



समुद्री मात्स्यकी सूचना सेवा MARINE FISHERIES INFORMATION SERVICE

No. 121

MAY, JUNE, JULY 1993



तकनीकी एवं TECHNICAL AND
विस्तार अंकावली EXTENSION SERIES

केन्द्रीय समुद्री मात्स्यकी CENTRAL MARINE FISHERIES
अनुसंधान संस्थान RESEARCH INSTITUTE
कोचिन, भारत COCHIN, INDIA

भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

THE STRUCTURAL CHANGE IN KARNATAKA MARINE FISHERY AND ITS SOCIO-ECONOMIC IMPLICATIONS

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Introduction

Karnataka has a coast line of 270 km and a shelf area of 25,000 sq.km. The state contributes about 10% of the total marine fish production of the country. Marine fishing is almost confined to nearshore areas and the major contribution to the state's total landings is from oil sardine and mackerel. The fishermen population is estimated to be 1.25 lakhs inhabiting in about 150 fishing villages. Till the early seventies, fishing operation was mainly carried out by the traditional fishing units. The gears used were *rampani*, small shore-seines, gill-nets, drift-nets and hooks & line. The craft commonly used were *rampani* boats, dugout-canoes and out-rigger-boats. By mid-seventies, mechanised crafts and gears started dominating and as a result, *rampani* which used to contribute more than 60% of the total catch, almost disappeared from the Karnataka fishery. It has paved the way for a structural change in the socio-economic scenario of Karnataka fishery. These changes have been further influenced by the emergence of new type of encircling gear such as *mattubala/ring-seine* (mini purse-seine) which appears to be an offshoot of the introduction of motorisation of country craft during the mid-eighties. The present paper is an attempt to study the socio-economic implications of these changes.

Data base

The data on cost and earnings of different fishing units and the socio-economic aspects of Karnataka marine fishery have been collected through special surveys conducted by CMFRI from time to time. Catch and effort and other relevant data utilised for this study have been obtained through marine fish landing survey regularly conducted by the Institute covering the entire coast line of the country.

Phases of marine fishery development

The two decades of fishery in Karnataka from 1970 to 1990 can be divided into three

phases. The first phase upto the mid-seventies was dominated by traditional fishery and during this period the major gear under operation was *rampani*. The second phase starting from mid-seventies and extending upto mid-eighties was characterised by the domination of mechanised fishing, particularly by purse-seine. The third phase witnessed the emergence of motorisation of country crafts which resulted in the introduction of more efficient artisanal gear like *mattubala/ring-seine*.

Fishing techniques and fish landings

Before mid-seventies marine fishery of Karnataka was dominated by traditional fishing methods particularly using *rampani*. It is one of the traditional gears having great catching power. A large number of fishermen families were depending on *rampani* fishing for their livelihood till the large-scale introduction of commercial purse-seining by 1978. After mid-seventies *rampani* fishing dwindled very fast, causing serious hardship to the coastal fisherfolk. There were about 160 *rampani* units operating along Karnataka coast in 1976, which used to account for about 60 per cent of the total fish landings of the state. *Rampani* is a shore-seine of exceptionally large size having a length of about 2,000 m. The net requires about 100 persons for operation. *Rampani* fishing was mainly a village-based venture. Most of the villages along the coast were having 2 to 5 *rampani* units. The ownership of one unit was shared by about 100 families and all of them were actively involved in the operation. When a shoal of fish is located near the shore one end of the net is fixed at the shore and the other end is steered around the shoal by the *rampani* boat bringing the catch ashore or kept impounded in water near the shore and marketed in stages according to the demand.

The average cost and earnings of a *rampani* unit worked out on the basis of its performance during mid-seventies indicated that the annual

revenue per unit came about Rs. 2.7 lakhs. The per capita annual revenue of a *rampant* fisherman worked out at Rs. 3,370 in 1976-'77.

Considering the employment pattern just before mid-seventies, about 15,000 persons (including women) were employed in *rampant* fishing which was mostly confined to rural areas. During this period the annual landings of the state were estimated at 35,000 to 90,000 tonnes and the only mechanised fishing unit under operation at that time was trawler, the contribution of which to the total landings of the state was not significant.

TABLE 1. Estimated marine fish landings (tonnes)

Year	India	Karnataka	Contribution by Karnataka (%)
1975	14,22,693	87,494	6.2
1976	13,52,855	95,283	7.0
1977	12,59,782	97,152	7.7
1978	14,03,607	1,52,860	10.9
1979	13,88,380	1,26,384	9.1
1980	12,49,837	1,15,322	9.2
1981	13,78,457	1,53,349	11.1
1982	14,20,624	1,54,836	10.9
1983	15,48,475	1,11,598	7.2
1984	16,30,678	1,26,996	7.8
1985	15,34,726	1,18,844	7.7
1986	16,93,377	1,89,276	11.2
1987	16,62,550	2,20,576	13.3
1988	18,03,817	2,12,409	11.8
1989	22,30,225	2,51,012	11.3
1990	21,62,270	1,78,334	8.3

From 1976 onwards the marine fishery along Karnataka coast was dominated by purse-seining. During this year purse-seining was introduced but the intensive commercial-scale operations started only by 1978 with the introduction of about 120 purse-seine units. The number steadily increased and touched the level of 350 by the end of 1982 but further the increase was only marginal, remaining at 390-400 by 1990. Purse-seine is an encircling gear. Since the catch composition of both purse-seine and *rampant* was the same, the two gears became competitive and the more efficient one namely the purse-seine, was preferred and this resulted in the gradual reduction in operation of *rampant* and the substantial depletion in its catch after 1978.

