CAPACITY BUILDING OF FISHERWOMEN

A PARTICIPATORY APPROACH

BY

B.SHANTHI

Examined & evaluated
8 July 2000
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A THESIS SUBMITTED TO THE AVINASHILINGAM INSTITUTE FOR HOME SCIENCE ANDHIGHER EDUCATION FOR WOMEN (DEEMED UNIVERSITY) COIMBATORE – 641 043 IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE

DEGREE OF **DOCTOR OF PHILOSOPHY**
IN HOME SCIENCE EXTENSION EDUCATION

MARCH 2000

DECLARATION

I hereby declare that this thesis entitled **"CAPACITY BUILDING OF FISHERWOMEN – A PARTICIPATORY APPROACH"** is the result of investigation carried out by me in the Department of Home Science Extension Education, Avinashilingam Institute for Home Science and Higher Education for Women (Deemed University), Coimbatore, for the award of the **DEGREE OF DOCTOR OF PHILOSOPHY IN HOME SCIENCE EXTENSION EDUCATION** under the supervision and guidance of **Dr.S.SITHALAKSHMI, M.Sc., Ph.D.,** Professor and Head of the Department of Home Science Extension Education and that it has not been submitted for the award of any Degree / Diploma / Associateship / Fellowship or similar title of any other University or Institute.

Supervisor

Candidate

CERTIFICATE

This is to certify that this thesis entitled **"CAPACITY BUILDING OF FISHERWOMEN – A PARTICIPATORY APPROACH"** submitted to the Avinashilingam Institute for Home Science and Higher Education for Women, Deemed University, Coimbatore, for the award of the **DEGREE OF DOCTOR OF PHILOSOPHY IN HOME SCIENCE EXTENSION EDUCATION** is a record of original research work done by **B.SHANTHI, M.Sc., M.Phil., D.I.D.,** during the period of her study in the Department of Home Science Extension Education, Avinashilingam Institute for Home Science and Higher Education for Women, Deemed University, Coimbatore, under my supervision and guidance and the thesis has not formed the basis for the award of any Degree / Diploma / Associateship / Fellowship or similar title to any candidate of any other University.

Signature of the Supervisor

S. Siltanki

Signature of the Head of the Department

S. Siltanki

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This is to certify that Dr.(Mrs).Shanthi, IARS - Scientist working at CTCRI-Trivandrum, Kerala and a Ph.D Scholar of Avinashilingam Deemed University Coimbatore - 43. Underwent her research work with the Fisherwomen at Mattankuppam, Triplicane, Chennai 600 005. During her studies, she organised a "Free Computer Training Programme", to 25 youth of this Kuppam, through the "Exnora Vocational Training Institute" Chennai. This programme that was organised benefited the youth to take up job opportunities.

We found her to be doing wonderful work. She is totally dedicated, sincere and hard working. Her leadership capabilities were seen when she was able to successfully organise a Youth group, for the above mentioned programme.

I wish her all success in her future endeavours.

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During her reserach work she organised the following "Action Programme for the Upliftment of Fisherwomen" at Mattankuppam, through Exnora International.

1)	Women Entrepreneurship Development	- Demonstration & Training by Mrs.Nagarathina - FIIWES
2)	Solid Waste Management	- Mr.Rajan Philip, Mrs.Lavanya Mrs.Mangalam Balasubramaniam
3)	Slum Cleaning and Sanitation	- Mr.S.S.Kannan
4)	Self-help Group Formation	- Mr.Paramanandam

M.B.NIRMAL
FOUNDER & CHAIRMAN



Dedicated

To My Beloved

Parents, Husband

And Loving Daughter Kaaviya

Acknowledgement

* * * \

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* The investigator individually did all illustrations and photographs found in this text

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Introduction

* * * *

INTRODUCTION

Along with agriculture, fisheries provide the food for humanity. The population explosion over the decades and the shrinkage of agricultural land for food production have intensified the dependence of man on sea as an inexhaustible source of food. The global demand for fish by 2000 AD was estimated to be 114 million tonnes in which the developing countries would have their share of 60 million tonnes. It may not be an exaggeration if fish would make the food of the next millennium.

The fish industry in India is as old as the Indian soil. With a long coastline of over 7500 kms., fishing sector makes a signal contribution to the Indian economy, helping in augmenting the availability of nutritious food, providing employment to millions as well as earning a sizeable foreign exchange. Fish production in India has increased from 2.50 lakh tonnes in 1951 to 54.50 lakh tonnes in 1997-98. During the eighth five year plan period alone, fish production in India has increased considerably by 4.4 per cent per year from 43.65 lakh tonnes in 1992-93 to 54.50 lakh tonnes in 1997-98 (Indian Express, 1997 and Research and Reference Division, Government of India, 1999).

As for employment, nearly nine million people in India are dependent on fishing industry contributing about 2.4 per cent of the GDP. In 1992-93, 208,600 metric tonnes of marine products were exported, earning foreign exchange worth Rs.17,674 million (Dharmarajan, 1998 and Gopakumar, 1999).

Tamil Nadu having the second longest coastline of about 1000 kms., ranks seventh in fish production in India and has a rich potential for the development of marine fisheries (Sarguna, 1998). Nearly one lakh fishermen are engaged in active fishing, spreading over 422 fishing villages in the state. The capital of the state, Chennai alone has 44 fishing villages, called 'kuppams'.

Fishing is normally a **male preserve**. However, the post-harvest fish product development in the small scale fishing sector is mostly women dominated. Much of the skilled labour in post-harvest enterprises is provided by the womenfolk. Gutting fish, drying, curing, etc., are all activities mostly confined to women ; so are ancillary activities like seaweed collection and drying, shell craft making, marketing of fresh and dry fish. The fisherwomen thus provide a vital link between the suppliers and the consumers (Froebd, 1978 ; Bay of Bengal Programme, 1992 and Bostock, et al., 1992).

The role of women in the subsidiary activities of fishing is considerable along the Tamil Nadu coast. About 70 per cent of the persons participating in marketing activities at the landing centres are women. Fish marketing forms the greatest single source of income for women. A woman takes about 30 kgs of fish at a time for trading. The fish are sold at both wholesale and retail rates. Besides, selling the fish in the market, they carry head loads of fish for door to door sale (Kalavathy, 1985 ; Menezes, 1991 ; Nayak, 1991 and Rao et al., 1996).

Women in fishing communities contribute a great deal to the fishing economy. Their role has been complementary in bringing about green revolution

and white revolution and it is only natural to expect that they will play an even more vital role in blue revolution (Satyen, 1987 and Nayak, 1991).

However, fisherwomen as any other women in agriculture, are not in the mainstream, but remain marginalised. Their labour and contribution are not reflected in the census or in surveys of the fishing communities. Many of their needs remain undocumented, underestimated and ignored. Fisherwomen are often caught in a deprivation trap of powerlessness, vulnerability, physical weakness, poverty and marginalisation and reflect the Indian scenario characterised by these oppressive conditions of women (Sathiadas and Panikar, 1989 ; Rajendran, 1992 ; Herzl, 1993 and Mazumdar, 1984).

At the threshold of the 21st century, the issue of women in development has been debated and their role in different fields of production accepted and appreciated. All the nations are attempting to correct the blames, wrong orientations and misperceptions regarding women's capabilities and potentials in order to bring the women into the mainstream of development.

Science and technology are important instruments for facilitating the process of development, improving the position of women, minimising their drudgery in performing household chores, maximising their productivity and improving the quality of life (Muthayya and Anneesudhin, 1988). Technology opens the doors to modernisation. However, technological changes in traditional activities often displace women workers. Low literacy, coupled with lack of training resulting in low level of skills and displacement due to technology, reduce

women's participation in economic pursuits. All these lead to the resulting unequal status of women (Devadas, 1997).

Empowerment of fisherwomen is a critical factor in the eradication of poverty, improving their status and decision making power. Empowerment is an active process enabling women to realise their full identity and power in all spheres of life and build up their capacities to become partners in the process of development (Devadas, 1999).

Increasingly in the past few years the notion of participation as an exercise of empowering people has gained wide support. Empowering is the development of skills and abilities to enable people to manage better, have a say in or negotiate with existing development delivery systems and make decisions on the actions to be taken.

Participation is a contemporary catchword in development studies, particularly in the field of social development. Participation has become synonymous with 'development'. There is no development agenda that has been evolved for improving the livelihoods of the poor without the component of participation. Participation as an important alternative strategy for development requires to be understood by the development planners, policy makers and functionaries (Bob, 1998 ; Dantwala, et al., 1998 and Rehman and Rehman, 1998).

The aspects of participation include that in decision making, implementation of development programmes, monitoring and evaluation as well as sharing the benefits of development. The lowest level of participation is by order or by decree. The highest level at which participation can occur is the level of creative assertion of free will and the sharing of one's ideas, talents and resources (Lacar, 1986 and Mishra and Sharma, 1985).

Participation is not always a spontaneous phenomenon. It is a complex concept. People need to be involved right from the planning process so that they would identify their own needs and resources, understand their potentials and work out strategies for implementation and evaluation (Mohanan, 1987).

There is a growing realisation that it is necessary to understand and appreciate the traditional technologies and the resource endowments of people so as to make programmes more effective. Participatory Rural Appraisal (PRA) and Rapid Rural Appraisal (RRA) are the latest techniques developed for people's participation in problem identification and planning. It is increasingly being used by development agents, government departments and non-government organisations the world over, to learn about the conditions in the field (Chelliah, 1992 and Jayaraj, 1992).

Rapid Rural Appraisal is an approach to collecting information in the field. It is shorter than a full-fledged, questionnaire – based statistical survey and does not collect detailed statistics ; but it can obtain a good qualitative and indicative picture of the situation. Also, because it is field based and quick, the information

collected can be used immediately. Rapid Rural Appraisal identifies specific issues that require more detailed study (Townsley, 1993).

RRA was originally developed out of the accumulated experience of many experts working in rural development particularly with agricultural communities. Through sharing their practical experience, a set of replicable and adaptable techniques have been developed.

Participatory Rural Appraisal helps in removing the feeling of 'outsider' in the minds of the participants. This informal approach of collecting information through participatory processes helps the scientists to know more about the areas and people in a short time. PRA methods reveal the hidden complexity and can bring the needs to the attention of the investigators (John and Subramanian, 1992 ; Manoharan, et al., 1992 and Pretty et al., 1992).

Although PRA techniques are increasingly favoured in outreach efforts and in training programmes involving grass root level workers, their application as research tools is scanty, particularly in examining women's issues and concerns. Since this action research aimed at building the capacity of the fisherwomen, participatory approaches were chosen involving the clientele right from the beginning of the process in identification of problems, needs and resources as well as in planning the strategies for capacity building. This research is a maiden experiment with fisherwomen employing a set of PRA techniques for situation analysis based on which capacity building attempts were made.

The specific objectives of the study are to

* Make **a situational analysis** of the socio-economic and cultural conditions of the fisherfolk ;
* Study **the prevalent technologies in use for sea-farming** ;
* Understand the profile of fisherwomen and their **contribution to the shore based activities** ;
* Examine the **decision making and family resource management practices** ;
* Create **scientific temper and attitude** among the fisherwomen towards adoption of appropriate technologies ;
* Take efforts for **capacity building of the fisherwomen** with special thrust on awareness generation, technology transfer and widening their perspectives and
* Evaluate the **outcomes of the efforts** in quantitative and qualitative dimensions.

Review of Literature

* *

II. REVIEW OF LITERATURE

The literature pertaining to this study was reviewed on the following lines :

A. Scope of Fisheries in India,

B. Efforts towards promoting Fisheries and

C. Women in Fisheries.

A. SCOPE OF FISHERIES IN INDIA

Agriculture and fishing are the two oldest occupations of the world. There are manifold similarities between fisheries and agriculture through the common use of land and water resources and concurrent food production activities. The sea as a biological environment is the source of food and other valuable products to man. It is the easiest available and inexhaustible source of food supply. Fisheries and agriculture often fall within one Government Ministry. Integration between the two sectors is an important means to enhance food production and food security (Drewes, 1982 ; Directorate of Fisheries, 1986 ; Ahilan, 1988 ; Clucas, 1990 and Directorate of Fisheries, 1997).

India is the sixth largest producer of fish in the world. India has a long coastline of about 7500 kms., along with an extensive fishing area over its continental shelf, covering an area of approximately 3,11,680 sq.km. The sea can provide a rich source of food in the form of fish and other sea foods. It provides food and employment to over five millions and earns foreign exchange contributing about 2.4 per cent of the GDP. In 1992-93 alone 2,08,600 mts., of

marine products with a value Rs.17,674 million were exported from India. Nearly 2496 marine fishing villages including 1654 major landing centres have been identified along the coastline (Directorate of Economics and Statistics, 1983 ; Natarajan, 1983 ; Srinivasan, 1986 ; Rajalakshmi, 1988 ; Government of India, 1991 ; Government of Tamil Nadu, 1992 ; and The Economic Times, 1994).

The Marine fish varieties of India are as follows :

Prawns : About 100 species of prawns are reported from Indian waters. The West coast and Southern coast contribute larger quantities (Fig. 1).

Sardines : There are 4 species available in Indian waters of which the most important is the oil sardines. The oil sardines occupy a unique position among the Indian fishes for food value and vast potentialities as an important industrial raw material.

Mackerel : Rastrelliger Kanagurta mackerel have been honoured as India's national fish by the government of India and occupies an important position in the country's fishery as a delicious, nutritious and highly relished food.

Pomfrets : These are one of the most highly esteemed table fishes of India both from the point of view of consumer acceptability, nutritive value and attractive flavour.

Seer : These are largely fatty fish, very tasty and popular as food.

Tuna : These resemble mackerel in shape and grow to a large size and inhabits the water of the tropical and temperate zones. Tuna is very tasty and nutritious being rich in Vitamin A.

TYPES OF FISHES

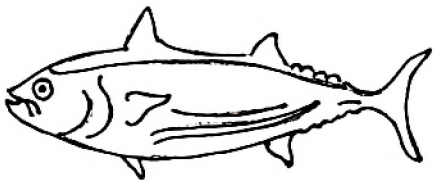
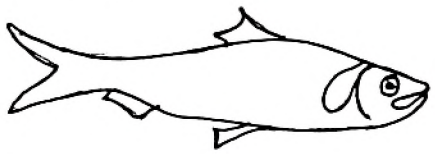
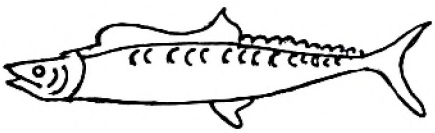
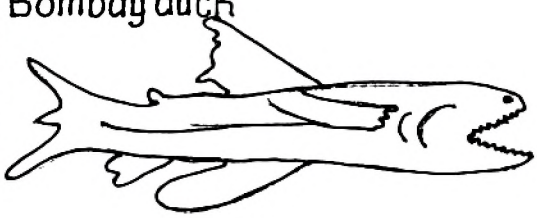
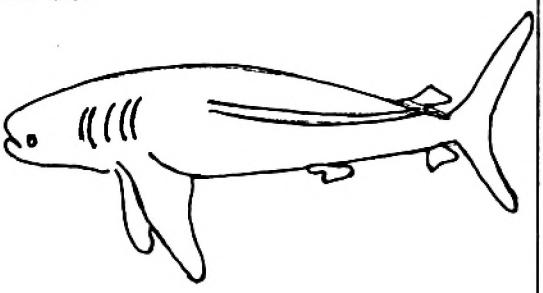
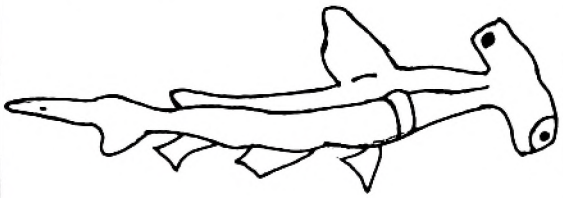
Prawns (Eral) 	Tuna (Surai) 
Oil Sardin (Mathi) 	Mackerel (Kannan Kaelithi) 
Pom fret (Vaval) 	Seer (Vanjaram) 
Bombay duck 	Whale 

Fig. 1

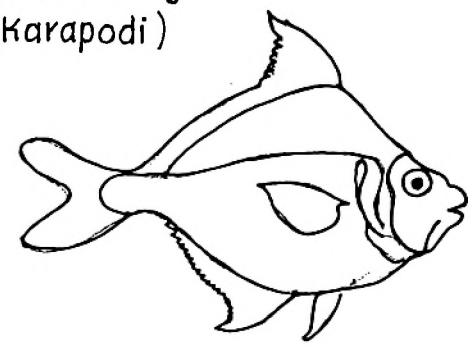
Ribbon fish
(Valai)



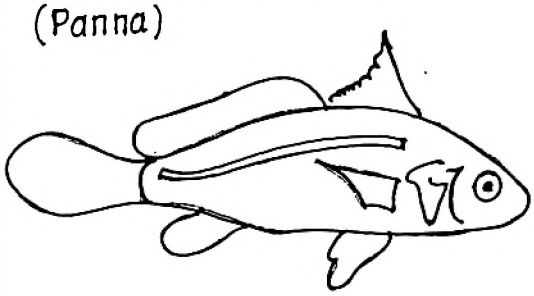
Hammer headed shark
(Sura)



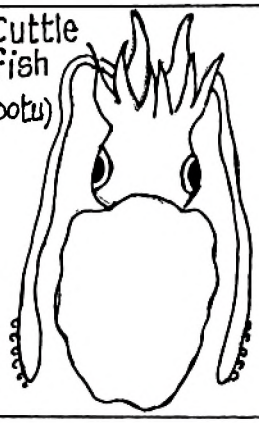
Silver belly
(Karapodi)



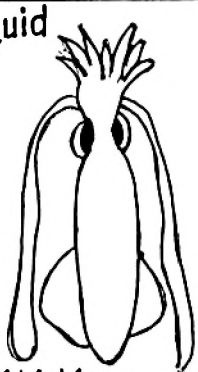
Sciaenid or Panna
(Panna)



Cuttle fish
(ootu)

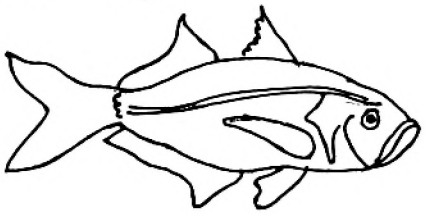


Squid

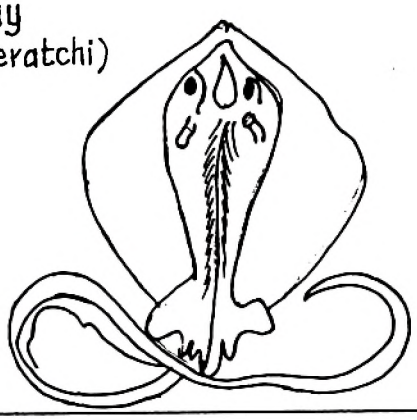


(oothichi Kannava)

Lactarius
(Sudhumbu)



Ray
(Theratchi)



Flat fish
(NakKumeen)



Bombay duck : Bombay duck is a carnivorous fish found along Maharashtra / Gujarat coasts.

Whale Shark : Some sharks are treacherous man-eaters. They are valued for the shark liver oil containing vitamin – D. They are also a source of insulin, besides the protein rich muscle fit for human and animal food.

Rays and skates : The sting is very poisonous. One of the species called electric ray produces electric current of such high voltage as to impart severe shocks to its enemies (Govindan, 1985).

Fisheries in Tamil Nadu

Tamil Nadu has a long and glorious tradition of maritime activity. The three ancient rulers namely the 'Cholas', the 'Cheras' and the 'Pandiyas' competed with each other in promoting maritime trade on par with other countries of the world. Currently, Tamil Nadu is one of the eight maritime states of India endowed with the second longest coastline of about 1000 km. Tamil Nadu ranks VIIth in the marine fish production in India. It has a continental shelf 41,412 km^2 and EEZ of 0.19 million km^2, covering the Coromandel Coast, Palk Bay, Gulf of Mannar and the West Coast, besides the 21 coral islands in the Gulf of Mannar. There are 33 species of fish found in the coastal districts of Tamil Nadu (Subramanian, 1986 and Government of Tamil Nadu, 1992).

There are 422 marine fishing villages in the 10 districts covering the coastline of Tamil Nadu. The number of landing centres used by all vessels is

362, of which six are exclusively for mechanised boats (Government of Tamil Nadu, 1991).

Thus Tamil Nadu with its vast aquatic resources has been making pioneering efforts in the development of fisheries for over centuries. Tamil Nadu also takes the place of honour in being the pioneer in fisheries research in India. It has the distinction of starting the first Marine Biological and Fresh Water Biological (Hydro Biological) research in India (Bay of Bengal Programme, 1983 ; Fisheries Research Cell, Trivandrum, 1987 ; The Marine Products Export Development Authority, 1987 and Bay of Bengal Programme, 1997).

Determinants of fishing activity

The pattern of fishing activity is determined by various factors such as length of the coastline, depth of the sea, continental shelf, location of harbour, ocean currents and the chemical contents of the sea. The determinants have been classified into physical, spatial, demographic and economic determinants.

Physical determinants : Physical determinants are related with the nature of land. Broken coastline and gentle slope with wide and shallow sea help for the existence of banks, which favour the growth of fish in the coastal areas. The coastline in the northern part of Tamil Nadu is more or less straight whereas the southern part of the coastline has bays (Rajakumar, 1990 and Rajyalakshmi, 1996).

The coastline length influences the distribution of fishing villages and landing centres. Among the 10 coastal districts of Tamil Nadu namely Chennai, Chengalpattu, South Arcot, Nagappattinam, Thanjavur, Pudukkottai, Ramanathapuram, Tuticorin, Tirunelveli and Kanyakumari, Chennai, Kanyakumari, Pudukkottai, Thanjavur and Tirunelveli have minimum share (Sampathkumar and Selvaraj, 1987 and Rajendran, 1992).

The amount of salinity of seawater determines the distribution of fish, sea animals and planktons in the sea. The salinity in the Bay of Bengal decreases from South to North. In Chennai ; the surface salinity ranges between 19.25 per cent in November to 28.13 per cent in June.

The temperature in the coastal water of Chennai ranges from 26.2 to 29.4° C. It is usually high during April – June and again during September – October (29.2 – 29.4° C) and cool during December.

Rainy season affects the production of fishing days. The normal rainfall of the state is about 945.7 mm with the maximum amount of rainfall being during North East monsoon period between October and November.

Cyclones are more frequent in the Bay of Bengal than in the Arabian Sea. Cyclone storms occur mainly during the pre monsoon (April and May) and post monsoon (October and December) periods, adversely, affecting the production of fish (Kalavathy, 1985 ; Kesava, 1985 and James, 1989).

The movement of a mass of water in a fairly defined direction under various forces (internal as well as external) is called ocean currents, which modify the distribution of temperature, salinity and plankton along the coast and it also helps in the dispersal of maritime life. In Chennai, the currents along the coast is North to South during November – December and South to North during February – May (Jagannathapati, 1994).

The following are the fishing seasons at Chennai :

Season – January to September

Bloom – April to June and August and September

Off season – October to December (North East monsoon) (Ela, 1987).

Landing centres are places where the fishermen land their catches along the coastline. A place at which the ships load and unload goods is called 'Harbour'. Chennai and Tuticorin are the two main harbours in Tamil Nadu. There are four medium centres and all the other centres are jetties, with landing piers like a junction between places separated by water.

Tamil Nadu has two types of fishing - inshore fishing where small vessels like catamarans are used and off-shore fishing where large fishing vessels are used and the fishermen venture into sea for a period of one month or more (Sarguna, 1998).

Tamil Nadu exports marine products to Japan, United Emirates, USA, South East Asia, Middle-East and other countries. Japan, the second largest

country in fish production in the world also imports from Tamil Nadu, tropical fish like sardines, mackerel, scrombroids, cat fishes, prawns, pomfrets, sole fish and perches, not available in Japan (Commissioner of Statistics, 1989).

Fish in human nutrition : Malnutrition is threatening the economic development of the third world countries. Nutritionally adequate diets, optimally utilising the locally available food sources is the answer to combat malnutrition in these countries. For the poor and common man, fish is nutritionally important. It provides easily digestible protein, which has an amino-acid profile, particularly lysine, not necessarily available from other proteins. Fish fat is rich in polyunsaturated fatty acids which have health benefits and growth in the development of brain and nerves, fetal and infant and in protection against cardio-vascular diseases and diabetes, infections and even some types of cancer (Venugopal, 1992 and Dora and Chandrasekhar, 1996).

Fish is a rich source of Vitamin A, B_{12}, D and E. Fish also contains trace elements like selenium, low sodium and other minerals of nutritional significance like calcium, potassium, iron and copper. In India only 56 per cent of people are fish eaters. Surveys conducted in Coimbatore reveal that a considerable number eat fish once a week and the majority consumed fish like Mackerel, Salmon and Sardines (Devadas, 1981 and Devadas and Easwaran, 1981).

Fish for industrial use : Several types of trash fish which do not command any worthwhile demand as table fish can be considered as by products of fishing

industry such a fish powder, fish liver oils, lubrication oil, paint base, printing ink, fish – skin – leather and pet foods (Durairaj, 1981).

Transportation

For marketing at nearby places within 10 kms., the fish is transported in baskets by means of a cycle or head load without icing. For despatch to distant markets by trucks or train, fish is packed in baskets in leaf mats or old tea chests with layers of ice and strongly bound by ropes (Kandoran, 1985).

The physical flow of fish in domestic markets is thus :

50 per cent of the catch consumed within 40 kms. from coastal line

45 per cent consumed between 40 to 200 kms. and

5 per cent consumed beyond 200 kms., (Edin and Ydell, 1991).

