

# **Bio-Economics of Bheri Fisheries Near by Dhapa Canal of East Kolkata Region in West Bengal During 2014-'15.**

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**ABSTRACT:** Bheri fisheries played an important role to the market economy and fish consumption in Kolkata. The neighbouring households use these bheris for various purpose viz. agriculture, water supply, fisheries, irrigation, livestock grazing, jute retting etc. Bheris in East Kolkata area play a significant role by providing many goods and services in the livelihoods of the local people. Bheris constitute an important fishery resources contributing significantly to the fish production apart from providing livelihood to thousands of poor fishers. Normally the bheris in East Kolkata are productive environment. In bheris the natural fish population and their growth are monitored to obtain the desired production levels whereas in the closed ones stocking is the mainstay of management.

**KEY WORDS:** Econometrics, Bheris, Productivity, Fisheries, Livelihood.

## **I. INTRODUCTION**

The States of West Bengal is important inland fisheries state in the country, not only from the point of view of their potential for the development of fish farming, but also because fish is the main constituent of the local diet and about 95 percent of the states' populations consume freshwater fish. India has vast inland fishery resources about 73.59lakh Ha in which rivers and canals (195210 million km), reservoirs (29.07 lakh ha), tanks and ponds (24.14 lakh ha), estuaries, floodplain lakes (7.98 lakh ha) and bheris, offering tremendous scope for fish production. West Bengal has always been at the top at the national level in terms of inland fish and seed production. There are 1 288 027 persons involved in inland fisheries and freshwater aquaculture and 199 122 in marine fisheries. (Chattopadhyay *et. al* 2002) The State of West Bengal has also the highest consumption of fish in India. The per capita fish demand is estimated as 15.6 kg, which is above the world average of 13 kg and the national average of 9 kg. (Bhattacharyya, S. and Santra, S.C. 2003). Bheris constitute an important fishery resources contributing significantly to the fish production apart from providing livelihood to thousands of poor fishers. Bheris influence the socio-economic status of the local communities. Still, studies on fisheries management particularly socio-economic management and sustainable utilization of bheri fishery resources in India are far from adequate. Being such type of background, the bheri resources have been intensively used by the poor people in the bheri catchment area. Mukherjee, S. (2008).

## **II. MATERIALS AND METHODS**

To conduct the study of "Econometrics of Bheri Fisheries in East Kolkata at Dhapa Pumping Station, West Bengal during 2014-'15." scientifically, a suitable research design was evolved in order to arrive at an authentic conclusion. The Dhapa Canal is situated at 7<sup>0</sup>-70'- 15'' E, 7<sup>0</sup>-70'-35'' E and 2<sup>0</sup>-20'- 25'' N, 2<sup>0</sup>-20'-35'' N. The maximum

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temperature during summer rises around 39<sup>0</sup>C, while minimum temperature during winter is around 10<sup>0</sup> C. The average temperature during most part of the year is around 30<sup>0</sup> C during day time.

The Plan of work sequence is:

Designing the Sampling Frame → Selection of two Bheris from the Dhapa area →  
 Selecting the bheri fishery farmers to be interviewed → Cross verification with the  
 block/district level government officials → Drawing of Inference → Find out the Management  
 Strategies on the basis of the study.

Proposed Sampling Frame :

Stage	Selected Zone	Sampling Procedure	Number of Unit	Data Collection
Bheri Selection	2 bheris near <b>Dhapa Canal</b> a) Nalban Bheri b) Natar Bheri	Purposive Sampling	2 Bheris	Secondary Data
Fish farmer selection (20 farmer from each bheri i.e. in total 40 farmers interviewed)	Data From each Bheri	Purposive Sampling	Bheri Officials & member	Questionnaire & Interview

Data collection were made by two ways; collection of existing data (secondary data) such as published literature, books, research articles and maps etc. of institutions. The present status, current problems and related legislation were collected from the literature survey. The collection of new data by filling of questionnaires was carried out. The collected data are later analyzed statistically.

