Detailed Project Report

On

Bio-Floc Fish Farming (50 Tanks)

Under MKUY

Name of the Entrepreneur/Entity:

Address:

Contents

1. Project Summary

1	Name of the Enterprise (as per the Illustrative List of Enterprises)	Bio-Floc Fish Farming
2	Sector (as per the Illustrative List of Enterprises)	Fishery
3	Project Capacity[1]	50 Tanks
4	Key components of the project	Production of Fish
5	Project Address (Village/Ward, Gram Panchayat/ Municipality, Block, District)	
6	Products/Output from the project	Fish
7	Total Project Cost	Rs. 98,89,000
8	Fixed Capital Cost	Rs. 96,91,000
9	Working/Recurring capital (for 1 month)	Rs.1,98,000
10	Bank Finance/ Self Finance	Self- Finance
11	Bank Loan Amount	
12	Promoter Contribution	Rs. 98,89,000
13	Assumed Rate of Interest	
14	Subsidy Eligibility (40%, 50%)	
15	Repayment Terms (Tenure, Moratorium, Frequency, Mode of Repayment: equal principal/equal instalment)	
16	Key Financial Indicators:	
	1. Average Annual Net Profit	Rs. 39,94,658
	2. Debt Service Coverage Ratio (DSCR)	
	3. Internal Rate of Return	37.08%
	4. Break Even Year	2 Year 9 Months
17	Estimated employment to be generated (nos.)	5

Note:

1. Customized DPR is to be prepared as per the information given by the beneficiary.
2. The CIS will be calculated as per the cost norm of MKUY guideline.
3. All the prices quoted here are indicative in nature.
4. The particulars under each component of the Capital Investment may be changed as per the requirement of the project.

[1] Capacity can be in terms of area or quantity

2. Project Profile

2.1 Entrepreneur/Entity Profile

1	Name of the Entrepreneur/Entity	
2	Legal status (Individual/ Group/ FPO/ FPC/ Proprietorship/ Partnership firm/ Company/ Cooperative/ Federation/ Society/ Trust)	
3	Name of Representative[2] in Ease of entity	
4	Gender (Male/ Female/ Third Gender/ Not Applicable)	
5	Date of Birth of Individual/Representative of Entity	
6	Date of Incorporation/Registration of Entity	
7	Category opted for (Women/ ST/ SC/ Differently Abled/ Third gender/ Agri & Allied Graduate)	
8	Educational Qualification of Individual/Representative of Entity	
9	Passport size photograph of the Individual/ Representative of entity	
10	Local Address for Correspondence of the Individual/ Representative of entity	
11	Registered Address of Entity	
12	Main Office/Branch Address of Entity	
13	Phone no. of Individual/Representative of Entity	
14	Email Id of Individual/Representative of Entity	
15	AADHAR No. of Individual/Representative	
16	PAN of Individual/Representative of Entity, if available	
17	Farmer Id of Individual, if available	
18	Details of other Partner/Director/ President/Secretary	
19	Registration No./ CIN of the Entity[3]	
20	PAN/TAN of Entity	
21	GSTIN of Entity, if available	
22	Details of experience and exposure relevant to the proposed enterprise/project (family business, work experience, e-learning/certificate courses, trainings undertaken etc.)	

[2] Representative should be authorized by the board/governing body of the entity.

[3] Registration document:
Groups (SHG/PG/: FPO: Proprietorship firm: Registration Certificate under Shops & Establishment Act, Partnership firm: Registration Certificate from IGR of state, Company (Pvt. Ltd., Public Ltd., LLP, OPC, FPC): Certification of Incorporation, Cooperative/ Federation: Certificate of Registration from Registrar of Cooperative Societies, Society/Trust: Darpan Unique Id

2.2. Project Consultant Details

DPR prepared by: APICOL, Baramunda, Bhubaneswar

2.3. Concept and Scope of the Project

"Bioflocs" are a consortium of particulate matter formed predominantly by a biota of aerobic and heterotrophic bacteria, protozoa, microalgae (diatoms), metazoans, detritus, faeces, remnants of feed and remains of dead organisms

Principle on which Bio-floc works

Bio-floc system is a wastewater treatment, which has gained vital importance as an approach in aquaculture.