The Bay of Bengal Programme in Periakuppam fishing village (near Mahabalipuram in Chingleput district, Tamil Nadu) made available a tricycle to help women fish vendors to transport fish. Funds for the tricycle were provided through NGOs. The tricycle alleviated the hardship, saved time and effort. The tricycle had been a multi purpose convenience. It had saved lives on a few occasions by rushing people injured or critically ill to hospital. It transported not only fish, but also vegetables and groceries and cement for construction (Bay of Bengal Programme, 1980 ; Balasubramanian and Perumal, 1993 and Jancy, 1993).

Technologies

Several technologies have been evolved to increase fish production and better utilization, The impact of a new technology on the largest group of small scale fisherfolk and on other stakeholders have to be assessed in terms of the infrastructure locally available, the appropriateness of the technology for small processors and the time taken for processing. Inputs for artisanal fisherfolk should involve low technology and manufacture by local artisans using locally available materials. They should be easy to manage, maintain and repair (Kandoran, 1990 ; Ahilan and Selvaraj, 1991 ; Johny, 1991 and Mohan, 1991).

Several types of fishing crafts have been evolved and are in use to suit the environmental and biological requirements of each locality. Three types of fishing crafts viz., (a) catamarans, (b) plant built boats (vallam) and (c) mechanised boats are commonly used for fishing in the sea waters of Tamil Nadu (Shaleesha, 1992). The fishing implements or tackles used for catching fish are numerous including boat seine, trawl nets, drift nets, fixed bag nets, in shore drag nets, gill nets, cast nets, hooks and lines and shore seine nets (David, 1975).

The mechanisation of fishing vessels, introduction of different types of synthetic fibers for fish nets and modernisation of fishing gears and methods have revolutionised fishing resulting in substantial increase in the catches. But due to cost escalation and higher cost of fuel, the operation and maintenance of mechanised fishing boats became uneconomical which resulted in fishermen not going in for mechanised boats from the late seventies. Stress is now to go in

for smaller crafts with low horse power engine thereby reducing the initial cost and the operational expenses on fuel, etc. Efforts are made to mechanise the traditional fishing crafts like catamaran, canoes and vallams with in-board and out-board engines (Velayudhan and Sidharthan, 1989 and Ahilan, 1993).

Baskets made of split bamboo, palmirah, leaf matting, plywood boxes, etc., are used as containers. To improve the functional properties of bamboo baskets, it can be lined inside with polythene and exterior wrapped with gunny and firmly secured by screwing. For short distance transportation of iced fish upto 16 hours duration these non-returnable cheap containers serve the purpose. Containers used for long distance transportation up to 60 hours duration are plywood boxes with thick foamed polystrene slabs inside on all sides. Chemical methods used for transporting fish is by addition of salt, acid and exposure to smoke (Council for the Advancement of People's Action and Rural Technology (CAPART), 1986 and Balasubramaniam et al., 1993).

The earliest method ever to be employed for preservation of fish in the country and by which $1/5^{th}$ of the total landings is still being preserved is salt-curing and drying. Utilization of processing wastes and by products and development of diversified products from fish are the spectacular achievements recorded (Shasi and Ramachandran, 1994).

Freezing involves removal of heat from the product by which the water is converted to ice. Usually the temperature of the product is reduced to 20°C or below. Canning is the action of enzymes and bacteria in the fish products

suppressed by the application of heat to the product in an airtight container (Thankappan et al., 1990 and Salagrama, 1998).

There has been an increasing demand for marine products during the period from 1984-85 to 1994-95. During this period, changes had been taking place in different markets in terms of quantity and value. An increased demand for value added products in European countries was also observed (Frej and Gustafsson, 1993 and Kumar et al., 1997).

Fish pickles, fish wafers and dried fish have a good market potential and can be produced by small scale units. The eco-viability of production of these products has been worked out (George et al., 1992).

B. EFFORTS TOWARDS PROMOTING FISHERIES

1. Efforts by the Government of India

Fishery Surveys : The Fishery Survey of India, Mumbai is the nodal agency of the country responsible for survey and assessment of marine fishery resources of the Indian Exclusive Economic Zone (EEZ). The Institute has 12 ocean-going survey vessels being operated from seven bases, namely Porbandar, Mumbai, Mormugao and Kochi along the West Coast, Chennai and Vishakapatnam along the East Coast and Port Blair in the Andaman and Nicobar Islands (Bay of Bengal Programme, 1992).

The survey programme for the year 1997-98 covered four broad areas, namely (a) Demersal resources survey and monitoring of the stocks on the

continental shelf and slope along the West and East Coasts, (b) Pelagic resources survey of coastal pelagic resources by mid water trawling along the Orissa-West Bengal Coast, (c) Oceanic Tuna / Shark resources Survey of oceanic tuna resources along the North-West Coast and Andaman and Nicobar Waters and shark resources along the lower East Coast and (d) Experimental projects undertaken for selective fishing methods (Muthiah, 1988).

Development of marine fisheries : Apart from six major fishing harbours, 29 minor fishing harbours and 120 fish landing centres have been constructed to provide landing and berthing facilities to fishing crafts (Department of Industrial Fisheries, 1995). The Government is providing subsidy to poor fishermen for motorizing their traditional crafts which increase the fishing areas and frequency of operation with consequent increase in catch and earnings of fishermen. About 33,000 traditional crafts were sanctioned to be motorised up to 1996-97. Improved beach landing crafts made of plywood, fibre glass and other light materials are also being supplied to groups of fishermen. The Government has also been operating a scheme of re-imbursing the central excise duty on HSD oil used by fishing vessels below 20 m length to offset the operational cost, incurred by small mechanised fishing boat operators (Lathiban and Selvaraja, 1988 and Menezes, 1991).

Fish processing : Processing of marine products into canned and frozen forms is carried out almost entirely for the export market. In all, there are 399 freezing units, 13 canning units, 150 ice-making units, 16 fish meal units and also about

474 cold storage units in the marine product industries (Dhal and Foresgrem, 1988 and George et al., 1992).

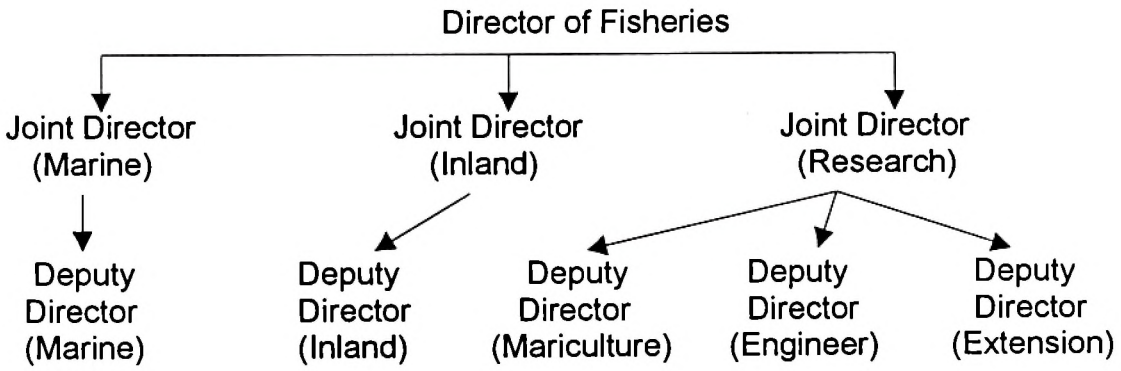
Welfare programmes for traditional fishermen : There are two important programmes for the welfare of traditional fishermen, namely, (i) Group Accident Insurance Scheme for active fishermen and (ii) Development of Model Fishermen Village. From 25 March 1997 fishermen are insured for Rs.35,000 in case of death or permanent disability and Rs.17,500 in case of partial disability. A single policy has been taken in respect of all the participating states through FISHCOPFED and the premium would be Rs.12 per beneficiary. Annual premium is shared equally between the Centre and the States. About 11.62 lakh fishermen have been insured during 1997-98. Under the programme of Development of Model Fishermen Villages, basic civic amenities such as housing, drinking water and construction of community hall for fishermen villages are provided. About 18,800 houses have so far been constructed for fishermen. In addition to the houses, tube wells and community halls have also been provided (Rajkumar, 1990 ; Ranjani, 1992 and Rao et al., 1996).

Specialised institutes : The Central Institute of Fisheries Nautical and Engineering Training, Cochin, aims at making available sufficient number of operators of deep-sea fishing vessels and technicians for shore establishments. It has a unit each at Chennai and Visakhapatnam. The Institute has an intake capacity of about 200 trainees per year. Integrated Fisheries Project, Cochin, envisages processing, popularising and test marketing of unconventional

varieties of fish. The Central Institute of Coastal Engineering for Fisheries, Bangalore is engaged in Techno-economic feasibility study for location of fishing harbour sites and farms / sites for coastal aqua culture (Mathew and Nair, 1996).

2. Efforts by the Directorate of Fisheries, Tamil Nadu

The Directorate of Fisheries is the apex body of the State Government to assist fisherfolk. The Directorate is headed by a Director / Commissioner of Fisheries from the Indian Administrative Services (IAS) who is assisted by three functional Joint Directors and five Deputy Directors as follows :



There are five regions at Chennai, Nagapatinam, Tuticorin, Madurai and Coimbatore.

In the state there are four inshore fishing stations, six fishermen training centres, three extension units and two brackish water survey and extension units. There are fishery departments in 10 districts of the state (Directorate of Fisheries, 1997).

The functions of the fishery department are :

* contributing to the general economic development of the state.
* providing a source of cheap and easily available animal protein.
* increasing the foreign exchange earnings.
* providing employment opportunities.
* improving the socio-economic conditions of the fisherfolk.
* providing adequate infrastructural facilities like landing and berthing facilities and shore based facilities.
* strengthening fishermen co-operative societies and giving input loans with subsidy for buying crafts, gear etc.
* organising extensive fish culture through fishermen's development agencies.
* transfer of technology to fishermen / fish seed producers / marine fishermen.
* motivating and assisting the Panchayat Union / Councils to do fish culture, etc., in the irrigation tanks in their area.
* Implementing welfare measures which include, supply of out board motor, In board motor, supply of crafts under 20 per cent subsidy, supply of gear to traditional craft, saving – cum relief schemes during lean season, fishermen group accident insurance scheme, community hall in fishing villages, free housing scheme, link road to fishermen colonies, cyclone shelters, distribution of tricycles and aluminium containers.

* Implementing women specific schemes such as registration of societies, training for income generation activities, practical training programme and improving administrative training (Government of Tamil Nadu, 1992).

National Government Institutions involved in Post-harvest fisheries

The responsibility for development of the fisheries sector lies with both the Union and State governments. A variety of institutions have been set up over the years to provide a strong base for development of fisheries in India. Most of these have some influence on post-harvest issues, either directly or indirectly (Government of India, 1992).

Training

The objective of the training programme is to impart knowledge on the causes of fish spoilage and methods of prevention or control of deterioration of fish due to bacterial action. The programme included practical training in the methods of hygienic handling of fish and shell fish, preparation of diversified products such as wafers, soup powder, cutlets, fish fingers, curries, picklets, etc., (Khader and Ramanamma, 1994).

The Department of Fish Processing Technology of Fisheries College and Research Institute, Tuticorin has conducted training programmes sponsored by the District Rural Development Agency on "Value Added Fishery Products" for the upliftment of fisherfolk and downtrodden under the Integrated Rural Development Programme. The institute has offered 20 programmes for

500 trainees. The effectiveness in adoption of these technologies and constraints encountered by them were analysed. About 10 per cent of the trained persons were involved in producing and marketing fishery products. Out of the 10 per cent, progressive entrepreneurs constituted 4 per cent. Unfamiliarity with marketing and difficulties in bank procedures for availing financial support were the major constraints (Rathnakumar et al., 1994).

The Bay of Bengal Programme (BOBP) was a multi-agency regional fisheries programme, covering seven countries around the Bay of Bengal, Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka and Thailand. The BOBP was sponsored by the governments in the Bay of Bengal region and also by AGFUND (Arab Gulf Fund for United Nations Development Organisations) and UNDP (United Nations Development Programme). The main executing agency was the FAO (Food and Agricultural Organization of the United Nations). The Programme played a catalytic and consultative role : it developed, demonstrated and promoted new techniques, technologies or ideas to help improve the conditions of small-scale fisherfolk communities in member countries (Townsley, 1993).

C. WOMEN IN FISHERIES

In fishing and related activities, the division of labour between sexes is distinct. Men are involved in fishing, crafts and gear maintenance and other activities requiring high physical effort, while women are mostly confined to shore line activities including fishing and shell fishing in shallow areas, curing, drying,

product making, transport and vending (Dantwala et al., 1998). Fisherwomen who are equal to men in population size, are completely dependent on the male folk for all their needs, as they are devoid of any substantial occupation (Joseph, 1989 ; Rajalakshmi et al., 1990 and Kamila and Salagrama, 1997).

In spite of the abundant micro studies on maritime cultures and industries, the role that women play in fisheries is even less reported at the national level than their role in agriculture (Adamkeuper and Jessica, 1992). Women play a significant and crucial role in agricultural development and allied fields including the main crop production, livestock, horticulture, post-harvest operation, agro-social forestry and fisheries. A number of factors which stem from the historical and cultural evolutions and socio-economic environment shape female labour participation (Baetiz, 1975 and Kaul et al., 1987).

Fisherwomen in India constitute half of the total fisherfolk and are directly or indirectly involved in various fisheries activities either on a part time or a full time basis (Marshall and Rosman, 1989). When women are involved in large scale vending, they have to go to distant landing centres to purchase fish. The women walk 4-5 km under blazing sun to catch public buses, carrying head loads of fish that weigh as much as 35 kg. There are problems with the traditional baskets used, to transport fish in public buses as they are not permitted to travel in trains / buses and therefore have to hire lorries. Sitting for 20 – 24 hours with their loads and to get back to their homes is drudgery ridden (Brandt, 1984 and Gnanasoundaravalli and Sithalakshmi, 1992).

Women seldom fish on the open sea owing to the length of absence required which would interfere with family obligations, the physical strength demanded by commercial fishing and the taboos associated with (Ambrose, 1987). Women take care of shore based activities such as fish handling, processing, distribution and marketing. Women's main commercial role in marine and fresh water fisheries is to be found essentially in processing and trading. In fisheries women are mainly involved in the process after the fish is landed. Once the catch is landed women take over the entire post harvest.

They also take the responsibility of cleaning, repairing and maintenance of fishing nets. In most areas women make and repair items used by the fishermen, particularly nets, traps, ropes, baskets, packing materials, etc. Whatever be the preservation technique it is usually women who handle the packing of processed fish for storage and shipment, using locally made materials. A majority of the workers in all the modern fish processing plants especially in the shrimp processing plants are women (Sathiadas and Venkataraman, 1983 ; Srinivasan, 1986 and Sathiadas and Panikar, 1989).

A majority however depend on the husband's income alone, making only their invisible contribution through their unpaid work (Anbarasan and Fernandez, 1986 ; Dharmarajan, 1987 ; Kumar, 1990 and Ranjinadoss and Jaffry, 1998).

The socio-economic structure of small scale fisheries in India is very complex and there are many factors which influence the participation of women

in fishery related activities like prawn peeling, fish curing, drying and marketing, fishing in the canals and calm shell collection (Kumari, 1981). Presently, the participation of women in aqua culture is on a very limited scale but the possibility of their participation is enormous. As entrepreneurial skills are developed, women are involved in several seasonal or year round aqua culture activities (Sridevi, 1986 ; Sukumar et al., 1988 and Sudhakar and Rao, 1994).

The women in any fishing community may be classified as follows :

1. Head loader fresh / dried fish marketing women hailing from poor families which are in most cases without male members or with earning male members who are engaged as crew in country crafts.
2. Fisherwomen hailing from boat / net owning class engaged in fish processing but are not involved in direct sales of fish-fresh / dried (Senthilathiban, 1985 ; Sankaran, 1984 and Singh, 1992).

In the case of the latter category of women, the fish sales are done through their male members or through traders visiting their villages. Due to cultural values which coincide with the value system of middle class women, these women in general are not much engaged in direct fish marketing (Sathiadas and Venkataraman, 1981).

Women engaged in fish marketing possess a low status in the society. There is a higher incidence of participation in fish marketing by old and middle aged women (Jayakumar, 1993).

The introduction of improved technology can make women redundant. Nylon nets and net making machines have displaced women in many countries from the cottage industry of hand braiding. Ice plants and processing factories displaced women from smoking and drying occupation. Urbanisation in the third world has led to greater demand for fish in towns and cities. Very often fisherwomen because of cultural barriers cannot become very mobile and they are forced to shift from the trade owing to competitions from men who can ride bicycles or rickshaws (Dehradrai, 1987 and Srivastava, 1993).

In all countries, both developing and developed, with an export oriented fishing industry, it is women who work as low paid labour in the processing lines to sort and pack shrimp and to dress fish for canning and freezing. Most women have very little education and are often illiterate. They do not support higher education for their daughters, thus perpetuating a vicious cycle. Due to lack of information, they are unaware of public services for infrastructure ; credit or extension. The skills they posses such as net making and repair get lost from one generation to the other, when the demand for them disappears (Dehradrai, 1987).

Though the state has ample potentially for fish production, the poor and backward economic condition of fishermen forms the first and foremost constraint for the exploitation of available resources. They are not able to purchase mechanised boats and use modern methods of fishing. Hence they are still practicing the indigenous way of fishing. The primary urge of the average

fishermen on landing ashore is to dispose of his catch as soon as he can, maintain / repair his craft and gear, get a good drink and a good rest and get ready for the next day's fishing. The poor fishermen suffer at the hands of upper classes, who own trawl nets and boats (Thanasekaran et al., 1984 ; Government of India, 1988 ; Kleitman, 1994 and Jonise, 1998).

The marine fishery resources are unevenly exploited. Several problems exist in full exploitation of under utilized fish as source of human food. To utilize the potential areas, more investment and skills in fishing technology are needed, which the small scale fishermen cannot afford. These problems give less scope for women commercial processing of fish species by conventional techniques such as freezing, canning, modified atmosphere storage, etc., (Narain, 1983 ; Srivastava, 1983 and Thomas and Mathew, 1998).

In spite of several decades of continued efforts, the majority of the traditional fishermen still remain below the poverty line (Jagannathpati, 1994). Post-harvest fisheries, being closely linked to production is obviously affected by any issue that affects production. There are a number of critical issue, technical, environmental, social and economic which the fisheries sector, including post-harvest is grapping with (Lindgen, 1985 and Maheswari, 1985).

Lack of suitable infrastructure including transportation and ice making plants increases the problem of rapid spoilage. Handling sites are often remote and it is not economical to provide the infrastructure needed to preserve fresh fish either on board or immediately on landing (Venugopal et al., 1998).

Even when landing sites and roads exist, it is often not economical to transport the catch. Solutions are not easy as they must address a complex and sometimes conflicting range of issues at both the micro and macro level. Many enterprises in artisanal fisheries both development oriented and profit motivated have failed because new methods / tools technically sound have not been acceptable to fisherfolk (Kurien, 1978 ; Muthayya, 1980 ; Joseph, 1989 and Jayaraman, 1991).

Methodology

* * * *

III. METHODOLOGY

This action research on **"Capactiy Building of Fisherwomen – A Participatory Approach"** was carried out in the following sequence :

A. Selecting the Locale for the Study
B. Making the Situational Analysis
C. Capacity Building of the Fisherwomen and
D. Measuring the Outcomes of the Capacity Building Efforts.

A. SELECTING THE LOCALE FOR THE STUDY

This study was carried out in Mattaankuppam, one of the 44 fishermen dwelling areas of coastal Chennai, the capital of Tamil Nadu. The Kuppam is located at 'Kannaki Beach', Triplicane, Chennai. It was selected owing to its proximity to the researcher, who hailed from Chennai.

The locality is surrounded by all important landmarks. A highway runs between the Kuppam and the sea-shore. A sub-urban railway with 'Mass Rapid Transport System' (MRTS), exists at a few yards from this Kuppam. The fisherwomen of Mattaankuppam were found actively involved in fishing.

B. MAKING THE SITUATIONAL ANALYSIS

'Participatory Rural Appraisal' (PRA) was adopted to study the socio-economic profile of the fisherfolk. PRA is an informal approach of collecting information in a short time. PRA comprises a rich menu of visualisation, interviewing and group work methods, revealing the complexities of social structures and mobilising and organising local people (Vijayaragavan et al., 1992). The PRA methods / exercises used in this study are summarised in Table I.

TABLE I

PRA METHODS USED IN THE STUDY

S.No.	PRA Methods	Purpose	Procedure	Persons Involved	Materials Used
1.	Participatory Mapping	To show the topography of the 'Kuppam' indicating the location as well as key areas. This helps to understand the existing facilities and gives useful information on the present status of the kuppam for any future plan of development.	First, a good rapport was developed with the fishermen and women. The temple campus was selected for doing this participatory mapping exercise. The kuppam map was drawn on the floor using colour (Rangoli) powder. It took about four hours to complete the colourful mapping.	Nearly 30 women and 20 men participated.	Rangoli powder (colour powder normally used to make decorative designs on the floor).
2.	Transect walks	These are systemic walks with key informants through the area of interest, observing, asking, listening to, looking at and identifying different zones in the area. It is very valuable for learning the real topography of the area. It offers an opportunity to explore the full spatial differences in the area of study.	A transect walk was made across the fisherfolk settlements, accompanied by a group of elderly fisherfolk. The East West transect was between the kuppam and the beach front. An interaction was made with the fhsherfolk and a semi-structured interview was also conducted to elicit information on the population, language, family type, family norms, labour force, literacy rate and housing conditions.	Twenty fisherwomen and men, including society leaders, elderly and experienced.	Information was recorded by the researcher.

3.	Wealth Ranking	To identify groups or clusters of households, according to their relative wealth or well-being which is useful for leading into other discussions on livelihood and vulnerability. The data gives a baseline against which future intervention and impact can be measured.	The entire exercise started with a discussion with the fisherfolk, asto how their kuppam could be classified according to the wealth. Data was collected on economic setting, income group and material possessions.	Fifteen men and 25 women participated in this exercise.	Chalk pieces and Rangoli powder were used for the diagrams.
4.	Seasonal Calendars	To explore seasonal changes, opportunities and constraints, month by month throughout the year ; Festivals, functions and ceremonies are noted to cross-check data.	Senior fishermen and women were involved in this exercise. Marking was done on the factors such as employment pattern, labour distribution (male and female), seasonality of fishes, demand for selected fishes, income and expenditure pattern.	Ten senior fishermen and ten fisherwomen participated.	Chalk pieces, match boxes, stones, seeds and Rangoli powder were used.
5.	Daily Activity Profile	To explore the daily routine and patterns of activities on the sea-shore and in the households.	The fisherfolk were asked to trace out their daily activity profile.	Ten fishermen and 15 fisherwomen were involved.	Data were recorded by the researcher.
6	Historical Profiles and Trend Analysis	To examine the historical events in the kuppam with events indicated in a sequence wherever possible.	Through a semi-structured interview with the elderly women the events and the changes that took place in the kuppam were elicited.	Five elderly women were involved.	Data was recorded by the researcher.

7.	Venn Diagrams	To represent people, groups, institutions and distances. They are arranged to represent the degree of real overlap.	A small group of women who could read and write were asked to draw the map of the kuppam focussing on infrastructural facilities available. The degree of interaction among these institutions as perceived by the fisherfolk was marked.	Twenty five fisherwomen and five fishermen participated.	Chalk piece, pen, pencil and a pair of scissors were used.
8.	Matrix Scoring	These versatile methods confirm their value for learning from local people. For pairwise ranking, items of interest are compared pair by pair and informants asked for their preference. Matrix scoring was done to understand the following : 1. Livelihood occupations 2. Motivating and facilitating factors 3. Energy management 4. Income and expenditure pattern 5. Saving and debts 6. Decision making practices 7. Transformation. 8. Attitudes of fisherfolks.	The criteria were scored on the rows and items in columns and then the participants filled in the boxes for each row and column by putting piles of stones, seeds, berries.	Fifteen women and 12 men participated.	Seeds, stones, berries, match boxes, etc. were used.

9.	Systems and Flow Diagrams	* To undertand the flow of various resources within the kuppam and households. * To learn about mediating variables, influencing their decision making practices on fishing activities. * To study the fiserfolk perception on sequence treatment of fish to reach human beings through systems diagram. * To study the food web as understood by the women.	The men and the women drew the resource flow diagram within the kuppam and hosueholds. Educated children also helped to show pictorially the systems diagrams.	Ten men, 15 women and 15 youth participated	Chalk piece and Rangoli powder were used.
10.	Participatory Diagramming	Topics that include conflicting sources are marked using diagrams such as pie-diagrams. In this study there were used to know the 1. Type of Sales 2. Task Performance 3. Problems encountered 4. Expenditure Pattern and 5. Participation of women in post-harvest fishing activities.	Pie diagrams and bar charts were drawn by the investigator. Marking and colouring were done by the participants.	Ten men and 20 women participated.	Chalk pieces, seeds, stones and Rangoli powder were used.
11.	Preference ranking	* To rank the order of importance. The outcomes include * Ranking the institutions in order of importance. * Ranking the constraints faced in adopting the technologies	The factors were marked by the investigator and scoring was done by the participants according to the order of their preference using numbers cut from calendar.	Five men and 10 women participated.	Sticks and numbers cut from calendars.

12.	Semi-structured interviews	This is a guided interview and listening to some of the questions and topics predetermined during the interview. In this study, semi-structured interviews were conducted to elicit details on * Sea farming profile * Technology details * Profile of women * Food management * Health * Analysis of problems and * Constraints.	A simple check list to study factors which cannot be represented pictorially.	This was used in addition to PRA methods.	Data were recorded by the researcher.

The PRA methods employed in this study were carefully selected based on the data required and keeping in mind the background of the participants. Since fisherwomen play complementary roles with fishermen and youth, all the three were involved in the PRA exercises.

C. CAPACITY BUILDING OF THE FISHERWOMEN

The PRA exercises brought to light the socio-economic conditions of the fisherfolk under study and revealed the need to build up the capacity of the fisherwomen to promote their quality of living. The capacity building efforts included education on appropriate technologies and exposure to developmental inputs.

