

INTRODUCTION

In West Bengal coastal fishing is not a long tradition. Upto the fifties coastal fishing was confined to the operation of a few bagnet (*Behundi Jal*), stake nets (*Panch Kati Jal*) and encircling nets (*Kachal Jal*). Moreover this type of fishing was only seasonal being confined from October to January. According to fishermen the traditional method of bag net operation is better than any other method as 'risk' and 'uncertainty' is less. Moreover, the catch is disposed after sundrying. In case of gillnet-risk is

Both mechanised and non-mechanised boats are used in the operation of bag nets. The boats are mainly used as a means of transportation of gears, catch and provisions. The nets are fixed on the sea bed. The most common species caught are sciaenids, Bombay duck, clupeids, pomfret etc.

The units which are using mechanised along with non-mechanised boats are called *bara behundi*. Generally one such unit consists of one mechanised along with two-to three non-mechanised boats and eight to nine gears. About 15-20

COMPARATIVE EFFICIENCY OF DIFFERENT TYPE OF BAG NET (Behundi Jal) UNITS OF WEST BENGAL

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more so far as availability of catch is concerned.

Bag nets locally called *Behundi Jal* is the traditional method of fishing that has been very popular over the years. The fishing by this gear is restricted to only five months in a year; but its operation is more intensive and wide-spread than any other type of fishing.

Jaldah; Kharpi; Jumpt (in Midnapore district) Bakkhali, Frasergunj and Jumboo island (in 24 Parganas) are the major landing centres for this type of gear.

persons are required for operation in each unit.

For the non-mechanised unit, generally two to three country boats along with six to seven gears from a unit, which is locally called as *doba behundi*. About 10 persons are required for the operation, for both type of units. Since the catch is sold in dried form 25-30 labourers are engaged for drying and processing.

At Jaldah, apart from these two categories there is another category which is called *bhasa behundi*. A *bhasa behundi*

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unit consists of one country boat with 5-6 gears and usual number of crew is 5.

Each gear is simply tied between the two poles or barrels. Generally a structure is made with *devdaru* and *bamboo* for setting the net in the sea, which lasts for one year. The cost of setting this structure for each type of unit is different. The initial establishment costs of this structure for different type of units are Rs. 4055/- for *Bara behundi*; Rs. 1830/- for *Doba behundi* and Rs. 385/- for *Bhasa behundi*.

The establishment costs of *Bara behundi* units are higher than the other categories of units.

The present study dealt with the comparative efficiency of different type of bag net fishing units. The efficiency is judged here not only on the basis of net income of different units but also in relation to their factor-product relationship.

MATERIALS & METHODS:

The study is based on primary data sources. A pilot enquiry was carried out in the fish landing centres of West Bengal for selecting the sample centres for indepth study. Based on the investigation, Frasersgunj, Bakkhali, Jumboo island (in 24 Parganas) and Jaldah (in Midnapur) were selected purposively for detailed study.

Twenty sample units both mechanised and non-mechanised were selected randomly from each selected centre. Data were collected from October 1983 to February 1984; as fishing by bag nets were confined within this five months. More than fifty per cent of the fishing days were covered for actual observation.

Day to day costs and earnings data were collected from the selected units by cost accounting-cum-survey method for the year 1983-84.

Detailed information regarding sources of finance; year of purchase of craft and gear; terms and conditions of labour engagement were recorded for all the selected units by interviewing the owners.

CATCH & EFFORT:

Average catch and effort per fishing day for five months both for mechanised and non-mechanised units were shown in Table 1. Generally each unit makes two trips in a day. For mechanised units average fishing days were maximum at Jaldah (23.5) followed by Frasersgunj (21.2) and Jumboo island (21). In the non-mechanised unit average fishing days were maximum at Jaldah (22.5) followed by Bakkhali (18.6) and Jumboo island (18.4). Both for mechanised and non-mechanised units, a similar trend with regard to fishing days were observed at Jaldah.

In the mechanised unit catch per day of fishing ranged from 109 to 360 kg at Frasersgunj, 88 to 429 kg at Bakkhali, 412 to 630 kg at Jumboo island and 334 to 388 Kg at Jaldah.

The average annual bag net catch in the mechanised sector was maximum at Jumboo island (524 kg.), followed by Jaldah (357 kg), Bakkhali (290 Kg.) and Frasersgunj (187 kg).