- It combines the removal of nitrogenous metabolites from the water by addition of carbon source externally for the production of microbial biomass under strong aeration, which then can be used by the cultured fish species as an additional food source.
- The principle of the technique is to maintain the higher C-N ratio by adding carbohydrate source and the water quality is improved through the production of high-quality single cell microbial protein.
- In such condition, heterotrophic microbial growth occurs which assimilates the nitrogenous waste that can be exploited by the cultured species as a feed and also works as bioreactor controlling of water quality.
- Immobilization of toxic nitrogen species occurs more rapidly in biofloc because of the growth rate and microbial production per unit substrate of heterotrophs are ten-times greater than that of the autotrophic nitrifying bacteria.
- This technology is based on the principle of flocculation within the system.

Major requirements of BFT

- High stocking density
- High aeration (To keep DO level >6ppm)
- Sludge/waste disposal system
- Poly-lined ponds /poly-tarpaulin or cemented tanks
- Indoor/Outdoor
- Suitable candidate species (Fin/Shellfish & FW/BW/MW)
- Zero water exchange
- Zero tolerance to antibiotics

Basic Requisites for BFT

- Biofloc tank installation
- Air pump and supply
- Feed, probiotics, molasses & chemicals
- Water quality test kit & equipment

Nutritional value of Bio-floc

- Dry weight protein ranges from 25–50%
- Fat ranges from 0.5–15%
- Good source of vitamins and minerals, particularly phosphorous

- It has an effect similar to gut probiotics
- The dried bio-floc meal is proposed as an ingredient to replace the fishmeal or soybean meal in the feed.

Advantage of Bio-floc technology

- It is an eco-friendly fish farming system and it reduces environmental impact.
- Judicial use of land and water
- Limited or zero water exchange system thus reducing the pollution
- Higher productivity (it enhances survival rate, growth performance and feed
- conversion in the culture systems of fish).
- It provides higher bio-security thus minimizing the risk of disease
- outbreaks.
- It reduces utilization of protein rich feed and cost of standard feed.
- It reduces the pressure on capture fisheries i.e., use of cheaper food fish and
- trash fish for fish feed formulation.

Fish Species Suitable for Bio-floc Technology

Bio-floc system works best with species that are able to derive some nutritional benefits from the direct consumption of floc. Bio-floc system is most suitable for species that can tolerate high solids concentration in water and are generally tolerant of poor water quality. Some of the species that are suitable for bio-floc technology are:

- Air breathing fish like Singhi (Heteropneustes fossilis), Magur (Clarias batrachus), Pabda (Ompok pabda), Anabas/Koi (Anabas testudineus), Pangasius (Pangasianodan hypophthalmus).
- Non-air-breathing fishes like Common Carp (Cyprinus carpio), Rohu (Labeo rohita), Tilapia (Oreochromis niloticus), Milkfish (Chanos chanos).
- Shellfishes like Vannamei (Litopenaeus vannamei) and Tiger Shrimp
- (Penaeus monodon) - in brackish water systems.

Bio-floc Fish Farm Infrastructure

Under the scheme promoted by the Department, the technical standards of circular tanks constructed from cement concrete or PVC/HDPE polyliners with metallic/PVC frames is a minimum of 4-meter diameter, 1.3-meter depth and with central drain. The tanks should be housed in a shed constructed from shade net. Good sunlight is essential for bio-floc 04 Bio-floc Technology in Fish Farming culture. Transparent polyliners can also be used by replacing shade nets to increase the sunlight and to protect the tanks from rainwater. Freshwater can be sourced from borewell or municipal tap water line. In case of municipal tap water, care should be taken to remove all the chlorine content from source water. Each tank should be provided with ample aeration line with air blower. Air blowers should have to power backup from inverter with battery or mini genset for continuous aeration.