1. Education on appropriate technologies

Fish drying was the major activity in which the fisherwomen of the kuppam were indulged in. The PRA exercises pointed out the following problems encountered by the fisherwomen in drying fish :

* Drying was done at unhygienic public places due to non-availability of drying space near their households. The Public Works Deparment had objected to the putting up of permanent platforms on the sea-shore for drying.
* While drying fish over the sand and on the platforms only the top layer was dried ; the moisture was still found at the bottom surface leading to

easy spoilage. Rain, overcast skies and high humidity further prevented fish from drying quickly and completely.

* Due to drying on unhygienic places, the quality of the product was poor and the rate fixed for this was very low.

These constraints called for the need to get drying done hygienically on clean platforms, at a faster rate so that the quality of the product would be good to fetch higher prices. The fisherwomen preferred a portable type of low cost equipment for drying. This prompted the researcher to design the following low cost devices for drying fish and motivate the fisherwomen to adopt the same.

a. Bamboo Dryer

This device was meant for drying fish in a hygienic way at an elevated level so that the fish to be dried could be free from the dust and dirt from the floor.

Large bamboo poles were used on the four sides encompassing thin bamboo pieces woven in the form of a mesh, to allow draining of water during the drying process (Fig. 41). During heavy windy season, a nylon net may be spread on the rack to protect it from wind, dirt and dust.

b. Solar Dryer

This device was designed using bamboo frames encompassing aluminium mesh coated with black non-corrosive paint for absorbing heat to speed up the

drying process. The porous holes in the mesh would help to drain off the water. Large bamboo poles were used for square lashing at the borders. A net was tied over the protruding structure for protection against dust, rain and flies. (Fig. 42). Like the bamboo dryer, the solar dryer was also portable.

Both the bamboo and solar drying racks could be used for drying two kgs. of fish at a time. These racks could be constructed quickly, from low cost locally available materials. The bamboo drier of size 4' x 2' could be constructed for Rs. 150 and the cost of the solar dryer of size 4' x 2' was Rs.300.

Demonstrations were conducted for 30 fisherwomen and 20 fishermen leaders on how to use the above devices. The following sequence was used.

Washing Fish

↓

Gutting and Filleting

↓

Washing the Dressed Fish

↓

Draining the Water

↓

Salting*

Drying on the Bamboo / Solar Dryer

(*Salt proportion varied from 1:3 to 1:10 fish to salt) depending upon the size of the fish)

Training on Hygienic Handling of Fish

The Technical Officer from the Export Inspection Agency, Chennai was invited to conduct training on 'hygienic handling of fish', grading of fish on the basis of their texture and quality for export and application of bleaching agents and preservatives. The resource person also explained to them the possibility of getting financial assistance from different government and private agencies. Fifty participants - 15 women, 15 men and 20 youth participated in the training programme.

The researcher gave training to the fisherwomen on different methods of fish processing for consumption, different fish food recipes and methods of fish pickle making wherein 25 women and 20 youth participated.

2. Exposure to developmental inputs

In addition to technology transfer programmes, several efforts, were undertaken to improve the quality of life of the fisherwomen through exposure to developmental inputs. Table II gives the complete details about these capacity building efforts. Fifty participants consisting of women (15), men (15) and youth (20) were exposed to these educational programmes.

TABLE II

EXPOSURE TO DEVELOPMENTAL INPUTS

S.No.	Themes	Resource Person / s	Ideas Imparted	Number Participated	Infrastructure Utilised
1.	Awareness on welfare measures by the state government	Mr.Gajendran, Inspector of Fisheries, Extension Department, Directorate of Fisheries, Teynampet, Chennai – 82.	* Awareness on the various programmes, introduced by the State Government for the development of the fisher community. * Procedures for enrolment in the society. * Possibilities of taking the problem to the State Director of fisheries.	Men (15) Women (15) and Youth (20)	- Temple campus - Visit to the State Department of Fisheries to submit the petition to Shri.Hans Raj Verma, IAS, Director of Fisheries, Government of Tamil Nadu.
2.	Awareness on Entrepreneurship Development for Women	Mrs.Sulochana Ramaseshan (Vice President) Mrs.Nagarathinam (Co-ordinator) Women – Welfare and Service by women Exnora International Co-ordinator. Exnora Women's Guides and Shakthi, Chennai – 17.	Awareness on various types of income generation programmes such as tailoring, toy making, waste material management, papad and phenyl making.	Men (15) Women (15) and Youth (20)	- Temple campus. - Visit to the Exnora office

3.	Vocational Skill Training a. Computer Training for Youth	Mr.Rangaraja, Instructor, Computer Training Centre, Nandanam, Chennai (Exnora Group).	* Training was imparted in Basic Computer Programme, E-mail and Internet to interested educated youth belonging to the Kuppam. * How to enrol for employment.	Youth (20)	Computer Training Centre, Nandanam, Chennai.
	b. Demonstration on sea-shell fancy articles making	Mr.Sashi Kumar, Beneficial Entrepreneur, Mattaankuppam, Chennai.	* Demonstrated the making of different art pieces from sea-shells.	Men (15) Women (15) and Youth (20)	House terrace
4.	Awareness Generation on Legal and Social Issues a. Legal provisions and safeguards	Women Police Inspector, Triplicane Police Station, Chennai	* Awareness on legal rights for women * Legal protections available to women * How to approach the police	Men (15) Women (15) and Youth (20)	Temple campus
	b. Social Welfare Programmes	Social Welfare Officer – Social Welfare Department, Chennai	* Awareness on social welfare programmes for women	Men (15) Women (15) and Youth (20)	Visit to Fisheries Staff Training Institute, Adayar, Chennai.

5.	Credit support through commercial banks	Mr.P.Selvaraj, Branch Manager, NABARD, Chennai.	Imparted knowledge and ideas on 'Self Help Group' (SHG), formation and various loan facilities available to the SHGs.	Men (15) Women (15) and Youth (20)	Fisheries Staff Training Institute, Adayar, Chennai.
6	Education for Better Family Living a. Nutrition and childcare	B.Shanthi, IARS, Scientist (CTCRI) (Investigator)	* Low cost locally available nutritious diets. * Methods of conserving nutrients while cooking. * Child care practices. * Care of pregnant women	Men (15) Women (15) and Youth (20)	Houses / campus
	b. Health and Hygiene	Medical team from EXNORA	* Awareness on different infectious diseases. * Vaccination camps for infants. * A General health check-up for all participants.	Men (15) Women (15) and Youth (20)	EXNORA Group
	c. Sanitation : Street Cleaning Programme	EXNORA Groups	* Cleaning of streets and drainages around the area. * Disposal of wastes. * Frequent collection of wastes disposed from the kuppam by tricyles.	Men (15) Women (15) and Youth (20)	Streets
	d. Seminar on 'Solid Waste Management' and Awareness on EXNORA Programme	Shri B.Nirmal, Founder, EXNORA and Mr.Rajan Philip	* An association known as 'Kannaki EXNORA Sakthi' was registered with 35 members. * A seminar on 'Solid Waste Management' was attended by the participants. * Awareness on Exnora Programme	Men (15) Women (15) and Youth (20)	EXNORA Office.

As indicated in Table II, the fisherfolk were exposed to a variety of developmental inputs, with thrust on awareness generation, which is fundamental to work out the agenda for action. The EXNORA group helped the investigator to get very good resource persons. EXNORA (acronym for Excellent, Novel and Radical ideas) is an International Organisation aiming at collective action to protect environment through promoting sanitation, hygiene and waste management. This organisation has membership from different walks of life and can offer expertise and consultancy to the needy.

D. MEASURING THE OUTCOMES OF THE CAPACITY BUILDING EFFORTS

The outcomes of the Capacity Building Efforts were measured on the following lines :

1. Evaluating the efficacy of the newly designed fish dryers.
2. Assessing the impact of exposure to Developmental Inputs and
3. Preparing a perspective plan for an integrated system of fishing.

1. Evaluating the efficacy of the newly designed fish dryers

The fish dryers newly developed were given to five women leaders in the kuppam who were asked to use the two dryers for a period of 15 days each and compare the efficacy of the dryers against the traditional drying procedures. Their opinions were recorded by the investigator.

2. Assessing the Impact of exposure to developmental inputs

The participants who were exposed to different developmental inputs were asked to evaluate the benefits using a proforma given in Appendix I.

3. Preparing a perspective plan for an integrated system of fishing

Since the focus of this study is on participation, it was envisaged that the women who had taken part in the PRA exercises, and were exposed to the 'Capacity Building Efforts' should ultimately be ready to prepare a perspective plan for their own kuppam and work out strategies to be self sustaining. Therefore, the women participants were motivated to prepare a perspective plan for an integrated system of fishing which may be adopted for their Kuppam. As a prelude, the fisherwomen were helped to make a SWOT analysis.

SWOT analysis as a management technique intends to analyse the strengths (S), weakness (W), opportunities (O) and threats (T), applied mainly in business or in organisations. This is a method which compels one to think or reason out systematically and analytically, the important facts in a given situation.

Strengths and weaknesses are always related to the individual or an organisation. Opportunities and threats are usually related to the outside environment. SWOT enhances the reasoning process. Once a person recognizes the weakness and threats, he / she can weigh the strengths and opportunities against the weakness and threats and see if the positives outweigh

the negatives. It also enables one to think of ways to overcome the risks or threats (Colombo Plan Staff College for Technician Education, 1998).

Against the backdrop of the PRA exercises done earlier the fisherwomen identified their Strength (S), Weakness (W), Opportunities (O) as well as Threats (T) and envisaged the Integrated Fishing System.

Chapter IV gives the findings of this study namely the situational analysis and the outcomes of the 'Capacity Building Efforts'.

Results and Discussion

* * * *

IV. RESULTS AND DISCUSSION

The salient outcomes of the efforts taken towards the **"Capacity Building of Fisherwomen",** are discussed under the following headings :

A. Situational Analysis and

B. Impact of the Capacity Building Efforts on the Fisherwomen.

A. SITUATIONAL ANALYSIS

This aspect is discussed on the following lines :

1. Bio-Physical Characteristics
2. Topography of the Area
3. Demographic Setting
4. Sea Farming Profile
5. Economic Setting
6. Technologies in Use
7. Income and Expenditure Pattern
8. Infrastructural Facilities
9. Social and Cultural Settings
10. Resource Flow and Linkages and
11. Profile of Fisherwomen

1. Bio-Physical Characteristics

Mattaankuppam, situated near the gentle and shallow 'Kannaki Beach' in Chennai has a flat land area with a highway road running in between the kuppam and the beach front along the Bay of Bengal. The sea-shore has no depth to

berth the mechanised boats called 'Launches'. Therefore only the traditional boats known as 'catamarans' are used for fishing. All catamarans are found to be lodged along the sea-shore. The soil is uniformly sandy and porous. The climate is influenced by the ocean, as seen in the distribution of temperature, pressure and prevailing wind system over the sea surface.

2. Topography of the Area

The PRA methods employed such as 'Historical Time Line', 'Transect Walk' and 'Participatory Mapping' enabled the researcher to understand the topography of the study area.

Historical Time Line

Smt.Chammanthi, aged 79 years was asked to recall the past events in the kuppam to obtain a historical recounter. During enquiry some more elder women gathered and gave their views. It was very interesting to note that they took 1840 as the base year, which they could recollect from their own memory and from consultation with each other. The major events that could be traced were as detailed in Table III.

TABLE III

HISTORICAL TIME LINE MADE BY THE FISHERWOMEN

Year	Historical Time Line
1840	Presidency College was constructed.
1841	'Velnet' – Play ground was constructed.
1914	World War – I (German Cruiser Emden) Bomb was dropped near Chennai Fort.
1920	Rice was sold at the rate of Re.1 per gunny bag.
1940	Houses were electrified.
1941	'Ghosha' Hospital was constructed.
1941	School was constructed within the kuppam.
1943	World War II – Japanese Fighter Craft's Bomb was dropped near Chennai coastline.
1966	British ship got wrecked at Labour Statue Beach
1969	'Seerani Arangam' – A Sea-shore open auditorium was constructed.
1985	MRTS – Mass Rapid Transport System was started.

The historical time line revealed the growth and development of the kuppam to the present stature.

Transect Walk

The East-West transect walk between the kuppam road and the beach front revealed the spatial pattern. This strip of land accommodated the areas adjoining the hutments and the landing centre, where the crafts and gears were lodged. The entire area had a muddy soil, with a scanty vegetation of drumstick trees and neem trees planted in front of a few houses.

The kuppam had thatched, tiled and a few terraced houses with some empty places here and there. Dogs and chicken were the domestic animals / birds found. The households had a very limited open space. Fish drying was carried out near the sea-shore.

The first contact person was the leader of the Fisherwomen Society Smt.Kala, from whom the list of members was obtained and a visit was made to all the houses in the kuppam. The details of the kuppam were elicited through the semi-structured interview conducted with 20 fisherwomen comprising mainly elderly persons.

Participatory Mapping

The participatory mapping exercise started slowly after getting acquainted with the fisherfolk and explaining the purpose of the mapping. The fisherwomen society leader came forward to draw the kuppam map ; soon others joined her to outline sea, sea-shore, the roads, temples, schools, canals, bridges, hospitals, co-operative society, bank, college, thatched houses, sub-urban railway station, bus stop etc. One woman started lining the main road with white Rangoli powder, while the other women gave her the clues. Mud roads and streets were given violet colour, schools orange, thatched houses brown, temples dark pink and trees green ; they put a red cross to indicate the hospital. Other utility spots were marked with different colours. This exercise took about four hours to complete the colourful mapping involving 30 fisherwomen, 20 fishermen and their children (Figs. 2a and 2b).

Topography of Mattankuppam

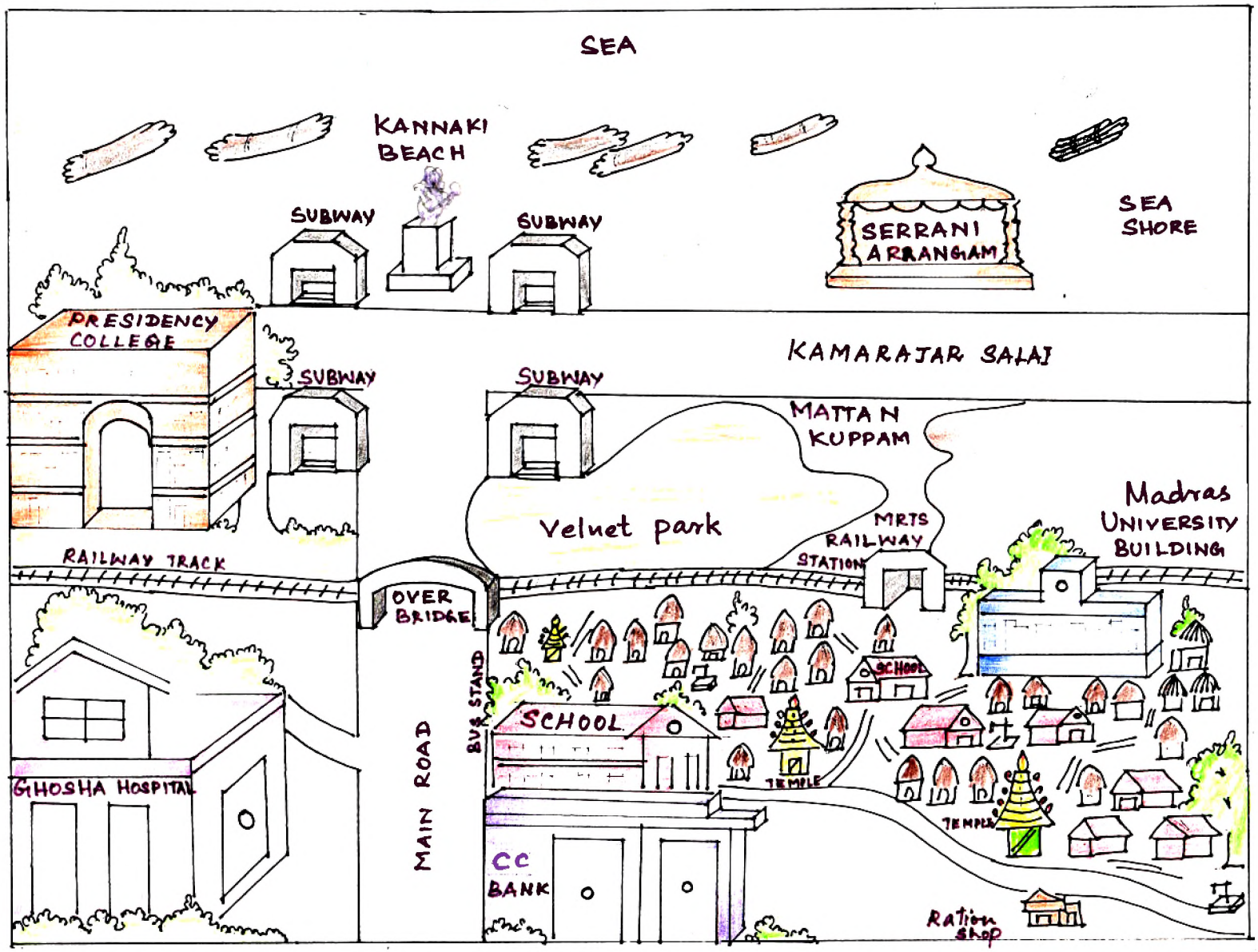


Fig. 2a



FIG. 2b. KUPPAM MAPPING BY FISHERWOMEN

The key areas depicted in the kuppam through participatory mapping were as follows :

Temples	2
Schools	2
Hospital	1
MRTS (Railway System)	1
College	1
Sea-shore auditorium	1
Landing centre	1
Streets	8
Main roads	3
Bus stand	2
Telephone booth	2
Ration shop	1
Panchayat leader office	1
Fisherwomen society leader's house	1
Terraced houses	6
Electricity posts	12
Water supply (Pumps)	6
Bank	1
Bridges	1

The kuppam appeared to be self content with regard to basic amenities.

3. Demographic Setting

Population : The population profile of Mattaankuppam is as detailed below :

Number of households	-	600
Adult population	-	7088 (Men : 3632 ; Women : 3456)
Sex ratio	-	952 women against 1000 men*
Children	-	1085 (Boys : 525 ; Girls : 560)
Sex ratio	-	1066 girls against 1000 boys

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* The sex ratio in Mattaankuppam was greater than the national figures i.e., 929 / 1000

The sex ratio is in favour of women among the younger generation. Only 57 per cent fisherwomen had a positive attitude towards family planning (Fig. 3).

Labour : The labour in the fishing industry was not determined in terms of hours of work and days of work, but only in terms of the size of the catch, which in turn determined the income of the fishermen. The share of the fishermen was determined by the ownership of the crafts, nets and the time spent.

Literacy profile : The kuppam being located in the city, the primary to college education facilities were plenty. As many as 160 children attended the primary school, situated within the kuppam and 30 attended the secondary school outside the kuppam. Although there is proximity to high school and college only 200 youth availed these facilities. As for adults, 50 per cent were illiterates.

Language : The language spoken by the majority of the fisherfolk was Tamil with a different slang. Men in business understood and a few spoke English too. Twenty five per cent households purchased Tamil dailies / weeklies.

Family type : The traditional joint family system was slowly disappearing due to modernisation and urbanisation. The nuclear family system predominated in the kuppam with 60 per cent in this type. A majority belonged to Hindu religion.

Family size : A majority of 65 per cent had the family size of 5 to 6 children.

Housing : As a natural phenomenon, fishermen had their dwelling units very near to their place of work. Regarding the type of housing, 55 per cent fisherfolk resided in tiled houses, 35 per cent in thatched houses and only 10 per cent had terraced houses.

Fig.3. Demographic Setting of Mattaikuppam

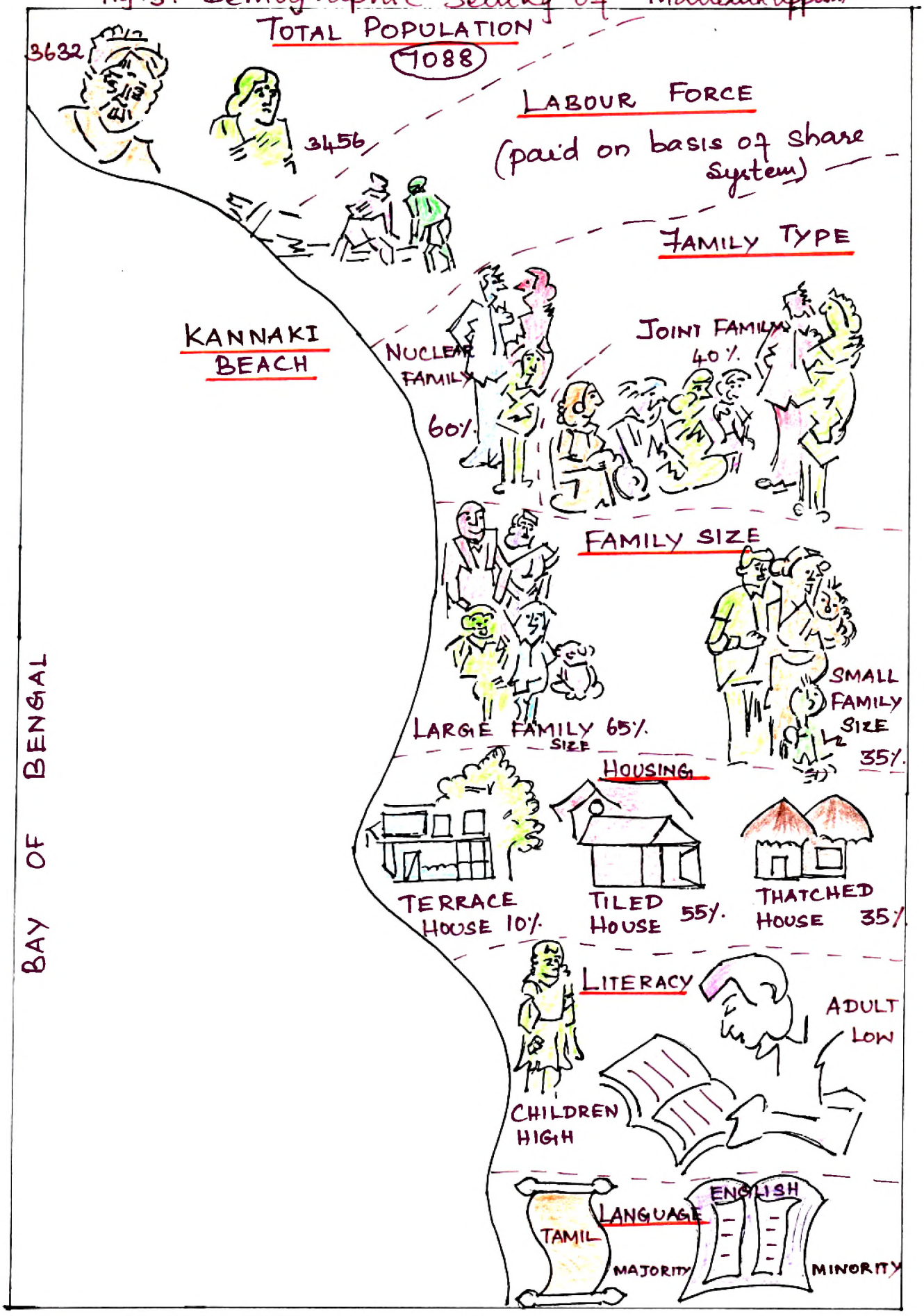


Fig.3. Demographic Setting of Mattaikuppam

4. Sea Farming Profile

In a semi-structured interview, 25 women, 15 men and 10 youth narrated the sea farming profile by drawing the sea and sea-shore, launching of catamarans and important fishing activities carried out using cartoon diagrams with chalk piece and 'Rangoli' powder (Fig. 4).

Scale of operations : The fishing effort from this kuppam was estimated to be around 350 fishermen, who were actively engaged in fishing. The number of units operating from this kuppam had been estimated to be 100 catamarans including large and small ones and motorized and non-motorized crafts.

The large off-shore fishing catamarans operated with eight members on board, while the small catamarans accommodated only four members. All catamarans did not go for fishing simultaneously. However, during the times of good catch, they undertook 2 to 3 rounds of operations daily.

The distance travelled by fishermen mostly depended upon the crafts used. If it was a motorized catamaran, they could travel to a distance of 20-30 kms. while the non-motorized catamaran could travel only to a distance of 10 to 15 kms.

On an average, the fishermen spent around 6 to 8 hours in the sea for 4 to 5 days a week. During peak fishing season, they worked for the whole week. During lean seasons they worked only 2 to 3 days a week. Day fishing was mostly common. Usually the fisherfolk go to the sea in three batches per day depending upon the catch expected.

