Community Mangrove Aquaculture at Sundarbans Impact Zone: Example of using traditional knowledge in adaptation to climate change

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IPSI second Global Conference, Kenya
The Sundarbans

World’s largest single block of mangroves comprising a total area of 10000 square kilometres placed in between Bangladesh and India
Sundarbans provides multiple resources

Source: Baten & Selim, 2011
Traditional Resource Communities of Sundarbans

3.5 million people directly or indirectly depend on the Sundarbans for livelihood

- **Bawali** (Wood Cutter and Nypa Palm collector)
- **Mouwali** (Honey Collector)
- **Jele** (Fisher man)
- **Chunari** (Snail and Oyster Collector)
- Prawn fry collector
- Crab farmer
- Small scale honey and timber businessman
Vulnerability to Climate Change

• Sea level rise (28 cm sea level rise by 2070 & 40 cm by 2100 - IPCC 4AR)
  – A rise of 40cm may inundate 11-17% of land in coastal areas.
  – 40 cm SLR would submerge two-thirds of the Sundarban

• Cyclones (Sidr in 2007, Aila 2009)

• Salinity Intrusion
Cyclone Aila...
Sea level Rise
Salinity Intrusion
Community Mangrove Aquaculture

- Community started cultivating mangrove species along with crabs, oyster, shrimps and fishes (Pershe, vetki and the like) in saline water logged lands otherwise those were fellow
Cultivation Method

- Site Selection
- Species Selection
- Farm Construction

- Canal of 2-2.5 feet depth for aqua-species (fish & shrimp) cultivation
- Central platform (usually flooded) for mangroves cultivation
- Dyke 0.5-1.5 feet height from water level

Figure: Model of CMAS Culture Farm

Figure: Types of Mangrove Cultivated in CMAS Culture farms (by Percentage)

<table>
<thead>
<tr>
<th>Types of Mangrove</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goalpata</td>
<td>94.44</td>
</tr>
<tr>
<td>Goran</td>
<td>5.56</td>
</tr>
<tr>
<td>Keora</td>
<td>66.67</td>
</tr>
<tr>
<td>Hargoza</td>
<td>16.67</td>
</tr>
<tr>
<td>Baen</td>
<td>16.67</td>
</tr>
</tbody>
</table>

Figure: CMAS Culture Farm
Cultivation Method

- Seed Collection
- Nursery Establishment
- Plantation in the farms
- Maintenance of the farm
- Harvesting

Table: General Farming Pattern (Temporal) of Mangroves Cultivation

<table>
<thead>
<tr>
<th>Name of Mangrove</th>
<th>Seed collection and seed bedding</th>
<th>Plantation</th>
<th>Time from seed bedding to harvesting (month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goalpata</td>
<td>July</td>
<td>August</td>
<td>13-14</td>
</tr>
<tr>
<td>Keora</td>
<td>August</td>
<td>September</td>
<td>62</td>
</tr>
<tr>
<td>Hargoza</td>
<td>July</td>
<td>August</td>
<td>62</td>
</tr>
<tr>
<td>Baen</td>
<td>August</td>
<td>September</td>
<td>62</td>
</tr>
<tr>
<td>Possur</td>
<td>July</td>
<td>August</td>
<td>98</td>
</tr>
<tr>
<td>Goran</td>
<td>August</td>
<td>September</td>
<td>14</td>
</tr>
</tbody>
</table>

Mangroves Farming Procedure

- Seeds Collection
- Growing seedlings in homestead nursery (48%)
- Floating seeds from rivers (30%)
- Directly from the Sundarbans (18%)
- Plantation in the farm
- Collecting the seedlings from the riverbanks -- Khulna Port Area (50%)
- Maintenance
- Harvest
- Processing and Distribution
Economic suitability of Community Mangrove Aquaculture

\[ y = 350x^2 - 1510x + 221520 \]
\[ R^2 = 0.6485 \]

\[ y = -765.71x^2 - 477.71x + 206684 \]
\[ R^2 = 0.9625 \]

\[ y = 278.57x^2 - 3741.4x + 114520 \]
\[ R^2 = 0.5876 \]
Ecological Value of CMAS Culture

- Utilization of salinity intruded lands
- Protection from river erosion
- Reduce pressure on the Sundarbans
- Biodiversity conservation
- Protection from land erosion
- Acting as wind barrier
- Provide breeding ground for aquatic species
- Carbon sequestration
Thank You