With the introduction of purse-seining, the total landings in Karnataka increased from 87,000 t in 1975 to 1,53,000 t in 1978. With some annual fluctuations, the total landings crossed 2 lakh tonnes in 1987 reaching 2.5 lakhs tonnes 1989. Contribution of purse-seine catch to total landings increased from 56% in 1978 to 77% in 1985 but declined to 53% in 1988. However, in 1989 due to unprecedented heavy landings of mackerel the total landings as well as purse-seine contribution have increased.

Due to the increased tempo of purse-seine operation during this period there was a structural change in the socio-economic framework of the Karnataka fishery. Before the introduction of purse-seining, the village economy was mainly depending on fishing income created in coastal rural areas. Fishing mainly by *rampant* was a subsistence level of operation. But after the introduction of purse-seining, marine fishing activity had been concentrated in urban areas, and by the middle of eighties about 75% of the state's fish landings was from six urban landing centres, namely, Mangalore, Malpe, Ganguli, Bhatkal, Tadri and Karwar. This indicates a clear shift in fishing activities from rural to urban area which has very much adversely affected the coastal rural economy.

The large-scale introduction of purse-seining could enhance the fish production of the state, help in the development of supporting industries like ice manufacturing, boat building, net making etc., generating more employment opportunities. But such a development has taken place mainly around the above mentioned urban centres and did not have a direct bearing on the *rampant* fishermen in villages whose income from fishing has been considerably reduced due to the introduction of purse-seining. The village fishermen were forced to go to the nearest town as wage earners in purse-seiners. However, among the unemployed fishermen who lost their employment due to the disappearance of *rampant*, only youngsters were willing to move out of the village to work in purse-seiners.

During 1989-'90, a wage earner working in a purse-seine unit used to earn about Rs.75 per day of operation. It was much higher than what was earned by a worker in any other mechanised or traditional fishing unit.

The problem faced by a fisherman family in the village is that eventhough the head of the

family gets a higher income as compared to what he used to get from the traditional *rampani* fishing, other members of his family are not at all employed. Since *rampani* fishing is a village-based venture, the entire family is fully engaged in the fishing activity eventhough some of them are in disguised enemployment or under-employment.

TABLE 2. Annual average cost and earnings of a purse-seine unit in Karnataka during 1989

A. Initial investment	
Craft	Rs 4,50,000
Net	" 3,00,000
Other accessories	" 20,000
Total	" 7,70,000
B. Catch (tonnes)	
	428
C. Revenue	
	Rs 8,77,400
D. Operating costs	
Fuel	" 1,56,750
Wages	" 2,03,034
Auction 5%	" 43,870
Rent for carrier boat	" 35,000
Repairing & maintenance	" 60,000
Jetty rent	" 3,000
E. Fixed costs	
Depreciation	" 1,14,167
Interst 15%	" 1,15,500
Insurance	" 12,000
Total	" 2,41,667
F. Total cost	
	" 7,43,231
G. Net returns	
	" 1,34,169
H. Net income over operating cost	
	" 3,75,836
I. Rate of returns (%)	
	32

Purse-seine is considered as a highly destructive gear, because of its operational efficiency. During mid-seventies when the purse seine was introduced along Karnataka coast, it was apprehended that large-scale purse seining would result in the depletion of the pelagic fishes like oil sardine and mackerel. However, with the increased number of purse-seiners from 120 in 1978 to 390 in 1989, the total landings of the state also increased from 1.5 lakh tonnes to an all-time peak of 2.5 lakh tonnes during the same period indicating that the destructive nature of the gear was not reflected in the catch even after a decade of continuous purse-seine operation.

Economics of purse-seine operation

The annual average cost and earnings of a purse-seine unit during the year 1989 are given in Table 2. The annual average revenue per unit worked out at Rs. 8.8 lakhs. Out of this, an

amount of Rs. 5 lakhs was spent as operating cost. The major components of operating cost were wages and expenditure on fuel. Wages came to about Rs. 2 Lakhs and fuel expenditure to Rs. 1.5 lakhs. Operating cost included rent for carrier boat also. In Karnataka the purse-seine operators usually engage carrier boats on rental basis. After deducting the operating cost and all fixed costs such as depreciation, interest and insurance from the annual average revenue, the annual net profit per unit worked out at about Rs. 1.3 lakhs. During the year, the rate of return worked out at 32% indicating the high profitability of purse-seine operation.