In the non-mechanised units, annual average catch was higher at Bhakkali (244 kg) compared to Jaldah (219 kg), Jumboo island (166 kg) and Frasersgunj (163 kg.)

Table-1

Catch and effort of mechanised and non-mechanised fishing units (bag nets) at Frasersgunj, Bakkhali, Jumboo island and Jaldah in different months (1983-84).

Centres	Units/Efforts	Oct. '83	Nov. '83	Dec. '83	Jan. '84	Feb. '84	Annual Total	Monthly average	Number of observation
Frasergunj	<i>Behundi With mechanised and non-mechanised boat</i>								
	No. of fishing days	12	26	26	28	15	107	21.4	
	No. of trips	20	40	45	50	26	181	36.20	20
	Catch per fishing days (kg)	115	163	186	360	109		186.60	
	<i>Behundi with non-mech. boat only</i>								
	No. of fishing days	10	26	26	28	15	105	21	
Bakkhali	<i>Behundi with mech & Non-mech. boat.</i>								
	No. of fishing days	12	24	28	30	12	106	21.02	
	No. of trips	20	44	54	58	21	197	39.04	20
	Catch per fishing days (kg)	263	384	275	429	98		290.00	
	<i>Behundi with non-mech boat only</i>								
	No. of fishing days	10	19	27	28	9	93	18.06	
No. of trips	15	30	50	54	14	153	30.06	20	
Cotch per fishing days (kg)	209	312	213	355	133		244.00		

Table 1 contd...

Centres	Units, Efforts	Oct. '83	Nov. '83	Dec. '83	Jan. '84	Feb. '84	Annual Total	Monthly average	Number of observations
Jumboo Island	<i>Behundi with mech. & Non-mech. boat</i>								
	No. of fishing days	24	28	28	15	10	105	21.00	
	No. of trips	40	50	54	24	16	184	36.80	20
	Catch per fishing days (kg)	511	531	630	534	412		524.00	
	<i>Behundi with Non-mech. boat only.</i>								
	No. of fishing days	20	24	26	12	10	92	18.40	
No. of trips	32	40	46	14	13	145	29.00	20	
Catch per fishing days (kg)	219	188	192	130	102		166.20		
Jaldah	<i>Behundi with mech. & non- mech. boat (Bara behundi)</i>								
	No. of fishing days	12	24	28	30	Nil	94	23.05	
	No. of trips	23	48	56	60	Nil	184	46.75	20
	Catch per fishing (kg)	388	338	367	334	Nil		357.00	
	<i>Behundi with more than one non- mech. boat (Doba behundi)</i>								
	No. of fishing days	12	24	26	28	Nil	90	22.50	
	No. of trips	20	40	46	50	Nil	156	39.00	20
	Catch per fishing days (kg)	175	251	211	240	Nil		219.25	
	<i>Behundi with one non-mech. boat (Bhasa behundi)</i>								
	No. of fishing days	9	12	20	26	Nil	67	16.75	
	No. of trips	15	20	40	50	Nil	125	31.25	20
	Catch/fishing days (kg)	165	230	272	190	Nil		214.25	

Fishing trips for selected units varied from unit to unit, even from centre to centre. In the mechanised sector, average fishing trips were maximum at Jaldah (47), followed by Bakkhali (39), Jumboo island (37) and Frasergunj (36). For the non-mechanised sector, fishing trips were maximum at Jaldah (39), followed by Bakkhali (31), Jumboo island (29) and Frasergunj (21).

COSTS AND RETURNS:

The data on catch in terms of quantity and value realised were observed on daily basis for different types of bag net units, on all sample days. The mode of disposal of catches varied for quality fish like pomfret and fishes like Ribbon fish, Bombay duck, clupieds, sciaenids etc. which used to be disposed after sun dried. The quality fishes were usually sold by weight, whereas the dry fish like Bombay duck and other were sold in numbers. The trash fish which were generally used for fish meal again weighed and sold.

Average price was higher during October in all the landing centres, because catch was low compared to its demand. At Frasergunj fish price during October ruled at higher level compared to other centres because 20% of the bag net catch in this centre consisted of quality fish like pomfret.

Monthly variable costs are deducted from the monthly gross value of catch; yielding at the monthly net revenue. In the mechanised sector; month-wise variable cost was higher at Jaldah followed by Jumboo island; Frasergunj and Bakkhali. In the non-mechanised sector,

monthwise operational cost was higher at Bakkhali, followed by Jaldah Frasergunj and Jumboo island.