Example of GIFT farming in Bio-floc system: Seed stocking density, feed management and water quality management

S. No.	Component	Details
1	Bio-floc Tank size (1.20 m water depth)	4 metre diameter and 1.5-meter height
2	Water holding capacity ofeach tank	15,000 Litres capacity
3	Water quality parameters	Dissolved Oxygen - 5mg/L; Temperature-26-34°C, pH-7.5 to 8, TDS-600ppm, Floc density-25-40mg/l, Ammonia-0.5 ppm, Nitrite-0.3 ppm, Nitrate-150 ppm, Alkalinity-120-280 ppm
4	Stocking density depending on species)	100 nos/m3(1000 nos. of fingerlings per tank)
5	Common Species cultured	GIFT Tilapia *(Oreochromis niloticus)* - mono-sex fingerlings bought from licensed hatcheries should be stocked for fast and uniform growth
6	Survival (%)	80
7	Type of feed to be used Fat 3%)	Floating pellet feed (Crude Protein 22-24%)
8	% of feed per day	2-3% of Average Body weight per day
9	Feeding frequency	4 times early stage, later 2 times per day
10	FCR	1:1.25
11	Duration of culture	4 months
12	Size/ weight of the fish at harvest (gram)	500 g average weight
13	No. of crops per year	3

How to Prepare the Inoculum:

METHOD I:

For 15000 Litres of fresh water 150 Litres of inoculum is required for the floc development

Step 1

Take clean tub/can with 150 Litres of water and continue vigorous aeration

Step 2

Add 3 Kg of pond soil

+

1.5 gm of Ammonium sulphate /Urea

+

30 gm of carbon source (Jaggery /Wheat flour /Tapioca flour)

Step 3

Mix it well with water in tub and provide adequate aeration

Step 4

The inoculum will be ready after 24-48 hrs and it can be transferred to main tank

- Daily addition of carbon source is required for the development of floc. For every 1 kg of feed given (with 25 % of crude protein), 600 gm of carbon source is to be added to the system to maintain C: N of 10:1.
- Once the floc volume reaches 15-20ml further addition of carbon source is not required

METHOD II:

Step 1

Take clean tub/can with 130 Litres of water and continue vigorous aeration

Step 2

Add 20 Litres of pond water/RAS water (before filtration)

+

30 gm of carbon source (Jagerry /Wheat flour /Tapioca flour)

+

10 gm of probiotic (with Bacilus Sp., Aspergilus Sp. etc with a total concentration of 10x109 CFU/gm)

Follow the remaining steps as mentioned in **method 1**

***NB: Well developed inoculum will be turbid with foam on the water surface (Ideal Volume of Floc in Imhoff cone for shrimp is 10-15 ml/L**

Techno-commercial Assumptions

Sl. No.	Parameter	Value	Unit
Sl. No	Parameters	Value	Unit
1	Increase in Rate of Product	5	%
2	Increase in Electricity consumption	5	%
3	Collection from Debtors (First Year)	15	Days
4	Collection from Debtors	15	Days
5	Payable to Creditors	20	Days
6	Drawing by Promoter	30	%
7	Increase in Staff Salary	5	%
8	Rate of Interest on TL	11	%
9	Rate of Interest on WC	9	%
10	Loan Repayment (in year)	7	Days
11	Raw Material in Stock (on sales)	5	Days
12	Finished Goods in stock (on sales)	10	Days
13	Promoter's Contribution (Term Loan)	100	%
14	Promoter's Contribution (Working Capital)	100	%
15	Working Capital Requirement	1	Months
16	Working Capital Utilisation	100	%
17	No. of Working days	360	Days
18	No. of Tanks	50	Nos.
19	No. of fingerlings per tank (Stocking)	1200	Nos.
20	Production per tank per crop of Tilapia/ Pangasius/ Catfish/ Amur carp/ Scampi/ shrimp/ barb etc.	600	kg
21	No. of crop per year	3	Nos.
22	Feed per Tank per Year	400	Kg
23	Cost of Feed per kg	36	Rs
24	Cost of one Fingerling	4	Rs
25	Cost of probiotic per tank per annum	1600	Rs
26	Office Space	200	Sq. ft
27	Store Space	200	Sq. ft
28	Cost of Office construction per sq. ft	850	Rs
29	Cost of Store construction per sq. ft	400	Rs
30	Space required for one Tank	345	Sq. ft
31	Cost of construction of one Tank	45000	Rs
32	Cost of construction of shed with flooring per sq. ft.	320	Rs
33	Survival Rate	80	%
34	Size /Weight of Fish at harvest	0.5	Kg

