

**MINISTRY OF CO-OPERATIVES  
COTTAGE INDUSTRIES DEPARTMENT**

**A Report on the Floating  
Gage Fish Culture Research**

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Ministry of Co-operatives  
Cottage Industries Department

A Report on the Floating  
Cage Fish Culture Research

Research carried out at the Central Co-operative  
Society's Aquaculture Station in Hlegu Township  
Rangoon, Burma.

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## 1. OBJECTIVE

The research work on floating cage fish culture has been carried out in order to develop a fresh water aquaculture system in rural areas, through the utilization of natural water resources such as rivers, streams, lakes, etc.,.

## 2. BACK GROUND

Test breeding of cat fish ( *Clarias batrachus* ) in floating cages was performed at the Central Co-operative Society's Aquaculture Station, near Kalihtaw Village, Hlegu - Township, Rangoon, BURMA.

This project was implemented during the period from October 1985 to September 1986, with the assistance of United States Agency for International Development, (U.S.A.I.D). The foreign exchange obtained was spent on laboratory equipment supplies for aquaculture and a short term study tour abroad of two Burmese researchers.

In carrying out this project, the economic feasibility study was performed before hand and the application of this technology in rural areas had been planned, based upon the outcome of the feasibility studies.

## 3. WORK PROGRAM

### (a) Rearing of fish in floating cages

The fingerlings of cat fish ( *Clarias batrachus* ) were purchased from the fish producing facility of the Hlegu - Township Co-operative Society. The average size of the fingerlings was (15.8) cm, which were caught from the flooded fields in Hlegu Township; the quantity of the total fingerlings purchased during January 1986 was ( 162.1 Kilo-gram ) and were about 3495 in numbers.

The floating fish cages were constructed of bamboo and wood, the size of which was ( 2.1 meter ) in length, ( 1.52 - meter ) in width, and ( 1.52 meter ) in height. The total surface area of a cage was ( 3.19 ) square meter. Bamboo floats were fastened along both sides of the cage.

The starting dates of rearing and the quantities of cat fish fingerlings, stocked in each floating cage is shown in Table (1).

(b) Feeding

The fingerling, which had been stocked in 4 cages were fed with three different formula of fish feed. The fingerlings in another fish cage besides the 4 cages were fed with cheaper raw tresh fish.

The three kinds of fish feed contained, difference ratio of rice bram, broken rice, ground nut meal and dried tresh fish, and the composition of the formula is shown in Table (2). In feeding fish the amount of the feed were taken about 6% of the body weight of fish and put in to the bamboo baskets before feeding them. The fish were fed every evening at about 4 P.M.

(c) Technical data collection

During the experimental period, technical data, such as, the growth rate, mortality rate, the conditions of fish, etc., were observed and recorded; chemical and physical analysis on water samples from the "horse-shoe" lake around the work area were also carried out and recorded.

(d) Harvesting

The reared cat fish in the floating cages grown to a certain size, were harvested on the 7 July, 1986 when the fish prices in the township were getting high. They were harvested upon the completion of the six-month experimental rearing period, as envisaged.

In order to harvest the reared fish, each of the cages was taken out of the water and the number, average weight and average length of the fish were recorded. The harvested fish were than sold to the Hlegu Township Co-operative Society.

#### 4. OBSERVATIONS

##### (a) Rearing of fish in floating cages

The number of fish, which were reared in the floating cages are shown in the Table (1). Some of the fingerlings purchased were found to be dead after 14 days of rearing period. It is assumed that they succumbed to the injuries inflicted during handling and transportation. In rearing, the total weight quantity, average weight, and length of the fishes are shown in Table (4).

##### (b) Feeding

The composition of the three types of fish feed formulations, fed to the caged fish are shown in Table (2). Among these formulations, protein content of formula  $K_3$  is 33.7%, formula  $K_1$  is 29.8%, and formula  $K_2$  is 28.35%. The quantity of feed, fed to the fish was equivalent to about 6% of the average body weight of the fish.

Upon the observation of growth rate of fish those of the fish from cage No.(9), fed with these formulations, were found to be increased in weight by 88.59% and are considered to be best among the reared fish. The average weight of fish from cage No.(7) fed with formula  $K_1$ , was found to increase by 78.65% and rated as second. The fish from cage No.(8), fed with formula  $K_2$ , were found to be increased in body weight by 48.44%.