The annual average catch per unit in 1978 was 572 t which continuously declined to the level of 137 t in 1983, further increased and touched the level of 428 t in 1989. Similar trend was observed for revenue also upto 1983 and after 1985 there was continuous increase in annual revenue reaching an all-time record of Rs. 8.8 lakhs in 1989. The total value of purse-seine catch increased from Rs. 73 million in 1978 to Rs. 347 million in 1989. The total cost also increased from Rs.50 million to Rs. 262 million during the same period.

The third phase of fishery development has been characterised by the large-scale motorisation of country craft, by mid-eighties, which resulted in the emergence of *mattubala* and also the increase in the number of gill-net units. The traditional sector, which has been almost shattered by the onslaught of purse-seining, revived its activities with the introduction of motorisation. During this period, the dominance of purse-seine gradually came down. In 1985 the purse-seine catch was 77% of the total landings and it came

TABLE 3. Average annual landing (tonnes) at important fishing centres in Karnataka

Centres	Average landings during 1981-'84	Percentage contribution to the state landings
Mangalore Bunder	41,230	30.2
Malpe	14,780	18.1
Ganguli Bunder	12,677	9.3
Bhatkal	2,932	2.1
Tadri	6,397	4.7
Karwar	11,682	8.5
Total	99,698	72.9

down to 45% in 1987, the lowest during this decade, and in 1990 it was about 57%. There was no significant increase in the number of purse-seine units during this period, almost stagnating around 390 units.

Another development during this phase was the increase in catch and effort of trawlers. During seventies trawlers contributed only less than 10% of the total landings which increased to about 30% in 1990. There has been a considerable increase in the number of trawlers, as well as the size of the vessel and H.P. of engine. Recently trawlers have started night fishing also which enhanced the revenue as well as net profit. During the year 1990 the total landings of the state was estimated at 1.8 lakh tonnes of which trawlers contributed 52,000 t and purse-seiners 1 lakh tonnes. The contribution of non-mechanised craft, without either inboard or outboard engines to the state's landings has been reduced to 3%.

Even in the third phase the contribution of purse-seine to the total fish catch was about 60%. Because of its huge investment requirement, which at present comes to about Rs.12 lakhs, it is beyond the financial means of most of the fisherman families. The recently introduced *mattubala* and ring-seine are becoming popular, among fishermen. Hence there is every chance that these mini replace the big purse-seine within two to three years.

Recently there has been a tendency to use both trawl units and purse-seine by the same craft depending upon the seasonal variations of the marine fishery.

With all these new developments, the marine fishing is becoming more and more capital intensive. The total investment in fishing equipments in the beginning of seventies was estimated at about Rs.10 crores and it increased to about Rs 75 crores by 1990.

Fish marketing

The structure of fish marketing system has also been considerably changed during the last two decades. In the beginning of seventies, when about 70% of the catch was contributed only by *rampanti*, the marketing was mostly done at the village level where fish used to be impounded and disposed of according to the demand. Purchasers were mostly headload vendors.

With the introduction of purse-seines, the Karnataka Government took rehabilitation measures by providing loans to the unemployed *rampanti* operators through Karnataka Fish Marketing Federation which helped them to purchase purse-seines. The Federation took the responsibility of marketing the landings by all such purse-seine units. About one-third of the purse-seine units is under the control of the Federation which is a co-operative organisation. This has resulted in a remarkable improvement in the fish marketing system of the state which helps the fishermen to get better price for their product. At present a number of trucks are daily engaged at all major landing centres which carry fish to interior places, all major towns and even to neighbouring states. Thus the increase in fish production and improvement in marketing have taken place side by side since both are complementary.

Conclusion

Marine fishery of Karnataka had undergone a structural change during the last two decades effecting remarkable transformation in its socio-economic framework. The dominance of *rampanti* operation came to an end by mid-seventies with the emergence of large scale purse-seine operation. Consequently the marine fishing activity had almost shifted from rural area to urban centres resulting in large scale unemployment in the rural area. Further increase in the number of purse-seine mainly aimed at the rehabilitation of unemployed rural fishermen, culminated in the dominance of purse-seiners. Together with the increased tempo of purse-seine operation, the total landings of the state had also increased. It has paved the way for the development of auxiliary industries such as ice factories, processing units, boat building yards and net making factories. Hence the introduction of purse-seining has created more employment opportunities and this has benefitted those who are in and around the urban landing centres, rather than unemployed *rampanti* fishermen in the farflung villages. However, large scale motorisation of country craft which started in the mid-eighties has resulted in the revival of traditional fishing with the increased tempo of gill-net operation and the emergence of new gears like *mattubala*. Thus the village landing centres, after remaining idle for about a decade have become busy again. Together with this, the increased number of trawlers during this period slightly reduced the dominance of purse-seiners. It is

expected that the ring-seine with its advantage of lower level of investment requirement, as compared to purse-seine, would replace purse-seine within two to three years.

Due to these developments in the production sector, the fish marketing system of the state

has also developed to an appreciable level, mainly with the introduction of co-operative system in the sector.

The authors are thankful to Dr. A. Regunathan for his valuable suggestions.