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IN MAHARASHTRA AND GUJARAT**
--- A CASE STUDY

Central Marine Fisheries Research Institute
(Indian Council of Agricultural Research)
P. B. No. 2704, E. R. G. Road, Cochin-682 031, India
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P. S. B. R. JAMES
Director
Central Marine Fisheries
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An Evaluation of Fishermen Economy in Maharashtra and Gujarat—A case study

D. B. S. SEHARA, R. SATHIADHAS and J. P. KARBARI

INTRODUCTION

Emphasis for the development of fisheries and the extent of resource allocation has increased in each successive Five Year Plan and several welfare schemes for fishermen were launched. Removal of poverty and attainment of self reliance are given top priority in our national planning. In the fishery sector, adoption of technological innovations has been encouraged and fishery infrastructure facilities have been enhanced by the Government. The increased pace of mechanisation and step-in deepsea fishing have undoubtedly helped in boosting the production and export of marine products, and fishermen are given loan and subsidy under various schemes. Fishermen cooperatives are encouraged by the Government. Commercial banks are also coming forward to extend liberal loans at reasonably low rate of interest. In spite of all these efforts, the economic benefits of several development and welfare schemes are believed to have been, mainly reaped by a few, and most of the fishermen are still in the grip of poverty. In this context, extensive studies about the socio-economic status of fishermen pertaining to different regions of the country will be immensely useful for future planning of developmental schemes.

Maharashtra and Gujarat are the important maritime states in northwest coast of India. Till recently, fishing was considered to be an occupation of socially backward section of society. About 180 fishing villages in 10 coastal districts of Gujarat and 375 villages in 5 coastal districts of Maharashtra are dominated by marine fishermen, with a population of about 4 lakhs. The present study on income, consumption and employment pattern and credit facilities available to fishermen in northwest coast was taken up by the Central Marine Fisheries Research Institute, Cochin, to analyse and assess the economic conditions of fishermen.

METHOD OF STUDY

To select fishing villages in Maharashtra and Gujarat for the socio-economic study of fishermen, preliminary data were collected from 14 fishing villages of Maharashtra and 18 fishing villages of Gujarat through a schedule containing information on items such as topography of fishing villages/landing centres, fishermen population, infrastructure facilities available, craft and gear used, catch composition and credit facilities available. The data were collected by interviewing heads of villages, chiefs (leaders) of fishermen community, office bearers of fishermen cooperative societies and from records of Panchayat Samitees and state fisheries department. Considering the size of village, mechanisation level, craft and gear combination and fishery infrastructure availability, 3 villages of Maharashtra, namely Ekdara, Alibag Koliwada (both in Raigad District) and Mahim Koliwada (Greater Bombay District) and 4 villages of Gujarat, namely, Umbergaon (Valsad District), Bhimpore (Surat District.), Sutrapada Bunder and Mangrol Bunder (both in Junagadh District, Saurashtra), were finally selected for the study. Based on investigation, two schedules were prepared, one for collecting data from all the fishermen families regarding the details of fish catch, income and indebtedness and the other for collecting information from selected families regarding the various socio-economic parameters in detail.

For data collection, enumerators were locally selected from fishermen community and were properly trained. Survey work was supervised regularly to ensure maximum accuracy of information. All the fishermen families in these villages were divided into four categories based on the means of production, viz. families owning/sharing, (i) mechanised boats, (ii) non-mechanised boats, (iii) only gears and (iv) those engaged in fishery allied activities, hereafter referred to as mechanised group, non-mechanised group, gear owners and fishery allied group, respectively. Depending on the size of category, representative families were selected in each village (table 1). Taking fishermen family as basic unit, all relevant information necessary to meet the specific objectives of

the study were collected quarterly, representing winter (January-March), pre-monsoon (April-June), monsoon (July-September) and post-monsoon (October-December) seasons, during the year 1983.

The terminologies followed in the collection and interpretation of data are defined below:

- 1) Fishermen family - A family having at least one of its members engaged in fishing or fishery related activities. The term 'family' is restricted to members sharing meals in one kitchen.
- 2) Children - Aged 12 years and below.
- 3) Occupation:
 - a) Main - An occupation contributing 50% or more income
 - c) Subsidiary - An occupation contributing less than 50% income.
 - c) Fishery allied/related activities include fish loading/unloading, transporting, trading, processing/curing, net mending/repairing, boat building/repairing or any other activity directly connected with fishery.
- 4) Catch share of a family - Fish catch received by a family as share of craft/gear and/or remuneration from fishing or fishery allied activities.
- 5) Income:
 - a) Fishery - Income received from fishing or fishery related occupations.
 - b) Non-fishery - Income received from a source other than fishery viz. farming, service, animal husbandry etc.
- 6) Education:
 - a) Primary - Up to 5th standard
 - b) Middle - 6th to 8th standard
 - c) Higher secondary - 9th to degree level
 - d) Graduate & above - Degree holders.

- 7) OBM boat - Boat fitted with outboard motor.
 - 8) IBM boat- Boat fitted with in board motor.
 - 9) GFCCA - Gujarat Fisheries Central Co-operative Association.
 - 10) NCDC - National Co-operative Development Corporation.
- Data analysis:*

Procedure / method in estimation of economic parameters followed in data analysis is presented below:

1. Gross fishery income (GFI) = Value of catch share of (craft/gear and family members) + income from fishery allied activities.
2. Fishing expenditure (FE) = Crew wages + fuel charges + processing, transportation & marketing charges + repair & maintenance cost of craft/gear + miscellaneous fishing expenditure.
3. Net fishery income (NFI) = G F I - FE
4. Value of catch (Rs) = $\sum_{i=1}^n W_i P_i$
 Where W_i = Weight of i^{th} fish group (kg)
 P_i = price of i^{th} fish group (Rs/kg.)
 n = Number of fish groups.
5. Village average = $\frac{\sum_{j=1}^N C_j \cdot F_j}{\sum F_j}$
 Where C_j = Average value of a parameter/ character for j^{th} category of families,
 F_j = Number of families in j^{th} category,
 N = Number of categories.
 $\sum F_j$ = Total number of fisher men families in the village.

An analysis of variance technique was used to find out the differences between villages and between categories based on annual catch, fishing days, fishery income, non-fishery income, fishing expenditure, household expenditure, investment and indebtedness. For this purpose annual aggregates from the villages having common categories were taken. The differences between seasons and between villages, for these parameters/characters were also tested category-wise.

GENERAL INFORMATION ABOUT VILLAGES

Fishing is traditionally conducted by Mahadev Kolis (Scheduled Tribe) and Kolis (Backward community) in the villages of Maharashtra and Machhi and Kharwas (Backward communities) in Gujarat. Fishing is generally considered as an occupation of socially backward sections of society. Among the selected villages, Alibag Koliwada in Maharashtra and Umbergam and Mangrol Bunder in Gujarat have adequate fishery infrastructure facilities. Five out of the seven villages were found without jetty facility.

Craft and gear: Majority of the boats in Alibag Koliwada, Mahim Koliwada, Sutrapada Bunder, Mangrol Bunder and Umbergam are fitted with IBM/OBM. In Ekdera, the boats are 22-32 footers fitted with 2-4 cylinder engines. Surface (Tarti) and bottom set (Budl) gillnets and bagnets (Dol) are commonly used for fishing. On mechanised boats, 4-6 persons are operating bagnets and 8-10 persons operating gillnets whereas on non-mechanised boats (known as Sidhwala) 3-5 persons are operating small stakenets (Boxi). In Alibag Koliwada, mechanised boats are 28-32 footers fitted with 2-4 cylinder Ruston engines (about 80%) whereas a few 42 footers, fitted with 6 cylinder engines, operate trawlnets. Most commonly used gear is bagnet, operated by 5-7 persons on mechanised boats in 8-13 fathoms of water. Non-mechanised boats are generally operating stakenets in creek or used for transporting the catch of mechanised boats from fishing ground to the landing place. A few mechanised boats use gillnets. In Mahim Koliwada, majority of boats are 22-32 footers and fitted with 2-4 cylinder engines (Kirloskar and Ruston). Surface

and bottom set gillnets are very common at this centre operated during the fishing season of 8-9 months in a year (excluding 3-4 months of monsoon period). During monsoon period, dragnets and castnets are operated. In small boats, 3-4 persons form the crew, whereas 5-7 persons operate big mechanised boats.

In the selected villages of Gujarat, Mangrol Bunder is a major mechanised centre having about 300 mechanised craft including trawlers, IBM and OBM boats. Accordingly, trawlnets and gillnets are in majority at this centre. Trawlers are operating on 3-6 days, gillnetters 2-4 days and OBM boats daily a trip. Generally, 6-7 persons on trawlers, 7-9 on gillnetters and 3-4 on OBM boats as well as on non-mechanised boats constitute the crew. Another highly mechanised fishing village is Umbergam with gillnetters and trawlers numbering about 90. As many as 25% of the crafts are non-mechanised plankbuilt boats. Trawlers are generally 42 footers fitted with 6 cylinder Ashok Leyland and Ruston engines. The trawlers are observing a fishing trip of 4-6 days and gillnetters 7-10 days. The bagnetters are operating for 3-4 months starting from September every year and then shift over to gillnetters because bagnet operation is not remunerative afterwards. In Sutrapada Bunder, most of the boats (about 80%) are fitted with 6-9 HPs OBM and operated by 3-5 persons. Gillnets are commonly used throughout the fishing season. There is no mechanised boat at Bhimpore centre where as non-mechanised boats number about 38. Stakenet, gillnet, dragnet, wallnet, hooks and line and trap are common gears used at this centre. Generally, plank-built boats (22 footers) are operating stakenets (locally known as *gholwa*).

Catch composition: Catch composition at different centres shows that *Acetes* spp. (Jawla) forms major catch (65-70 per cent) at Alibag Koliwada. Other main species are ribbonfish, prawns, catfish and clupeoids. Pomfret, silverbar, seer fish, clupeoids, sharks and prawns at Ekdara and pomfret, perches, *Hilsa*, eels, sharks, seerfish and ghol at Mahim Koliwada form major catch. Sharks, pomfret, catfish, dhoma, prawns, seer fish and croakers are common catch at Mangrol Bunder and

Umbergam. In Bhimpore, Bombay duck, *Hilsa*, prawns, catfish and croakers and in Sutrapada Bunder, pomfret, seerfish, *Hilsa* and other clupeoids, dhoma, shatka and ghol comprise the major landings. Post-monsoon is peak fishing season and monsoon is almost lean at all the centres except Bhimpore where good landing of anadromus *Hilsa* was observed.

Crew payment: In Alibag Koliwada, labour is paid in cash where as in Ekdara and Mahim Koliwada both the systems ie. payment in cash and kind exist. In Ekdara, one-third of catch is going for boat as hire charges and two-third as wages for crew. In Mahim Koliwada, crew members contribute towards operating cost and the catch is divided equally among members operating equal number of nets including owner of the boat. But majority of mechanised boats contract labour for 8-9 months fishing period in a year and pay Rs. 400-600 per month excluding food and other personal expenses. In Mangrol Bunder and Umbergam, labour is paid in cash on trawlers whereas on gillnetters both types of payment ie. in cash and kind are prevalent. Boat owners and net owners get equal share in catch on gillnetters at Umbergam, whereas at Mangrol Bunder the net owners get whatever catch comes in their portion of nets. Boat owner possesses 75 per cent of the nets and labour the rest. Share system in Sutrapada Bunder differs from that of Mangrol Bunder. From total catch value, the cost of fuel is subtracted and one-fourth of remaining is given as rent of OBM boat and three-fourth is equally divided among net owners. All crew members operate equal number of gill net pieces, including boat owner. In Bhimpore, 3-4 persons are joining on non-mechanised boats with boat owner, pay rent of boat and the catch is divided equally among crew members operating with equal number of gillnet pieces. In some cases, boat owners pay the crew in cash and catch is solely taken by them.

Functions of fishermen co-operative societies; Regarding the role of fishermen cooperative society, it is observed that in all the three selected villages of Maharashtra and three out of four selected villages of Gujarat (leaving Bhimpore) the society is providing

fishing impliments and fuel (diesel & kerosene) to fishermen at subsidised rates. Fishermen cooperative societies in Ekdera, Alibag Koliwada and Sutrapada Bunder are involved in fish marketing also. The societies are helping member fishermen in getting loan from banks and Government agencies. Major portion of the catch in these villages is sold to private fish traders either directly by the fishermen or through fishermen co-operative society. In Sutrapada Bunder about 40 per cent of OBM boat owners sell the catch to GFCCA through fishermen cooperative society. Most of the catch is sold in fresh in all the villages except Alibag Koliwada where a large portion of catch is sun dried and disposed. In other villages where fish storing facilities are not available or where there is no possibility of immediate disposal of catch (especially night catch), the catch is sun dried or salted before disposal.

RESULTS AND DISCUSSION

Literacy: Educational status, categorywise, in all the seven villages is presented in table 2. Majority of population (51-75 per cent) in all the villages except Mahim Koliwada (48.1 per cent) were not having even primary education. The percentage of population having primary education varied from 19.0 in Mangrol Bunder to 32.7 in Bhimpore. Among all the villages, the percentage of degree holders were highest in Umbergam (3.5%). No significant difference in education level was seen between categories within the villages. No significant correlation was observed between literacy and mechanisation level in these villages.

Table 3 shows the level of education among males, females and children. In all the villages literacy among males was more than the females. Literacy among adult males was lowest in Mangrol Bunder (36.4%) and highest in Bhimpore (74.1%). Literacy among females ranged from 17.8 per cent in Sutrapada Bunder to 53.7 per cent in Mahim Koliwada. Literacy among children varied from 19.9 per cent in Mangrol Bunder to 32.1 per cent in Mahim Koliwada. No specific conclusion could be drawn on literacy among children as about 30 per cent of the

children were below the school going age. Again, among the literate males, females and children, majority was with primary education. Higher education was more prevalent in males than females. Males with graduation and above qualification were observed in all the villages (1-8 percent) but female graduates were observed in Mahim Koliwada, Umbergam and Bhimpore only (1-4 per cent.)

Family size: Table 4 shows the family size and occupation particulars of family members (categorywise) in all the seven villages. No significant variation was observed in family size between different categories. In Maharashtra, family size was minimum in Mahim Koliwada (6.9) and maximum in Ekdara (8.1). In Gujarat, family size varied from 7.3 in Bhimpore to 7.6 in Sutrapada Bunder. It is interesting to note that though difference in family size was insignificant between different categories within the villages in both the states, it was significant between the villages in Maharashtra and non-significant in Gujarat.

Occupation: Occupation analysis in Maharashtra indicated that there was no significant difference in number of non-earning members between the villages. Non-earners ranged from 41 to 49 per cent among different categories. The percentage of population having fishery as the main occupation varied from 38.4 in Mahim Koliwada to 49.5 in Ekdara. The percentage of population having non-fishery as the main occupation was highest in Mahim-Koliwada (17.4%).

Occupation analysis of Gujarat fishing villages indicated that earning population ranged from 49.2 per cent in Mangrol Bunder to 54.6 per cent in Sutrapada Bunder. Percentage of population having non-fishery as main occupation was highest in Bhimpore (20.3%). It is a non-mechanised fishing village and almost every fisherman family has someone employed as seaman in merchant navy. The percentage of population having fishery as main occupation was highest in Sutrapada Bunder (49.9%) followed by Mangrol Bunder (44.2%) and lowest in Bhimpore (33.8%). In both the states, percentage of family members having non-fishery as the main occupation was the highest for fishery—alleged group.

As shown in table 5 adult males outnumbered adult females as earners in all the villages. Of children, 71-75 per cent in Maharashtra and 68-78 per cent in Gujarat were recorded as non earners. Children engaged in fishery occupations ranged from 16.2 per cent in Bhimpore to 24.8 per cent in Sutrapada Bunder. Of adult females, 37-44 per cent in Maharashtra and 40-52 per cent in Gujarat were non-earners. Among adult females, non-fishery as the main occupation ranged from 3 to 16 per cent in Maharashtra and 1 to 9 per cent in Gujarat. The percentage of earning males varied from 83.0 per cent in Mangrol Bunder (Gujarat) to 85.8 per cent in Mahim Koliwada (Maharashtra). Number of adult males having fishery as main occupation ranged from 53 to 75 percent in Maharashtra and 49 to 71 per cent in Gujarat.

CATCH DETAILS

Fishing days: The number of annual fishing days in Maharashtra were maximum for non-mechanised group (233 days) in Mahim Koliwada and minimum for non-mechanised group and gear owners (200 days) in Alibag Koliwada (table 6). For mechanised group the average annual fishing days varied from 208 to 225. Quarterly fishing days for different categories numbered 64-70 in winter, 50-59 in pre-monsoon, 18-40 in monsoon and 66-70 in post-monsoon season. The number of fishing days in general were comparatively low in Alibag Koliwada. The basic reason of less number of fishing days in Alibag Koliwada was attributed to complete absence of bagnet operation during monsoon season.

