

Area Development Scheme on Freshwater Fisheries

Introduction

Pakur was formed as a separate district from a sub-division under Sahibganj district on 28 January 1990. The district covers an area of over 1805.59 sq km divided into 6 blocks viz. Pakur, Pakuria, Hiranpur, Littipara, Amrapara and Maheshpur. The district has 1250 villages of which 1128 villages are inhabited. It is predominantly a tribal district having a tribal population of about 49 %. The agriculture economy of the district is characterized by dependence on nature, mono cropping, inadequate irrigation facilities and small and marginal holdings, low investment, low productivity, uncertain and weak marketing and storage arrangement. Rice being the staple food and land being low lying and rain-fed, paddy is the principal crop of the district. In Pakur district total number of land holdings is 107426 covering area of 126391 ha. Proportion of small and marginal farmers is 82% which hold only 31% of total cultivable land. Average size of land holdings of small and marginal farmers is than 1.18 ha. Gross cropped area of the district is 66488 ha. Of which net sown area and irrigated area is 52721 ha. and 12977 ha., respectively. Cropping intensity of the district is 126%. Major crops cultivated in the district are Paddy, wheat, maize etc. Fisheries sub-sector with total water area of 4.61 lakh ha is an integral part of livelihood of rural populace of Jharkhand. As per the last survey made in the year 2007, there were 0.60 to 1.00 lakh fishermen in the state. The fisheries sector in Jharkhand has witnessed an appreciative growth and the state is on the verge of meeting its own requirement. Since formation of the state, the fish production has increased to 8 times. From fish production of mere 0.14 lakh MT in the year 2001-02, the production went upto 1.16 lakh MT in 2015-16. With realisation of plans and programmes in near future, the state will be able to produce annually two lakh MT of fish by the year 2020 and will be one of the leading inland fish producing states of the country. With standard 25 gms of per day per capita fish intake with 70% projected fish eating adult population, the total requirement of consumption of fish was 1.79 lakh MT for the year 2014-15.

The strategy basically is centred on increasing the area under pond aquaculture from 88000 ha in 2015-16 to 140000 ha in the year 2020-21. Similar efforts are being made to increase coverage under reservoir fisheries. The target for cage fisheries is to increase from 2800 cages in the year 2015-16 to 12000 cages in the year 2020-21. Apart from this drive, there is thrust on production of fish seed and the state produced 161.18 crore of fish seed fry in the 2016-16 which was 49% more than the production achieved during 2014-15. This growth has enabled the state to reduce dependence on neighbouring states. The percentage distribution of GSDP by industry current

prices (based on Base year 2011-12) iro Fishing and aquaculture increased from 0.50% in the year 2014-15 to 0.53% in the year 2015-16.

Fish is the cheapest and most easily digestible animal protein and was obtained from natural sources from time immemorial for consumption by human beings. However, due to over exploitation and pollution, the availability of fish in natural waters has 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 is cultured simultaneous 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. Per capital availability/consumption in the district is 6.40 kg. Average productivity of the fish in the state is 1750 kg/ha. which is less than the national productivity i.e. 2150 kg/ha.

2.Forward and Backward Linkages

Jharkhand is on the path of to achieve self-sufficiency in fish seed as well as fish production. There is a need to renovate fish hatcheries, establish new fish hatcheries, improving seed marketing and distribution system, renovation of existing ponds and creation of new ponds. There is also need for intensive pisciculture in ponds with modern input management. The cage culture is going through a transformational phase. Several new technologies have been infused for enhancing productivity under capture fisheries. Once the infusion of technologies stabilises, the state will be self-sufficient both in fish seed fry and fish production.

The state has approximately 466 nos of seed rearing tanks, 33 private hatcheries and 3600 Matsya Mitras and 362 nos of fishermen cooperative societies. As a part of skill up gradation for livelihood, the Department conducts skill development for fish seed growing, training on fish farming on a regular manner. The important state plan schemes are fisheries research scheme and cage aquaculture. The National Fisheries Development Board Scheme is also under

implementation entailing stocking of fingerlings in reservoirs along with training of member of fishermen cooperative societies.

