

Fish Seed Rearing in Pen for Increasing *Chaur* (Wetland) Productivity of North Bihar



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Introduction

Bihar is endowed with rich aquatic and fisheries resources in the form of rivers, flood plain wetlands, ox-bow lakes, reservoirs, tanks and ponds. Wetlands in Bihar are locally called mauns, chauras and dhars which have potential for high fish yield. Annual floods, presence of predators and uncontrolled growth of aquatic plants are the major deterrents to fish production leading to poor productivity. Scientific fisheries management like seed stocking with appropriate size, density and species composition with periodic stocking and harvesting can improve yield several fold. Seed production in pen is the most appropriate, simple and inexpensive technique for raising fish seed for stocking enhancement in such ecosystem which will enhance livelihood opportunity of fishers. A Pen is defined as “a fixed enclosure with sides of netting or bamboo screen, in which the bottom is the bed of the water body”.

Site selection

The part of wetland with gentle slope and minimum water level fluctuation is preferred for pen culture. The site having 1-2 metre depth is ideal for pen installation. The selected site should be away from strong water and wind current, while a mild flow is desirable. Aquatic plants free zone and easy access are the other considerations.

Pen shape and size

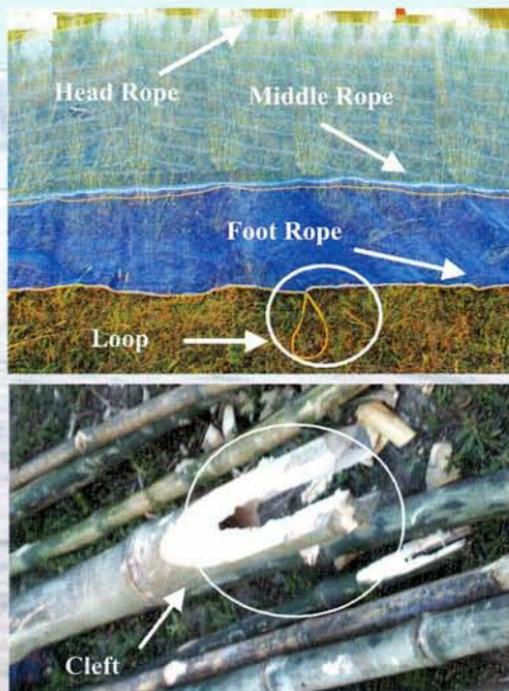
The pen may be of square, rectangular or circular shape. However, circular pen is economical compared to other shapes. Larger pens give better yield while smaller are easy to maintain. For better management and good yield the size should vary between 0.05-0.2 ha.

Pen material & construction

Economic and durable material like split bamboo screen can be used to make enclosure for holding fishes. Bamboo poles are securely fixed to ground at 2 m intervals to hold the screen firmly and vertically. For providing support to pen wall against wind action extra pole is fixed obliquely (at 45°) with every third vertical pole and split bamboo bars are fixed horizontally to the vertical poles. Bamboo screen is prepared by weaving split bamboo (4-6 mm in thickness) with coir or HDPE thread, leaving narrow space between splits for water exchange. To prevent possible escape of fry, a fine meshed and cheap HDPE net is stitched with the bamboo screen. The bamboo screen is fixed in bottom soil and tied with vertical pole. About 0.5 m of the pen wall should be above the maximum water level to prevent fish escape.

HDPE knotless webbing net can be used in place of bamboo screen which is more cost effective. A strong and thick HDPE net with 3.3 feet height and 3 mm mesh can be used for making under-water part of pen wall. For net pen wall the mesh size should not be more than 5 mm for fingerling and 10 mm for table fish production. If net of appropriate height is not available, stitching of two or more such net is required.

HDPE rope of 7-8 mm and 4-5 mm thickness should be tied to the bottom (foot rope) and head (head rope) of the net wall respectively.



Loops at an interval of 3-4 meters in the foot rope are given for fixing with the cleft of the bamboo pole which is driven into the mud. This arrangement is made to ensure tucking of about 30 cm of the net into the mud. Steps for installation of the net pen are more or less similar to bamboo screen fencing. The pen wall will last for 3 years while yearly replacement of bamboo poles is required.



Pre-stocking management

The pen area is made free from aquatic macrophytes, predators and competitors. Aquatic macrophytes are totally eradicated manually or mechanically. Unwanted fishes are removed by repeated netting. Liming



is done @ 250-300 kg/ha depending on the pH of water. The pH of water should be 7.5 to 8.5.

Stocking

Fish species belonging to Indian Major Carp like catla, rohu and mrigal; and minor carp like bata and reba are good candidate species for pen culture. In addition, exotic fishes like grass carp, silver carp, common carp and Java puthi are also suitable for pen farming. Both species composition and stocking density depend upon availability of natural food and water quality. For producing advanced fingerlings of carp (>10 cm), fries (40-50 mm) are stocked @ 2,50,000/ha, while, for raising table fish, fingerlings (8-10 cm) are stocked @ 4,000-5,000/ha.



Post-stocking management

In addition to natural food, supplementary farm made feed in the form of dry pellet or moist ball containing boiled mustard/groundnut oil cake, rice/wheat/maize bran, lentil/Bengal/black gram dust fortified with fish meal, soya meal, vitamin-mineral mixture is given to fishes for better and faster growth. Supplementary feed @ 5-10% of live weight is given in a tray or porous bag twice daily. Fish growth (length and weight) and health are monitored periodically. Immediate remedial measures need to be taken at the incidence of disease. Dead fish, if any, should be removed immediately. Macrophyte clearance, liming, cleaning and repair of pen wall to be done regularly or whenever required. Measures should be taken to keep away the predatory birds and snakes.

Harvesting and yield

Advanced fingerlings become ready for harvesting when they attain a size of >10 cm (average weight 15 g) in 2 months. Harvesting is

done with fine meshed drag net during early morning. A yield of 12793 nos. advanced fingerlings corresponding to 192 kg/0.1ha/2month with 51% survival could be obtained. While, yield of table fish (average weight 500g) ranging 1600-2000kg/ha/6months with 80% survival could be achieved.

Economics

Economics of seed rearing in pen was worked out considering the cost price prevailing in Jandaha (Vaishali). Two crops of advanced fingerlings could be produced in the first year and three crops in the following years. The capital cost estimated for a pen of size 0.1 ha was ₹ 11,350/- and recurring cost of ₹ 35,720/- was involved for the 1st year. Minor repair and maintenance cost involving man and material will be additional cost in the 2nd and 3rd year. The net benefit of ₹ 29,688/- can be earned in the 1st year while ₹ 58,957/- in the 2nd and 3rd year. The B:C ratio of pen culture operation for seed production was found to be 1.93.

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