In Gujarat, the average number of fishing days in post-monsoon (64-70 days) and winter (63-70 days) were more or less the same (table 7). In pre-monsoon season, the number of fishing days ranged from 50 to 59. The number of fishing days in monsoon season were minimum for mechanised group at Umbergam (23 days) and maximum for gear owners in Bhimpore (55 days). The number of annual fishing days varied from 204 to 225 for mechanised group, 220 to 244 for non-mechanised group and 216 to 241 for gear owners. Number of fishing days

in general, were comparatively more at Bhimpore centre since fishing continued in monsoon season also.

As given in table 6 the catch share was highest in post monsoon season and lowest in monsoon for all the categories in Maharashtra villages. As much as 34-40 percent of annual catch was contributed by post-monsoon season followed by 29-32 per cent in winter. The catch share in monsoon season ranged from 9 to 16 per cent of the annual catch. It was also observed that percentage contribution of monsoon towards annual catch was slightly more for gear owners (9-16 per cent) as compared to those of craft owners (9-12 percent). Annual catch share for mechanised group, among all the villages, was maximum in Alibag Koliwada (36,061 kg) and minimum in Mahim Koliwada (20,329 kg). Catch share per operating day was maximum for mechanised group (92-173 kg) and minimum for gear owners (12-26 kg). On comparing the quantity and value of catch it was found that percentage contribution of catch quantity was more than that of catch value during post-monsoon season in all the villages whereas reverse was the trend in pre-monsoon season. This was because of the heavy catch availability in the post-monsoon season and resultant price decline.

Details of catch share for different categories in Gujarat (table 7) showed that catch share (quantity) was maximum in post-monsoon season followed by winter and minimum in monsoon for all the categories. For mechanised group, percentage share of post-monsoon in annual catch was highest in Umbergam (41.5%) and lowest in Sutrapada Bunder (35%). About 26-32 percent of annual catch was contributed by winter and 18-23 percent by pre-monsoon season for different categories. For mechanised group, annual catch share was maximum in Mangrol Bunder (29,125 kg for trawler owners) followed by Umbergam (23,930 kg). There was not much difference in annual catch share for OBM boat owners at Mangrol Bunder (11,505kg) and Sutrapada Bunder (12,814 kg). In Umbergam, Bhimpore and Sutrapada Bunder, the annual catch share for non-mechanised group was 6,753, 10472 and 5,482 kg respectively. Annual catch share per family for gear owners ranged from 2,860 kg in Sutrapada Bunder to 5,043 kg in Bhimpore. Catch share per

operating day was found to be 51-142 kg for mechanised group, 25-43 kg for non-mechanised group and 13-21 kg for gear owners.

Gross fishery income: Post-monsoon contributed 33-38 percent of gross fishery income for different categories in Maharashtra villages. Among four seasons, monsoon contributed the least towards the income (8-17 percent). The maximum gross fishery income was found for mechanised group and minimum for gear owners in all the villages (table 6). It is interesting to note that despite a lower catch, the gross fishery income for mechanised group was more in Mahim Koliwada (Rs. 61,784) than Alibag Koliwada (Rs. 60,650) and Ekdara (Rs. 57,768). The proportion of quality fish in total catch being comparatively more at Mahim Koliwada was one of the reasons. Besides Bombay wholesale fish market being at approachable distance the catch fetches good price. Almost similar trend in gross fishery income was observed for non-mechanised group and gear owners.

For different categories in Gujarat village (table 7) 31-39 per cent of gross fishery income was obtained in post-monsoon, 26-31 per cent in winter, 15-28 per cent in pre-monsoon and 9-20 percent in monsoon season. For mechanised group, annual gross fishery income was maximum for trawler owners in Mangrol Bunder (Rs. 1,09,974) and minimum for OBM-boat owners in Sutrapada Bunder (Rs. 35,342). For non-mechanised group, the gross returns ranged from Rs. 15,256 in Sutrapada Bunder to Rs. 25,176 in Bhimpore. The average annual gross income for gear owners was Rs. 8,969, Rs. 9,710, Rs. 7,493 and Rs. 11,274 in Umbergam, Bhimpore, Sutrapada Bunder and Mangrol Bunder respectively.

Per operating day gross fishery income: Gross fishery income per operating day for Maharashtra ranged from Rs. 257 to Rs. 292 for mechanised group, Rs. 84 to Rs. 98 for non-mechanised group and Rs. 40 to Rs. 50 for gear owners.

In Gujarat, maximum gross returns (Rs. 536) per operating day was found for trawler owners in Mangrol Bunder. There was

not much difference in gross fishery income per operating day for OBM boat owners at Sutrapada Bunder (Rs. 164) and Mangrol Bunder (Rs. 159). For non-mechanised group, gross returns per operating day ranged from Rs. 69 at Sutrapada Bunder to Rs. 103 at Bhimpore. For gear owners minimum gross returns of Rs. 34 per operating day was found at Sutrapada Bunder and maximum Rs. 52 at Mangrol Bunder.

Analysis of variance indicated significant difference in catch share between villages as well as between seasons (table 8, 9 & 10) Further, as shown in table 11 non-significant difference between villages and significant difference between categories was observed in annual catch share.

Significant difference in number of fishing days was observed between seasons for all the categories and between villages for mechanised group only (table 12, 13 & 14). In annual fishing days, no significant difference was observed either between the villages or between the categories (Table 15).

FISHING EXPENDITURE

Annual fishing expenditure: Details of annual fishing expenditure are given in table 16. In Maharashtra, crew wages had a major share in fishing expenditure. For mechanised group, percentage share of the crew wages in fishing expenditure was highest in Alibag Koliwada (65.7%) and lowest in Mahim Koliwada (51.1%). About 72-77 per cent of fishing expenditure for non-mechanised group was incurred on the wages. Fuel was the second major fishing expenditure for mechanised group. Fuel share in fishing expenditure was maximum at Mahim Koliwada (31.0%) and minimum at Alibag Koliwada (19.4%). It was obvious since fuel consumption in gillnet operation at Mahim Koliwada was more as compared to fixed bagnet operation at Alibag Koliwada. Boat and net repairs accounted for 8-10 percent of fishing expenditure whereas transport and marketing 3-8 per cent for different categories. Processing and miscellaneous expenditure formed 2-4 per cent each of fishing expenditure. Annual fishing expenditure for mechanised group was maximum at Mahim

Koliwada (Rs. 51,680) and minimum at Ekdara (Rs. 48,339). The expenditure ranged from Rs. 14,607 to Rs. 15,026 for non-mechanised group and Rs. 5,338 to Rs. 6,567 for gear owners. Average fishing expenditure for mechanised group (Rs. 49,868) amounted about 3 times the expenditure of non-mechanised group (Rs. 14,818) and 8 times that of gear owners (Rs. 5,945).

In Gujarat, crew wages formed 44.7 per cent of fishing expenditure for mechanised group and 78.5 per cent for non-mechanised group. For gear owners, the sum of payment made to boat owners towards the rent of the boat and crew wages accounted for 72.3 per cent of the fishing expenditure. As much as 39.0 per cent of the expenditure was incurred on fuel by mechanised group. Fuel share in annual fishing expenditure was maximum for trawler owners at Mangrol Bunder (48.8%) and minimum for OBM boat owners at Sutrapada Bunder (25.2%). Boat, engine and net repair for mechanised group was 7.0 per cent of the expenditure whereas boat and net repair for non-mechanised group accounted for about 10 per cent. For gear owners, percentage expenditure incurred on net repair ranged from 8.6 in Umbergam to 15.5 in Sutrapada Bunder. Marketing and transportation for mechanised group, non-mechanised group and gear owners accounted for 3.5, 6.2 and 9.1 per cent of fishing expenditure respectively. Processing formed 3-5 per cent of the expenditure for these categories. Annual fishing expenditure, among mechanised groups, was maximum for trawler owners in Mangrol Bunder (Rs. 93,666) and minimum for OBM boat owners in Sutrapada Bunder (Rs. 25,138). For non mechanised group and gear owners, the average annual fishing expenditure for Gujarat villages (overall) was calculated at Rs. 13,699 and Rs. 4,982 respectively. Fishing expenditure for all categories in general, was more at Mangrol Bunder as compared to other villages.

Quarterly fishing expenditure: Quarterly analysis of fishing expenditure in Maharashtra (table 17) showed that percentage of the fishing expenditure was highest in post-monsoon season

(32-36 per cent) followed by winter (28-31 per cent). In monsoon season, highest percentage of the expenditure was observed for gear owners in Mahim Koliwada (18.8%) and lowest for mechanised group in Ekdara (10.3%). About 22-25 per cent of the expenditure was incurred in pre-monsoon season. Seasonal fishing expenditure was directly related to the number of fishing days.

The fishing expenditure per day of operation for mechanised group was maximum at Alibag Koliwada (Rs. 238) and minimum at Ekdara (Rs. 215). For Maharashtra villages as a whole, the expenditure per operating day for non-mechanised group and gear owners was calculated at Rs. 68 and Rs. 28 respectively.

For mechanised group in Gujarat, 32.1 per cent of the annual expenditure accounted for post-monsoon, 30.3 per cent for winter, 25.5 per cent for pre-monsoon and 12.1 per cent for monsoon (Table 17). For non-mechanised group and gear owners, post-monsoon season shared 30.9 per cent and 34.7 per cent of fishing expenditure respectively, which was more than the expenditure of any other quarter in the year. The percentage expenditure was least in monsoon for these categories, ranging from 11 to 22 per cent over the villages.

The average fishing expenditure per operating day was Rs. 267, Rs. 59 and Rs. 22 for mechanised group, non-mechanised group and gear owners respectively. The expenditure per operating day was as high as Rs. 457 for trawler owners in Mangrol Bunder and as low as Rs. 17 for gear owners in Umbergam and Sutrapada Bunder.

Analysis of variance (Tables 18, 19, 20 & 21) showed that there was significant difference in fishing expenditure between villages and between seasons for all the categories. Further, the annual fishing expenditure showed significant difference between categories only.

NET INCOME

Fishery income: Details of net fishery income for different categories in Maharashtra villages are presented in Table 22. For

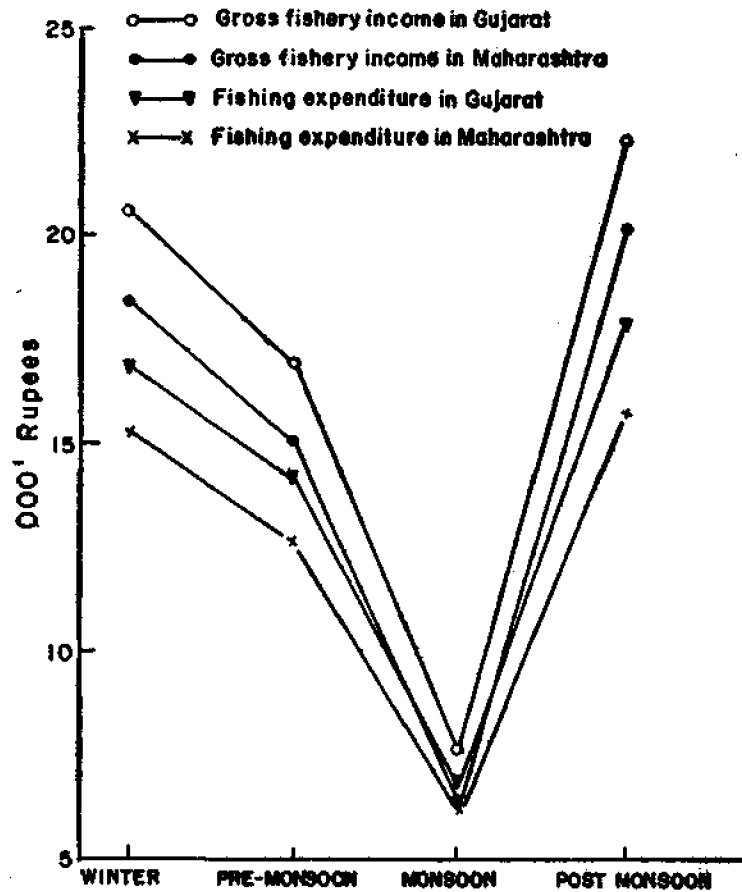


Fig. 1. Fishing expenditure and gross fishery income for mechanised group.

mechanised group, 41-49 per cent of net income accrued in post-monsoon season, 25-36 per cent in winter and 17-28 per cent in pre-monsoon. During monsoon season, the total fishing expenditure was exceeding the gross fishery income for mechanised group at Alibag Koliwada and Mahim Koliwada (figure 1) because of heavy investment on boat, engine and nets repair during this season at one hand and limited number of fishing days with low catch at the other. For non-mechanised

group, the percentage contribution of post-monsoon, winter, pre-monsoon and monsoon towards net fishery income, overall villages, was 46.4, 31.4, 16.3 and 5.9 respectively. For gear owners maximum contribution towards the net income was observed in post-monsoon (37.7%) and minimum in monsoon (12.6%). Almost similar trend was noticed for fishery allied group with minimum share in monsoon (16.2%) and maximum in post-monsoon (31.8%).

The net annual fishery income for mechanised group was highest at Alibag Koliwada (Rs. 11,064) and lowest at Ekdara (Rs. 9,429). The net fishery income ranged from Rs.4,393 to

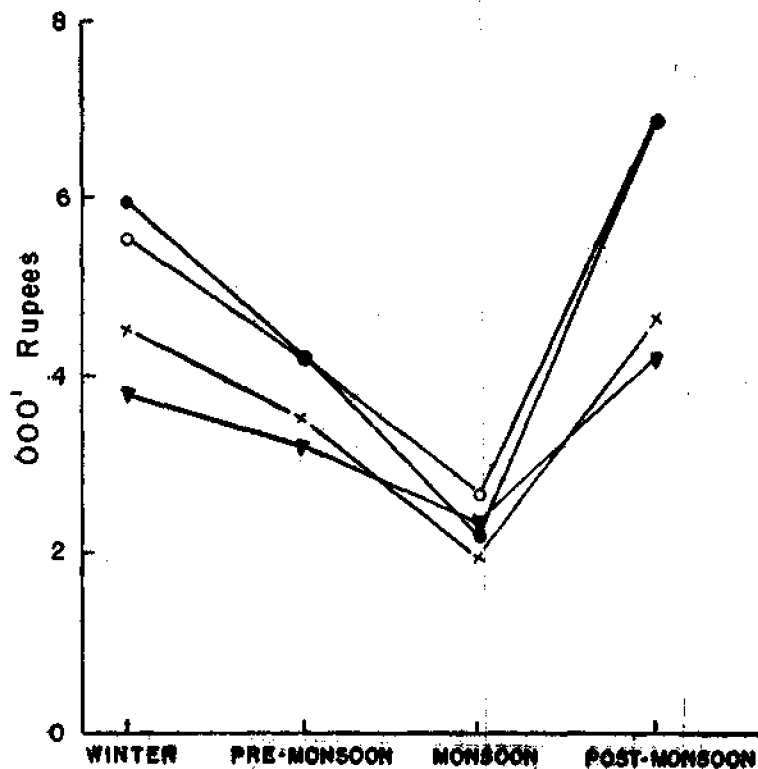


Fig. 2. Fishing expenditure and gross fishery income for non-mechanised group. [for explanations see fig. 1]

Rs. 4,886 for non-mechanised group and Rs. 3,709 to Rs. 4,013 for gear owners. Average net income for fishery allied group, in Maharashtra was worked out to Rs. 3,467 with highest of Rs. 3,621 at Alibag Koliwada and lowest of Rs. 3,265 at Ekdara. The percentage of net to the gross fishery income was 17.0 for mechanised group and 23.6 for non-mechanised group. For gear owners, share of net in the gross income ranged from 38 per cent in Ekdara to 41 per cent in Mahim Koliwada. A significant

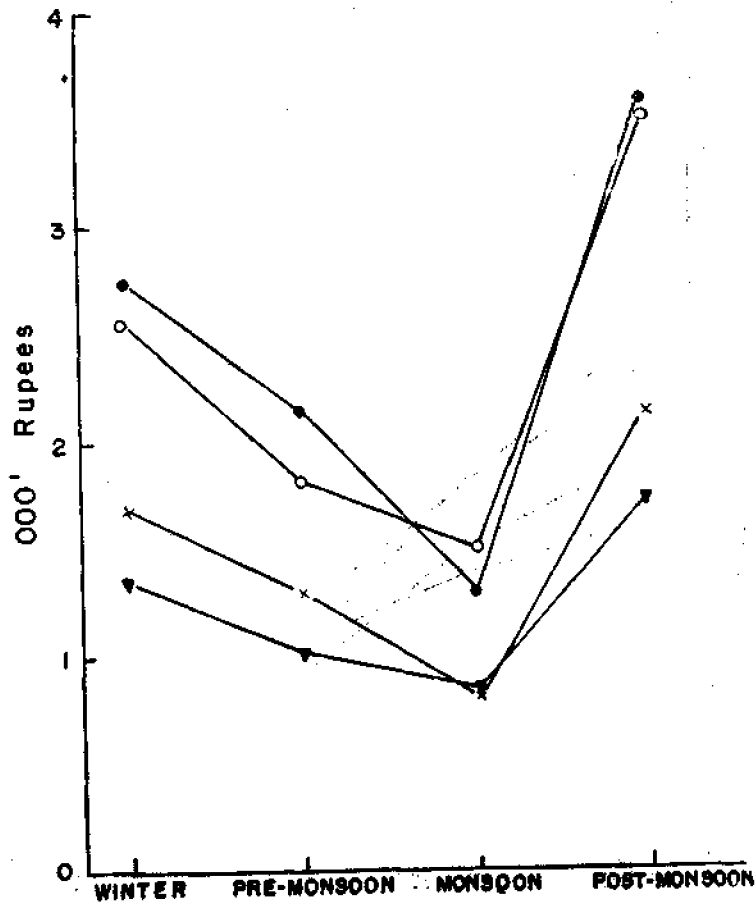


Fig. 3. Fishing expenditure and gross fishery income for gear owners. [for explanations see fig. 1]

feature noted was that higher the capital investment in means of production, lower was the ratio of net to gross fishery income in these villages. The net fishery income per operating day was found Rs. 47, Rs. 21, Rs. 18 and Rs. 10 for mechanised group, non-mechanised group, gear owners and fishery allied group respectively.

