

Internship Report:

Cage culture practices by Jalari community in khapudi of Phewa Lake

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INTRODUCTION

Cage fish culture was introduced in Nepal in 1972 at Lake Phewa, Pokhara Valley as a means of holding brood of common carp (Swar et al., 1988. Total cage culture in Nepal is 80,000 m³ with fish production 480 mt and productivity 6.0 kg/m³ (DOFD, 2007/008). Pokhara has eight lakes of varying sizes. Among the lakes, Phewa, Begnas and Rupa are utilized for fish culture using planktivorous fish species, with cage fish culture being predominant in Phewa and Begnas and to a lesser extent in Rupa(Wagle et al.,2007).The Bighead carp (*Aristichthys nobilis*) and silver carp (*Hypophthalmichthys molitrix*) are cultured in the Lakes. Phewa Lake (742m, asl) is the biggest lake in Pokhara valley. Approximately 200 households of Jalari, a deprived ethnic community, who had a history of nomadic life, are living around the Pokhara valley and about 86 families around the Phewa Lake. These 86 families still have no farming land and are continuing their traditional occupation capture fishery and cage aquaculture.

METHODOLOGY

A study survey was carried out to the Jalari community in Khapudi area along the Phewa Lake in Pokhara, Nepal from September 2009 to march 2010. In each week two day was used for the survey, interview and fields observations for this study. It has taken about 6 months to conduct household survey with preparations. PRA was done to make study more precise. All necessary documents were translated in local language including questionnaires. Simple random sampling was used to select the household (HH) for surveying at Jalari community who have been doing aquaculture and fishing occupation. Household (HH) survey was carried out in Jalari community selected from total 86 HH members among whom 46 respondents were asked the questionnaires. Respondents selected were 38 male and 8 female. Others respondents were executive committee members of PFEC and Macchapuchhre Women's Group (MWG). All raw field data were analyzed by the standard package using SPSS (Statistical Package for Social Sciences) and Excel. Cost-Benefit analysis variables calculated on the basis of mean of 46 farmers of each parameter.

RESULTS

HOUSE HOLD DESCRIPTION

Majority (57%) of jalari community resident in the Khapudi area (Khapudi+ Phaure) followed by Baidam. Total numbers of cage fish farmers in Phewa Lake is 86. Male farmers were 83.7% and female 16.3%. A total farmers interviewed for this study was 46, among which 37 (80.4%) was male and 9 (19.6%) female. Most of cage fish farmers have uneducated (73.9%) and only 8.7% farmers have S.L.C level education. The average family size of cage fish farmers is five. They spent around 3 hr in cage fish farming per day and some respondents say 5 hr a day.



CAGE DESCRIPTIONS

Nylon or polyethylene net cage have been most popular among cage fish farmers Phewa Lake. Local fisherman could weave their own netting of mesh size more than 25 mm locally. Almost 90% of nursery cage is made by netlon cage (Kalo jal) and production cages by nylon or polyethylene threads. The threads materials initially provided from FRC office but now they buy threads from Dahal trading in mahendrapool, Pokhara.

The total cage number counted was 636.0 with volume 26074.0 m³ in Phewa Lake during the study. Total cage volume of nursery cage was 6866.0 m³ and number was 260.0. The total volume of production cage was 19208.0 m³ with number 376.0. The mean volume is 26.4 m³ and 51.5 m³ of nursery and production cage respectively. The mean holding of nursery cage by individual's farmers is 80.8 m³ having three numbers and production cage was 223.3 m³ having five numbers. The farmers which cultures Bighead carp and Silver carp in polyculture were 38.4 % while 61.6 % farmers were now using both grass carp as monoculture and silver carp and bighead carp as polyculture in Phewa Lake. In total grass carp cage fish farming occupy 18.8% by volume and 17.8 % by number of total cages in Phewa Lake.

The fish species used for culture in cages were silver carp (*Hypophthalmichthys molitrix*), bighead carp (*Aristichthys nobilis*) and grass carp (*Ctenopharyngodon idella*)

STOCKING, CULTURING AND HARVESTING PRACTICES IN CAGE FISH FARMING

NURSERY CAGE

Jalari farmers were stocked fish fry with mean stocking size 4.0 gram and stocking rate of 185.0 fry /m³ in nursery cage. They rear in nursery cage for 1.9 months feeding with locally available feed materials

(Rice bran, oilcake, maize flour) at the rate of 1.3 kg per day for 3000 fry. They stocked firstly in 5-10 mesh size nursery cage then after 2-3 months transfer into 20 mesh size of nursery cage if available. The mean total culture period of fry to advanced size fingerlings is 9.2 months with range of 5-12 months. The mean mortality reported by farmers is 39.4% from fry fingerlings production in Phewa Lake. They buy fry from FRC, Pokhara office at the Rs 0.50 to 0.75 of size 2.0 – 5.0 gm and from outside Rs 5.0 for 5.0-10.0 gm of fingerlings.

