

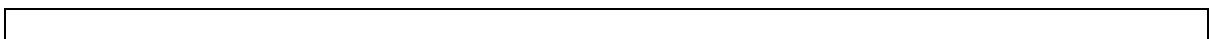
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## MODEL SCHEME ON INTEGRATED FISH FARMING WITH POULTRY IN BIHAR

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**NATIONAL BANK FOR AGRICULTURE AND RURAL DEVELOPMENT**  
**BIHAR REGIONAL OFFICE, PATNA**



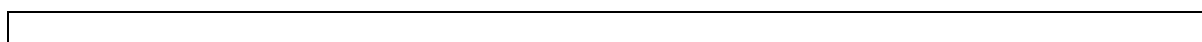
## 1. Introduction

The inland fisheries and aquaculture contributes about 68 per cent of the total fish production of the country. Fisheries and aquaculture is one of the important allied sectors in Bihar in terms of providing livelihood, nutritional security and employment opportunities to the rural poor. The agro-climatic conditions of the State are suitable for fish farming. It is envisaged to produce 10 lakh tonnes of fish per annum by 2022 as per the Agriculture Road Map prepared by Govt. of Bihar. The State ranks 4<sup>th</sup> position in inland fish production in the country. The annual domestic demand of fish in the State is 6.42 lakh tonnes and majority of people in the State prefer fresh water fish. The State depends on supply of fish from Andhra Pradesh and West Bengal (about 1.42 lakh tonnes per annum) to meet the growing demand in towns and cities. There is demand for locally produced fish in the State. With growing urbanization, increased purchasing power and change in food habits, there is also growing demand for poultry meat.

Integrated fish farming is a system of producing fish in combination with other agricultural/livestock farming operations centred on the fish pond. The farming sub-systems e.g. fish and livestock are linked to each other in such a way that by-products/wastes from one sub-system become the valuable inputs to another sub-system.

Poultry farming is a common practice in the villages. Integration of poultry farming with fish culture is suitable and economically viable practice, where poultry droppings is used as organic manure in fish ponds, which leads to production of natural food for fish to grow. Poultry litter contains 1.6 per cent nitrogen, 1.5 per cent phosphorous, 0.9 per cent potassium and 2.4 per cent calcium.

In the context of doubling of farmer's income and also to derisk the farming from climate change effects, the integrated farming system is very much suitable for adoption in rural areas. From the economic point of view, the integrated farming system of fish and livestock ensures higher returns per unit of land, regular income source, increased savings and credit worthiness of famers, help in risk mitigation and better recovery of credit.



## **2. Scope for Integrated Fish farming with Poultry**

The integrated fish farming with poultry (broiler) is suitable in the State as there is immense demand for both chicken and fish. The integrated fish farming can be taken up in the existing ponds/tanks and also by constructing new ponds. The State has 93926 ha of tanks and ponds. There is vast scope for construction of new ponds in low lying areas in all districts of Bihar. The integrated fish farming with broiler is very much suitable for small and marginal farmers so as to maximize the returns per unit of land.

## **3. Technical Parameters**

In the integrated fish cum poultry farming system, fish farming is the nucleus activity. The culture of IMC (Rohu, Catla & Mrigal) and exotic carps like Common Carp and Silver Carp are taken up for culture. The grow-out period is maximum of 8 weeks for broiler and maximum 4 batches are taken in a year. The Day Old Chicks (DOC) should be purchased from a good hatchery.

### **3.1 Site Selection**

The selection of site plays an important role in integrated fish cum poultry farming as the management measures to be taken depends on the site conditions. The aspects to be considered for integrated fish farming with broiler are soil type, availability of quality water, access road, source for supply of DOC, etc. The site selected should be free from regular occurrence of high floods and free from pollution. The site selected should also have surface or ground water supply source for filling the pond or water exchange in case of need. The broiler are housed in a low cost thatched house supported by poles footed on the embankment and pond bottom, so that the droppings are easily fallen into the pond water.

### **3.2 Soil**

The quality and texture of the soil have great bearing on the productivity of pond water and construction of embankment. The ideal soil quality for culture of carps should be clay, clay loam, silty clay and sandy clay with good water retention capacity. The pH of the soil should be in the range of 6.5 to 7.5. The pH affects the productivity of the ponds. The acidic soils are less productive than alkaline soils. Based on soil pH, application of lime is recommended.

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Besides moderating the soil pH, the lime acts as a buffer and avoids fluctuations of pH, increases the resistance of soil to parasites, kills parasites and fastens the process of decomposition of organic matter.