Income analysis in Gujarat (Table 23) showed that for mechanised group, the percentage contribution of post-monsoon

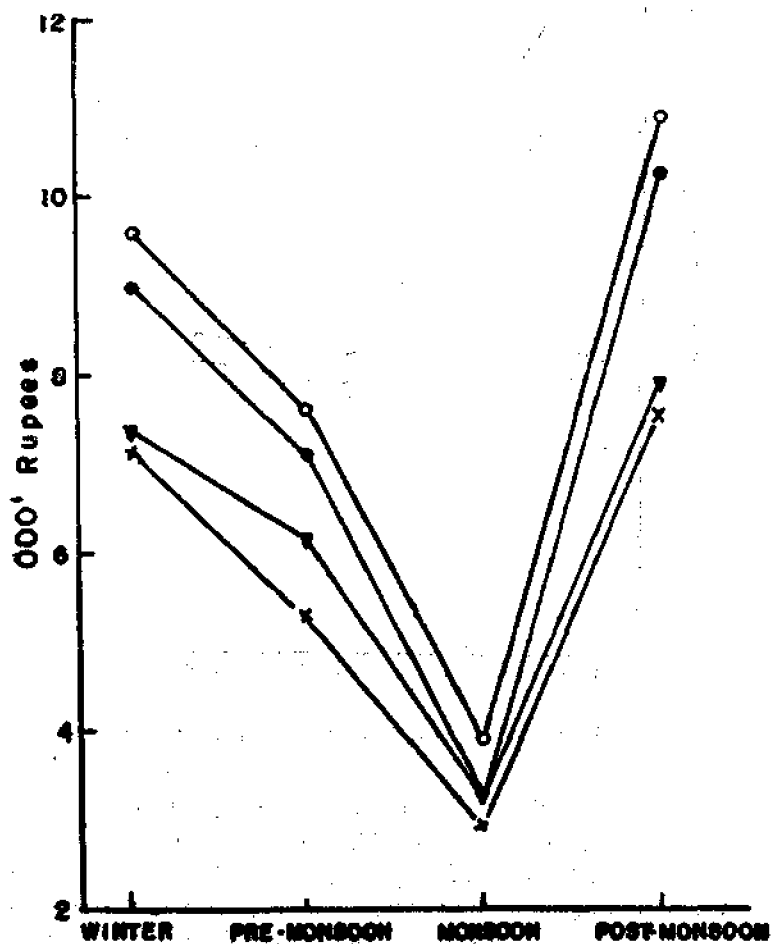


Fig. 4. Fishing expenditure and gross fishery income for all categories (combined) (for explanations see fig 1)

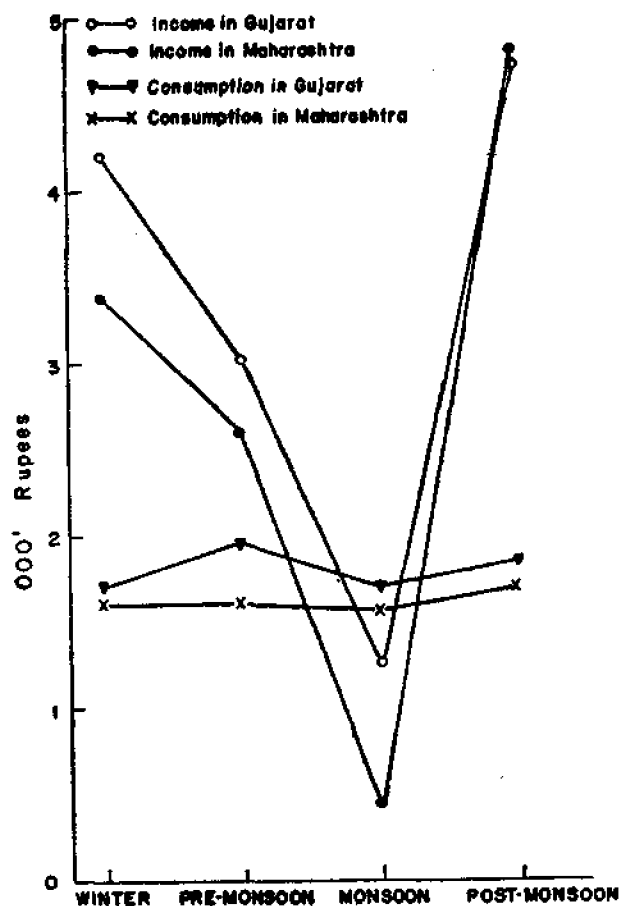


Fig. 5. Income and consumption for mechanised group.

season towards annual net fishery income varied from 31.4 in Mangrol Bunder to 47.4 in Umbergam. Similarly, post-monsoon season contributed 46.6, 40.2 and 31.5 per cent for non-mechanised group, gear owners and fishery allied group respectively. Share of monsoon in annual net fishery income was 8.0, 6.7, 14.5 and 16.4 per cent for mechanised group, non-mechanised group, gear owners and fishery allied group

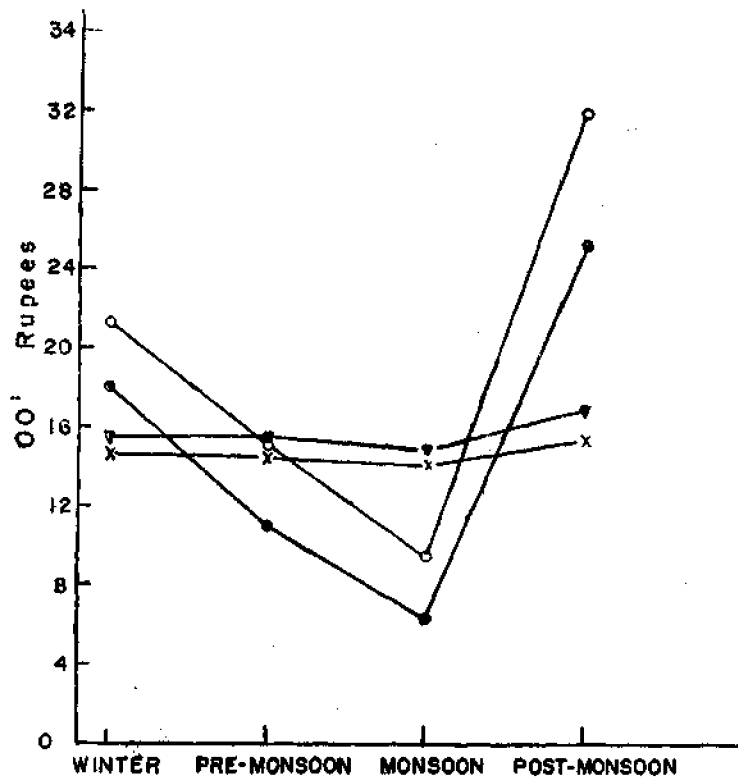


Fig. 6. Income and consumption for non-mechanised group.
[for explanations see fig. 5]

respectively. In Gujarat villages, 27-32 per cent of the net fishery income accrued in winter and 17-25 per cent in pre-monsoon season for different categories.

Annual net fishery income among mechanised groups in Gujarat was maximum for trawler owners (Rs. 16,208) in Mangrol Bunder. The net fishery income ranged from Rs. 4,900 to Rs. 6,406 for non-mechanised group, Rs. 3,808 to Rs. 4,915 for gear owners and Rs. 3,293 to Rs. 3,726 for fishery allied group. Among all the categories, the net fishery income was minimum for fishery allied group in all the villages. The average

net fishery income per family for mechanised group, non-mechanised group, gear owners and fishery allied group was Rs. 12,042, Rs. 5,685, Rs. 4,379 and Rs. 3,513 respectively. Further, the net fishery income of a family per operating day was maximum for mechanised group (Rs. 57) and minimum for fishery allied group (Rs. 10). Share of net in gross fishery income varied from 14.3 per cent in Umbergam to 28.9 per cent in Sutrapada Bunder for mechanised group, from 22.8 per cent in Bhimpore to 36.2 per cent in Umbergam for non-mechanised group and from 41.2 per cent in Mangrol Bunder to 54.8 per cent in Umbergam for gear owners. It was observed that the ratio of net to gross fishery income declined as the capital investment in means of production increased though reverse trend was observed while comparing absolute amounts of net fishery income.

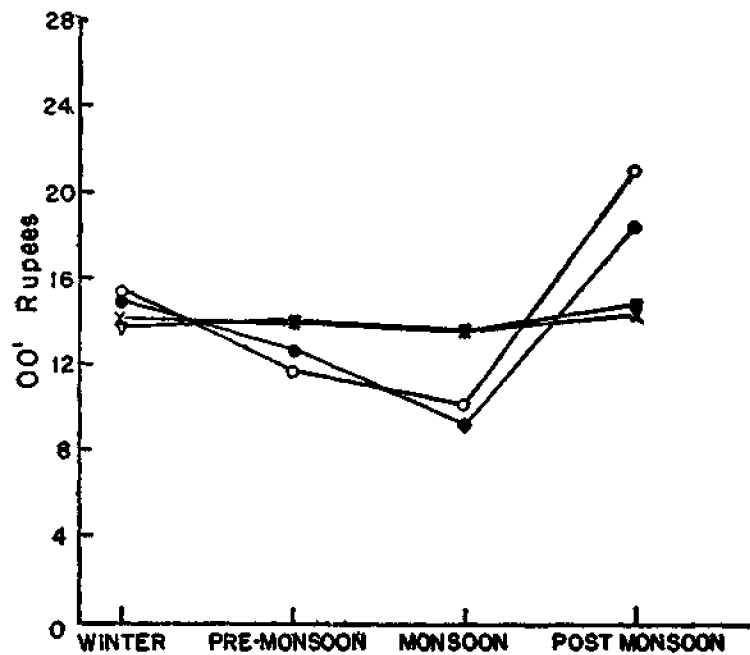


Fig. 7. Income and consumption for gear owners.
[for explanations see fig 5]

Analysis of variance showed that the difference in net fishery income was highly significant between the seasons and non-significant between villages for all the categories (Tables 24, 25, 26 & 27) The annual net fishery income showed significant difference between villages and between categories as well (Table 28).

Non-fishery income: In the fishing villages of Gujarat and Maharashtra majority of population were engaged in fishing or fishery allied activities. Besides, livestock & poultry keeping, farming and working in public or private organisations were main sources of non-fishery income. The percentage contribution of non-fishery occupations towards total income in Maharashtra and Gujarat is presented in table 34.

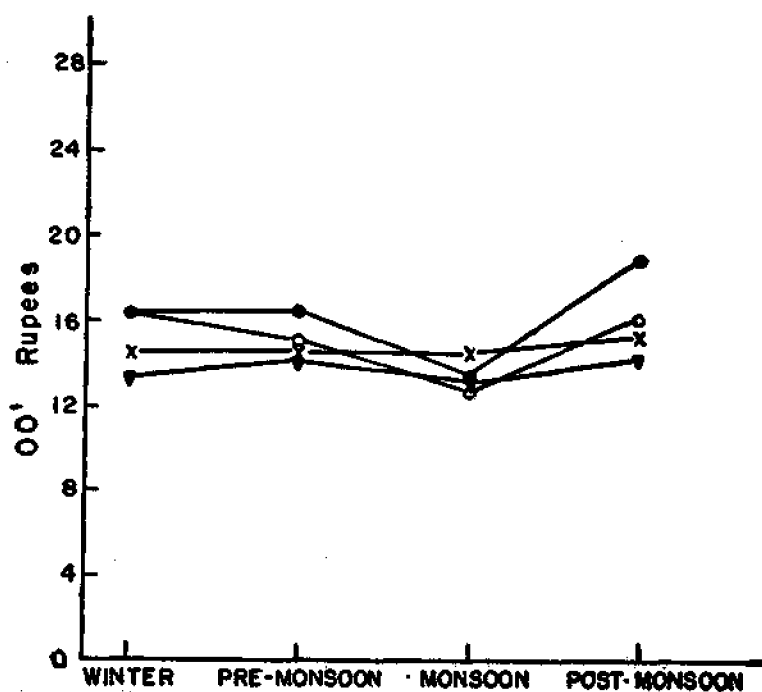


Fig. 8. Income and consumption for fishery allied group.
[for explanations see fig 5]

In Maharashtra villages (overall) share of non-fishery in total annual income ranged from 9 to 47 per cent for different categories. The percentage contribution of non-fishery income was comparatively more for fishery allied group in all the villages. For this category, percentage contribution of non-fishery towards total income was highest in Mahim Koliwada (53.1%) and lowest in Alibag Koliwada (38.8%). The percentage contribution of non-fishery income was lowest in the case of mechanised group (9-10 per cent) followed by non-mechanised group (23-27 per cent). For gear owners, the share of non-fishery in total income ranged from 26.7 per cent in Ekdara to 34.5 per cent in Mahim Koliwada.

In Gujarat, the share of non-fishery in total income was the lowest for the mechanised group (5-15 per cent) and the highest for fishery allied group (34-50 percent). The contribution of non-fishery occupations averaged 27.4 per cent towards total income for non-mechanised group. About one-fourth of income accrued from non-fishery occupations for gear owners.

Analysis of variance showed that the difference in non-fishery income was significant (Tables 29, 30, 31 & 32) between villages and non-significant between seasons for all the categories. Annual non-fishery income differed significantly between categories only (Table 33). Mean differences between fishery allied groups and all other groups individually were found significant (results not presented).

Total income: Annual income from all sources, in Maharashtra for mechanised group, non-mechanised group, gear owners and fishery allied group was Rs. 11,260, Rs. 6,117, Rs. 5,593 and Rs. 6,591 respectively (Table 34). For mechanised group the annual income was highest in Alibag Koliwada (Rs. 12,189) and the lowest in Ekdara (Rs. 10,352). For fishery allied group, the income per family was highest at Mahim Koliwada (Rs. 7,486) and lowest at Alibag Koliwada (Rs. 5,916). Except mechanised group there was not significant difference between the categories.

In Gujarat, annual income per family ranged from Rs. 9,515 to Rs. 17,218 for mechanised group, Rs. 6,400 to Rs. 8,587 for

non-mechanised group, Rs. 5,388 to Rs. 6,640 for gear owners and Rs. 5,377 to Rs. 6,830 for fishery allied group. Average income from all sources in Gujarat was maximum for mechanised group (Rs. 13,248) and minimum for gear owners (Rs. 5892).

Comparison between Gujarat and Maharashtra villages showed that except for fishery allied group, the average annual income was comparatively more for all the categories in Gujarat (Figure 10). Among all the categories, per capita income (Table 17) was highest for the mechanised group both in Maharashtra (Rs. 1,482) and Gujarat (Rs. 1,792). Lowest per capita income in Maharashtra was observed for gear owners (Rs. 736) and in Gujarat for fishery allied group (Rs. 790).