The fish reared in the fish cage No.(12) were fed daily with the raw trash fish. The quantity fed was about 5% of their average body weight. The growth rate of fish from this cage was about 107.25% of the original body weight and was the best growth rate achieved among the fish fed with raw trash fish. However, there were some loss of feed through the bottom of the cages.

##### (c) Technical data collection

The fish samples from the floating cages, were taken out monthly for inspection and the growth rates observed are shown in Table (4). The monthly mortality rates are shown in Table (5).



On studying the physical data of the water level in the horse-shoe lake, the depth of water in the end of May, was about 2.74 meter, and found to be the lowest. The water level in January, which was the initial rearing period, was about 5.88 meter deep.

The water in the "horse-shoe" lake was still and there were no currents. The temperature of water in May was about 30° C and considered to be the highest. The lowest temperature of water was in January and it was found to be about 24° C. The temperatures were recorded at about 1 meter depth, at noon. The physical data of the water from "horse-shoe" lake, are shown in Table (6).

From the results of the chemical analysis of water samples collected from the "horse-shoe" lake it was found that the lake is suitable for rearing fresh-water fish. The chemical analysis data of the water samples collected from the horse-shoe lake are shown in Table (7).

(d) Harvesting

The amount of harvested cat fish in floating cages on 7 July, 1986 was found to be about 81.98 kilo-gram in weight from the five cages. The total number of fish harvested was 1076 and the amount of harvested fish from each cage is shown in Table (8).

5. ECONOMIC EVALUATION

From the evaluation of economic feasibility of this Project, it was observed that the life of floating cages was 2 years and the capital cost of each floating cage is half of initial value i.e. half of K 915.02 = K 457.51. The monthly salary of each worker was calculated as K 200/- for six month duration of the Project.

According to the assessment of the Project, as shown in the balance sheet in Table (9), the net loss amounted to K 7548.50 and the project was not found to be economically feasible.

6. CONCLUSION

During the rearing of fish in floating cages about 69.21% of the total number of fish initially reared, died About 35% of the death took place in January, the starting period.

Although the reared fish were fed with three kinds of feed formulations, they were found to decrease in growth rate this is due to the still water in the over stocked cages, which were placed in the horse-shoe lake, where the amount of dissolved oxygen is very low.

Since the reared eat fish in the fish cage No.(12) were small in number and the feed used nutritious raw tresh fish, they were found to manifest good growing characteristics.

Therefore, in conclusion, this project on floating cage fish culture research was not found to be economically feasible due to high mortality rate, poor growth rate and, low profit.

Table (1) Data on rearing of fish in floating cages

Cage number	Date	Number of fish	Weight Kilogram
12	3-1-86	684	26.40
11	25-1-86	786	32.52
9	26-1-86	418	22.66
8	27-1-86	758	36.84
7	30-1-86	849	43.68
		<hr/>	<hr/>
		3495	162.10

Table (2) The composition of ingredients in feed formulations

Feed formula	Proportion of ingredients in %			
	Broken rice	Rice bran	Ground nut cake	Dry tresh fish
K <sub>1</sub>	40	10	10	40
K <sub>2</sub>	25	25	25	25
K <sub>3</sub>	20	20	20	40
K <sub>4</sub>	Raw tresh fish ( 100% )			

Table (3) Nutritional values of the fish feed formulations

Feed formula	Crude protein (%)	Fat (%)	Carbohydrate (%)	Calcium (%)
K <sub>1</sub>	29.8	3	25.9	2.8
K <sub>2</sub>	28.35	4.72	16.22	1.75
K <sub>3</sub>	22.7	4.46	12.98	2.8

Monthly progress record of reared fish in floating cages

Table (4)

Cage number	Particulars	January	February	March	April	May	June	July
7	Number of fish	849	523	303	288	278	243	172
	Mean weight (gm)	51.45	60.45	69.45	78	85.5	90.5	91.92
	Mean length (cm)	16.5	18.7	18.7	19.8	20.6	21.5	22
	Fish feed	K <sub>1</sub>	K <sub>1</sub>	K <sub>1</sub>	K <sub>1</sub>	K <sub>1</sub>	K <sub>1</sub>	K <sub>1</sub>
8	Number of fish	758	633	515	504	495	482	409
	Mean weight (gm)	48.59	53.50	58.55	62.40	70.1	72	72.13
	Mean length (cm)	16	16.5	17.2	18	18.8	19.5	20
	Fish feed	K <sub>2</sub>	K <sub>2</sub>	K <sub>2</sub>	K <sub>2</sub>	K <sub>2</sub>	K <sub>2</sub>	K <sub>2</sub>
9	Number of fish	418	266	218	196	191	167	118
	Mean weight (gm)	54.2	62.5	70.5	78.2	87	95.5	102.22
	Mean length (cm)	17	18.2	19.4	20.7	21.8	22.9	23.5

