

Design of Proposed Fish Cages for Kaptai Lake in Bangladesh*

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Kaptai Lake, the project site, with an area of 90,648 hectares is the biggest man-made lake of Bangladesh. Situated in Chittagong Hill Tracts District, the lake was formed following the construction of a dam for the Karnafuli Hydro-electric Project in 1969.

Limnological and biological studies done in 1973 show that the lake is capable of supporting abundant fish resources.

To maximize the fishery products that could be derived from the productive potential of the lake, intensive aquaculture practices proven successful and most profitable in other countries should be introduced. The most appropriate among such practices is the floating fish cage.

The floating cage technique is recommended for introduction due to the wide differences between the minimum and maximum water levels in the lake observed to be 38 feet during the dry and monsoon months. Another physical feature of the lake that is favorable for fish cage aquaculture is the hilly topography resulting in varying water depths.

The raising of fish in cages is very popular in Japan and the United States. Using the Japanese method of intensive fish culture a floating fish cage can produce an average of 20 to 40 kilograms per square meter. The American method can produce 500 pounds of fish per cubic meter. Recent data on Taal Lake in the Philippines indicate an average production of 12.2 MT per hectare during a six-month culture period.

In view of the above considerations and observations, the Firm believes that fish cages would undoubtedly become a booming industry in Kaptai Lake.

The project shall culture the major Indian carp which is strongly in demand in Bangladesh. The

culture of hilsa (*Hilsa hilsa*) in cages should also be attempted on a pilot basis to demonstrate the possibility of its culture on a commercial basis.

The polyculture of compatible fish species in cages should also be seriously considered to further increase fish production in the lake. This scheme aims to utilize the various fish foods available.

The project shall also provide for the establishment of a hatchery with nursery at Rangamati, Chittagong Hill Tracts. This hatchery shall service the fish seed requirements of the fish cages.

Other physical inputs of the project include transport equipment like fiberglass boat with outboard motor, vehicles and laboratory equipment.

Detailed Description of a Fish Cage

The fish cage is simple and can be constructed by local fishermen. The skeletal framework is made of whole pieces of bamboo. The upper square to which the empty oil drum floats are attached is made stronger by three pieces of whole bamboo laced together by 1/8-inch diameter nylon rope. The bamboo framework, 4 meters in depth, is further strengthened by diagonal and vertical pieces of whole bamboo properly secured with 1/8-inch diameter nylon rope. The vertical wall supports, spaced five meters apart, should have an allowance of two meters above the water level to support the extension wall which is provided all around to prevent the fish from jumping out of the cage.

Empty 45-gallon oil drums shall be used as floats spaced five meters apart. The drum floats shall be properly tied to the upper square with 1/4-inch diameter nylon and interlinked at the outer end on top with five pieces of whole bamboo laced together to support the walkways all around the cage. The empty drums to be used should be leak-proof and painted with three coatings of coal tar before using.

*This supplements the Bangladesh country paper.

To keep the cage upright, five-kilogram stone sinkers are hung in the bottom square also spaced five meters apart.

For the enclosure, nylon netting of 20 mm mesh and 9-ply twine shall be used. To support the net and prevent the uneven distribution of load a lattice network of ribbing lines of 3/8 inches in diameter kuralon rope is provided with space five meters apart both horizontally and vertically. The ribbing lines are likewise tied to the vertical wall support, especially the lower edge of the net wall, to prevent the net from billowing during strong winds.