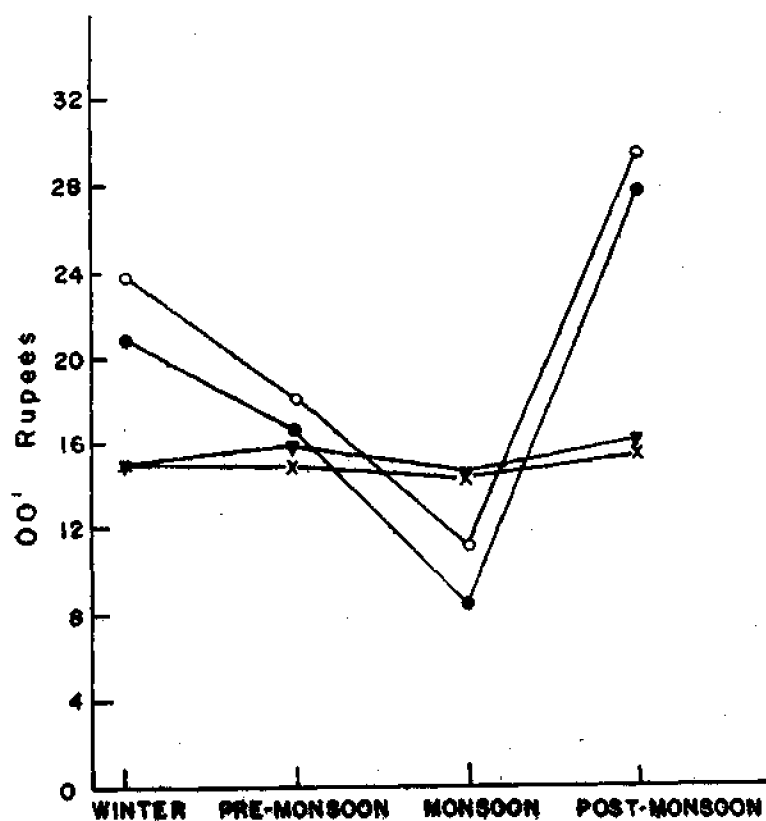


Fig. 9. Income and consumption for all categories (combined)
[for explanation see fig 5]

EXPENDITURE

Household expenditure: In table 35 and 36 are given the details of household expenditure for different categories in Maharashtra and Gujarat villages respectively. Expenditure was divided into 8 major items viz. expenditure on food, clothing (including foot wear), light & fuel, education, medical expenses, recreation & ceremonies, personal expenses (including tobacco, pan, bidi etc) and miscellaneous (including toilet items, conveyance, rent of house and service charges etc.)

Food expenditure was the major item in all Maharashtra villages for all the categories. Out of total annual expenditure for mechanised group, a minimum of 59.9 per cent in Mahim Koliwada and a maximum of 62.3 per cent in Ekdara were incurred on food. Average expenditure on food for non-mechanised group, gear owners and fishery allied group accounted for 58.0, 60.3 and 62.6 per cent of household expenditure respectively. Clothing shared about 6 percent of the expenditure for all the categories. Percentage expenditure incurred on light & fuel ranged from 5.6 for mechanised group at Mahim Koliwada to 7.0 for gear owners at Ekdara. The expenditure on education accounted the lowest (1-2 per cent) among all the items. Medical expenses accounted for 3-4 per cent of the household expenditure. Percentage expenditure on recreation & ceremonies ranged from 4.2 for fishery allied group at Mahim Koliwada to 8.7 for mechanised group at Ekdara. About 3 per cent of the expenditure was coming under personal expenses. The miscellaneous items accounted for about 13 per cent of the household expenditure for all the categories.

The household expenditure was comparatively more in Mahim Koliwada. For mechanised group, the expenditure was maximum in Mahim Koliwada (Rs. 6,825/annum) and minimum in Alibag Koliwada (Rs. 6,203/annum). Annual household expenditure ranged from Rs. 5,853 to Rs. 6,061 for non-mechanised group and Rs. 5,565 to Rs. 5,768 for gear owners. For fishery allied group, average household expenditure was found to be Rs. 5,976 per annum. Per day expenditure, for different categories, ranged from Rs. 15 to Rs. 19.

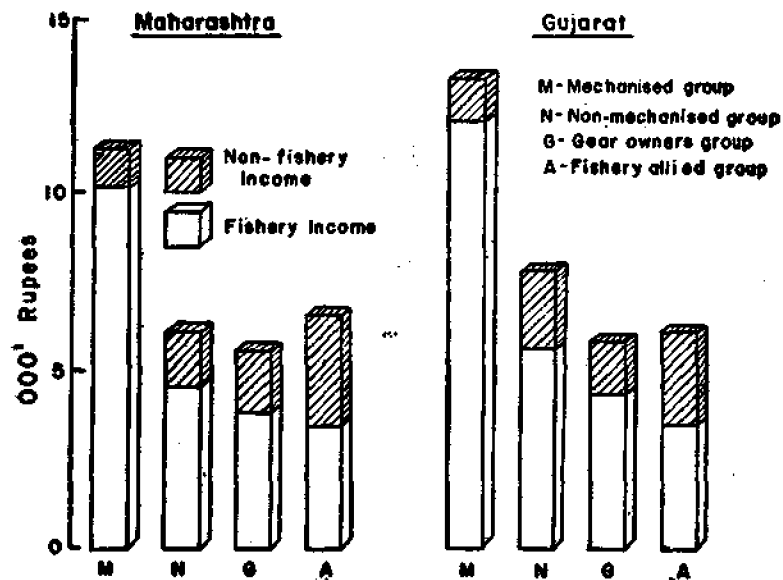


Fig. 10. Fishery and non-fishery income.

In Gujarat also, food was the major expenditure and for mechanised group, non-mechanised group, gear owners and fishery allied group it accounted for 57.7, 58.2, 63.5 and 62.5 per cent of the household expenditure respectively (Table 36). Of house hold expenditure, 5-6 per cent was incurred each on clothing and light & fuel and 1-2 per cent on education. Medical expenses ranged from 2.6 per cent for non-mechanised group at Umbergam to 4.6 per cent for OBM boat owners at Sutrapada Bunder. Recreation & ceremonies for mechanised group, non-mechanised group, gear owners and fishery allied group, overall formed about 11, 8, 6 and 7 per cent of the expenditure respectively. Personal expenses accounted for 3-4 per cent of the household expenditure.

Among the mechanised groups in Gujarat, maximum annual household expenditure for trawler owners (Rs. 7,918) and minimum for OBM boat owners (Rs. 6,461) were observed at Mangrol Bunder. For non-mechanised group, the expenditure

ranged from Rs. 5,967 at Sutrapada Bunder to Rs. 6,938 at Bhimpore. Overall average expenditure for gear owners and fishery allied group was calculated at Rs. 5,660 and Rs. 5,553 respectively. Per day household expenditure was minimum for fishery allied group at Sutrapada Bunder (Rs. 14 per family) and maximum for mechanised group at Umbergam and Mangrol (Rs. 22 per family).

Per capita annual consumption (Table 37) was comparatively more for mechanised group in both the states (Rs 852 and Rs. 978). Among all the categories, percentage consumption to the income was highest for gear owners (101% in Maharashtra & 96% in Gujarat) and lowest for mechanised group (58% in Maharashtra and 55% in Gujarat).

Significant difference in household expenditure was found between the villages for all the categories except gear owners and between the seasons for non-mechanised group and gear owners (Tables 38, 39, 40 & 41). Analysis indicated significant difference in annual household expenditure between categories (Table 42).

Investment: The fishery and non-fishery investment pattern for different categories in Maharashtra and Gujarat is presented in Figure 11. Fishery investment included the purchasing/replacement of boat, engine and nets whereas non-fishery investment included purchasing of animals, poultry birds, land, plot and house. In Maharashtra villages (Table 43) percentage share of fishery in total investment was maximum for mechanised group (90.1%) and minimum for non-mechanised group (64.0%). The annual investment for mechanised group, among Maharashtra villages, was maximum in Alibag Koliwada (Rs. 5,465) and minimum in Ekdara (Rs. 3,665). For non-mechanised group, gear owners and fishery allied group, average annual investment was Rs. 1,107, Rs. 798 and Rs. 360 respectively.

The fishery investment for different categories in Gujarat villages, accounted for 64-80 per cent of total investment. For mechanised group, the annual investment ranged from Rs. 2,756 to 8,616. Average annual investment for non-mechanised group,

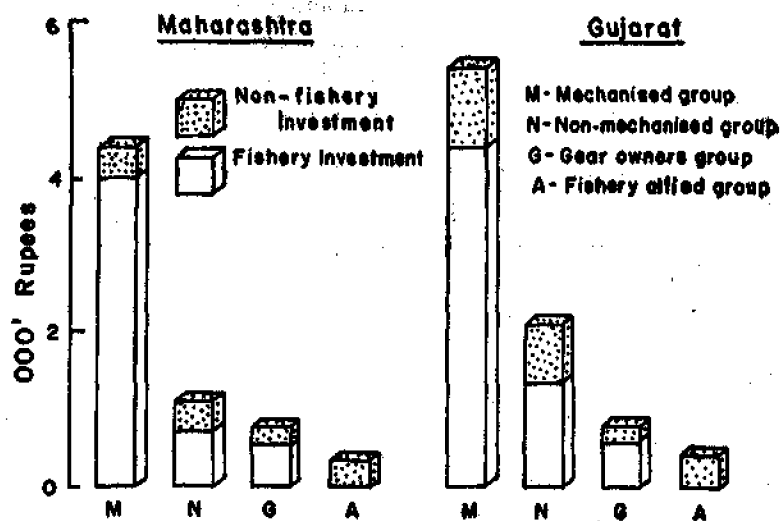


Fig. 11. Fishery and non-fishery investment.

gear owners and fishery allied group was Rs. 2,116, Rs. 827 and Rs. 425 respectively. Non-fishery investment was 20-36 per cent for boat/gear owners.

Analysis of variance (Tables 44, 45, 46 & 47) showed that difference in investment was not significant between villages for any category. Difference in investment between seasons was significant for gear owners and fishery allied group only. The difference in annual investment was significant between categories and non-significant between the villages (Table 48).

Aggregate expenditure: The break up of total expenditure into household expenditure and investment (fishery and non-fishery) was shown in table 34. Among all the categories in Maharashtra, total expenditure was maximum for mechanised group (Rs. 10,862) followed by non-mechanised group (Rs. 7,046). For gear owners and fishery allied group, the expenditure was Rs. 6,468 and Rs. 6,336 respectively. Percentage share of household in total expenditure was highest for fishery allied group (94.3%) followed by gear owners (87.6%) and lowest for mechanised group (59.6%). Overall fishery investment for the

mechanised group, non-mechanised and gear owners accounted for about 36, 10 and 9 per cent of the total expenditure respectively. Non-fishery investment for Maharashtra ranged from 3.3 to 5.7 per cent of the annual expenditure for different categories.

In Gujarat, maximum annual expenditure among the four categories was noted for mechanised group (Rs. 12,661) followed by non-mechanised group (Rs. 8,474). The annual expenditure ranged from Rs. 6,331 at Bhimpore to Rs 6,668 at Mangrol Bunder for gear owners and Rs. 5,399 at Sutrapada Bunder to Rs. 6,479 at Umbergam for fishery allied group. The household expenditure in Gujarat accounted for about 57, 75, 87 and 93 per cent of the total expenditure for mechanised group, non-mechanised group, gear owners and fishery allied group respectively. Of the total expenditure, fishery investment formed a minimum of 9.2 per cent for gear owners and a maximum of 34.6 per cent for mechanised group. Similarly, percentage share of non-fishery investment in total expenditure was maximum for non-mechanised group (9.0%) and minimum for gear owners (3.6%).

INDEBTEDNESS

In Maharashtra, fishermen co-operative societies are providing loan to the fishermen at reasonable rate of interest. Fishermen are also getting loan from State Fisheries Department. National Co-operative Development Corporation provides 80 percent of project cost to the state Fisheries Department as a loan with 20 percent subsidy. Remaining 20% of project cost is borne by the State Fisheries Department. The amount is paid to the fishermen, on the recommendations of fishermen co-operative society, for purchasing boat, engine and nets. The loan is to be repaid in 12 years with 12.5 per cent interest per annum. Generally, a group of 6 persons apply for N. C. D. C loan with the recommendations of fishermen co-operative society. In all, about 40 percent subsidy is given if the loan is repaid timely. Availing loan from banks and private agencies is also prevalent in most of the villages.



Fig. 12. OBM boats used for gillnet operation at Sutrapada Bunder.

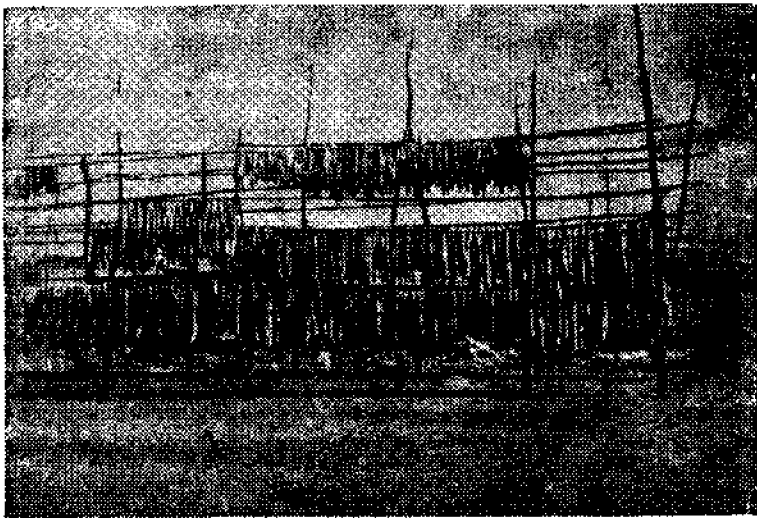


Fig. 13. Ribbonfish sundrying on wooden stands in Maharashtra.



Fig. 14. *Acetis* spp. and other small fishes sundrying.



Fig. 15. Bulk catch of pomfrets at Sstrapada Bunder

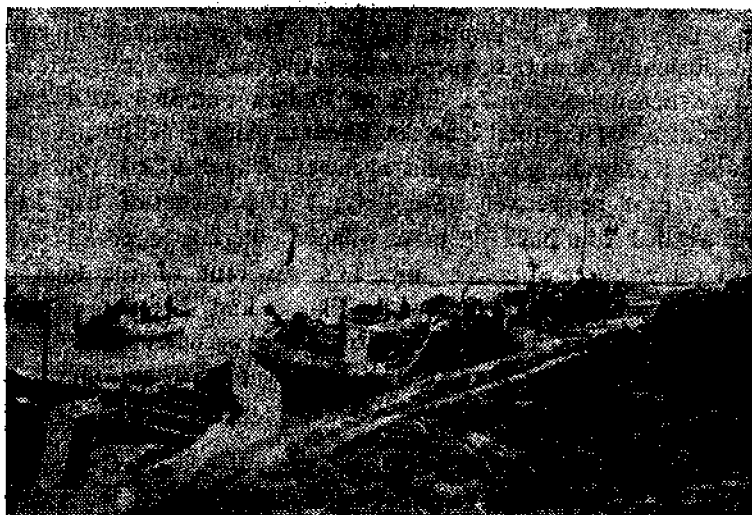


Fig. 16. Dolnetters

Table 49 shows that in Maharashtra villages 87-93 per cent of the families under mechanised group, 70-90 per cent under non-mechanised group, 60-87 per cent under gear owners and 40-70 per cent under fishery allied group availed loan from different agencies. Percentage of loan availing families was highest in Alibag Koliwada (84.0%) and lowest in Mahim Koliwada (61.5%). Loan per indebted families ranged from Rs. 3,389 at Mahim Koliwada, to Rs. 4,206 at Alibag Koliwada. Among all the categories, outstanding loan per indebted family was maximum for mechanised group (Rs. 6,203 - Rs. 9,159) followed by non-mechanised group (Rs. 3,005 - 4,130) and minimum for fishery allied group (Rs. 418 - 803).

The percentage of loan (amount) availed from fishermen co-operative societies by mechanised group ranged from 16.1 at Mahim Koliwada to 42.1 at Alibag Koliwada. No significant difference was observed in percentage of loan taken from the fishermen co-operative society between mechanised and non-mechanised group within the villages. Percentage of loan availed from the

societies by fishery allied group was lowest in Ekdara (9.5%) and highest in Alibag Koliwada (23.8%). The percentage of outstanding debt from fishermen co-operative societies accounted for 4.9 in Mahim Koliwada, 22.8 in Ekdara and 36.4 in Alibag-Koliwada. Of the total loan in Ekdara, Alibag Koliwada and Mahim Koliwada, government agencies provided 22.3, 19.6 and 4.3 per cent respectively. Similarly, 7-17 per cent of the loan was availed from banks in these villages. Private agencies were important source of credit since 83.4 per cent of the loan in Mahim Koliwada, 38.1 percent in Ekdara and 29.6 per cent in Alibag Koliwada was provided by these agencies. Fishermen co-operative society in Alibag Koliwada played an important role as a credit agency to fishermen.

