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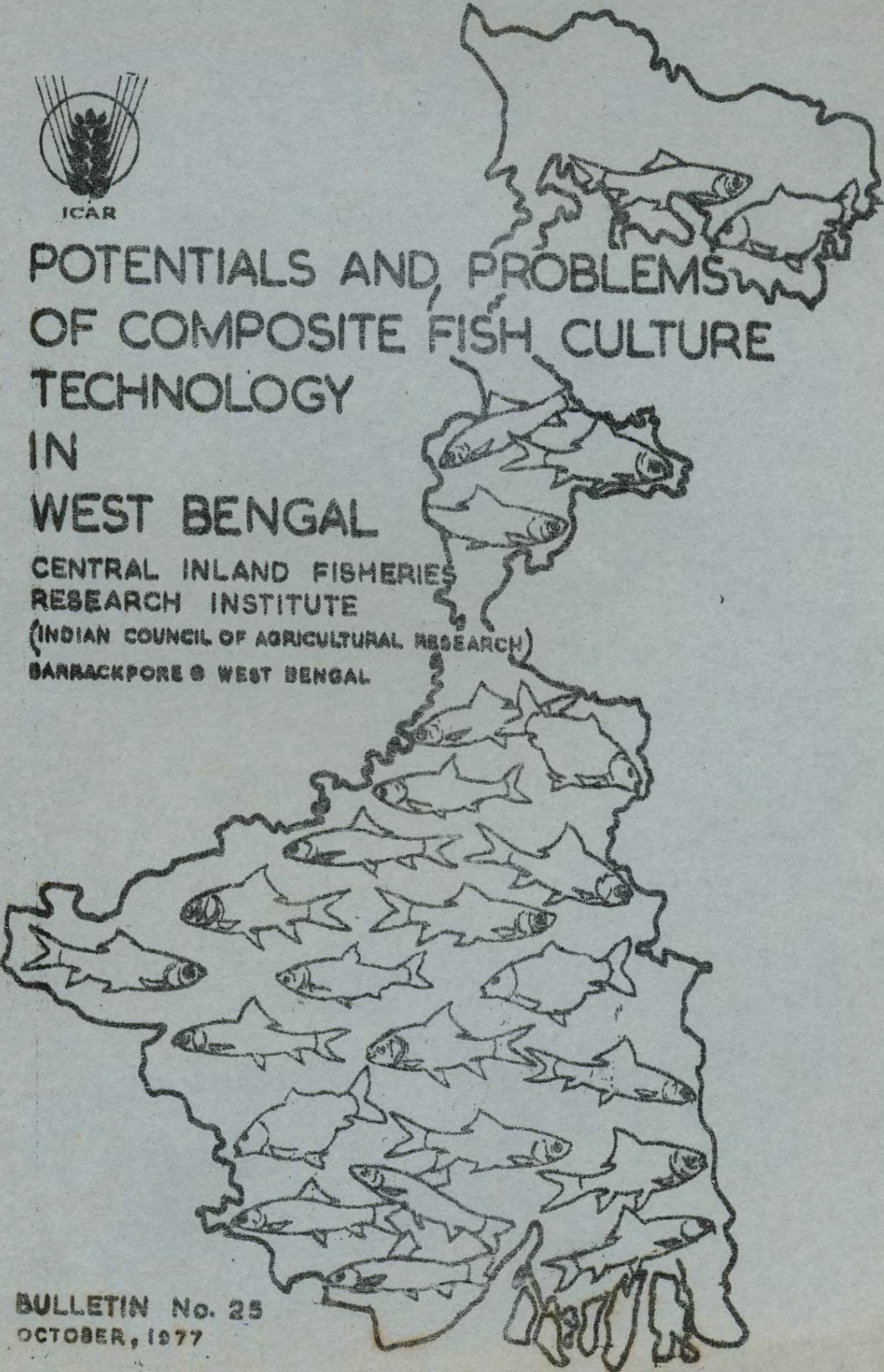
POTENTIALS AND PROBLEMS OF COMPOSITE FISH CULTURE TECHNOLOGY IN WEST BENGAL

CENTRAL INLAND FISHERIES RESEARCH INSTITUTE
(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)
BARRACKPORE ● WEST BENGAL



