Aquaculture Enhancement and Income Generation of Tribal People of Betul District Through Spirulina Cultivation.

FINAL REPORT

Under the scheme of WOSB

No: SSD/SS/010/2009

Submitted to

DEPARTMENT OF SCIENCE AND TECHNOLOGY, NEW DELHI

Submitted by

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SOCIETY FOR ENVIRONMENTAL CONSERVATION

E-4/177 ARERA COLONY, BHOPAL-462016

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cages of size 4x2x2 mt constructed by the organization during previous project under TSP scheme.

- During the second year, 5 training were organized in the villages namely- Chopna, Barridhana and Shahpur for spirulina culture and feed preparation.
- We have given the technology of mud pot culture to the villagers of Deopur Kotmi village of Chicholi block, Gadhakhar of Bhimpur block and Ambada of Athner block.
- Fish growth experiments of two Indian Major Carps and Common carps were carried out in ponds of the village Barridhana, Hirapur and Dulhara fed with Spirulina incorporated feed.

4. DATE OF START : 1December, 2010
SCHEDULED DATE OF COMPLETION : 30 November, 2012

5. TOTAL SANCTIONED : 9,41,000/-
TOTAL EXPENDITURE :

6. INTRODUCTION (Need Assessment For S & T Intervention In Project Area):

The application of Spirulina in aquaculture offers a very promising avenue for its use in fresh and processed form. Based on FCR and body weight gains, this algal diet was found to be superior to ground nut oil cake (GNOC) and even more superior to natural foods. It has substantial levels of PUFA, (Polyunsaturated fatty acid) including y-linolenic acid which is used In the synthesis of prostaglandins in fishes. It plays a role in augmenting pigmentation of ornamental fishes and prawns. The blue pigment, phycocyanin, makes upto 20'Yo of the dry weight of Spirulina. It enhances disease resistance and improves organoleptic qualities of the fishes. It has also been found recently to have application in the preparation of biofertiliser, cattle feed, fuel and in the making of cosmetics.

The role of Spirulina is manifold. It can generate new hope for farmers and industrial people once it is utilized for mass cultivation. Mass cultivation of Spirulina will generate

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good employment opportunities both in rural and urban sectors. Women of rural areas can take up Spirulina culture as a cottage industry.

7. APPROVED OBJECTIVES OF THE PROJECT:

- To explore the algal species of village ponds of Betul district.
- To evaluate the growth rate of fishes fed with spirulina.
- Transferring this technology to the resource poor farmers.
- To provide eco friendly algal production technology as an additional crop and generate self employment among tribal community

8. PROJECT AREA (Block, Village & Total Area Covered):

District	Block	Village
Betul	Ghoradongari (8 villages)	Dagdaga (2 group), Dulhara, Barridhana, Hirapur, Markadhana, Mankadhana, Chopandhana and Temru
	Shahpur (3 villages)	Barbatpur, Malawar and Silpati
	Total no of villages - 11	

9. COMMUNITY BACKGROUND (Caste & Occupation):

Total area of Betul district is 10043 sq. km which has been divided in 5 tehsils and 10 blocks. Total population of Betul district is 1395175 out of which 6,97,664 are general category, 5,499,07 are ST and 1,47,604 are SC. The district has total 1391 villages. The working and nonworking population of the project area are given below-

			TOT_WORK_M	TOT_WORK_F	NON_WORK_M	NON_WORK_F
DISTRICT	Betul	Total	362132	253844	347824	431375
		Rural	302148	243262	272556	318090
TEHSIL	Bhainsdehi	Total	88733	75885	79583	87742
		Rural	84744	74173	75482	81778
TEHSIL	Betul	Total	136318	77848	139879	185283
		Rural	93410	71308	84246	101984
TEHSIL	Shahpur	Total	25013	18885	23527	28484
		Rural	24058	18724	22370	26760

10. DETAILED PROGRESS REPORT :

10. A. METHODOLOGY & SYSTEMS APPROACH ADOPTED : (Survey; PRA Exercise; Community Mobilization & Social Engineering Technology Identification, Modulation & Diffusion; Demonstration & Training Component, Objective wise achievements etc.)

As it was proposed in the phases of the project work plan, the project was started from 1st December, 2010.

- Consultation on with the Resource persons was done to reschedule the activities as per the sanction given by DST.
- Consultation with local Government officials and NGOs to select the community under this project.
- Consultation with the Target community field visits were made by the investigator and following methodology was adopted to mobilize the target community.