Indebtedness position in the fishing villages of Gujrat is persented in Table 50. The indebted families ranged from 58.0 per cent in Bhimpore to 78.0 per cent in Umbergam. Except in Bhimpore, 80-90 per cent of the boat owners availed loan from different agencies. In Bhimpore all the indebted families (58%) were depending on private agencies. Among fishery allied group, the percentage of indebted families ranged from 53.3 in Mangrol Bunder to 80.0 in Umbergam. Overall outstanding loan per indebted family was highest in Mangrol Bunder (Rs. 5,827) and lowest at Bhimpore (Rs. 1,040). For mechanised group, minimum cash dues of Rs. 5,170 per indebted family was found in Sutrapada Bunder and maximum of Rs. 12,275 at Mangrol Bunder. In Gujarat villages the loan amounted Rs. 1,873-3,921 for non-mechanised group, Rs. 720-1675 for gear owners and Rs. 507-845 for fishery allied group.

In Bhimpore, the fishermen co-operative society was found defunct. In Sutrapada Bunder, the society was providing loan in the form of advances to the member fishermen, after taking advance money from GFCCA, on the condition that the catch should be sold to them. The loan was interest free and recovered by deducting about 30 per cent of value of catch per day. All the payments were settled monthly. About 18 per cent of loan availed by fishermen in these villages was provided by fishermen

co-operative society and maximum beneficiaries were OBM-boat owners (23.6% of loan). None of the fishermen availed loan from government agencies in Bhimpore and Sutrapada Bunder. The loan taken from government agencies was 10.7 per cent in Umbergam and 13.8 per cent in Mangrol Bunder. Except in Bhimpore, 17.24 per cent of loan was contributed by the banks. Private agencies had been the biggest source of finance in Gujarat villages (59-100 percent). The interesting point to note was that private traders were not charging interest on the loan but exploiting the fishermen by not giving proper price of the catch sold to them.

Analysis of variance showed that difference in indebtedness was significant between the categories and non-significant between the villages (Table 51).

INTER-RELATIONS AMONG INCOME, CONSUMPTION, INVESTMENT AND INDEBTEDNESS

Correlations between the factors—income, consumption, investment and indebtedness—tried by taking annual data separately for both the states were found significant. Regression lines were fitted for different combinations of the characters (Table 52). Regression of consumption on income showed that marginal propensity to consume was 0.12 in Maharashtra and 0.22 in Gujarat (equation 1). Equation 2 showed that about 91-97 per cent of variation in investment was explained by income. One rupee change in income changed the investment by Rs. 0.68 in both the states. Coefficient of determination in regression of indebtedness on income was 0.75 for Maharashtra and 0.93 for Gujarat whereas regression coefficient was 1.02 and 0.94 respectively (equation 3). Equation 4 showed that response of consumption to a unit change in indebtedness was more in Gujarat (0.22) than in Maharashtra (0.08).

Correlation between fishing expenditure and net fishery income was highly significant. About 92-97 per cent of the variation in fishery income was explained by fishing expenditure in these states. Equation 5 showed that one rupee change in

fishing expenditure was followed by Rs. 0.15 change in net fishery income in Maharashtra and Rs. 0.13 in Gujarat.

SUMMARY

A preliminary investigation was carried out in north-west coast of India to identify the sample villages for indepth study of marine fishermen economy. Three villages of Maharashtra namely Ekdara, Alibag Koliwada and Mahim Koliwada and four villages of Gujarat namely Umbergam, Bhimpore, Sutrapada Bunder and Mangrol Bunder were finally selected for this purpose. All the families were grouped into four categories viz, mechanised group, non-mechanised group, gear owners and fishery allied group and quarterly information pertaining to catch, income, consumption, employment and indebtedness was collected from sample families during 1983.

The study showed that mechanised boats varied from 22 feet to 40 feet in length fitted with 2-6 cylinder engines. Gillnets, bagnets and trawl nets were common gears operated by 3-4 persons on small boats and 7-9 persons on big boats. Bhimpore was completely non-mechanised village whereas Sutrapada Bunder had mostly dugout boats fitted with OBM. Mangrol Bunder had mostly trawlers and OBM boats and remaining villages both mechanised and non-mechanised boats. Post-monsoon was good fishing season whereas lean fishing was observed during monsoon season at all the centres, with an exception of substantial *Hisa* landing at Bhimpore.

Activities of fishermen co-operative societies were comparatively better in Maharashtra. The societies were playing important role in marketing of catch at Alibag Koliwada, Ekdara and Sutrapada Bunder. In remaining villages catch was directly sold to private fish traders.

Most of the people were lacking even basic education in all the villages except Mahim Koliwada. Among literates, majority were having only primary education. Education level in females was comparatively low in both the states. Mechanisation level did not seem to be related with literacy in these villages.

Family size was 7-8 in the selected villages. As much as 49-59 per cent of the people were earners. In both the states, percentage of population having non-fishery as main occupation was comparatively more among the families engaged in fishery related activities.

The number of annual fishing days ranged from 200 to 244 for different categories. Number of fishing days were comparatively more at Bhimpore and less at Alibag Koliwada. As much as 34-41 per cent of annual catch in Maharashtra and 35-42 per cent in Gujarat was contributed by post-monsoon season. Gross fishery income was maximum for mechanised group which ranged from Rs. 57,768 to Rs. 61,784 in Maharashtra and from Rs. 35,342 to Rs. 1,09,974 in Gujarat. The fishery income among all the villages for non-mechanised group was maximum at Bhimpore (Rs. 25,176) and minimum at Sutrapada Bunder (Rs. 15,256). Significant difference in catch share was observed between villages as well as between seasons both for boat and gear owners. Annual catch share showed significant difference between categories and non-significant difference between villages. Difference in number of fishing days between seasons was also significant for these categories. Difference in annual fishing days was significant neither between villages nor between categories.

The crew wages formed 60-75 per cent of annual fishing expenditure in Maharashtra and 45-78 per cent in Gujarat. System of engaging labour for crew on contract basis was common in these villages. Some villages had both systems of labour payment, i.e. payment in cash and share in catch. For mechanised group fuel was the second biggest expenditure accounting for 23.8 per cent in Maharashtra and 39.0 per cent in Gujarat. Annual fishing expenditure for mechanised group formed about 3 times that of non-mechanised group and 8 times that of gear owners in Maharashtra and 4 and 11 times respectively in Gujarat. About one-third of the annual fishing expenditure in both the states was incurred during post-monsoon season. About 12-14 per cent of expenditure in Maharashtra and 12-18 per cent in Gujarat was incurred during post-monsoon season. Significant difference was

observed in fishing expenditure between villages and between seasons for all the categories. Annual fishing expenditure showed significant difference between categories only.

The net fishery income, among all the categories, was maximum for mechanised group, averaging Rs. 10,199 in Maharashtra and Rs. 12,042 in Gujarat. For different categories, net fishery income per operating day ranged from Rs. 10 to Rs. 47 in Maharashtra and Rs. 10 to Rs. 57 in Gujarat. Average income for all the categories was comparatively more in Gujarat. An interesting feature to note about net fishery income in both the states was higher the capital-intensive means of production, lower the ratio of net to gross fishery income. Difference in net fishery income was found significant between the seasons for all the categories. Annual net fishery income showed significant difference between the villages and between the categories as well.

Share of non-fishery in total income was lowest for mechanised group (about 9 per cent) and highest for fishery allied group (43-47 per cent) in these states. Analysis of variance showed that difference in non-fishery income was significant between villages and non-significant between the seasons for all the categories whereas annual non-fishery income was significant between categories only.

Annual income from all sources among all the categories was highest for mechanised group both in Maharashtra (Rs. 11,260 per family) and Gujarat (Rs. 13,248 per family). Most poor among the four categories were gear owners with the annual earning of Rs. 5,600-5,900 per family. The per capita income ranged from Rs. 736 to Rs. 1,482 in Maharashtra and Rs. 790 to Rs. 1,790 in Gujarat.

The household expenditure for different categories ranged from Rs. 5,700 to 6,500 in Maharashtra and Rs. 5,600 to Rs. 7,200 in Gujarat. The household expenditure per day for different categories was calculated at Rs. 16-18 in Maharashtra and Rs. 15-20 in Gujarat. Food was the major item contributing 57-64 per cent of household expenditure in these states. The education shared the lowest of 1-2 per cent of the expenditure. The household expenditure was directly related to income.

Annual household expenditure showed significant difference between categories only. Significant difference in household expenditure was observed between seasons for non-mechanised group and gear owners and between villages for all the categories except gear owners.

Total annual investment for different categories ranged from Rs. 360 for fishery allied group to Rs. 4,383 for mechanised group in Maharashtra and Rs. 425 to Rs. 5,424 for respective categories in Gujarat. Majority of the investment (64-90 per cent) was made on fishing implements by boat/gear owners. Significant difference in annual investment was observed between categories and not between villages. The sum of household expenditure and investment for different categories ranged from Rs. 6,336 to Rs. 10,862 in Maharashtra and Rs. 5,978 to Rs. 12,661 in Gujarat.

About 62-84 per cent of families in Maharashtra and 58-78 per cent in Gujarat were under debt. Private agencies including fish traders and money lenders provided 30-83 per cent of the loan in Maharashtra and 59-100 per cent in Gujarat. Supply of credit through fishermen co-operative societies was found unsatisfactory in Gujarat. The flow of funds from the institutional credit agencies into the fisheries sector was not found encouraging. The outstanding loan per indebted family ranged from Rs. 3,389 to Rs. 4,206 in Maharashtra and Rs. 1,040 to Rs. 5,827 in Gujarat. Significant difference in indebtedness was found between categories only.

Correlations between factors viz. income, consumption investment and indebtedness were found significant. The regression of consumption on income showed that marginal propensity to consume was 0.12 in Maharashtra and 0.22 in Gujarat. One rupee change in income changed the investment by Rs. 0.68 and indebtedness by Rs. 0.94 - 1.02 in these states. One rupee change in indebtedness brought a change of Rs. 0.08 - 0.22 in consumption. About 92-97 per cent variation in net fishery income was explained by fishing expenditure. Marginal net returns of fishing expenditure was Rs. 0.15 in Maharashtra and Rs. 0.13 in Gujarat, showing further scope of additional fishing expenditure.

HIGHLIGHTS OF THE STUDY

1. Illiteracy was high in all the villages (48-75 per cent). Among literates, majority of people were having only primary education.
2. Size of family varied from 7 to 8.
3. Earning members in different categories were 40-59 per cent.
4. Number of annual fishing days ranged from 200 to 244.
5. Annual fishing expenditure was Rs. 50,000-56,000 for mechanised group, Rs. 13,000-14,000 for non-mechanised group and Rs. 5,000 - 6000 for gear owners. Quarterly fishing expenditure and income were highest in post-monsoon and lowest in monsoon season.
6. Average annual net fishery income for mechanised group, non-mechanised group, gear owners and fishery allied group was about Rs. 10,000, Rs. 4,500, Rs. 3,800 and Rs. 3,500 respectively in Maharashtra and Rs. 12,000, Rs. 5,600 Rs. 4,400 and Rs. 3,500 respectively in Gujarat. Significant difference in the annual income was observed between categories and between villages.
7. For different categories, 53-91 per cent of the total income in Maharashtra and 57-91 percent in Gujarat were obtained from actual fishery.
8. The percentage of total income spent on household items ranged from 60 to 94 in Maharashtra and 57 to 93 in Gujarat.
9. Of total number of families in different categories, 62-84 per cent were indebted in Maharashtra and 58-78 percent in Gujarat. Average outstanding loan per family was about Rs. 4,000 in Maharashtra and Rs. 3,000 in Gujarat.
10. One rupee increase in fishing expenditure was responsible for Rs. 0.15 and Rs. 0.13 increase in net fishery income in Maharashtra and Gujarat respectively.

POLICY IMPLICATIONS

1. The infrastructural facilities like jetty, link roads, ice and cold storages, transport and drying/curing yards were found

meagre in most of the fish landing centres. Besides providing the basic amenities like link roads, transport, sanitation and jetty at all centres, the other requirements including cold storage, drying/curing yards, marketing yards, fish-meal plants and processing plants can be thought of at least for cluster of villages at a central place having easy accessibility.

2. It is observed that the fishermen co-operative societies are playing a good role in both the states. Though co-operative movement in fisheries sector is not much successful in Gujarat, the Gujarat Fisheries Central Co-operative Association is doing good service by supplying fishing requisites to fishermen and doing marketing in some villages. However, the role of supplying credit by the co-operative societies is found negligible. Hence the revitalisation of co-operative movement and supply of credit to fishermen on easy terms is the need of the day.

3. The fishermen are not getting remunerative prices for their catch owing to the involvement of middlemen who advance money and do marketing catches. Both during gluts and scarcity period the middlemen are exploiting the fishermen and taking maximum advantage. Hence, fixation of the support price, at least for the commercially important fishes and involvement of the co-operatives and other appropriate agencies in the field of marketing will help the fishermen in a big way.

4. The income of mechanised fishermen was higher than that of traditional sector. And so the public agencies like Agriculture Refinance Development Corporation, Fisheries Co-operative Banks, Commercial Banks, NCDC and GFCCA can channelise their funds through the primary co-operatives to accelerate the tempo of mechanisation.

5. In view of the prevalent marketing system, both of Gujarat and Maharashtra, the realisation of sale proceeds is considerably delayed, causing considerable hardship to fishermen. Hence it is highly imperative that fishermen be provided loan for working capital and for maintenance of engines, craft and tackles, in addition to the finance being provided for procurement of craft and gear.

6. In some of the villages, the fish stock in the creeks get completely depleted owing to the increasing influx of chemical effluents from the factories, plants and mills that have sprung up in and around the fishing villages. The pollution in the creek region has been posing a grave problem for the fishermen who mainly depend upon creek fishing for their livelihood. In view of this, it is highly necessary that the concerned authorities take immediate remedial measures to prevent this menace to preserve the scarce and valuable resources. It is also noticed that the construction of dams at Ukai and Kankarapara on the upper reaches of the Tapti river (Surat district) has adversely affected anadromous *Hilsa* fishery at Bhimpore and nearby centres. The provisions of 'fish slopes' can be made in the dam to overcome this problem.

7. In view of the high illiteracy among fishermen and the poor communication facilities in fishing villages, it is of paramount importance that extension work pertaining to availability of fishery resources, introduction of modern fishing techniques, market information and export marketability of non-traditional items of marine products be taken up.

8. Fishermen are generally unemployed and are not able to meet even their household expenditure during lean season. Hence, local resource-based development schemes need to be formulated to provide supplementary occupations to the fishermen. As for example they may be provided with low-lying fallow lands adjoining to sea wherever possible, and the technical knowhow and financial support for aquacultural practices.

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PREFACE

The socio-economic improvement of fishermen is the ultimate objective of all fishery development schemes. Coastal fishing villages in general are still backward, and the only scope for their income generation is through fishing and related activities. Expansion of mechanization programmes including motorisation of country crafts, has to some extent eased the hardships and improved the living conditions of fishermen. While the investments in marine fishery sector have considerably increased, the credit demands are partly taken care of by Institutional financing. About 25 lakhs of marine fishermen live in about 2500 fishing villages spread along the country's coastline. The socio-economic status of these fishermen, ownership of craft/gear and methods of fishing differ from region to region, warranting location-oriented and resource based developmental schemes. For proper planning and implementation of programmes detailed information on social, economic, technological, financial and infrastructural facilities in fishing villages is imperative. The Central Marine Fisheries Research Institute has plans for conducting a number of investigations in this regard.

The present study is confined to the states of Maharashtra and Gujarat, covering 7 representative marine fishing villages, with the main objective of gathering a comprehensive information on the income and employment status of fishermen and the credit facilities available to them. The role of different agencies, including National Co-operative Development Corporation, co-operative societies, State Fisheries Departments and commercial banks, in financing fishermen of these villages is dealt with in detail. The annual fishing days, gross and net fishery income, fishing expenditure, crew wages, household expenditure and

indebtedness are also discussed. The need for development of infrastructural facilities, revitalization of co-operative movement, fixation of support price, measures to reduce pollution problems and provision for supplementary occupation during the lean season for fishermen are highlighted.

I greatly appreciate the efforts made by Mr. D. B. S, Sehara Mr. R. Sathiadas and Mr. J. P. Karbhari in carrying out this study and in bringing out this report. It is hoped this report will be of much use to the agencies involved in fisheries development along the north west coast of the country.

