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A Study on the Prospects of Fish Farming in West Bengal

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ABSTRACT:
This study aims at highlighting the unlimited unharnessed potentiality of development of fishery sector in West Bengal. West Bengal is endowed with all kinds of fishery resources. The people of West Bengal are also hereditary fond of fishes. Aquaculture for fishes has the uncommon opportunities for employment generation, contribution to the food and nutrition security, foreign exchange earnings in West Bengal etc. This sector has the unlimited unharnessed potentiality of development. Total demand of fishes almost exceeds production of fishes in West Bengal. It has to import fish from other states to fulfill the deficit demand of fishes. Out of 2, 76,202 ha area under ponds and tanks only 2, 20,000 ha i.e. 79.65% are presently used for aquaculture which means 20.35% remains unused. And out of 2.1 lakh ha, inland brackish water resources, 72.40% remains unused. Enhancement of prawn culture in 2.1 lakh hectares brackish water may bring huge exchange foreign exchange for the state. Government of West Bengal is also providing some attractive incentives for development of aquaculture fisheries and allied investments. But for the overall development of aquaculture and rural economy, a planned and long vision is necessary.

Key words: Pisciculture, Brackish water, Potentiality, Foreign exchange, Long term vision.

I. BACK DROP:

West Bengal is endowed with all kinds of fishery resources, plenty of rivers, water estuaries, lakes, ponds, beels and baors etc. There exists most suited agro climate for aquaculture of fishes. It is a gift of nature to the people of Bengal. The people of this state also have the high consumption habits of fishes. 80% people of the state consume fishes-unban people consuming more than rurals. There are popular sayings in Bengali that 'Sujala Suphala Sasya Shyamala Bangla' and 'Mache Bhate Bangali' mean that West Bengal is ideal place for fish farming having large natural resources and the people of West Bengal are fond of fishes hereditary. Fishes also have universal taste with continuous growth global market demand. More over there is huge abundant and diversified resources which remained untouched due to lack of infrastructure and technological facilities. This sector has the unlimited unharnessed potentiality of development. According to FAO, aquaculture can make significant contribution to global food security and economic growth if it is developed and practiced in a sustainable manner and 60% of fish food will come from aquaculture by 2030. Freshwater aquaculture that contributes about 55% of the total fish production is predominantly driven by smallholder farmers and institutionalised culture fisheries in part. In small-scale fisheries, products are consumed at the household level or/and sold in local markets within the fishing community (Food and Agriculture Organization, 2008)

Out of 2, 76,202 ha area under ponds and tanks only 2, 20,000 ha i.e. 79.65% are presently used for aquaculture which means 20.35% remains unused. Moreover, out of 5, 91,476.71 ha total inland water resource only 2.87000 ha water area are brought under aquaculture which means 51.48% remains unused (Jhingran V.G. 1991). The fish production of West Bengal is increasing over the years but the productivity of the fishery sector shows a very slow enhancement over the years due to lack of high quality fish seeds in proper ratio, lack of marketing infrastructure, socioeconomic and environmental constraints (Roy, 2008) and again the most farmers used to follow traditional technology due to the absence of fishery extension services (Singh, 2001). Due to legal problems among owners, rivalry, theft, lack of renovation of existing ponds etc. have kept large numbers of potential water bodies unproductive which could have play an important role in bridging the gap between demand and supply. Farm to farm

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differences in aquaculture practices are also considered as important factors contributing to the variations in productivity. There is a huge differences in the size of the fish farms, species cultured, stocking density, fish seed procurement, nursery management, feed and feeding management, pond preparation, harvesting frequency, mode of fish marketing, source of information on aquaculture, fish seeds and treatment of diseases, etc. (Abraham et al., 2010).

The demand for fish in rural areas of West Bengal is increasing over time with the increase in purchasing power and standard of living. Although, the state has registered a high growth in fish production, the supply in countryside is shrinking due to deceleration in area arising out of situations like rural rivalry, litigation, theft, breaking of joint family etc. The traditional system of fish production has failed to meet the growing demand, resulting excessive dependence on commercially managed, organized fish production units, locally known as 'bheries' and on the supply from other fish producing States(Rahaman et al., 2013)

The production as well demand for fish in West Bengal is the highest in the country. The domestic demand for fish in West Bengal is high because almost all the people of West Bengal consume fishes. But the state has a higher demand for fish than its production of fish i.e. this state has a deficit in fish supply. To meet this gap the state West Bengal has to import fish from other states like Andhra Pradesh, Tamil Nadu etc. (Bairagya Ramsunder, 2011). In these perspectives, this study highlights the prospects of fish farming in rural areas of WestBengal.

