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RESEARCH REPORTS

SUSTAINABLE AQUACULTURE FOR A SECURE FUTURE

Title: Evaluation of tilapia culture by resource limited farmers in Panama and Guatemala

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Abstract: Mixed-sex and male Nile tilapia, *Oreochromis niloticus*, were cultured in family and communally managed fish ponds in Guatemala and Panama in the 1980s. Fish were used to improve family nutrition and meager incomes of the pond managers. Tilapia culture systems were designed to permit farmers with no fish culture experience to produce their own tilapia fingerlings on-farm and grow the fingerlings using available household by-products and animal manures to sizes required for home consumption and sale. The author returned to Guatemala and Panama in 1998 to evaluate the ability of pond managers to learn and sustain tilapia culture as a farm activity.

Mixed-sex culture of Nile tilapia was the culture system introduced to Guatemalan pond managers in the 1980s and continues as the only culture system employed by those farmers still growing fish. Forty-three percent of the pond projects were abandoned between 1989 and 1998. Seventy-two percent of Guatemalan farmers produced small tilapia for pond stocking on-farm or obtained them from neighbors. Use of the predacious guapote tigre, *Cichlasoma managuense*, to control tilapia offspring in grow-out ponds increased from 14 % in 1989 to 36 % in 1998.

Pond managers in Panama were shown how to grow either mixed-sex Nile tilapia with the guapote tigre or monosex male Nile tilapia to reduce tilapia offspring during grow-out and permit harvest of a 200 to 400 g fish. Twenty-nine percent of the pond projects polycultured mixed-sex tilapia with a predator and 71 % grew male tilapia in 1984. Forty-eight percent of the pond projects were abandoned between 1984 and 1998. Of the projects still culturing tilapia in 1998, 36 % cultured mixed-sex tilapia with a predator and 64 % cultured male tilapia. Sixty-four percent of the projects still growing fish in 1998 stocked guapote tigre, indicating that some of the projects stocking male tilapia were also stocking guapote to

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control tilapia offspring. Most pond managers did not produce tilapia fingerlings on-farm as 82 % of the fish pond projects received their tilapia fingerlings from the government hatchery.

Economic and nutritional impacts from fish culture as documented for Panama in 1984 and Guatemala in 1989 were not sustained. The failure of fish culture in Guatemala and Panama does not rest solely with tilapia but with a complex of economic, social, technical and political issues that combined to limit the intended impact of fish culture on impoverished pond managers and their families.

This abstract was excerpted from the original paper, which was published in K. Fitzsimmons and J. Carvalho Filho (Editors), *Tilapia Aquaculture in the 21st Century, Fifth International Symposium on Tilapia Aquaculture*. American Tilapia Association and Departamento de Pesca e Aqüicultura/Ministério da Agricultura e do Abastecimento, Rio de Janeiro, Brazil, pp. 633–638.

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