Managing Aquatic Resources to Benefit the Poor where Water is Limiting: Lessons from India and Sri Lanka

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**Background**

- DFID & CARE funded, collaborative project
  - India - Raichur District - Karnataka State
  - Sri Lanka - NW Province - Dry Zone
- Framework
  - Water scarcity - Increasing productivity
  - Poverty focussed
  - Systems approach
- Farmer/ community managed irrigation systems
- Methodology
  - PRA followed by farmer-managed trials 98-2002
Partnership & Collaboration

- India: NGO Samuha
  - Pre-existing framework for research
- Sri Lanka: CARE International & Peradeniya University
  - Logistical support

Benefits
- In built dissemination pathways

Constraints
- Lack of existing research/ aquaculture capacity
India - Watershed Approach

- Current model for dryland development
- Hydro-geological vs admin boundaries
- NGO emphasis - Peoples Institutions
  - Women’s and landless groups
- State emphasis - Physical Infrastructure
  - Soil and water conservation (SWC)
- Sustainability vs Scaling up problems
Sri Lanka - Household

- Household or village level
  - Traditional water harvesting structures
  - Conventional development has ignored intra & inter-community factors
    - Multiple use priorities & conflicts
    - Hydrological and other related upstream and downstream resource flows
Livelihood Characteristics
<table>
<thead>
<tr>
<th>Sri Lanka</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF: 1200mm</td>
<td>700mm (Semi-Arid)</td>
</tr>
<tr>
<td>70% Rainfed</td>
<td>80%</td>
</tr>
<tr>
<td>&lt; 40% lower castes</td>
<td>&gt; 68% STC</td>
</tr>
<tr>
<td>25-30% child malnutrition</td>
<td>&gt; 45-50%</td>
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<tr>
<td>Off-farm labour</td>
<td>Labour migration</td>
</tr>
</tbody>
</table>

Rainfed: 700mm (Semi-Arid)
Demand for Inland Fish
# Marketing

<table>
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<th>Sri Lanka</th>
<th>India</th>
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<tbody>
<tr>
<td>70-90% Tilapias</td>
<td>IMCs, River fish</td>
</tr>
<tr>
<td>Small fish 60-70% retail value of large fish</td>
<td>Poor rural match</td>
</tr>
<tr>
<td>Rural consumption</td>
<td>&gt; 1kg fish - urban markets</td>
</tr>
<tr>
<td>Supply matches demand</td>
<td>Oligopolies</td>
</tr>
<tr>
<td>Small-scale networks</td>
<td>Poor Margins - 25%</td>
</tr>
<tr>
<td>Producer margins - 50%</td>
<td>&lt;3kg</td>
</tr>
<tr>
<td>10-15kg consumption</td>
<td>Low impact</td>
</tr>
<tr>
<td>High impact on vulnerability</td>
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Low impact on vulnerability
Small-scale production - Sri Lanka

- Negligible commercial contribution
  - Erratic seasonal production
  - Consumer perceptions: Off-flavours / colour

- Household consumption
  - Collective harvesting: community activity
  - Staggered hook and line fishing
  - Visibility: persistent cultural taboo
  - Most important to poorer households
The Water Resource
Sri Lanka: Small-tank cascade systems

- Community managed
- ‘Micro’ watersheds (‘00s of Ha)
- Upper tanks smaller (<10ha)
- Seasonality & Spill
- Marginal groups
Small-scale water bodies - India

👩‍🎨 Types of water bodies and seasonality constraints

1. Ravine reclamation Structure - < 1mnth
2. Nala Bund: 0.5 - 2 months
3. Farm Ponds: 1-3 months, low potential
4. Percolation tanks: 1-6 months
5. Farm Irrigation Tanks: Perennial
6. Check Dam: 6 -12 months
7. Open wells: Perennial
Access

- Open wells: private - better-off
- Check Dams in India & Seasonal tanks in SL are common pool resources
  - Local rules and norms
  - Opportunities for landless (& women’s) groups
  - Appropriation by elites
  - Multiple use & conflicts
Tank Multiple Use Priorities

- Irrigation ***
- Bathing domestic ***
- Livestock **
  - watering & grazing
- Aquatic production *
  - Fish, plants, game
- Micro-industries *
  - Brick-making
  - Sand & gravel
  - Cajun retting

Less well perceived:

- Flood control
- Silt harvesting
- Ground water recharge
- Environmental
- Ritual / symbolic
- (Rarely consumption)
Multiple use conflicts

- Externalities - User doesn’t pay
  - Consumptive uses
  - Water quality modifying uses
- Irrigation, bathing and fishing
- Severity of problems depends on
  - Time of year
  - Climatic variation
  - Size of waterbody
CPRs - Who benefits?

- **Inter-community:**
  - Kinship/ Caste & Wealth
- **Intra-community**
  - Wealth, Gender, Age
  - Needs based / Customary Norms
- Conventional stocking initiatives are poorly targeted - frequent conflicts
Accessibility & Poaching

- Sri Lanka - Tank and village proximity
- In India most water bodies are located away from villages increasing the likelihood of poaching
## India - Farmer Managed Trials

<table>
<thead>
<tr>
<th>Fish Variety</th>
<th>Water Body</th>
<th>Outcome</th>
</tr>
</thead>
</table>
| Indian & Chinese Carps, Tilapia, Local Species | - Farm Ponds  
- Open Wells  
- Check Dams | - Seasonality  
- Predation/multi-use  
- Poaching/escape |
| Catfish (C. gariepenis)     | - Backyard ponds (Women’s Groups) | - Poor growth                                |
| Catfish (& local Species)   | - Open wells                      | - Rapid growth/short cycle                   |
Fish Seed - India

Hatchery seed available but poor access in arid areas
Catfish in Backyard Ponds
Catfish in Open Wells

Intensification?
India - Outcomes

Benefits - farmer opinion
- Ready access for consumption or income
- Increased water use efficiency

Major Constraints
- Lack of feed resources & poor growth
- Low familiarity with production & consumption
- Availability of juvenile fish for stocking
Sri Lanka - Farmer managed trials

- Highly seasonal tanks - <2-3 Ha
  - Dry periodically with complete loss of stocks
- Stocked tilapia fry/adults & snakehead fry sourced from lower perennial tanks
- Early stocking: contrary to farmer perceptions
  - Low risk of spill events & fish loss
- Negotiation and adaptation of access rules
Sri Lanka Outcomes

- Yields improved through staggered harvesting & early stocking
  - Targeted poorer households
  - Hook and line fishing reduces multiple use conflicts
  - 9 of 24 households harvested 0.5-1.5kg fish 2-3x/ wk, 2-3 months.

- Collective action & cohesion
  - Lowest Caste groups most cohesive
  - Higher Caste groups increased conflicts

- Adaptive learning process