The Department of Fisheries, Govt. of Jharkhand in the district as well as state office will extend the extension service required under the scheme and also play key role in identifying the entrepreneurs. If need be a special technical workshop will be organized in the district for the identified / potential entrepreneurs. In the district, there are water bodies covering 6179 ha. of govts & private ponds, dams and dobhas. The average production of fish in the district is 4855 MT. There is demand of finger fry of 1600 lakh.

No of seed growers: 200

No of fish fry production: 1533

Total No of fishermen societies: 6

No of trained fishermen: 265

2.1 Fisheries department implementing some of the scheme in the district is as under:

New ponds

Farmers may avail financial assistance for constructing new ponds of their own. Unit cost of one acre pond is Rs 3.00 lakh. Subsidy is available for constructing a pond mechanically and it varies from 90% to 80% for SCs/STs and others respectively.

Ved Vyas Awaas Yojna

Ved Vyas Awaas yojna is for providing houses to poor fishermen living in mud / Kuccha houses. Unit cost of a house is Rs. 1.20 lakh. It is 100% assistance to Fishers for constructing their own house like Indira Awaas

Group Accident Insurance Scheme For Active Fishermen

Group Accident Insurance Scheme is for active fishermen. Fishermen between the age of 18-69 are covered under this scheme. Insurance claim of Rs. 2.0 Lakh is paid by the insurance company to the legal heir of the deceased for loss of life or complete permanent disability while Rs. 1.00 lakh is paid for partial and permanent disability.

JHASCOFISH

JHASCOFISH extending 50% subsidy on fish feeds to fishermen.

3. Selection of the Area

The project will be implemented in the Pakur and Maheshpur block of Pakur District initially where scope for fisheries development is very good as the nearby fish market is farakka in West Bengal. Latter on other blocks like Hiranpur and Pakuria may be taken up in due course under ADS in the district. However, stone query natural pond in the district has immense potential for aquaculture across the district.

4. Selection of beneficiaries

The beneficiaries will be identified by the District Fisheries Department, Govt of Jharkhand through 6 fisheries societies in the district.

5. Training / Capacity Building of the beneficiaries

Training on fish farming is being provided by Fish Farmers Training Centre, Shalimar, Hatia Ranchi, JSPS, RSETI to the fish farmers. NABARD's promotional funds may also be utilized for providing training to the farmers in collaboration with KVK/NGOs in the district.

6. Techno economic assumptions & project components

The main criteria to be kept in mind while selecting the pond is that the soil should be water retentive, adequate supply of water is assured and that the pond is not in a flood prone area.

- **Soil:** The Quality of water and fertility of pond depends upon the soil quality. Soil should be fertile and should have water retention capacity. The pH should be 7.0 - 7.5.
- **Water:** Assured fresh water should be available throughout the year. In culture system, at least 1.5 meter water depth should be maintained throughout the culture period. At any given time (especially during summer months), care should be taken not to allow the water level to fall below 1.0 meter. The source of water, may be river, canal, open well or borewell. Being located beside the river Gumani in Barharwa block has ready source of water.
- **Flood prone Zone:** Care should be taken, not to consider any pond in the flood affected zones. Barharwa blocks is not flood prone block.
- **Water quality:** The water should be free from all pollution sources. The optimum water quality parameter for Indian Major Carp and *Macrobrachium rosenbergii* is as under :

Temperature	:	25 - 32°C
Dissolved Oxygen	:	5 - 7 ppm(i.e. 5 - 7 mg of O ₂ /lit of water)
Visibility	:	About 40 cm (1 ft.)
Colour	:	Brown/light green.
pH	:	7.0 - 7.5

Salinity	:	0 - 5 ppt
Total Alkalinity	:	50 - 100 ppm.
Ammonia	:	Not more than 0.1 ppm.
Insecticide level	-	'o' (Nil)

- **Pond Construction:** The planning and designing of the pond in a farm is the most basic aspect for successful operation of the farm. Generally rectangular shape ponds are preferred. The ideal pond specification for fish and fresh water prawn culture will be as under :

Height of Main wall	-	>1.5 m.
Depth of Water Column	-	>1.5 m.
Chest width	-	1.0 m.
Slope (Dry side)	-	1:1.5 m.
Slope (Wet side)	-	1.2 m.
Base width of bund	-	6.25 m.
Height of Dividing wall	-	1.5 m.
Crest width of Dividing wall	-	1.0 m.