### III. RESULTS AND DISCUSSION

The present dissertation gives a spectrum of information, identification of important input variables, threats and the required management for the sustainability of bheri fishery near by Dhapa area (Station 1) in East Kolkata area. The value of construction cost in station 1 is Rs 4743.895. But in the year 2015 the expenditure of construction in that area is Rs 7000. For electric installation the average cost is Rs 290.19 in 2014 but in the year 2015 the expenditure are in Station 1 is Rs 329.99. For watchmen shed the collected data is Rs 182.84 but in the year 2015 the expenditure is 213.35. The collected data on Lease amount in Station 1 is Rs 9117.42, but in the year 2015 the expenditure is Rs 9938.92. The collected data on Liming & Manuring is Rs 10784.08 in 2014. But in the year 2015 the expenditure is Rs 12218.28. The collected data on chemicals Station 1 is Rs 4280.93. But in the year 2015 the expenditure is in Station 1 is Rs 5368.4. For cost of seeds the collected data is Rs 32767.93 in 2014. But in the year 2015 the expenditure is Rs 35197.01. The collected data on Fuel charge in Station 1 is Rs 103.43 in 2014. But in the year 2015 the expenditure are in Station 1 is Rs 118. The collected data on Electricity charge in Station 1 is Rs 511.42 in 2014. But in the year 2015 the expenditure are in Station 1 is Rs 423.56. The collected data on Labour charges in Station 1 is Rs 3908.39 in 2014. But in the year 2015 the expenditure are in Station 1 is Rs 5700.75.

**Table 1 : Average Economics of bheri fisheries near by Dhapa Pumping Station during 2014-15**

Sl. No.	Particulars	2014 (June-December)	2015 (Jan-July)	Comments
A.	Capital Cost	Amount (Rs.)	Amount (Rs.)	
1	Construction	4743.895	5380.222	
2	Electric installation with electrification	290.19	329.9863	
3	Equipments(net,handi,boat etc)	1934.595	2279.353	
4	Watchman shed	182.84	213.3581	
5	Miscellaneous	1258.865	1776.989	
6	<b>Total</b>	8410.385	9979.91	

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B.	Variable Cost	Amount (Rs.)	Amount (Rs.)	Comments
1.	Lease amount	9117.415	9938.927	
2.	Liming and manure (Fertilise and productivity purpose)	10784.08	12218.28	
3.	Chemicals (weed infestation)	4280.93	5368.4	
4.	Cost of seeds	32767.93	35197.01	
5.	Cost of feed	6097.322	7555.162	
6.	Fuel charges	103.4273	118.0065	
7.	Electricity charges	511.4245	423.5615	
8.	Labour charges	3908.39	5700.75	
9.	Annual maintenance and repairing cost	356.383	464.1702	
10.	Miscellaneous	107.3682	147.165	
	<b>Total</b>	68034.67	77131.43	
	<b>Total Input (capital cost + variable cost)</b>	76445.06	87111.34	

a) 2015: Total Production: 1025 Quintal

Sl no	Species name	Production (in quintal)	Rate@/que	Amount (in Rs)
1	Rohu	4.835	12000	58020
2	Catla	3.02	14000	42280
3	Mrigal	1.99	10000	19900
4	Bata	1.725	10000	17250
5	American rahu	2.26	7000	15820
<b>Total</b>				<b>153270</b>
Profit : (output-input)				153270-87111.34=66158.66

b) 2014: Total Production: 852 Quintal

Sl no	Species name	Production (in quintal)	Rate@/que	Amount (in Rs.)
1	Rohu	4.175	11000	45925
2	Catla	2.995	13000	38935
3	Mrigal	1.92	9000	17280
4	Bata	1.815	9000	16335
5	American rahu	1.215	6000	7290
<b>Total</b>				<b>125765</b>
Profit : (output-input)				<b>125765-76445.06= 49320</b>