P. S. B. R. James
Director.
Central Marine Fisheries
Research Institute.

Table 1. Sample size of fishermen families in the villages of Maharashtra and Gujarat

Village Category	Number of families	
	Total	Selected
MAHARASHTRA		
<i>Ekdara</i>		
Mechanised group	41	15
Non-mech. group	13	10
Gear owners	68	15
Fishery allied group	18	10
Total	140	50
<i>Alibag Koliwada</i>		
Mechanised group	87	15
Non-mech. group	22	10
Gear owners	73	15
Fishery allied group	84	10
Total	266	50
<i>Mahim Koliwada</i>		
Mechanised group	58	15
Non-mech. group	28	10
Gear owners	44	15
Fishery allied group	373	25
Total	503	65
GUJARAT		
<i>Umbergam</i>		
Mechanised group	76	15
Non-mech. group	42	10
Gear owners	72	15
Fishery allied group	90	10
Total	280	50

<i>Bhimpore</i>		
Non-mechanised group	35	15
Gear owners	153	20
Fishery allied group	49	15
Total	237	50
<i>Sutrapada Bunder</i>		
OBM-boat owners	132	20
Non-mech. group	24	10
Gear owners	25	10
Fishery allied group	91	10
Total	272	50
<i>Mangrol Bunder</i>		
Trawler owners	171	20
OBM-boat owners	102	15
Gear owners	215	20
Fishery allied group	145	15
Total	633	70

Table 2. Literacy in the fishing villages of Maharashtra and Gujarat

Village Category	Percentage Population				
	Primary	Middle Secondary	Higher Secondary & above	Graduate	Illi-terate
MAHARASHTRA					
<i>Ekdara</i>					
Mechanised group	24.7	6.7	4.2	0.9	63.5
Non-mech. group	26.7	7.4	1.2	1.2	63.5
Gear owners	28.7	9.1	1.7	-	60.5
Fishery allied group	37.7	-	-	-	60.1
Overall	29.4	6.2	2.0	0.5	61.9
<i>Alibag Koliwada</i>					
Mechanised group	25.2	6.8	4.3	1.7	62.5
Non-mech. group	26.9	6.5	5.2	-	61.4
Gear owners	21.6	5.1	2.5	-	70.8
Fishery allied group	27.6	7.1	3.5	-	61.8
Overall	25.0	6.3	3.8	0.5	64.4

<i>Mahim Koltwada</i>					
Mechanised group	29.3	15.2	6.7	2.9	45.9
Non-mech. group	26.9	7.2	5.8	1.5	58.6
Gear owners	30.6	7.7	4.8	1.9	55.0
Fishery allied group	33.2	10.6	12.4	2.9	40.9
Overall	30.7	10.5	8.2	2.5	48.1

GUJARAT

Umbergam

Mechanised group	27.0	10.0	9.1	6.4	47.5
Non-mech. group	25.4	12.2	6.8	1.3	54.3
Gear owners	31.5	10.3	3.4	0.9	53.9
Fishery allied group	29.0	6.7	4.0	5.3	55.0
Overall	28.4	9.9	5.9	3.5	52.3

Bhimpore

Non-mechanised group	33.7	5.5	6.4	1.8	52.6
Gear owners	34.9	10.0	5.7	1.4	48.0
Fishery allied group	29.2	10.4	5.2	0.9	54.3
Overall	32.7	8.8	5.8	1.4	51.3

Sutrapada Bunder

OBM-boat owners	22.2	4.1	2.7	0.7	70.3
Non-mech. group	24.5	3.7	1.3	-	70.5
Gear owners	19.4	3.9	1.3	-	75.4
Fishery allied group	25.1	5.1	1.3	1.3	67.1
Overall	22.7	4.2	1.9	0.5	70.7

Mangrol Bunder

Trawler owners	20.3	6.2	2.7	0.7	70.1
OBM-Boat owners	17.8	3.5	0.9	-	77.8
Gear owners	16.7	2.1	0.7	-	80.5
Fishery allied group	21.2	5.0	1.7	0.8	71.3
Overall	19.0	4.2	1.5	0.4	74.9

Table 3 Literacy (sex-wise) in the villages of Maharashtra & Gujarat.

Village Category	Education (%)				
	Primary	Middle	Higher Secondary	Graduate & above	Nil
MAHARASHTRA					
<i>Ekdara</i>					
Adult males	33.3	13.3	5.9	1.7	45.8
Adult females	24.2	7.5	0.8	-	67.5
Children	28.8	-	-	-	71.2
Overall	29.4	6.2	2.0	0.5	61.9
<i>Alibag Koliwada</i>					
Adult males	28.5	16.0	10.1	1.7	43.7
Adult females	15.4	5.1	2.6	-	76.9
Children	27.7	-	-	-	72.3
Overall	25.0	6.3	3.8	0.5	64.4
<i>Mahim Koliwada</i>					
Adult males	32.1	18.6	16.4	5.0	27.9
Adult females	25.0	15.5	10.3	2.9	46.3
Children	32.1	-	-	-	67.9
Overall	30.7	10.5	8.2	2.5	48.1
GUJARAT					
<i>Umbergam</i>					
Adult males	33.0	15.7	11.3	7.8	32.2
Adult females	23.0	16.8	8.0	3.5	48.7
Children	27.7	-	-	-	72.3
Overall	28.4	9.9	5.9	3.5	52.3
<i>Bhimpote</i>					
Adult males	39.3	17.9	13.4	3.5	25.9
Adult females	25.4	10.9	5.5	0.9	57.3
Children	31.9	-	-	-	68.1
Overall	32.7	8.8	5.8	1.4	51.3

Sutrapada Bunder

Adult males	28.8	9.3	5.9	1.7	54.3
Adult females	13.6	4.2	-	-	82.2
Children	24.1	-	-	-	75.9
Overall	22.7	4.2	1.9	0.5	70.7

Mangrol Bunder

Adult males	24.9	7.3	3.0	1.2	63.6
Adult females	10.6	6.2	1.9	-	81.3
Children	19.9	-	-	-	80.1
Overall	19.0	4.2	1.5	0.4	74.9

Table 4 *Size of family and occupation particulars (categorywise)*

village Category	Family size	Percentage population		
		Fishery main occupation	Non-fishery main occupation	Non earning

MAHARASHTRA*Ekdara*

Mechanised group	7.9	51.3	5.0	43.7
Non-mech. group	8.1	51.9	7.4	40.7
Gear owners	8.0	49.2	5.0	45.8
Fishery allied group	8.4	45.2	6.0	48.8
Overall	8.1	49.5	5.7	44.8

Alibag Koliwada

Mechanised group	7.8	45.3	10.3	44.4
Non- mech. group	7.7	45.4	9.1	45.5
Gear owners	7.9	43.2	8.5	48.3
Fishery allied group	8.5	37.6	15.3	47.1
Overall	7.9	43.1	10.6	46.3

Mahim Koliwada

Mechanised group	7.0	42.8	12.4	44.8
Non-mech. group	6.9	44.9	13.0	42.1
Gear owners	6.9	46.2	9.6	44.2
Fishery allied group	6.8	28.2	27.1	44.7
Overall	6.9	38.4	17.4	44.2

GUJARAT

Umbergam

Mechanised group	7.3	40.0	8.2	51.8
Non-mech. group	7.4	41.9	9.5	48.6
Gear owners	7.7	40.5	11.2	48.3
Fishery allied group	7.5	34.7	21.3	44.0
Overall	7.5	39.5	12.0	48.5

Bhimpore

Non-mech. group	7.3	36.7	14.7	48.6
Gear owners	7.0	34.3	18.6	47.1
Fishery allied group	7.7	30.4	27.8	41.8
Overall	7.3	33.8	20.3	45.9

Sutrapada Bunder

OBM-boat owners	7.4	54.4	2.7	42.9
Non-mech. group	8.0	50.0	2.5	47.5
Gear owners	7.6	48.7	6.6	44.7
Fishery allied group	7.8	42.3	9.0	48.7
Overall	7.6	49.9	4.7	45.4

Mangrol Bunder

Trawler owners	7.3	34.2	5.5	60.3
OBM-boat owners	7.7	46.1	3.5	50.4
Gear owners	7.1	52.8	2.8	44.4
Fishery allied group	8.0	44.2	8.3	47.5
Overall	7.5	44.2	5.0	50.8

Table 5 Occupation particulars sexwise

Village Category	Percentage of persons		
	Fishery main occupation	Non-fishery main occupation	Non-earning
MAHARASHTRA			
<i>Ekdara</i>			
Adult males	75.0	10.0	15.0
Adult females	60.0	3.3	36.7
Children	23.1	4.3	72.6
Overall	49.5	5.7	44.8
<i>Alibag Koliwada</i>			
Adult males	66.4	18.6	15.1
Adult females	50.4	6.0	43.6
Children	20.5	8.1	71.4
Overall	43.1	10.6	46.3
<i>Mahim Koliwada</i>			
Adult males	52.9	32.9	14.2
Adult females	46.3	15.5	38.2
Children	20.4	6.4	73.2
Overall	38.4	17.4	44.2
GUJARAT			
<i>Umbergam</i>			
Adult males	60.0	24.4	15.6
Adult females	45.1	8.0	46.9
Children	19.0	5.4	75.6
Overall	39.5	12.0	48.5
<i>Bhimpore</i>			
Adult males	49.1	36.9	14.3
Adult females	40.9	9.1	50.0
Children	16.2	16.2	67.6
Overall	33.8	20.3	45.9

Sutrapada Bunder

Adult males	71.2	11.9	16.9
Adult females	59.3	0.8	39.9
Children	24.8	2.1	73.1
Overall	49.9	4.7	45.4

Mangrol Bunder

Adult males	69.7	13.3	17.0
Adult females	46.6	3.2	52.2
Children	20.8	1.0	78.2
Overall	44.2	5.0	50.8

Table 6 *Fishing days, catch share and gross fishery income per family in the villages of Maharashtra (1983)*

Village	Jan- Mar.	April- June	July- Sept.	Oct.- Dec.	Total	Av. per operating day
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Ekdara

I. Mechanised group:

a) No. of fishing days	70	56	29	70	225	
b) Catch share (kg)	8498	6154	2801	10059	27512	122
	(30.9)	(22.4)	(10.2)	(36.5)		
c) Gross fishery income (Rs)	17452	14984	5893	19439	57768	257
	(30.2)	(25.9)	(10.2)	(33.7)		

II. Non-mech. group:

a) No. of fishing days	68	55	39	69	222	
b) Catch share (kg)	2829	1782	1095	3572	9278	42
	(30.5)	(19.2)	(11.8)	(38.5)		
c) Gross fishery income (Rs)	5874	4121	2251	6754	19000	86
	(30.9)	(21.8)	(11.8)	(35.5)		

III. Gear owners

a) No. of fishing days	64	53	30	66	213	
b) Catch share (kg)	1582	1057	797	2102	5538	26
	(28.6)	(19.1)	(14.4)	(37.9)		
c) Gross fishery income (Rs)	2868	2246	1524	3942	10580	50
	(27.1)	(21.2)	(14.4)	(37.3)		

Alibag Koliwada

I. Mechanised group:						
a) No. of fishing days	64	57	20	67	208	
b) Catch share (kg)	11133	7712	3191	14025	36061	173
	(30.9)	(22.4)	(8.8)	(38.9)		
c) Gross fishery income (Rs)	18944	14915	5715	21076	60650	292
	(31.2)	(24.6)	(9.4)	(34.8)		
II. Non mech. group:						
a) No. of fishing days	65	50	18	67	200	
b) Catch share (kg)	3861	2269	1049	4872	12051	60
	(32.0)	(18.8)	(8.8)	(40.4)		
c) Gross fishery income (Rs.)	6344	4096	1790	7270	19500	98
	(32.5)	(21.0)	(9.2)	(37.3)		
III. Gear owners						
a) No. of fishing days	64	52	18	66	200	
b) Catch share (kg)	1458	1048	451	2019	4976	25
	(29.3)	(21.0)	(9.1)	(40.6)		
c) Gross fishery income (Rs)	2941	2250	851	3736	9778	49
	(30.1)	(23.0)	(8.7)	(38.2)		

Mahim Koliwada

I. Mechanised group						
a) No of fishing days	67	56	30	69	222	
b) Catch share (kg)	6515	4497	2169	7148	20329	92
	(32.0)	(22.1)	(10.7)	(35.2)		
c) Gross fishery income (Rs)	18734	15162	7312	20576	61784	278
	(30.3)	(24.6)	(11.8)	(33.3)		
II. Non-mech. group:						
a) N. of fishing days	70	59	34	70	233	
b) Catch share (kg)	1894	1322	769	2182	6167	26
	(30.7)	(21.4)	(12.5)	(35.4)		
c) Gross fishery income (Rs)	5759	4651	2653	6645	19707	84
	(29.2)	(23.6)	(13.5)	(33.7)		
III. Gear owners						
a) No. of fishing days	67	50	40	69	226	
b) Catch share (kg)	804	561	427	933	2725	12
	(29.5)	(20.6)	(15.7)	(34.2)		
c) Gross fishery income (Rs)	2479	1982	1511	3075	9047	40
	(27.4)	(21.9)	(16.7)	(34.0)		

Note: Figures in the parantheses show the percentages of catch (quantity and value) in each quarter.

Table 7 *Fishing days, catch share and gross fishery income per family in the villages of Gujarat (1983)*

Village/ Category	Jan- Mar.	Apr- June.	July- Sept.	Oct- Dec.	Total	Av. per operating day
Umbergam						
I. Mechanised group:						
a) No. of fishing days	63	53	23	65	204	
b) Catch share (kg)	7342 (30.7)	4857 (20.3)	1792 (7.5)	9939 (41.5)	23930	117
c) Gross fishery income (Rs)	27521 (30.7)	21785 (24.4)	8508 (9.5)	31640 (35.4)	89454	438
II. Non-mech. group:						
a) No. of fishing days	69	56	31	70	226	
b) Catch share (kg)	2132 (31.6)	1283 (19.0)	746 (11.0)	2592 (38.4)	6753	30
c) Gross fishery income (Rs)	5361 (30.2)	3930 (22.3)	1533 (8.6)	6896 (38.9)	17720	78
III. Gear owners:						
a) No. of fishing days	65	56	42	69	232	
b) Catch share (kg)	919 (27.7)	655 (19.7)	429 (12.9)	1318 (39.7)	3321	14
c) Gross fishery income (Rs)	2407 (26.8)	1842 (20.5)	1268 (14.2)	3452 (38.5)	8969	39
Bhimipore						
I. Non-mechanised group:						
a) No. of fishing days	67	59	51	67	244	
b) Catch share (kg)	2701 (25.8)	2086 (19.9)	1873 (17.9)	3812 (36.4)	10472	43
c) Gross fishery income (Rs)	7044 (28.0)	5412 (21.5)	4310 (17.1)	8410 (33.4)	25176	103
II. Gear owners:						
a) No. of fishing days	65	54	55	67	241	
b) Catch share (kg)	1376 (27.3)	974 (19.3)	926 (18.4)	1767 (35.0)	5043	21
c) Gross fishery income (Rs)	2529 (26.0)	1488 (15.3)	1949 (20.1)	3744 (38.6)	9710	40

Sutrapada Bunder

I. OBM-boat owners:

a) No. of fishing days	66	52	30	67	215	
b) Catch share (kg)	4019	2933	1373	4489	12814	60
	(31.4)	(22.9)	(10.7)	(35.0)		
c) Gross fishery income (Rs)	10494	8771	4322	11755	35342	164
	(29.7)	(24.8)	(12.2)	(33.3)		

II. Non-mech. group:

a) No. of fishing days	69	51	31	69	220	
b) Catch share (kg)	1626	1030	797	2029	5482	25
	(29.7)	(18.8)	(14.5)	(37.0)		
c) Gross fishery income (Rs)	4250	3386	2269	3351	15256	69
	(27.8)	(22.2)	(14.9)	(35.1)		

III. Gear owners:

a) No. of fishing days	67	51	35	68	221	
b) Catch share (kg)	811	535	480	1034	2860	13
	(28.4)	(18.7)	(16.8)	(36.1)		
c) Gross fishery income (Rs)	2008	1667	1193	2625	7493	34
	(26.8)	(22.3)	(15.9)	(35.0)		

Mangrol Bunder

I. Trawler owners:

a) No. of fishing days	64	50	27	64	205	
b) Catch share (kg)	9414	6435	2889	10387	29125	142
	(32.3)	(22.1)	(9.9)	(35.7)		
c) Gross fishery income (Rs)	34310	27373	13635	34656	109974	536
	(31.2)	(24.9)	(12.4)	(31.5)		

II. OBM-boat owners:

a) No. of fishing days	70	56	30	69	225	
b) Catch share (kg)	3451	2480	1173	4401	11505	51
	[30.0]	[21.6]	[10.7]	[38.2]		
c) Gross fishery income (Rs)	10365	9933	4247	11192	35737	159
	(29.0)	(27.8)	(11.9)	(31.3)		

III. Gear owners:

a) No. of fishing days	67	51	28	70	216	
b) Catch share (kg)	1176	739	563	1708	4186	19
	(28.1)	(17.7)	(13.4)	(40.8)		
c) Gross fishery income (Rs)	3268	2263	1599	4144	11274	52
	(29.0)	(20.1)	(14.2)	(36.7)		

Note:- Figures in the parentheses show the percentages of catch (quantity and value) in each quarter.

