

# Tilapia Production Booms in the Philippines

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There has been a boom in tilapia production in the Philippines since 1980. Less than a decade ago, tilapia (primarily the dark "Java" tilapia, *Oreochromis mossambicus*) was an unpopular fish: undesirable to consumers who preferred marine and brackishwater species and despised by fishpond operators who considered the fish a pest. All that has changed with the realization that Nile tilapia (*O. niloticus*) is a far superior species for culture. Tilapia is now the second most popular cultured fish in the Philippines after milkfish (*Chanos chanos*). Tilapia production in 1982 from ponds and cages around the country probably exceeded 50,000 tonnes.

## Increased Consumer Demand

Recent government incentives have provided considerable stimulus for tilapia production, particularly by small-scale cage operators, many of whom were formerly full-time fishermen in freshwater lakes around the country. The current profitability of tilapia hatcheries, growout systems and marketing is fueled by expanding consumer demand. Demand is highest on the northern island of Luzon but it is slowly spreading south.

The increased attractiveness of tilapia to consumers is due to a number of factors: they can be sold very fresh, even alive; they are well suited to Filipino cooking styles (frying and broiling) and

marine fish prices have increased as the catch has levelled off and operating costs increased. Moreover, declining real wages have apparently led consumers to substitute tilapia for other more costly species. With increased consumer acceptance, however, tilapia prices in many urban markets now rival those of milkfish, traditionally considered a first-class fish.

## Workshop

No reliable statistics exist on tilapia production. To obtain data on this developing industry, the Philippine Council for Agriculture and Resources Research and Development (PCARRD) and ICLARM cosponsored a workshop in August 1983 on Philippine Tilapia Economics for researchers who during 1982-1983 had conducted economic analyses on various aspects of the tilapia industry. Seventeen papers were presented; the 45 workshop participants spent three days discussing the papers and holding working group discussions on inputs (hatcheries), land-based and lake-based production systems, and marketing. A summary report on the workshop has recently been published by PCARRD and ICLARM. This report, which can be obtained free from ICLARM or PCARRD, contains abstracts of presented papers and the full working group reports. The full proceedings will also be published. While the various pre-

sented papers generally documented the current profitability of tilapia operations, they also raised several potentially serious constraints to the sustained development of the industry. The following descriptions are based on the workshop findings.

## Hatcheries

The bulk of tilapia fingerlings produced for the industry come from privately operated hatcheries, most of which are small-scale operations in the provinces of Laguna and Rizal, adjacent to Manila where there are currently over 500 such hatcheries. Several government hatcheries, including one large 9.3-ha operation of the Bureau of Fisheries and Aquatic Resources (BFAR) in Muñoz, Nueva Ecija, also provide fingerlings, occasionally at subsidized prices, for new farmers and for stocking in lakes and rivers. Dispersal from this large hatchery during the first year of operation was over 3 million fingerlings, average weight 4.6 g, average price (June 1982-May 1983), 0.09 Philippine pesos (₱) (then approximately US\$0.01). At the time the hatchery was working at about one-third of its total fingerling production potential. Private hatcheries, with 1982 outputs ranging from 80,000 (backyard) to 3.8 million (large commercial hatcheries bigger than one hectare) fingerlings,

sold fry and 30- to 45-day-old fingerlings at ₱0.07-0.14 each.

The small-scale/backyard hatcheries are ideally suited for part-time household operation by rural rice farmers who have often developed their hatcheries in a corner of their ricefields. At November 1983 prices (₱0.08-₱0.16 per piece, when ₱14 = US\$1.0) backyard hatcheries were found to be quite profitable. However, if fingerling prices fall, now possible with the continued proliferation of hatcheries around the country, these hatcheries will be affected before the larger hatcheries, which tend to follow better management practices.

One major problem for the hatchery sector is a general lack of awareness and control over the *quality* of broodstock and fingerlings. A cooperative research project between the Marine Sciences Center of the University of the Philippines and ICLARM has demon-

strated that hatchery and experimental stocks of Nile tilapia are not pure species, but are contaminated with undesirable *O. mossambicus*, presumably from natural waters or previous culture operations. It is probable that some deterioration of performance has already occurred. This could cause serious problems in the future for small-scale operators. Large-scale operators will find it easier to maintain quality control, since they can afford to import proven commercial strains of fish, for example from Israel and Taiwan, and can keep their broodstock in facilities which exclude all possibility of contact with wild fish. This can also confer a selling advantage.

