Poster 4-2

Understanding Demand- How the Poor Benefit from Tilapia Production in the Northwest Dry Zone of Sri Lanka

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Summary

A poor understanding of the demand for aquatic products has frequently undermined attempts to promote fish production that benefits the most marginal members of the community. In Sri Lanka, an island nation with particular dependence on fish for meeting nutritional needs, this lack of information has probably contributed to the repeated failed attempts to introduce sustainable aquaculture.

Rich coastal fisheries disguise a worsening deficit of fish, indicated by increasing imports of processed fish. Inland fisheries resources are considerable, of which ancient man-made reservoirs (tanks) constructed primarily for irrigation of ricefields in the dry zone are pre-eminent. Since their introduction in the 1950s exotic tilapias have come to dominate production in these shallow water bodies despite numerous attempts to introduce carp-based culture-based fisheries. Our research focus is the dry zone where gill net-based fisheries account for 90% of commercial production. A yearlong study in Northern Kurunegala and Puttalam Districts, located in the Northwest and Central provinces in the dry zone was complemented by an analysis of the situation nationally[1]. A livelihood analysis researching the potential options for involvement of the poor in aquaculture was carried out in Mahawelli H system[2].

Compared to comparable rice-growing countries in SE Asia, poor households appear to be far more reliant on purchasing fish than harvesting aquatic animals from ricefields and water bodies themselves. A network of wholesalers and retailers link professional fishers around perennial tanks with consumers in even remote rural locations. Harvest of fish from large, perennial tanks fluctuates far less than from coastal fisheries and prices remain fairly stable year-round. Yields from the far more numerous smaller tanks are less predictable and constrained by their multi-purpose use and water availability. Most fish is produced seasonally and consumed locally. An assessment of the national situation found that

- Coastal and better-off urban communities (including those on main roads) preferred marine fish
- Poor communities in the dry zone were most dependent on freshwater fish, mainly the exotic tilapia.

We gained an understanding of fish marketing networks of importance to the poor in the Dry Zone through interviews with

- Fishers around perennial and seasonal tanks over 12 months
- Wholesalers and retailers at different levels of network in and around major irrigation systems in Northern Kurunegala and Puttalam Districts
- Retailers in urban areas of Kandy and Columbo to establish overview of fresh inland fish and substitutes (processed fish, marine fish, livestock, vegetables)

Consumption patterns and preference were established with consumers in villages of rain-fed Giribawa and Galgamuwa using ranking /scoring exercises.

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The basics of implementation

General demand for fish compared to alternative foodstuffs is high and related to cultural norms and price. In terms of marine fish consumed by the poor, sardines and other low cost species such as herring and anchovies are the main substitutes for tilapias and similarly priced. Livestock products are relatively expensive; retail prices for chicken, beef and mutton exceed large tilapia by a factor of at least two, and small tilapia at least three. Consumption levels by the rural poor are low.

The conventional marketing networks for marine fish and higher value inland fish overlap marginally with that of tilapia sold by poor traders in rural areas. Fish are generally sold whole and fresher fish are most marketable. Common carp, which are the only exotic carp established in the fishery are sold at prices similar to large tilapias, but often after processing into portions. The green chromide (*Etroplus suratensis*) an indigenous brackish water cichlid widely introduced into tank fisheries sells for similar prices as tilapia but is produced in low but stable quantities. Highest value freshwater species include the snakehead (*Channa* striata) and several eel species.

Perennial tanks

- Free-breeding tilapias constitute between 75-90% of the harvest of fish gill-netted using canoes throughout the year. In recent years there has been increasing numbers of entrants, that live around the large reservoirs.
- This unregulated fishery is resulting in a declining mean individual size of fish and a loss of indigenous species from the catch.
- Production peaks during the two dry seasons when water levels are low (March-April and July—September) and during spill events (November-January)
- Fish are marketed mainly through a short chain of wholesalers and mobile retailers that service rural areas. Vendors using bicycles predominate over shorter distances and sell smaller quantities (typically 10-20kg day^{-1}) than those using motorbikes (typically 30-50kg day^{-1}), who also have a greater range.
- In the dry season when fish are most abundant, larger wholesalers truck tilapias to urban centres and the coast

Seasonal tanks

- The productivity of small tanks (<10 ha) depends on linkages with the watershed as a whole and fish availability varies within and between seasons.
- Natural repopulation of seasonal tanks through movement of fish from perennial refuges lower down the watershed, principally tilapia and snakehead
- Harvest occurs mainly in the dry season for subsistence purposes, any trading being limited to a few casual participants.