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C O N T E N T S

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by

S.M. Murshed[1], S.N. Roy[2], D. Chakraborty[3], M. Ranadhir[4] & V.G. Jhingran[5]

Abstract

Fish farmers in West Bengal took up composite fish culture at 91 centres in various districts of the State and achieved an average production of 4,372 kg of fish per hectare per annum. West Bengal is on the verge of total transformation in freshwater fish culture sector, capable of yielding an estimated untapped yield reservoir of 0.77 million tonnes. The index of untapped yield reservoir from freshwater fish culture sources alone is estimated at 4.4, indicating that the average traditional fish productivity can be raised by about 450% through adoption of the new technology developed at the Central Inland Fisheries Research Institute. An average gross profit of about Rs. 16,500 per hectare of culturable water area has been shown possible at current price structure from fish culture ponds employing the new technology. The hazards that stand in the way of successful implementation of improved technology in freshwater culture fisheries are discussed.

Present address :

1 Secretary for Fisheries, Government of West Bengal, Writers' Building, B.B.D. Bag, Calcutta.

2 Director of Fisheries, Government of West Bengal, 8-B, Lindsay Street, 4th Floor, Calcutta-19.

3 Dy Director of Fisheries, Government of West Bengal, 8-B, Lindsay Street, 4th Floor, Calcutta-19.

4 Scientist S-1, Central Inland Fisheries Research Institute, Barrackpore-743 101, 24 Parganas.

5 Director, Central Inland Fisheries Research Institute, Barrackpore - 743 101, 24 Parganas.

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1 Introduction

Perhaps the most outstanding event in the annals of Freshwater Aquaculture in India is the evolution of the multispecies fish culture technology that has come to be known popularly as "Composite Fish Culture". This technology, evolved after well over a decade of sustained research efforts by a group of scientists of the Central Inland Fisheries Research Institute has revolutionized the fish farm productivity and enabled the attainment of extraordinarily high production rates of about 9,400 kg/ha/annum in some of the experimental ponds at Cuttack. It has got the potential of forming a major aquaculture system in the freshwaters of the country, capable of substantially narrowing the country's protein gap.

Composite fish culture has a key role to play in changing the structure of entire rural economy by providing additional job opportunities and generating additional purchasing power to the fishermen communities. As per the available estimates, out of 16 lakh hectares of freshwater tanks and ponds in the country, 6.4 lakh hectares are presently under traditional fish culture. The estimated national average annual production of fish from these water bodies is 600 kg/ha/annum. State-wise classification of existing waterbodies in regard to size, water quality, soil conditions and other ecological factors, which are suitable for adoption of different culture systems are not available in order to frame any national projections or laying priorities. The absence of statistical information on a country-wide basis in regard to the factors mentioned above has put the planners and administrators in a difficult position to process national fisheries developmental plans and to make any detailed projections of total input requirements etc. for optimum utilization of water areas for different culture systems. Evidently, the technology of composite fish culture has got some technical constraints in regards to size and water quality and is best applicable to water spread areas ranging from 0.1 ha to about 2.5 ha, and having a depth idually of about 2 m.

Studies pertaining to quantitative assessments of various issues arising out of a technological change in freshwater aquacultural operations on output, employment and other functional income distribution are of utmost importance at present and it is time for the economists to step in this direction to make a beginning.

2 Materials and methods

Culture of Indian major carps has been an age old practice in West Bengal. Though India's average production from the traditional sources of fish culture, which is termed in this paper as old technology, is estimated at 600 kg/ha/annum, in West Bengal, average fish production from freshwater culture sources has been estimated at a higher rate compared to other States because of its stronger aquaculture base and constant improvements being made in the old technology itself. Moreover, the eagerness on the part of fish culturists to augment yields as a result of very attractive local market rates has significantly contributed to a higher level of State average. These factors have given a special status to freshwater fish culture in West Bengal and efforts are continuously being made by fish farmers themselves to make improvements in the old technology itself. As a result of the shifts in the old technology, the average fish production from freshwater culture sources in West Bengal through traditional technologies has been estimated at 1000 kg/ha/annum. No systematic sampling surveys were undertaken to estimate the district-wise average productions. Saha also estimated the rate of annual production from tank fisheries in West Bengal at 450 kg per acre per annum, which is about 1100 kg/ha/annum. A pilot survey on the basis of a circular systematic sampling was undertaken under a research project at the Central Inland Fisheries Research Institute, with the main objective of knowing the economic impact of improved technology in the vicinity of operational research centres, wherein data in regard to old fish culture production systems were collected from 68 surveyed sampled ponds, the average of which is at 1113 kg/ha/annum.