#### Cage Culture in Lakes

Cage culture of tilapia in Philippine freshwater lakes began over a decade ago in the small volcanic lakes near San Pablo City south of Manila. Today, most lakes,

including the 90,000-ha Laguna de Bay, have some form of tilapia cage culture. The attraction of cage culture is that it needs no purchase or rental of agricultural land, which is scarce and expensive in many parts of the Philippines. Cage culture appears to be profitable in some locations but disappointing in others. The problems are not technical, since cage culture is relatively simple. Rather, environmental constraints, such as poor water quality and overcrowding, are the major problems. Some of the smaller lakes have passed through several cycles of profits, overcrowding, withdrawal by marginal producers, profits and overcrowding again.

Institutions that would limit access to these lakes could preserve cage culture profits and generate license income for local authorities. However, they have generally been slow to develop. Interestingly, a system of transferable



Harvesting from a large Philippine tilapia farm. Photo by Roger Pullin.

use rights for shoreline areas, through sale on the open market, has evolved in one small lake, but this system represents little more than expropriation of public property by private individuals.

### Land-Based Growout Systems

There is a wide variety of land-based tilapia culture systems ranging from rice-fish integration in lowland paddies, through conventional freshwater or brackishwater earthen fish ponds,

Land-based systems have been slower to catch on than was earlier expected. Use of fast-growing rice varieties has so shortened the growing season that stocked tilapia do not reach favored market size (60-125 g) in the 3-4 months available. The restaurant trade in and around Metro Manila is beginning to call for much larger fish of several hundred grams. Rice farmers who wish to raise fish apparently prefer to set aside separate fishpond areas rather than to stock individual rice paddies.



Cage culture of tilapia in Sampaloc Lake, near Laguna de Bay. Photo by Roger Pullin.

to the so-called "sky ponds" which are fed by mountain streams high among the Philippine rice terraces (see ICLARM Newsletter, July 1983, p. 8). Each variation has its own set of advantages and problems, each quite location-specific; all systems except rice/fish culture are currently profitable. If, as appears likely, Nile tilapia or other high performance species or hybrids can be successfully adapted to brackishwater ponds, milkfish will not only be faced with increased competition in the market place but also in their traditional growing areas which to date they have had to share only with shrimp. This would revolutionize Philippine aquaculture and have a major impact on total fish supply and prices probably to the ultimate benefit of Philippine consumers.

Capital constraints are especially critical for intensive animal-fish integrated operations, although several groups including BFAR and the International Institute for Rural Reconstruction have had sufficient success with backyard integrated farms (some with pond area as little as 500-600 m<sup>2</sup>) to indicate that these systems can be successfully scaled-down for profitable adoption by many small farmers. Adequate water supply remains a serious problem in some locations as evidenced by the serious drought conditions experienced in parts of the Philippines in 1983.

### Marketing

To quote one of the tilapia workshop groups, "the present market for tilapia looks rosy with only a few prob-

lems confronting the traders." The performance of the market to date indicates that it is readily able to absorb current production at prices that reward both producers and marketing intermediaries alike. In fact, the major 'problem' cited by traders is that they cannot obtain sufficient tilapia to meet the requirements of their buyers.

Locale-specific bottlenecks have developed, however, in areas outside Metro Manila. Even cage operators in outlying regions such as Bicol, 500 km from the metropolitan area, are finding it more lucrative to transport their fish to Manila, than to sell exclusively in more limited local markets. It is certainly true that much of the increased demand for tilapia comes from urban consumers. Several large city restaurants (Filipino, Chinese and Japanese) keep aquaria containing large Nile and red tilapias and the fish command a price comparable to that of grouper.

### Conclusion

The widespread enthusiasm for tilapia culture and the consequent boom in production are due to increased acceptability of tilapia by consumers and the success of culture techniques adapted by small-scale rural and larger commercial producers. Of course, pressures will always exist for concentration of the industry into the hands of fewer producers, but with the correct mix of credit incentives, research, extension and information dissemination, the potential for continued involvement of small-scale producers appears to be great.

The future success of the industry in the Philippines and the degree of participation by small-scale producers depend to a great extent upon the initiation of measures to improve both the efficiency of culture methods and the performance of cultured stocks. For the latter, recent demonstrations of contamination of commercial and experimental stocks of Nile tilapia with *O. mossambicus* give serious cause for concern.

A National Tilapia Broodstock Center has been proposed where long-term research on genetics, broodstock improvement and performance evaluation could be undertaken in cooperation with farmers.