Depending upon the type of soil and cost factors, specifications may be slightly altered.

- **Harvesting Pit:** Harvesting pit or cropping pit is useful for harvesting of prawn. It should be located at one corner or at the other side of main wall, near the drain pipe. The harvesting pit wall have canals, spreading all over the bottom, like radiating canals. The harvesting pit required for an acre pond would be (depth: 0.5 m, length 50 m. and breadth 20 m). The harvesting pits can be constructed either inside the pond before sluice or outside its pond, after sluice.
- **Water inlet and outlet:** Monk type water inlet and outlets should be constructed. Alternatively, PVC pipes may be used for the purpose.
- **Seepage/Drainage Trenches:** Where ever, project area belongs to a low lying area, it may be ensured that the seepage/ drainage canals run as far as possible along the sides of pond outside. If not possible, all ponds may be inter-connected with each other and connected to a common drainage canal. These canals or trenches help in collecting the water, coming out of pond either through sluice gate or seepage. These canals help in avoiding the spreading of seepage water in the entire area.

- Ponds should be sun-dried and the top silt to be removed. Drying helps mineralisation of bottom soil and increases productivity of the bottom soil. Disease causing microorganisms and parasites also can be eliminated by drying. Two weeks drying is enough.
- For good production the pond water should have PH ranging between 7.3 – 7.5. In order to have this, lime should be applied in the recommended doses. In case the pond can not be drained out, it should be subjected to renovation through clearance of weeds, eradication of weed & predatory fishes through application of Mohua Oil Cake @ 200 kg/ha.
- Necessary pre-stocking measures should be adopted, covering fertilization of pond with both organic and inorganic fertilizers in the recommended doses.
- Stocking of seeds of Indian Major carps (minimum size : 8 cm) and freshwater prawn (*Macrobrachim rosenbergii*) should be done, in the recommended numbers, with due acclimatization.
- The prawn seeds should be stocked in the grow-out ponds on completion of the Nursery phase of 45 days. The ideal age group of prawn seed for stocking in nursery is PL 7 - 10 (Post Larvae 7 - 10 days old).
- Care should be taken to stock males (Orange Clawed and Blue Clawed Males) in the grow-out ponds on grading of prawns into males and females
- Good quality seeds from reputed hatchery/ seed bank, should be obtained.
- Hideouts are required to be provided for prawns to reduce cannibalism.

• **Stocking Density :**

Fish fingerlings : 5,000 Nos/ Ha WSA

Prawn Post larvae : 1,000 Nos/ Ha WSA (in case desired)

- **Feeding:** Supplementary feeding needs to be followed for fishes. As per the latest technology, floating pellet feed can be given, based on the technique of satiation feeding. For prawns, traditional feeds comprising of groundnut oilcakes and rice bran should be given under broadcasting method.
- **Feeding methods (Prawns):** Prawns are slow feeders. Hence it is necessary to distribute feed in granules (for juveniles) and pellets (for Adults). The pellets should have water stability for 2-3 hours. Broadcasting method should be followed.
- Check trays should be used to find out the feed consumption by prawns.
- **Feeding Frequency:** Feed should be given 2-3 times a day.
- **Trial Netting:** This should be done at least once in a month for monitoring the growth of fishes and for prawns, the growth should be assessed through sample tray method.

- **Insurance** : All ponds, civil structures, equipments, pump sets, machinery should be insured. Fishes/ Prawns should be insured against mortality. To claim Insurance, maintenance of farm records is essential.

7. Partners in implementation, convergence of efforts and support from state Govt

District fisheries department would be nodal agency for implementation of Area development scheme in the district. A special committee may be constituted for implementation and monitoring of scheme comprises District Fisheries Officer, Lead Bank Manager, Rseti Director and DDM NABARD. For aquaculture, existing pond of soil conservation, MNREGA, Agriculture Department and ITDA may be exploited in the district. Stone query pond in the district may be utilized for aquaculture in the district.