In this paper, an attempt has been made to focus the untapped yield reservoir from the existing freshwater culturable water bodies, from different districts in West Bengal. As district-wise data from different States are not readily available as regards to yield from improved technology, the estimation of untapped yield reservoir could not be attempted on a country-wide basis. West Bengal is perhaps the first State, where improved technology is on the verge of transfer to the farmers' ponds, where fish revolution will start from, just like green revolution from Punjab, to the rest of the country.

The West Bengal State Fisheries Directorate, in pursuance of its efforts to disseminate composite fish culture technology and thereby to augment local fish supplies in the State, set up 98 demonstration centres in private farmers ponds scattered all over the State, of which results from 91 centres have been obtained. Average expenditure on inputs is Rs. 11,445/ha of which Rs. 9,000 was subsidized by the State Government. These demonstration centres were actually managed by the farmers themselves, only the technical know-how of the new technology was made known to them by the Department. The data pertaining to these demonstration centres, supplied by the State Government formed the basis for analysis in section 3.

The Central Inland Fisheries Research Institute has been conducting its experimental work on composite fish culture technology, at Cuttack and also involved in the coordinated research projects in collaboration with six State Governments, and with International Development Research Centre of Canada in two States, the results of which have been summarized in Table I. The results that have been obtained in the coordinated project centres are highly encouraging, in that through suitable species combination tailored to make use of all the available ecological niches in the pond eco-system, fish yields ranging from 3-6.5 t/ha/yr were generally obtained. Productions even as high as 7,284 kg/ha/8 months and 5,890 kg/ha/6 months have been obtained at some of these coordinated project centres.

/ Table -1 /

A measure of the size of the untapped yield reservoir is provided by the difference between the average yield obtained in well-managed demonstration ponds cultured in farmers' ponds and the average of the area. Composite fish culture, the new technology consisting of several integrated processes is quite distinct from old set of aquacultural practices. The new technology is in the process of adoption stage and it is felt that by the time another

1000 demonstrations are brought to light, it will have a firm footing in this State. The district-wise average yield obtained from these 91 fish ponds has been taken as the one representing new technology and 1000 kg/ha/yr has been taken as the average of the area from traditional fish culture representing old technology. The difference in the yield of what would have been obtained through adoption of new technology and what is presently obtained without a technical change is the potential of untapped yield reservoir. This is best indicated by a ratio of the average of demonstrations of new technology by the average of the area representing old technology.

3 Untapped yield reservoir

The indices of untapped yield reservoir and quantum of untapped yield in different districts of West Bengal from sources of freshwater aquaculture are presented in Table II. The total untapped yield reservoir is estimated 0.77 million tonnes, if the existing cultivable water areas are fully brought under improved technology. The index of untapped yield reservoir in West Bengal from freshwater fish culture sources varied from 3.7 to 5.3, average being 4.4. This indicates the potentiality of raising traditional productivity by at least 4 times.

/ Table II /

Burdwan, Midnapore, Birbhum, Hooghly and 24 Parganas offer unique opportunities for immediate adoption of the improved technology. Among the 91 demonstration centres in the farmers' fields, the production rates in 62.6% farms were in between 3,000-5,000 kg/ha/annum. Only in about 1.1% of demonstration centres, low yields of below 2,000 kg/ha/annum were obtained, the causes of which may be attributable to random fluctuations (Appendix-1). Among them, 15.4% of farms obtained yield rates of 5,000-6,000 kg/ha/annum and 9.9% obtained more than 6,000 kg/ha/annum. The high percentage of 87.9 fish farmers obtaining more than 3,000 kg/ha/annum coupled with a rate of Rs. 16,528 gross profit at a sale price of about Rs.6.40 per kg, reveals the status of composite fish culture compared to an average net return of Rs. 2,323 obtained by private food fish farms through traditional aquaculture (Ranadhir, 1976).