OBJECTIVES OF THE STUDY:

1. The main objective of the study is to highlight the unbounded prospects of development of the fishery sector of West Bengal.
2. It also aims to show that there is huge potentiality of employment generation for fisher men, farmers and their family members in the aquaculture.

RESEARCH MEYHODOLOGY:

This is an exploratory study which seeks to explore the potentials of aquaculture in West Bengal for fishermen or fish farmers. The secondary data are used for this study. The data are collected from the Handbook Fisheries Statistics 2020 which is published by Ministry of Agriculture, Govt. of India and also from different books and journals and published data by the government of West Bengal. For the analysis of data, Microsoft Excel software is used.

II. DATA ANALYSIS AND INTERPRETATION

Fishery sector plays great role in Indian economy contributing remarkable share in GDP. The share of GDP of fishery sector during last 20 years is shown in Table & Fig 1. West Bengal has occupied 2nd position in producing fish and fishery products producing over 16.5% of India's total fishery production and over 23% of India's Inland fishery production during the last three years (Table 1). West Bengal had occupied 1st position till 2010-11, producing 151.1 million tonnes where as Andhra Pradesh produced 136.8 million tones. During 2011-12 production in A.P enhanced @17.18% whereas production in West Bengal reduced @4.86%.

TABLE: 1
CONTRIBUTION OF FISHERIES SECTOR TO GROSS DOMESTIC PRODUCT (current prices) (rupees crores)

Year	Total GDP	GDP from		GDP from fisheries as % of	
		Agriculture	Fisheries	Total GDP	GDP from Agriculture
2000-01	1991982	460608	20948	1.05	4.55
2001-02	2167745	498620	22818	1.05	4.58
2002-03	2338200	485080	25027	1.07	5.16
2003-04	2622216	544667	26448	1.01	4.86
2004-05	2971464	565426	27152	0.91	4.8
2005-06	3390503	637772	31699	0.93	4.97
2006-07	3953276	722984	35182	0.89	4.87
2007-08	4582086	836518	38931	0.85	4.65
2008-09	5303567	943204	44073	0.83	4.67
2009-10	6108903	1083514	50370	0.82	4.65

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 5 May 2022, pp: 1357-1364 www.ijaem.net ISSN: 2395-5252

2010-11	7248860	1319686	57271	0.79	4.34
2011-12	8391691	1499098	66862	0.8	4.46
2012-13	9388876	1644926	78053	0.83	4.75
2013-14	9801370	1366311	80065	0.81	5.85
2016-17	12308193	2092392	95996	0.85	4.59
2017-18	13144582	2024266	115037	0.88	5.68
2018-19	14003326	2520598	212915	1.24	7.28
2019-20	14569268	2593330	180659	1.24	7.28
2020-21	13512740	2689035	144586	1.07	5.37

Source: Central statistical office, Extract for Hand book of fishery statistics, 2020