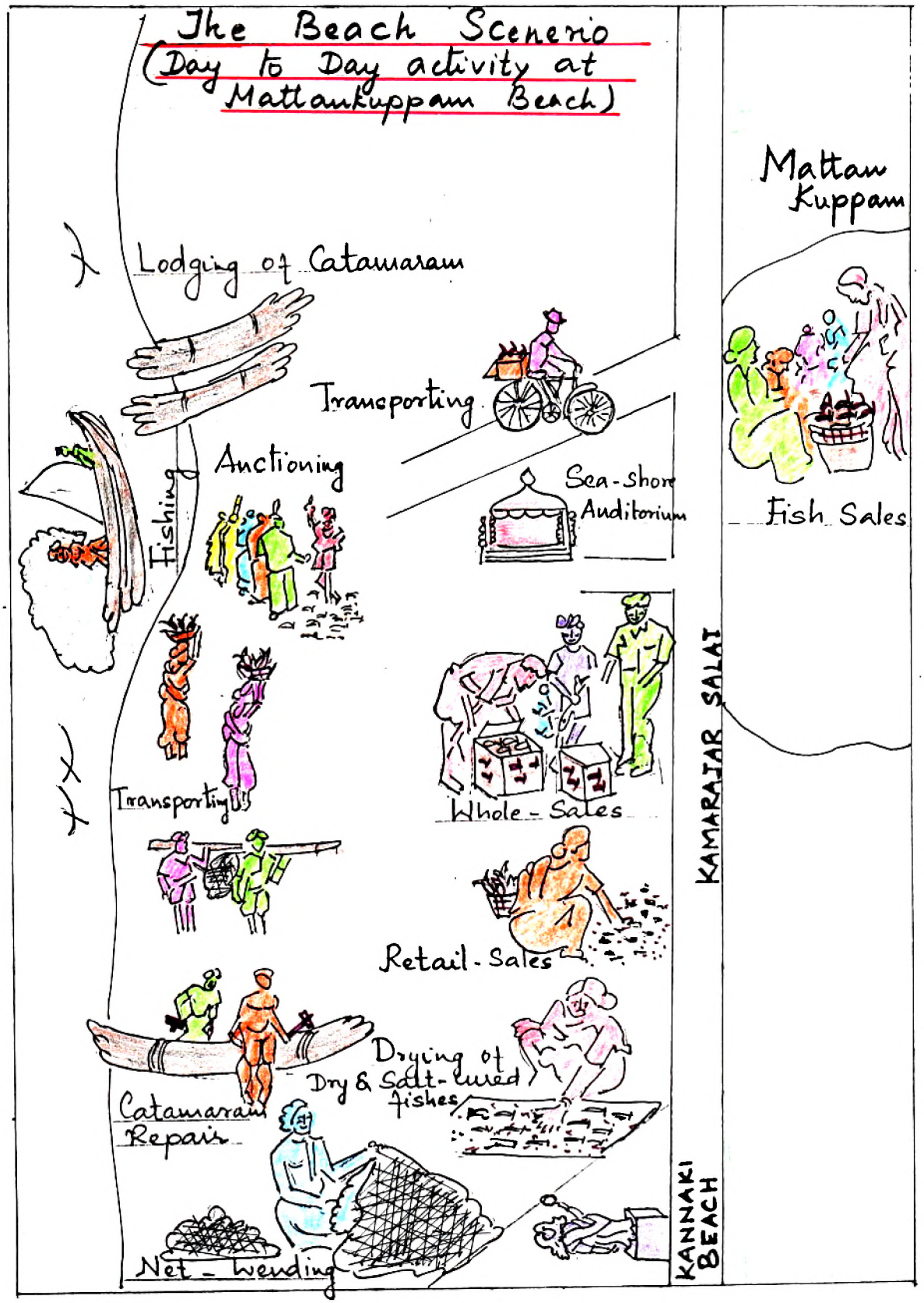

The Beach Scenerio
(Day to Day activity at Mattankuppam Beach)
Mattan Kuppam
Lodging of Catamaram
Transporting
Auctioning
Sea-shore Auditorium
Fishing
Fish Sales
Transporting
Whole-Sales
KAMARAJAR SALAI
Retail-Sales
Drying of Dry & Salt-cured fishes
Catamaram Repair
Net-Mending
KANNAKI BEACH

Fig. 4

I batch - leave by 3 a.m. and return between 6 and 8 a.m.

II batch - leave by 3 a.m. and return between 10 and 11 a.m.

III batch - leave by 8 or 9 a.m. and return between 2 and 3 p.m.

Local taxonomy

The local names used for different materials and activities in fishing are as follows :

Local Terms (With Tamil Version)	**Meaning**
Vayal (வயல்)	- The sea is very calm
Saaruppu (சரப்பு)	- The sea is very rough
Padu or Pagam (பாடு or பாகம்)	- Fathoom or Distance travelled in the sea (Two hands stretched distance)
Maphu (மாப்பு)	- Shoal or School of fish species
Annakoodai (அன்னக்கூடை)	- Aluminium containers to carry fish
Valaikallu (வலைக்கல்லு)	- A black stone tied at the corners of the nets
Pachai Padam (பச்சை பாடம்)	- It is a salt-curing method where, fish is stored in a salt solution (brine)
Karuvadu (கருவாடு)	- Dried fish
Andai (அண்டை)	- Side locks of catamaran
Irruku (இறுக்கு)	- Tie two catamarans together
Annium (அனியம்)	- Front portion of mechanised and non-mechanised boats
Thala (தலா)	- Row
Mal (மால்)	- Gill net
Kannu (கன்னு)	- Mesh

Seasonality of fish : Groups of fishermen and women, who were engaged in sorting, auctioning and sale of fish at the sea-shore were contacted and oriented, on Seasonal Calendars.

The illustration was drawn using Rangoli powder and scoring was done using stones (Fig. 5). Ten senior fishermen and ten fisherwomen got involved in this exercise. The number of stones at the column, indicated the season and availability of fish in a particular month.

SEASONALITY OF SELECTED FISHES

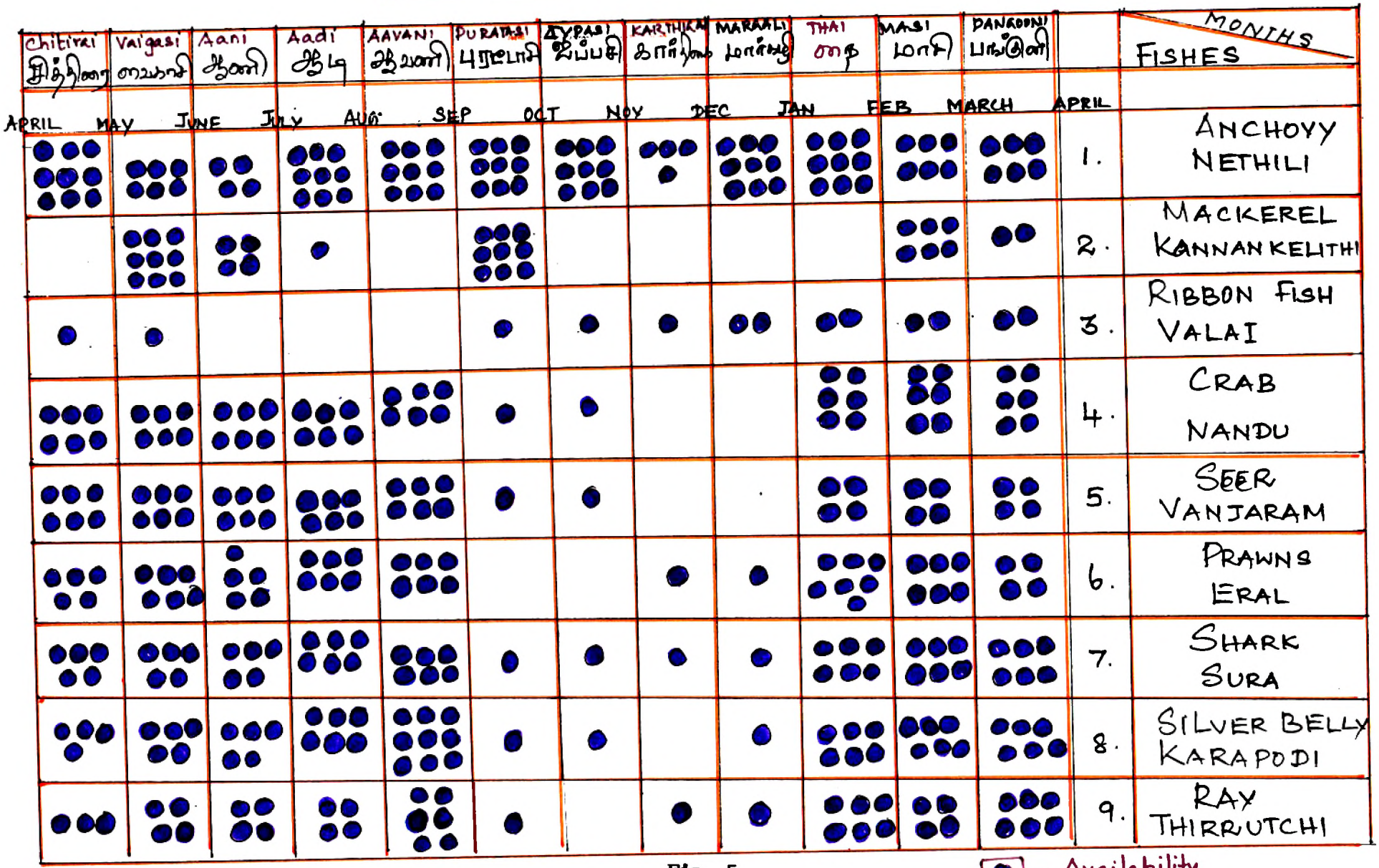


Fig. 5

● - Availability

From the illustration, the following facts emerged :

1. The main season for availability of all types of fish except Valai (Ribbon fish) and Kaanaankeluthi (Mackerel) ranged from the month of Thai (mid January) to Avani (mid September).
2. The off-season was noticed from Aipasi (mid October) to Margazhi (mid December) when the North-East monsoon sets. However Nethili fish (Anchovy) would be available during these month.
3. There is a bloom in the rate of fish between Chitrai (mid April) to Aani (mid June) and Masi (mid February) to Panguni (mid March) for all varieties of fish, except for Kaanaankeluthi (Mackerel) and Valai (Ribbon fish).

It is quite difficult to depict very accurately, the season for a few fishes, such as Mackerel (Kaanaankeluthi) and Ribbon fish (Valai) which may be caught only by chance or luck.

The common species of fish found in this area are listed below :

English Name	**'Tamil' Version**
Bream	Sankara (சங்கரா)
Anchovy	Nethili (நெத்திலி)
Prawns	Eral (எறால்)
Crab	Nandu (நண்டு)
White Fish	Sudhumbu (சுதும்பு)
Mackerel	Kaanaankeluthi (காணான்கெலுத்தி)
Ribbon Fish	Valai (வாலை)
Flat Fish	Naakumeen (நாக்குமீன்)
Silvery Belly	Kaarapodi (காரப்பொடி)
Sardine	Matthi (மத்தி)
Seer	Vanjaram (வஞ்சரம்)

(Figures, 6a, b, c, d, e and f)



a. Sardine (Matthi)



b. Flat Fish (Nakumeen)



c. Anchovy (Nethili)

FIG. 6. KINDS OF FISH



d. Crab (Nandu)

e. Prawns (Eral)





f. Clams (Aali)

Indigenous Knowledge : Some fishermen were reported to have the power to view the sea and predict the availability of the varieties of fish from the changes in the colour of the waves. Dark blue colour indicated the availability of sardine (Matthi) fish. If the colour of the wave was reddish, it depicted the availability of 'Bream' (Sankara) fish and when the sea was quite rough, good varieties of fish would be available in good quantity.

Types of fishing activities

Fishing : Fishing was exclusively a **male domain**. Women played a major role in pre-preparation and post harvest fishing activities (Figs. 7a, b and c).

Auctioning : On arrival of the catamarans, the fisherfolk on shore got ready to receive the catch. Auctioning was carried out immediately. A headman formed a group and started calling out the variety of fishes got and fixed up a rate for the fish. Auctioning was done for single large fish, a basketful count of single variety of fish and a basketful count of varieties of fish.

Sorting : The wholesale agents and retail sellers bought the fish at the auctioning centres. Then they undertook sorting of the fish according to the size and species caught.

Transportation : Transporting fish to different areas within the city was done through head loads, bicycle, tricycle and auto-rickshaws. The 'Kannaki Beach' had got a road leading to the landing centre and had access to the city (Figs. 8a, b and c).



a. Fishing

b. Auctioning





c. Sorting

FIG. 7. FISHING ACTIVITIES



a. By Headload by Women



b. On Shoulders by Men



c. By Cycle Rickshaws

FIG. 8. TRANSPORTATION

Net mending : On returning from fishing, the fishermen were found busy indulging in drying their nets, cleaning the nets to remove the weeds adhering the nets, and repairing the nets for use for the next day. Net mending was one of the age old activities carried out by the fisherfolk. The net required for fishing was either newly wended or the damaged nets repaired. This activity was usually undertaken between 10.00 a.m. – 12.00 p.m. and 2.00 – 3.30 p.m. i.e., after fishing was completed.

Drying and salt-curing : Drying and salt-curing were activities carried out by the fisherfolk for preserving fish and making by-products. Women were actively involved in this activity especially, the aged women between 60 and 70 years who were unable to do fresh fish marketing (Fig. 9a and b). The constraints in drying and salt-curing as expressed by the Fisherwomen were :

* non-availability of drying equipment leading to drying on unhygienic platforms.
* lack of area available to put up permanent drying structures and
* low prices for their products owing to poor quality.

Marketing : The different marketing channels included.

Domestic sales
Coastal retail
Coastal wholesale
Urban retail
Urban wholesale
Fish by-products wholesale and retail (Fig. 10).



a. Salt-curing



b. Drying

FIG. 9. FISH PROCESSING

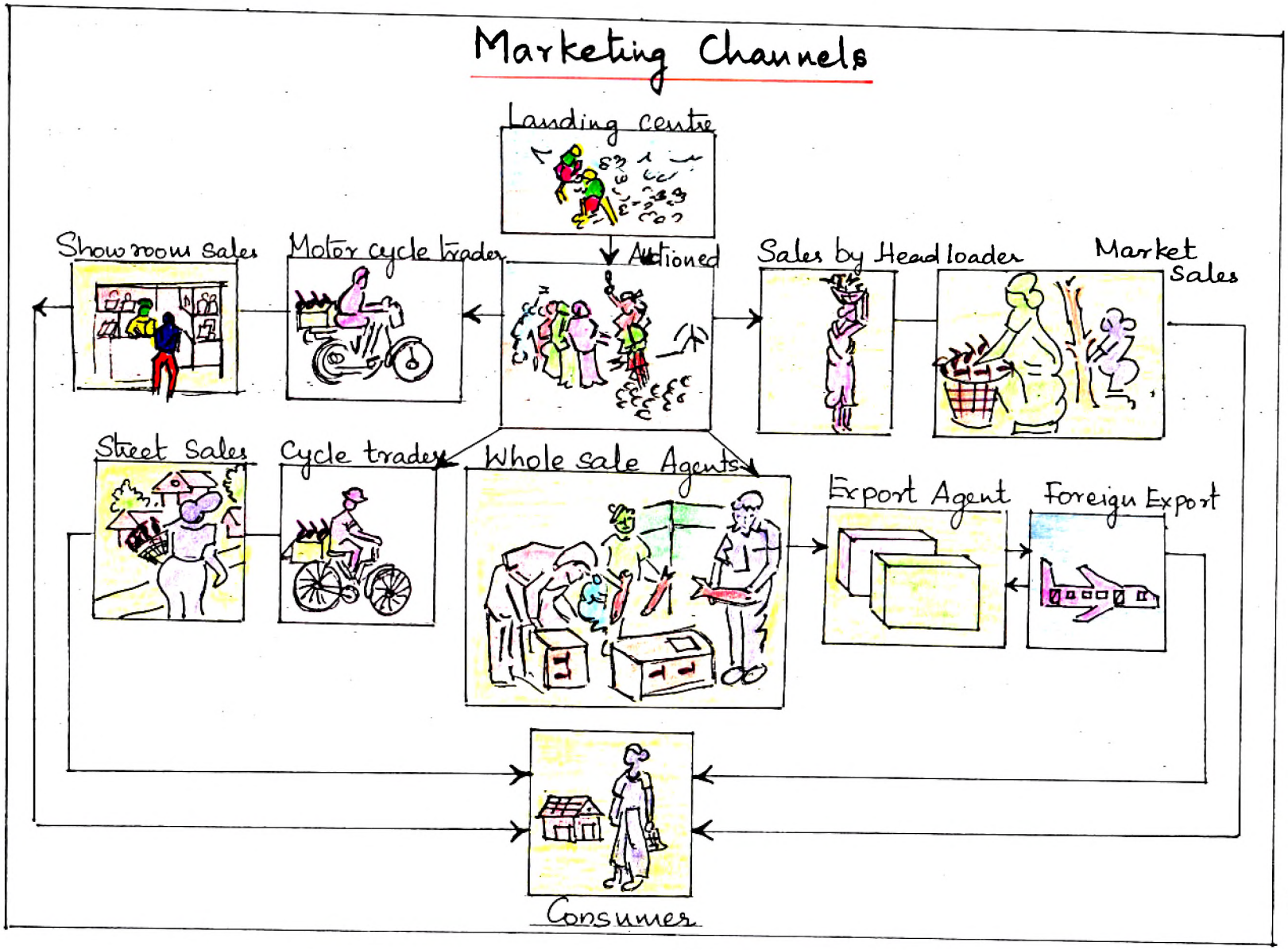

Marketing Channels
Landing centre
Auctioned
Showroom sales
Motor cycle trader
Sales by Head loader
Market Sales
Street Sales
Cycle trader
Whole sale Agents
Export Agent
Foreign Export
Consumer

Fig. 10

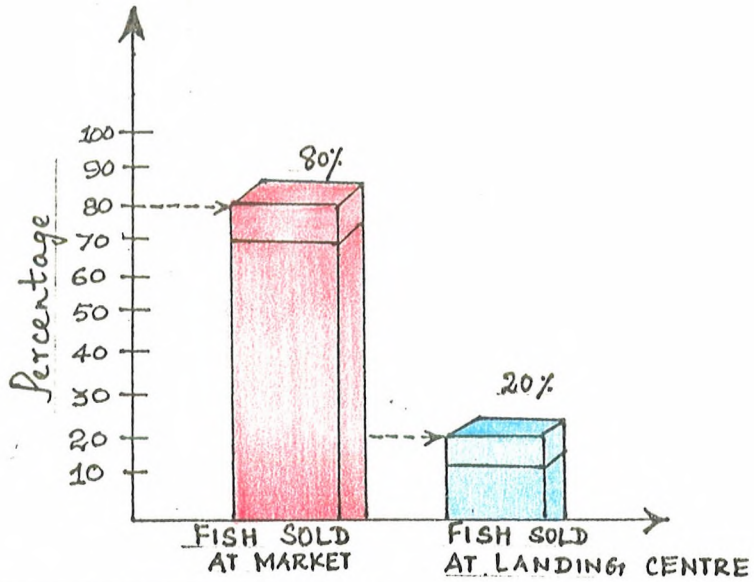
Participatory diagramming and Semi-structured Interviews were conducted to collect data on the different factors related to marketing. Ten men and 20 women participated in this exercise.

'Fish sold in the Market' was given 80 per cent scores and 'Sales at the landing centre' 20 per cent. 'Sales at the market' was given the highest score because the sales took place between 9.00 a.m. and 2.00 p.m. and again from 5.00 to 8.00 p.m. 'Sales at the landing centre', took place in the early morning hours, between 6.00 and 8.00 a.m. and occasionally in the afternoons between 2.30 and 4.00 p.m. (Figs. 11a and b).

Factors affecting the supply : Semi-structured interviews conducted among the fisherfolk depicted the following factors influencing the sale of fish.

* Variations in quantity
* Variations in quality
* Price fixed for the fish
* Extent of spoilage
* Demand for the product
* Time of landing of the catamarans
* Market trends
* Social and cultural events such as fasting on auspicious days (Viradam) followed by different religions.
* Problems of middle men
* Transportation
* Labour shortage
* Sales techniques

a. Type of Sales





b. Sales at Market

Fig.11. Sales of Fish

The different methods of sales at the market as narrated by the fisherfolk were :

* Sales at the market by the retailers included small heaps of fish called the 'Kooru' (Fig. 12a) and another method was by numbering (counting).
* Sales at the market by the wholesale agents included weighing, heap wise sales and basket count sales (Fig. 12b).
* The fish to be sold would be covered by sand to impress the customers on the freshness. The rate for this fish also would be high and
* Often the fisherwomen sang songs and shouted slogans to attract the customers.

The only craft used was the traditional catamaran, which did not fetch a large catch. Therefore export of fish was limited.

The constraints identified at the local markets were :

* Lack of proper sheds
* Lack of storerooms for fish and ice required for preservation
* Unhygienic maintenance of shops
* Irregular cleaning
* Inadequate water supply
* Lack of space for gutting and cleaning of fish
* Inadequate power supply
* Lack of ownership rights for the shopkeepers.
* Lack of concrete platforms with drainage facilities
* Adulteration by mixing spoilt fish.



a. Sales by Kooru



b. Sales by Basket Count

FIG. 12. METHOD OF SALES

Demand and value characteristics of selected fish : In continuation of the earlier exercise on seasonality of fish, the demand and value characteristics of different species of fishes were found through matrix scoring (Fig. 13).

The participants were asked to illustrate the different criteria like market value, export value, taste, processing of value added foods, consumer preferences and fishing type of selected varieties of fish, using Rangoli powder, match box and chalk pieces for marking the factors. From the illustration, the following facts could be arrived at :

Market value : The fishes such as Eral (Prawns), Vaval (Pomfret) and Vanjaram (Seer) were the costliest followed by Sura (Shark) and Thirukkai (Ray). All other varieties were sold at moderate rates.

Export value : The export value fixed for different varieties was depicted. It was identified that tropical fish such as Eral (Prawns), Vaval (Pomfret) and Mackerel (Kaanaankeluthi) were exported to major markets at Japan, United Emirates, USA, South-East Aisa, Middle East and other countries through agents (Figs. 14a and b).

Consumer preferences : When enquired about the consumer preferences for varieties of fish, Shark (Sura), Vanjaram (Seer) and Vaval (Pomfret) were the highest preferred varieties owing to their taste.

Fishing type : Fishing of Eral (Prawns), Vaval (Pomfret), Vanjaram (Seer), Sura (Shark), Thirukkai (Ray) and particularly Kola (Clupeids) was felt to be tedious.

DEMAND AND VALUE OF SELECTED FISHES

Criteria	Tamil Name / English Name	Eral / Prawns	Vaval / Pomfret	Vanjaram / Seer	Nethili / Anchovy	Valai / Ribbon fish	Nandu / Crab	Kolal / Clupeids	Luuu / Shark	Karapodi / Silver Belly	Thiruka... / Ray	Kanavalai / Mackerel
Market Value		●●●●●	●●●●●	●●●●●	●●●●	●●●●	●●●●	●●	●●●●	●	●●●●	●●●●
Export Value		●●●●●	●●●●●	●●	-	-	-	-	-	-	-	●●●●
Taste		●●●●●	●●●●●	●●●●●	●●●●	●●●●	●●●●	●●	●●●●●	●●	●●●●	●●●●●
Processed into Special value added foods		●●●●● Shrimps are used Dry fish	Dry fish	●●●●● Used Pickle making	●●●●● Dry fish	●●●●● Dry fish	-	-	●●●●● Dry fish	●● Dry fish	●●	●●●●● Tni foods
Consumer Preference		●●●●●	●●●●●	●●●●●	●●●●	●●●●	●●●●	●●●●	●●●●●	●●	●●●●	●●●●●
Fishing Type	Tedious	●●	●●	●●				●●	●●		●●	
	Easiness				●●	●●	●●			●●		●●

● Availability

Fig. 13



a. Ice Packing of Fish



b. Exporting Fish

FIG. 14. MARKETING TRENDS

Processing into value added foods

Dry fish : Nethili (Anchovy), Valai (Ribbon Fish), Sura (Shark), Kaarapodi (Silverbelly) and Shrimps of Eral (Prawns) were the most suitable ones for processing into dry fish products.

Pickle making : The fish having less bones were selected for pickle making e.g. Vaval (Pomfret) and Sura (Shark).

Tin foods : The most familiar tin fish foods were Sardine (Matthi) and Mackerel (Kaanaankeluthi).

Other dishes : All fish varieties were made use of for preparing fish curry, fish fry and other gravy items.

Seasonal Calendar

Fishing is influenced by the seasons and depends on the vagaries of nature. A seasonal calendar was prepared involving elderly fishermen and women to understand the employment pattern in different seasons.

The terms of reference were the Tamil months so familiar to the group. The 12 Tamil months in a year were marked with symbols depicting the various festivals celebrated during the period.

