

**BANKABLE PROJECT PROPOSAL**  
**ON**  
**COMMERCIAL FISH PRODUCTION**  
**OR**  
**COMPOSITE PISCICULTURE**  
  
**FOR**  
**APICOL (Agricultural Promotion and Investment**  
**Corporation of Odisha Ltd.)**

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## **BANKABLE PROJECT PROPOSAL**

**ON**

### **COMMERCIAL FISH PRODUCTION or COMPOSITE PISCICULTURE**

#### **Introduction:**

Fish is the cheapest and most easily digestible animal protein caught from the natural sources since immemorial for consumption of human beings. However, due to over exploitation and pollution, the availability of fish in natural waters have declined considerably forcing scientists to adopt various methods to increase its production. Fish farming in controlled or under artificial conditions has become the easier way of increasing the fish production and its availability for consumption. Farmers can easily take up fish culture in village ponds, tanks or any new water body and can improve their financial position substantially. It also creates gainful employment for skilled and unskilled youths. The technology developed for fish culture in which more than one type of compatible fishes are cultured simultaneously is the most advanced and popular in the country. This technology is known as Composite Fish Culture. This technology enables to get maximum fish production from a pond or a tank through utilization of available fish food organisms in all the natural niches, supplemented by artificial feeding. Any perennial fresh water pond/tank retaining water depth of 2 metres can be used for fish culture purpose. However, the minimum level should not fall below one metre.. Even seasonal ponds can also be utilised for short duration fish culture.

#### **Present Scenario:**

The present level of production from the inland aquaculture of Odisha is 1,90,372 MT which is quite low compared to the resource potentials available. The population of Odisha is around 41 million which is growing 1.5% per annum and about 70% of the population are fish eaters. The rapid population growth is exerting tremendous pressure on the available land for housing, industrial, agricultural and infrastructure development. The total fish production of the state was 4.10 lakh tonnes (2012-13) out of which fresh water fish production was 2.61 lakh tonnes. The present level of fish production and productivity is quite insufficient to meet the need of the state. The upgraded and advanced technical knowledge for intensive pisciculture to produce more than 5.0 MT per ha is not disseminated to the fish farmers and bankers of the state. Therefore to create interest and awareness among the fish farmers, entrepreneurs and bankers of the state demonstration and exposure visits are essential.

Composite fish culture using six varieties of fishes viz; Catla, Rohu, Mrigal , Grass carp, Silver carp and Common carp is generally being practiced by farmers throughout the country, however, taking into consideration the growth rate , consumer preference and seed availability the a farmers in various parts of the country adopt poly culture/ mixed culture of these varieties in varied proportions. The farmers in Andhra Pradesh have developed the technique for intensive fish culture of two varieties of carps viz; Rohu and Mrigal depending on the compatibility, feeding habits and market preference of the fishes. Composite fish culture aims at fuller utilization of pond productivity at different ecological niches by culturing together fast growing compatible species of complementary feeding habits in enemy free ponds under favorable conditions with enough food including supplementing the same. The fish species involved in composite are:

<b>Species</b>	<b>Feeding habit</b>	<b>Feeding niche</b>
<b>Indian Major carps</b>		
Catla	Zooplanktophagus	Surface feeder
Rohu	Omnivorous	Column feeder
Mrigal	Detritovorous	Bottom feeder
<b>Exotic carps</b>		
Silver carp	Phytoplanktophagus	Surface feeder
Grass carp	Herbivorous	Column & Marginal areas
Common carp	Omnivorous	Bottom feeder

### **Technical Parameters:**

#### **a. Soil and water quality management**

The productive pond soil status include loamy or clay loamy bottom free from excessive silt deposition with 6.5 –7.5 pH, 30-50mg/100g available nitrogen, 6.0 – 16mg/100g available phosphorus, 1-2% organic carbon.

The productive pond water conditions include light green to turbid brown water colour, 25-35° C temperature, 20 ppm turbidity, 7.5-8.6 pH, 75-250 ppm total alkalinity and 5-10 ppm dissolved Oxygen.

If the pond bottom soil is acidic (pH below 6.5) or sodic (pH above 8.5) needs corrective measures for their profitable utilization. Application of quick lime ( CaO ) @ 160-480 kg /Acre depending on soil pH in 3-4 instalments corrects the a acidity of soil where as sodic

soil may be corrected to favorable pH range by applying agricultural gypsum ( $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$ ) @ 2-2.4 tones/acre in instalments.