Major operating expense for bag nets the mechanised sector was the wages for the crew. During 1983-84, it was about 48% at Jaldah, 52% at Bakkhali, 45% at Frasergunj and 44% at Jumboo island. Diesel expense was the second major operating cost followed by cost on food (Table 2).

The total costs of the operations in different units in the season can be broken down in terms of fixed and variable costs. The difference between fixed and variable costs basically lies in the fact that while fixed costs need to be incurred even if the fishermen do not go for fishing, the variable costs are incurred only when there is fishing.

Variable costs include the cost of payment of labour i. e. wage, fuel repair and maintenance etc. Fixed costs include interest payments, depreciation etc.

INVESTMENT COSTS:

At Frasergunj and Bakkhali the average acquisition cost for a mechanised boat comes about Rs. 39500 and 40,000, respectively. The cost of a non-mechanised boat being Rs. 7000/- and 8000/-. The cost for a single gear is about Rs. 6000-7000/-. The life expectancy of a boat either mechanised or non-mechanised is about 10 years and for a gear it is about 6 years.

The average initial investment came about Rs. 89,500/- at Frasergunj and Rs. 105,000/- at Bakkhali in the mechanised

Table 2

Title: Annual returns from different types of bag nets in Frasergunj, Bakkhali, Jumboo Island and Jaldah during 1983-84.

Items Centres	Frasergunj		Bakkhali		Jumboo Island		Jaldah		
	Mech. along with non-mech. unit	Non-mech. unit	Mech. along with non-mech. unit	Non-mech. unit	Mech. along with non-mech. unit	Non-mech. unit	Mech. along with non-mech. unit	Non-mech. unit (two boat)	Non-mech. unit (One boat)
Annual Gross revenue (in Rs.)	97422	50805	93060	51262	127569	52225	133492	56640	33637
<i>Annual costs:</i>	2275	1007	2813	1181	4500	2200	3900	2177	1079
i) Fixed costs:									
Establishment cost and construction for shed.									
Association fee	50	20	25	15	200	75	250	100	50
Depreciation	11650	5567	13767	7600	21500	12333	22800	7666	4966
Total fixed costs	13675	6594	16605	8796	26200	14608	26950	9943	6095
ii) <i>Variable costs:-</i>									
Diesel	20025	—	15900	—	22575	—	20492	—	—
Kerosene	—	315	—	326	—	276	—	553	229
Food	9630	9030	9010	6510	13230	6256	10554	9090	5138
Repairing and maintenance	1605	735	1166	372	1890	276	1316	643	385
Wages	25680	21525	28090	23808	29820	15180	31208	18956	12388
Others	496	280	468	261	910	236	1469	594	423
Total variable costs	57436	31885	54634	31277	68425	22224	65039	29836	18563
Total fixed + variable costs	71111	38479	71239	40073	94625	36832	91989	39779	24658
Residual Ret. to the unit	26311	12326	21821	11187	32944	15393	41503	16861	8979
Less opportunity cost of investment capital	11740	4680	12600	6400	20040	10320	21600	6480	3960
Unit's pure profit	14571	7646	9221	4789	12904	5073	19903	10381	5019

sector and in the non mechanised sector the average investment amounted to Rs. 39,000/- at Frasersgunj and Rs. 52,000/- at Bakkhali.

The investment for both mechanised and non- mechanised units at Jumboo island and Jaldah were higher as compared to Bakkhali and Frasersgunj. At Jumboo island average investment of a unit for craft and gear was Rs. 167,000/- and Rs. 180,090/- at Jaldah because in both these areas the fisherman used engines in their craft with higher H. P. and generally a unit operates more number of gears than that of Frasersgunj and Bakkhali.

VARIABLE COSTS:

Among the variable costs, fuel expenses, wage for crew; food for crew; repair and maintenance of craft and gears were the major components. The crew were engaged on seasonal contract basis. The contract payment varied from Rs. 3000/- to Rs. 4000/- for a crew in a season. Generally chief crew gets more than others. In addition to their salary they get food as well as other items like bidi etc. At Frasersgunj about 35% of the daily expenditure was contributed by diesel whereas at Bakkhali it was 29%, at Jumboo island 33% and at Jaldah 32% in the mechanised sector (Table 2). The variation was dependant on the fishing ground from the landing centre.