Table 8. Analysis of variance of catch share for mechanised group

Source	Degree of freedom	Mean sum of squares	F- value
Village	5	15423003.97	11.40 **
Season	3	49627805.30	36.69 **
Error	15	1352529.98	

* Significant at 5% level.

** Significant at 1% level.

ns. Non-significant.

Table 9. Analysis of variance of catch share for non-mechanised group

Source	d. f	M S S	F - value
Village	5	1730482.39	9.17 **
Season	3	5278366.00	27.98 **
Error	15	188630.22	

Table 10. Analysis of variance of catch share for gear owners

Source	d. f	M. S. S.	F - value
Village	6	323622.03	11.08 **
Season	3	1278015.44	43.74 **
Error	18	29217.17	

Table 11. Analysis of variance of annual catch share

Source	d. f	M. S. S	F - value
Village	4	50195784.69	3.05 n. s
Category	2	573568673.60	34.90 **
Error	8	16434841.45	

Table 12. Analysis of variance of fishing days for mechanised group

Source	d. f.	M. S.S.	F - value
Village	5	15.90	3.20 *
Season	3	2147.32	431.82 **
Error	15	4.97	

Table 13. Analysis of variance of fishing days for non-mechanised group

Source	d f	M. S. S	F - value
Village	5	52.99	1.89 ns.
Season	3	1702.05	60.60 **
Error	15	28.08	

Table 14. Analysis of variance of fishing days for gear owners

Source	d. f	M. S. S.	F - value
Village	6	42.58	1.29 ns.
Season	3	1552.54	47.00 **
Error	18	33.03	

Table 15. Analysis of variance of annual fishing days

Source	d. f	M. S. S.	F - value
Village	4	241.64	3.78 ns.
Category	2	40.59	0.63 ns.
Error	8	63.97	

82 Table 16 Annual fishing expenditure in the villages of Maharashtra and Gujarat (1983)

Village/ Category	Expenditure incurred (%)							Annual expendi- ture (Rs)
	Boat & engine repair	Net repair	Fuel	Crew wages	Transport & marketing	Proce- ssing	Other misc. items.	
MAHARASHTRA								
<i>Ekdara</i>								
Mechanised group	6.3	2.4	20.5	63.2	2.9	2.8	1.9	48339
Non-mec. group	6.9	5.2	—	75.5	5.3	3.8	3.3	14607
Gear owners	—	8.1	—	79.4*	5.7	3.5	3.3	6567
<i>Alibag Koliwada</i>								
Mechanised group	4.2	3.0	19.4	65.7	2.9	2.5	2.3	49586
Non-mech. group	4.4	5.0	—	77.3	6.2	3.9	3.2	15026
Gear owners	—	9.2	—	73.5*	10.1	3.9	3.3	5931
<i>Mahim Koliwada</i>								
Mechanised group	5.2	4.9	31.0	51.1	3.8	2.2	1.8	51680
Non-mech. group	4.5	6.4	—	72.2	7.8	5.2	3.9	14821
Gear owners	—	13.0	—	70.0*	10.0	3.9	3.1	5338
<i>Maharashtra villages (Overall)</i>								
Mechanised group	5.3	3.4	23.8	59.8	3.2	2.5	2.0	49868
Non-mech. group	5.3	5.5	—	75.0	6.4	4.3	3.5	14818
Gear owners	—	9.9	—	74.6*	8.5	3.8	3.2	5945

GUJARAT

Umbergam

Mechanised group	3.9	2.9	36.3	49.2	3.4	3.3	1.0	76669
Non-mech. group	5.4	6.8	—	72.5	7.5	5.0	2.8	11314
Gear owners	—	8.6	—	75.8*	8.2	4.5	2.9	4054

Bhimore

Non-mechanised group	3.3	3.5	—	84.2	4.2	2.8	2.0	19426
Gear owners	—	9.8	—	69.9*	10.0	6.6	3.7	5557

Sutrapada Bunder

OBM-boat owners	3.9	3.5	25.2	57.3	6.0	1.9	2.2	25138
Non-mech. group	5.4	7.0	—	74.0	8.8	2.2	2.6	10356
Gear owners	—	15.5	—	68.0*	9.1	4.6	2.8	3685

Mangrol Bunder

Trawler owners	4.7	2.5	48.8	33.8	2.7	4.9	2.6	93666
OBM-boat owners	3.8	3.4	25.4	58.0	4.5	2.7	2.2	26866
Gear owners	—	9.3	—	74.6*	9.0	4.0	3.1	6633

Gujarat villages (Overall)

Mechanised group	4.2	2.8	39.0	44.7	3.5	3.9	1.9	55585
Non-mech. group	4.4	5.3	—	78.5	6.2	3.2	3.4	13699
Gear owners	—	10.4	—	72.3*	9.1	5.0	3.2	4982

* The payment made by gear owners to boat owners towards rent of boat.

Table 17 Quarterly fishing expenditure in the villages of Maharashtra and Gujarat (1983)

Village/ Category	Jan- March.	April- June	July- Sept.	Oct.- Dec.	Annual expen- diture (Rs)	Fishing expendi- ture per operating day (Rs)
MAHARASHTRA						
<i>Ekdara</i>						
Mechanised group	31.3	26.1	10.3	32.3	48339	215
Non-mech. group	29.9	25.4	13.8	30.9	14607	66
Gear owners	29.9	21.1	11.8	37.2	6567	31
<i>Allbag Koliwada</i>						
Mechanised group	30.1	26.4	11.9	31.6	49586	238
Non-mech. group	32.2	24.1	11.0	32.7	15026	75
Gear owners	29.1	23.5	11.1	36.3	5931	30
<i>Mahim Koliwada</i>						
Mechanised group	30.4	23.8	14.5	31.3	51680	233
Non-mech. group	30.1	22.1	15.0	32.8	14821	64
Gear owners	26.1	21.5	18.8	33.6	5338	24
<i>Maharashtra villages (Overall)</i>						
Mechanised group	30.6	25.4	12.3	31.7	49868	229
Non-mech group	30.8	23.9	13.2	32.1	14818	68
Gear owners	28.5	22.0	13.6	35.9	5945	28

GUJARAT

Umbergam

Mechanised group	29.4	26.0	11.2	33.4	76669	376
Non-mech. group	30.6	24.3	11.2	33.9	11314	50
Gear owners	25.7	21.0	16.5	36.8	4054	17

Bhimpore

Non-mechanised group	26.4	23.5	21.6	28.5	19426	79
Gear owners	25.8	17.8	21.0	35.4	5557	23

Sutrapada Bunder

OBM-boat owners	31.3	23.7	13.4	31.6	25138	117
Non-mech. group	29.5	23.7	14.7	32.1	10356	47
Gear owners	29.6	22.6	15.5	32.3	3685	17

Mangrol Bunder

Trawler owners	30.6	25.7	12.2	31.5	93666	457
OBM-boat owners	30.7	25.6	12.8	30.9	26866	119
Gear owners	28.2	21.4	16.2	34.2	6633	31

Gujarat villages (Overall)

Mechanised group	30.3	25.5	12.1	32.1	55585	267
Non-mech. group	28.3	23.8	17.0	30.9	13699	59
Gear owners	27.3	20.5	17.5	34.5	4982	22

Table 18. Analysis of variance of fishing expenditure for mechanised group

Source	Degree of freedom	Mean sum of squares	F-value
Village	5	70887770.58	22.27**
Season	3	131781333.60	41.41**
Error	15	3182644.60	

Table 19. Analysis of variance of fishing expenditure for non-mechanised group

Source	d.f	M.S.S.	F-value
Village	5	2581653.63	19.64**
Season	3	6708477.46	51.04**
Error	15	131422.90	

Table 20. Analysis of variance of fishing expenditure for gear owners

Source	d.f	M.S.S.	F-value
Village	6	331095.92	8.27**
Season	3	1455067.46	36.35**
Error	18	40028.48	

Table 21. Analysis of variance of annual fishing expenditure

Source	d.f	M.S.S.	F-value
Village	4	119163910.90	1.08 ns.
Category	2	2899265454.00	26.25**
Error	8	110452073.60	

Table 22. Net fishery income in the villages of Maharashtra (1983)

Village Category	Quarterly income (%)				Annual income (Rs)	Net % to gross income	Net income per operating day (Rs)
	Jan- Mar.	April- June	July- Sept.	Oct- Dec.			
<i>Ekdara</i>							
Mechanised group	24.8	25.0	9.4	40.8	9429	16.3	42
Non-mech. group	34.2	9.3	5.5	51.0	4393	23.1	20
Gear owners	22.5	21.4	18.7	37.4	4013	37.9	19
Fishery allied group	26.0	29.9	12.9	31.2	3265	100	9
<i>Alibag Koltwada</i>							
Mechanised group	16.5	16.6	-1.8	48.7	11064	18.2	53
Non-mech. group	33.8	10.5	3.2	52.5	4474	22.9	22
Gear owners	31.7	22.2	5.0	41.1	3847	39.3	19
Fishery allied group	27.3	22.8	15.8	34.1	3621	100	10
<i>Mahim Kolinada</i>							
Mechanised group	29.4	28.5	-1.7	43.8	10104	16.4	46
Non-mech. group	26.5	28.0	8.9	36.6	4886	24.8	21
Gear owners	29.3	22.5	13.7	34.5	3709	41.0	16
Fishery allied group	26.3	24.1	19.6	30.0	3514	100	10
<i>Overall</i>							
Mechanised group	30.5	23.2	1.7	44.6	10199	17.0	47
Non-mech. group	31.4	16.3	5.9	46.4	4585	23.6	21
Gear owners	27.7	22.0	12.6	37.7	3856	39.3	18
Fishery allied group	26.6	25.4	16.2	31.8	3467	100	10

29 Table 23 Net fishery income in the villages of Gujarat (1983)

Villages Category	Quarterly Income (%)				Annual income (Rs)	Net % to gross income	Net income per opera- ting day (Rs)
	Jan- Mar.	April- June.	July- Sept.	Oct.- Dec.			
<i>Umbergam</i>							
Mechanised group	38.9	14.5	-0.8	47.4	12785	14.3	63
Non-mech. group	29.5	18.5	4.2	47.8	6406	36.2	28
Gear owners	27.8	20.1	12.2	39.9	4915	54.8	21
Fishery allied group	25.9	25.5	20.1	28.5	3649	100	10
<i>Bhimpore</i>							
Non-mechanised group	33.3	14.8	2.0	49.9	5750	22.8	24
Gear owners	26.4	12.0	18.8	42.8	4153	42.8	17
Fishery allied group	29.4	21.9	15.0	33.7	3383	100	9
<i>Sutrapada Bunder</i>							
OBM-boat owners	25.7	27.7	9.3	37.3	10204	28.9	47
Non-mech. group	24.5	18.9	15.3	41.3	4900	32.1	22
Gear owners	24.1	21.9	16.3	37.7	3808	50.8	17
Fishery allied group	27.2	24.9	15.7	32.2	3293	100	9
<i>Mangrol Bunder</i>							
Trawler owners	34.7	20.4	13.5	31.4	16308	14.8	80
OBM-boat owners	23.8	34.6	8.9	32.7	8871	24.8	39
Gear owners	30.1	18.2	11.3	40.4	4641	41.2	21
Fishery allied group	27.6	25.7	14.8	31.9	3726	100	10
<i>Overall</i>							
Mechanised group	31.9	23.0	8.0	37.1	12042	17.8	57
Non-mech. group	29.3	17.4	6.7	46.6	5685	29.3	25
Gear owners	27.2	18.1	14.5	40.2	4379	46.8	19
Fishery allied group	27.5	24.6	16.4	31.5	3513	100	10

Table 24. Analysis of variance of net fishery income for mechanised group

Source	Degree of freedom	Mean sum of squares	F-value
Village	5	480779.56	0.64 n.s.
Season	3	18249778.86	24.45 **
Error	15	746473.40	

Table 25. Analysis of variance of net fishery income for non-mechanised group

Source	d.f	M.S.S.	F-value
Village	5	154897.41	1.24 n.s.
Season	3	4767787.37	38.32**
Error	15	124431.02	

Table 26. Analysis of variance of net fishery income for gear owners

Source	d.f	M.S.S.	F-value
Village	6	52037.76	1.42 n.s.
Season	3	1470720.49	40.13 **
Error	18	36648.28	

Table 27. Analysis of variance of net fishery income for fishery allied group

Source	d.f	M.S.S.	F-value
Village	6	8305.35	1.16 n.s.
Season	3	352675.63	49.40 **
Error	18	7138.73	

Table 28. Analysis of variance of net annual fishery income

Source	d.f	M.S.S.	F-value
Village	4	1697006.14	5.58 **
Category	3	55448741.18	182.43 **
Error	12	303938.75	

Table 29. *Income and expenditure particulars of fishermen families in the villages of Maharashtra and Gujarat (1983)*

Village	Income (annual)			Expenditure (annual)			Total (Rs)
	fishery	Non-fishery	Total	Household	Investment	Total	
	(%)	(%)	(Rs)	(%)	fishery (%)	Non-fishery (%)	
<i>MAHARASHTRA</i>							
<i>Ekdara</i>							
Mechanised group	91.1	8.9	10352	63.6	29.9	6.5	10071
Non-mechanised group	74.3	25.7	5912	84.7	8.8	6.5	6909
Gear owners	73.3	26.7	5476	88.5	7.7	3.8	6412
Fishery allied group	51.2	48.8	6372	96.6	-	3.4	6252
<i>Alibag Koliwada</i>							
Mechanised group	90.8	9.2	12189	53.2	43.0	3.8	11668
Non-mech group	73.1	26.9	6117	83.3	9.1	7.6	7088
Gear owners	68.2	31.8	5641	86.9	9.6	3.5	6404
Fishery allied group	61.2	38.8	5916	95.7	-	4.3	5831
<i>Mahim Koliwada</i>							
Mechanised group	89.9	10.1	11238	62.9	35.3	1.8	10843
Non-mech. group	77.3	22.7	6321	84.9	12.2	2.9	7141
Gear owners	65.5	34.5	5662	87.6	9.7	2.7	6587
Fishery allied group	46.9	53.1	7486	91.0	-	9.0	6925

<i>Maharashtra villages</i>							
(Over all)							
Mechanised group	90.6	9.4	11260	59.6	36.4	4.0	10862
Non-mech. group	75.0	25.4	6117	84.3	10.0	5.7	7046
Gear owners	69.0	31.0	5593	87.6	9.1	3.3	6468
Fishery allied group	52.6	47.4	6591	94.3	-	5.7	6336
<i>GUJARAT</i>							
<i>Umbergam</i>							
Mehanised group	84.6	15.4	15105	53.7	27.1	19.2	14695
Non-mech. group	74.6	25.4	8587	68.6	14.0	17.4	8985
Gear owners	74.0	26.0	6640	87.3	7.7	5.0	6383
Fishery allied group	53.6	46.4	6813	91.8	-	8.2	6479
<i>Bhimpora</i>							
Non-mechanised group	67.5	32.5	8516	75.8	17.8	6.4	9158
Gear owners	71.1	28.9	5842	88.8	7.1	4.1	6331
Fishery allied group	49.5	50.5	6830	87.2	-	12.8	6342
<i>Satrapada Bunder</i>							
OBM-boat owners	91.5	8.5	11154	71.6	30.4	4.0	10195
Non-mech. group	76.6	23.4	6400	82.0	16.3	9.7	7279
Gear owners	70.7	29.3	5388	86.1	11.3	2.6	6367
Fishery allied group	61.2	38.8	5377	97.8	-	2.2	5399

8	<i>Mangrol Bunder</i>							
	Trawler owners	94.7	5.3	17218	41.9	48.8	3.3	16535
	OBM-boat owners	93.2	6.8	9515	70.1	25.9	4.0	9218
	Gear owners	81.5	18.5	5696	86.9	10.3	2.8	6668
	Fishery allied group	66.0	34.0	5645	95.8	-	4.2	5691
	<i>Gujarat villages</i>							
	(Over all)							
	Mechanised group	90.9	9.1	13248	57.2	34.6	8.2	12661
	Non-mech. group	72.6	27.4	7835	75.0	16.0	9.0	8474
	Gear owners	74.3	25.7	5892	87.2	9.2	3.6	6487
	Fishery allied group	57.0	43.0	6165	92.9	-	7.1	5978