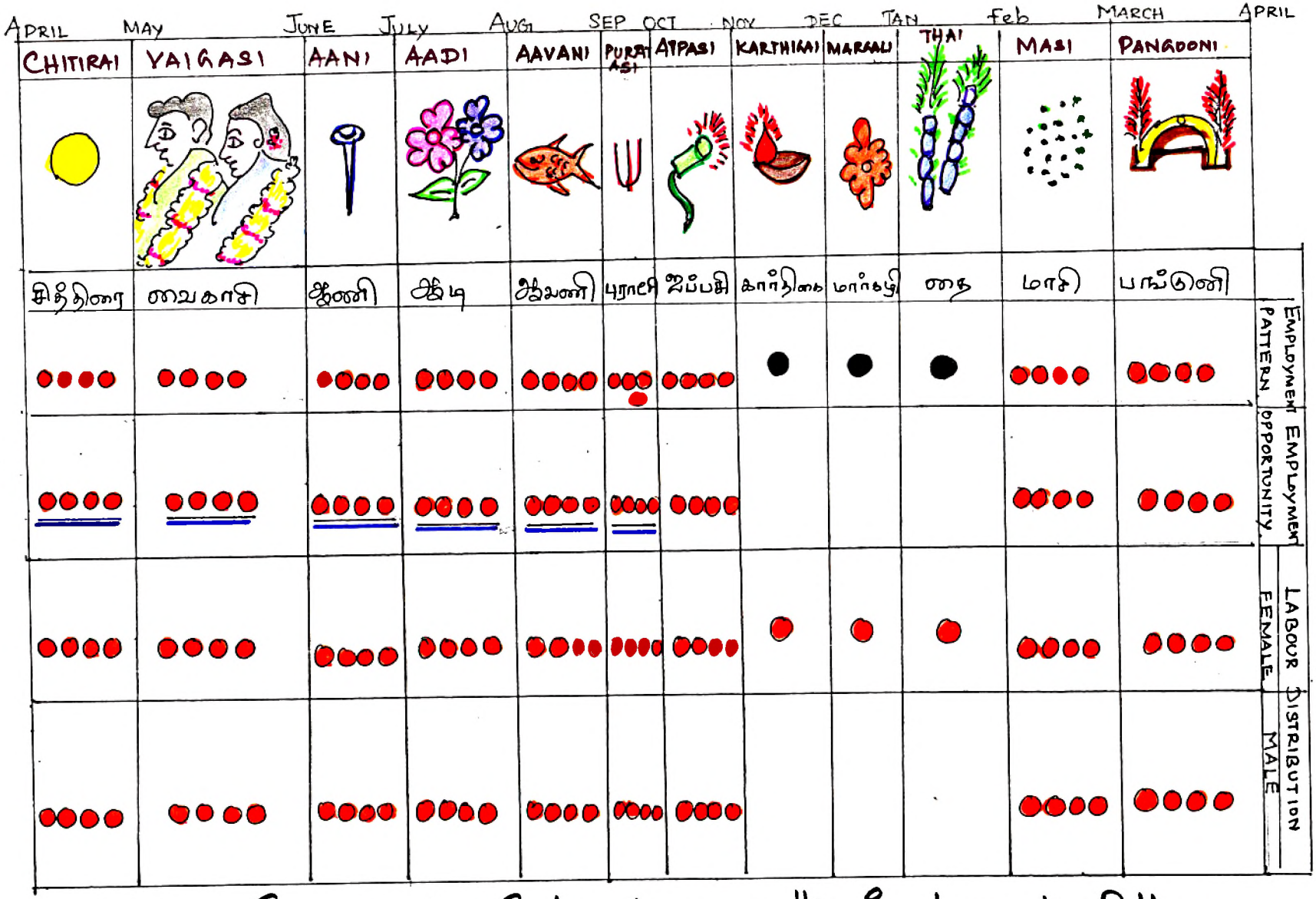
All illustrations were drawn on the floor using Rangoli powder and scoring was carried out by involving 10 senior fishermen and 10 fisherwomen. Stones,

match boxes, seeds and pulses were used for scoring. The number of materials used for scoring and the colour indicated the level of employment in a particular month (Table IV and Fig. 15).

TABLE IV

SEASONAL CALENDAR

Tamil month	Symbol denoting the month	Reasons for depicting the symbol
Chitrai	Full moon figure	Celebrating Chitra Pournami (the full moon day).
Vaigasi	Marriage couple	Month of marriages.
Aani	Screw	Tamil version of screw.
Aadi	Flowers	Flowering season.
Aavani	Fish	High quality of fish is caught during this month.
Puratasi	Naamam	Holy month for worshiping Lord Perumal whose devotees wear this symbol on their forehead.
Aipasi	Crackers	Celebration of Deepavali, a festival of lights and crackers.
Karthigai	Lamp	Depicting the festival of lights.
Margazhi	Drawing of Kolam	Hindus decorate the front of their houses with kolam inviting Lord into their house.
Thai	Sugarcane	Sugarcane is harvested and used for 'Pongal' festival.
Masi	Pulses	Poojas for Goddess are performed during this month. Pulses are used in plenty in this month.
Panguni	A symbol of Kavadi	'Kavadi' is a wooden structure carried by the devotees of Lord Muruga.



Seasonal Calendars of the Employment Patterns

Fig. 15

Employment opportunities : There was employment opportunity for the fisherfolk throughout the year from Masi (mid February) to Aipasi (mid November) except for the lean period marked from Karthigai (mid November) to Masi (mid February). It was expressed that the peak season of employment opportunities was between Chitrai (mid of April) to Puratasi (mid October).

The employment profile of fisherwomen was slightly better than that of fishermen. This is because even during the lean season, the women were found engaged in allied fishing activities like drying, salt-curing and sale of dry fish.

Transformation of fish products : Transformation is the change that takes place between the time of capture and the time when fish is consumed by the consumers. This aspect was studied using matrix scoring by 15 fishermen and 15 fisherwomen randomly selected to represent retailers, head loaders, auctioners, processing agents and ancillary participants – i.e., non-participants in fishing activity such as suppliers of ice, salt and bamboo baskets (Fig. 16). The transformation of fishery products took place in three general ways :

Product transformation : is a process of enhancing the quality of the fish namely, 'gutting and filleting', salt-curing and drying and value addition'. The fisherwomen participated in all the activities other than 'image transformation', in terms of value addition, packing and publicity. The men participated only in gutting and filleting but were aware of salt-curing, drying and image transformation.

TRANSFORMATIONS

S.N.	Methods	Participation		Aware		Unaware	
		Male	Female	Male	Female	Male	Female
		N=15	N=15	N=15	N=15	N=15	N=15
A.	PRODUCT TRANSFORMATION						
1.	Gutting and filleting.	●	●				
2.	Salt-Curing.		●	●			
3.	Drying.		●	●			
4.	Value Addition.			●	●		
B	PRICE TRANSFORMATION						
1.	Fresh Fish Sales	●	●				
2.	Dry and Salted Fish Sales	●	●				
C	IMAGE TRANSFORMATION						
1.	Value Addition			●			●
2.	Packaging			●			●
3.	Advertising / Camps.			●			●

● represents score by all

Fig. 16

Price transformation : is that where the rate of fish is fixed differently by the sellers according to the variety. Both men and women participated in price fixing.

Image Transformation : is the process whereby the larger private sector processors, impress the consumers by actively involving in sales promotion techniques, eg., advertising in media, conducting campaigns, use of stickers, leaflets, attractive packaging etc. Although fisherwomen in Mattaankuppam were mostly confined to minor processing activities, they were found indulged in indigenous techniques of marketing through shouting slogans and singing songs to attract the customers.

5. Economic Setting

Nearly 80 per cent of the fishermen were only workers in fish crafts. The fishing activities included fishing, fish trading, fish processing, net-mending, catamaran making, transporting fish and serving as brokers and commission agents in the fish trade (Fig. 17a).

The fish processing activity was found to be the exclusive domain of women. Fisherwomen were engaged also in drying the trash fish and waste from fish for the poultry feed and a few were occupied in packaging, transporting and trading.

Other economic activities

City life influenced the fisherfolk particularly the men to undertake other occupations such as petty trade, sale of fuel, sale of fancy articles from sea

shells, repair of out board engines, etc. A few fishermen were found to be in menial jobs in the private and government sectors (8 per cent and 2 per cent respectively).

Livelihood occupations of fishermen

To understand the nature of the livelihood occupations of fishermen, matrix scoring exercise was conducted. The investigator drew a table and marked the different occupations in the column like major fishing activity, minor fishing activity, menial government and private jobs ; 15 women and 12 men participated in the scoring using coloured beads and chalk pieces (Fig. 17b).

The matrix depicted the following features :

* As for income earned, fishing and allied fishing activities obtained the highest scoring.
* The government and private job holders appeared to have the maximum man days of work, bonus / incentives and optimum rest periods and
* Fishing was felt the most tedious occupation although, they felt physically fit owing to their constant exposure to nature and fresh air.

Wealth Ranking

Wealth Ranking was the PRA technique employed to identify groups or clusters of households according to relative wealth or well being.

a. Economic Setting

	ACTIVITIES	PERCENTAGE
	Fishing	80%
	Government Job	2%
	Private Job	8%
	Business	10%

b. Livelihoods of Different Fisherfolk Groups

OCCUPATION FEATURES	MAJOR FISHING ACTIVITY	ALLIED FISHING ACTIVITY	GOVERNMENT JOBS	PRIVATE JOBS
				
Income	●●●●●●	●● ● ● ● ●	● ●●●	● ●●
Rest	● ● ●	● ●●	●●●●	●●●●●
Tedious	●●●●	● ●●●	●●	●●
Man days of employment	●	●	●●●●●●	●●●●●
Bonus	—	—	●●●●●●	●●●●
Physical fitness	●●●●●●●	●●●●●●●	●●●●	●●●●

Fig. 17

More beads in a column represents the highest score

The entire process started with the discussion with the fisherfolk as to how their kuppam could be divided and categorised into 'wealthy', 'average' and 'poor' based on the following criteria :

Wealthy (High Income Group) : owning motorized boats, a house of their own, television, refrigerator and vehicle and lending money (financing) to others.

Middle class (Middle Income Group) : owning catamaran, a house, television, a vehicle and gill nets.

Poor (Low Income Group) : owning no catamarans and house and earning their livelihood by working as casual labourers and possessing no assets.

The classification emerged to be thus : The fisherfolk belonging to the category of middle income group was found to be the majority (55 per cent) followed by low income group (35 per cent) and high income group (15 per cent).

6. Technologies in use

Semi-structured interviews and preference ranking were the PRA techniques employed to collect information related to technology, involving 15 men and 25 women.

Crafts used : The volume of employment and the level of income to a very great extent depend on the fishing crafts used such as traditional catamaran (motorized and non-motorized), motorized boats (launches), non-mechanised boats (padagu), thala (row), valai kalu and kannu (Figs. 18a, b, c and d).



a. Traditional Catamaran



b. Motorized Catamaran



c. Boat – Padagu



d. Motorized Boats

FIG. 18. CRAFTS USED

The main crafts used in Mattaankuppam were traditional catamarans. There were nearly 100 catamarans including 15 motorized ones. The catamarans were of three types : (a) 3 piece catamarans, (b) 5 piece catamarans and (c) 7 piece catamarans.

Nets used : Different types of nets made of synthetic twines were used for different types of fishing. They included Peru Valai, Edda Valai, Aeru Valai, Pannu Valai, Siru Valai and Kandai Valai (Figs. 19a, b, c and d).

The wood pieces in the catamaran are joined together using nails and thick ropes. This joint is called 'Irukku' in local language (Fig. 20). Large catamarans operated off-shore upto a distance of 30 kms. for large catch using 'peria valai'. Small catamarans were used near shore and they covered a distance of 10 kms. for small catch using small gill nets.

Constraints in adopting the technologies : To understand the constraints faced by the fisherfolk in adopting technologies, preference ranking was done by 10 women and 5 men participants. Scoring was done using large, medium and small size sticks (Fig. 21).

'Inadequate financial support', 'non-availability of inputs on time' and 'lack of incentives for adoption' featured to be the major constraints as indicated by the large sticks.

The medium size sticks pointed out 'high cost of inputs', 'low level of literacy', 'difficulty in adoption by women' and 'difficulties in repaying the loan'.



a. Eda Valai



c. Pannu Valai



b. Peru Valai



d. Mani Valai

FIG. 19. KINDS OF NETS



FIG. 20. SEVEN PIECE CATAMARAN WITH IRRUKU

CONSTRAINTS IN ADOPTING THE TECHNOLOGIES

	Constraint Factors	Order of Ranking.
1.	Risk Underlying the new technology.	
2.	High Cost of inputs	
3.	Low level of literacy	
4.	Difficulty in adoption by women	
5.	Inadequate Financial Support	
6.	Lack of training	
7.	Non-availability of inputs on time	
8.	Lack of incentives for adoption	
9.	Difficulties in paying the loan	

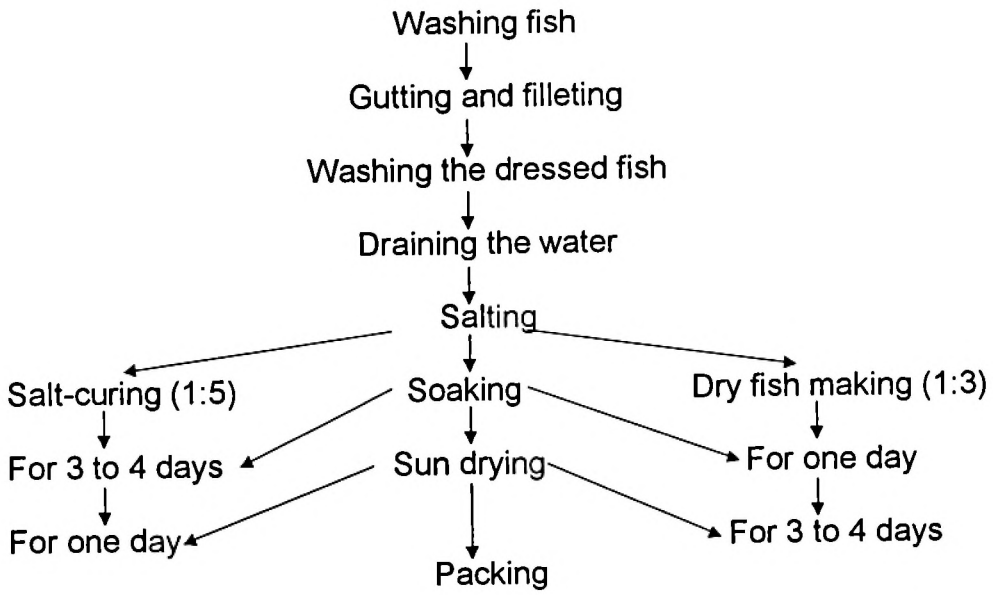


Fig. 21

The least constraining factors as revealed by the small sticks were 'risks underlying the new technology' and 'lack of training'.

Indigenous techniques used

Salt-curing and dry fish making : Salt-curing was done in rainy season while dry fish making was undertaken in summer. Salt-curing required the use of excess salt whereas dry fish making needed only less salt. The other steps involved were more or less the same as detailed below :



Poultry feed mix : Mainly prawns (eral) and trash fish were used for making poultry feed mix. The waste parts of the fish like shells and skins were sun-dried for 10 to 15 days and then packed in gunny bags to be transported to the poultry mix units at the neighbouring state Andhrapradesh. There was no poultry mix unit at Chennai (Fig. 22a).



a. Poultry Feed Mix



b. Shells of Squid Fish

FIG. 22. INDIGENOUS TECHNIQUES

Glass cleaning raw material from fish : The shells or bones inside the 'squid' or 'cuttle fish' locally known as 'ootu' and 'oothich kanava' were sun dried for 10 to 15 days and transported to glass factories for cleaning glass. They were also sent to pharmaceutical companies for preparing medicines (Fig. 22b).

Technology awareness of women

The technologies promoted by the State Government include ice-boxes (portable), aluminium container, tricycles, gill nets, mechanised and non-mechanised boats, motors for catamaran and accessories required for catamaran building.

The semi-structured interview conducted with 25 women and 15 men revealed the technology awareness and utilisation (Table V).

TABLE V

TECHNOLOGY AWARENESS AND UTILISATION

Technologies	Awareness about technology		Use of technology	
	Men n = 15	Women n = 25	Men n = 15	Women n = 25
Ice-box (portable / fixed)	15	18	-	-
Aluminium container	15	25	-	25
Tricycles	15	25	3	10
Motor	15	25	10	-
Mechanised and non-mechanised boats	15	25	-	-
Catamarans	15	25	15	-
Bamboo-drying racks	5	6	-	-

While the awareness about technologies was satisfactory, the extent of utilization was limited. Further probe is required to explore the possibilities of facilitating adoption of technologies.

7. Income and expenditure pattern

The income and expenditure pattern of the fisherfolk was studied using matrix scoring, participatory diagramming (pie diagram, histogram) and seasonal calendar. Rangoli powder, coloured beads, coins and chalk were used for marking. Ten men and 20 women participated in this exercise.

As for the sources of income, 'sale of fresh fish' and 'sale of fancy sea shell articles' were given the highest scores (Fig. 23a).

The seasonal calendar revealed that the fisherfolk who were actively involved in the fishing activity, had a steady flow of income from mid April (Chitrai) to mid September (Puratasi) and again from mid January (Thai) to mid March (Panguni). The lean period was marked from mid October (Aipasi) to mid December (Margazhi) (Fig. 24).

Expenditure wise the peak periods were Aadi (mid Julty), Purattasi (mid September) and Aipasi (mid November) and Thai (mid January) due to the significant festivals celebrated during these months.

A bar diagram with Rangoli powder was used to illustrate the 'expenditure of income on fishing activities'. Maintenance and repair of catamarans was to be the item demanding the highest expenditure while loan repayment obtained the lowest priority (Fig. 23b).

Source of Income

S.N	Source	Scores
1.	Sales of fresh fish	●●●●●●
2.	Sales of fancy sea-shell articles	●●●●●●
3.	Sales of dry and salt-cured fish	●●●●●
4.	Agency role played in different fishing activities	●●●
5.	Labour wages for different activity	●●●●

Expenditure of Income on Fishing Activities

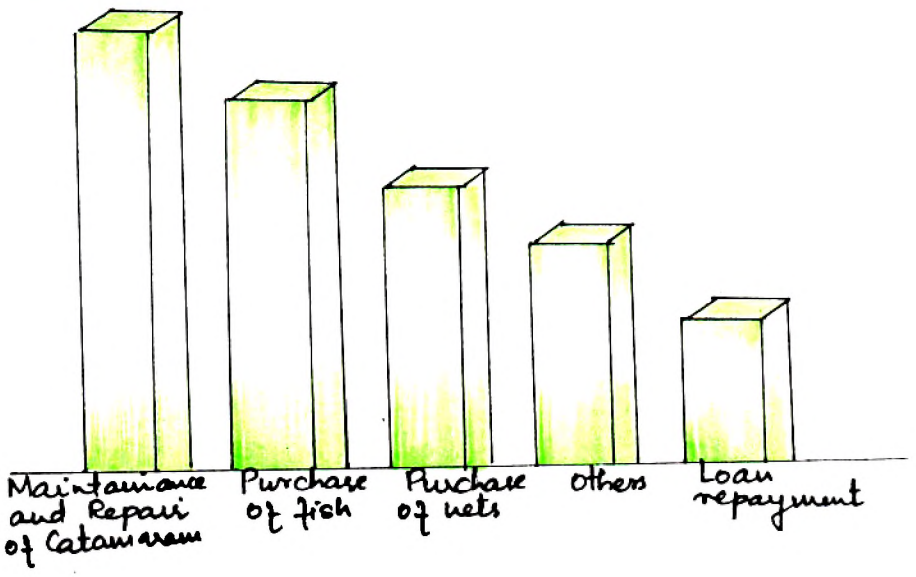


Fig. 23

Seasonal Calendar on Income and Expenditure

Symbols denoting the year	Months of year	Income	Expenditure
APRIL	CHITHRAI	●●●●	▭
MAY	VAIKHASI	●●●●	▭
JUNE	AAI	●●●●	▭
JULY	AADI	●●●●	▭▭
AUG	AAVANI	●●●●	▭
SEP	PURATASI	●●●●	▭▭
OCT	IPASI	●	▭▭
NOV	KARTHIGAI	●	▭
DEC	MARGAZHI	●	▭
JAN	THAI	●●●●	▭▭
FEB	MASI	●●●●	▭
MARCH	PANGUNI	●●●●	▭

● Lean period

▭ Heavy Expenditure

Fig. 24

With regard to household expenditure pattern, (pie-diagram), food was given the maximum score (45 per cent) followed by clothing (15 per cent) (Fig. 25a).

Food management pattern

A semi-structured interview conducted with 25 women, 15 men and 10 youth, revealed the food management pattern of the fisherfolk.

* Rice was preferred to other cereals. They prepared a single meal in the morning and consumed the same for breakfast and lunch.
* Naturally fish was found to be a compulsory item in every meal and
* The type of cooking normally adopted was boiling, steaming and frying.

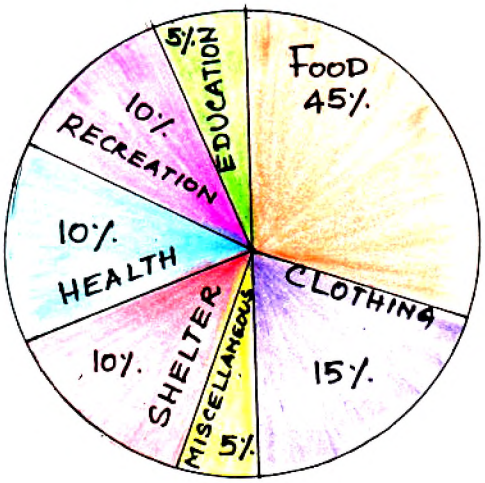
Meals commonly taken were :

Breakfast	Lunch	Dinner
Rice with fish-curry, iddly-sambar and Gruel (kanjji)	Rice, sambar, rasam, buttermilk, curd, egg, fish and meat.	Rice, sambar, rasam, egg, fish-curry, fish fry, dry fish fry and meat.

Special foods and dishes consumed

Tubers : The fisherfolk of Chennai consumed tubers as their special food. Tuber were boiled and consumed with jaggery and coconut or with fish curry or dry fish.

Household Expenditure Pattern



Type of Savings and Debts

S.N	TYPE OF SAVING	Scores
1.	Hundi	●●●●
2.	Bank	●●
3.	With individual	●●●●●
4.	Post office.	●
S.N	Type of Debts	Scores
1.	Money lenders	●●●●●●
2.	Loan from Society	●●●●

Fig. 25

Puttu : This is a special food made out of shark fish. The fish is boiled, mashed and then fried with onions, grated coconut and spices. This was consumed as a side dish particularly by women during pregnancy and lactation.

Halwa : This is a sweet dish made out of cereals, pulses, jaggery and coconut prepared and sold in empty / waste coconut shells, near the seashore. The fishermen who went for fishing early morning consumed this as a breakfast (Fig. 26).

Food beliefs

Table VI shows beliefs related to food consumption.

TABLE VI

BELIEFS RELATED TO FOOD CONSUMPTION

Fish	Beliefs
Silver Belly(Kaarapodi)	Consumed during pregnancy and lactation.
Shark (Sura)	Consumed during lactation - believed to aid in the secretion of milk
Seer (Vanjaram)	Supposed to be very nutritious and tasty and suitable for giving children due to less bones present in it.
Anchovy (Nethili)	Believed to control asthma
Tuna (Surai)	Consumed for good strength
Crab (Vellai Nandu)	Believed to relieve cold and cough
Lizard Fish (Panna)	Supposed to control blood pressure
Ray (Theratchi)	Believed to give strength to the bones



FIG. 26. HALWA

During religious festivals and on certain days of the week such as Tuesdays, Fridays and Saturdays, fasting was observed mainly by women who avoided consuming fish.

Likewise the months 'Puratasi' and 'Margazhi' (mid September and mid October and mid December and mid January respectively) were considered holy and auspicious, when there was a low consumption of fish. The cost of fish was less during these months.

Fish consumption by different income groups

When the income was high in certain seasons, there was a tendency even for low income groups to explore the taste of new varieties of fish or go in for good quality fish.

Savings and Indebtedness

Saving with individuals (chits) was given the highest score followed by 'Hundi' (savings box) savings. Institutional savings in the post office or bank appeared to be scanty.

As far indebtedness, 'borrowing from money lenders' was given the highest score. It was observed that there were individuals in the kuppam running small finance companies for promoting savings in the form of 'chits' and also for lending money to the needy (Fig. 25b).

8. Infrastructural facilities

The infrastructural facilities available to the fisherfolk in the kuppam were examined using Venn diagrams on institutions and preference ranking.

Venn diagram exercise was conducted to find out whether the fisherfolk could interpret and relate the relationships they had with the various institutions and also with the people in the kuppam. Twenty five fisherwomen and five fishermen participated in this exercise using chalk pieces, pen, pencil, a pair of scissors and stones.

First, the kuppam boundary was drawn. The investigator helped to make the paper cut circles, to show the various institutions. They wrote the names of the institutions on the paper cut circles and fixed them at the respective places, within the kuppam boundaries (Fig. 27).

They fixed the two temples, schools, noon meal centre, tea shops, provision shop, panchayat leader's office and other important utility centres within the kuppam. Then they placed the paper cut circles outside the kuppam boundaries, to show the hospitals, fish market, provision shop, shopping area, post office and bank.

The institutions found inside the kuppam were :

Temple	-	2
School	-	2
Panchayat leader office	-	1
Fisherwomen's society	-	2
Noon meal centre	-	1
Petty shop	-	2
Fish sales centre	-	2
Provision shop	-	2
Tea shop	-	2

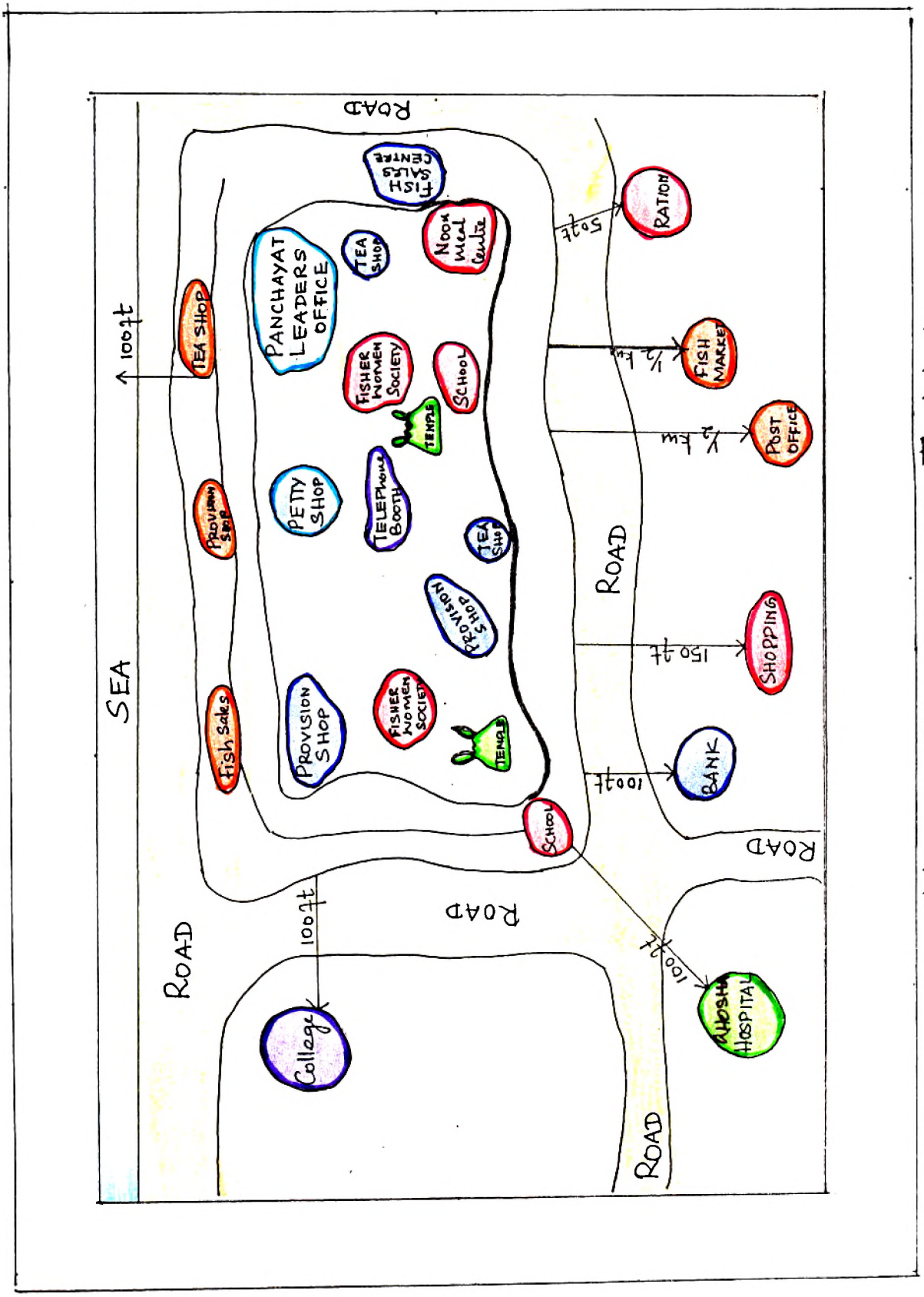


Fig. 27 Venn Diagram on Institutions

The institutions found outside the kuppam were :

Kasturba Gandhi Memorial Hospital (Ghosha Hospital)	-	1
Bank	-	1
Post office	-	1
Fish market	-	1
College	-	1
Ration shop	-	1
Shopping centre	-	1

Regarding the distance, only two institutions - the post office and the fish market were found situated at half a kilometre.