### **3.3 Water**

Adequate and good quality of water, free from pollution is required for fish culture. The water depth of 1.2 m should be maintained throughout the culture period. The optimum water quality parameters for culture of IMC and exotic carps are as under:-

Temperature	: 25 -32 °C
Dissolved oxygen	: 5-7 ppm (5-7 mg oxygen per liter of water)
Visibility	: 40 cm
Color	: Light Green/Brown
pH	: 7 to 7.5
Salinity	: 0-5 ppt
Total alkalinity	: 50-100 ppm
Ammonia	: not more than 0.1 ppm

Since the poultry excreta are rich in nitrogen, regular monitoring of water quality parameters needs to be taken up, for which readymade kits are available.

### **3.4 Pond Construction**

Rectangular ponds are suitable considering operational convenience, particularly for harvesting of the fish. A convenient width of 30 to 50 m is recommended, whereas the length of the pond depends on the site, topography and farm layout. The length of pond should be from east to west direction. Normally pond size of 0.4 to 1.5 ha is found suitable. The average depth of the pond should be minimum 1 m and maximum of 1.5 m. Dyke slope may be kept at 1.5:1 outside and at 2:1 inside. The minimum top width of dyke should be about 1 m. The embankment must have a free board of at least 60 cm above the high water level in the pond. Design and layout of the farm may be prepared keeping in view the water intake and discharge facilities. The drainage system should be designed carefully to prevent mixing of outlet water with incoming water. The pond construction may be done by earth moving equipment i.e. proclainer, Dumper/tractor. While constructing pond embankment, berm of maximum upto 6 feet length needs to be provided. The detailed layout plan of the pond needs to be prepared by engaging engineers or technical persons for submission along with the

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project report. The top soil should be kept aside and placed in the pond bottom after excavation of the new pond.

### **3.5 Water Supply**

The tube well and pumping system may be arranged for water intake and exchange in the absence of perennial surface water supply. Water exchange as required is to be made and provisions have to be made accordingly. The water inlet to be provided at suitable height above the water level and an outlet at suitable height below water level needs to be provided. For the year round maintenance of optimum water level and water exchange, the shallow tube well with pump set may be installed near the site.

### **4. Farm Management**

In the integrated fish cum poultry farming system, approximately 500 to 600 birds are required to fertilize one ha of pond area. The success of integration of broilers with fish depends on good quality DOC, housing, management and health care. The poultry birds are reared in deep litter or cage system. Deep litter system is preferred due to higher manurial value.

The type of pond preparation to be adopted before stocking of fish is based on the type of culture, its intensity and the culture period. The stocking density of 5000 fingerlings is recommended. The culture period of fish would be maximum of 11 months. The stunted yearlings (50 to 60 g) should be stocked and average growth of 600 to 700 gram would be possible at harvest. The broiler birds are reared for 6-8 weeks in four batches per year with 250 birds per batch. The broilers are fed with formulated feed (prestarter, starter and finisher). The feeding equipment are used to avoid wastage. The birds are provided with clean water through waterer. The DOC should be purchased from good hatchery having quality certification.

The fish seed obtained should be of healthy and good quality. The trial netting should be done every month to monitor growth and health of the fish. The litters can be applied daily @ 30 to 35 kg per ha or in weekly basis. Application of litter is stopped when algal bloom appears on the pond. The equipment purchased should be insured. The farm records may be maintained to facilitate insurance claim, if required.

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## **5. Extension Services**

The borrower should have experience in fish farming and broiler rearing or received training for management of fish farms and broiler farms. The officers of Fisheries Dept. and Animal Husbandry Dept. are available in the District/Block headquarters. The block level training programmes may be arranged periodically for the groups of farmers. The fish Farmers Club or Producer Groups may be formed in a cluster of villages to get the required extension services, procurement of seed, DOC, fishing equipments and also help in marketing of fish/broiler.

## **6. Marketing**

In Bihar, there is huge demand and supply gap for fish and broiler meat. The local fishes are preferred by the consumers over the ice preserved fishes brought from West Bengal and Andhra Pradesh. The fish produced locally fetches higher price in the local market and there would not be problem with marketing of fish. The units developed in a cluster may form Producer Groups to market the fish directly to the wholesalers in the markets, avoiding the intermediaries and this would facilitate higher returns to farmers. Marketing of broilers should start from 4-5 weeks of rearing during which birds weigh 1.2 to 1.5 kg.