In the non-mechanised sector wages contributed 67 per cent to total cost at Bakkhali, 68 per cent at Jumboo island and Frasersgunj and 64 per cent at Jaldah. Both for mechanised and non-mechanised sector food was the third major item in the operational cost.

Average variable cost per day was

highest at Jalkah compared to other centres in the mechanised sector and lowest at Bakkhali. In the non-mechanised sector, per day average variable cost was higher at Bakkhali and lower at Jumboo island. The variation was mainly due to the difference in wage structure.

VIABILITY OF THE INVESTMENT:

Using the information in the earlier part of the analysis regarding various components of cost, life expectancy of craft and gears, gross revenue based on total catches and its price realised per kg the viability of investment has been worked out.

Residual returns to a unit is defined as the difference between gross returns and annual total costs. In order to work out the profit, wherever the initial investment was made from own capital, opportunity cost of investment capital was also taken into account.

In both mechanised and non-mechanised sectors, profit was higher at Jaldah. It was Rs. 199,03/- in mechanised sector and Rs. 10381/- and Rs. 5019/- for the two non-mechanised type of units. At Frasersgunj profit was Rs. 14571/- in the mechanised units and Rs. 76446/- in the non-mechanised unit. The pay pack period of investment capital in different centres were shown in Table 3. The analysis indicates that mechanised units offer better returns per rupee. The net value added was higher at Jaldah both in mechanised and non-mechanised sector. It was 64 paise per one rupee operational cost in the mechanised sector and 57 paise and 48 paise respectively in the non-mechanised sector. Another observation (from Table 3) the non-mechanised units at Jaldah contributed more in value added process than the mechanised unit at Frasersgunj, Bakkhali and Jumboo island.

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Table 3

Title: Comparative economic performance of different bagnet units in West Bengal
1983 - '84

	<i>Mechanised</i>				<i>Non-mechanised</i>				
	Frase- rgunj	Bakkhali	Jumboo Island	Jaldah	Frase- rgunj	Bakkhali	Jumboo Island	Jaldah (1) (2)	
1. Initial investment	89,500	105,000	167,000	180,000	39,000	52,000	86,000	54,000	33,000
2. Annual profit	15,571	9,221	12,904	19,903	7,646	4,789	5,073	10,381	5,019
3. Pay back period (Year)	2.38	2.95	3.07	2.80	2.18	2.77	3.10	2.20	2.37
4. Net value added	0.46	0.40	0.48	0.64	0.39	0.36	0.69	0.57	0.48
5. Total crew required	15	15	20	20	10	10	10	10	5
6. Labour Productivity (per man day)/unit	12.44	19.33	26.20	17.85	16.32	24.40	16.62	21.42	21.92
7. Productivity of the unit (per man hour)	0.62	0.92	1.19	0.81	0.82	1.22	0.83	1.07	1.10

Lastly the efficiency was judged by its productivity per man-hour. It has been observed that the units which were operated at Jumboo island was much more efficient in terms of productivity per man-hour, than other centres. It was 1.19kg per man-hour for a unit (Table 3) at Jumboo island, whereas it was 0.92 kg at Bakkhali, 0.81 kg at Jaldha and 0.62 kg at Frasergunj. So even though profit margin was higher at Jaldah, the productivity of the unit was higher at Jumboo island. Man-power was used more efficiently at Jumboo island as compared to Jaldha.

In the non-mechanised sector for bag net operation, the productivity for a unit was higher at Bakkhali. It was 1.22 kg per man hour, whereas at Jaldah, it was 1.10 kg and 1.07 kg.

Though initial investment cost for a mechanised unit was higher at Jaldah,

the pay-back period was less (2.80) as compared to Jumboo island (3.07.)

In the non-mechanised sector, both initial investment cost as well as pay-back period were higher at Jumboo island (3.10) as compared to other landing centre. Relatively pay-back period was less at Jaldah in the case of non-mechanised sector also.

Above analysis indicates both mechanised and non-mechanised units operate efficiently at Jaldah as compared to other landing centres.

Generally the different types of units yielded reasonably good profit margin. But due to the high risks and uncertainties, rate of growth of the industry is slow because a suitable portion of income is invested on immovable property where risk is less. ○



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