From (Table 2), which represent the Correlation matrix considering all the variables under consideration, the results are depicted in the following manner. Firstly, considering the correlation between **Stocking** with other variables, there exist a significant high positive correlation with equipments, total capital cost, moderate positive correlation with watch man, low positive correlation with construction, electrification, high negative correlation with Miscellaneous, total variable cost, total input, total output, lease amount, cost of seed, moderate negative correlation with liming and manuring, chemical, fuel charge, electric charge, annual maintenance and repair, profit and low negative correlation with labour charge, and Miscellaneous. Secondly, considering the correlation between **Construction** with other variables there exist a significant moderate positive correlation with watch man, total capital cost, annual maintenance, profit low positive correlation with equipments, high negative correlation with electrification, Miscellaneous, Chemicals, Fuel charges, Labour charges, moderate negative correlation with Cost of seeds, Electricity charges, Total Variable Cost, Total Input, low negative correlation with Total Output, Miscellaneous, equipments. Thirdly, considering the correlation between **Electric installation** with electrification other variables there exist a significant moderate positive correlation. Fourthly considering the correlation between **Equipments** with electrification other variables there exist a significant high positive correlation. Fifthly considering the correlation between **Watchman shed** with electrification other variables there exist a significant high positive correlation. Sixthly considering the correlation between **Miscellaneous** with electrification other variables there exist a significant high positive correlation with Total Capital Cost, high negative correlation with Lease amount and other variables. Seventhly considering the correlation between **Total Capital Cost** with electrification and other variables there exist a significant high positive correlation with Lease amount and other variables. Eighthly considering the correlation between **Lease amounts** Cost with electrification other variables there exist a significant high positive correlation with

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other variables. Ninthly considering the correlation between **Liming and manure** Cost with electrification other variables there exist a significant high positive correlation with Chemicals and other variables. Tenthly considering the correlation between **Chemicals Cost** with electrification and other variables there exist a significant high positive correlation with Cost of seeds and other variables. Eleventh considering the correlation between **seeds** with electrification and other variables . Twelfth considering the correlation between **Fuel charges** with electrification and other variables there exist a significant high positive correlation with Labour charges and other variables. Thirteenth considering the correlation between **Electricity charges** with other variables there exist a significant high positive correlation with Miscellaneous and other variables. Fourteenth considering the correlation between **Labour charges** with electrification other variables there exist a significant moderate positive correlation with Total Variable Cost, Total Input, and low positive Miscellaneous, total out put, low negative correlation with Annual maintenance and repairing cost, Profit. Fifteenth considering the correlation between **Annual maintenance** and repairing cost with electrification other variables there exist a significant high positive correlation with, moderate positive correlation with Miscellaneous, total output, low positive with correlation with Variable Cost ,Total Input. Sixteenth considering the correlation between **Miscellaneous** with electrification other variables there exist a significant high positive correlation with Total Variable Cost, Total Input, Total Output, moderate positive correlation with profit. Seventeenth considering the correlation between **Total Variable Cost** with electrification other variables there exist a significant high positive correlation with Total Input, Total Output, and low positive correlation with profit. Eighteenth considering the correlation between **Total Input** electrification other variables there exist a significant high positive correlation with Total Output, and low positive correlation with profit. Ninetieth considering the correlation between **Total Output** electrification other variables there exist a significant high positive correlation with profit.

**Table 2: Correlation Matrix for Average Economics (unit 1Ha) comprising two bheri fisheries culture at Dhapa canal of East Kolkata during -2014 (June-Dec)**

	Construction	Electric Installation	equipment	Watchman shed	Miscellaneous	Total capital cost	Lease amount	Liming and manure	Chemicals	Cost of seeds	Cost of Fed	Fuel charges	Electricity charges	Labour charges	maintenance/repairing cost	Miscellaneous	Total Variable Cost	Total Input	Total Output	Profit	
Construction	1																				
Electric installation	.869	1																			
equipment	.981	.949	1																		
Miscellaneous	.993	.803	.950	1																	
Watchman shed	.774	.986	.882	.692	1																
Total Capital Cost	.988	.935	.999*	.962	.862	1															
Lease amount	.983	.763	.928	.998*	.643	.943	1														
Liming and manure	.553	.893	.705	.448	.956	.674	.389	1													
Chemicals	.474	.847	.636	.363	.924	.603	.302	.996	1												
Cost of seeds	-.745	-.319	-.602	-.821	-.155	-.635	-.856	.143	.234	1											
Cost of	.99	.81	.95	1.0	.708	.968	.996	.469	.385	-	1										