3. Financial Details

4.1. Project Fixed Capital

Details of Fixed Assets					
Sl. No.	**Particulars**	**Unit**	**Qty.**	**Cost per unit (Rs)**	**Total (Rs)**
A	**Land**				
1	Land Development	Sq. ft	20000	0.70	14,000
2	Fencing (Barbed wire)	ft	200	60.00	12,000
	Sub Total				**26,000**
B	**Civil Construction**				
1	Construction of Shed including installation cost	sq. ft	17250	320.00	5,520,000
2	Setup of Bio-Floc tanks: Brick Masonary with frames, solid base, drain pipe fish net covering (4m dia x 1.3 m depth tank with 1.2 m water depth =15,000 lts Capacity) with 750 cum capacity	Nos.	50	45,000.00	2,250,000
3	Store	sq. ft	200	400.00	80,000
4	Office	sq. ft	200	850.00	170,000
	Sub Total				**8,020,000**
C	**Water Supply**				
1	Water Supply with borewell, pump (3 HP) and PVC pipe fittings for air and water flow			LS	**3,00,000**
D	**Electrification**				
1	Electrical Installation & Transformer/ DG Set/ Power Generator/ Any other back up system			LS	**4,00,000**
E	**Plant & Machinery (all the machinery items to be specified)**				
Sl. No.	**Particulars**	**Specification**	**Qty**	**Unit Price (Rs)**	**Total (Rs)**
1	Ring Blower 8 Nos of 3 HP/ High pressure air pump and other accessories			LS	500,000
2	Nets & Accessories			LS	375,000
3	Other accessories			LS	25,000
	Total Machinery Cost				**900,000**
G	**Miscellaneous Expenditure**				
1	Insurance premium of assets			LS	15,000
2	Cost of DPR Preparation			LS	23,338
3	Other miscellaneous exp.			LS	6,662
	Total Miscellaneous Expenditure				**45,000**

4.2. Project Variable Expenses

Details of Recurring Expenditure						
A	**Details of raw material (per annum @ 100%)**					
Sl. No.	**Items**	**Unit**	**Rate/Unit (in Rs)**	**Qty/day**	**Qty/annum(kg)**	**Total (Rs)**
1	Fish Fingerlings Tilapia/ Pangasius/ Catfish/ Amur carp/ Scampi/ shrimp/ barb etc.	Nos	4		1,80,000	7,20,000
2	Formulated Feed (24-30% crude protein & 3% fat)	Kg	36		20,000	7,20,000
3	Probiotics, Carbon source test kits	Rs				80,000
	Total				**2,00,000**	**15,20,000**

Details of salary and other benefits				
Sl. No.	**Type of Workers**	**No. of Worker**	**Salary Per Month/head (Rs)**	**Total Salary per Annum (Rs)**
1	Supervisor	1	15000	3,60,000
2	Unskilled	3	10000	1,44,000
3	Skilled	1	12,000	1,80,000
	Grand Total	5	37000	**6,84,000**

4.3. Details of Sales

Details of sales						
Sl. No.	**Type of products**	**Unit**	**Rate/Unit (Rs)**	**Quantity/day**	**Quantity/annum**	**Total (Rs)**
1	Tilapia/ Pangasius/ Catfish/ Amur carp/ Scampi/ shrimp/ barb etc. production	Kg	130		72,000	93,60,000
	Total				**72,000**	**93,60,000**

