ECONOMICS OF DIFFERENT CRAFT - GEAR COMBINATION IN ORISSA COAST

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After declaration of Exclusive Economic Zone, the Govt. of India took lot of developmental programmes in capure fisheries. But it is very difficult to formulate as well as to implement any programme unless and until we know the existing position prevailing in different coastal areas. In India the contribution of fisheries to GDP has increased by registering a growth of 0.38 during the period from 1971 to 1982-83. Moreover number of fishery workers among the total working force has increased by one percent. But most of the fisherman is still persisting absolute and relative poverty. A good volume of work (Gupta, et al 1979, Srivastava et al 1979, 1980, 82) has done but very little attention has been given about what income is generated by various craft-gear combination.

One of the commonly accepted notions about mechanisation is that it would impart an element of stability into the returns in any process of productions and hence influence the yield rates favourably. So there was need to examine whether there is any impact of the mechanisation programme on the incomes of various groups of fishermen.

Most of the studies estimated the disparity in income distribution in terms of household and village level income (Subba Rao, 1980, Srivastava, et. al 1985). But very little attempt have done to explore the possible consequences of mechanisations on income distribution between mechanised and non-mechanised fishing units (A craft-mechanised or non-mechanised along with gear pieces and its crew member form a unit) our intention was to study the inequalities in the distribution of income among the non-mechanised and mechanised fishing units in Orissa Coast.

METHODOLOGY:

The Central Marine Fisheries Research Institute conducted a socio-economic survey throughout the coastal area of orissa during 1985-87. In Orissa, there are 13 districts of which 4 are characterised as coastal. They are Balasore, Cuttack, Puri and Ganjum, covering a coast line of 480 Kms in length, which constitutes 8% of the coast line in India.

Bahabalpur, Talsari and Balaramguri from Balasore; Pradeep and Badapadia

from Cuttack; Pentakota and Puri from Puri and Gopalpur and Bandar from Ganjam districts were selected through suitable selection criteria. Different forms of production function were estimated. On the basis of the value of multiple determination (R^2) and the level of significance of regression coefficients, the Gob-Douglas form of production functions were found best fitted to explain the variables. An attempt has been made to measure the extent and magnitude of income inequalities. Sixteen income classes were formed to examine the income distribution among the fishing units. The inequalities were measured in terms of Gini concentrations Ratio (GCR) computed with the help of new coordinate system Approach (NCSA) (Kakwani & Poddar, 1976).

RETURNS OF DIFFERENT CRAFT-GEAR COMBINATION:

Net returns is defined as the money received from total catch during the survey year (1985-87) minus the operating cost in the same year. Annual net return from Paradeep base trawler unit was considerably higher (Rs. 97061) than that of from Balaramguri trawler unit (Rs. 9278) (Table-1). This is mainly because of better infrastructure (like Jetty and Harbour) facilities at Paradeep. In the mechanised gillnet units, the net income was higher at Bahabalpur as compared to Talsari (Table-1). This may be due to better catch composition of quality fishes at Bahabalpur. In the non-mechanised gillnet units, the net returns were maximum at Pentakota base big Katamaran units (Table-1). The fishermen of Pentakota received higher price for their product because of the availability of quality fishes. The comparative economic efficiency of different fishing units were not meaningful because those units do not compete each other and their catch composition is different, but it is essential for formulating credit policy and development plans.

The Annual operating cost per unit for a trawler at Balaramguri were Rs. 87723 whereas at Paradeep it was Rs. 76245 (Table-1). Fuel was the major expense incurred in the mechanised units. Shares/wages are not included in the operation cost because of various mode of labour engagement in different units in different areas.

The sharing arrangement for mechanised units in Balasore district is that craft owner will get 45% of the gross earning; 45% for the gear owners and 10% for the chief crew. In this arrangement, the craft owner bears the fuel as well as repairing cost for his craft. Similarly, the gear owner pays expenses like crew's food and repairing charges for the gears. The chief crew will not bear any expenses. The crew in the non-mechanised units at Balasore will ge equal share from gross earning. At Ganjam and Puri districts, the net return (over operating cost) is shared in five equal amount for big Katamaran and three equal share for small Katamaran one share goes to the craft owner and rest is shared among the crew. On non-mechanised units at Cuttack district, net income is shared equally among the crew members.

PRODUCTIVITY OF DIFFERENT FACTORS:-

To estimate the production function following functional form being used:

$Y = ax_1^{b_1} x_2^{b_2}$ where Y= Annual gross returns (in Rs) (per unit).

x_1 = Annual fishing days (per unit)

x_2 = Fishing experience

The estimate of coefficient of multiple determination (R^2) in those equations varies from '99 to '52. Thus about 99% to 52% of the variation in gross returns were expalined by the variables in those equations.