4 Economic factors

An attempt has also been made to estimate the district-wise costs, if all the freshwaters that are presently under carp culture are brought under improved technology (Table III).

/ Table III /

An estimate of 257 crores of rupees are involved for additional inputs that are required for a complete transformation replacing old technology. These additional investments will generate a direct employment potential to about 0.3 million people by way of watch and ward, skilled fishermen and through fish marketing. This estimate is based on the assumption that one hectare of water area that is brought under improved technology will provide job opportunities to one skilled fishermen, who is also to be engaged to look after the watch and ward duties and marketing of 11 tonnes of additional fish will provide employment for one more person. Added to this, additional employment will also be generated in secondary, tertiary sectors as a result of increased demand for inputs such as fish seed, feeds and fertilizers and also through construction works that will have to be undertaken for farm maintenance at the beginning and during the course of culture period. It is estimated that every additional expenditure of about Rs. 8,500 will provide job opportunity to one person through adoption of composite fish culture technology.

The State level average income of Rs. 27,973 from sale proceeds of fish in one hectare of culturable water area is highly attractive as far as water/land use is concerned. In some districts like Hooghly, the level of average income even went up to Rs. 43,307. Except in one district, the sale proceeds in all exceeded Rs.20,000 per hectare of culturable water area. The average cost of production per kg of fish is Rs. 2.62 and in no case did it exceed Rs. 3.50. The average sale price is Rs. 6.39 per kg. For every rupee of cash variable expense, the anticipated gross profit is Rs. 1.44, accounting to a rate of 144% gross profitability.

5 Constraints

Inspite of the emergence of an improved technology, willingness on the part of the banks to finance the culture operations and publicity being made through news media, popular talks, exhibitions, demonstration programmes, film shows, extension pamphlets, fish farmers' days etc., a question will naturally arise as to why fish farmers are tardy in completely or even partially adopting the improved technology. The reasons perhaps might be that either the fish farmers were not fully convinced of the efficacy of the technology itself or serious constraints and hazards stand in the way of its adoption replacing the existing set of fish culture practices. It would be of great value to decipher the constraints responsible for this gap and to suggest practical remedial measures to remove the hurdles coming in their way of successful management of composite fish culture operations. The constraints that are responsible for the gap between potential yield at current levels of technology and the actual yield could be attributable to many factors like inadequate resources, insufficient extension and managerial inability to cope up with the technology. As far the constraints in composite fish culture are concerned, these can be grouped into four viz., (i) biological and environmental hazards, (ii) management problems, (iii) financial requirements, and (iv) lack of adequate extension agencies and training facilities.

5.1 Biological and environmental hazards

(a) The improved technology envisages complete removal of weeds, predatory fishes, insects and animals like frogs and water snakes from the pond environment. Though initially, the unwanted animals can be eradicated through application of biocides, there will be no guarantee that these will not reappear posing a biological hazard in the way of successful operation of composite fish culture.

(b) Over crowding, lack of food and poor water condition may result in the spread of fish parasites and diseases, causing considerable loss to the cultivated fish stocks. In case of occurrence of fungal infections like gill rot, bacterial infections like fin and tail rot, dropsy, eye diseases and protozoan caused diseases, there is very chance of whole fish crop being lost unless the infected fish are treated or destroyed and other fishes segregated into other ponds. If fish diseases are not checked in time, they start loosing weight and may ultimately succumb. The fear psychosis of possible occurrence of fish diseases among fish farmers coupled with lack of 'fish hospitals' as are available in other sectors like veterinary, is an important constraint for the spread of composite fish culture. Some sort of insurance of the fish crop will pave the way for spreading the high yielding technology.

(c) One of the serious biological problems in fish culture is in regard to algal blooms occurring in the ponds, which create supersaturation in oxygen levels during day and oxygen depletion during night, at times leading to mass mortality. In cases of oxygen depletion, fishes get distressed in the early hours of the morning when oxygen content touches its lowest and start surfacing to gulp air and, if suitable remedial measures are not taken in time, the fishes die.