4.4. Project Balance Sheet

Liabilities	I	II	III	IV	V	VI	VII
Opening Capital	**-**	**8,276,554**	**7,811,377**	**7,841,348**	**8,475,148**	**9,335,174**	**10,142,579**
Add: Introduced	9,889,000						
Add: Profit	1,935,554	2,883,823	3,391,971	4,266,800	4,862,026	5,155,405	5,467,029
Less: Drawing	3,548,000	3,349,000	3,362,000	3,633,000	4,002,000	4,348,000	4,683,000
Closing Capital	**8,276,554**	**7,811,377**	**7,841,348**	**8,475,148**	**9,335,174**	**10,142,579**	**10,926,609**
Term Loan from Bank	-	-	-	-	-	-	-
Current Liabilities							
Cash Credit from Bank	-	-	-	-	-	-	-
Sundry Creditors	60,800	79,800	89,400	105,667	117,133	123,000	129,200
Expenses Payable	112,400	121,700	129,100	138,300	146,600	154,000	161,700
Current Provisions	561,666	968,067	1,185,845	1,560,771	1,815,868	1,941,602	2,075,155
Total Current Liabilities	**734,866**	**1,169,567**	**1,404,345**	**1,804,738**	**2,079,602**	**2,218,602**	**2,366,055**
Total Liabilities	**9,011,420**	**8,980,944**	**9,245,693**	**10,279,886**	**11,414,776**	**12,361,182**	**13,292,664**
Assets							
Fixed Assets	9,646,000	9,646,000	9,646,000	9,646,000	9,646,000	9,646,000	9,646,000
Less Depreciation	1,027,000	1,829,100	2,643,908	3,370,190	4,017,856	4,595,667	5,111,370
Net Fixed Assets	**8,619,000**	**7,816,900**	**7,002,093**	**6,275,810**	**5,628,144**	**5,050,333**	**4,534,630**
Current Assets							
Sundry Debtors	280,800	368,600	412,800	487,700	540,500	567,600	596,000
Inventories	168,700	172,700	223,450	251,433	295,417	325,978	342,306
Cash and Bank Balance	56,200	73,800	82,600	97,600	108,100	113,600	119,200
Other Current Assets	113,280	548,944	1,524,750	3,167,342	4,842,615	6,303,670	7,700,528
Total Current Assets	**392,420**	**1,164,044**	**2,243,600**	**4,004,076**	**5,786,632**	**7,310,848**	**8,758,034**
Total Assets	**9,011,420**	**8,980,944**	**9,245,693**	**10,279,886**	**11,414,776**	**12,361,182**	**13,292,664**

4.5. Calculation of Depreciation

Rates of Depreciation		10%	15%	Total depreciation for the year (Rs)
Year	1	832,000.00	195,000	1,027,000
	2	748,800.00	165,750	914,550
	3	673,920.00	140,888	814,808
	4	606,528.00	119,754	726,282
	5	545,875.20	101,791	647,666
	6	491,287.68	86,523	577,810
	7	442,158.91	73,544	515,703

4.6. Projected P&L

Description	Year ending March 31st						
	I	II	III	IV	V	VI	VII
Capacity Utilisation	**60**	**75**	**80**	**90**	**95**	**95**	**95**
Revenue							
Sales	5,616,000	7,371,000	8,256,000	9,753,000	10,810,000	11,351,000	11,919,000
Opening Stock of Finished Goods	-	(156,000)	(204,750)	(229,333)	(270,917)	(300,278)	(315,306)
Closing Stock of Finished Goods	156,000	204,750	229,333	270,917	300,278	315,306	331,083
Total Income (A)	**5,772,000**	**7,419,750**	**8,280,583**	**9,794,583**	**10,839,361**	**11,366,028**	**11,934,778**
Expenditure							
Opening stock of Raw Material	**-**	**12,700**	**16,700**	**18,700**	**22,100**	**24,500**	**25,700**
Purchase (Net) of Material	912,000	1,197,000	1,341,000	1,585,000	1,757,000	1,845,000	1,938,000
Closing Stock of Raw material	**12,700**	**16,700**	**18,700**	**22,100**	**24,500**	**25,700**	**27,000**
Raw Material Consumption	**899,300**	**1,193,000**	**1,339,000**	**1,581,600**	**1,754,600**	**1,843,800**	**1,936,700**
Repair & Maintenance- Machinery (@5% of Cost)	481,000	505,100	530,400	557,000	584,900	614,200	645,000
Utility expense	112,320	147,500	165,200	195,100	216,200	227,100	238,700
Insurance cost	15,000	15,800	16,600	17,500	18,400	19,400	20,400