Number of fishing days was taken because it is the main indicator of fishing effort. Fishing experience has been chosen as a determinant of gross returns.

At Puri centre, the coefficient of multiple determination (R^2) was '11, indicating that in this area there may be some other important variables which are essential to incorporate in the production function to explain its behaviour. The regression coefficient of fishing days turned out to be statistically significant in all the equations (Table-2). it implies there is a scope to increase gross returns by increasing fishing days. The elasticities of production indicate the percentage in gross returns that would be forth coming with one percentage increase in the indicated resource. implies that by an increase in fishing days one percent would bring about an increase in gross returns by '96 for Tappa unit at Badapadia, '85 for trawler unit at Balaramguri. In most of the cases fishing days were significant. Indicated fishing days to be quite important, as fisheries would expect.

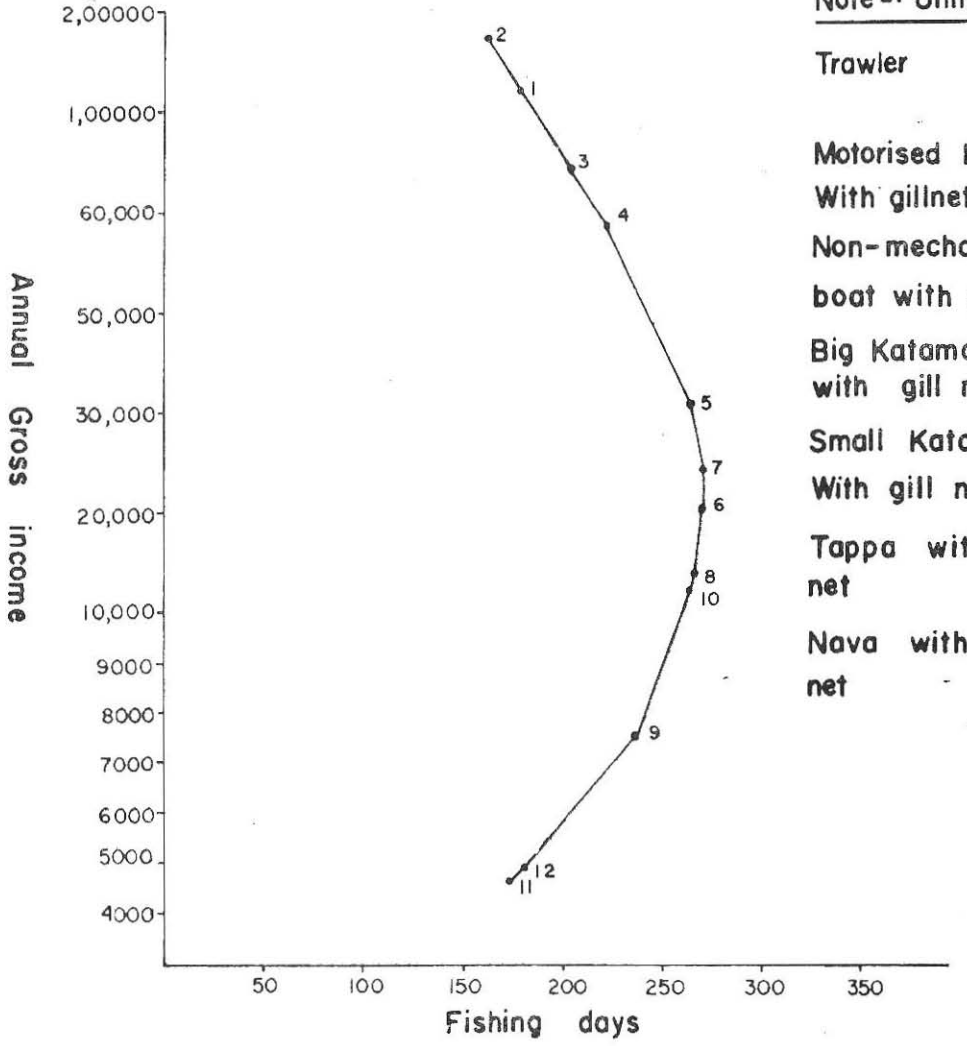
In all cases fishing experiences were statistically significant and positive effects on gross returns. With one percent increase in fishing experiences would bring about an increase in gross returns by two percent in the non-mechanised unit at Bahabalpur.

From the above discussion it was clear that fishing days and experiences were the most important factors for determining the gross returns. But even though there is no gurantee of fishing returns due to uncertainty in its nature. Field survey showed that with same effort, different fishermen did not yield uniform catch. Better efforts sometime attain low returns and vise-versa. Bad luck in fishing in a common idiomatic expression used by fishermen when, despite their efforts, good weather and adequate gear, they catch less than other fishermen who extent the same amount of effort with similar craft-gear combination. So always higher degree of uncertainty attached in capture fishery. Moreover it has been observed from Figure 1 that in the beginning as fishing days increase, income increases then reaches to a point, afterwards it tends towards backward bending form. Implying fishing income decrease, with increasing fishing days.