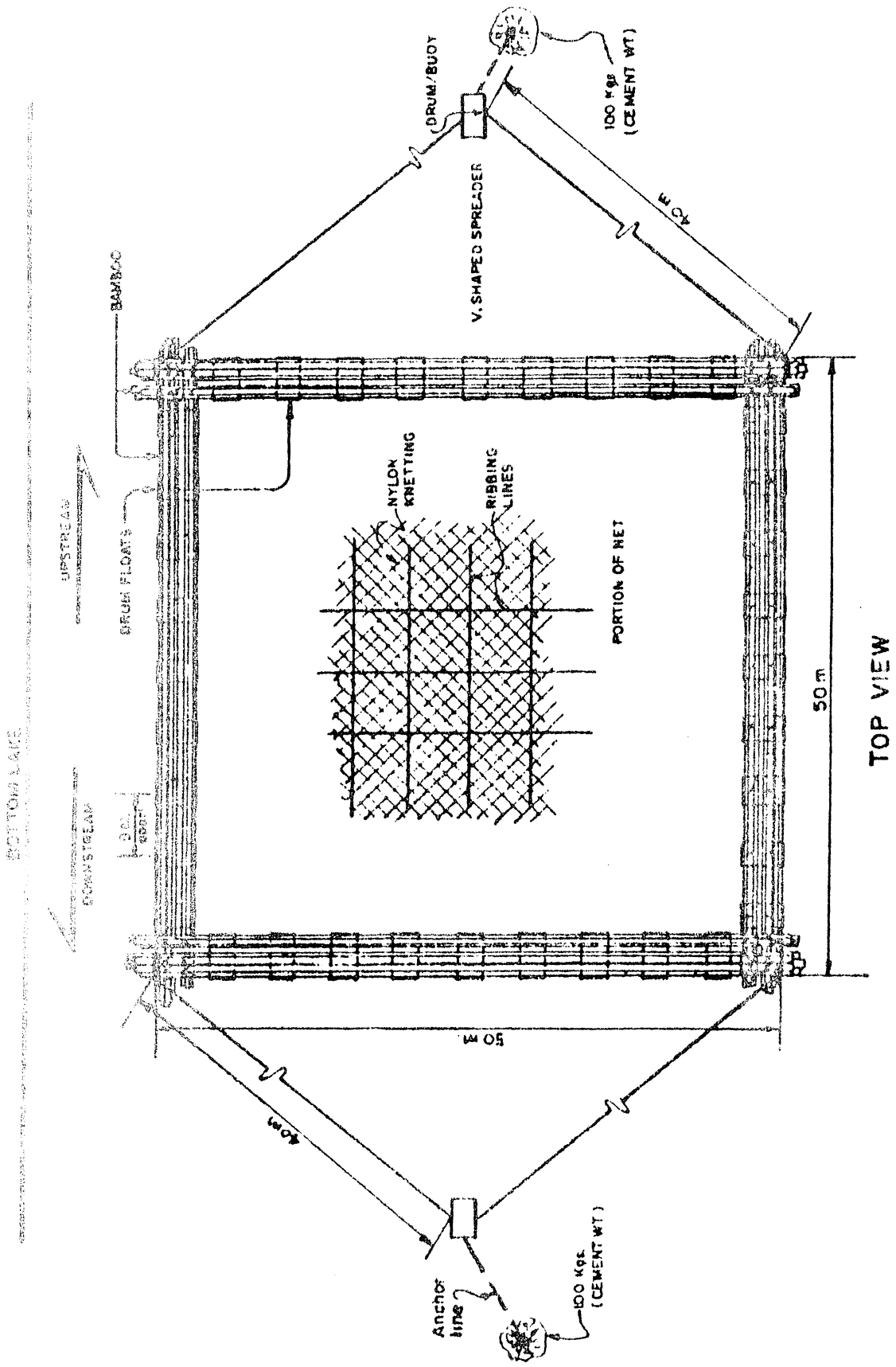
Two cement weights of 100 kilograms each shall be used as anchors at the upstream and downstream directions to establish the setting and position of the edge. The adjustable anchor line will be nylon ropes, 1/2-inch in diameter, tied directly to the drum buoys. A V-shaped spreader of nylon rope 1/2-inch in diameter, with 40-meter legs, shall be tied to the corners of the cage. These drum buoys are used to facilitate the adjustment of the anchor

lines when desired. An illustration of the floating fish cage is shown in Figures 1a & 1b.

