Identified Opportunities for Inland Aquaculture Development in Dry Zone, Northwest Sri Lanka

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Supported by Department for International Development, UK (Aquaculture and Fish Genetics research Programme and Knowledge and Research Programme)

Poor Success of Inland Aquaculture

- repeated attempts to introduce through 'projects'
- typically based on hatchery-led promotion of culture
  - stocking of seasonal tanks with hatchery-produced carps
  - semi-intensive pond-based
  - full-cycle intensive cage culture or
  - nursing of IMC in perennial tanks or ponds

Inadequate understanding of….

- the nature of demand
- potential culturists needs and expectations
- resource base
- institutional constraints
- multiple-use nature of tanks

Another Look at Aquaculture Potential..

- the status of fisheries and potential linkages
- the livelihoods associated with fish production and distribution
- why is inland aquaculture undeveloped in Sri Lanka and
- what development approaches are relevant?

Status of Inland Water Resources

- perennial (larger) and seasonal (smaller) water bodies or ‘tanks’
- large perennial tanks store water within irrigation systems, engineer-managed
- small seasonal tanks, rain-fed supply, located as within ‘cascading’ watersheds
- primary function of tanks is irrigation of crops

Commercial and Subsistence

- most important fish are exotic tilapias, estimated at 70-90% total catch
- an estimated 90% of tilapias caught in 76 of the largest tanks by artisanal fishers
- seasonal tanks, erratic seasonal production, little sold
- high concentration of both types of tank in the Dry Zone

Livelihoods Dependent on Perennial Tanks

- support high input agriculture in command area
- artisanal, full-time fishers and farmer-fishers are important stakeholders
- short, marketing chain-bicycle vendors purchase fish and sell in rural areas
- Low cost, high availability BUT seasonal

Livelihoods Dependent on Seasonal Tanks

- inconsistent water availability
- less dependence on on-farm income
- greater seasonality of water, poverty and more marginal agriculture higher in watershed
- poorest people most dependent on fish from seasonal tanks

Why Is Inland Aquaculture Undeveloped?

- Conventionally explained by
  - lack of knowledge and know-how
  - lack of suitable fish species
  - lack of hatchery development-poor fish seed availability
  - lack of markets

But our research suggests

- low demand for cultured fish is more fundamental
- low price of freshwater fish makes conventional semi-intensive culture unattractive
- linked to high availability of tilapias from perennial tanks
- relatively high opportunity cost of land for pond-based culture

Past Aquaculture Initiatives Have Been Undermined by

- dependence on seed from hatcheries and unsustainable government extension
- high cost and high risk approach (e.g. full-cycle cage culture)
- focus on exotic carps with uncertain demand
- conflicts exacerbated by interventions that disregard multipurpose nature and complex access characteristics of water bodies

Opportunities in Perennial Tanks

- livelihood analysis identified seasonal variation in catches and incomes of fishers
- short-term fattening of smaller wild fish identified as potential intervention
- appropriate cage materials identified and design tested
- wild fish respond to local feeds - rice bran and fresh "trash" fish feeds

Piloting Cage - Based Fattening in Perennial Tanks

- benefits to producers and traders-larger tilapias more valuable
- cage – based fattening of tilapias has value as savings method
- producers can exploit marketing opportunities
- adoption and rejection being assessed

Opportunities in Seasonal Tanks

- multipurpose especially irrigation, bathing and livestock
- fish production has low importance but
- numerous, shallow and productive when stocked
- poor productivity based on lack of wild stock early in the season
- erratic re-establishment of stocks through migration up the cascade from more perennial tanks
- tank rehabilitation can reduce productivity and cause conflicts

Piloting Interventions in Seasonal Tanks

- physical/social mapping to identify appropriate watersheds and communities
- upper watershed, poor and dependent communities, highly seasonal tanks
- early season transfer of local tilapias (adults/tilapias) and predator seed
- continuous harvest using non-intrusive methods
- participatory monitoring of asset balance
- low interest by relatively better-off

Conclusions

- hatchery dependent, semi-intensive aquaculture is currently inappropriate
- relatively intensive cage fattening in perennial tanks holds promise for some groups of fishers
- extensive stock manipulation of locally available tilapia and indigenous fish in some seasonal tanks managed by poor groups has potential

Summary

Level of intensity	Extensive	Semi-intensive	Intensive
Yield range	<1MT ha^{-1} y^{-1}	1-15 MT ha^{-1} y^{-1}	>15 MT ha^{-1} y^{-1}
System	Small seasonal tanks	On-farm ponds	Cages in large perennial tanks
Reliance of external inputs	Low	Medium/High	Low
Access/rights	Common property	Household	Open access
Potential for contributing to rural livelihoods	High	Low	High