MONSOON TRAWL BAN AND ITS EFFECTS ON THE LIVELIHOOD OF TRAWL LABOURERS: THE CASE WITH VERSOVA FISHING VILLAGE IN MAHARASHTRA

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ABSTRACT

Indian fisheries sector in view of its potential contribution to national income, nutritional security, employment opportunities, social objectives and export earnings, plays an important role in the socio-economic development of the country. Fisheries sector contributes 4.3% to the agricultural GDP and export earnings are presently valued at over INR 68 billion from a volume of 460,000 tonnes. In addition, it provides direct and indirect employment, and dependency for over seven million people in the country. With an estimated production potential of 8.4 million tonnes, the present level of production in the country is 5.9 million tonnes with almost equal contribution from both marine and inland sectors. The estimated fisheries potential from the Indian exclusive economic zone was found to be 3.9 million tonnes. But in spite of the increased efforts in fish production, the catch stagnates around 2.9 million tonnes. The stagnation in catches, mainly due to the overexploitation of dwindling marine resources, forced the government to impart some management measures to regulate the fishery and for the sustenance of the marine resources. The monsoon trawl ban in fisheries was one of the major reforms, which had created a substantial increase in fish production in the past few years. The ban on trawling during monsoon season was introduced in Maharashtra, after a series of studies, from 1992 for a period of 65 days from 10 June to 15 August or Naralipoornima, whichever is earlier. A notable increase in production from the marine sector of the country occurred in the post-ban period. Nevertheless, it had created problems in employment, poverty and income distribution of fishermen during the ban period and was always a matter of unrest between mechanized and traditional sectors of fishing. The aim of this study was to understand the impact of the ban on monsoon trawling in employment pattern, poverty and income distribution of fishermen along the coast of Maharastra. The study was conducted at the Versova fishing village, Mumbai, and provides reflections on the possible impact of monsoon ban in the livelihood and standard of living of the fishermen in the state.

Keywords: Marine fisheries, monsoon ban, socio-economic development, Maharashtra

INTRODUCTION

The Indian fisheries sector in view of its potential contribution to national income, export earning, nutritional security, employment opportunities and social objectives plays an important role in the socio-economic development of the country. Presently, the contributions of the fisheries sector to GDP and agricultural GDP have been estimated to be 1.24 and 4.34%, respectively. The fish, which is the source of cheap animal protein, has an annual per capita consumption of 9 kg in India as compared to 11 kg recommended by the World Health Organisation. The sector is also an important employment generator providing direct employment to seven million fisherfolk and indirect employment to about three million fishermen population. The sector is also a primary foreign exchange earner and contributes to one-third of the agricultural exports and during 2002-03, it provided the exchequer with a whopping INR 68.63 billion from 460,000 tonnes of seafood export.

India, with a coastline of 8129 km enjoys the right over an exclusive economic zone (EEZ) of 2.02 million square kilometres. The country is also bestowed with rich inland resources including rivers, reservoirs, lakes, ponds and wetlands. The total fish production during 2002-03 was 6.05 million tonnes with 47.9 and 52.1%, respectively, from the marine and inland sectors. The estimated fisheries potential of the Indian EEZ was found to be 8.4 million tonnes with 3.9 million tonnes from the marine sector and the estimate from the inland sector stands at 4.5 million tonnes. Even though aquaculture is considered as a

viable option for the provision of food security, the productivity of inland resources is rather low compared to the marine ones due to the lack of harnessing the resources, multiple uses associated with the water bodies, and different institutional and policy mechanisms. In the marine fisheries sector, in spite of the increased efforts in production, the catch stagnates around 2.9 million tonnes, much below the potential. This is due to the overexploitation of the dwindling marine resources in the inshore and offshore areas, and the under-exploitation of the deep-sea resources. The exploitation of the deep-sea fisheries resources is not found to be economical due to the high capital investment and because of that, many joint ventures in this sector were not very successful. Therefore, in order to augment production, the only way is to conserve the overexploited resources of the oceans, and the pressure on these resources forced the government to impart various management measures and reforms to regulate fisheries for the sustenance of the marine resource.