**b. Control of algal bloom & aquatic weeds**

Due to eutrophication of pond water through application of organic manures, luxuriant growth of algal bloom / aquatic weeds may occur. Application of commercial hydrated  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  at the rate of 0.3 ppm or Simazine / Diuron at the rate of 0.3 – 0.5 ppm controls all types of algal blooms. All types of aquatic weeds can be eradicated by using manual labour, which is the cheapest method over using any chemical herbicides. Further, emphasis has to be given on control of submerged aquatic weeds by biological means using herbivorous fishes like grass carp (*Ctenopharyngodon idella*)

**c. Predatory and weed fish control**

Sometimes larvae and eggs of weed & predatory fishes are escaped into the pond culture system and grown, established through prolific breeding activities, create nuisance to the system. Mahua oil cake (*Basia latifolia*) containing 4-6% saponin kills unwanted fishers at 1000- 1200 kg /Ac-m in 6-10 hours. The toxicity lasts about 3 weeks. In another method 40kg/Ac-m of urea is applied before 12-18 hours of bleaching powder application @ 100kg/Ac-m. The fishes are killed within 15-20 minutes and toxicity lasts for a week.

**d. Productivity improvement**

The inherent productive capacity of the ponds can be enhanced through the application of animal excreta and liming, which in turn results sufficient production of fish food organisms (planktons & benthos) and subsequent growth of fishes . Liming is done @ 240-320 kg/Acre/based on soil & water pH condition in 3-4 installments. If bleaching powder is used as fish toxicant, the first dose of lime is not applied. Depending upon the inherent fertility of the soil live-stock excreta is applied @ 10 tones/acre/yr, on 10-11 monthly split-up doses. Initial manuring with organic manure @ 20% of the total requirement is done before 7 days to stocking. If mahua oil cake is applied as piscicide the initial manuring may be dispensed with.

**e. Species combination and repeated stocking**

The pond is to be stocked with 15-20cm yearlings @ 5000-6000/ha/year. In 3-4 installments keeping 25-30% surface feeders (catla) , 50-60 % column feeders (rohu), 15-20% bottom feeders (mrigal and common carp). The table-size fishes (0.75 –1.0 kg) are

skimmed off in 3-4 months interval and the numbers of harvested fish are replenished with yearlings to optimum utilization of the carrying capacity of the pond in a year. Adjacent 4 nos of nursery tanks can be utilized rearing and keeping of yearlings for repeated stocking purpose .

**f. Supplementary feeding**

In this culture system, fishes meet their nutritional demand from the grazing and detritus food chain in natural condition. However, artificial feeds like GNOC/MOC and DORB (1:2) are to be fed daily to the fish at the rate of 2-3% of total bio-mass to shoot up their body growth. Grass carps are fed with preferred aquatic vegetation kept in enclosures in selected corners of the pond. Marginal vegetation, land grasses, maize leaves, banana leaves, vegetable refuse cattle fodders like - Napier, Berseem, elephant grass etc. may be used for grass carp feeding.

**g. Aeration & water exchange**

One 5 hp. Pumpset is required for emergency aeration through water circulation in the culture pond. Due to continuous dumping of animal excreta and accumulation of fish metabolites, the pond water environment gets spoiled leading to slower growth and disease in fish. Under such circumstances 5 –20% water exchange is required.

**h. Periodical Monitoring**

Fortnightly sampling of fish stock by using a drag net is essential to assess the survival, growth and health of fishes. Each sampling time fish should be given a dip treatment of either 3% common salt or 0.15% malathion or 50 ppm formalin or 3-5 % potassium permanganates for 15 seconds as a prophylactic treatment against harmful protozoan or crustacean parasites or fungal infection or bacterial attack respectively.

**i. Harvesting**

Under this management practice, table size fishes of 0.75 to 1 kg can be harvested repeatedly in 3-4 months interval and a total fish yield of 3 tonnes /Acre/year can be achieved.

## TECHNICAL PROGRAMME FOR COMPOSITE PISCICULTURE

1. Water spread area of the tank (in hectare): 1.0 ha WSA

### A) Operational cost

Sl. No	Particulars	Rate of Application	Unit Price (Rs.)	Quantity required in kg	Total Amount (Rs.)
<b>1.</b>	<b>Liming and Manuring</b>				
	a) Initial Monthly Liming	1000 kg	5.50	1000 kg	5,500.00
	b) Raw cow dung	5000 kg	0.30	5000 kg	1,500.00
	c) Single super phosphate	100 kg	6.00	100 kg	600.00
	d) Cal. Ammonium Nitrate	100 kg	6.00	100 kg	600.00
<b>2.</b>	<b>Seed – Fingerlings(100 mm above)</b>	5,500 nos.	5.00	5,500 nos	27,500.00
<b>3.</b>	<b>Feed</b>				
	a) Rice Bran	1,500 kg	10.00	1,500 kg	15,000.00
	b) GNOC / MOC	1,500 kg	40.00	1,500 kg	60,000.00
<b>4.</b>	<b>Miscellaneous</b>				
	a) Medicines and Chemicals (LS)				2,500.00
	b) Harvesting Expenses (LS)				5,000.00
	c) Insurance @ 2.5% at input				2,950.00
	d) Misc. Expenses				3,850.00
<b>TOTAL</b>					<b>1,25,000.00</b>

