Mekong2Rio Conference, Phuket, Thailand, May 1-3, 2012
Water, Energy and Food Nexus

Session 1.1: Water and Environmental Challenges

Ecosystem Service Implications for Sustainable River Flow Management

Environment Programme
Mekong River Commission
and
Thai National Mekong Committee
May 1, 2012
Presentation outline:

• The water, energy and food nexus

• Environmental impacts

• Socio-economic and social impacts/implications

• An added nexus perspective

• Summary
The Water, Energy and Food Nexus

- Water security
- Energy security
- Food security

Environmental and Social Impacts/Implications?
### Changes Affecting Water Resources

#### Demands
- Consumptive Uses
  - Agriculture
  - Culture fisheries
  - Water supply
  - Environmental
- In-stream Uses
  - Fish
  - Salinity control
  - Energy
  - Navigation

#### Climate
- Sea level rise
- Increased dry season demands
- Higher drought risk
- Increased flood flows & frequencies

#### Infrastructure
- Dams
- Irrigation & Drainage
- Flood mitigation
- Salinity control
- Dredging & River works
- Water supply & Sanitation

#### Management Practices
- Catchment management
- Energy production
- Irrigation & Animal husbandry
- Fishery management
- Pollution control

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**What are the implications from these changes?**
## Flow Changes & Possible Impacts

<table>
<thead>
<tr>
<th>Change</th>
<th>Flora</th>
<th>Fisheries</th>
<th>Other Fauna</th>
<th>Other/Livelihoods</th>
<th>Can we provide time series?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dry Season Water Level Increase</strong></td>
<td>Possibility of drowning rocky outcrops, sand banks &amp; mud flats</td>
<td>Habitat damage</td>
<td></td>
<td>Fewer exposed rocks for Algal harvest</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Longer Dry Season/Late 1st Transition</strong></td>
<td>No impact</td>
<td>Not known</td>
<td>Not known</td>
<td>Not known</td>
<td>Only typical years</td>
</tr>
<tr>
<td><strong>Suppression of Freshettes during 1st Transition</strong></td>
<td></td>
<td>To be confirmed</td>
<td>not known</td>
<td>not known</td>
<td>No</td>
</tr>
<tr>
<td><strong>Delayed Flood Season</strong></td>
<td>not known</td>
<td>not known</td>
<td>not known</td>
<td>not known</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Reduced Flood Peaks</strong></td>
<td>None</td>
<td>Adverse impacts especially for Tonle Sap</td>
<td>None</td>
<td>Possible improvement</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Higher Flow Velocities</strong></td>
<td>Some species are adapted, others will die</td>
<td>Possible impact</td>
<td>not known</td>
<td>not known</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Change of (Exposed) Bed Affected by loss of</strong></td>
<td>Affected by loss of</td>
<td></td>
<td></td>
<td>Only a time</td>
<td></td>
</tr>
</tbody>
</table>
MRC Integrated Basin Flow Mgmt. (IBFM)
Main Issues

River channel
- Bed level changes
- Increased bank erosion
- Loss of secondary channels

Movement of water/Flows regime
- Increased dry season water levels
- Decreased flood peaks
- Delayed inundation of floodplains

Biological/Agricultural productivity/services
- Wetlands
- Fisheries
Hydropower, the main nexus driver

- 12 mainstream HP projects planned in LMB/11 dams
- 4 dams built on mainstream in Yunnan, China UMB/4 planned
Environmental Impacts of 12 Hydropower Schemes

• Changes in flow regimes and degradation of connectivity of Mekong ecosystems

• Many areas no longer subject to ecologically important transition seasons

• Loss of fertile sediment load (by 50%–2)
Environmental Impacts of 12 Hydropower Schemes (cont’d)

• Serious and irreversible reduction in biodiversity

• Approx. 17% of LMB wetlands permanently inundated

• >40 riverine fish species threatened
Socio-economic Impacts of 12 Hydropower Schemes (cont’ d)

• Significant net negative impacts on fisheries and agriculture
• Negative implications for food security
• Growing inequality in the LMB countries
• Asymmetrical upstream/downstream benefit/cost
Social Conditions and Impacts/Implications

Living standards have generally increased but areas of poverty remain particularly in rural areas. MRC monitors social conditions through SIMVA.
Immediate Social and Economic Impacts/Implications

- Population living closer to the river are likely to be impacted than those who live further if river system has changed.
- Population living closer to the river system generally engage in fishing, collecting OAA, cultivating riverbank crops and vegetable.
- The higher the dependence on the river resource the higher the vulnerability they are, if the resource become scarce.
- In this regard it is worthwhile to identify who are the most resource dependence.
What is SIMVA?

A monitoring tool developed by MRC to assess how much people rely on the river’s natural resources for their livelihood, where these populations are located, and how vulnerable they might be if Mekong’s water resources are changed.

It also aims to assess the current status, and monitor the impact of how changes in the Mekong basin environment affect the economic conditions of people in the basin.

Baseline survey covered almost 3,000 households in the countries.
How to monitor social conditions?

- 15 km corridor as the point of departure for monitoring socio-economic aspect
- 40 km corridor was considered for flood plain region particularly for Tonle Sap and Delta area

For monitoring purposes, a baseline study for SIMVA is being carried out by the MRC Secretariat to determine present conditions. Results of the study are expected during Quarter 3 of 2012.

Baseline report will cover 70 indicators on baseline vulnerabilities, dependence on resources (fisheries, OAA, and riverbank cultivation), resilience, shock, and vulnerability to climate change.
### Some facts on LMB corridor population (2007), SIMVA Pilot Study 2008-2009

<table>
<thead>
<tr>
<th>Country</th>
<th>Corridor population</th>
<th>% of national population living in the corridor</th>
<th>% of corridor population per country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>9.9 millions</td>
<td>70%</td>
<td>33%</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>3.4 millions</td>
<td>53%</td>
<td>12%</td>
</tr>
<tr>
<td>Thailand</td>
<td>2.5 millions</td>
<td>4%</td>
<td>8%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>13.9 millions</td>
<td>16%</td>
<td>47%</td>
</tr>
<tr>
<td>All countries</td>
<td>29.7 millions</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>
An Added Nexus Perspective

- Irrigated agriculture another player: growing populations need more food
- Change towards more water-intensive diets
- Negative environmental impacts of increased irrigation:
  - loss of biodiversity in cultivated areas
  - deteriorating water quality due to polluted return flows
Summary:

- Hydropower is the main nexus driver and will lead to significant environmental impacts (but positive economic impact ?!?)
- Also negative impacts on fisheries and agriculture => impacts on food security
- Exacerbating existing inequalities
- Asymmetrical benefits and costs accrual for LMB countries
- Increased need for food production will add to the pressures on environment
Thank you for your attention

for more information contact:
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www.mrcmekong.org