



Peter Edwards writes on

Rural Aquaculture

Aquaculture for Poverty Alleviation and Food Security - Part II

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This issue's column is based on the remaining seven presentations from the session on "Aquaculture for Poverty Alleviation and Food Security" at World Aquaculture 2002 held in Beijing in April. My previous column (Volume 7, No. 2, pp. 53-6) outlined five presentations.

Aquaculture is often considered to be the only way for small-scale farming households to increase their supply of aquatic organisms. This may lead to policy decisions detrimental to the overall output of the farming system, particularly if attention is devoted mainly to intensification of rice. As Matthias Halwart of FAO, Rome, pointed out, "rice fields provide much more than rice". In the presentation entitled "Availability and Use of Aquatic Organisms in Rice-based Farming Systems in the Southeast of the P.R. China" by M. Halwart, A. Luo, D. Bartley and J. Margraf, Matthias described the findings of a three month field study among 14 ethnic groups, predominantly the Dai minority, in Xishuangbanna, Yunnan province to gain insight into their indigenous knowledge of aquatic organisms in the ricefield agro-ecosystem. 65 species of fish, and five amphibian, five mollusc, three insect and two crustacean species were obtained by villagers using 25 collection methods and tools. There is a need to raise awareness of aquatic organisms among R & D practitioners and policy makers. Strategies and action plans for the protection and management of aquatic biodiversity in natural agro-ecosystems of the Lancang – Upper Mekong River Basin were drawn up in a provincial level workshop.

The next three presentations by David Little and his doctoral students from the University of Stirling were on inland rural aquaculture in South Asia. In "Identified Opportunities for Inland Aquaculture Development in Dry Zone, Northwest Sri Lanka" by D.C. Little, L.J. Pollock and F.J. Murray, David pointed out that rural aquaculture barely exists in the country because aquaculture has been promoted without adequate understanding of demand for the products, access or rights to utilize water resources, or the needs and assets of potential beneficiaries. A surprising conclusion of the study is that semi-intensive aquaculture in on-



Tilapia harvested from a seasonal tank in Sri Lanka. Courtesy Murray, Pollock and Little

farm ponds depending on hatchery-produced seed that has proved successful elsewhere in Asia, is currently inappropriate for Sri Lanka.

Analysis of resources and needs has led to the view that aquaculture can be promoted without conventional hatchery development through transfer of adult and wild-spawned tilapia seed at local level. Opportunities for the development of aquaculture lie mainly at either end of the aquaculture intensity spectrum within communal water bodies and thus need to consider the multidisciplinary nature of, and access to, such water resources. The two technologies currently being investigated are extensive stock manipulation by poor groups of locally available tilapia and indigenous fish in community-managed seasonal reservoirs or tanks, and cage-based fattening of tilapias by poor fishers around perennial reservoirs. Their sustainability and wider dissemination are considered to be feasible because of low reliance by the

community on external inputs such as seed and feed.

Lindsay Pollock presented case studies comparing an agricultural with a fishing community in which cage-based fattening of tilapia was introduced to households in both, in “Participation of the Rural Poor in Aquaculture: Case studies in Northwest Sri Lanka” by L.J. Pollock and D.C. Little. Various resources were required such as access to live fish for stocking, access to feed ingredients, time for feed preparation (from wild fish and rice bran) and feeding, and access to markets. Household-level activities involved cage construction, feed preparation, feeding, observation, and harvesting and selling fish. Participation in trials was affected by access to resources, gender, risk and other income generating activities. Reasons for continued involvement in, or abandonment of cage culture were numerous but further improvement of the system may increase the rate of adoption.



Cage-based fattening of tilapia in a perennial tank in Sri Lanka. Courtesy Pollock and Little

Francis Murray outlined approaches for developing aquaculture in seasonal water bodies (SWBs) in “Managing Aquatic Resources to Benefit the Poor Where Water is Limiting: Lessons from India and Sri Lanka” by F.J. Murray and D.C. Little. SWBs are a substantial yet underutilized resource for rural aquaculture in water-stressed areas as development initiatives have focused



Women participating in cage culture in a perennial tank in Sri Lanka. Courtesy Pollock and Little

largely on irrigation. SWBs are often highly productive because of nutrient release from sediments exposed to the air as they dry out, in spite of limited periods of water for fish culture. These multipurpose SWBs are located in upper watershed areas where they benefit the poor in marginal rain-fed agro-ecosystems. The “invisibility” of these small-scale community / household managed systems contrasts with larger perennial reservoirs that are managed by government agencies.