## **7. Eligible Borrowers**

The scheme may be sanctioned to individuals/groups of farmers/SHG members/JLG members, etc. The selected borrower should have received training on fish farming/poultry or having experience of fish farming/poultry. The borrower should have clear title of land or land taken on long term lease of more than 10 years. The loan application available with banks along with project report needs to be submitted by the prospective entrepreneurs to the local Commercial banks, Gramya banks and Cooperative banks for financing. The short term training on fish farming is provided by the Fisheries Dept., NFDB, CIFA and KVKs.

## **8. Financial Outlay**

The details of financial outlay for integrated fish farming in new pond with broiler are indicated in Annexure-I. The capital cost for one ha has been estimated at Rs.3.98 lakh and

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the operational cost for one cycle has been estimated at Rs.3.03 lakh and capitalized. The particulars of investments and costs worked out are indicative and it may vary with the field situations and accordingly required changes have to be made in the field conditions, if required.

## 9. Margin money and Bank loan

As per the guidelines of RBI, the borrowers are required to spend for the development of the activity from their own resources, at the rate of minimum 5 per cent for small farmers, 10 per cent for medium farmers and 15 per cent for other farmers. The margin money assumed is 25 per cent in the model scheme prepared.

## 10. Refinance

The refinance facility is available from NABARD to Commercial banks, Cooperative banks and RRBs for financing integrated fish farming with poultry. Under Long Term Rural Credit Fund (LTRCF), the concessional refinance is available to cooperative banks & RRBs for on lending to farmers. The quantum and rate of interest under normal refinance and LTRCF window to banks varies from time to time.

## 11. Subsidy

Under *Blue Revolution* scheme of the GoI, the subsidy assistance is available for development of new ponds 40 per cent of the unit cost for general category and 60 per cent of the unit cost for the category of SC/ST/women and their cooperatives.

## 12. Financial Viability

The financial viability of integrated fish farming with poultry has been assessed with the assumptions mentioned below.

Sl. No.	Parameters	Assumptions
i	Unit size	1 ha
ii	Grow out period - Fish	11 months
iii	Stocking density of Fish	5000
iv	Grow out period - Broiler per batch	4-6 weeks
v	No. of poultry batches per year (all in all out system)	4

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vi	No. of birds per batch	250
vii	Survival of birds and fish	95%
viii	Average weight of birds at harvest	1.3 kg
ix	Stocking Size of Fish	50g -60g
x	Production Fish	2500 kg in first year and 3000 kg from second year onwards
xi	Farm gate price - Fish	Rs.125.00 per kg
xii	Farm gate price - Broiler	Rs. 75.00 per kg

The scheme is financially viable and bankable with the above assumptions having BC ratio of 1.20, NPW of Rs. 338869.00 at 15 % DF and IRR of more than 15 %.

### **13. Rate of Interest**

The interest rates to be charged to the beneficiaries is as per the individual bank/RBI guidelines from time to time.

### **14. Repayment Period**

The borrower of the unit would be able to repay the bank loan in 7 equated annual instalments with grace period of first year for repayment of the principal. The details of repayment schedule are given in Annexure II.

### **15. Security**

The security to be provided by the by the beneficiaries would be as per guidelines of RBI issued from time to time.

### **16. Conclusion**

Since the State has large untapped potential and demand for fish and poultry meat, integrated fish farming with poultry (broiler) would provide higher returns to farmers and create employment opportunities and make the state self-sufficient in fish and broiler production.

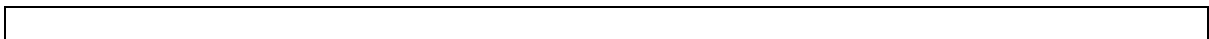
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**DISCLAIMER**

The views expressed in this model project are advisory in nature. NABARD assumes no financial liability to anyone using the report for any purpose. The actual cost and returns of the projects will have to be taken on a case by case basis considering the specific requirement of projects