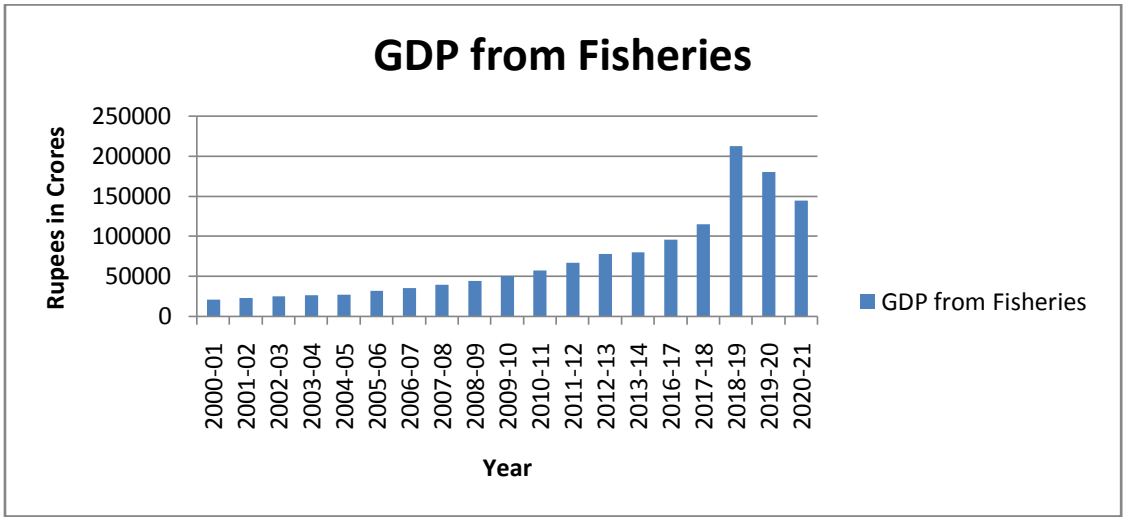

Fig: 1: GDP Contribution from Fisheries Sector during last 20Years

TABLE: 2: DEMAND AND PRODUCTION OF FISH IN WEST BENGAL (LAKH TONS)

YEAR	DEMAND		PRODUCTION		DEFICIT /SURPLUS
	Total	Growth rate (%)	Total	Growth Rate (%)	
2000-2001	11.35	-	10.60	-	(-) 0.75
2001-2002	11.58	2.03	11.00	3.77	(-) 0.58
2002-2003	11.47	(-)0.9	11.20	1.82	(-) 0.27
2003-2004	11.67	1.74	11.696	4.43	(-)0.004
2004-2005	11.88	1.8	12.15	3.88	(+)0.27
2005-2006	12.65	6.48	12.5	2.88	(-)0.15
2006-2007	13.70	8.3	13.59	8.73	(-)0.11
2007-2008	14.25	4.01	14.46	6.49	(+)0.21
2008-2009	14.90	4.56	14.84	2.54	(-)0.06
2009-2010	15.25	2.35	15.17	2.22	(-)0.08
2010-2011	15.75	3.28	14.43	(-)4.86	(-)0.32
2011-2012	16.10	2.22	14.72	1.99	(-)0.38
2012-2013	16.29	1.18	14.9	1.22	(-)1.39
2013-2014	16.52	1.41	15.80	6.04	(-)0.72
2014-2015	16.72	1.21	16.17	2.34	(-)0.55
2015-2016	16.92	1.20	16.71	3.34	(-)0.21
2016-2017	17.19	1.60	17.02	1.86	(-)0.17
2017-2018	18.02	4.82	17.42	2.35	(-)0.60

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 5 May 2022, pp: 1357-1364 www.ijaem.net ISSN: 2395-5252

2018-2019	18.50	2.67	17.70	1.61	(-)0.80
2019-2020	19.91	7.62	16.19	(-)8.53	(-)3.72

Source: Hand book of Fishery Statistics, 2020 and www.statitica.com on 19.5.2022 at 1 P.M

With the increase in population, the demand of fishes in West Bengal is increasing since 2000 to 2020 except 2004-05. Production also increases except the year 2010-11 and 2019-20. Total demand of fishes almost exceeds production of fishes in West Bengal except the year 2007-08 and it has deficit in producing fishes till 2019-20 (Table 2 and Fig.2). The total internal demand of fishes has not been filled up by producing fishes in this state. West Bengal has to import fish from other states to fulfill the deficit of fishes. However, West Bengal has yet enough potentiality to increase its production by aquaculture. It imports fishes around 1 lakh tones from other states. Maximum import is from Andhra Pradesh, next from Orissa. Rahu and Katla are the main species of import from other states. Due to severe shortage of fish supply in West Bengal, prices of fishes are rising at a higher rate than other food items. The rate of rise is 67% with respect to 2012 and 2022.