PRODUCTION CAGE

The mean stocking density was 5 No/m³ with mean stocking size 139 gram of grass carp in production cage. They stocked silver and bighead carp in polyculture with mean stocking density 9 No/m³ and mean stocking size 139 gram. The grass carp generally cultured as monoculture but some (10%) respondents say they have been culturing grass carp with silver and bighead carps also. Grass carp were feed daily at the rate of mean 350 kg of aquatic grass collected from the Lake. They reported that Grass carp attain mean size 1.67 kg and silver carp and bighead carp mean weight 0.81 kg within 8-12 month culture periods. The mean yields of 46 respondents cage fish farmers is 8.3 (kg/m³/yr) of Grass carp in monoculture and Silver and Bighead carp is 5.7 (kg/m³/yr) in polyculture.

Lake overturns and fish mortality

Fish mortality due to Lake Overturn is experienced by every farmer in each year. The fish mortality started in the Phewa Lake from October-November due to mixing of Lake Water or destratifications. In farmers experienced, the lake water become blackish and fish mortality occurs. The loss of fish increased in the low rainfall year as said by jalari community cage fish farmers. 20-30 fish of 0.5-1.0 kg size mortality occurs from one cage of 50 m³ volume in this year.

FISH HARVESTING

The fish harvested from production cage by the use of bamboo pole of length slightly longer than the frame of the cage. The bamboo is inserted beneath the cage at the opposite side of the opening. Then, it is slowly moved toward the opening of the cage. Fishes removed with the help of small scoop net. Total fish production estimated from cage fish farming in Phewa Lake is 120.3 mt in the year 2010. The cage productivity in Phewa Lake is different by species cultured. The silver and Bighead carp cultured in Polyculture give mean productivity of 5.7 (kg/m³/yr) and range is 2.43 to 7.29 kg/m³/yr. The grass carp cultured in monocultures mean productivity was 8.3 kg/m³/yr and range is 4.25-10.2 kg/m³/yr. Fish production rates in cages ranged from 1.3-5.0 kg in Phewa Lake (Wagle et al., 2007).

FISH MARKETING

The fish marketing is done by both male and female member's .They sale their fish as a partial harvest directly to consumer at their home. Only 2% of cage fish farmer's sale their fish to middleman. There is huge demand of fish in hotels around the Lake. The farmers have not problem for fish sale. They get higher prices at farm gate. The mean sale price of grass carp is Rs. 226.0 and silver carp/bighead carp Rs.162.0 per kg of fish.

COST- BENEFIT ANALYSIS

The net profit from cage fish culture in polyculture of bighead carp and silver carp without feeding is total NRs is 30593.17(US\$ 424.9) is 1.5 times lower than monoculture of Grass carp is NRS 51708.17

(US\$718.16) from one nursery and two production cage. The net profit indicated that it is economical to Jalari community for sustaining their life as they have no other lands and occupations. The cost benefit ratio of bighead carp and silver carp is 2.96 and monoculture grass is 2.2. The livelihoods of jalari community of Pokhara valley have been improved (Wagle et al., 2007; Gurung et al., 2005).

PROBLEMS FACED BY FARMERS

- Lacks of advanced fingerlings at the time of stocking.
- Cage making threads of good quality is not found in the market.
- Sudden fish mortality in cages near to sale.
- Fish poaching.
- Private sector fish seed price is high and low quality of fish seed.
- Mortality of private sector fingerlings is high.
- Low quality of cage threads and materials causes fish scale damage at the time of handlings and cage cleaning then fish mortality.
- Lake water is becoming polluted.
- Low rainfall resulted high mortality in cages.

SUGGESTED SOLUTIONS

- Community nursery pond constructions for rearing fish larvae from hatchlings to fingerlings stage.
- FRC, Pokhara office should provide advanced fingerlings (10-20gm size) at the time of stocking.
- FRC, Pokhara office should manage for special nylon threads for cage preparations.
- Lake Environment should be kept usable for fish culture by avoiding contaminants and pollutants to lake water for a long time.
- FRC, Pokhara Office should provide pond for ponde (jalari) fisherman for fry nursing.
- Phewa matsaya samiti should manage fish seed and cage making materials.

CONCLUSIONS

The fish production and productivity in cage cultures indicated that both monoculture of Grass carp and polyculture of silver and Bighead carp are profitable to landless jalari community. Cage fish farming profit contributed major portion to their livelihood. The productivity and return from cage fish farming could be improved if they follow recommended practices with timely supply of adequate number of appropriate size of fingerlings. Stocking of Rohu (*Labeo rohita*) as a biological cleaner; manual cage cleaning, cage shifting during the months October to November should be done properly.

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