Key benefits

Current system

- Year-round livelihoods of marginalised, often ethnic minorities, concentrated around perennial tank fisheries. These groups have few alternative livelihood opportunities.
- Tilapia-based fisheries require no government or private sector investment in seed production for regular restocking[3] in contrast to culture-based fisheries based on exotic carps.
- Very stable prices of tilapia historically (over the last 15 years) and throughout the year[4].

- Low perishability of tilapias, compared to the carps, allows marketing chains to remain unsophisticated and accessible by the poor working on a short-term basis. This makes trading a robust livelihood option with low entry costs that doesn't require sophisticated support.
- Equitable returns to different levels of the marketing network largely because of market space-i.e. the nature of the supply, multipoint landing and marketing of fish at tanks and their marketing mainly to dispersed rural population
- Seasonal employment as fishers and traders for landless, share croppers, agricultural labourers
- Smaller, lower valued species marketed to poorer, most remote communities. Reduces costs and opens opportunities to poorer traders limited to the use of bicycles.
- Opportunities for low caste, poor women in the production and marketing of small dried fish. The large market for dried fish, although not an option for 'adding value', does make salvage an option which is important for reducing risk to producers and traders

Researchable issues

- Increasing availability of tilapias in seasonal remote tanks where subsistence options are most important. Developing improved seed and nutrient management within watersheds containing tanks linked through irregular spill events will require community participation. Strategies are required to reduce common off-flavours while maintaining the multipurpose nature of seasonal tanks. Improving the benefits from seasonal tanks has to consider the watershed as a whole and should aim to build social as well as physical and human capital. Measures should also aim to optimize yields when perennial tank fish are least available and most expensive.
- Reducing vulnerability of poor fishers dependent on unsustainable perennial tank fisheries. The higher value of medium-sized tilapia (Rp30-40 kg^{-1}) compared to smallest (Rp20-30 kg^{-1}) suggests cage-based fattening is a possibility to improve income flows.

Evidence of impact on the poor

- The poorest, most marginal members of communities appear to gain direct benefits from fish produced in seasonal tanks
- Communities in the upper watershed, where water availability is most seasonal, have least livelihood options. Exploitation of fish production probably reduces negative impacts on the watershed.
- Poor people substitute tilapias for vegetables in the dry season when fish from perennial tanks are most available and cheapest, and vegetables are most expensive.
- Marketing networks are dominated by men but small dried tilapia produced in remote perennial tanks are processed and traded by women marginalised by poverty, caste, ethnicity or marital status.

Notes

[1]This work is a component of the Fish in irrigation Systems Technology project supported by the Aquaculture Research Programme, DFID and CARE , Sri Lanka.

[2] A livelihoods and situation analysis to assess the potential for poverty focused aquaculture interventions in selected villages in the Mahawelli H system , Sri Lanka (Universities of Stirling and Newcastle, UK and University of Peradeniya, Sri Lanka. Funded by the KAR programme, DFID.

[3]Policy required on issues such as introduction of new species and strains of tilapias

[4]Apart from remaining affordable to poor consumers it has allowed poor people to invest in their production and marketing without undue risk. Price fluctuations that do occur are modest (<20%) and result in the greatest quantities of the smallest, cheapest tilapia being available when poor households have most problem meeting their food security needs

[5]This poster is drawn largely from Fisheries Marketing Systems in Sri Lanka and Relevance to Development of the Local Reservoir Fishery and Culture Based Fisheries.F.J.Murray, S.Koddithuwakku and D.CLittle Paper presented at the Workshop on Reservoir Fisheries Biology and Management Bangkok Thailand 15-18 Feb 2000.