INCOME DISPARITY:-

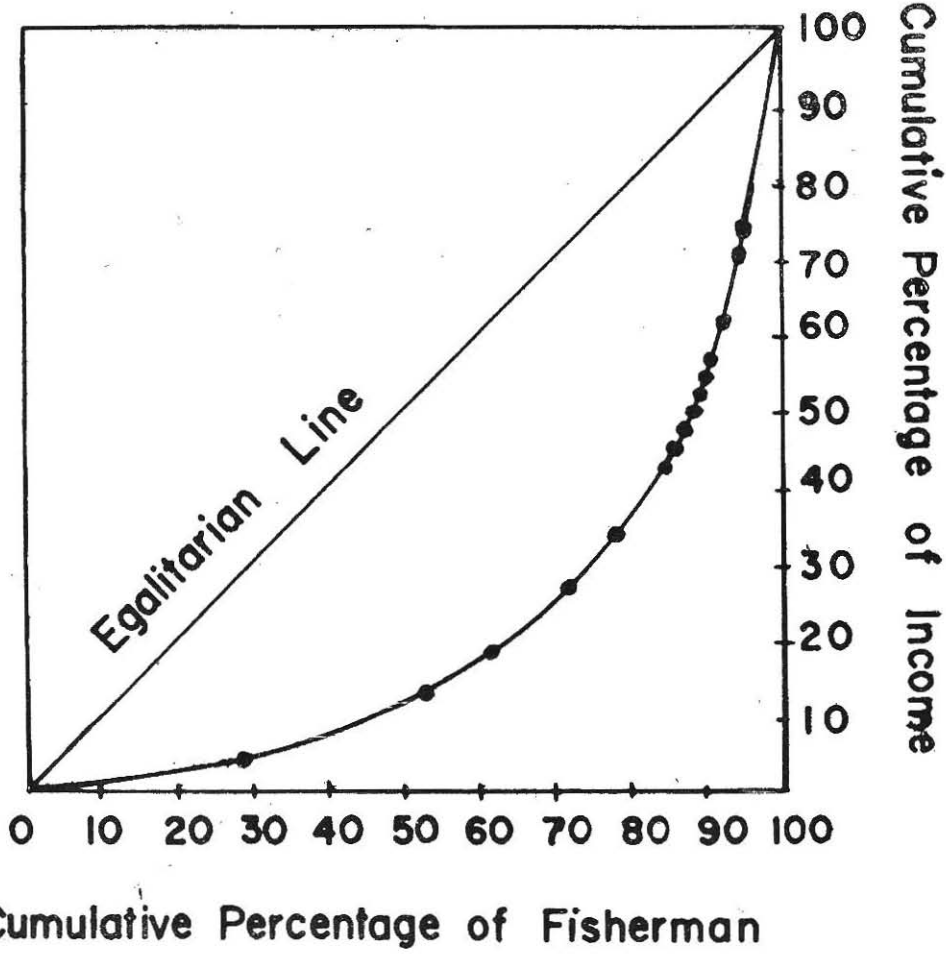
The difference is fishery income between mechanised and non-mechanised sectors were highly significant. The share of bottom 80% fishermen in total income was only 35% (Figure-2). Another observation was income inequalities were more skewed in the mechanised sector ($\hat{\beta} > \hat{\mathcal{L}}$) (Table-3) and Particularly trawler unit of the same sector. Therefore the programme of mechanisation has little effect on the income of the fishermen.

Figure. 1. Relationship between fishing days & Income in different Craft-gear Combinations in Orissa (1985-87)



Note -: Units	Landing Centers	1.1 Points
Trawler	Balaramguri & Paradeep	1, 2
Motorised boat With gillnets	Bahabalpur & Talsari	3,4
Non-mechanised boat with gill net	-do-	6,8
Big Katamaran with gill net	Pentakota & Gopalpur	7,9
Small Katamaran With gill net	Puri & Bandar	11,12
Tappa with gill net	Badapdia	5
Nava with gill net	-do-	10

Figure-2 Income-Inequality between mechanised and non-mechanised fishing-units in Orissa Coast (1985-87)



Moreover it helped only the upper income strata and the fruits of mechanisation have not percolated down into the lower strata of the fishing units. In other words, it has contributed to wider disparities. The Gini concentration Ratios corroborate the finding that income inequalities were more significant between lower and upper strata.