Monsoon Trawl Ban in Fisheries and the Problems encountered

About 53,000 mechanised vessels are used for fishing in the marine sector of India and among them, around 75% are trawlers. The exploitation of the most valued export items of the seafood are done mainly by the trawlers. The high profit enjoyed by the trawlers in the sector motivated more and more trawlers and trawl labourers into the lucrative business of trawl fishing. This instead of increasing the profit, ended up with the phenomenon of "tragedy of the commons". The decreasing returns and unscientific

practices carried out in this sector led it to a chaotic condition, and the management of the sector in an efficient way was the only solution to alleviate the prevailing situation. Based on the recommendation of the central government and the state committees, many of the maritime states like Maharashtra, Kerala, Tamil Nadu, Andhra Pradesh, etc. have enacted suitable policies and regulations in the fisheries sector and introduced trawl ban during the monsoon months. Trawl ban is the prohibition of fishing using mechanized vessels like trawlers during the monsoon season which is considered to be the breeding and pre-recruitment period of most of the commercially important species.

The implementation of the ban, a major step to regulate capture fisheries, had its own impact in the sector. Studies conducted during the post-ban period indicated that it is a powerful regulatory measure to augment marine fish production. But, in spite of this achievement, in many states, it created inter-sectoral conflicts between traditional and mechanized sectors, problems between fishing groups of different states and conflict between ring seine and trawl labourers. But, the worst impact was the changes it brought about in the livelihood pattern of the labourers working in trawlers. For almost two months of the year, those fishermen who contribute a major portion of the valued export commodity are deprived of any source of employment and their income levels face a serious setback during the period. This period is usually associated with problems like poverty, malnutrition and increase in debt among the fisherfolk

communities engaged in trawling. In order to address the changes the trawl ban brought in the livelihood of fishermen through problems like unemployment, poverty and low-income level, the following study, was proposed.

MATERIAL AND METHODS

Data and Methodology

For the study on the influence of trawl ban among the labourers, Maharashtra State was purposively selected owing to its importance in the contribution towards the fish production of the country, mainly from trawl fishing. In Versova fishing village, about 500 trawlers operate in the territorial sea. In order to ascertain the problems faced by the trawl labourers during the ban period, primary data from 60 labourers were collected to draw a meaningful conclusion about the problem faced by the community during the ban period and the factors contributing towards their opinion on implementing the ban. The employment pattern, income, poverty and opinion about the ban were analyzed, and the analytical tools used in the study are discussed below.

Tools of Analysis
Conventional analysis

The conventional analyses like the percentage analysis were used to find out the effect of monsoon trawl ban on the livelihood of the trawl labourers. The analysis was done to find the different levels of income, incidence of poverty, and mitigating measures by the government, co-operatives and other sources in providing support or alternate source of employment during the ban period.

Garette ranking technique

The Garette ranking technique was employed to rank the problems associated with the ban as expressed by the trawl labourers. The order of merit given by the trawl labourers was transmitted into scores. For converting the scores assigned by the trawl labourers towards the particular problem, percent position was worked out using the formula

$$\text{Percent Position} = \frac{100 \, (R_{ij} - 0.05)}{N_j}$$

where, R_{ij} = Rank given for the ith problem by the jth trawl labourer
N_i = number of attributes

Opinion towards ban

In order to evaluate and identify the factors that influence the opinion towards the ban, the probit model was employed. Here, the dependent variable (favourable or unfavourable opinion towards the ban) is a dichotomous response variable taking a 1 or 0 value.

Out of the binary models, the model that emerges from the use of normal cumulative density function is popularly known as the probit model. It is also known as normit model. It was explained on the basis of the utility theory or rational choice perspective on behaviour by McFadden (1973).