Preliminary survey of village ponds:

In the initial stage of the project preliminary survey of village ponds of Shahpur and Ghoradongari blocks of Betul district were conducted. Two students were associated with this survey activity as a part of their M.Phil Dissertation done from Department of Limnology, Barkatullah University, Bhopal. 26 ponds were surveyed and algal samples were collected for further analysis.

PRA Exercise: PRA approach was adopted to mobilize the community.

Field visit for Interaction with target group: In February, 2011, first interactive visit was organized in Ghodadongari, Shahpur, Chicholi and Bhimpur block. Our organization is in close contact with 25 tribal groups in four tribal block of Betul District and they have started fisheries in their village ponds. During the visit they were consulted to take up fish culture. A rapid rural assessment exercise was carried out during the visit.

Initial workshop with target group: To initiate a dialogue with the target groups who are new to the projects, an initial workshop was organized in Shahpur block of Betul district to take up the project activities at beneficiary level. Tribals engaged in fisheries

activities were invited to attend it. Fisheries Department of Betul districts was also involved in the activity. About 50 tribal's associated with fisheries related activities attended the workshop. In this workshop the experts of the organization told them about Spirulina culture, its importance and its benefits. They have also mentioned how they can use the Spirulina as manure in the pond.

Group formation: After initial workshop we formed and re-organized 12 self help group (SHGs) in 11 villages in Ghodadongari and Shahpur block of Betul district. 4 groups were selected from the previous project run under TSP scheme (SP/TSP/047/2007) and 8 groups were formed in this project.

Activity selection: As per the interest of the beneficiaries group and the local need different activities related to integrated fish farming were selected.

Training: We conducted 4 trainings of fish culture and spirulina culture during the first year of the project. All aspects of fish culture and Spirulina culture were covered in those trainings. The detail of the project is given below-

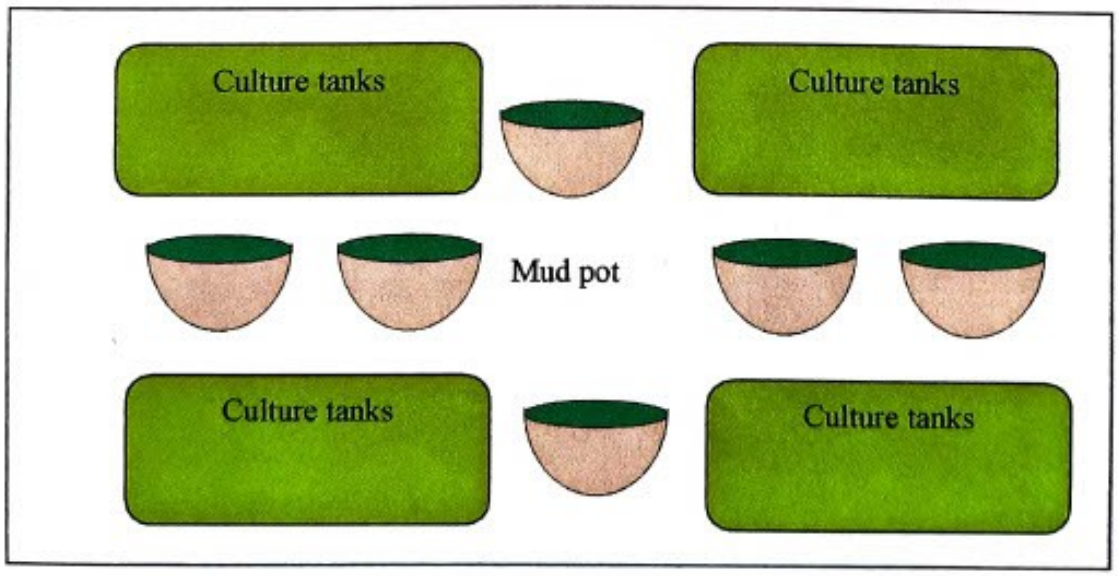
S No	Date of training	Place of training	No. of beneficiaries
1.	25/05/11	Chopna,	25
2.	20/06/11	Dagdaga village, Ghoradongari block	22
3.	03/07/11	Shahpur block	20
4.	23/07/11	Chopna village, Ghoradongari block	23

During the second year of the project we have conducted 5 trainings. The detail of the trainings were given below-

S No	Date of training	Place of training	No. of beneficiaries
1.	16/09/2012	Chopna	25
2.	28/09/2012	Barridhana	18
3.	12/10/2012	Barridhana	22
4.	17/10/2012	Shahpur	20
5	02/11/2012	Barridhana	19

Experimental unit: Laboratory experiments were conducted in Department of Zoology and Applied Aquaculture, Barkatullah University, Bhopal. Spirulina was cultured using poultry waste, Biogas slurry and KVK medium.