'Preference ranking' was done to estimate the perceived importance of the institutions. Calendar cut out numbers were used for ranking. Five men and 10 women were the participants in this exercise. Table VII gives the ranks assigned to the different institutions.

TABLE VII

RANKING INSTITUTIONS ACCORDING TO THEIR PERCEIVED IMPORTANCE

Institutions	Rank Order	
	Men	Women
Landing Centre	1	1
Fishermen and women society	3	3
Police station	11	11
Panchayat leader office	8	2
Ration shop	4	4
Market (Sales centre)	2	5
Hospital	7	6
Noon meal centre	9	7
Drinking water supply	5	8
Post office	14	9
School	12	10
Temple	6	12
Bank	10	13
College	13	14

There was consistency in ranking between the men and the women only with regard to four institutions namely the landing centre (I Rank), society for fishermen and women (III Rank), ration shop (IV Rank) and police station (XI Rank). Men's preferences mainly related to outside institutions whereas women's preferences centred around the institutions within the kuppam or to those related to basic amenities.

9. Social / cultural settings

Religious beliefs : Idol worshipping was common. There were two big temples and four small temples found within the kuppam. They worshipped the goddess 'Amman' (Wife of Lord Siva). The idols in these two temples were believed to be recovered from sea-shore and brought by their ancestors. All marriages, festivals, rituals and celebrations were performed here.

'Kola' (Clupeids) was considered to be a very auspicious fish. Fishing of this particular variety was found tedious, requiring fishing at least for 2 to 3 days. The fishermen before leaving for fishing, used to take oil bath, performed poojas and then left with packed food. Till they returned, the women at home would keep a lighted lamp at the entrance of the house.

On return from fishing the fishermen usually took the fish straight to their houses where the whole family performed pooja before the catch was taken for sales.

During 'Kola' fishing, there was another belief, that fishermen would be attacked by hungry evil spirits in the sea. To satisfy their hunger a handful fish would be thrown into the sea.

The other beliefs included the following :

* When a new catamaran was purchased special poojas were performed for the 'sea goddess' at the temple in the sea-shore.
* During auctioning, first a handful of fish would be given to a poor old lady free of cost.
* During festivals a handful of fish from every catch would be collected in a basket and later auctioned. The amount got from this auctioning would be given to the local leader for purchase of new dresses, rice and other materials to be distributed to the poor among the fisherfolk.

Participation in social activities : In order to understand the fisherfolks' social participation and problems encountered, a semi-structured interview was conducted with 25 women and 15 men as participants.

All women participants in this exercise, were members in the Fisherwomen Co-operative Society and all the 20 men were members in the Fishermen Co-operative Society. They attended all meetings and training programmes conducted by the State Fisheries Department.

The fisherfolk were regular participants in all political meetings as a supporting crowd and took part in the political processions on payment by the parties concerned.

Problems encountered

Social problems such as land dispute, dowry, theft, alcoholism, etc., were reported to be taken first to their Panchayat leader for redressal and judgement. The major problems would be reported to the police. An interesting incident reported was that when wages were distributed by the owners, wives accompanied their husbands in order to restrict them from spending the entire money earned on alcohol.

Attitude and satisfaction

The satisfaction towards their occupation and attitude towards involving their children in fishing were elicited using matrix scoring by 25 fisherwomen (Fig. 28). The scoring was done using coloured beads and chalk pieces.

The factor such as 'Fishing is a traditional and auspicious occupation' and 'the age old activity need to be protected and developed' were given the highest score followed by 'fishing is a risky occupation'. With regard to their attitude towards involving their children in fishing, negative attitude was given the highest score. Due to the science and technology advancement including computers, new avenues in the job market were available to the young fishermen and women. They felt that the younger generation need not depend on the vagaries of the nature.

Attitude of Fisherfolk towards their Occupation

S.N	Factors	Scores
1.	Risky occupation	●●●●●
2.	Adventurous Occupation	●●●●
3.	Traditional and Auspicious occupation	●●●●●●●
4.	Age-old activity need to be protected and developed	●●●●●●
5.	It involves much techniques and experience required	●●●
6.	It is proud to be in this occupation	●●

Attitude of Fisherfolk towards involving their Children in sea profession

S.N.	Factors	Scores
1.	Will not involve our Children in Fishing Activity	●●●●●●
2.	Will involve our Children in Fishing Activity	●●●

Fig. 28

10. Resource flow and linkages

The flow of products chart helped in the analysis of various resources within the kuppam and households and understanding the mediating variables influencing their decision making practices related to fishing activities.

This exercise started with the illustrations drawn on the floor by the participants (10 men, 15 women and 10 youth) by using chalk pieces and Rangoli powder.

External linkages : They first drew the kuppam boundary and then denoted the flow of products inside and outside the kuppam by using arrow marks. As revealed in the diagram, the products from inside the kuppam were fresh fish, dry fish and shell-fancy articles. The flow of products from outside the kuppam included diesel, kerosene, fire wood, fishing equipment, nets, vegetables, fruits, ice, salt, medicines, household goods, clothing, etc., (Fig. 29a).

Internal Linkages : This included the flow of products within the households in the kuppam namely,

* Nets mended being shared among the fisherfolk.
* Fish sold / distributed within the kuppam, Whenever a good and large size fish was got, there was a tendency among the fisherfolk to share among their friends and neighbours.
* Sea-shell fancy articles, used for decorating the houses were sometimes sold to the neighbours and friends.

* Unsold fish were either consumed or dried and salt-cured, to be used for family consumption or sale to the friends and neighbours (Fig. 29b).

Further probe was done using flow diagrams to describe important patterns of flow and transformation of resources. The fisherfolks' strategic choices are best understood by means of decision trees, whilst circles of different sizes and colours have become popular in representing individuals, groups and institutions, that have significant bearing on their critical decisions.

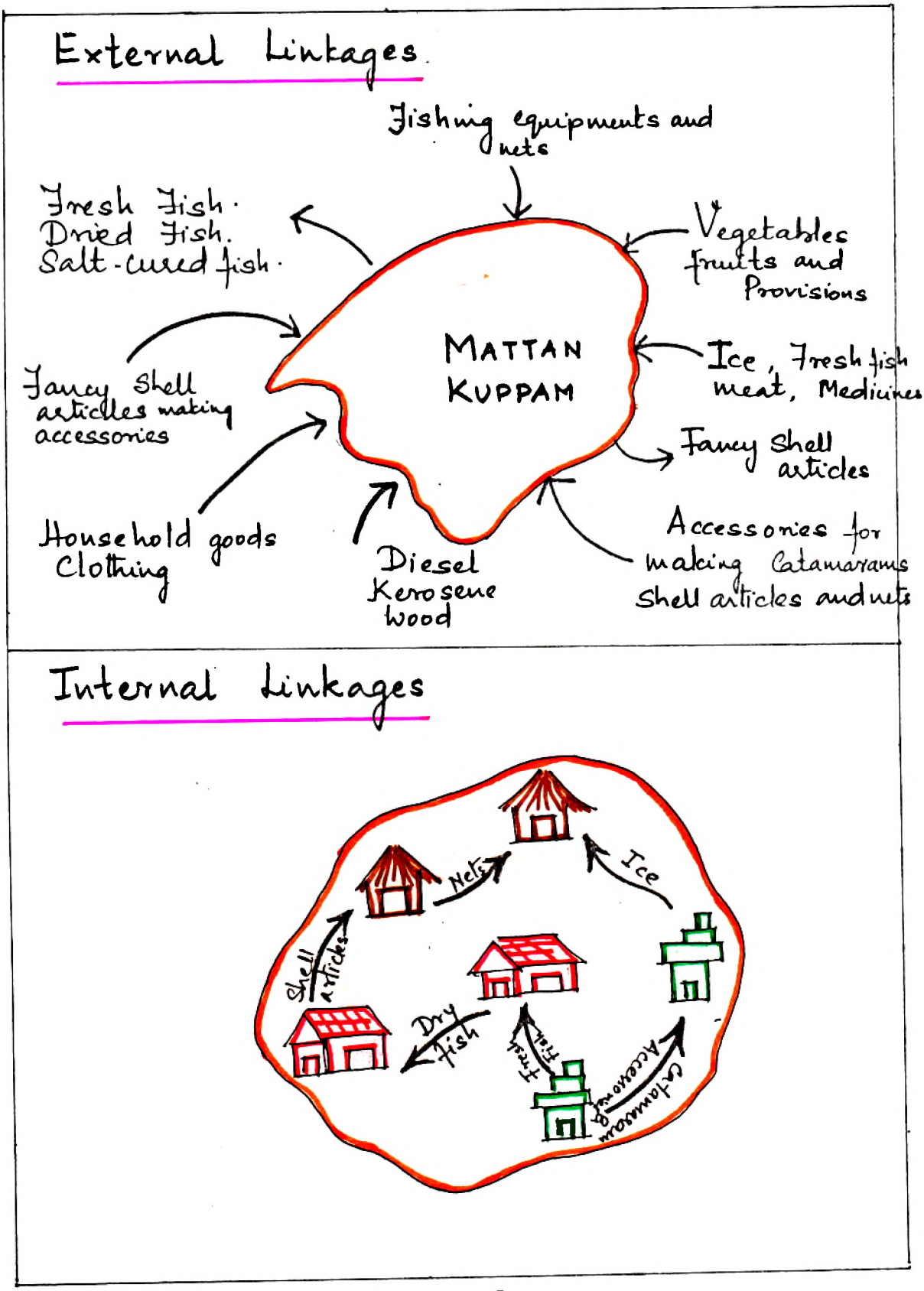
Ravi (45 years) and Kanakammal (40 years), two well experienced fisherfolk collaborators helped to learn about the mediating variables influencing their decisions on fishing activities, purchase of household inputs and resource allocation.

They used cards, 'chapathi* circles' of different sizes, colour powder, colour beads and coins to symbolically represent resources, their flow and transformation in different plots, their resource allocation decisions and institutions having significant impact on these decisions (Fig. 30).

* First, a large circle was drawn on the ground using Rangoli powder to represent the 'kuppam' boundaries. Within the boundary they drew symbols of their houses on one side.

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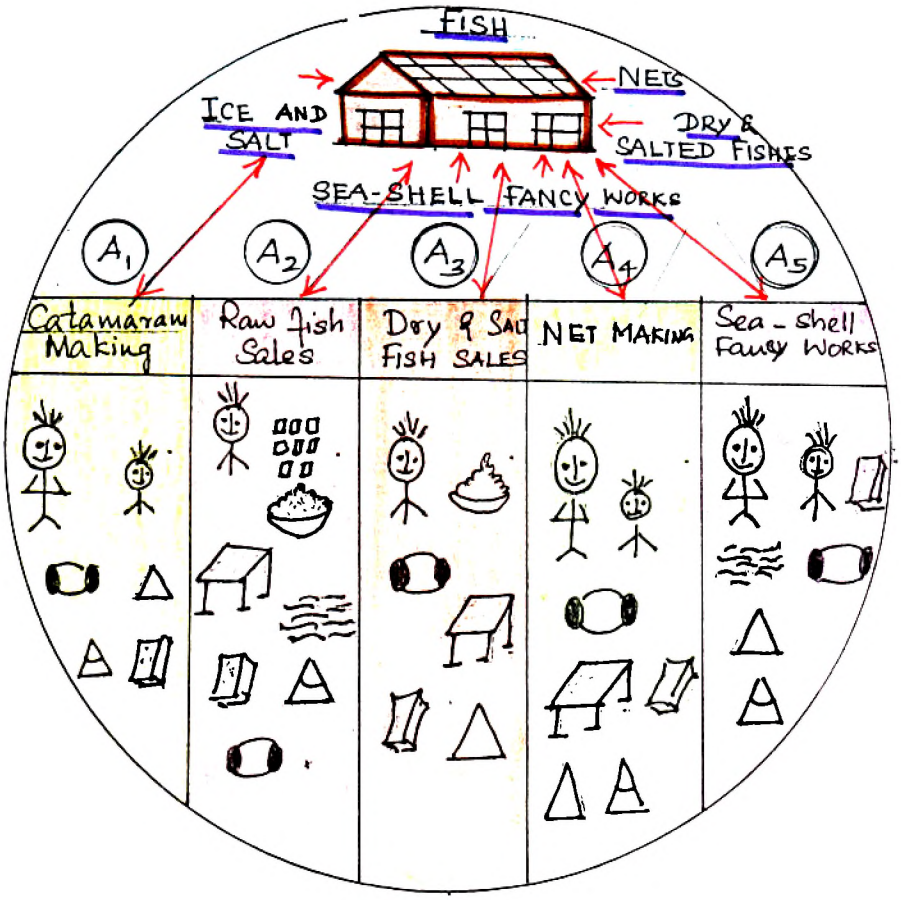
* Chapatthi is a food preparation out of wheat which has a circular shape.



FLOW OF PRODUCTS

Fig. 29

RESOURCE FLOW DIAGRAM



Hired Labour	Purchase of raw materials from outside	Market sales
Self participation	Own use	Ice
		Salt
Sold within themselves	Money	Sales at Landing Centre

Fig. 30

* Inputs such as raw fish, nets, dried and salt-cured fish, sea shell fancy items, salt and ice were symbolically represented by placing small samples of each input around their houses.
* They divided the remaining space in circles into five parts, drawing thin lines. This represented the different areas within the kuppam. The names of the areas were written on small paper cut circles. They were marked A_1, A_2, A_3, A_4, and A_5.
* Illustrations and materials, such as beads and coins were used to mark the resources required for carrying out the different activities at each area. Arrow marks were used to show the internal and external linkages from their houses to different fishing areas.
* Cut outs of human figures were used to differentiate the self participation and hired labour.

It is evident that fisherfolk's decisions on enterprise selection was influenced by the micro-ecological niches available to them and the access to and the assurance of institutional support.

11. Profile of Fisherwomen

The perception of the fisherwomen on fishing and allied activities was studied using semi-structured interviews, matrix scoring, systems diagram and participatory diagram. Twenty five women participated in all these exercises.

The role of women was not confined to domestic or reproductive activities alone. They played a multiple role and added to the family income and saved for the future.

An encounter was first made to understand the roles played by women in fishing activities and household chores. Fisherwomen's work schedule began from 3.00 a.m. when their husbands left for fishing. The work schedule ended up around 11.00 p.m. Table VIII and Fig. 31 show the different roles played by the fisherwomen.

TABLE VIII

ROLES PLAYED BY THE FISHERWOMEN UNDER STUDY

Productive (activities that generate income) roles	Hosuehold chores	Social roles
- Fish handling, sorting, grading - Fish trading - Fish processing (drying, processing, marketing) - Work in allied fishing activities	Domestic activities (that increase household responsibilities) a) Creative job - Child bearing - Care of children b) Maintenance role - Cooking - Washing clothes - Growing food for own consumption	Participation in religious and cultural activities. Participation in society meetings to discuss community issues.

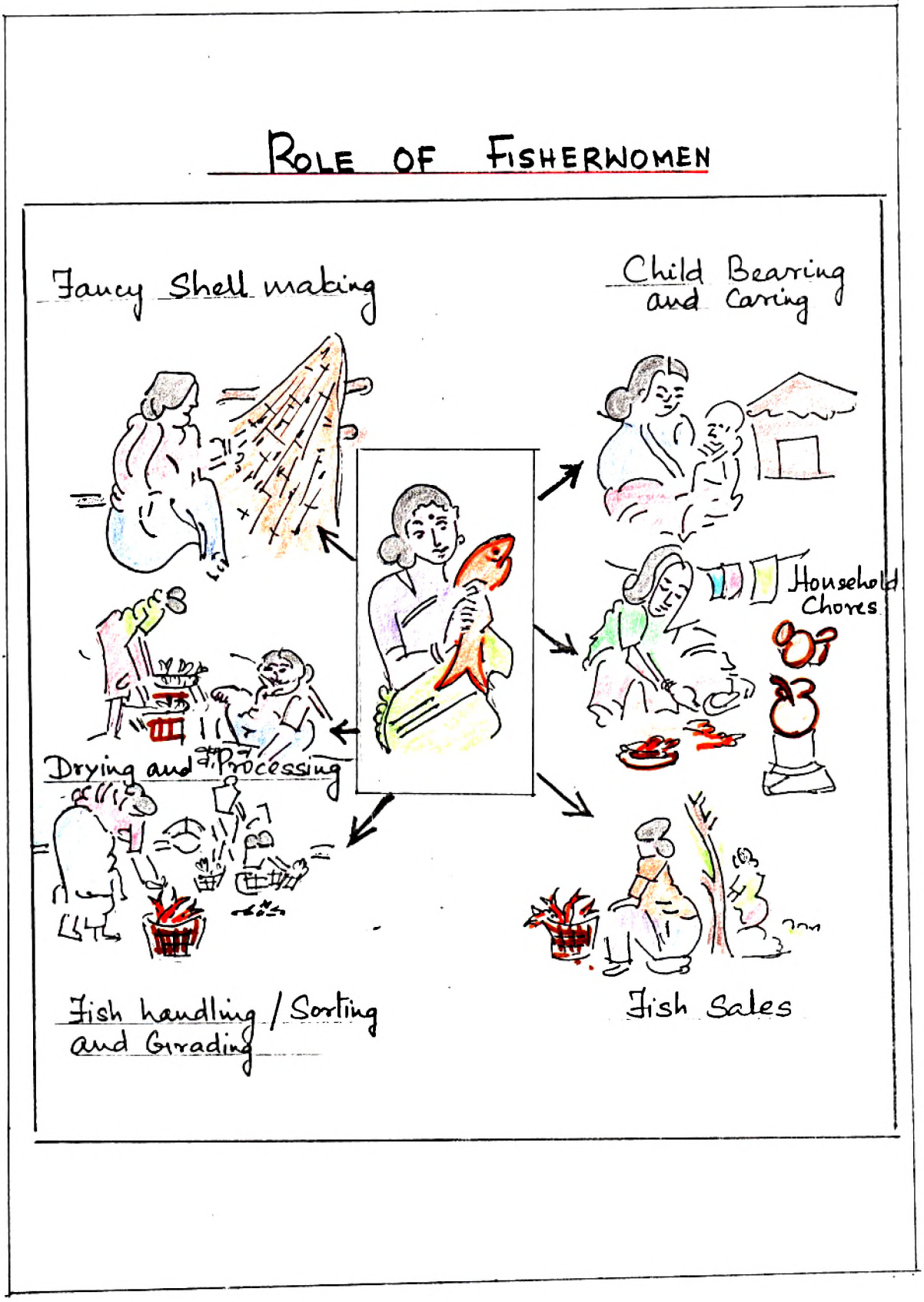

ROLE OF FISHERWOMEN
Fancy Shell making
Child Bearing and Caring
Household Chores
Drying and Processing
Fish handling / Sorting and Grading
Fish Sales

Fig. 31

Matrix scoring exercise was done to elicit information related to motivating and facilitating factors for participation in fishing activity. Interactions and deliberations by the fisherfolk were marked using beads of different colours and chalk pieces (Fig. 32a).

To raise the standard of living was the factor given the highest score, followed by 'economic independence'.

Among the facilitating factors, 'fishing being a traditional activity' was given the highest score (cent per cent) followed by 'need to help husband / father / son' (80 per cent) and 'satisfaction in looking after own business' (40 per cent) (Fig. 32b).

Task performance of women in major fishing activities : The participatory diagramming (pie-diagram), was used to explore the task performance of women in post harvest activities. The same participants got involved in this exercise. Rangoli powder and chalk pieces were used for marking / scoring (Fig. 33).

The post-harvest activities in which women participated were :

Sale of fish	45%
Salt-curing and drying	20%
Sorting	15%
Poultry feed mix	10%
Fancy shell making	5%
Auctioning	5%

a. MOTIVATING FACTORS

	Factors	Scores
1.	To raise the standard of living	●●●●●●●●
2.	Economic Independence	●●●●●
3.	To occupy time usefully	●●●
4.	Dislike household work	●

b. FACILITATING FACTORS

	Factors	Scores
1.	Fishing being traditional activity	●●●●●●●●
2.	Need to help husband father / son / others	●●●●●●
3.	Satisfaction in looking after own business	●●●●
4.	Technology and Labour saving devices available	●●●
5.	Family size is small	●●
6.	Encouragement from family members	●

* ◐ one bead represents 10% score

Fig. 32

Participation of Women in Major Fishing Activities

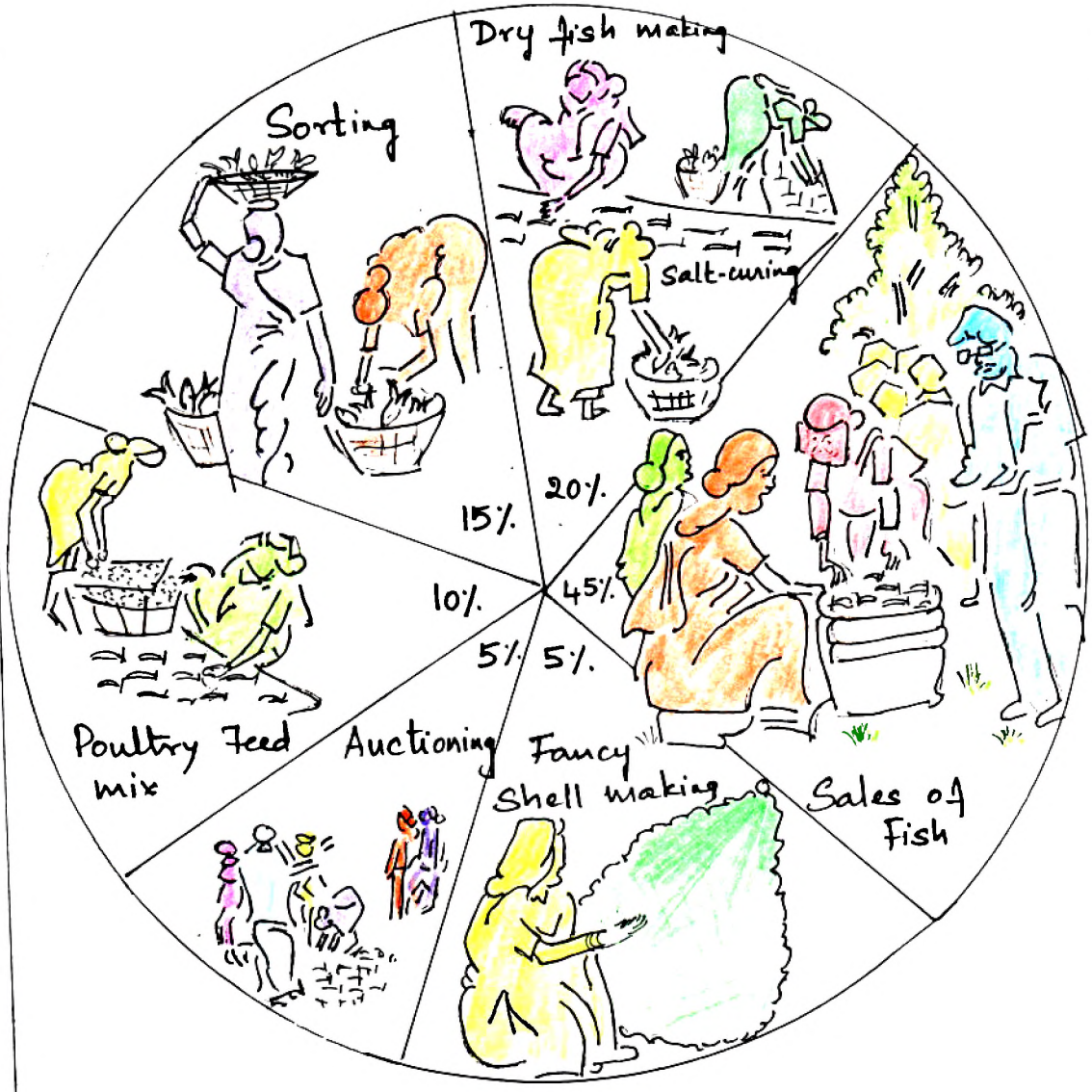


Fig. 33

As shown in Figure 33, the highest participation was found in the 'Sale of Fish' (45 per cent), followed by 'Salt-curing and drying' (20 per cent) and 'Sorting' (15 per cent).

