

## Fishpen and Cage Farming in the Philippines

The Philippines has around 70 freshwater lakes and impoundments with a total area of 200,000 hectares. Potential production of fish from these waters is estimated to be 50 thousand metric tons per year or only about 5 percent of the total annual fish production of the country.

In 1971, the culture of milkfish (*Chanos chanos*) in fishpens was started in Lake Laguna, the largest lake in the Philippines with an area of 900 km<sup>2</sup>. The hectareage of fishpens in the lake estimated to be 3,500 - 4,000 in 1978 produced some 16,000 metric tons of fish or 20 percent of the total milkfish production in the country. The fishpen industry in Lake Laguna has an investment of about P100 million.

Cage farming in lakes is of more recent development than the fishpens in the Philippines. Culture of *Tilapia mossambica* in floating cages began in 1976. Commercial production of tilapia was reported to be as high as 10-15 metric tons per cage every six months. Cage culture of *T. nilotica* and *Penaeus monodon* in Lake Laguna has shown much promise.

### The Milkfish Fishpen Industry

Culture of milkfish in pens has the following distinct advantages: (1) An annual potential yield of about 4,000 kg/ha or over ten times that of the open water catch; (2) abundance of natural food in the lake which makes supplemental feeding minimal; (3) areas between pens serve as refuge and breeding grounds of fish; and (4) as a source of livelihood of the lakeshore populace.

Fishpen owners in Lake Laguna are said to derive some P24,863 in annual income while the caretakers earn P8,085/year. In 1974, a study on the costs and returns of milkfish production in fishpens showed that the highest average net income of P1,941/ha was obtained from fishpens of 1-5 ha. Fishpens of less than 1 ha and those of 6-10 ha had net losses.

### Culture Practices

#### A. Site selection

The following factors are considered in the selection of fishpen sites:

1. Availability of fingerlings at reasonable prices.
2. Depth— Not less than 1 meter at lowest water level.
3. Wind and current direction - The ideal site is on the leeward side of the prevailing winds with moderate flow of water.
4. Water condition – Turbid and polluted water should be avoided.
5. Cheap labor in the locality.
6. Lake substratum— Muddy-clayey-loam soils are suitable substrates. Lake bottoms with too much silt and decaying organic matter should be avoided.
7. Security— The fishpens should be guarded against poachers.

#### B. Fishpen design and construction

The fishpens of Lake Laguna are of various shapes - circular, square and rectangular. Construction of the fishpens is done with netting materials (e.g., kuralon and nylon), bamboo poles and nylon rope. The poles are staked in the mud at depths of 15-30 cm or more depending on the substratum.

#### C. Transport and rearing of fingerlings

Milkfish fingerlings stocked in fishpens are usually purchased from nearby provinces. Fingerlings are transported from source of fishpens either by means of a live fish boat or in oxygenated, water-filled plastic bags. The fingerlings are acclimated in nursery pens for 5-6 hours or for as long as 2-3 weeks after transport to prevent stress and reduce predation. Mortality in the nursery pens vary from 1-3 percent during fine weather to 20-30 percent in inclement weather.

#### D. Stocking and management of fishpens

From the nursery pen, the fingerlings are stocked at 30,000/ha in the rearing pen where they are grown to marketable size (200 g or more). Mortality rates of 20-40 percent are usually obtained after transferring the fingerlings from the nursery to the rearing pen.

Supplemental feeding is not practiced in the majority of the fishpens. Some operators, however, resort to giving bread crumbs, rice bran, broken ice cream cones, fish meal, egg yolk in small quantities, ipil-ipil (*leucaena leucocephala*) leaves, or kangkong (*Ipomoea reptans*) leaves.

Loss of fish in the grow-out pens may result from predation by the tenpounder (*Elops hawaiiensis*) and tarpon (*Magalops cyprinoides*) or by minor destruction of the pen caused by floating objects. Only about 40-50 percent of the stock is recovered upon harvest.

#### **E. Cropping pattern and harvesting**

Fishpen operators differ in number of croppings per year. Some fishpen operators stock their pens once a year, usually in May or June, of the following year. Others stock twice a year. The first stocking is done in March and April and harvesting is made in July or August; the second stocking is in July or August (immediately after the first harvest) and harvesting is done after eight months in February or March. The number of croppings depends on capital and availability of fry-fingerlings. Partial harvests during the rearing period may be done to catch up with the high price of fish.