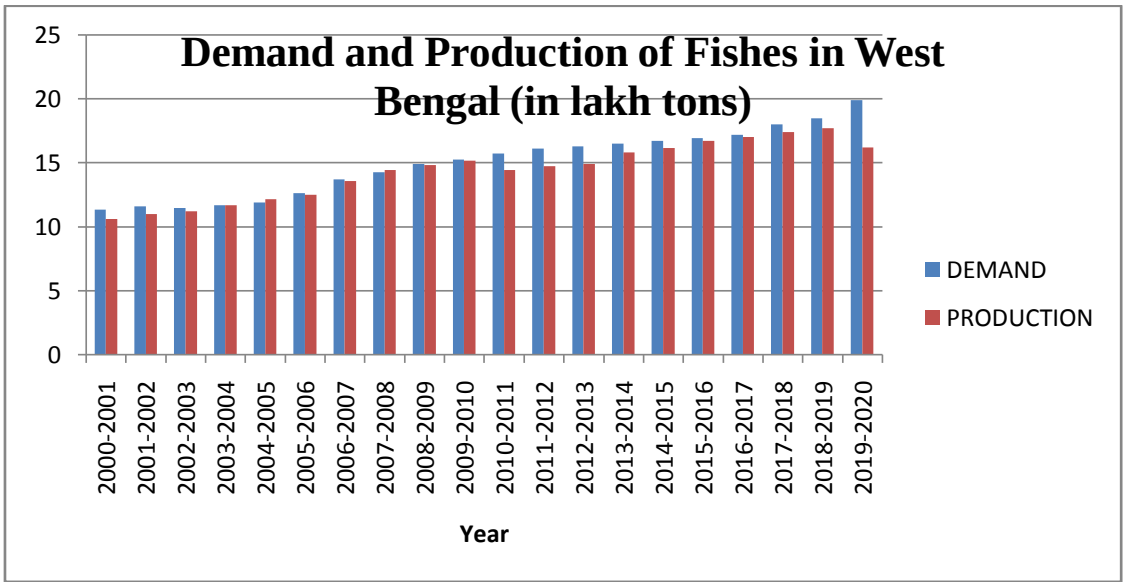

Fig: 2: Demand and Production of fishes in W.B during last 20Years

III. FUTURE PROSPECTS:

West Bengal has a vast water resource potentiality. By utilizing these water resources there are huge prospects of aquaculture of fishes. These resources can be divided into two categories: i) Inland and ii) Marine. Inland resources constitute both capture and culture areas like ponds, rivers, marshy lands, canals, reservoirs etc. It should be noted that tanks/ponds occupy the major share i.e. 46.17% of total inland water resources. But out of 2.63 lakh ha area under ponds and tanks, only 2.2 lakh ha i.e. 83.65% are presently using for pisciculture which means 16.35% remains unused. Whereas, out of 5.70 lakh ha, total inland fresh water resource only 1.48 lakh ha water area is brought under pisciculture i.e. 25.96% are presently used and 74.04% remains unused. And out of 2.1 lakh ha, total inland brackish water resource (24%) only 0.58 lakh ha water area is brought under prawn culture i.e. 27.60% are presently used and 72.40% remains unused(Table 3). These unused water resources can be brought under both fresh water pisciculture and saline water prawn culture through proper utilization.

Production of fishes through aquaculture may be a better option to satisfy the demand of fishes as well as earning money from exporting other states and even other countries. This practice may generate huge employment to the small and marginal fishermen and fish farmers' family members.

Fish farming is a short duration of crop assuring quick return on investment. Harvesting of fishes can be panned according to market demands for fetching better prices such as festival or marriage seasons when demand of fishes are high and prices are more.

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 5 May 2022, pp: 1357-1364 www.ijaem.net ISSN: 2395-5252

TABLE: 3: FISHERIES RESOURCES OF WEST BENGAL

Marine		
Length of coast line (Km)	158	
Continental Shelf (‘000 sq km)	17	
Number of Fish Landing Centers	66	
No of Fishing villages	171	
No of fishermen families	81067	
Traditional Fishermen families	56447	
BPL families	55301	
Fisher-folk population	368816	
Inland		%
Total inland water bodies (ha)	**570429.00**	100%
Rivers and Canals (Km)	2726.00	-
Small, Medium and Large Reservoirs (Total number)	52.00	-
Small, Medium and Large Reservoirs (Area ha)	28050.00	4.92%
Tanks & ponds (ha)	263372.00	46.17%
Brackish Water (area ha)	210000	36.81%
Beels (ha)	42082	7.38%
Derelict Water (ha)	26925	4.72%

Source: Marine Fisheries Census 2016, extracted from Hand book of Fisheries Statistics 2018

