Institutional Analysis for Mangroves at Indus Delta: The case of Keti Bandar, Pakistan

Waheed Zafar
Sustainable Development Policy Institute
Water Resource

Desert Ecosystem

Water Utilization

Mountain Ecosystem

Increase water demand
Water use efficiency?

Farmland Ecosystem

Variable Water Availability

Increase population pressure/Food insecurity

Deltas

Soil and Water Salinity
Erosion/Depleting nutrient
Pollution/deforestation

Other Ecosystems like forest, wetland

Reduction in area of active delta (about 95%)
Low Fresh water flows
Low sedimentations
Endanger habitat & biodiversity

Rangeland Ecosystem

Sea

Retention, flood and storm damage;
erosion; saltwater intrusion; rising water tables/impeded drainage;
Wetland loss (and change)

Mangroves Ecosystem

Sea

Glacier/Snow melting
Climatic changes

Climate Change and Mangrove Ecosystem

Changes in Temperature
Changes in CO$_2$ concentration
Variability in Precipitations
Changes in Humidity
Occurrence climatic extreme events
Changes in Sea Level rise
The Study Area – Keti Bandar, Indus Delta, Pakistan
System Approach to study the impact of climate change on mangroves Ecosystem
Mean projected changes in the temperature and precipitation over the study area for three future climates F1 (2010-39), F2 (2040-2069) and F3 (2070-2099) with respect to the base climate (1961-1990)
TRIANGULAR RELATIONSHIP

STATE

INSTITUTIONS

Look after resources in terms of conservation & livelihoods

Responsibility for management

Ensure the livelihood security

RESOURCE USERS

Practice sustainable management

Practice resource management following communal rules and regulations

Subsidies for community development activities

Subsidies for management
INSTITUTIONS

In general sociology

• “An organized, established, procedure”
  (Jepperson, 1991)

These procedures are represented as “Rule of game”

• Institutions are the key to explain economic performance.
  (Coase, 2000)
Institutions are a combination of:

- Policies and objectives
- Laws, rules and regulations
- Operational plans and procedures
- Incentive mechanisms
- Accountability mechanisms
- Norms, traditions, practices and customs
Institutional Analysis Needs to Know

• What are the rules?
• Who decides, & how?
• Who implements, & how?
• When is progress assessed, & how?
• What are the relationships between different institutions (formal and informal)?
Institutions interviewed

• Sindh Forest Department (SFD)
• Sindh Board of Revenue (BoR)
• Port Qasim Authority (PQA)
• WWF-Pakistan
• IUCN-Pakistan
• Pakistan Fisher-folk Forum
Four key elements of the Indus Delta perspective

1. Appropriate Institutional Arrangements
2. Reliable Information Base
3. Integrated Natural Resources Management
4. Strong Community Participation
OBJECTIVES

• To develop necessary framework of adaptation for policy and institutional intervention for mangroves sustainability and development for decision makers at local, national and regional level
METHODOLOGY

- Qualitative & Quantitative data obtained through:
  - Field observations
  - Interviews
  - Policy documents
  - Survey
  - FGDs
FOUR LEVEL CORE SUB SYSTEMS

• Resource systems
  – Specific territory containing forested area, wild life & water systems

• Resource units
  – Flora, fauna & amount of water

• Governance systems
  – The government & other institutions

• Users
  – Community/Individuals
Socio Ecological System Interaction
## Boundaries and property rights in mangrove areas

<table>
<thead>
<tr>
<th>Indicators</th>
<th>SFD</th>
<th>BoR</th>
<th>PQA</th>
<th>WWF</th>
<th>IUCN</th>
<th>PFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear delineation of boundaries for area under jurisdiction</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Managerial staff familiarity with the boundaries</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Field staff familiar with the boundaries</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Clear stipulation of property rights</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Stipulation of access and withdrawal rights of local communities</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>

## Monitoring mangroves

<table>
<thead>
<tr>
<th>Indicators</th>
<th>SFD</th>
<th>BoR</th>
<th>PQA</th>
<th>WWF</th>
<th>IUCN</th>
<th>PFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department for monitoring of mangroves</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Provision of field staff for monitoring</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Law enforcement</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Authority to take legal action against violators</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>
## Restoration & conservation of mangroves

| In-house expertise in plantation and restoration | ✔️ | ✗ | ✗ | ✔️ | ✔️ | ✔️ | ✔️ |
| Staff capacity for plantation and restoration | ✗ | ✗ | ✗ | ✔️ | ✔️ | ✔️ | ✔️ |
| Partnership with other agencies | ✔️ | ✗ | ✗ | ✔️ | ✔️ | ✔️ | ✔️ |
| Influence of partner agencies | ✔️ | ✗ | ✗ | ✔️ | ✔️ | ✔️ | ✔️ |
| Health of mangroves | ✔️ | ✗ | ✔️ | ✔️ | ✔️ | ✔️ | ✔️ |
| Efforts taken for restoration & conservation | ✔️ | ✗ | ✗ | ✔️ | ✔️ | ✔️ | ✔️ |

## Community participation initiatives

| Community meetings | ✔️ | ✗ | ✗ | ✔️ | ✔️ | ✔️ | ✔️ |
| Response of community towards participation | ✔️ | ✗ | ✗ | ✔️ | ✔️ | ✔️ | ✔️ |
Policy 2010

• Stands out as compared to previous non-participatory autocratic policies

• Geographical Information System (GIS) & Remote Sensing (RS)
  – To effectively monitor the forest cover on public and private land
GAPS

- Stakeholder involvement by incentive-based programs
- Improper arrangements to control marine pollution, sufficient water to flow down stream for sustainability
Recommendations

• Transfer the authoritative ownership and powers to Sindh Forest Department (SFD) for improved management practices
  – the main purpose for mangrove forest management should be well defined and prioritized.

• An inter-institutional committee, comprising of representatives from formal and informal institutions, research institutions, local communities, NGO’s and INGO’s, should be formed to enlighten the scientific and indigenous knowledge base, and management practices in the mangrove ecosystems
Thank you