Underlying Assumptions

Fish Cages in Kaptai Lake

Price of fry	TK. .09 each
Total fry requirement	16 million
Survival rate at nursing	50 percent
Total annual fingerling production	8 million
Total number of cages	1,600 units
Size per unit 50m x 50m	2,500 sq m
Stocking rate per cage (no feeding)	2,500
Survival rate at farming	60 percent
Culture period	6 months
Size of fish at harvest	1 kg each
Production per 6 months per cage	1,500 kgs
Annual production per cage	3,000 kgs
Total fish production for 1,600 units	4.8 MT
Price of fish per kilogram	\$590/ton



TOP VIEW

Figure 1a. Floating Fish Cage

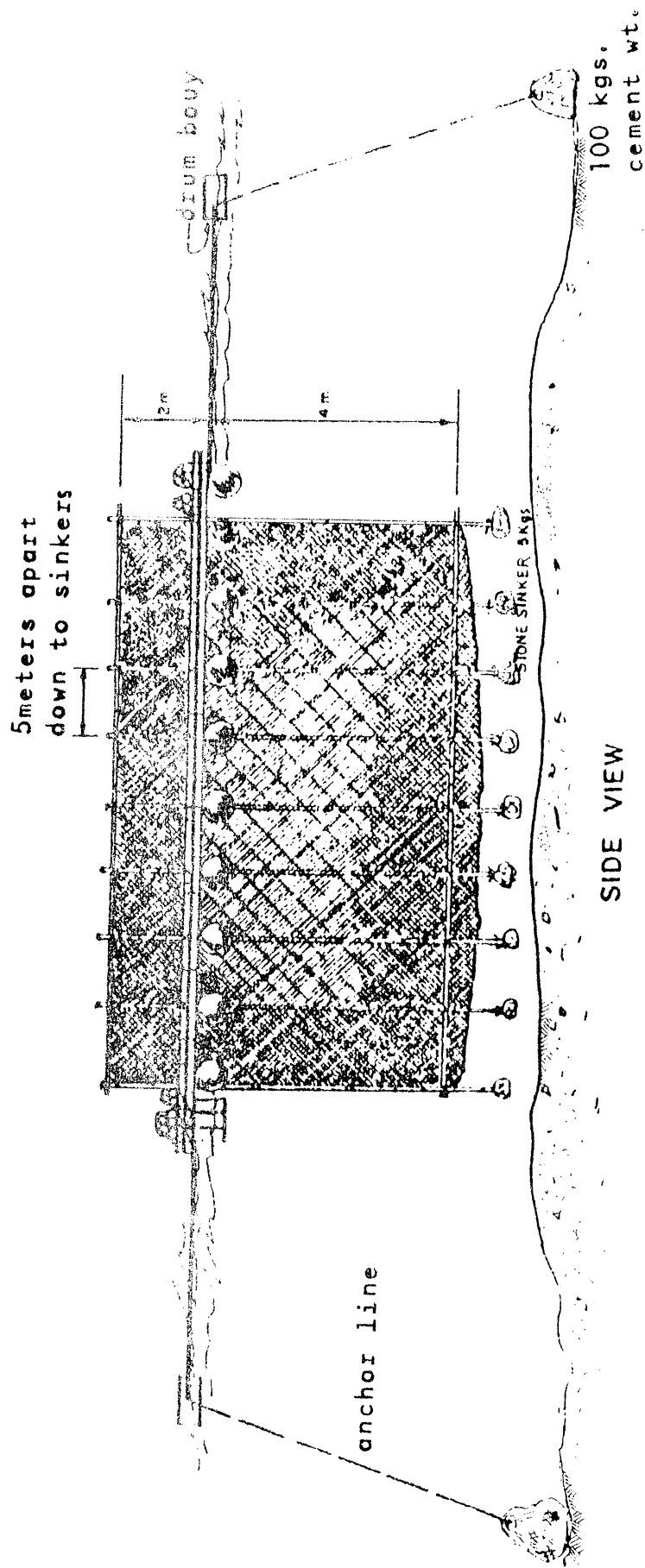


Figure 1b. Floating Fish Cage