The assumption is that the favourable or unfavourable opinion towards trawl ban depends on an unobservable utility index, Ii, that is explained by an explanatory variable Xi, in such a way that the larger the value of

the index Ii, the greater the probability of the opinion having an association. The index Ii is expressed as

$$I_i = \beta_1 + \beta_2 X_i,$$

where X_1 is the ith explanatory variable.

There is a critical threshold level of the index Ii such that if Ii exceeds Ii*, the opinion will be unfavourable; otherwise the opinion will be favourable. Though the threshold Ii*, like Ii, is not observable, it is possible to estimate the parameters of the index, if we assure that Ii is normally distributed with the same mean and variance.

Given the assumption of normality the probabilities that Ii* is less than or equal to, Ii can be computed from the standardized normal cumulative distributive function (CDF) as

$$P_i = \Pr(Y=1) = \Pr(I_i^* \leq I_i)$$

$$= F(I_i) = 1/\sqrt{2\pi} \int_{-\infty}^{\beta_1 + \beta_2 X_i} e^{-t^2/2} \, dt$$

$$P_i = 1/\sqrt{2\pi} \int_{-\infty}^{T_i} e^{-t^2/2} \, dt$$

where 't' is a standardized normal variable, i.e., $N(0,1)$.

To obtain information on Ii, the utility index as well as the coefficients β_1 and β_2 inverse are taken as

$$I_i = F^{-1}(I_i) = F^{-1}(P_i) = \beta_1 + \beta_2 X_1,$$

where F^{-1} is the inverse of CDF.

In the language of probit analysis, the unobservable utility index Ii is simply

known as normal equivalent deviate (NED) or simply normit. Since NED or Ii will be negative whenever Pi < 0.5; in practice, the number 5 is added to NED and the result is called a probit.

$$Probit = NED + 5 = Ii + 5$$

To estimate $ß_1$ and $ß_2$, we write

$$Ii = ß_1 + ß_2 X_1 + U_i,$$

Where, U_i is the stochastic disturbance term.

In this study, a probit model of the following form

$$Ii = ß_0 + ß_1 EXP + ß_2 FAM + ß_3 EDN + ß_4 OCC + ß_5 INC + ß_6 CRE + ß_7 LUE + ß_8 POV$$

was conceptualized and estimated, where, Ii = Unobservable utility index which determines the opinion towards ban (1 for agreeing and 0 for disagreeing with the ban)

EXP = Experience in years (Number)

FAM = Number of dependent family members (Percentage)

EDN = Level of education (Number of years)

OCC = Dependency on fishing (Dummy; 0 - Fishing alone, 1- secondary occupation

INC = Annual income (Rupees)

CRE = Credit availed (Dummy; 0 - Availed, 1- Not availed)

LUE = Number of days unemployed

POV = Poverty (Dummy; 0 - Incidence, 1- Not incident)

Predicted probabilities were computed as $\hat{f}_t = \hat{f}_t = F(\hat{X}_t' ß)$

The coefficients tell the effect of a change in the independent variable on the utility index. The impact of a unit increase in an explanatory variable on the choice probability was obtained by estimating the marginal effect using the probit model

$$(\partial \overline{P_t} / \partial X_{kt}) = f(\overline{X'_t ß}) \hat{ß}_k$$

The elasticity gives the percentage change in the choice probability in response to a percentage change in the explanatory variable. For the ith coefficient this was estimated as

$$E_{kt} = (\partial \overline{P_t} / \partial X_{kt}) (\overline{X}_{kt} / F(\overline{X'_t ß})$$

