SEDIMENT OF THE MEKONG BASIN

Finding from the Mekong River Commission Study
INTRODUCTION

Why should we think about Sediment?

- The Significance of Sediment:
  - Land degradation
  - Water Resource Development: siltation of reservoirs, canals, navigation channels, harbours etc
  - Impacts on aquatic ecology: Turbidity, channel and lake sedimentation
  - Sediment-associated nutrients and contaminants

- Sediment is essential for fish habitats and reproduction
- The Mekong River serves as the heart and circulatory system for all the nutrients
- The pure water is the lifeblood that carries the fine sediment that conveys the nutrients

Drivers of Change

- Increasing Sediment Loads
  - Land clearance
  - Land use change
  - Infrastructure development

- Decreasing Sediment Loads
  - Dam construction
  - Soil conservation and sediment control programmes
OBJECTIVES

1. Sediment contribution from tributaries to the Mekong River
2. Sediment trapped by hydropower cascade on the Mekong Basin
3. Trends in sediment reduction from scenario comparison analysis

Definition of Scenarios

- Infrastructures of six related sectors in 2007
- Infrastructures of six related sectors in 2007, currently under construction and planned for 2020
- Infrastructures of six related sectors in 2007, currently under construction and planned for 2020 and 2040

M1
Early Development 2007

M2
Development 2020

M3
Development 2040
MODELLING APPROACH

The following selected developments are modelled:

- Dams in the Upper and Lower Part

- Flood Protection Structure and Food plain Infrastructure

- Irrigation development

- Agriculture and Forest cover reduction and increase

- Navigation

- Domestic and Industrial Water use
1. Route sediment and nutrient loads generated by SWAT through Mekong tributaries to the mainstream
2. Replicate the IQQM flows, hydropower and water use
3. Simulate Source by using Brune Reservoir Sediment Trapping Model (Brune, 1953) which primarily in the tributaries and storage dams
4. Route sediment along the Mainstream by ISIS
**MODELLING RESULTS**

**Sediment Contribution from Tributaries to the Mekong River**

<table>
<thead>
<tr>
<th>Tributaries name</th>
<th>Area (%)</th>
<th>Average Annual Sediment (Mt)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>M1</td>
</tr>
<tr>
<td>Nam Ou</td>
<td>3.20</td>
<td>4.89</td>
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<tr>
<td>MeaKok</td>
<td>1.31</td>
<td>1.99</td>
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<td>Prek Te</td>
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<tr>
<td>Tonle Sap</td>
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<tr>
<td>Prek Thnot</td>
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</tbody>
</table>

**Map Legend**

- **A**: Percentage of total catchment area
- **B**: Average annual sediment in Mt

**Map Key**

- **M1**: Model 1
- **M2**: Model 2
- **M3**: Model 3
MODELLING RESULTS

Trends in Sediment Reduction

![Graph showing trends in sediment reduction across different scenarios and locations.](image_url)
MODELLING RESULTS

Sediment Trapped by Hydropower cascades on the Mekong Basin
CONCLUSION AND RECOMMENDATION

- The changes in seasonal flow patterns in the Mekong Basin (MB) is significant. However, The differences in total flow volumes are subtle.
- Large Reduction of sediment transport downstream caused by hydropower projects in the MB is about 67% and 97% in the 2020 and 2040 scenarios respectively.
- It is likely to have substantially impacts on the river channel and delta landforms, floodplain fertility as well as other productivities.
- Mitigation strategies of all planned dams should be implemented to improve sediment loads reaching the Mekong Delta.

To have effective outcomes, mitigation measures should be implemented in a coordinated way for all dams in the cascade.
Thank you