

Fish Cage Culture in the Town of Jambi, Indonesia

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ABSTRACT

Fish cage culture in Jambi has been practiced since 1955. However, the occupation has remained secondary to others such as those working in rubber plantations and trading.

Applying simple technology and management technique such as stocking and restocking, feeding and regulating the culture cycles in about 275 cages of approximately 1,250 m² distributed along the lakes and canal within the town of Jambi, produced in 1975 about 54,000 kg of fish consisting mostly of *Leptobarbus hoeveni*. This exceeds the yield from fish ponds comprising 198 hectares, which produced 34,000 kg of fish in the same year.

There are two types of cages generally used for fish culture, namely the small cage made from bamboo which is cheap but less durable and the big one made from "bulian" wood which is costly but much more durable. The cages traditionally used by the farmers are not sturdy enough to withstand the waves and current of the main river, Batanghari. This has been one of the constraints to further extension of cage culture along the main river.

INTRODUCTION

The Indonesian inland waters cover a total area of approximately 13.7 million hectares. These produce 285,754 metric tons of fish per year or 20 kg of fish per hectare per year. The water could be made to produce more if developed on sound scientific basis and with improved techniques.

This paper discusses the floating cage fish culture in Jambi, its present status and its constraints to further development. The report is based mainly on interviews with fish farmers. To accelerate further development, a series of research programmes related to floating cage fish culture is recommended.

MAGNITUDE OF PRESENT FLOATING CAGE CULTURE

Seed Resource

Every year, with the onset of the monsoon season, the waters of Batanghari river rise and overflows the tributaries, lakes, and river canals. The inundated zones seem to become nursery ground of various fish species such as small cyprinids (e.g. *Thynnichthys polylepis*, *T. thynnoides*, *Dangila ocellata*, *Barbichthys laevis*, *Botia macracanthus* and *Balantiocheilus melanopterus*) and big cyprinids (*Leptobarbus hoeveni*, *Puntius schwanefeldi* and *Osteochilus spp.*) (Ondara and Amrullah K., 1968). When the water recedes, the people catch the fish using various types of lift nets. They select the valued fish species such as *Leptobarbus hoeveni* and *Thynnichthys thynnoides* for stocking the fish pond and fish cages and *Botia macracanthus* and *Balantiocheilus melanopterus* as ornamental fish to be exported. The other species are sold in the local market.

The seeds of *L. hoeveni* together with other species can be caught continuously as long as the zones are inundated (from November till April). However, the bulk of *L. hoeveni* fry are caught within a very short period during early monsoon or about two weeks in November (Ondara and Amrullah K., 1968).

In 1975, the waters of the town of Jambi produced about 685,000 fish seed (Anonymous, 1975) consisting of 600,000 *L. hoeveni* from natural waters and a mixture of common carp and other cultured species from hatcheries.

Although there have been no complaints about the decrease of the number of fry of *L. hoeveni* in

Jambi's waters notice must be taken of several factors that might influence the availability of the fry in the nursery ground. Some of these are sewage pollution due to the increase of inhabitants of Jambi and the decrease of spawners due to overfishing or tampering of habitat in the upper part of Batanghari as a result of deforestation. Considering all these, studies on reproductive biology and breeding of *L. hoeveni* are of primary importance to maintain the continuity or even to develop the floating cage culture through artificial production of fish fry.

Development

Nobody knows when the floating cage fish culture started in Jambi. Sutrisno S. (1959) mentioned that it was being done as early as 1922. In 1955, a fishery official introduced this type of fish culture from Mudung Lake to Sipin Lake. Since then it gradually extended to the other parts of Sipin Lake, Buluran Canal and Kenali Lake.

Fishery statistics of 1975 (Anon., 1975) shows that within the town of Jambi there have been already 275 cages, equivalent to approximately 1,130 m², producing as much as 54,400 kg of fish. This means a production of 200 kg of fish per cage or 43.5 kg of fish per m². In the same year, the fish ponds of about 198 hectares produced only 34,000 kg of fish, that means a production less than 0.002 kg of fish per m². These figures show the advantage of cage culture over pond culture

Most of the cages are located along the coast nearby the villages in Sipin Lake and Buluran Canal.

CONSTRUCTION OF THE CAGE

There are principally two types of cages for rearing fish in Jambi. The first type is small and made of bamboo splits except for its frame and its buoys which are made of wood. The other type is relatively big and made entirely of wood.