Conventional hatchery-based seed production is usually promoted for stocking SWBs but the former are

mainly located in distant areas with perennial water, a major constraint to timely and cost-effective use of the seed in the latter.

Farmer-managed trials were carried out in India in farm ponds, backyard ponds with women’s groups, check dams and open wells; and in Sri Lanka in small-scale tank cascade systems, which are community managed. Availability of seed for stocking was a major constraint in India but tilapia fry and adults, and snakehead fry, were obtained from lower perennial tanks in the cascade system for stocking in Sri Lanka. Poor growth resulted in India, in



A seasonal tank in Sri Lanka. Courtesy Murray and Little

part because of lack of feed resources, but 9 out of 24 households harvested 0.5-1.5 kg fish two to three times a week over 2-3 months in seasonal tanks in Sri Lanka.

Cecile Brugere presented “Aquaculture for Poverty Alleviation: Can it also Improve the Position of Women ?” in which she questioned, from a theoretical point of view, whether aquaculture can be used for the empowerment of women. While gender is implicit in livelihoods approaches and aquaculture may lead to poverty alleviation, aquaculture interventions may not necessarily challenge women’s subordinate position in society. Two kinds of problems arise: women’s role in decision-making within the household regarding the uptake of aquaculture as a suitable food and income generating activity; and women’s access to, and control over, aquaculture resources and benefits. Based on case studies of the introduction of small-scale cage aquaculture into Bangladesh and Sri Lanka, Cecile presented a “capability improvement framework for women in aquaculture” as well as courses of action and policy recommendations derived from the case studies so that gender, as well as social impacts of the introduction of aquaculture may be taken into account. Improved livelihoods should not be the only goal and women’s empowerment should go hand-in-hand. She concluded by stating that rather than “women for aquaculture”, it should be “aquaculture for women”.

There was only a single presentation on coastal aquaculture, “Role of Mariculture in Securing Food Supply and Reducing Poverty in the Philippines” by W.G. Yap. Wilfredo pointed out that aquaculture in the Philippines is dominated by marine and brackishwater aquaculture, unlike most other countries in Asia. Freshwater aquaculture has a relatively recent history in the Philippines and has not really taken off. With an estimated 75% of Philippine mangroves developed into brackishwater fish and shrimp ponds (which are largely in the hands of the rich), a ban on further development in mangroves, and a dwindling catch from coastal fisheries, mariculture offers the only opportunity for most of the coastal



A check dam in India. Courtesy Murray and Little

poor, the great majority of whom are landless.

With a total coastline of 17,480 km, there are many opportunities for the coastal poor to engage in mariculture. Mussels, oysters and seaweeds require low capitalization and are farmed by the poor. Ironically according to Wilfred, it is the culture of high-value fish such as grouper for the lucrative export and restaurant markets that has potential for the poor, providing that constraints of access to capital and markets can be overcome. The rich produce the traditional Philippine food fish, the milkfish. Wilfredo presented convincing economic data to show the comparative advantage for the poor to invest in grouper rather than milkfish.

The final paper in the session, “Tilapias from Different Aquaculture Systems Contain Variable Amounts of w-3 and w-6 Polyunsaturated Fatty Acids: Implications for Human

Nutrition” by I.T. Karapanagiotidis, M.V. Bell, D.C. Little and A. Yakupitiyage, followed on nicely from Michael Crawford’s plenary lecture. Professor Crawford made the case that the evolution of the human brain depended on polyunsaturated fatty acids (PUFAs) in the diet derived from aquatic food. Ioannis also outlined the beneficial effects of fish in the human diet. The study he reported analyzed the fat content and fatty acid composition of Nile tilapia from various culture systems. Higher levels of w-6 and lower ratios of w-3/w-6 were found in fish fed pelleted feed compared to wild fish and fish cultured mainly on natural food in fertilized ponds. Ioannis concluded that awareness should be raised among change agents and policy markets that the intensive culture of fish can have an adverse effect on fish quality, which may have an adverse impact on human health.



Women managing a cage in Bangladesh. Courtesy Brugere