Table 30. *Analysis of variance of non-fishery income for mechanised group*

Source	Degree of freedom	Mean sum of squares.	F-value
Village	5	79034.18	21.71 **
Season	3	3961.70	1.09 ns
Error	15	3640.78	

Table 31. *Analysis of variance of non-fishery income for non-mechanised group*

Source	d.f	M.S.S.	F-value
Village	5	69835.52	12.64 **
Season	3	12089.99	2.19 n.s.
Error	15	5525.84	

Table 32. *Analysis of variance of non-fishery income for gear owners.*

Source	d.f	M.S.S.	F-value
Village	6	20899.04	13.04 **
Season	3	1692.26	1.06 n.s.
Error	18	1601.99	

Table 33 *Analysis of variance of non-fishery income for fishery allied group*

Source	d.f	M.S.S.	F-value
Village	6	147562.93	26.43 **
Season	3	6333.85	1.13 n.s.
Error	18	5584.10	

Table 34. *Analysis of variance of annual non-fishery income*

Source	d.f	M.S.S.	F-value
Village	4	443920.09	2.23 n.s.
Category	3	2532608.74	12.73 **
Error	12	199004.54	

82 Table 35. Annual household expenditure in the fishing villages of Maharashtra (1983)

Village/ Category	Household expenditure (%)							Annual Per day		
	Food	Clo- thing	Light & fuel	Edu- cation	Medical expenses	Recre- ation & ceremo- nies.	Perso- nal expenses	Misc. items	expen- diture (Rs)	expendi- ture (Rs)
<i>Ekdara</i>										
Mechanised group	62.3	5.9	5.8	1.0	3.2	8.7	2.6	10.5	6406	18
Non-mech. group	60.2	5.5	6.4	1.0	4.2	8.4	3.5	10.8	5853	16
Gear owners	60.6	5.8	7.0	1.5	4.2	5.9	3.8	11.2	5674	16
Fishery allied group	61.5	5.3	6.2	1.0	3.9	5.8	3.8	12.5	6041	17
<i>Alibag Koliwada</i>										
Mechanised group	60.6	6.1	6.4	1.4	4.4	6.4	3.2	11.5	6203	17
Non-mech. group	57.2	6.7	6.3	1.4	4.4	8.1	3.8	12.1	5904	16
Gear owners	62.6	5.8	6.5	0.9	4.4	6.3	3.1	10.4	5565	15
Fishery allied group	65.1	5.7	6.0	1.1	3.9	5.0	3.4	9.8	5581	15
<i>Mahim Koliwada</i>										
Mechanised group	59.9	5.6	5.6	1.3	3.3	5.3	3.4	15.6	6825	19
Non-mech. group	57.0	6.4	6.3	1.4	3.6	5.0	3.1	17.2	6061	17
Gear owners	58.3	5.3	6.0	2.4	3.9	5.4	2.8	15.9	5768	16
Fishery allied group	61.9	5.6	6.0	1.4	3.0	4.2	2.7	15.2	6305	17

Maharashtra villages
(Over all)

Mechanised group	60.8	5.9	5.9	1.3	3.6	6.8	3.1	12.6	6478	18
Non-mech. group	58.0	6.2	6.3	1.3	4.2	7.2	3.4	13.4	5939	16
Gear owners	60.3	5.6	6.6	1.6	4.2	5.9	3.2	12.6	5669	16
Fishery allied group	62.6	5.6	6.1	1.2	3.6	5.0	3.3	12.6	5976	16

Table 36. Annual household expenditure in the fishing villages of Gujarat (1983)

Village/ category	Household expenditure (%)								Annual expen- diture (Rs)	Per day expen- diture (Rs)
	Food	Cloth- ing.	Light- & fuel	Edu- cation	Medi- cal expen- ses	Recre- ation & ceremo- nies	Perso- nal expen- ses	Mis. items		
<i>Umbergam</i>										
Mechanised group	51.1	5.4	4.7	2.0	2.8	20.7	2.3	11.0	7891	22
Non-mech. group	59.5	5.5	5.7	1.0	2.6	11.2	2.9	11.6	6168	17
Gear owners	63.4	4.5	5.7	1.2	2.7	8.2	2.2	12.1	5744	16
8 Fishery allied group	62.2	4.7	5.7	1.3	2.8	10.1	2.5	10.7	5947	16

Bhimpore

Non-mechanised group	54.2	7.6	6.8	1.3	4.3	7.6	4.8	13.4	6938	19
Gear owners	61.6	6.0	7.0	0.8	3.7	4.8	2.9	13.2	5623	15
Fishery allied group	58.8	6.6	6.1	1.7	4.3	5.6	3.4	13.5	5529	15

Sutrapada Bunder

OBM boat owners	59.8	5.2	5.6	1.6	4.6	7.7	2.9	12.6	6677	18
Non-mech. group	61.6	6.4	5.9	1.1	3.4	5.8	3.1	12.7	5967	16
Gear owners	64.6	5.0	6.0	1.0	3.4	4.1	2.9	13.0	5480	15
Fishery allied group	61.6	5.0	6.7	1.1	3.3	6.1	3.0	13.2	5281	14

Mangrol Bunder

Trawler owners	61.0	6.1	4.8	1.3	3.1	7.5	2.7	13.5	7918	22
OBM-boat owners	59.6	5.5	5.8	1.6	3.8	7.0	3.0	13.7	6461	18
Gear owners	64.4	5.1	5.8	1.1	2.8	5.3	3.0	12.5	5792	16
Fishery allied group	67.3	3.7	6.2	1.2	2.8	4.1	2.5	12.2	5455	15

Gujarat villages

(Over all)

Mechanised group	57.7	5.5	5.2	1.6	3.5	11.0	2.8	12.7	7237	20
Non-mech. group	58.2	6.5	6.1	1.2	3.5	8.3	3.6	12.6	6358	17
Gear owners	63.5	5.1	6.1	1.0	3.2	5.6	2.8	12.7	5660	16
Fishery allied group	62.5	5.0	6.2	1.3	3.3	6.6	1.8	12.3	5553	15

Table 37. *Per capita income and consumption in Maharashtra and Gujarat during 1983*

Category	Per capita		Consumption as percentage to income.
	Income (Rs)	Consumption (Rs)	
<i>MAHARASHTRA</i>			
Mechanised group	1482	852	58
Non-mech. group	805	781	97
Gear owners	726	746	101
Fishery allied group	834	756	91
<i>GUJARAT</i>			
Mechanised group	1790	978	55
Non-mech. group	1031	837	81
Gear owners	796	765	96
Fishery allied group	790	712	90

Table 38. *Analysis of variance of household expenditure for mechanised group*

Source	Degree of freedom	Mean sum of squares	F-value
Village	5	92219.67	3.35*
Season	3	60860.53	2.21 ns.
Error	15	27560.59	

Table 39. *Analysis of variance of household expenditure for non-mechanised group*

Source	d.f	M.S.S.	F-value
Village	5	40549.12	8.92 **
Season	3	31220.73	6.87 **
Error	15	4545.34	

Table 40. Analysis of variance of household expenditure for gear owners

Source	d.f	M.S.S.	F-value
Village	6	3299.40	1.11 ns.
Season	3	10861.09	3.65 *
Error	18	2978.53	

Table 41. Analysis of variance of household expenditure for fishery allied group

Source	d.f	M.S.S.	F-value
Village	6	33911.81	4.87 **
Season	3	18866.23	2.71 ns.
Error	18	6966.19	

Table 42. Analysis of variance of annual household expenditure

Source	d.f	M.S.S.	F-value
Village	4	283607.84	2.51 ns.
Category	3	1294112.53	11.47 **
Error	12	112831.29	

Table 43. Investment pattern in Maharashtra and Gujarat (1983)

Village/ Category	Investment (Rs)		Total
	Fishery	Non-fishery	
<i>MAHARASHTRA</i>			
<i>Ekdara</i>			
Mechanised group	3007 (82.0)	658 (18.0)	3665
Non-mech. group	606 (57.4)	450 (42.6)	1056
Gear owners	497 (67.3)	241 (32.7)	738
Fishery allied group	—	211 (100)	211

Alibag Koliwada

Mechanised group	5022 (91.9)	443 (8.1)	5465
Non-mech. group	643 (54.3)	541 (45.7)	1184
Gear owners	618 (73.6)	221 (26.4)	839
Fishery allied group	—	250 (100)	250

Mahim Koliwada

Mechanised group	3823 (95.2)	195 (4.8)	4018
Non-mech. group	875 (81.0)	205 (19.0)	1080
Gear owners	643 (78.6)	175 (21.4)	818
Fishery allied group	—	620 (100)	620

*Maharashtra villages
(Over all)*

Mechanised group	3951 (90.1)	432 (9.9)	4383
Non-mech. group	708 (64.0)	399 (36.0)	1107
Gear owners	586 (73.4)	212 (26.6)	798
Fishery allied group	—	360 (100)	360

*GUJARAT**Umbergam*

Mechanised group	3982 (58.5)	2822 (41.5)	6804
Non-mech. group	1254 (44.5)	1563 (55.5)	2817
Gear owners	511 (61.0)	327 (39.0)	838
Fishery allied group	—	532 (100)	532

Bhimnore

Non-mech. group	1632 (73.5)	588 (26.5)	2220
Gear owners	451 (63.7)	257 (36.3)	708
Fishery allied group	—	813 (100)	813

<i>Sutrapada Bunder</i>			
OBM-boat owners	3111 (88.4)	407 (11.6)	3518
Non-mech. group	1189 (90.7)	123 (9.3)	1312
Gear owners	718 (81.0)	169 (19.0)	887
Fishery allied group	—	118 (100)	118
<i>Mangrol Bunder</i>			
Trawler owners	8075 (93.7)	541 (6.3)	8616
OBM-boat owners	2386 (86.6)	370 (13.4)	2756
Gear owners	690 (78.7)	186 (21.3)	876
Fishery allied group	—	236 (100)	236
<i>Gujarat villages (Over all)</i>			
Mechanised group	4389 (80.0)	1035 (20.0)	5424
Non-mech. group	1358 (64.2)	758 (35.0)	2116
Gear owners	592 (71.6)	235 (28.4)	827
Fishery allied group	—	425 (100)	425

Note: Figures in Parentheses indicate percentages.

Tabl 44. *Analysis of variance of investment for mechanised group.*

Source	Degree of freedom	Mean sum of squares.	F-value
Village	5	438387.77	0.60 ns.
Season	3	588577.67	0.81 ns.
Error	15	728153.63	

Table 45. *Analysis of variance of investment for non-mechanised group*

Source	d.f	M.S.S.	F-value
Village	5	134340.24	1.32 ns.
Season	3	85214.00	0.84 ns.
Error	15	101703.35	

Table 46. *Analysis of variance of investment for gear owners*

Source	d.f	M.S.S.	F-value
Village	6	1142.86	0.77 ns.
Season	3	21127.93	14.32 **
Error	18	1475.81	

Table 47. *Analysis of variance of investment for fishery allied group*

Source	d.f	M.S.S.	F-value
Village	6	16711.61	1.21 ns.
Season	3	55493.40	4.01 *
Error	18	13853.54	

Table 48. *Analysis of variance of annual investment*

Source	d.f	M.S.S.	F-value
Village	4	1199672.81	2.57 ns.
Category	3	19217196.03	41.24 **
Error	12	465962.79	

Table 49. *Indebtedness in the fishing villages of Maharashtra (1983)*

Village/ Category	Families availed loan (%)	Loan per indebted family (Rs)	Amount of loan (%)			
			Fish. co-op. society	Govt.	Banks	Private
<i>Ekdara</i>						
Mechanised group	86.7	6203	31.2	25.5	18.6	24.7
Non-mech. group	80.0	4130	21.4	27.6	23.5	27.5
Gear owners	80.0	1907	21.9	18.7	13.0	46.4
Fishery allied group	60.0	480	9.5	15.9	11.8	62.8
Overall	78.0	3576	22.8	22.3	16.8	38.1
<i>Alibag Koliwada</i>						
Mechanised group	86.7	9159	42.1	25.8	21.1	11.0
Non-mech group	90.0	3176	41.8	17.0	14.0	27.2
Gear owners	86.7	1797	38.3	17.9	11.5	32.3
Fishery allied group	70.0	803	23.8	13.7	7.5	55.0
Overall	84.0	4206	36.4	19.6	14.4	29.6
<i>Mahim Koliwada</i>						
Mechanised group	93.3	7080	16.1	9.7	19.4	54.8
Non-mech. group	70.0	3005	16.7	10.0	20.0	53.3
Gear owners	60.0	1247	6.0	6.0	12.0	76.0
Fishery allied group	40.0	418	1.7	2.6	3.5	92.0
Overall	61.5	3389	4.9	4.3	7.4	83.4

Table 50. *Indebtedness in the fishing villages of Gujarat (1983)*

Village/ Category	Families availed loan (%)	Loan per indebted family (Rs)	Fish. co-op. society	Amount of loan (%)		
				Govt.	Banks	Private
<i>Umbergam</i>						
Mechanised group	80.0	9390	5.4	18.1	30.6	45.9
Non-mech. group	90.0	3921	6.5	12.8	21.8	58.9
Gear owners	66.7	1435	8.2	3.5	3.5	84.8
Fishery allied group	80.0	845	5.6	5.0	3.4	86.0
Overall	78.0	4335	5.8	10.7	17.1	66.4
<i>Bhimpore</i>						
Non-mechanised group	60.0	1873	—	—	—	100.0
Gear owners	55.0	720	—	—	—	100.0
Fishery allied group	60.0	597	—	—	—	100.0
Overall	58.0	1040	—	—	—	100.0
<i>Sutrapada Bunder</i>						
OBM-boat owners	85.0	5170	23.6*	—	34.4	42.0
Non-mech. group	80.0	3255	21.4*	—	21.5	57.1
Gear owners	70.0	1675	14.1*	—	15.7	70.2
Fishery allied group	60.0	686	9.5*	—	7.2	83.3
Overall	76.0	3415	18.1*	—	23.0	58.9

26 *Mangrol Bunder*

Trawler owners	90.0	12275	—	16.5	30.9	52.6
OBM-boat owners	80.0	5453	—	13.5	21.6	64.9
Gear owners	75.0	1225	—	14.2	21.2	64.6
Fishery allied group	53.3	507	—	2.1	4.2	93.7
Overall	75.7	5827	—	13.8	23.8	62.4

* G. F. C. C. A provided loan in the form of advances through fishermen co-operative society.

Table 51. *Analysis of variance of indebtedness*

Source	d.f	M.S.S.	F-value
Village	4	1054983.20	1.18 ns.
Category	3	44571618.99	49.69 **
Error	12	896951.88	

Table 52. Regression analysis

$$Y_i = a + b X_i$$

$i = 1$ for Maharashtra

$i = 2$ for Gujarat

(X & Y in oo'Rs.)

1. $Y_1 = 50.97 + 0.124 X_1$ **
(0.029)

$$r^2 = 0.65$$

$$Y_2 = 43.55 + 0.221 X_2$$
 **
(0.019)

$$r^2 = 0.91$$

where $X_i =$ income

$Y_i =$ Consumption

2. $Y_1 = -33.23 + 0.675 X_1$ **
(0.068)

$$r^2 = 0.91$$

$$Y_2 = -34.18 + 0.676 X_2$$
 **
(0.031)

$$r^2 = 0.97$$

where $X_i =$ Income

$Y_i =$ Investment

3. $Y_1 = -42.37 + 1.0181 X_1$ **
(0.184)

$$r^2 = 0.75$$

$$Y_2 = -45.22 + 0.937 X_2$$
 **
(0.072)

$$r^2 = 0.93$$

where $X_i =$ Income

$Y_i =$ Indebtedness

4. $Y_1 = 57.57 + 0.079 X_1$ *
(0.033)

$$r^2 = 0.36$$

$$Y_2 = 54.86 + 0.216 X_2$$
 **
(0.028)

$$r^2 = 0.82$$

where $X_i =$ Indebtedness

$Y_i =$ Consumption

$$5. Y_1 = 27.08 + 0.149X_1^{**}$$

(0.009)

$$r^2 = 0.97$$

$$Y_2 = 42.58 + 0.127X_2^{**}$$

(0.013)

$$r^2 = 0.92$$

where X_i = Fishing expenditure
 Y_i = Net fishery income

*Significant at 5% level

**Significant at 1% level.