving to perceive the big picture, to ask and answer genuine systems questions, and to identify the prime pathways toward global sustainability."

Schellnhuber, H.J., Crutzen, P.J., Clark, W.C., Claussen, and Hunt J., Environment Volume 47 Number 8 October 2005
New Adaptive Earth System Strategies

1. Collaboration enhances adaptive capacity to global environmental change (GEC)

2. Earth system analysis is a powerful tool

3. Case study: bioenergy
Goal: identify major opportunities and constraints for bioenergy in the context of earth system sustainability
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>17th C</td>
<td>Alcohol fuel (lamps &amp; heating)</td>
</tr>
<tr>
<td>1902</td>
<td>Paris alcohol fuel exhibition (alcohol powered cars)</td>
</tr>
<tr>
<td>1908</td>
<td>Ford T Model</td>
</tr>
<tr>
<td>1923</td>
<td>Rolls-Royce</td>
</tr>
<tr>
<td>1947</td>
<td>Bell X-1 (mach 1)</td>
</tr>
<tr>
<td>1973</td>
<td>Arab oil embargo</td>
</tr>
<tr>
<td>1975</td>
<td>Brazilian National Alcohol Program</td>
</tr>
<tr>
<td>2000s</td>
<td>Expansion of renewable energy</td>
</tr>
<tr>
<td>2007</td>
<td>UN Secretary-General calls for more scientific research on biofuels</td>
</tr>
</tbody>
</table>
Fuel to the Fire

Policy

1975 - Brazilian National Alcohol Program

2003 - EU Directive

2005 - Energy Policy Act (USA)

2006 - Renewable Energy Law (P.R. China)

2007 - UN Sec Gen: more scientific research on bioenergy

Corresponding Timeline

Fuel to the Fire

- Food riots (sign of future times?)
- Investment / market speculation
- Land grabbing (ongoing)

ESSSP Research

???? - Modelling workshop

July 2008 - Piracicaba Workshop

June 2008 - Science – Policy Dialogue

2007 - Gap Analysis
Good News
Success Stories from GEC Research Community

- START - AIACC
- GECAFS – Food Systems Concept
- GCP – Carbon Budget
- GWSP – Digital Water Atlas

Bad News
ESSP Bioenergy Study

Why?
1. Research – Policy Direction
   • which is the driver?
2. Terminology barriers
   • e.g. land abandonment
3. Institutional support
   • employment vs. transdisciplinarity
4. Champions and resources
   • led by who? (e.g. economists, agriculturalists?)
New Adaptive Earth System Strategies

1. Collaboration enhances adaptive capacity to global environmental change (GEC)

2. Earth system analysis is a powerful tool

3. Case study: bioenergy and its lessons
   - science – policy direction
   - terminology barriers and new insights
   - institutional support
   - champions and resources