Task performance of women in minor fishing activities : The participatory diagramming exercise, (bar diagram) was used to depict the task performance of fisherwomen in minor fishing activities (Fig. 34a).

Activities such as 'cleaning and preparing for sales', was given the highest score (70 per cent) followed by 'selection of members to be sent for fishing' (20 per cent) and the least score was given to the arrangement of equipments for fishing (10 per cent).

Problems encountered in fishing activities : The participatory diagramming exercise (bar diagram) was done with Rangoli powder to identify problems encountered in post-harvest activities (Fig. 34b).

The major problem encountered by the fisherwomen was getting ice for preservation (70 per cent) because there was no ice storage plant in the area under study. Ice had to be brought from a distance of 8 kms. resulting in spoilage of fish. 'Lack of space for drying fish' (15 per cent), 'non-availability of transport' (10 per cent) and 'inadequate market facilities' (5 per cent) were the other problems. Tricycles were reported to be hired from outside the kuppam at exorbitant costs.

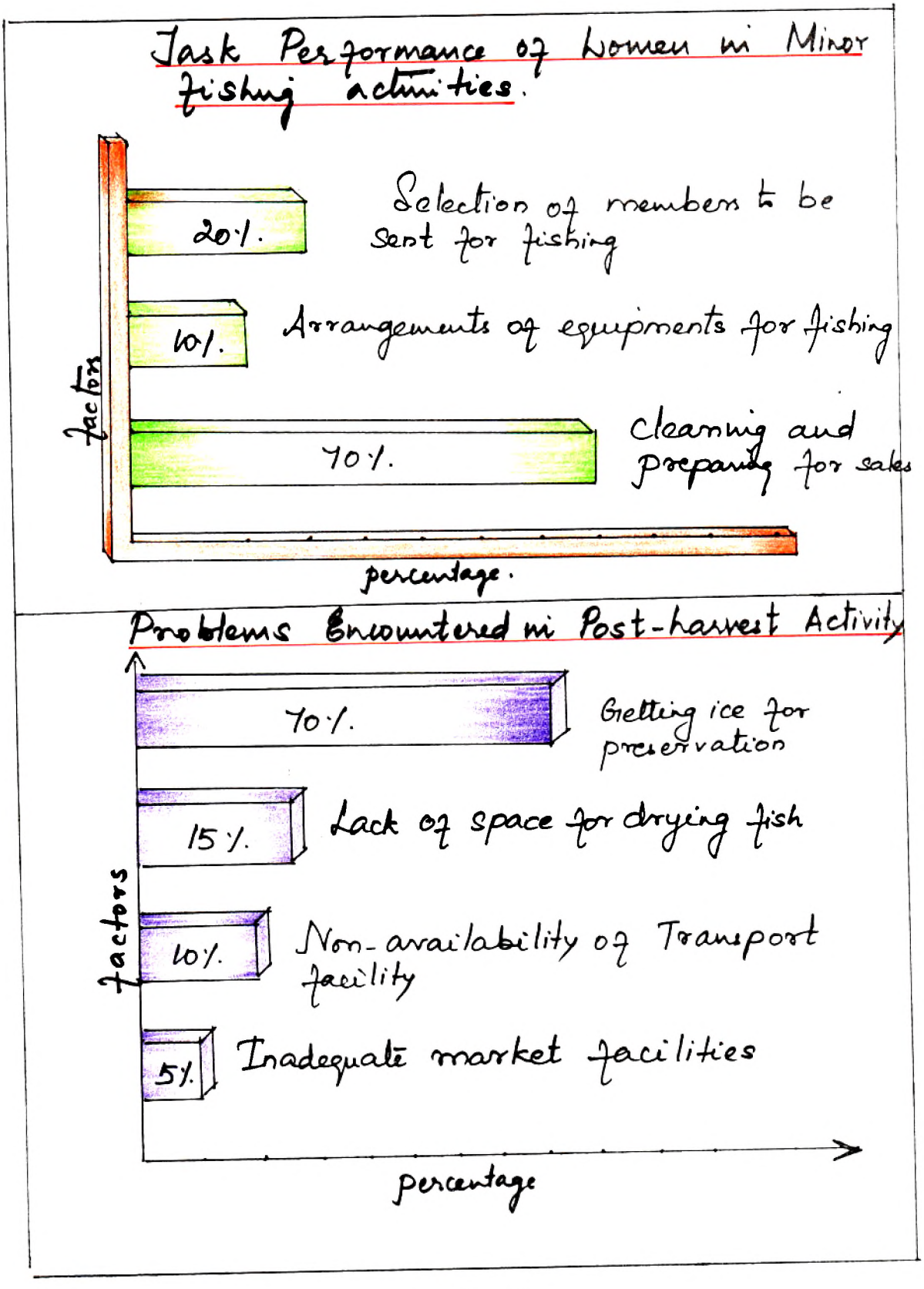

Task Performance of Women in Minor fishing activities.
20%.
Selection of members to be sent for fishing
10%.
Arrangements of equipments for fishing
70%.
Cleaning and preparing for sales
factors
percentage.
Problems Encountered in Post-harvest Activity
70%.
Getting ice for preservation
15%.
Lack of space for drying fish
10%.
Non-availability of Transport facility
5%.
Inadequate market facilities
factors
percentage

Fig. 34

Perceptions of Women

An attempt was made to study the perceptions of the fisherwomen on 'Integrated Fishing System'. Twenty women with their children came forward to draw 'The Systems Diagram' and 'Food Web' (ecosystem chain) using Rangoli powder.

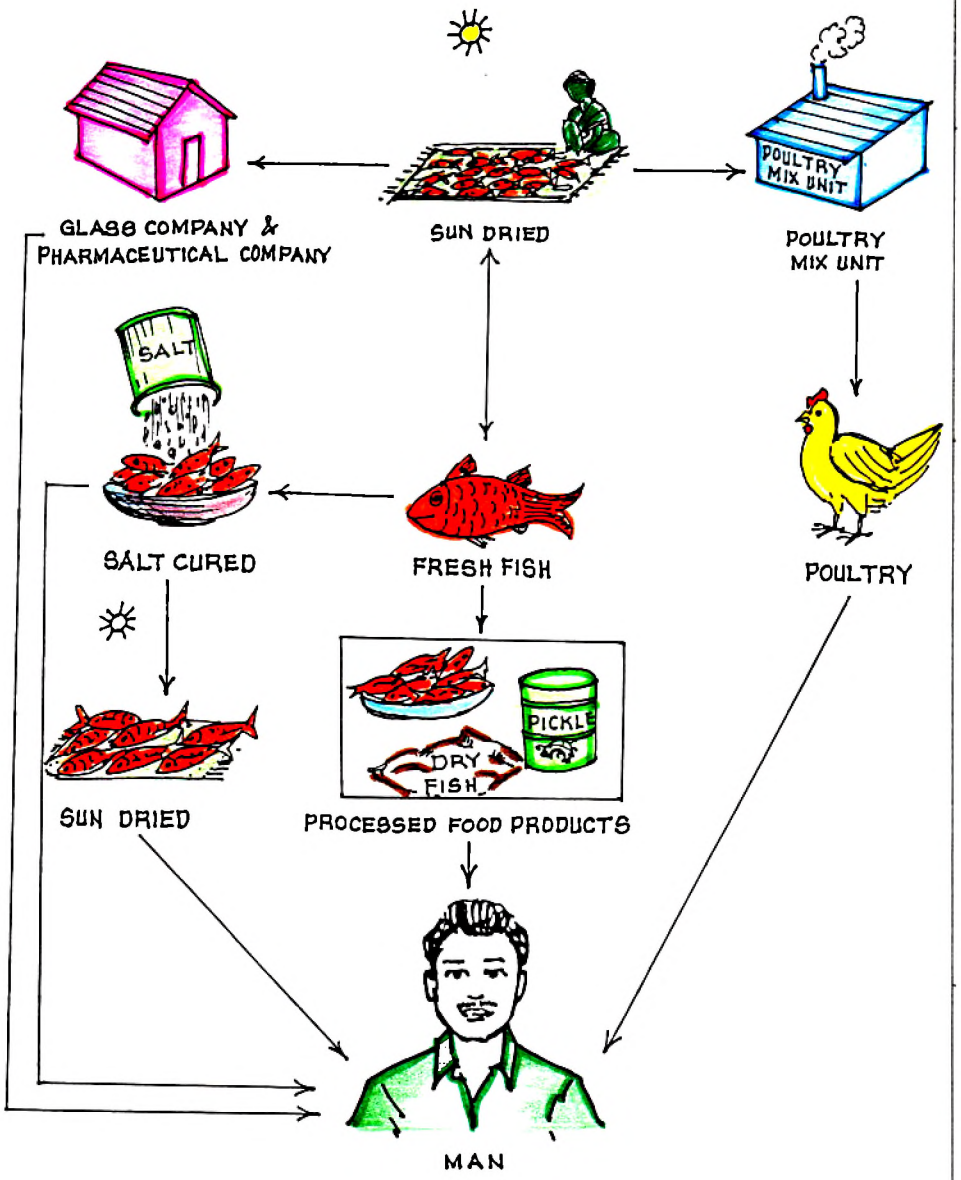
Systems diagram : The illustration depicted the ways in which fish reached, man for his consumption.

* First, fresh fish gets processed into food products.
* Second, fish in the process undergoes salt-curing treatment and then sun dried or used directly for human consumption.
* Third, the fish waste is sun dried and used for the preparation of poultry feed mix. Poultry again is consumed by man.
* Fourth, the fish waste shells (outer covering) are sun dried and sent to glass company for glass cleaning and for preparation of Pharmaceutical products which are again used by man (Fig. 35).

Food web (Ecosystem) : The same type of flow diagram was used to depict the 'Food Web' chain of fish. This was to show its importance in the ecosystems. The diagram was drawn using Rangoli powder (Fig. 36).

The illustration depicted the following :

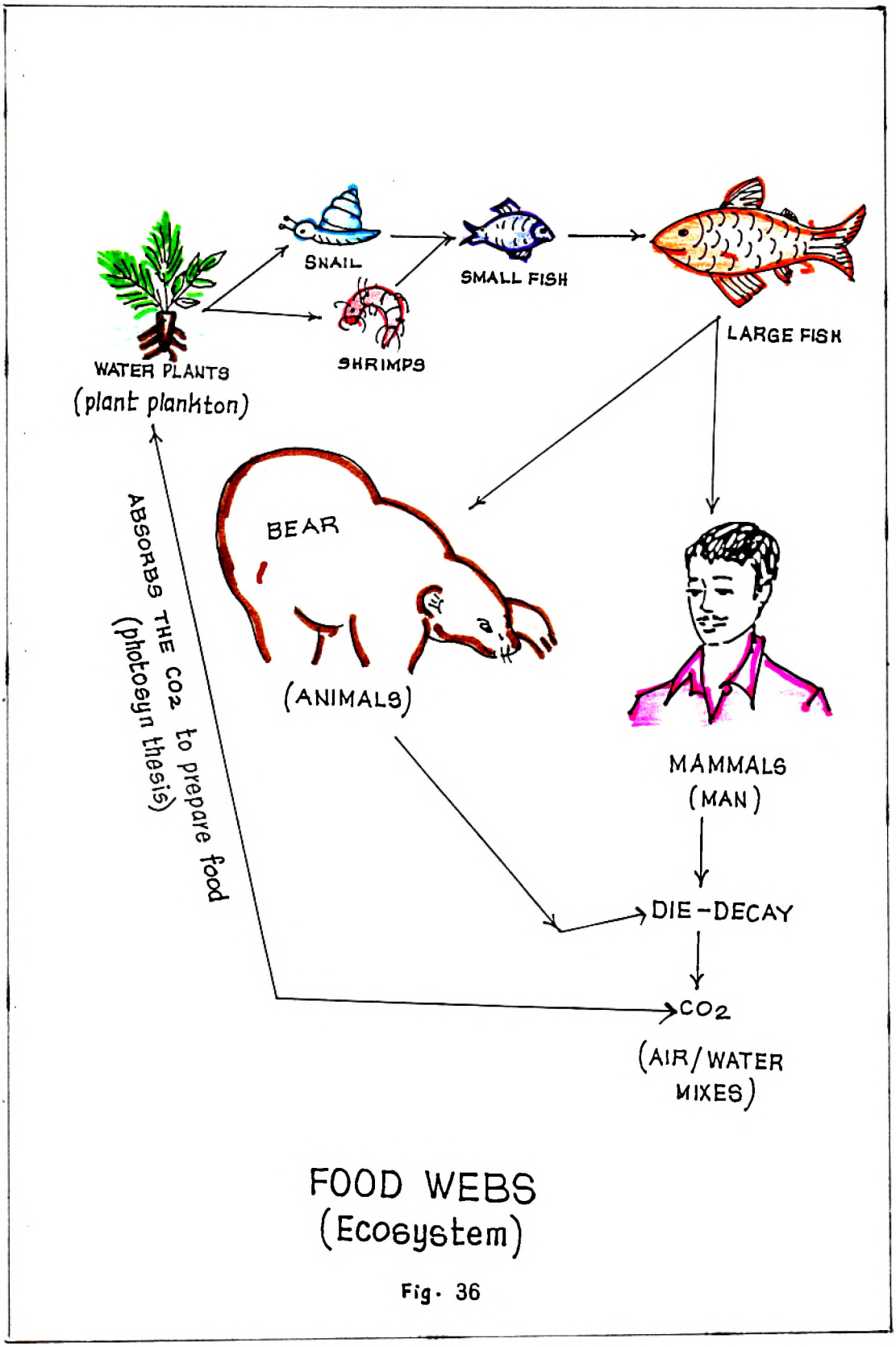
* Small fishes like shrimps and snail feed on water planktons and invariably been eaten by the small fish and



SYSTEMS DIAGRAM

The Sequence treatment of fish to reach man

Fig 35



FOOD WEBS
(Ecosystem)

Fig. 36

* Small fish are consumed by the large fish, which again are consumed by man and animals. When the animal and man die, they decay and get decomposed, emitting Co_2, which mixes with air, water and soil and is utilised by the plants for their survival. Thus, the ecosystem would be sustained.

Decision making and Family Resource Management : The decision making practices prevailing among the fisherfolk were analysed through matrix scoring using cartoon diagrams. Fifteen women and 12 men participated in this exercise.

Surprisingly, the fisherwomen played a major role in the decision making related to both fishing and household activities. 'Purchase of boat, and nets', 'labour allocation' and giving wages' were decided by men alone. Creating major family assets and buying equipment were jointly decided by men and women. The rest of the activities were planned exclusively by women (Fig. 37).

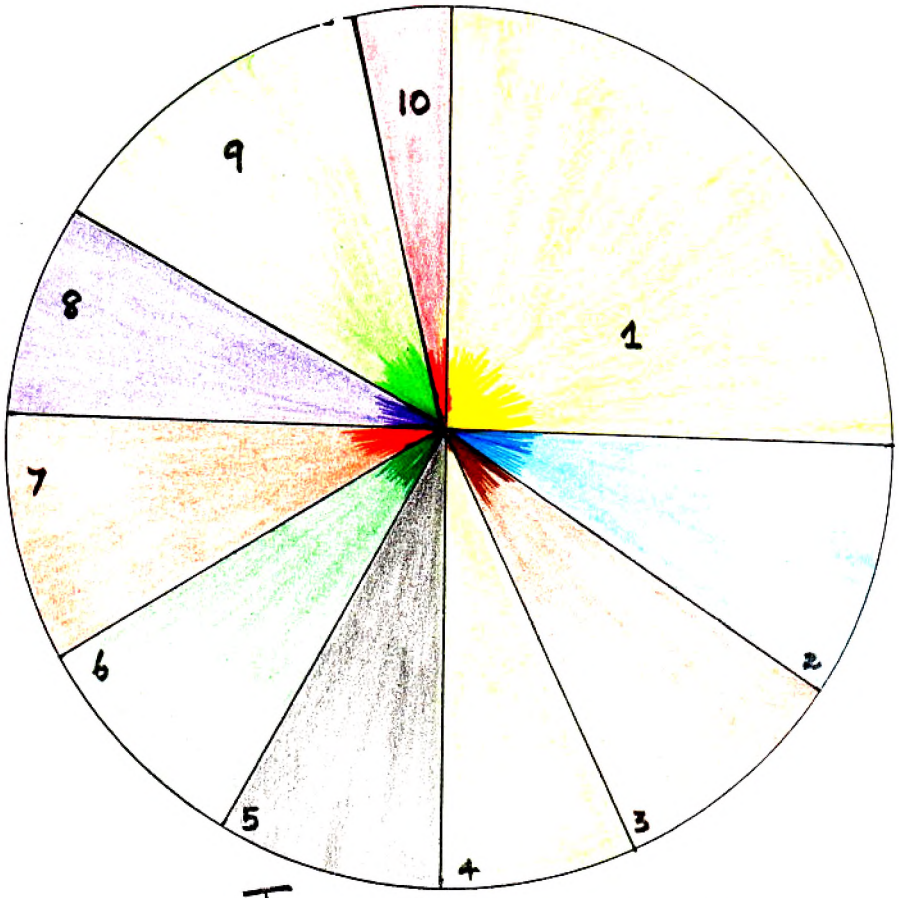
Family resource management : The practices related to management of human and non-human resources such as time, energy and money by the fisherwomen were studied through the PRA methods - participatory diagramming (pie chart), matrix scoring and semi-structured interview. Twenty women participated in this exercise.

Time management : The maximum time consuming activity was shore-based fishing activity followed by recreation and social activities. The least time was reported to be spent on 'sleep' since they went to bed very late and woke up very early in the morning (Fig. 38).

Decision Making Practices

	Factors	Men alone	Women alone	Both
1.	plan of work for the day			
2.	Purchase of boats, nets and others			
3.	Labour allocation			
4.	Sales of fish			
5.	Giving wages			
6.	Keeping accounts			
7.	Proportion to be used for family consumption			
8.	Expenditure of income from fish sales			
9.	Maintaining accounts			
10.	Creating major family assets			
11.	Buying new equipments			
12.	Storage of fish			

Fig. 37



TIME MANAGEMENT
(Time spent on different activities)

1. Shore-based fishery activity.
2. Purchase of household articles and food products
3. Personnel Hygiene
4. Pre-preparation for cooking
5. Cooking
6. Household maintanance
7. Washing clothes
8. Care of children
9. Recreation and Social activities
10. Sleep.

Fig. 38

Energy management : Matrix scoring method was applied to obtain data related to 'Extent of participation of women in household and fishing activities'. Fifteen women were the participants and they marked the scores against different attributes such as 'always', 'some times' and 'never'.

As the illustration reveals, the activities such as cooking, washing clothes and shore based fishing activity were the activities in which women 'always' participated ; the activities which were performed 'sometimes' included care of children, social activities and water collection. The only activity where women never participated was fishing (Fig. 39).

Fatigue experienced : A semi-structured interview was conducted with 25 women to study the fatigue experienced by them. The activities causing more fatigue were transporting fish from the landing centre to local markets, sale of fish at the market, auctioning and cooking. The activities causing less fatigue were sorting fish, general household maintenance, washing clothes and care of children.

The physical fatigue encountered by the fisherwomen resulted in pain in limbs due to transportation of fish (as expressed by 92 per cent) followed by neck and back pain during fish sales (4 per cent) due to postural difficulties.

The psychological fatigue encountered by the fisherwomen related to

Frustration due to poor sales	80 per cent
Exhaustion when the catch was poor	15 per cent
Boredom in lean season	5 per cent

Extent of Participation in Household and Fishing Activities

	Activities	Always	Sometimes	Never
1.	Cooking			
2.	House-hold Activities			
3.	Cleaning and washing Clothes			
4.	Care of Children			
5.	Social activities			
6.	Water Collection			
7.	Fishing			
8.	Shore based Fishing Activities			

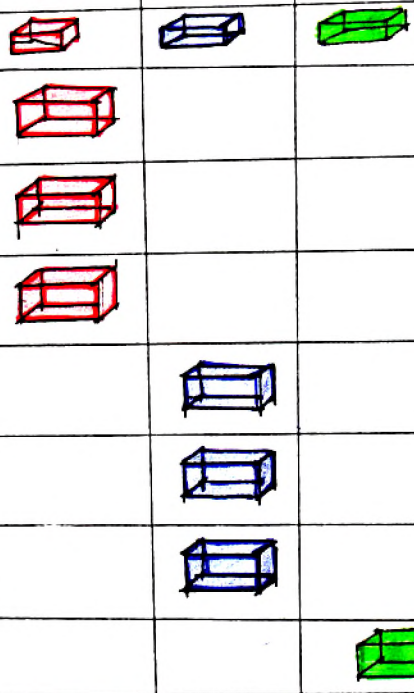


Fig. 39

The PRA exercises thus gave valuable information about Mattaankuppam, in terms of the biophysical characteristics, topography of the area, demographic setting, sea-farming profile, economic setting, technologies used, income and expenditure pattern, infrastructural facilities, social and cultural settings, resource flow and linkages and profile of fisherwomen.

B. IMPACT OF THE CAPACITY BUILDING EFFORTS

This aspect of the results is dealt with on the following lines :

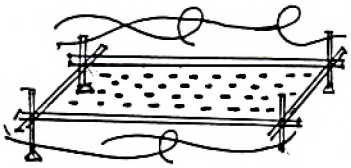
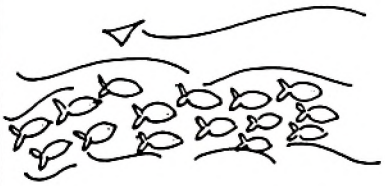
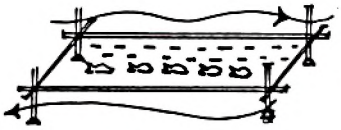
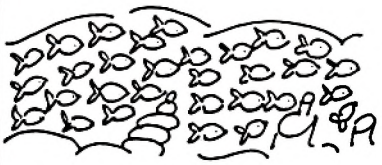
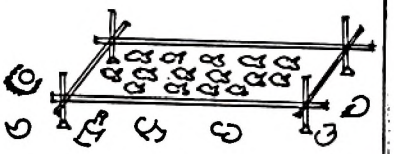
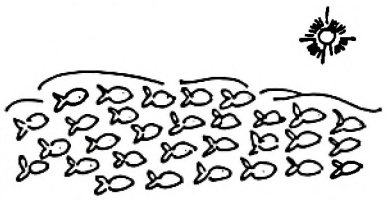
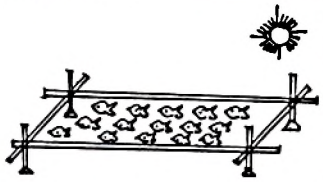
1. Feasibility of Adoption of the Technologies introduced.
2. Outcomes of Exposure to Developmental Inputs and
3. Preparation of a Perspective Plan for Integrated System of Fishing.

1. Feasibility of Adoption of the Technologies Introduced

The feasibility of adoption of the two dryers designed and introduced was assessed by the five fisherwomen after the trials they made with the devices. Table IX shows the comparison of the old and new methods of drying fish.

The new dryers appeared to have several advantages over the old methods of drying as detailed in the Table (Fig. 40).

The bamboo dryer and the solar dryer were portable, owing to their light weight. They were found to be cost effective also (Figs. 41 and 42).

Old Method of Drying	New Method of Drying
 Drying done unhygienically on sand, road side platforms, old cloths, etc.	 Drying could be done above the ground level on a clean platform or inside the solar dryer.
 Wind is weak at ground level.	 Wind is strong above the ground level.
 Air can pass over only one side of the fish, making the drying very slow and uneven.	 Air can pass on both sides of fish and drying is faster and even.
 Drying over hot sand burns the fish, making it fragile.	 Fish dried on racks or in the solar dryer will not get burnt.
 During rainy season, fish dried over sand gets wet by ground water, even when they are covered on the top. The drying place becomes slushy and smells.	 During rainy season fish can be covered on the top and ground water would not enter at the bottom.The porous holes on the mesh allows water to drain off and no smell is experienced.

COMPARISON OF THE OLD AND NEW METHODS OF DRYING FISH

TABLE IX.



a. Road Side Drying



b. Sea-Shore Drying

FIG. 40. UNHYGIENIC DRYING OF FISH





FIG. 42. DRYING FISH ON SOLAR DRYER DESIGNED

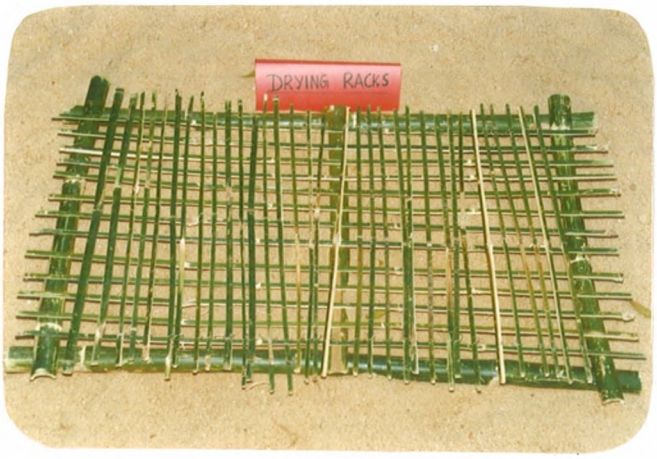




FIG. 41. DRYING FISH ON THE BAMBOO DRYER DESIGNED

2. Outcomes of Exposure to Developmental Inputs

Awareness about programmes and welfare measures

Frequent contacts with the Extension Officer of the Directorate of Fisheries, Government of Tamil Nadu enabled the fisherwomen, men and youth to become aware of the programmes and welfare measures. Twenty fisherwomen got sanction to receive the aluminium containers used for transporting fish.