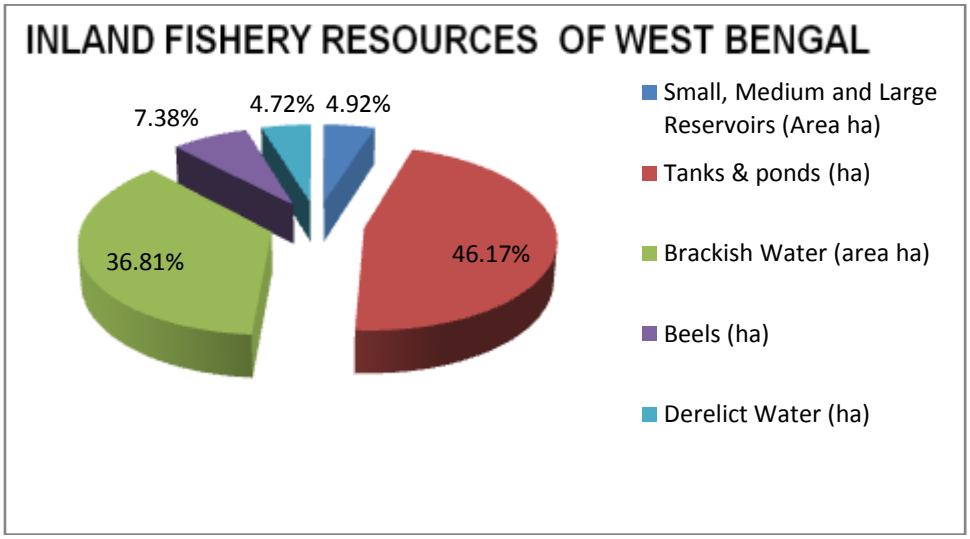

Fig: 3: Inland Fishery Resources of West Bengal

TABLE: 4
DISTRICT WISE IMPOUNDED WATER AREA IN WEST BENGAL
(In hectare)

Sl. No.	**Name of the district**	**Cultural Area**	**Semi-Derelict Area**	**Derelict Area**	**Total Area**	**Rank**
1	Coochbehar	1598.11	1993.76	727.44	4319.31	
2	Jalpaiguri	386.36	468.00	101.41	955.77	

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 5 May 2022, pp: 1357-1364 www.ijaem.net ISSN: 2395-5252

3	Uttar & Dakshin Dinajpur	9678.66	2173.36	2281.76	14133.78	
4	Malda	2967.94	3055.42	3557.23	9580.60	
5	Murshidabad	16161.76	646.29	0	16808.05	
6	Nadia	4579.56	900.13	508.23	5987.92	
7	24-Parganas (N)	8641.45	1068.76	277.80	9988.01	
8	24-Parganas (S)	11237.79	1389.87	361.28	12988.94	
9	Howrah	4240.45	415.70	898.51	5554.66	
10	Hooghly	9224.22	4545.76	2498.03	16268.01	
11	Medinipur	21886.55	11482.31	3830.27	37199.13	2
12	Bankura	17553.36	3810.75	1332.70	22697.01	4
13	Purulia	50078.06	14229.64	6947.37	71255.07	1
14	Burdwan	20618.79	7386.63	3189.49	31194.91	3
15	Birbhum	15260.62	1596.57	413.54	17270.73	5
	STATE TOTAL	**194113.88**	**55162.95**	**26925.06**	**276201.89**	

Source: Some basic fisheries statistics 2012-13, Department of fisheries, Govt. of WB

West Bengal has about 200000-ha water impounded curturable area. Moreover, there are 55000 semi-derelict areas, which may also be converted to culturable area by some development. Purulia, Mednapur, Burdwan,Bankura, Birbhum have the maximum potential area of fishes (Table 4) It has the highest potential brackish water aquaculture resources among all the maritime states. It has 27% share of the country's potential resources. Prawn farming is practiced in three coastal districts in West Bengal viz. North 24 Parganas, South 24 Parganas, and Purba Midnapore. Being coastal areas on the Bay of Bengal, nearby rivers, creeks, canals, estuaries are the sources of saline water. 69.74% of the Potential area of North 24 Parganas, 83.14% of the South 24 Parganas and 86.8% potential area of Purba Midnapur are still remains idle and do not come under prawn culture in West Bengal. As per the Economic Review 2013-14, West Bengal exports only around 0.7 lakh tonne (worth Rupees1,825 crore) of fish. Exports mostly include shrimps, prawns and some exotic marine fish varieties. Enhancement of prawn culture in 2.1 lakh hectares brackish water may bring huge exchange foreign exchange for the state.

The West Bengal government is looking to increase fish production double by 2025. To implement this, initiatives such as bringing all water bodies under fish farming are already under process. It may be possible to fulfill the future target of 20 lakh tones during 2025 and to ensure this production of fishes at the rate at least 5 tonnes per hectare is necessary. The government is also mulling to set up one-stop 'aqua shops,' which provide certified fish seeds and fish-feed and also advise the cultivators.

Aquaculture is a profitable business (return on investment @20%) (Dandapat & Islam et.al) and the quantum of profit depends on the production of fishes. Government of West Bengal encourages private entrepreneurs to invest in the following ancillary business of fishery sector.