Demonstration unit: To conduct further experiment a demonstration unit is being set up. Field experiment was carried out in Barridhana village of Ghoradongari block of Betul district. A shed was constructed with 14 X 18 ft area. Within the shed 4 cemented tanks were build with the dimension of 6 X 4 X 1.5 ft for spirulina culture. 20 numbers of mud pots were also used for the cultivation of Spirulina. Among 20 pots, 8 pots were remained under the shed and rest was distributed to the beneficiaries.



Project Title: Aquaculture Enhancement And Income Generation of Tribal People of Betul District Through Spirulina Cultivation.

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PRA activity

Training at chopna

Meeting with resource persons and local NGOs

Fish seed rearing in cage

Hands-on training

Training

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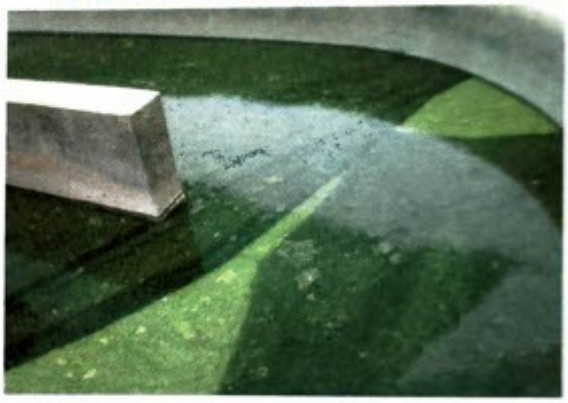
Lab culture of spirulina

Construction of demonstration unit

Demonstration unit



Mass culture of spirulina

Collection of spirulina

Dried spirulina

Table 1: Water quality data of different village ponds of Betul district.

Parameter	P-1	P-2	P-3	P-4	P-5	P-6	P-7	P-8	P-9	P-10	P-11	P-12	P-13
Air temperature	33	31	31	32	30	30	34	32	29	32	34	36	38.5
Water temperature (°c)	30.29	30	30	30	28	28	32	30	27	29	32	30	33.5
pH	8.5	8.9	8.4	8.4	7.5	7.9	8.3	8.3	7.6	8.6	8.8	8.8	7.2
Conductivity(µs/cm)	230	180	300	170	190	210	130	330	220	220	210	200	210
Total dissolved solid(mg/l)	150	110	180	110	120	130	190	210	100	120	120	110	120
Dissolved oxygen(mg/l)	4.8	5.6	5.6	8	6.4	4.8	5.2	8.3	8	7.2	7.2	6.4	8
Total Alkalinity(mg/l)	110	120	104	124	160	100	204	114	108	142	160	100	110
Total Hardness(mg/l)	220	160	210	220	152	310	320	160	104	112	140	164	180
Calcium Hardness(mg/l)	150	140	142.8	147	130	165	273	140.7	74	78	86	110	116
Magnesium Hardness(mg/l)	70	20	67.2	73	22	145	47	19.3	36	38	54	54	64
Chloride(mg/l)	22.9	15.9	20.9	15.9	15.9	25.9	31.9	17.9	21.9	23.9	26.9	25.9	25.9
Nitrate(mg/l)	0.378	0.278	0.079	0.038	0.078	0.046	0.156	0.188	1.5	1.5	1.65	1.35	1.26
Orthophosphate(mg/l)	0.144	0.105	0.062	0.053	0.129	0.072	0.036	0.105	0.032	0.036	0.032	0.026	0.031