5.2 Management problems

(a) Poaching of fish and/or wilful destruction of fish crops by poisoning due to enemity or jealousy or take revenge are important law and order problems for serious consideration. In States, where fish price is high, poaching on an organised scale has become a serious social problem standing in the way of capital investiment being flown in fish culture for intensive aquacultural operations.

(b) About fifty per cent of high yields in composite fish culture are contributed by the introduction of silver carp and grass carp, the stocking material of which is not easily available to the fish farmers, particularly in remote villages. The fish seed trade of Indian major carps has well developed in private sector and efforts should be made to further develop, the seed trade of silver carp and grass carp.

(c) Fish farmers, by and large, do not have ponds of their own and depend upon ponds taken on lease, which is normally of a very short duration with no security of getting the same renewed during the subsequent years. Moreover, the pattern of ownership and control of ponds resting with multiple agencies and short term leasing policies have stood in the way of long-term developmental efforts by the entrepreneurs.

(d) Organised arrangements for storage and marketing of the aquaculture produce are necessary in the interior areas so as to protect the fish farmers from exploitation by the middlemen traders.

5.3 Financial requirements

Composite fish culture involves an expenditure of Rs.10,000 to Rs. 15,000 per hectare per annum on various inputs. As fish farmers are generally poor and hence not in a position to invest the amounts needed, financial resources have become a major constraint in changing over to composite fish culture technology. Though the Agricultural Refinance Corporation and several leading banking institutions are willing to finance, they are unable to enter the field in a big way as the necessary climate, lack of proper organisational set up and lack of enthusiasm from the base level. Generally the institutional financier will look for an effective organisation, a compact area of operation, integrated activities under technical guidance, proper management of supervision of activities and an effective system of marketing and recovery of dues. A reliable gurantee for the repayment of loans taken by the fish farmers from the financing institutions is also required. This is not easily available to the poor fish farmers. Thus, the inadequate financing capacity of fish farmers has been a serious bottle-neck to a change over to any new technology involving costly inputs. Many more fish farmers should be brought under the umbrella of fish farmers' development agencies to whom the commercial banks have agreed to provide the necessary finances.

5.4 Extension gap

For transmission of any technology from the laboratory to the farmers' fields, an effective extension agency is of utmost importance. Besides fisheries extension units being attached to the research institutes, fisheries extension wings are also operating in the states. The fishery extension services require strengthening by way of additional man-power suitably trained in improved fish culture technology and regular provision of additional publicity material. Added to this, the extension officers require advanced training in aquaculture extension. The extension training centre of the Central Government at Hyderabad and the extension cell at the Central Inland Fisheries Research Institute are inadequate to cope with the anticipated magnitude of the workload.

Absence of effective extension mechanism at present at village level for the transmission of knowledge on improved technology to the field is a great handicap. The improved technology consists of several activities such as aquisition of suitable water area for culture, preparation of ponds, judicious stocking with suitable species combination, care of the crop and timely exploitation. Maximum yield will be obtained only when these activities are properly combined. The timing of operations can make all the difference between success and failure. At present, interest in fish culture is not deep enough to attract spontaneous response towards the improved technology and so, efforts should be made by the extension agencies to step up and create enthusiam in this direction. The achievements in agricultural crops have become possible because of effective extension services at the village level.

The extension wing at the Central Inland Fisheries Research Institute has already performed 30 demonstration programmes at Mirhati, Nilgunj and Khardah during 1973-77 showing different stages of composite fish culture. About 2,200 fish farmers attended the demonstrations at those centres. In the operational research projects, the technology of composite fish culture was demonstrated in Krishnagar, Sarpadihi, Babpur and Gosaba villages. In addition to these demonstrations, five fish farmers days were organised where the problems of composite fish culture were discussed. 16.62 lakh of Indian major carp spawn and 1.56 lakh of common carp seed were produced by the extension unit and handed over to the farmers. Also, 29 exhibitions were organised displaying posters depicting the various components of improved fish culture technology. Advisory services were provided to 700 fish farmers who visited this Institute regularly. Eight extension pamphlets have been published, some of them in Bengali. Film shows were arranged. The enthusiasm shown by the fish farmers visiting the extension cell of this Institute has strengthened the belief that the technology of composite fish culture is basically acceptable and what is lacking is an effective extension organisation at State level, dedicated to creating an awarness of intensive freshwater aquaculture in the interior of the State in rural Bengal.