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Feed	5	7	7	00*						.807										
Fuel charges	.002	.496	.197	.119	.635	.155	-.183	.834	.882	.665	-.096	1								
Electricity charges	.937	.987	.987	.888	.946	.980	.856	.809	.751	-.466	.898	.351	1							
Labour charges	-.014	.482	.181	-.135	.622	.139	-.200	.825	.874	.677	-.112	1.000*	.336	1						
maintenance/repairing	.975	.957	1.000*	.942	.894	.998*	.918	.723	.656	-.580	.949	.222	.991	.206	1					
Miscellaneous	.867	1.000*	.948	.801	.986	.933	.760	.894	.849	-.315	.814	.500	.986	.486	.956	1				
Total Variable Cost	.431	.820	.598	.318	.905	.564	.256	.990	.999*	.281	.340	.903	.718	.896	.619	.823	1			
Total Input	.569	.901	.718	.466	.961	.689	.407	1.000*	.994	.124	.486	.823	.820	.814	.736	.903	.987	1		
Total Output	.063	.548	.256	-.059	.681	.215	-.124	.866	.909	.618	-.035	.998*	.407	.997*	.281	.551	.928	.856	1	
Profit	-.132	.375	.063	-.251	.525	.021	-.314	.753	.810	.759	-.229	.991	.222	.993	.089	.379	.838	.740	.981	1

\*\* Correlation is significant at the 0.01 level (2- tailed)

\* Correlation is significant at the 0.05 level (2 tailed)

**Table 3: Correlation Matrix for Average Economics (unit 1Ha) comprising 2 bheri fisheries culture at Dhapa canal during -2015 (Jan-July)**

	Construction	Electric installation	equipments	Watchman shed	Miscellaneous	Total capital cost	Lease amount	Licensing and maintenance	Chemicals	Cost of seeds	Cost of Feed	Fuel charges	Electricity charges	Labour charges	maintenance/repairing cost	Miscellaneous	Total Variable Cost	Total Input	Total Output	Profit	
Construction	1																				
Electric installation	.920	1																			
equipments	.876	.995	1																		
Miscellaneous	.997	.948	.911	1																	
Watchman shed	.268	.692	.699	.343	1																

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		4																		
Total Capital Cost	.947	.997*	.985	.969	.563	1														
Lease amount	.723	.394	.300	.666	-.472	.463	1													
Liming and manure	.698	.923	.957	.752	.877	.891	.010	1												
Chemicals	.585	.856	.904	.647	.938	.815	-.137	.989	1											
Cost of seeds	-.077	.320	.413	.002	.940	.248	-.744	.661	.764	1										
Cost of Feed	.490	.109	.009	.420	-.708	.184	.957	-.282	.420	.907	1									
Fuel charges	.516	.810	.865	.581	.964	.763	.220	.973	.917	.815	-.494	1								
Electricity charges	.997*	.947	.910	1.000*	.340	.969	.668	.750	.640	.050	.423	.579	1							
Labour charges	.366	.701	.769	.438	.995	.645	.379	.922	.960	.900	.632	.986	.435	1						
maintenance /repairing	.621	.879	.922	.681	.921	.840	.092	.995	.99*	.734	.378	.992	.679	.957	1					
Miscellaneous	.757	.953	.978	.806	.832	.927	.096	.996	.973	.593	.198	.950	.804	.885	.982	1				
Total Variable Cost	.524	.816	.870	.590	.961	.770	-.209	.976	.97*	.809	-.485	1.000*	.587	.984	.993	.953	1			
Total Input	.578	.852	.900	.641	.941	.810	.146	.988	1.00*	.769	-.428	.997*	.639	.971	.999*	.971	.998*	1		
Total Output	.617	.876	.920	.677	.924	.837	.098	.994	.99*	.738	-.384	.992	.674	.958	1.000*	.981	.994	.999*	1	
Profit	.325	.669	.740	.398	.998*	.611	-.419	.904	.957	.918	-.665	.978	.395	.999*	.943	.864	.976	.959	.945	1

#### IV. CONCLUSION

The bheri fisheries, for which the wetland is known globally, has been constrained due to inadequate management of water regimes, technology integration and weak marketing, post marketing and value addition opportunities. Baseline data on fish farms collected by the authority indicate a relatively higher sewage access, productivity and net returns to the large farmers. The current farm management systems indicate a skewed incentive towards the large private farmers, as against the small and medium size farms. Despite living within a highly resource rich area, the communities living within East Kolkata wetland have high rates of poverty incidence. The average household income of the wetland communities still stands equivalent to less than 70 % of the state average. Attention is needed to educate the fishermen regarding the pond management and time schedule of harvesting for the overall development of bheri fisheries.

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## BIOGRAPHY



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