Merismopedia sp.	+	-	+	+	+	-	+	+	+	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Microcystis flosaquè.	-	+	+	-	-	-	-	-	+	+	-	+	-	+	+	-	+	+	-	+	-	+	+	-	+	+
Nostoc sp.	+	-	+	-	+	+	-	+	-	-	+	+	+	+	+	-	+	-	-	+	+	+	+	-	+	+
Oscillatoria sp.	-	+	+	+	-	+	-	+	+	-	+	+	+	+	-	-	+	-	+	+	+	+	-	-	+	-
Phormidium sp.	-	+	-	+	+	-	-	+	+	-	+	+	-	+	-	+	-	-	-	+	-	+	-	+	-	-
Raphidiopsis sp	-	+	+	-	+	-	+	-	+	+	+	+	+	-	-	-	+	+	+	+	+	-	-	-	+	-
Spirulina platensis.	+	+	+	+	-	-	-	+	+	-	+	+	+	+	-	+	-	-	+	+	+	+	-	+	-	+
Spirulina maxissima	-	+	-	+	-	-	-	+	+	-	-	-	-	-	-	+	-	-	+	+	-	+	-	-	-	+
Synechocystic sp.	-	+	+	+	+	-	+	-	-	-	-	-	+	-	+	-	-	-	-	-	+	-	+	-	-	-
Trichodesmium sp.	-	-	-	+	-	+	-	-	-	+	+	-	-	-	+	-	+	+	+	-	+	-	+	-	+	+
Dinophyceae																										
Ceratium sp.	+	-	-	-	+	-	-	-	+	+	-	-		-	+	-	-	+	-	-	-	-	+	+	-	+
Gonyaulax sp.	+	-	-	-	-	+	-	-	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Peridium sp.	+	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	+	-	+	-	+	+	+	+	-	+
Euglenophyceae																										
Euglena phacus.	-	-	+	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	+
Phacus longicauda.	-	-	-	-	-	+	-	-	+	-	+	-	-	+	+	+	-	-	+	-	-	+	+	+	-	-
Trachelomonas sp.	-	+	-	-	+	+	+	-	-	-	-	+	-	-	+	-	-	-	-	+	-	-	+	-	-	+

- **1,2….26 denoted the pond numbers**

Table 2: List of phytoplankton in different village ponds of Betul district.

Name of species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Chlorophyceae																										
Ankistrodesmus sp.	+	+	+	+	+	-	+	-	+	+	-	+	-	-	+	+	+	-	-	+	-	-	+	+	-	+
Closterium sp.	-	+	+	-	-	+	-	-	+	+	+	+	-	-	-	+	-	+	+	+	+	-	+	+	+	+
Closteridium sp.	-	+	+	-	-	-	-	-	-	+	+	-	-	+	+	+	-	+	-	+	-	-	+	-	-	-
Cosmarium sp.	-	+	+	+	+	-	-	+	+	-	-	-	+	+	+	-	+	+	+	-	-	+	-	+	-	-
Chlorella sp.	-	-	-	-	-	+	+	-	-	-	+	+	-	+	-	+	+	-	-	-	+	-	+	+	+	+
Coelastrum sp.	-	-	-	+	+	-	-	-	-	+	+	+	-	-	-	-	+	-	+	-	-	+	+	+	-	+
Euastrum sp.	-	-	-	-	+	-	-	+	+	+	+	+	+	-	-	+	-	+	+	+	+	-	-	+	-	-
Eudorina sp.	+	+	+	+	-	-	+	-	+	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	+
Goelastrum sp.	-	-	-	-	+	-	-	-	+	+	-	+	-	-	-	-	+	+	-	+	-	-	-	-	+	+
Kirchneriella sp.	+	-	+	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-
Micractium sp.	-	-	-	-	+	-	-	-	-	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	-
Mougeotia sp.	-	+	+	+	-	+	+	+	+	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-
Nephrochamys sp.	-	-	-	-	+	-	-	-	-	+	+	+	-	+	-	+	-	+	+	+	-	+	-	+	-	-
Rhizoclonium sp.	+	+	+	-	+	-	+	-	-	+	+	+	+	-	+	+	-	+	+	+	+	-	+	+	-	+
Scenedesmus sp.	+	+	+	+	-	+	+	-	+	-	+	+	-	-	-	-	+	-	+	+	-	-	-	-	+	-
Selenastrum sp.	-	+	+	-	-	-	-	+	+	-	+	-	+	-	-	-	-	-	+	-	+	-	-	-	-	+
Staurastrum sp.	-	+	-	+	-	-	-	-	+	+	+	-	-	+	-	+	+	+	+	-	-	+	-	+	+	-
Schroderia sp.	+	+	-	-	+	-	+	+	-	+	-	+	+	-	+	+	-	+	-	+	+	-	+	+	-	+
Spirogyra sp.	+	-	+	+	-	+	+	-	-	+	-	+	-	-	-	-	-	+	-	+	-	-	-	-	-	+
Pandorina sp.	+	-	+	-	-	-	-	-	-	-	+	-	+	+	-	-	+	-	+	-	+	+	-	-	+	-
Pediastrum duplex	-	+	-	+	+	-	-	+	-	+	+	+	+	+	-	+	-	+	+	+	+	+	-	+	-	-

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