6 Discussion

Economic evaluation of new and traditional technologies has clearly established the supremacy of composite fish culture operations either in terms of yield or in terms of economic returns. The fish farmers may face in the initial stages some operational difficulties when various ingredients are introduced to them. These may be overcome with the experience gained by them year after year. As finance is identified as a major constraint especially for marginal farmers in extending the new technology, commercial banks will have to come to their rescue initially with liberalized lending policies, sanctioning a minimum amount of Rs. 10,000 per ha. As fish cultural operations are progressing year after year, the farmer may himself be in a position to plough back his own profits in further aquaculture operation. Total transformation of all existing waterbodies at a time is perhaps not possible because of involvement of huge amounts of money which banks may not be willing to float and so development of fishery resources in a phased manner may be thought of, say by bringing 10% of additional waters every year to the fold of composite fish culture which may complete the task of fish revolution in West Bengal in not too distant a future.

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Table - I : Fish yield in composite fish culture technology from different parts of India (source : First 138 case studies of composite fish culture in India, CIFRI Bulletin No. 23).

State & District		Number of case studies	Area covered in ha	Actual fish yield obtained in kg.	Fish yield per ha (simple average in kg.)	Fish yield per ha per annum (weighted average in kg)
I	Orissa					
	Cuttack	3	1.05	9514.63	9061.55	9741.16
	Ganjam	11	5.33	16671.46	3127.87	3127.87
	Puri	14	4.68	11235.80	2400.81	2400.81
	Sub-total	28	11.06	37421.89	3383.53	3407.21
II	West Bengal					
	Nadia	14	7.39	27548.10	3727.75	3578.64
	24-Parganas	25	4.95	15015.30	3033.39	3661.30
	Malda	15	4.57	6674.57	1460.51	2491.63
	Sub-total	54	16.91	49237.97	2911.76	3566.61
III	Assam					
	Kamrup	3	0.90	2910.25	3233.61	3233.61
	Sub-total	3	0.90	2910.25	3233.61	3233.61
IV	Haryana					
	Karnal	6	0.82	3644.41	4444.40	7999.92
	Sub-total	6	0.82	3644.41	4444.40	7999.92
V	Uttar Pradesh					
	Jaunpur	13	2.17	7501.85	3457.07	3381.01
	Sub-total	13	2.17	7501.85	3457.07	3381.01
VI	Tamilnadu					
	Coimbatore	15	1.50	3837.60	2558.40	2960.07
	Sub-total	15	1.50	3837.60	2558.40	2960.07

Contd...

1	2	3	4	5	6
VII Andhra Pradesh					
Karnool	4	0.65	1231.05	1893.92	2217.78
West Godavari	4	0.72	1875.15	2604.38	2604.38
Sub-total	8	1.37	3106.20	2267.29	2445.50
VIII Maharashtra					
Poona	10	3.10	10440.00	3367.74	4950.58
Sub-total	10	3.10	10440.00	3367.74	4950.58
IX Pondicherry					
Pondicherry	1	0.30	170.00	566.60	1133.20
Sub-total	1	0.30	170.00	566.60	1133.20
TOTAL	138	38.13	118270.17	3101.76	3591.84

Table II : Untapped yield reservoir from freshwater aquaculture in different districts of West Bengal (Source : West Bengal Fisheries Directorate and Dr. K.C. Saha's book on "Fisheries of West Bengal").