Cage number	Particulars	January	February	March	April	May	June	July
11	Number of fish	786	590	481	468	455	392	322
	Mean weight (gm)	41.37	45.6	49	54	58	60.5	62.77
	Mean length (cm)	15	15.6	16.2	17	17.8	18.7	19
	Fish feed	K <sub>3</sub>	K <sub>3</sub>	K <sub>3</sub>	K <sub>3</sub>	K <sub>3</sub>	K <sub>3</sub>	K <sub>3</sub>
12	Number of fish	684	258	218	186	161	116	55
	Mean weight (gm)	38.6	46.84	55	63.2	71.4	78.5	80.01
	Mean length (cm)	14.5	15.9	16.3	17.5	18.8	20.6	21.5
	Fish feed	K <sub>4</sub>	K <sub>4</sub>	K <sub>4</sub>	K <sub>4</sub>	K <sub>4</sub>	K <sub>4</sub>	K <sub>4</sub>

Table (5)

Monthly mortality rate

Cage number	January	February	March	April	May	June
7	326	220	15	10	35	71
8	125	118	11	9	13	73
9	152	48	22	5	24	49
11	196	109	13	13	63	70
12	426	40	32	25	45	61

Table (6) Physical data on the water of horse-shoe lake

Date	Water temperature °C		Water Depth Meter	Smell	Turbidity 12:00 hrs. (cm)
	6:00 hrs. MIN	12:00 Hrs. MAX			
1-1-86	24	26	5.18	Nil	71.12
1-2-86	25	27	4.57	"	60.96
1-3-86	28	30	4.14	"	45.72
1-4-86	28	30	3.65	"	40.64
1-5-86	28	30	3.35	"	34.54
1-6-86	28	30	2.74	"	15.29
1-7-86	27	29	3.04	"	12.7

Table (7) Chemical analysis of water samples from horse-shoe Lake

Date	Quantitative Parts per Million						PH.
	Chloride	Total solid	Total hardness	Saline amonia	Iron	Nitrate	
1-1-86	23.00	46.00	15.0	0.002	0.12	0.12	7.4
1-2-86	23.00	44.00	15.0	0.001	0.12	0.1	7.4
1-3-86	23.00	44.00	15.0	0.002	0.12	0.1	7.4
1-4-86	23.00	42.00	15.0	0.003	0.12	0.12	7.4
1-5-86	20.00	42.00	15.0	0.003	0.12	0.1	7.2
1-6-86	17.00	40.00	15.0	0.004	0.12	0.1	7.0
1-7-86	5.67	40.00	15.0	0.005	0.12	Trace	6.7

Table (8) Data on harvesting of cat fish on (7-7-86)

Cage Number	Total number of fish	Total weight (kg)	Mean weight (g)	Mean length (cm)	Growth rate within 6 month (% of original weight)
7	172	15.81	91.92	22	98.65%
8	409	29.50	72.13	20	48.44%
9	118	12.06	102.22	23.5	88.59%
11	322	20.21	62.77	19	50.72%
12	55	4.4	80.01	21.5	107.27%

Table (9) Balance sheet

Sr. No.	Particulars	Quantity	Unit Price	Total cost		Particulars	Quantity	Unit Price	Total cost	
				Kyat	Pya				Kyat	Pya
	Sales <sup>of</sup> reared cat fish	50.3 Viss	24	1207	20	Cat fish - fingerlings	99	45	2091	00
	Loss			7541	50	<u>Fish feed</u>				
						Rice Bran		241	00	
						Broken Rice		374	00	
						Dry Tresh fish		1591	40	
						Ground nut meal		240	50	
						Raw Tresh fish		713	25	
						Floating fish cage		5457.51	2287	55
			Labour - charges		1200	00				
	<b>Total</b>			<b>8748</b>	<b>70</b>	<b>Total</b>			<b>8748</b>	<b>70</b>



Fig ( 1 )

Lifting Floating fish cage out of water ( 7-7-86 )