Harvesting of marketable-size fish is done by the use of seines, gill nets or cast nets. Seines are used for total harvest of fish while gill nets and cast nets are used in selective or partial harvest.

#### **Prospects and Problems**

Studies have indicated that the primary productivity of Lake Laguna could support up to 20,000 ha of fishpens. An ADB-OPEC supported project under the administration of the Laguna Lake Development Authority will be implemented this year to provide an initial 2,550 ha of fishpens and cages for the small fishermen of the lake.

Four major problems seriously affect the milkfish industry of the Philippines. These are: (1) destructive typhoons, (2) water pollution, (3) fry shortage, and (4) high mortality rates of fry in transport and storage.

#### **Cage Farming of *Penaeus monodon***

Experiments on the cage culture of the jumbo tiger shrimp *P. monodon*, in Lake Laguna have had very encouraging results. Shrimp postlarvae were acclimated to freshwater and reared to marketable size (40 g) in net cages after 5 months. Pilot-testing of the technology is being considered.

# Flloating Fish Cage

WOOD 2.5x5 CM.

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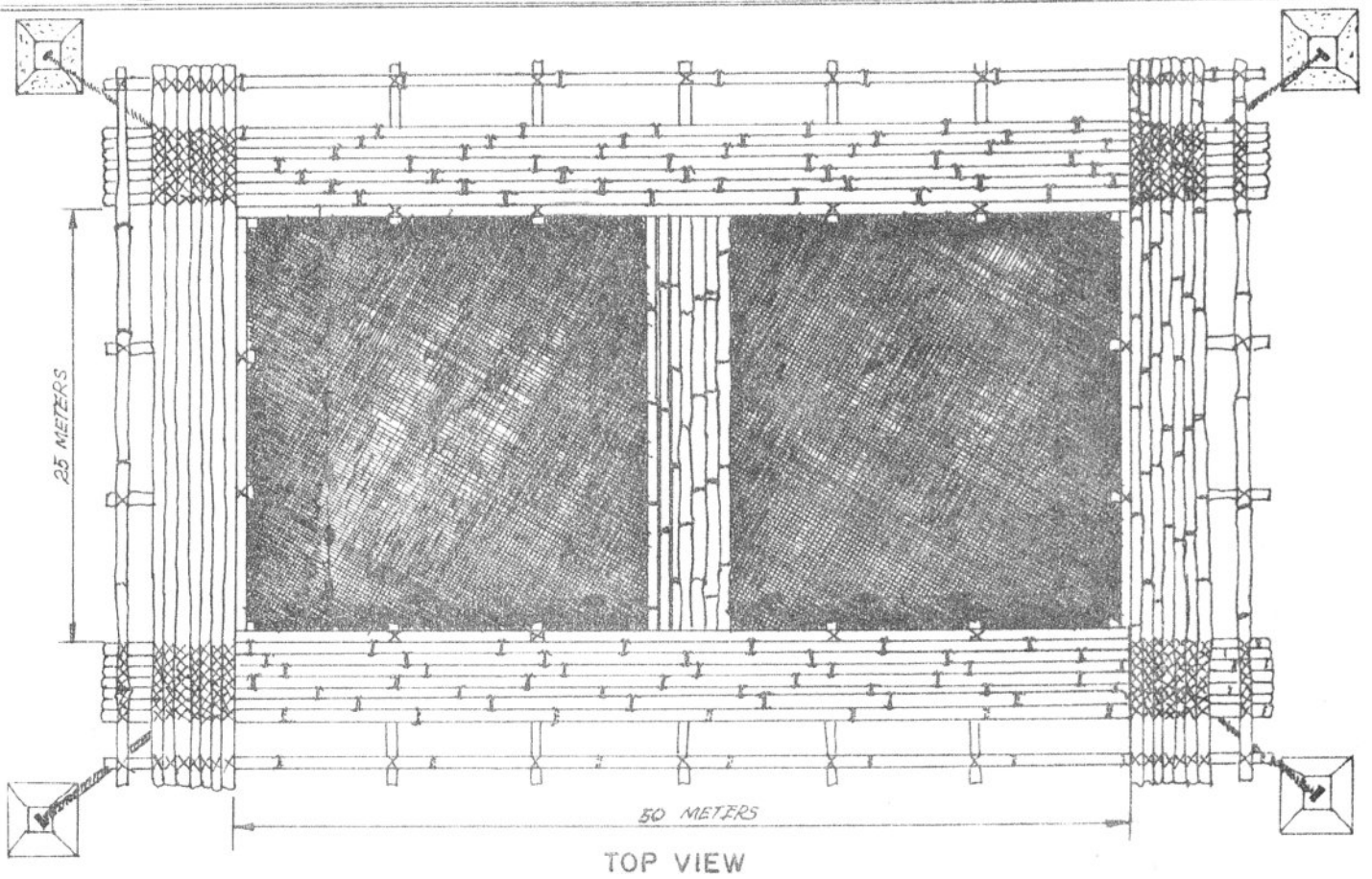
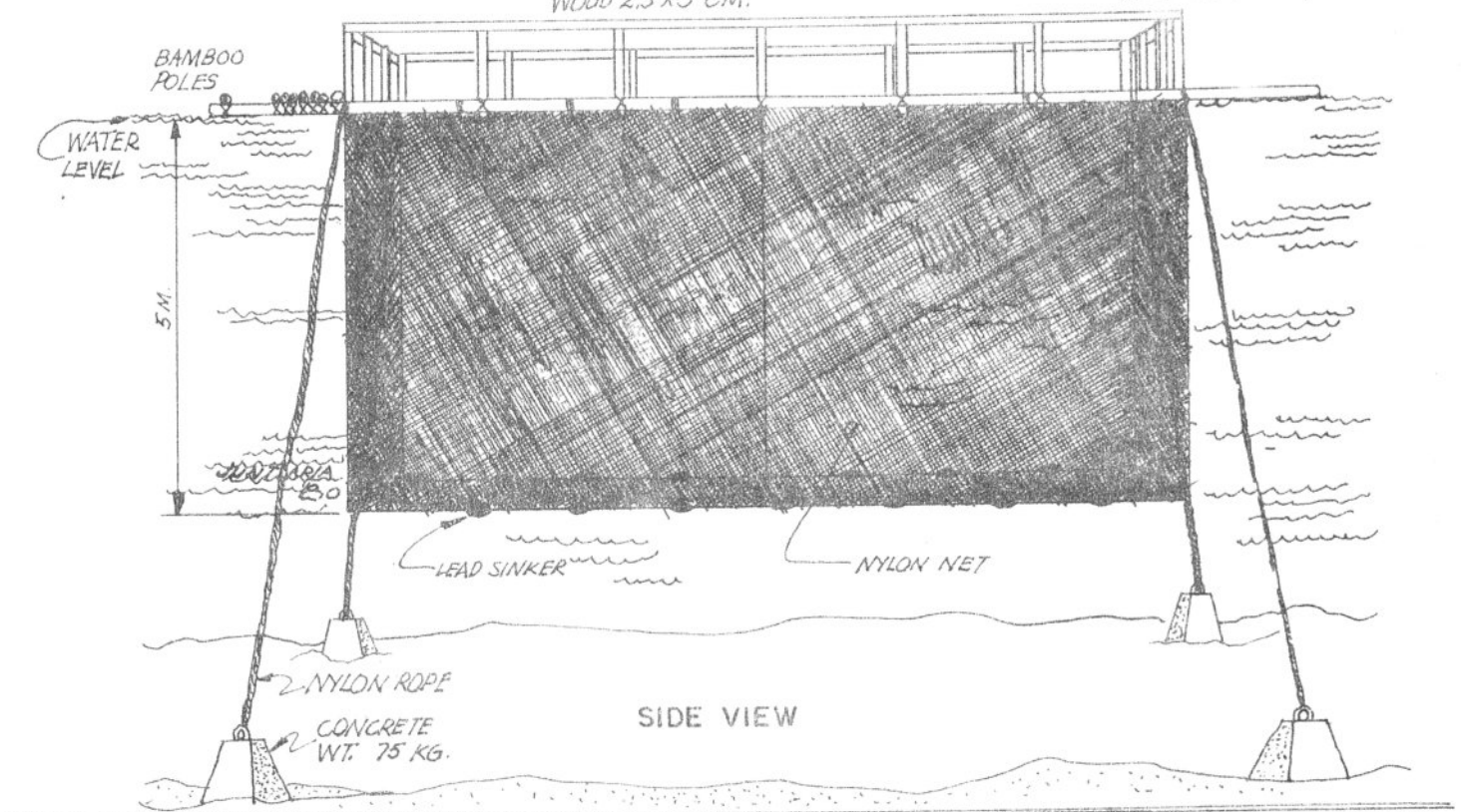
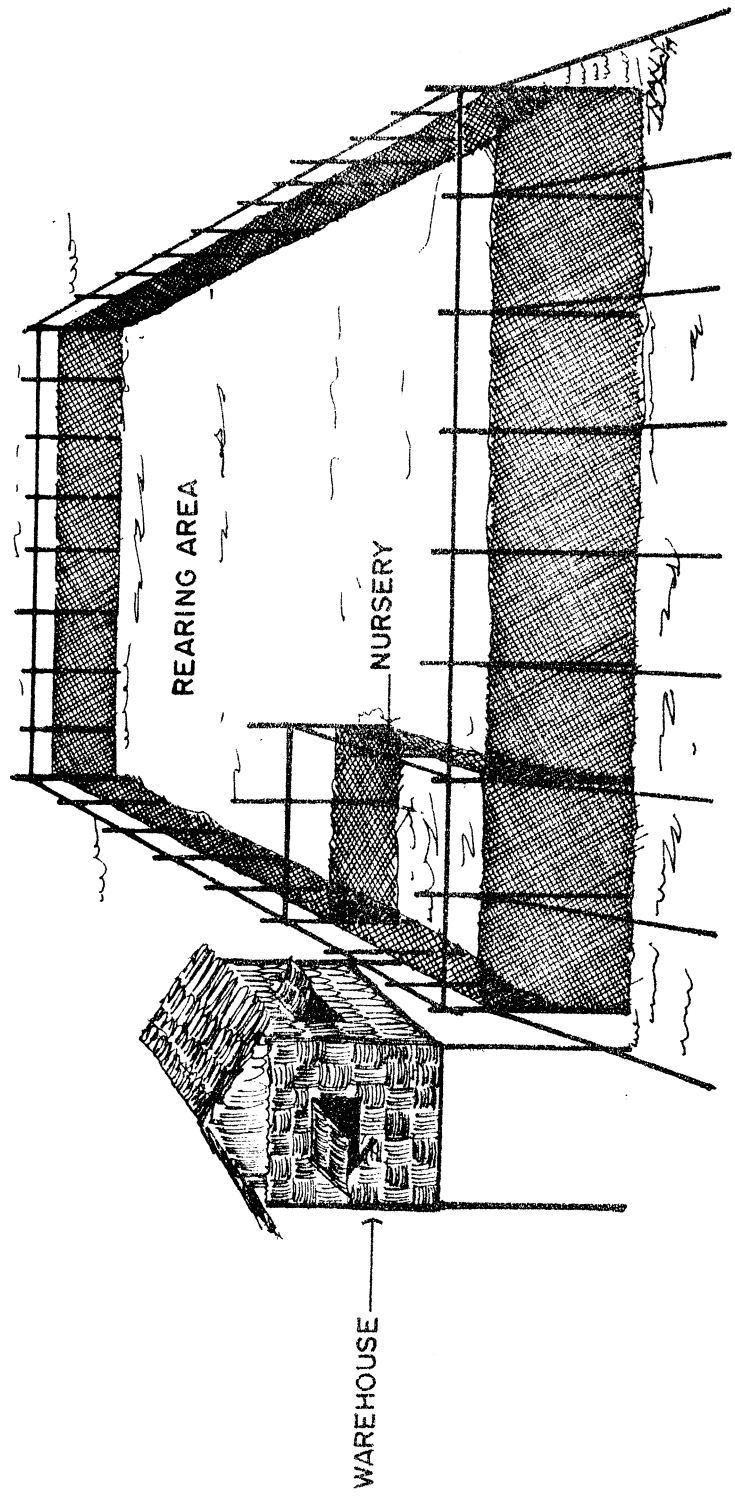


Fig. 1. Design of commercial fish cage in Lake Bunot.

Source: Anon. (1977)



Splitted Bamboo (Pongkol)

