

CAGE CULTURE



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Increasing world wide environmental concern has affected the expansion of aquaculture industry adversely. Water pollution has affected the aquaculture production as well. Therefore, a general thinking has been sprouted among the planners to depend more on the open waters and their capture fisheries to achieve high fish production through ecosystem management. In this context we should think about the applicability of modified technologies like pen and cage culture to improve the fish production. Further, most of the floodplain wetlands (*beels*) are infested with macrophytes which pose problem in the operation of different gear. As a management measure especially in the weed choked *beels*, pen and cage culture of fishes and prawns are recommended by CIFRI.

Stocking with right kind of fish seeds at right time is very much needed in wetlands for increasing production especially when there is low auto-stocking. Likewise, many of the small reservoirs get dried up or the water level becomes too low in summer months, which promotes over fishing. Such situation leads to the loss of brood stock to contribute to natural recruitment. In large reservoirs also stocking with seeds of economically important species is a part of management. During transportation of seeds high mortality takes place. Therefore, *in situ* production of fish seeds (<10 cm) in cages provide a vital input to the production enhancement programme of inland water bodies like wetlands and reservoirs.

Net cage culture

This is the most cheapest cage technology available under cage culture. Net cage is an enclosure made of net materials, which is closed from all sides and permit water exchange as well as waste removal. Raising fish seeds in floating cages will also reduce pressure on land-based system and can withstand floods.

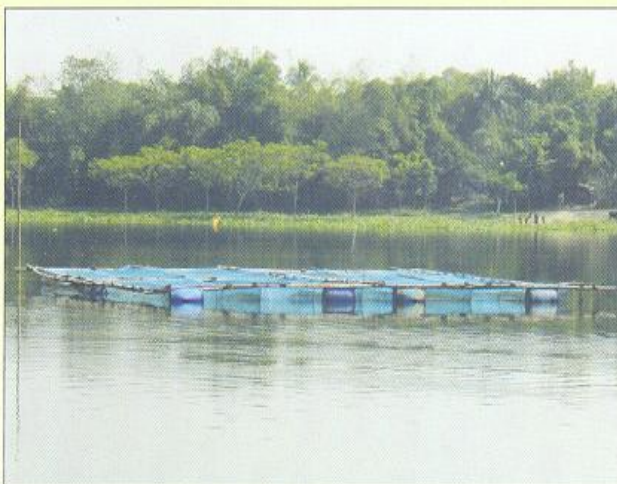
Site selection

Site for the cage farming must be favorable not only for the physico-chemical and biological requirements of the fish cultured but also to the structure itself. For cage construction, a flat bottom in 3–4 m at the lowest water level is suitable. The cages also should be no less than 2 m from benthic sediments to avoid fish parasites. For cage culture it is virtually possible to set up cages on almost any type of bottom except extremely rocky bottom. The sites must be away from points of industrial and sewage pollution.

Cage Construction

The cage

For seed raising HDPE nets (1mm mesh size) are used. A dimension of 6 x 3 x 1.5 m is very convenient in terms of operation and management. Covered top will prevent predation by birds. For feeding and other management measures provision is to be made for flap openings at the top two corners. Net cages having total area of 144 sq.m can be fitted to a bamboo frame to make a battery (usually 8 in nos) of cage. The bottom



corners of each cage are tied with some weights for perfect vertical hanging.

The frame

Locally available and cost effective strong but light in weight materials are chosen for frame construction. A full grown mature bamboo having 13 m length is very ideal frame material. To make a frame a pair of bamboo is placed 15 cm apart laterally. Eight such bamboos are placed in pairs (parallel) to form a square frame covering an area of 144m². Another four such bamboos are placed similarly inside the frame to form a cross, perpendicular to arms forming four chambers. These chambers are further divided in a similar manner to form eight chambers having equal dimension of 3 x 6m. The net cages



are fastened to this frame and hanged in water. Each joint is pegged to maintain the shape of the structure. Split bamboos are transversely fastened on the arms to make walk way for regular monitoring of cages.

The float

In order to keep the frame along with cages buoyant in water, 12 empty, leak proof, 220 l capacity metallic or PVC drums

(used solvent container) are securely tied, 4 in each arms, with the frame.

Installation

Once the frame is fabricated, it is gently dragged into water and anchored firmly to the bottom.

Stocking

Fish species

Fast growing fishes with great market value and demand are chosen for culture. Indian major carps like, *Catla catla*, *Labeo rohita*, and *Cirrhinus mrigala*, medium carps like, *L. calbasu* and *L. gonius* and minor carps like, *C. reba* and *L. bata* are some of the tested species.

Stocking density

Size to be grown and the species to be reared are considered before determining stocking density. In order to produce stockable advanced fingerlings (100-150 mm) for open waters, major carps fry having a length of 20-30 mm can be stocked @ 50-100 numbers/m³, while, the density for same length of medium carps may be 100-150/m³ and for minor carps the density can be increased to 150-200/m³.

Post-stocking management

Adequate feeding with high nutritious feed is mandatory in cage farming. The traditional mixture of rice bran, mustard oil cake and groundnut oil cake are improvised by adding fish meal and some premixes of vitamin and minerals maintaining crude protein level at 30% for carp species. While feeding *C. catla*, the porous bag containing feed mixture should be

suspended at the sub-surface layer of water. Fishes should be fed twice daily. Another important task is regular brushing of submerged portion of cage wall with soft, coir made brush to prevent choking of mesh with fouling organisms in water and deposition of silt.

Harvesting

The growth of carps found to be season dependent. During February-March, Fish grows moderately and during April-September, the growth is very fast reaching target size of 100 mm within 60 days, while during October-January, growth is slow. Three to four crops of advanced fingerlings can be harvested during fast growing phase (April-September), while during slack phase (approx. 4 months), instead of keeping the cages idle, a little bigger fish for table purpose may be grown.

Cost

The initial capital investment for a battery of eight cages covering 144m² involves approximately Rs.14270/-. The running cost for each crop is Rs. 1480/-. The net income is calculated as Rs. 32330/-

Economic viability

The fisheries enhancement programmes in open waters resources shall demand for enormous seed requirements. Adoption of cage culture would meet the seed requirements at a very rational cost. Considering the BCR of 3.6 and IRR more than 50, the technology found to be economically feasible.