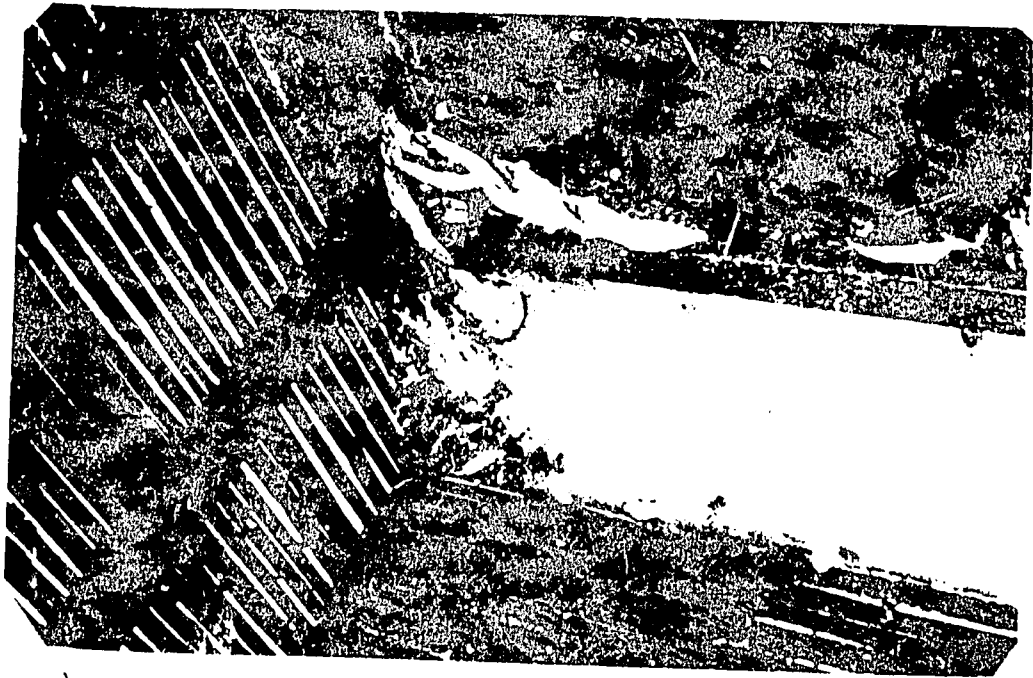


Fig ( 2 )

Reared cat fish inside the floating cage ( 7-7-86 )

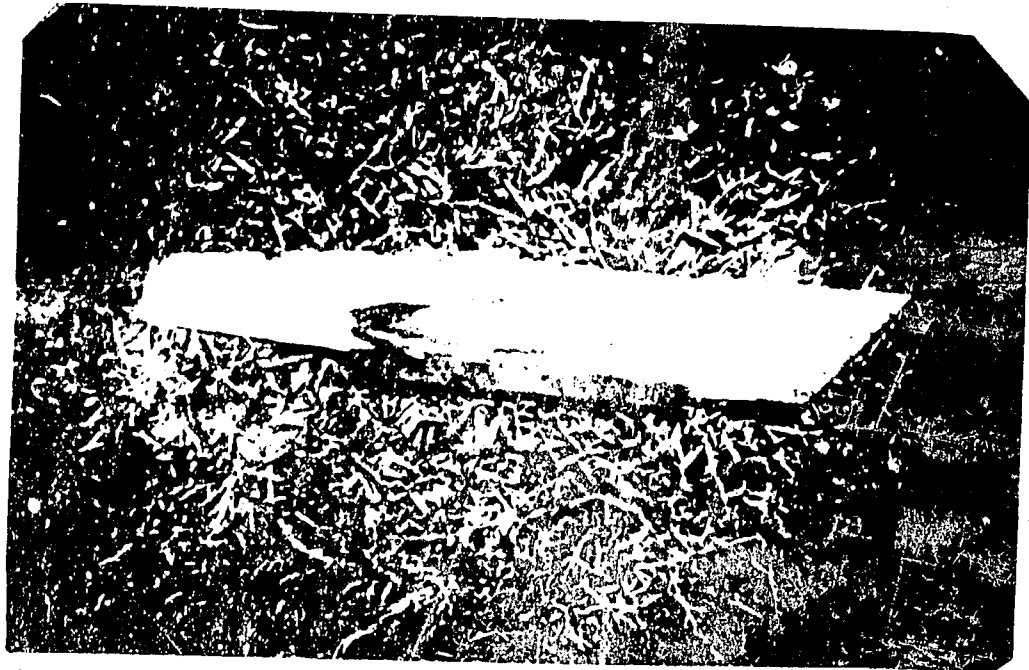


Fig ( 3 )