### B) ECONOMICS

1. Culture period: 11 months

a) Annual Income from sale of fish 3,000 kg/ha

@ Rs. 90/- per kg : Rs. 2,70,000.00

b) Total Income from 2<sup>nd</sup> year onwards : Rs. 2,70,000.00

C) Net Income (B – A)

i) Gross Income : Rs. 2,70,000.00

ii) Annual Operational cost : Rs. 1,25,000.00

iii) Net Income : Rs. 1,45,000.00

Repayment Schedule (7 years including 1<sup>st</sup> year as grace period)

Year	Loan Amount (Rs.)	Interest @ 11%	Total Loan (Rs.)	Gross Income(Rs.)	Repayment (Rs.)	Out standing (Rs.)	Net profit (Rs.)
1 <sup>st</sup>	4,25,000	46,750	4,71,750	0	Grace	4,71,750	0
2 <sup>nd</sup>	4,71,750	51,893	5,23,643	1,45,000	1,22,726	4,00,917	22,274
3 <sup>rd</sup>	4,00,917	44,101	4,45,018	1,45,000	1,14,934	2,85,983	30,066

4 <sup>th</sup>	2,85,983	31,458	3,17,441	1,45,000	1,02,291	2,15,149	42,709
5 <sup>th</sup>	2,15,149	23,666	2,38,816	1,45,000	94,500	1,44,316	50,500
6 <sup>th</sup>	1,44,316	15,875	1,60,191	1,45,000	86,708	73,483	58,292
7 <sup>th</sup>	73,483	8,083	81,566	1,45,000	81,566	0	63,434

### Calculation of NPV and IRR

	1	2	3	4	5	6	7
Capital Costs	425000	0	0	0	0	0	0
Recurring Cost	125000	130000	136000	143000	149000	155000	161000
Total Costs	550000	130000	136000	143000	149000	155000	161000
Benefit	0	270000	290000	320000	360000	420000	480000
Net Benefit	-550000	140000	154000	177000	211000	265000	319000
PW Cost @ 15%	1091403						
PW Benefits @ 15%	1285770						
NPW	194367						
B.C Ratio	1.178089						
I.R.R (%)	32.27						

$$\text{BEP} = \frac{\text{Fixed cost}}{\text{Sale Price} - \text{variable or recurring cost}}$$

$$= 141.67 / 48.33 = 2.93 \text{ units}$$

$$\text{DSCR} = \frac{\text{Net Income or cash accrual} + \text{depreciation} + \text{Interest expenses}}{\text{Principal repayment} + \text{Interest repayment}}$$

$$= 19.17 / 8.16 = 2.35$$

### Conclusion:

From the above analysis, it can be concluded that the project on commercial fish production is profitable and financially feasible.

**APPENDIX:**

**Detailed estimate for Excavation of New Pisciculture Pvt. Tank.**

**SIZE OF TANK**

Area of the tank overall -	1.0 Ha.	Length	120	Breadth	120
Depth of the tank proposed -	1.5 M	WSA-		<b>1.00</b>	Ha.

A. Earth work in ordinary soil within 50 mt. initial lead and one extra lift of 1.5 mt. over initial lift including rough dressing and breaking the clods minimum 5 cm. to 7 cm. size and laying in layers not exceeding 0.3 mt. in depth or as directed by the Engineer-in-charge.

95	95	0.30	2707.5
90	90	0.30	2430.0
85	85	0.30	2167.5
80	80	0.30	1920
75	75	0.30	1687.5

**10912.5 cum.**

or say .....cum @ Rs. 25/- per cum... Rs. 272813

B. Extra lifting of 1.5m or part there of over the initial lead of 1.5m in all kind of emarkments & road works & ordinary earth works in general including cost of all and complete

Qty. 1/3rd of items no. A 10912.5 cum.  
or say ... 3637.5 cum @ Rs. 6.33/- per cum Rs. 23047

C. Fine dressing and turving of pond embankment with initial lead 50m & 1.5m initial lift including 5 extra lead over the basic rate & cost of all and complete as per the direction of the Engineer-in-charge.

Quantity-

1X2[ 120+120 ]	X	4.5	=	2160.0 cum.
1X2[ 102+102 ]	X	4.5	=	1836.0 cum.
			=	3996.0 cum

		Rs.	29886
Deduct 12.5% towards Contractor's profit (-)		Rs.	40718
Misc. Expenditure.	L.S	Rs.	<u>14972</u>
	<b>Total</b>	<b>Rs.</b>	<b>300000</b>

**(Rupees Three lakh ) only**

# PLAN OF TANK (NOT TO SCALE)