Bamboo cages

This cage has a rectangular shape with volumes varying from 3.75 m³ to 9 m³ or from 2.5 x 1.5 x 1.0 m to 4 x 2 x 1.25 m. To construct the cage the bamboo splits of about 5 cm in width are arranged closely on rectangular wooden frame leaving very narrow spaces (0.5 cm) between them. This is to prevent predators like snakes and other unwanted animals from entering the cage and the stocked fish from leaving the cage. Unfortunately, this measure might slow down water circulation.

Using two types of cages instead of one might be a solution to the problem. The first type, with narrow spaces between splits, is for rearing the fingerlings; the other type, with wider spaces, is for bigger fish.

To be able to install the cage on the buoys that are made of logs several bamboo poles are installed across the cage.

The buoys are the biggest cost items in cage construction, as shown in the calculation below for a cage of 2.5 x 1.5 x 1.0 m dimension:

Wooden frame	Rp. 4,000
Bamboo split	2,500
Nail	1,000
Buoys (second hand logs)	12,000
Labor cost	7,000
Total cost	Rp.26,500

The buoys form almost 50 percent of the total cost; higher if new logs are used instead of second hand logs. The bamboo cage could last one to two years.

Wooden cages

Like the bamboo cages, the wooden cages have a rectangular shape of various volumes like 48 m³ and 54.4 m³, or 8 x 4 x 1.5 m and 8 x 4 x 1.7 m. To construct the cage, planks of "bulian" wood of 12 cm wide and 2 cm thick are arranged closely on a rectangular wooden frame leaving very narrow spaces between them. The farmers do that for the same reason as in constructing bamboo cages. The spaces between the planks are much narrower than those in bamboo cages.

The "bulian" wood for frame and plank comprise the biggest cost item of cage construction as shown in the calculation below for a cage of 8 x 4 x 1.7 m dimension:

Wooden frame	Rp. 75,000
Wooden plank	200,000
Nail	8,000
Buoys	100,000
Labor cost	100,000
Total cost	Rp. 483,000

The "bulian" wood material for frame and planks is more than 50 percent of the total cost. The "bulian" wooden cages will last more than 20 years.

AQUACULTURE TECHNIQUE

Stocking

Most of the cages are stocked with *Leptobarbus hoeveni*; some wooden cages in Mudung Lake are stocked with *Thynnichthys thynnoides* in addition to *L. hoeveni*. Stocking with two species gives more income to the fish farmer. This is so because *T. thynnoides* which is a plankton feeder feeds only on microorganisms available inside the cage such as plankton and periphyton.

The bamboo cages are usually stocked with 30 to 100 *L. hoeveni* fingerlings of about 12 cm length per 1 m³ of water, while for the same volume of water, the wooden cages are usually stocked with only 30 to 40 fish.

Feeding

The supplemental food consists of vegetable origin material such as waste of coconut, cassava, leaves of cassava and rubber leaves. Trash fish are also included in the diet. The frequency of feeding is generally once or twice a day.

Mortality

The fish farmers do not complain about the mortality during the rearing period. Sometimes predators (sand goby, *Oxyeleotris marmorata*) are found in the cage. These might have been introduced during stocking. Poachers and rotted bamboo cages frequently cause losses.

Harvesting and restocking

The first harvest is usually carried out after a rearing period of one to one-and-a-half years. Fish of 0.5 to 0.8 kg are captured and a number of fingerlings are restocked. The harvesting is repeated every six months, followed by restocking.

CONCLUSION

The floating cage fish culture in the town of Jambi has been practised since 1922. However, the construction of cages and aquaculture techniques have remained traditional. So far, there has been no research undertaken to improve the system.

Constraints to the development of floating cage culture in Jambi include lack of know-how, lack of capital, and lack of consciousness about the importance of cage culture.

Domestic sewage pollution in Jambi might in the long run cause the depletion of natural fish seed.

To improve the culture method, research should be conducted covering cage engineering, selection of fish species, polyculture, stocking density, nutrition, harvesting method and economics of fish cage culture operation.

Another important research area which could contribute to the development and maintain the continuity of floating cage fish culture in Jambi includes reproductive biology and breeding of valued wild species such as *L. hoeveni*, *Thynnichthys thynnoides* and *Pangasius pangasius*.

REFERENCE

- Anonymous, 1975. Annual Report (in Indonesian). Fishery Service. Jambi.
- Ondara and Amrulah K., 1968. Survey on fish seed, *Leptobarbus hoeveni*, in Jambi (in Indonesian). Inland Fisheries Research Institute, Report No. 35, Bogor.
- Sutrisno S., 1959. Possibilities for fishery development in Palembang town (in Indonesian). Inland Fishery Service of South Sumatra Province. Palembang.