**Annexure - I: Details of Financial Outlay for Integrated Fish farming in new pond (1 ha) with Poultry (Broiler)**

Sl. No	Particulars	Unit		Rate (Rs.)		Amount (Rs.)
<b>A</b>	<b>Capital cost</b>					
1	Land Cleaning/Development			2500.00	Lump Sum (LS)	2500.00
2	Construction of pond (digging & bund construction) by machine (using Proclainer) - 1.5 m depth	100	hr.	1500.00	per hour	150000.00
3	Earth movement using machines (Dumper/Tractor)	500	trips	125.00	per trip	62500.00
4	Sectioning, consolidation and compaction of bunds manually	70	man-days	250.00	per day	17500.00
5	Shallow Tube well (100 mm x 45 m depth) with pump set of 5 hp	1	No.	70000.00		70000.00
6	Pump house cum Store room cum Watchman room - AC sheet roofing	120	sq. ft.	250.00		30000.00
7	Low cost poultry shed for housing 250 birds @1 sq. ft. per bird	250	sq. ft.	100.00		25000.00
8	Cost of DOC for the first batch	250	nos.	25.00	per bird	6250.00
9	Inlet and outlet (sluices)				LS	10000.00
10	Sampling Nets, plankton net, water testing kit, plastic buckets, secchi disk, etc.				LS	10000.00
11	Feeder and waterer	250	nos.	25	per bird	6250.00
12	Miscellaneous expenses				LS	8000.00
					<b>Sub Total</b>	<b>398000.00</b>
<b>B</b>	<b>Operational cost</b>					
1	Lime	500	kg	12.00	per kg	6000.00
2	Fish seed (stunted Yearlings of 50 -60 g size)	5000	nos.	7.00	per piece	35000.00
3	Cost of DOC for 4 batches with 3% extra	1040	nos.	25.00	per bird	26000.00
4	Poultry feed @3.1 kg per bird	3224	kg	35.00	per kg	112840.00
5	Medicine and chemicals for broiler and fish				LS	12000.00
6	Harvesting expenses - Fish	2500	kg	2.00	per kg	5000.00

7	Labour cost	8000	per month	12.00		96000.00
8	Miscellaneous cost				LS	10000.00
					<b>Sub Total</b>	<b>302840.00</b>
					<b>Grand Total (A+B)</b>	<b>700840.00</b>
					Rounded off to nearest thousand	<b>701000.00</b>
	<b>Income Parameters</b>					
1	Culture period - Fish	11 months				
2	Broiler - 250 birds per batch	4 batches per year				
3	Production - Fish	2500	kg first year			
		3000	kg second year onwards			
4	Farm gate price of harvested fish (Rs.)	125.00	per kg			
5	Broiler meat @ 1.3 kg per bird for survival of 95% each batch	1235.00	kg			
6	Farm gate price of broiler (Rs.)	75.00	per kg			
7	Annual income from broiler (Rs.)	92625.00				
8	Annual income (1st year) - Fish (Rs.)	312500.00				
9	Annual income (2nd year onwards) - Fish (Rs.)	375000.00				
10	Total Annual Income - First year (Rs.)	405125.00				
11	Total Annual Income - 2nd year onwards (Rs.)	467625.00				

**Annexure - II: Financial Analysis and Repayment Schedule - Integrated fish farming in new pond (1 ha) with poultry (broiler)**

Financial Analysis (Amt. in Rs.)								
Particulars	Years							
	I	II	III	IV	V	VI	VII	VIII
Capital Cost	398000.00	0	0	0	0	0	0	0
Operational Cost	302840.00	302840.00	302840.00	302840.00	302840.00	302840.00	302840.00	302840.00
Total Cost	701000.00	302840.00	302840.00	302840.00	302840.00	302840.00	302840.00	302840.00
Total Benefit	405125.00	467625.00	467625.00	467625.00	467625.00	467625.00	467625.00	467625.00
Net Benefit (Total benefit - Total cost)	-295875.00	164785.00	164785.00	164785.00	164785.00	164785.00	164785.00	164785.00
Discounting Factor	15.00%							
NPW of cost at 15% DF	1705167							
NPW of benefit at 15% DF	2044036							
NPW at 15% DF	338869							
BCR	1.20							
IRR	>15%							
Means of Finance								
Total Financial Outlay (TFO)	701000.00							
Margin Money (25%)	175250.00							
Bank Loan	525750.00							
Repayment Period	8 years with 1 year grace period							
Rate of interest	12.00%							
<b>Repayment Schedule</b>								
Year	Net Income	Repayment			Bank loan outstanding at the end of year	Net Surplus		
		Interest @ 12% per annum	Principal Repayment	Total Outgo				
1		63090.00	0.00	63090.00	525750.00			
2	164785.00	63090.00	75107.00	138197.00	450643.00	26588.00		

3	150730.00	48291.00	75107.00	123398.00	375536.00	27332.00		
4	150730.00	40243.00	75107.00	115350.00	300429.00	35380.00		
5	150730.00	32194.00	75107.00	107301.00	225322.00	43429.00		
6	150730.00	24146.00	75107.00	99253.00	150215.00	51477.00		
7	150730.00	16097.00	75107.00	91204.00	75108.00	59526.00		
8	150730.00	8049.00	75108.00	83157.00	0.00	67573.00		