Measuring the average length of harvested cat fish ( 7-7-86 )

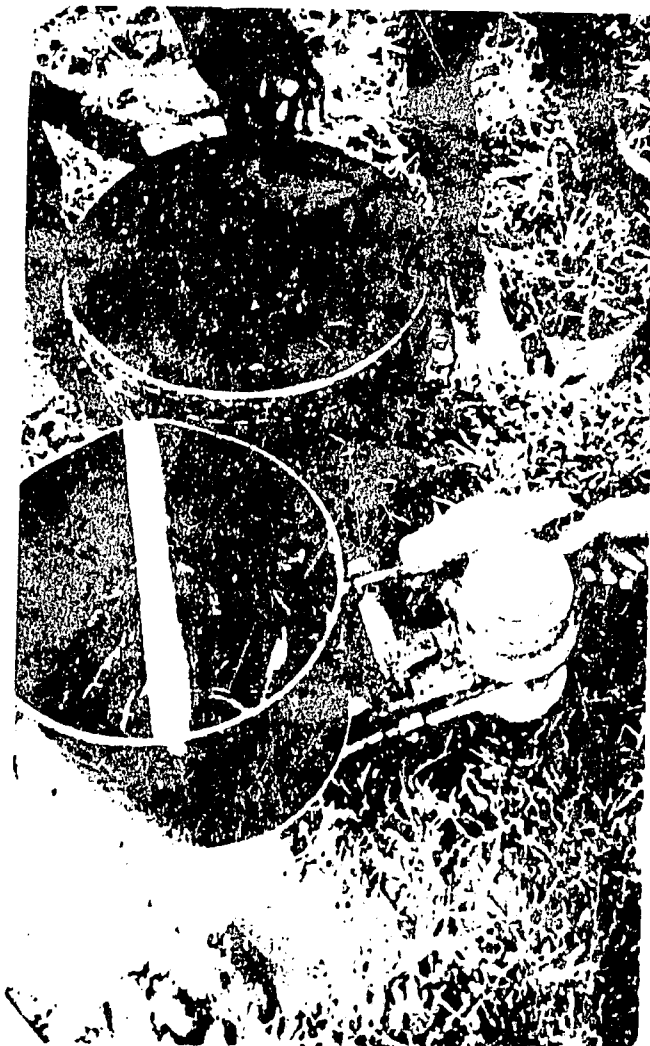


Fig ( 4 )

Weighing of harvested cat fish from each cage.

( 7-7-86 )



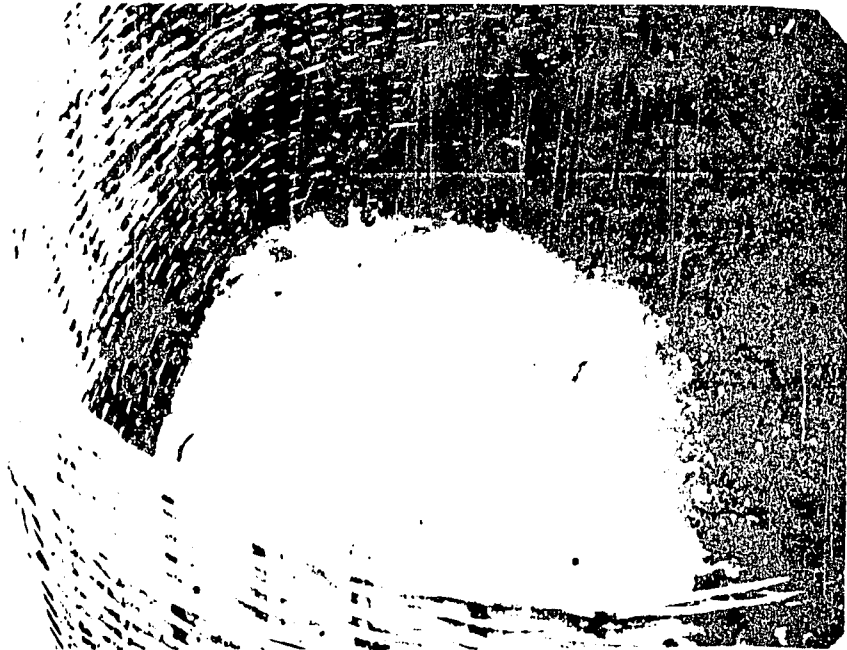


Fig ( 5 )

Interim storage of harvested cat fish before being  
sent to the market ( 7-7-95 )