Name of District	Number of demonstration centres	Water area of demonstration centres in ha	Total production of fish in kg.	Production of fish per ha in kg (approximated to nearest kg)	Average of the area per ha in kg.	Untapped yield per ha in kg.	Total culturable water area in ha	Total untapped yield in tonnes	Indices of untapped yield reservoir
2	3	4	5	6	7	8	9	10	11
ooch Behar	3	1.50	6149.5	4100	1000	3100	N.A.	-	4.1
arjeeling	-	-	-	-	-	-		-	-
alpaiguri	2	1.00	4600.0	4600	1000	3600	951	3423.6	4.6
est Dinajpore	4	2.24	9220.0	4116	1000	3116	13718	42745.3	4.1
alda	10	4.63	22436.5	4846	1000	3846	6394	24591.3	4.8
urshidabad	4	1.93	7065.0	3661	1000	2661	12380	32943.2	3.7
irbhum	5	2.50	11054.0	4422	1000	3422	30460	104234.1	4.4
adia	9	3.77	16053.4	4258	1000	3258	3121	10168.2	4.3
4-Parganas	16	7.87	35609.6	4525	1000	3525	22063	77772.1	4.5
owrah	1	0.50	1700.0	3400	1000	2400	8174	19617.6	3.4
ooghly	5	2.51	13381.5	5331	1000	4331	19772	85632.5	5.3
urdwan	12	5.51	24881.2	4516	1000	3516	40775	143364.9	4.5
ankura	4	1.71	6659.1	3894	1000	2894	30573	88479.3	3.9
dnapore	12	5.49	21864.3	3983	1000	2963	44762	133525.0	4.0
urulia	4	2.00	8038.3	4019	1000	3019	N.A	-	4.0
TAL	91	43.16	188712.4	4372	1000	3372	233143	766496.1	4.4

Table - III

Income, expenditure and other related details in composite fish culture technology from culturable freshwaters in West Bengal. (Source : West Bengal Fisheries Directorate)

Name of District	Expenditure on inputs per ha (in rupees)	Income from sale proceeds per ha in rupees	Gross profit per ha in rupees	Estimated expenditure if all waters are brought under improved technology (in million rupees)	Direct additional employment protential		Cost of production per Kg in rupees	Sale price per Kg of fish at site in rupees (approximated to nearest paisa)
					Watch & ward, netting etc. (in thousand)	Marketing (in thousand)		
Cooch Behar	11,800	24,598	12,798	N.A.	–	–	2.88	6.00
Darjeeling	–	–	–	–	–	–	–	–
Jalpaiguri	11,800	27,600	15,800	11.2	1.0	0.3	2.57	6.00
West Dinajpore	10,535	24,696	14,161	144.5	13.7	3.8	2.56	6.00
Malda	11,524	24,793	13,269	73.6	6.4	2.2	2.38	5.11
Murshidabad	11,822	21,969	10,147	146.4	12.4	3.0	3.23	6.09
Birbhum	11,323	27,238	15,915	345.0	30.5	9.5	2.56	6.16
Nadia	11,377	26,489	15,112	35.5	3.1	0.9	2.67	6.22
24-Parganas	11,798	29,475	17,677	260.3	22.1	7.1	2.60	6.51
Howrah	11,800	17,000	5,200	96.5	8.2	0.7	3.47	5.00
Hooghly	11,401	43,307	31,906	225.4	19.8	7.8	2.14	8.12
Burdwan	10,700	29,777	19,077	436.3	40.8	13.0	2.37	6.59
Bankura	12,275	28,601	23,300	375.3	30.6	8.0	3.15	7.34
Midnapore	11,402	25,497	14,095	510.4	44.8	12.1	2.86	6.40
Purulia	11,800	30,270	18,470	N.A.	–	–	2.92	7.53
TOTAL	11,445	27,973	16,528	2570.4	233.4	68.4	2.62	6.39

APPENDIX-I

Actual yield achieved in 91 demonstration centres laid out in farmers' ponds : (Source : State Fisheries Directorate)

Sl. No.	Name of District	Name of the block	Water area in ha.	Actual quantity of fish produced in Kg.	Quantity of yield per ha in Kg.
1	2	3	4	5	6
1	Cooch Behar	Cooch Behar	0.50	2000	4000
2	"	Dinhata-I	0.50	2150	4300
3	"	Dinhata-II	0.50	2000	4000
4	Jalpaiguri	Alipurduar	0.50	2400	4800
5	"	Jalpaiguri	0.50	2200	4400
6	Malda	English Bazar	0.50	2000	4000
7	"	Harischandrapur.	0.52	3200	6154
8	"	Old Malda	0.50	2867	5734
9	"	Ratua-I	0.13	Nil	Nil
10	"	Kaliachak-I	0.40	2273	5682
11	"	Chanchal-I	0.40	2762	6905
12	"	Gazole	0.48	1514	3154
13	"	Habibpur	0.80	4305	5381
14	"	Chanchal-II	0.40	1777	4442
15	"	Harischandrapur-II	0.50	2740	5480
16	Murshidabad	Burwan	0.43	1695	3942
17	"	Khargran	0.50	1816	3632
18	"	Bharatpur	0.50	1730	3460
19	"	Kandi	0.50	1824	3648
20	Nadia	Krishnaganj	0.45	1922	4271
21	"	Tehatta-I	0.50	2038	4076
22	"	Krishnagar-I	0.52	2015	3875
23	"	Nakashipara	0.30	1530	5100
24	"	Nabadwip	0.30	1204	4013
25	"	Karimpur	0.50	2348	4696
26	"	Chapra	0.50	1610	3220
27	"	Ranaghat-I	0.30	1292	4307
28	"	Ranaghat-II	0.40	2095	5238
29	Birbhum	Bolpur	0.50	2075	4150
30	"	Murarai-I	0.50	2391	4782
31	"	Bubrajpur	0.50	2554	5108

