Community-scale river health monitoring program: A case of Songkhram catchment, Thailand

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COMMUNITY-DRIVEN RIVER HEALTH MONITORING PROGRAMS

Literature review

Physical and hydrological parameters: Precipitation, Streamflow, Water use, Visual inspection, etc.

Water quality parameters: Temperature, DO, pH, Nitrates, Phosphates, Turbidity, etc.

Biological parameters: Diatoms, benthic macroinvertebrates, fish, etc.

Site-specific issues: Polluting sources, hotspots (fishkills), etc.
Community-scale river health monitoring indicators

- **D1 - Biological Dimension**
  - Fish
  - Macroinvertebrates
  - Algae
  - Invasive species

- **River Health**
  - Livelihood practices
  - Land use trends
  - Reverence for rivers
  - Community initiatives to protect rivers

- **D3 - Social Dimension**

- **D2 - Physical/Chemical Dimension**
  - Smell
  - River flow
  - Turbidity
COMMUNITY-SCALE RIVER HEALTH MONITORING INDICATORS

1. Floating and submerged macrophytes (particularly *Salvinia sp.* water fern, but also *Azolla sp.* fern, *Ceratophyllum sp.* and *Hydrilla sp.*)

2. Microalgae, potentially toxic or indicative of pollution particularly, *Microcystis*

3. Filamentous algae (‘Tao’) as potentially excessively proliferating species (mainly, *Cladophora sp.* and *Spirogyra*)

4. *Mimosa pigra* and other terrestrial invading tree species around water bodies (incl. *Neptunia orelacea*, water mimosa), the species well known to be global invasive alien trees causing major problems

5. Mayflies/stoneflies/caddisflies’ presence (and possibly, abundance), insect groups of benthic macroinvertebrates, highly sensitive to even mild pollution, and hence early water pollution indicators
6. Dynamics of fish species presence and abundance (surveys of Si Songkram markets, particularly for large fish catch and rare species) indicative of anthropogenic pressure.

7. Size and well-being of several troupes of long-tailed macaques (e.g. Ban Sang population) as a good indicator of health of fragmented riverine flooded forests.

8. Spiritual integrity of communities, as an indicator of potential impacts on wetland/forest ecosystem integrity as judged by attitude of different local communities to forest and wetland spirits (reflected in visual condition of belief manifestations, such as San Phra Poom, regular rituals performed, Don Pu Ta, etc).


10. This Indicator List to be kept open, since new indicators worthwhile to monitor may be establish in our further conservation efforts.

Basic indicators (T, turbidity, pH, DO, BOD, etc) are monitored routinely by PCD.
COMMUNITY-DRIVEN RIVER HEALTH MONITORING SYSTEM

Two-track approach

Community organizations (Women’s groups, village committees) -> Community-driven river health monitoring system (River Health Index) -> Official monitoring system

Volunteers and Enthusiasts (Schools, Champions)
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Checking for Macroinvertebrates (Preliminary survey)
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Pictures taken by a USB microscope

Mayfly

Stonfly

Damselfly

Beetle
COMMUNITY-SCALE RIVER HEALTH MONITORING PROGRAM

Good sampling sites
# Community-Scale River Health Monitoring Program

## Results of Sampling site near Sam pong Wittaya School

<table>
<thead>
<tr>
<th>Common name</th>
<th>Scientific Order</th>
<th>Pollution Sensitivity</th>
<th>Total no. found</th>
<th>Tick if present</th>
<th>Put the sensitivity no. here</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mayfly nymph</td>
<td>Ephemeroptera</td>
<td>10</td>
<td>30</td>
<td>✓</td>
<td>10</td>
</tr>
<tr>
<td>Water mite</td>
<td>Acariformes</td>
<td>6</td>
<td>4</td>
<td>✓</td>
<td>6</td>
</tr>
<tr>
<td>True bug</td>
<td>Hemiptera</td>
<td>5</td>
<td>1</td>
<td>✓</td>
<td>5</td>
</tr>
<tr>
<td>Water spider</td>
<td></td>
<td>5</td>
<td>2</td>
<td>✓</td>
<td>5</td>
</tr>
<tr>
<td>Damselfly larva</td>
<td>Odonata</td>
<td>4</td>
<td>5</td>
<td>✓</td>
<td>4</td>
</tr>
<tr>
<td>Dragonfly larva</td>
<td>Odonata</td>
<td>4</td>
<td>1</td>
<td>✓</td>
<td>4</td>
</tr>
<tr>
<td>Freshwater shrimps &amp; prawns</td>
<td>Decapoda</td>
<td>4</td>
<td>50</td>
<td>✓</td>
<td>4</td>
</tr>
<tr>
<td>Mosquito larva/pupae</td>
<td>Diptera</td>
<td>3</td>
<td>5</td>
<td>✓</td>
<td>3</td>
</tr>
<tr>
<td>Flat worm</td>
<td>Turbellaria (class)</td>
<td>3</td>
<td>1</td>
<td>✓</td>
<td>3</td>
</tr>
<tr>
<td>Freshwater snail</td>
<td>Gastropoda(class)</td>
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<td>25</td>
<td>✓</td>
<td>2</td>
</tr>
<tr>
<td>Predacious diving bettle adult</td>
<td>Coleoptera</td>
<td>2</td>
<td>9</td>
<td>✓</td>
<td>2</td>
</tr>
</tbody>
</table>

**Water Quality Score** = \( \frac{\text{Pollution Score}}{\text{Species Richness}} = \frac{48}{11} = 4.36 \)

**State**: Fair (3.0-6.9)
COMMUNITY-SCALE RIVER HEALTH MONITORING PROGRAM

Engaging schools
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Monitoring sites established

Legend
- ▲ Location of schools
- ○ Monitoring sites in the Songkhram river
- ● Monitoring sites in wetland/canal connecting to Songkhram river

Mekong River → ▲ Location of schools

Location of schools

1. Ban Had Kuan School
2. Ban Tha Bo School
3. Ban Had Phaeng School
4. Saharat Rangsarin School
5. Songkhram River
6. Huai Saab River
7. Pla Daet River
8. Songkhram River
9. Mekong River

Length of coverage: 85,136 meters