Description	Year ending March 31st						
	I	II	III	IV	V	VI	VII
Capacity Utilisation	**60**	**75**	**80**	**90**	**95**	**95**	**95**
Administrative salaries and wages	684,000	718,200	754,200	792,000	831,600	873,200	916,900
Other Misc Expenses [@1% of sales]	56,160	73,710	82,560	97,530	108,100	113,510	119,190
Total Cost	**2,247,780**	**2,653,310**	**2,887,960**	**3,240,730**	**3,513,800**	**3,691,210**	**3,876,890**
Profit Before Depreciation, Interest and Tax	**3,524,220**	**4,766,440**	**5,392,623**	**6,553,853**	**7,325,561**	**7,674,818**	**8,057,888**
Depreciation	1,027,000	914,550	814,808	726,282	647,666	577,810	515,703
Profit Before Interest and Tax	**2,497,220**	**3,851,890**	**4,577,816**	**5,827,571**	**6,677,895**	**7,097,008**	**7,542,185**
Interest on Term Loan	-	-	-	-	-	-	-
Interest on Working Capital Loan	-	-	-	-	-	-	-
Total Interest Paid	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Profit Before Tax	**2,497,220**	**3,851,890**	**4,577,816**	**5,827,571**	**6,677,895**	**7,097,008**	**7,542,185**
Income Tax	561,666	968,067	1,185,845	1,560,771	1,815,868	1,941,602	2,075,155
Profit after Tax	**1,935,554**	**2,883,823**	**3,391,971**	**4,266,800**	**4,862,026**	**5,155,405**	**5,467,029**
Capacity Utilisation	**60**	**75**	**80**	**90**	**95**	**95**	**95**

4.7. Projected Cash Flow

Period Ending:	I	II	III	IV	V	VI	VII
Cash & Bank Balance at Beginning	-	56,200	186,250	195,050	210,050	220,550	226,050
Cash Inflow during the Period	11,096,300	3,681,930	3,973,098	5,017,271	5,511,281	5,713,781	6,099,880
Cash Outflow during the Period	11,040,100	3,551,880	3,964,298	5,002,271	5,500,781	5,708,281	6,094,280
Closing Cash & Bank Balance	**56,200**	**186,250**	**195,050**	**210,050**	**220,550**	**226,050**	**231,650**

4.8. Calculation of BEP and IRR

Calculation of Break-Even Point (BEP)							
Sales	**5,772,000**	**7,419,750**	**8,280,583**	**9,794,583**	**10,839,361**	**11,366,028**	**11,934,778**
Variable Cost	955,460	1,266,710	1,421,560	1,679,130	1,862,700	1,957,310	2,055,890
Contribution	**4,816,540**	**6,153,040**	**6,859,023**	**8,115,453**	**8,976,661**	**9,408,718**	**9,878,888**
Fixed Cost	2,319,320	2,301,150	2,281,208	2,287,882	2,298,766	2,311,710	2,336,703
BEP Sales	**2,779,405**	**2,774,882**	**2,753,997**	**2,761,257**	**2,775,771**	**2,792,619**	**2,822,993**
Average BEP sales				**2,780,132**			

Calculation of Internal Rate of Return (IRR)				
Sl. No.	**Year**	**PAT**	**Depreciation**	**Cash Accrual**
	Cash outflow at beginning			-9,889,000
1	31/03/2023	1,935,554	1,027,000	2,962,554
2	31/03/2024	2,883,823	914,550	3,798,373
3	31/03/2025	3,391,971	814,808	4,206,779
4	31/03/2026	4,266,800	726,282	4,993,082
5	31/03/2027	4,862,026	647,666	5,509,693
6	31/03/2028	5,155,405	577,810	5,733,216
7	31/03/2029	5,467,029	515,703	5,982,732
IRR		**37.08%**		
Payback Period		**2 Years 9 Months**		

4.9. Summary of Project Cost

Sl. No.	Name of Assets	Amount (Rs)
1	Land Development	26,000
2	Civil Construction	8,020,000
3	Irrigation/Water Supply	300,000
4	Electrification	400,000
5	Plant & Machinery	900,000
6	Livestock	-
7	Insurance	15,000
8	DPR Cost	23,338
9	Other Miscellaneous Exp.	6,662
	Total Fixed Cost	**9,691,000**
	Recurring (for 1 month)	**198,000**
	Cost of Project	**9,889,000**

Working Capital Requirement

	Heads of Expenses	Amount/year
A	Raw Material	1,520,000
B	Salary	684,000
C	Utilities	112,320
D	Other Expenses	56,160
	Subtotal per year	**2,372,480**

Working capital requirement (for 1 month) **198,000**