RESULTS AND DISCUSSION

General Characteristics

A total of 60 trawl labourers were interviewed and data regarding their experience, family size, level of education, occupational level and annual income, assets, availability of credits, incidence of unemployment, poverty and the mitigatory measures by means of support from cooperatives, government and others were collected. The trawl labourers were from Gujarat, Southern Maharashtra and Northern India. It was found that the trawl labourers were having good experience in trawling operations, which made it difficult for them to have other skilled jobs. The educational level was found to be low with the majority having less than high school education. The only alternative source of employment available included the agricultural labour in their native area, and the repair and maintenance of craft and

gear. But, again, the wages were too low and employment highly seasonal in nature. On an average, the trawl labourers were paid INR 30,000-40,000 for the ten-month trawling operations. It was found that there exists a considerable level of unemployment during the two-month ban period. There was no governmental support or support from cooperatives during the ban period. As a result of unemployment, the trawl labourers were forced to avail of credit either from money lenders or from financial institutions to cope up with the expenditure during the ban period. There was no incidence of poverty as such, although it might be late for such a phenomenon to occur.

Problems during the Ban Period – Garette Ranking Technique

In order to analyse the problems encountered during the monsoon trawl period as felt by the trawl labourers, 60 sample trawl labourers were interviewed using a pretested interview schedule on the different problems encountered in fisheries export. The important problems were ranked by the trawl labourers and on the basis of the ranks assigned based on their priorities. Garette ranking technique was employed to analyse the problems in general associated with the trawl ban. The results of the Garette ranking technique are furnished in Table 1. It could be

Table 1: Analysis of the problems during ban period - Garette ranking technique

Sl no.	Reason	Mean score	Rank
1	Trawler owner's support	38.80	VI
2	Poverty	37.48	VII
3	Non-availability of credit	53.32	III
4	Unemployment	68.41	I
5	Lack of government support	45.58	V
6	Seasonal employment	57.04	II
7	Low wage rate	50.49	IV

Note: Garette ranking; Percent position = $100 (R_{ij} - 0.05)/R_i$

inferred from the results that unemployment is the most prominent problem associated with the ban, which was ranked first with a mean score of 68.41. This was followed by seasonal employment (mean score - 57.04), non-availability of credit (mean score - 53.32), low wage rate (mean score - 50.49), lack of government support (mean score - 45.58), support from trawl owners (mean score - 38.8) and poverty (mean score - 37.48). It was found that poverty was the least affected problem, due to the kind payments obtained from the agricultural sector for labour.

The Garette ranking analysis revealed that the unemployment is the most important problem encountered by the trawl labourers during the ban period. The trawl ban period is characterized by considerable unemployment to the tune of 35-40 days during the ban period. The seasonal employment as an alternative source of employment was found to be as agricultural labourer, and in the tertiary sector of fisheries in the repair and maintenance of craft and gear. But again, agricultural labour was found to be seasonal as the trawl ban period is not coinciding with the transplanting or harvesting of paddy, as a result of which the trawl labourers are not getting sufficient employment for their subsistence. There are also apprehensions of low wage rate. The wage rates are too minimal when compared to the income from trawling as there is excess availability of labourers during the ban period.

The trawl labourers are deprived of government support as governmental interventions for the support of the trawl

labourers are seldom found either in the form of providing employment or ensuring some mitigating measures. The lack of support and unemployment coupled with low wage rate and seasonality of employment made availing of credit an imperative means to meet the household expenditure. There is an inherent problem of non-availability of credit, and availing credit is difficult as credit institutions and money lenders charge an exorbitant rate of interest and complex legalities are required. Even though the trawl labourers contribute for the returns of the trawler owners, the support from the trawler owners are not encouraging and they are not provided with any advance since the trawl owners fear about the labourers reporting to duty in the next season. Poverty is not noticed as much because of the kind payments made in the form of agricultural produce.