Table: 5: Prospects of Ancillary business of fishery sector

Sl no	Areas	Prospects
1	FISH FEED &DISEASE MANAGEMENT	Immense scope for setting up fish feed plants. Ever growing demand for fish medicine and prophylactics
2	FISH PROCESSING UNITS FOR EXPORT	West Bengal is one of the major export epicentres for sea and processed fish in the world.
3	DEVELOPMENT OF COLD CHAIN	Essential for increasing shelf life of fishes and fetching remunerative prices for farmers.
4	MODERN HATCHERIES	Potential to set up hatcheries for seed production of new species.
5	AQUA FARMING WITH BIO FLOC & RAS TECHNIQUES	Immense scope for aqua farming of Indian and Exotic carps.
6	ORNAMENTALFISHFARMING	Tremendous opportunities to set up Mother Hatcheries and

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 5 May 2022, pp: 1357-1364 www.ijaem.net ISSN: 2395-5252

		Ornamental Hubs in PPP for Ornamental Fish.
7	DEEP SEA FISHING	The State offers opportunities for Deep Sea fishing, including manufacturing of vessels, gears, etc
8	MODERN FISH MARKETS	Demand for modern, clean, air conditioned fish markets on the rise. Fish retail chains coming up.
9	MANUFACTURING &PACKAGING UNITS	Scope to set up manufacturing & packaging units for Packaged Fish, Aquaponics, Bubblers, Solar Fish Driers etc.
10	VALUE ADDITION	Enormous demand for ready to cook, ready to eat fish items waiting to be tapped
11	FISH ECO-TOURISM	Opportunities abound in Aqua Sports, Amusement and Fish Eco Tourism Lodges

Source: http://www.wbfisheries.in/opportunity-for-investors.php on 19.5.2022 at 9 am

Government of West Bengal is providing some attractive incentives for development of aquaculture fisheries and allied investments (Table 6). These allied sectors also provide employment for many people. To induce greater utilization of modern and scientific technology training in imparted at the state, district and grass root level to fishermen in inland fisheries in West Bengal.

TABLE:6: ICENTIVES AVAILABLE BY THE GOVERNMENT

Sl No	Item	Micro (15L - 1Cr)	Small (l Cr-5 Cr)	Medium (5 Cr-10 Cr)	Large (10 crores & above)
1	Capital Investment Subsidy	15%-40 % (Max. Rs 20Lakh)	10% -50% (max Rs. 1 cr)	5%-20%% (maxRs75 lakh)	Up to 75%
2	Electricity Duty	Up to 100%	80%-100%	80%-100%	Max. Rs 25Lakh/yr
3	Power Subsidy	Rs.30Lakh annum (max)	Rs.40Lakh annum (max)	Rs.50Lakh annum (max)	Rs.75Lakh annum (max)
4	Refund of Stamp Duty	30%-100%	25% -100%	20%-80%	75%
5	Reimbursement of VAT	60% -90%	60% -90%	60% -90%	80% -90%
6	Waiver of Land Conversion Fee	25% -90%	25% -90%	25% -90%	25% -90%
7	Central Sales Tax(CST)	Total refund for 3 Rears	Total refund for 3 Rears	Total refund for 3 Rears	Total refund for 3 Rears
8	Work Force Welfare Assistance	75%-100%	75%-100%	75%-100%	80%-90%

Source: West Bengal Fisheries Investment Policy, 2015, The Kolkata Gazette June 4, 2015

LIMITATIONS OF THE STUDY:

1. The study is done on the basis of secondary data and the observations made are obviously micro in nature and not in general.
2. It is based on the assumption that fisher men are very weak in financial condition. The can not provide modern technologies, skill or knowledge for fish farming
3. In maximum cases, it may not be possible for the fish farmers or fisher men to be owner/entrepreneur of the fishery; they become the labour of the fishery. The profit of the fishery is taken away by the entrepreneur who provides capital.
4. Some risks like natural calamity, mortality, diseases of fishes are also to be considered for making fish farming

IV. CONCLUDING OBSERVATIONS:

It may be concluded that fish farming may become economically rewarding to the poor fishermen and fish farmers providing employment. Fish farming on small scale basis needs no more capital rather requires more labour. The family members of the poor fishermen and fish farmer's family may also get employment in the fisheries or processing works. This practice may help in developing rural economy. But for this, a planned and long term vision is necessary.

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