8. Project cost for fish culture unit:

Indicative cost of composite fish culture – 1 Ha area

(Amount Rs.)

A	Capital Cost	Amount Rs			
S.No	Particulars	Units	Quantum	Rate	Total
1	Site clearance		LS	4000	4000
2	Construction of pond including digging, bund construction and compaction and consolidation	Hrs	50	1500	75000
3	Diesel Pump Set	5HP	1	60000	60000
4	Inlet/outlet sluices			L/S	5000
5	Store Room/ Office Room	Sq ft	500	300	150000
6	Nets and other implements			L/S	5000
7	Miscellaneous			L/S	3500
	Total "A"				302500
B	Operational cost for one crop (6 months)				
1	Drying, desilting ,ploughing and watering	LS	LS	LS	10000
2	Lime	Kgs	500	5	2500
3	Single Super Phosphate	Kgs	250	5	1250
4	Urea	Kgs	125	5	625
5	Poultry Litter	Tons	5	1000	5000
6	Fish Seed 200-250 gms weight Catla (750)and Rohu(5500) @Rs 15 each	Nos	6250	10	62500

	Fish Feed Oil cake , Rice bran & Cotton Seed Cake @ 80% 10% and 10% ratio (9600kgs of Rice bran, 1200 kgs of Oil cake & 1200 kgs of Cotton Sedd Cake @ Rs 8/- ,Rs 22/- and Rs12/- per kg respectively)				
7		Kgs	12000	13.6	163200
8	Watch and ward, feeding	6	1	3500	21000
9	Harvesting charges per kg		7000	1	7000
10	Miscell	LS	LS		15000
	Total "B"				288075
	Total A +B				590575

Note: Unit cost specific to the state may be considered as the base. Changes may be made suitably to accommodate changes/improvements in technology / farming systems approach proposed at the district level.

9. Banking Network/ Financing Agencies:

In Pakur, Maheshpur and Pakuria block, State Bank of India, Vananchal Gramin Bank, Allahabad Bank and Bank of India may extend finance to fishermen.

10. Physical and financial programme:

Bank-wise physical and financial programme has to be given in detail in a tabular form as suggested below:

10.1 Physical Target

Block	No of Units					Total units
	Ist Yr	2nd Yr	3rd Yr	4th Yr	5th Yr	
Pakur	2	3	4	4	4	17
Maheshpur	1	2	2	2	2	9
Pakuria	1	2	2	2	2	9
TOTAL	4	7	8	8	8	35

10.2 Financial Target**(Rs. in lakh)**

Block	Total Financial outlay					Total financial outlay	Margin contribution	Credit flow
	Ist Yr*	2nd Yr	3rd Yr	4th Yr	5th Yr			
Pakur	11.81	17.72	23.62	23.62	23.62	100.40	25.10	75.30
Maheshpur	5.91	11.81	11.81	11.81	11.81	53.15	13.29	39.86
Pakuria	5.91	11.81	11.81	11.81	11.81	53.15	13.29	39.86
TOTAL	23.62	41.34	47.25	47.25	47.25	206.70	51.68	155.03

10.3 Target: 2018-19

District	Blocks	Name of the bank	Unit cost	No of Units	TFO	Bank Loan	Margin
Pakur	Pakur, Maheshpur, Pakuria	SBI,VGB, Allahabad, BOI	5.9	4	23.62	17.7	5.9

10.4 Target: 2018-23

District	Year	Physical	Financial (Rs. lac)
Pakur	2018-19	4	17.7
	2019-20	7	31.01
	2020-21	8	35.43
	2021-22	8	35.43
	2022-23	8	35.43

11. Project Profitability:

The project profitability for six years has to be given in a tabular form with the following details:

C	Production Norms		
1	Survival(%)	80	5000
2	Average weight at harvest (gms)	1000	5000
3	Total production (Kg)	5000	
4	Farm gate price (Rs.)	70	
5	Number of Crops per annum	2	
6	Income during 1st year	350000	
7	For 2 crops	700000	

Note : For larger unit wherever hired labour is involved that cost has to be factored in to the above statement.