1	2	3	4	5	6
32	Birbhum	Nanoor	0.50	2246	4492
33	"	Sainthia	0.50	1788	3576
34	24-Parganas	Basanti	0.50	1800	3600
35	"	Bhangore-I	0.50	2760	5520
36	"	Joynagar-I	0.50	2906	5812
37	"	Baruipur	0.50	1721	3442
38	"	Sonarpur	0.43	1723	4007
39	"	Jadavpur-Behala	0.67	4120	6149
40	"	Budge-Budge	0.47	2556	5438
41	"	Rajarhat	0.50	1938	3876
42	"	Habra-I	0.50	2854	5708
43	"	Habra-II	0.50	1985	3970
44	"	Gaighata	0.57	3350	5877
45	"	Degqnga	0.50	1825	3650
46	"	Bongaon	0.46	1676	3643
47	"	Barasat-I	0.50	2601	5202
48	"	Amdanga	0.27	735	2722
49	"	Bagda	0.50	1060	2120
50	Howrah	Domjur	0.50	1700	3400
51	Hooghly	Chinsura Mojra	0.50	3014	6028
52	"	Singur	0.44	2199	4998
53	"	Khanakul-II	0.50	2194	4388
54	"	Tarakeswar	0.60	2829	4715
55	"	Dhaniakhali	0.47	3146	6694
56	Burdwan	Katwa -I	0.57	2465	4325
57	"	Kalna-I	0.48	N.A.	N.A.
58	"	Manteswar	0.47	2100	4468
59	"	Purbasthali-I	0.50	1057	2114
60	"	Memari-II	0.46	1805	3924
61	"	Galsi-I	0.21	630	3000
62	"	Galsi-II	0.35	1706	4874
63	"	Ausgram-I	0.50	1215	2430
64	"	Raina-I	0.20	986	4930
65	"	Ketugram-I	0.50	1716	3432
66	"	Jamalpur	0.46	3714	8074
67	"	Burdwan	0.45	2367	5260
68	Bankura	Simlapal	0.38	1553	4087

1	2	3	4	5	6
69	Bankura	Sonamukhi	0.50	1700	3400
70	"	Onda	0.37	1110	3000
71	"	Kotulpur	0.46	2297	4993
72	Midnapur	Sabang	0.40	2500	6250
73	"	Kharagpur	0.35	2277	6505
74	"	Narayangar	0.40	2731	6827
75	"	Tamluk-I	0.50	2100	4200
76	"	Egra	0.50	1920	3840
77	"	Contai-I	0.44	2128	4836
78	"	Contai-II	0.42	1560	3714
79	"	Contai-III	0.53	1137	2145
80	"	Ramnagar-I	0.50	1656	3312
81	"	Mahisadal	0.45	736	1636
82	"	Patoshpur	0.50	1320	2640
83	"	Moyna	0.50	1800	3600
84	Purulia	Raghunathapur-I	0.50	1916	3832
85	"	Manbazar	0.50	2013	4026
86	"	Jhalda-I	0.50	2120	4240
87	"	Barabazar	0.50	1989	3978
88	West Dinajpore	Balurghat	0.88	3640	4136
89	"	Tapan	0.30	1260	4200
90	"	Gangarampur	0.41	1600	3902
91	"	Kumargunj	0.65	2720	4185

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