CONCLUSIONS:-

Each unit earns reasonable good amount of net income but in relations to the investment capital as well as operating cost, the net returns of the non-mechanised units were higher than that of mechanised units. It is therefore essential to give more emphasis towards development and credit policy to the non-mechanised units. The relationship between annual fishing days and gross returns of all types of units were observed backward bending. Indicatiing to restrict the fishing days (efforts) for different units.

To reduce disparities in income distribution, it is essential to give more emphasis to build up infrastructure as well as credit facilities in the remote coastal areas. Due to lack of infrastructure, the supply of the fish at the landing centre is highly inelastic which often would be resulted in disposal of fish at throw away prices at the time of heavy landings. The trader-cum-financier shows reluctance to take fish during heavy landing as a result the fishermen are forced to sell their product at a low price. Moreover due to perishablity nature of the product, it is essential to establish storage and processing facilities at least in major landing centres.

Table—1

ANNUAL COST AND RETURNS OF DIFFERENT CRAFT-GEAR COMBINATIUNS IN THE SELECTED CENTRES OF ORISSA (1985-87).

Landing centres	Craft-gear combinations	Annual operating cost (in Rs.)	Annual gross income (in Rs.)	Annual net Income (in Rs.)
Bahabalpur	Mech. boat with gillnets	26092	68158	42066
Bahabalpur	Non-mech. boat with gillnets	6488	24956	18468
Talsari	Mech. boat with gillnets	23144	59963	36819
Talsari	Non-mech. boat with gillnet	4351	15807	11456
Balaramguri	Trawler	87723	180401	92678
Paradeep	Trawler	76245	173306	97061
Badapadia	Non-mech (Tapa) boat with gillnet	5355	31751	26396
Badapadia	Non-mech (Nava) boat with gillnet	4030	13958	9928
Pentakata	Non-mech. (Big Katamaran) boat with gillnet	1084	20718	19634
Puri	Non-mech (Small katamaran) boat with gillnet	556	4731	4175
Gopalpur	Non-mech (Big katamaran) boat with gillnet	1245	14445	13200
Bandar	Non-mech. (Small katamaran) boat with gillnet	498	4937	4439

Table—2

FACTORS DETERMINING THE PRODUCTIVITY OF CAPTURE FISHERY IN ORRISSA (1986-87)

Landing centre	Craft-gear combination	Intercept	Regression Coefficient Fishingdays	Fishing Exp.		
		ao	X_1	X_2	R^2	N
Bahabalpur	Mech. boat with gillnet	9.1099	0.11288 (0.10935)	0.82269 (0.07950)	0.9440	20
	Non-mech. boat with gillnet	3.26718	** 0.29659 (0.11139)	* 2.27832 (0.44595)	0.88027	20
Talsari	Mech boat with gillnet	7.4979	* 0.65900 (0.12299)	* 0.33271 (0.01230)	0.9380	20
	Non-mech. boat with gillnet	4.89797	* 0.90201 (0.15523)	** 0.35564 (0.13415)	0.85581	20
Balaramguri	Trawler	8.4857	* 0.85322 (0.02516)	0.02591 (0.09182)	0.97487	20
Paradeep	Trawler	8.4054	* 0.79240 (0.10836)	0.07854 (0.04278)	0.92656	20
Badpadia	Tappa with gillnet	6.68418	* 0.74051 (0.06339)	0.33969 (0.26708)	0.98023	16
	Nava with gillnet	6.44470	* 0.95349 (0.03976)	0.157976 (0.05949)	0.99172	16
Pentakota	Big katamaran with gillnet	6.215568	0.70137 (0.60749)	0.093822 (0.05714)	0.22447	20
Puri	Small katamaran with gillnet	7.71802	0.142016 (0.67148)	0.064919 (0.04769)	0.1082	20
Gopalpur	Big katamaran with gillnet	6.23175	0.222965 (0.20059)	* 0.821514 (0.10548)	0.92134	20
Bandar	Small katamaran with gillnet	5.62896	0.775985 (0.270300)	0.29287 (0.162699)	0.51683	20

* Significant at 1% probability level

** Significant at 5% probability level

Figures in a parentheses show the standard errors of the estimates.

Table—3

ESTIMATED EQUATION OF LOREN CURVE; GINI CONCENTRATION RATIO AS MEASURES OF INCOME INEQUALITIES BETWEEN MECHANISED AND NON-MECHANISED FISHERMEN IN ORISSA COAST.

Year	Loren Curves: $Y_t = ar_t \ (\sqrt{2-r_t})$				
	Coefficient of				
	Constant term (a)	r_t	$\sqrt{2-r_t}$	R^2	Gini concentration ratio (GCR)
1985 - 87	.0478	***1.5577 (.0927)	***3.2352 (.1862)	.9621	0.6050

*** Significant at one percent level

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