12. Financial Analysis:

The financial analysis for a period of six years has to be given in a tabular form as detailed below:

Financial Analysis - Intensive carp culture - 1 Ha Model

Rs in lakh										
Year	1	2	3	4	5	6	7	8	9	10
Capital Cost	3.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.6*	0.00
Recur ring Cost	2.88	5.76	5.76	5.76	5.76	5.76	5.76	5.76	5.76	5.76
Total Cost	5.91	5.76	5.76	5.76	5.76	5.76	5.76	5.76	6.36	5.76
Gross Benefit	3.75	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50
Net Benefit (B-C)	-2.16	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.14	1.74

Present Worth of Costs @ 15%	33.28
Present Worth of Benefit @ t 15%	39.67
Net Present Worth (PW Benefit - PW Cost)	6.40
Benefit Cost Ratio (PW of Benefit / PW of Costs)	1.19 :1
Internal Rate of Return	80%

The repayment period may be arrived at based on the cash flow.

13. Sensitivity Analysis:

By assuming 5% increase in cost and 5% decrease in benefits, NPV, BCR and IRR have been worked out as under:

Sr. No.	Years / Particulars	1	2	3	4	5	6
I	Total cost after 5% increase	591000	81060	81092	81092	81060	80934

Ii	Total benefits after 5% reduction	375000	215880	217770	217770	215880	209643
	Net Benefit	-216000	134820	136679	136679	134820	128709
	NPV (Rs.)	204806					
	BCR	1.27					
	IRR	55.76%					

14. Repayment Period:

Grace period of 1 year may be considered. Repayment period has to be presented in detail in a tabular form as given below:

Total Financial Outlay: Rs.5.91 lakh

Margin : 25%

Financial assistance : Rs.5.02 lakh

Rate of Interest : 12%

(Rs. In Lakhs)

Year	Net Income	Interest	Principal	Total outgo	Bank loan O/s	Net Surplus	DSCR
1	0.87	0.60	0.00	0.60	5.02		1.44
2	1.74	0.60	0.56	1.16	4.46	0.58	1.50
3	1.74	0.54	0.56	1.09	3.90	0.65	1.59
4	1.74	0.47	0.56	1.03	3.35	0.71	1.70
5	1.74	0.40	0.56	0.96	2.79	0.78	1.81
6	1.74	0.33	0.56	0.89	2.23	0.85	1.95
7	1.74	0.27	0.56	0.83	1.67	0.91	2.11
8	1.74	0.20	0.56	0.76	1.12	0.98	2.29
9	1.14	0.13	0.56	0.69	0.56	0.45	1.65
10	1.74	0.07	0.56	0.62	0.00	1.12	2.79
		Average DSCR				1.88	

15. Implementation Strategy and Monitoring Mechanism

Bank credit may be extended to fishermen through group mode (Joint Liability Group) and arrangement may be made to ensuring repayment to concern bank by way of tripartite agreement among fishermen, branch and fishermen society/fisheries department. It is expected that the credit flow during the initial years would be low and people may take 'wait and watch' approach

and thereafter the credit flow would have quantum jump as the results would be clearly visible within 15-18 months.

15.1 Monitoring Mechanism

- i. Initial approval at the DCC level
- ii. Block-wise allocation at BLBC meetings
- iii. Review of the implementation in DCC and BLBC meetings
- iv. Involvement of stakeholders' agencies in review meetings for ensuring the extension of support services committed by them.
- v. The progress should be monitoring regularly in DCC/DLRC as an agenda.

16. Expected outcome/ Conclusion

The Area Development Scheme on Fisheries Sector, will discuss and facilitate the implementation of perspective plan of the State Govt., infrastructure gaps, available incentives/schemes from both Central and State Govt., fiscal incentives (taxes, subsidies etc.) available / being proposed for development of the Sector, support mechanism available / needed for procurement and marketing from State and Central Govt., and identify scope for convergence of efforts and areas for financing in the entire value chain of the sector. As can be seen from the analysis shown above, a unit of one ha. Aquaculture can generate an income of Rs. 78000.00 over a period of five years. Such supplementary income will help in doubling the farmers' income, increase in fish availability, increase in capital formation in agriculture through term lending, etc.