Factors affecting the Opinion towards Ban - Probit Analysis

The probit analysis on the factors affecting the opinion towards the ban is furnished in Table 2. Mostly, the income levels of trawl labourers and their

Table 2: Factors affecting the opinion towards ban - Probit analysis

Sl no.	Parameter	Coefficient	Standard error
1	CON	0.197	0.322
2	EXP	0.024*	0.012
3	FAM	-0.106**	0.041
4	EDN	0.179	0.091
5	OCC	-0.044	0.106
6	INC	0.068**	0.000
7	CRE	-0.143	0.232
8	LUE	-0.006**	0.003
9	POV	-0.021	0.323
10	GVS	-0.006	0.146

**One percent significant level; *Five per cent significant level; CON = Constant; EXP = Experience in trawl operation; FAM = Family size; EDN = Education level; OCC = Occupation; INC = Income; CRE = Credit availed; LUE = Level of unemployment; POV = Poverty; GVS = Government support

experience determine the favourable opinion towards the ban. The positive

association of income with a favourable opinion towards the ban indicated that ten percent increase in the income will increase the probability of opinion towards the ban by six percent at one percent level of significance, *ceteris paribus,* from the mean level of elasticities. *S*imilarly, a ten percent increase in experience in years would generate a favourable opinion towards the ban by two percent at five percent level of significance, *ceteris paribus,* from the mean level of elasticities.

On the contrary, the level of unemployment is negatively related in a favourable opinion towards the ban. A ten percent increase in the level of unemployment will decrease the probability of opinion by 0.6% at one percent level of significance, *ceteris paribus,* from the mean level of elasticities. The number of dependent family members also has a negative relation with the opinion towards the ban. A ten percent increase in the number of dependent family members would decrease the probability of favourable opinion towards the ban by two percent, at five percent level of significance, *ceteris paribus,* from the mean level of elasticities. Thus, it was found that the important factors, which generate a favourable opinion towards the ban, are the income levels and experience, and the level of unemployment and the number of dependent family members generate an unfavourable opinion towards the ban. Even though the trawl labourers are deprived of employment for two months, due to their experience in the field, they favoured the implementation of trawl ban. The details on the prediction success of factors causing the opinion towards the

ban through probit analysis are presented in Table 3. It could be observed from the table that the number of right predictions for the probability of having a favourable

Table 3: Probability of agreement or disagreement towards monsoon trawl ban prediction - Probit analysis

Choice		Actual		Total	Right prediction	
		0	1		Number	Percentage
Predicted	0	38	2	20	38	63.3
	1	51	10	10	10	16.7
Total		48	12	60	48	80.0

opinion was 48 out of 60 and the percentage of right prediction was worked out to be 80%. This confirms the fact that the probit function is a good fit for this type of analysis and prediction.

Conclusion

The study on the impact of fisheries reforms in employment pattern, poverty and income distribution with reference to monsoon trawl ban in Maharashtra generated some useful conclusions. It has been found that there exists a considerable level of unemployment during the two-month ban period. It has also been found that there is no government support or support from cooperatives during the ban period. The Garette ranking analysis revealed that the unemployment during the ban period is the most important problem encountered by the trawl labourers followed by seasonal employment, non-availability of credit, low wage rate, lack of government support and support from trawl owners, and poverty. It was found that poverty is the least affected problem, due to the payments obtained from the agricultural sector for labour. The probit analysis on the factors affecting the opinion towards the ban revealed that the income levels of trawl labourers and their experience in trawl operations determine the favourable

opinion towards the ban. On the contrary, the level of unemployment and the number of dependent family members create an unfavourable opinion towards the ban.

The implementation of trawl ban had served its purpose in augmenting marine fish production. But its impact on the income level of the labourers and the unemployment they face during the period forced some fishermen to oppose the ban on trawling, which was very well emphasized in the survey. However, in spite of the unemployment problem they face during the period, most of the experienced labourers in the field gave a positive opinion about the ban, which shows their concern towards the conservation of resources, which they count on, for their livelihood. It is evident from the survey that the lack of sufficient government support is one reason for their misery along with unemployment. The disparity arising in the income levels of fishermen during the ban and the non-ban periods is very high which makes a great difference in their livelihood. There should be some level of support for the fishermen to have a normal standard of living during the ban period. New policies for the socio-economic upliftment of labourers can be put forward after looking upon the problems they face during the ban period. The implementation of a fishing policy based on scientific principles highlighting the need of common fisherfolk is the need of the time.

REFERENCE

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