Vocational skill training and entrepreneurship development

* Linkages with the EXNORA groups facilitated 45 fisherwomen to get training on entrepreneurial skills to manage micro enterprises.
* Twenty educated youth (10 boys and 10 girls) could get vocational skill training in Basic Computer Programmes and use of E-mail and internet.
* After getting training on making sea shell fancy articles, five youth were absorbed in the production unit by the trainer himself.
* After attending the demonstration on fish pickle making, five women initiated pickle making on a commercial basis on a small scale.

Awareness on social and legal issues

* An association by name "Kannaki EXNORA Sakthi" was registered with 35 women members. They planned to start 'Self Help Groups' for collective action and articulation.

* Two families were helped to resolve their disputes with the help of the police officials who educated the members on legal and human rights.

Impact of education on health and hygiene

The education programmes organised by the researcher and contacts with EXNORA resulted in cleaner environment with streets cleaned and maintained and provision of dust bins for waste disposal (Figs. 43, 44, 45, 46, and 47).

The men, women and youth exposed to the educational inputs were enquired about the facilitating / motivating factors for their participation in the training / awareness programmes. Fifty respondents were randomly chosen (Table X).

TABLE X

FACTORS MOTIVATING FISHERFOLK TO PARTICIPATE IN THE PROGRAMMES ORGANISED

Factors	Percentage Stating n : 50
Economic upliftment	100
Recognition in society	100
Personal efficacy	80
Extension agency contacts	70
Peer group influence	70



a. Demonstration of Drying racks by the Investigator



b. Hygiene Handling of Fish

FIG. 43. TECHNOLOGY TRANSFER PROGRAMMES



a. Awareness on Programmes

b. Awareness on Social Issues





c. Awareness on Legal Issues

FIG. 44. AWARENESS GENERATION ON SOCIAL AND LEGAL ISSUES



a. Demonstration on Sea-Shell Fancy Article Making

b. Computer Training Programme





c. Credit Support by NABARD

FIG. 45. EXPOSURE TO INCOME GENERATION ACTIVITIES



a. Medical / Health Camp



b. Solid Waste Management

FIG. 46. EDUCATION ON HEALTH AND SANITATION



Before



After

c. STREET CLEANING



FIG. 47. PETITION SUBMISSION TO SHRI.HANS RAJ VERMA, IAS DIRECTOR OF FISHERIES GOVERNMENT OF INDIA

Raising the economic standards appeared to be the most obvious factor motivating the groups for participation. New contents established with officials and experts from outside also motivated the clientele. Recognition in society stimulated 80 per cent to come forward to take part in capacity building efforts. Peer group influence and urge for personal growth also were favourably considered.

3. Preparation of a Perspective Plan for Integrated System of Fishing

The SWOT analysis helped the fisherwomen to reason out systematically and analytically the important facts related to

Strengths	Weakness
Opportunities	Threats

The SWOT analysis done by the representatives of the fisherwomen revealed the following :

Strengths	Weakness
* Indigenous knowledge and technology	* Poor communication skills owing to illiteracy, poverty, etc.
* Tenacity and capacity to put in hardwork	* Lack of technical skills to produce value added food products from fish
* Understanding of market trends	* Lack of infrastructural facilities for transportation, provision of ice and salt, drying or storing fish
* Ability to withstand crisis during lean periods	* Inadequate credit / marketing support
* Willingness to take risks.	

Opportunities	Threats
* Infrastructural facilities being promoted by government * Access to programmes of Government for promoting fisheries * Exposure to media and educational facilities * Vocational skill training programmes for unemployed youth	* Interference of launches during catamaran fishing * Weather forecast such as cyclones and depression in the sea adversely affecting fishing leading to risks. * As their dwelling area belongs to the temple trust property of 'Parthasarathi Swamigal Temple', there is always a Threat to vacate the land.

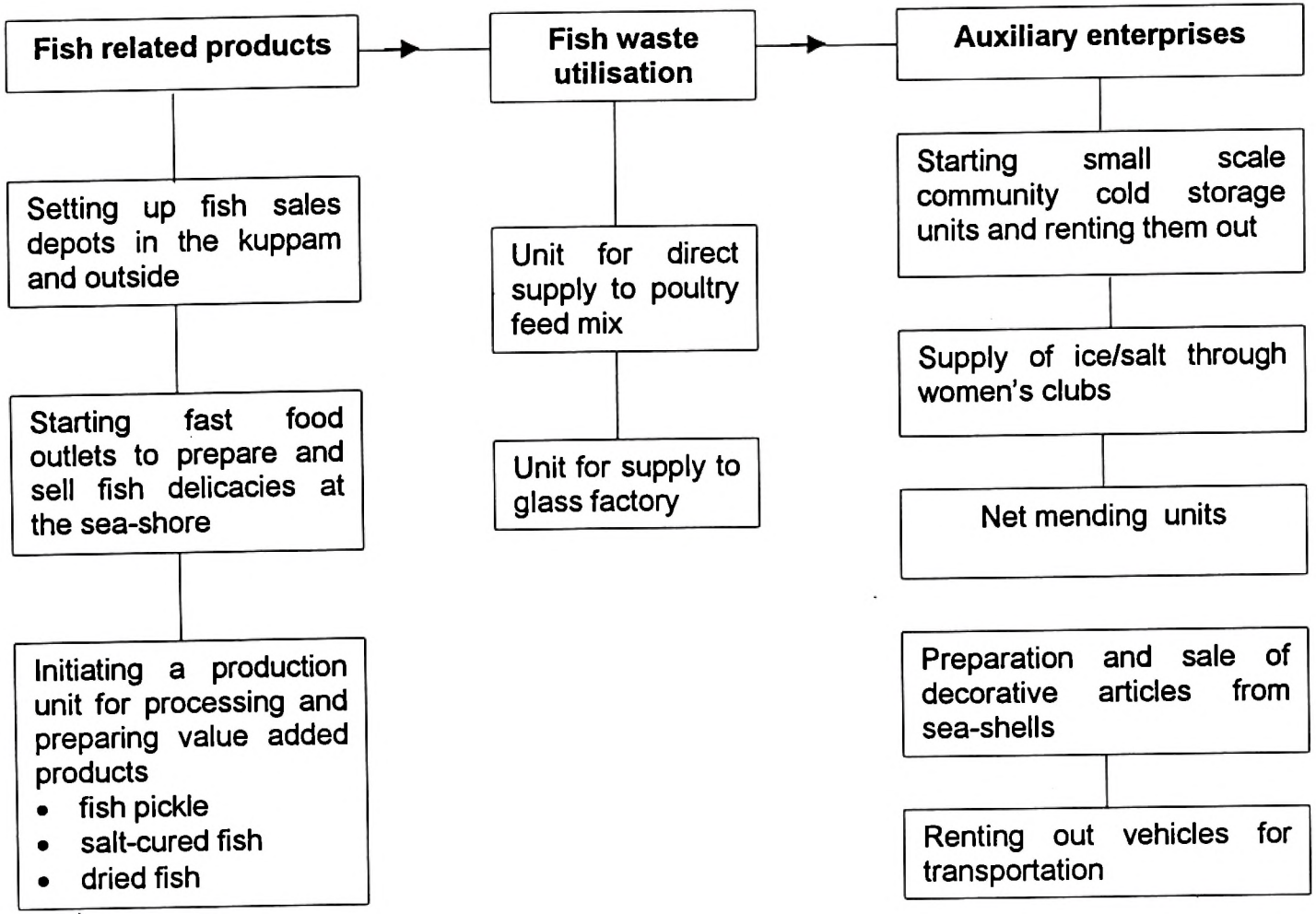
The SWOT analysis enabled the women to examine systematically the strength, the weakness, the opportunities and the threats. Participation in PRA exercises provided the clientele the backdrop to do this analysis. Based on the SWOT analysis, the fisherwomen were encouraged to perceive an integrated fishing system which may be adopted by them (Fig. 48).

The women perceived a number of inter linked activities related to Fish sales, Fish waste utilisation and Setting up auxiliary enterprises.

Fish related products

Currently the fish is sold in open places under unhygienic conditions. The fisherwomen contemplate setting up fish sales depots in the kuppam and outside to facilitate sale under hygienic conditions and clean surrounding.

Another interesting proposition was starting fast food outlets to prepare and sell fish delicacies for which there would be good take off in the beach itself. Normally fisherwomen do not get involved in the sale of cooked fish. However, this is a potential enterprise, provided the items are produced and sold under hygienic conditions.



PERSPECTIVE PLAN FOR AN INTEGRATED FISHING SYSTEM

FIG. 48

Drying and salt-curing are the two major tasks related to processing of value added products, the women were involved in. Fish pickling is done at the household level. With the new technologies introduced by way of bamboo dryers / solar dryers and the training programmes attended by them, the women felt confident to initiate processing units commercially on a small scale.

Fish waste utilisation

Currently a few middlemen come and collect the fish waste from the different fishing areas and sell them to the poultry feed mixing unit and the glass factories in the adjoining states. The fisherwomen felt that their society itself can take up this responsibility so that the members could avail the income directly and fully.

Auxiliary enterprises

The PRA exercises and the SWOT analysis pointed out several possibilities for auxiliary enterprises to be associated with fishing. Absence of cold storage units and lack of supply of ice and salt on time are impediments leading to spoilage of fish. The fisherwomen after exposure to EDP training could think of setting up auxiliary units such as setting up small scale cold storage units in their own kuppam and renting out the same to fishermen, taking up contracts for the supply of ice and salt through women's club, purchasing vehicles such as tricycles or tempos and renting them out, starting net mending units and preparation and sale of decorative articles from sea shells.

Summary and Conclusion

* * * *

V. SUMMARY AND CONCLUSION

Participation is a contemporary catchword in development studies, particularly in social development. Participation as an important alternative strategy for development improves the livelihoods of the poor. Increasingly in the past few years the notion of participation as an exercise of empowering women has gained wide support. Empowerment is an active process, enabling women to realise their full identity and power and build up their capacities to become partners in the process of development.

Women in fisheries constitute the economically invisible force. In view of their crucial and decisive contributions to the fisheries sector, it is necessary to reorient the existing strategies towards empowering fisherwomen and utilize their potentials fully. Empowerment of fisherwomen thus is a critical factor in improving their status and decision making power.

This action research on **"Capacity Building of Fisherwomen – A Participatory Approach"** was taken up with the following specific objectives :

* Make a situational analysis of the socio-economic and cultural conditions of the fisherfolk ;
* Study the prevalent technologies in use for sea-farming ;
* Understand the profile of fisherwomen and their contribution to the shore based activities ;
* Examine the decision making and family resource management practices ;

* Create scientific temper and attitude among the fisherwomen towards adoption of appropriate technologies ;
* Take efforts for capacity building of the fisherwomen with special thrust on awareness generation, technology transfer and widening their perspectives and
* Evaluate the outcomes of the efforts in quantitative and qualitative dimensions.

Methodology

The study was carried out in Mattaankuppam, located at 'Kannaki Beach', Triplicane, Chennai, the capital of Tamil Nadu. Although influenced by the modern city life, this kuppam still preserved its tradition of a typical fishing village.

Participatory Rural Appraisal (PRA) was adopted to study the socio-economic profile of the fisherfolk. PRA is an informal approach of collecting information in a short time. Participatory mapping, transect walks, wealth ranking, seasonal calendars, daily activity profile, historical time line, Venn diagrams, matrix scoring, systems and flow diagrams, participatory diagrams, preference ranking and semi-structured interviews were the PRA methods employed in this study.

Based on the situational analysis, capacity building efforts were made in terms of technology transfer and exposure to educational inputs.

The salient findings of this study are summarized hereunder :

A. SITUATIONAL ANALYSIS

General profile

* There were 600 households in Mattaankuppam with 7088 adults and 1085 children ; 65 per cent had the family size of 5 to 6 children.
* The sex ratio in Mattaankuppam was 959 women against 1000 men which was greater than the national average i.e., 929 / 1000. The sex ratio was in favour of girls among the younger generation. i.e., 1066 / 1000.
* The nuclear family system predominated in the kuppam (60 per cent). A majority belonged to Hindu Religion.
* Fifty five per cent fisherfolk resided in tiled houses ; 35 per cent in thatched houses and only 10 per cent had terraced houses.
* As for adults, 50 per cent were illiterates ; 160 children attended the primary school, situated within the kuppam and 30 attended the secondary school outsided the kuppam. Although there is proximity to high school and college, only 200 youth availed these facilities.

Sea farming profile

* The only fishing craft used in Mattaankuppam was the 'catamarans'.
* Fishing effort from this kuppam was around 350 fishermen and the number of units operating was estimated to be 100 catamarans including 15 motorized ones. Nearly 80 per cent fishermen were only workers in the fishing crafts.

* The fishermen spent around 6 to 8 hours in the sea for 4 to 5 days a week. During peak fishing season, they worked for the whole week. During lean seasons they worked only for 2 to 3 days a week. Day fishing was most common.

* The men were engaged in other occupations also such as petty trade, sale of fuel, sale of fancy articles from sea shells, repair of out board engines, etc., A few were found to be in menial jobs in the private and government sectors (eight per cent and two per cent respectively).

* The main season for availability of all types of fish except Valai (Ribbon fish) and Kaanaankeluthi (Mackerel) ranged from the month of Thai (mid January) to Avani (mid September). The off-season was noticed from Aipasi (mid October) to Margazhi (mid December) when the North-East monsoon sets. There is a bloom in the rate of fish between Chitrai (mid April) to Aani (mid July) and Masi (mid February) to Panguni (mid March) for all varieties of fish, except for Nethili (Anchovy), Kaanaankeluthi (Mackerel) and Valai (Ribbon fish).

* The seasonal calendar revealed that there was employment opportunity for the fisherfolk throughout the year from Masi (mid February) to Aipasi (mid November). The peak season of employment opportunities was between Chitrai (mid April) to Puratasi (mid October). Net wending was also an important activity noticed during lean season.

* The employment pattern of fisherwomen was slightly better than that of fishermen. This is because even during the lean season, the women were

found engaged in allied fishing activities such as drying, salt-curing and sale of dry fish.

* The fishermen had indigenous knowledge to predict the availability of the varieties of fish from the changes in the colour of the sea waves.
* Transporting fish to different areas within the city was reported to be done through head loads, bicycle, tricycle and auto-rickshaws.
* 'Sales at the fish market' was predominant which took place between 9.00 a.m. to 2.00 p.m. and again from 5.00 to 8.00 p.m. Fisherwomen were mainly involved in marketing. Lack of proper sheds and storage facilities for fish and ice required for preservation and adulteration by mixing spoilt fish were the constraints mainly identified at the local market.

Income expenditure pattern

* The fisherfolk had a steady flow of income from mid April (Chitrai) to mid September (Puratasi) and again from mid January (Thai) to mid March (Panguni). The lean period was marked from mid October (Aipasi) to mid December (Margazhi).
* A majority of 55 per cent belonged to the middle income category ; 35 per cent were in low income group and only 15 per cent belonged to the high income group.
* 'Maintenance and repair of catamaran' was stated to be the item demanding the highest expenditure, while loan repayment obtained the lowest priority.

* With regard to household expenditure pattern, food was given the maximum score (45 per cent) followed by clothing (15 per cent).
* Rice was preferred to other cereals. They prepared a single meal in the morning and consumed the same for breakfast and lunch. Naturally fish was found to be a compulsory item in every meal. The type of cooking normally adopted was boiling, steaming and frying. Special foods and dishes consumed were tubers, puttu and halwa.
* When the income was high in certain seasons, there was a tendency even for low income groups to explore the taste of new varieties of fish or go in for good quality fish.
* Savings with private individuals (chit) was the most preferred form of investment. Institutional savings in the post office or bank appeared to be scanty. As for indebtedness, borrowing from money lenders was common. There were individuals in the kuppam running small finance companies for promoting savings in the form of 'chits' and also for lending money to the needy.

Technologies used

Low level of literacy, 'inadequate financial support', non-availability of inputs on time, and lack of incentives for adoption were stated to be the major constraints hindering adoption of modern technologies in fishing and in post-harvest activities.

Infrastructural facilities

The fisherfolk could interpret and relate the relationships, they had with the various institutions and also with the people in the kuppam. Men's preferences were mainly related to outside institutions whereas women's preferences centred around the institutions within the kuppam or those related to basic amenities. There was consistency in ranking between the men and women only with regard to four institutions namely the landing centre (1 rank) ; society for fishermen and women (III rank) ; ration shop (IV rank) and police station (XI rank).

Socio-cultural setting

* Fisherfolk had strong beliefs in religion and charity. Idol worshipping was common. They worshipped the goddess 'Amman'.
* During religious festivals and on certain days of the week such as Tuesdays, Fridays and Saturdays and in months 'Puratasi' and 'Margazhi' (mid September to mid October and mid December to mid January), fasting was observed mainly by women, who avoided consuming fish.
* 'Fishing as a traditional and auspicious occupation needs to be protected and developed' was the attitude commonly prevalent. In contrast, they were unwilling to involve their own children in fishing and desired to adopt the urban lifestyles, finding new avenues in the job market for their youngsters. They felt that the younger generation need not depend on the vagaries of nature.

Resource flow and linkages

'The flow of products chart' revealed that the products from inside to outside the kuppam were fresh fish, dry fish, shell-fancy articles and nets. The flow of products from outside to inside kuppam included diesel, kerosene, fire wood, fishing equipment, nets, vegetables, fruits, ice, salt, medicines, household goods, clothing, etc. The internal linkages included sharing nets and sale of fish within the kuppam.

Profile of fisherwomen

* Fishing is exclusively a male domain ; women played a major role in pre-preparation and post-harvest fishing activities.
* Fisherwomen's work schedule began from 3.00 a.m. when their husbands left for fishing. The work schedule ended up around 11.00 p.m.
* The fish processing activity was found to be the exclusive domain of women. Fisherwomen were engaged also in drying the trash fish and waste from fish for poultry feed or glass factories and a few were occupied in packaging, transporting and trading.
* The major activities carried out by the fisherfolk were fish drying and preservation. The constraints in drying and salt-curing as expressed by the fisherwomen were :
  - non-availability of drying equipment leading to drying on unhygienic platforms.
  - lack of areas available to put up permanent drying structures and
  - low price for their products owing to poor quality.

* The fisherwomen were aware of the 'Integrated Fishing System' and Food Web (eco system) depicting the ways in which fish reached man for his consumption.
* The fisherwomen played a major role in the decision making related to both fishing and household activities either singly or jointly with their men.
* The maximum time consuming activity was fishing, followed by cooking food. The least time was reported to be spent on 'sleep' since they went to bed very late and woke up very early in the morning. The only activity where women never participated was fishing.
* As many as 25 families from the middle income and high income groups used labour saving devices to ease their household chores. The activities causing fatigue were transporting fish from the landing centre to local markets, sale of fish at the market, auctioning and cooking. The activities causing less fatigue were sorting fish, general household maintenance, washing clothes and care of children.
* The physical fatigue encountered by the fisherwomen mainly resulted in pain in limbs due to transportation of fish as expressed by 92 per cent of women followed by neck and back pain due to postural defects during fish sales.

B. IMPACT OF THE CAPACITY BUILDING EFFORTS

The PRA exercises brought to light the socio-economic conditions of the fisherfolk under study and revealed the need to build up the capacity of the

fisherwomen to promote their quality of living. The capacity building efforts included

- Education on appropriate technologies and
- Exposure to developmental inputs.

The outcomes of these efforts were measured in terms of evaluating the efficacy of the newly designed dryers, assessing the impact of exposure to developmental inputs and ability to prepare a perspective plan for an integrated system of fishing.

Education on appropriate technologies

The constraints faced in drying fish as expressed by the fisherwomen prompted the researcher to design low cost portable dryers which would ensure hygienic and faster drying. Two dryers – a bamboo dryer and a solar dryer were designed which would be feasible for drying 2 kgs. of fish at a time. Demonstrations and field trials were conducted for the benefit of the fisherwomen. In addition training programmes were conducted on hygienic handling of fish and fish food recipes.

The trials made by the fisherwomen convinced them of the advantages of the new dryers and motivated them to adopt the same.

Exposure to developmental inputs

This aspect of the study included awareness generation on welfare measures by the state government, vocational skill building and entrepreneurship

development for women and youth, awareness generation on social and legal issues and education on Better Family Living in terms of child care, nutrition, health, sanitation and waste management.

Awareness about programmes and welfare measures

* Frequent contacts with the Extension Officer of the Directorate of Fisheries, Government of Tamil Nadu enabled the fisherwomen, men and youth to become aware of the programmes and welfare measures. Twenty fisherwomen got sanction to receive the aluminium containers used for transporting fish.

Vocational skill training and entrepreneurship development

* Linkages with the EXNORA groups facilitated 45 fisherwomen to get training on entrepreneurial skills to manage micro enterprises.
* Twenty educated youth (10 boys and 10 girls) could get vocational skill training in Basic Computer Programmes and use of E-mail and internet.
* After getting training on making sea shell fancy articles, five youth were absorbed in the production unit by the trainer himself.
* After attending the demonstration on fish pickle making, five women initiated pickle making on a commercial basis on a small scale.

Awareness on social and legal issues

* An association by name "Kannaki EXNORA Sakthi" was registered with 35 women members. They planned to start 'Self Help Groups' for collective action and articulation.

* Two families were helped to resolve their disputes with the help of the police officials who educated the members on legal and human rights.

Preparing a perspective plan for an integrated system of fishing

Against the backdrop of the PRA exercises done earlier, the fisherwomen made a SWOT analysis and identified their own strength (S), weakness (W), opportunities (O) as well as threats (T) and envisaged an **integrated fishing system**. The women perceived a number of **inter-linked activities related to fish sales, fish waste utilisation and setting up auxiliary enterprises**. (Fig. 48).

Conclusion

This study has established the credibility of PRA as a tool for applied research in social sciences. This exercise enabled the fisherwomen to examine their living conditions, identify needs and problems as well as explore solutions on their own. If the fisherwomen of Mattaankuppam are motivated to continue their collective efforts, the Integrated Fishing System perceived by them would be realised over a period.

Recommendations for follow up Research

* Home scientists should explore the possibilities of applying PRA techniques in action / applied research in the fields of nutrition, health, food production, resource management and technology transfer.

* Researchers must design and popularise low cost equipment to alleviate the drudgeries of fisherwomen. The Directorate of Fisheries should be approached to popularise these equipment and get feed back.

* The Integrated Fishing System perceived by the fisherwomen may be implemented with the assistance of the Fisheries Extension Department and NGOs. Currently the fisherwomen appear to be isolated from the rest of the urban / rural communities. In the process of implementing the Integrated Fishing System, efforts may be taken to network the fisherwomen's societies / groups with the other women's groups in the community promoting collective action and articulation to build up collective strength.

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Appendices

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APPENDIX I

AVINASHILINGAM INSTITUTE FOR HOMESCIENCE AND HIGHER EDUCATION FOR WOMEN, COIMBATORE – 641 003

AN INTERVIEW SCHEDULE TO EVALUATE THE OUTCOMES OF EXPOSURE TO DEVELOPMENTAL INPUTS

I. Socio-economic Background of the Participants

1.	Name	:	
2.	Age in Year	:	
3.	Marital Status and family details	:	
	Family type	:	Single – Joint
	Marital Status	:	Married – Unmarried
4.	Educational Status	:	Illiterate High School Higher Secondary Collegiate
5.	Occupation	:	Fishing Allied Fishing activities Govt. Jobs Pvt. Jobs Business
6.	Income Level	:	HIG MIG LIG
7.	Extension Agency Contact	:	Unaware of officials Aware of officials Met the officials Received help from the office
8.	Social Participation	:	Non-member Member of one organization Member of more than one organization Office bearer
9.	Information Source use	:	

Sources

1. Health officials

2. Research workers
3. Extension Officers of Fisheries Department
4. Leader of Fisherwomen Co-operative Society
5. Friends
6. Relatives
7. Pamplets

10. Extent of Participation in Selected Programme

Type of Programme	Queries about the Programme	Scores Yes	No
A. Post-Harvest Technology Programme			
1. Awareness of Welfare measures and Programmes by the Government	- Where you aware of these programmes, earlier ?		
	- Have you attended the Councelling Session conducted by the Director of Fisheries		
	- Have you got your enrolment with these programmes in the the Government		
2. Hygiene Handling of Fishes	- Are you aware of different grades of fishes, earlier		
	- Are you surprised to know the cost fixed for the fishes by the exporters		
	- Have you attended such programmes earlier.		
3. Fish Pickle Making	- Have you started this fish product making.		
	- Were you doing this processing earlier.		
B. Entrepreneurship and Technical Training Programme			
1. Income Generating Activities for women	- Are you aware off of special programmes meant for women's development, before.		

		- Are you interested to take-up any training programme, mentioned in the programme - Have, such programmes been conducted earlier at your kuppam
2.	Fancy Shell making Demonstration	- Did this programme gave you an opportunity to understand the Value of fancy shell articles - We had an opportunity to know a man among us, has such a talented workmanship - It cleared our queries about various legal problems. - The speech of the police officer gave us courage to face our social problems boldly.
3.	Home Science Programme	- Understood that we could plan a good nutritional meal with food products we have - The nutritional value of fish and fish products was cleared. - The child-care practices are now adopted hygiene.
C.	**Sanitation and Hygiene**	
1.	Medical Check-up	- We are aware of these programmes earlier - Had an opportunity to take up general body check up after a long interval - Every person had an opportunity to have check up. Since, it was an door to door service.

2.	Street Cleaning	- We have regular tricycles visiting our streets to collect garbage - Our streets look clean and hygiene - We were surprised to see the sea shell fancy articles demonstrated.
3.	Computer Training	- Have you attended any computer courses before. - Was it an interesting and excitement to know about computers. - Did it gave you an exposure to modern technology. - Did the training gave a scope for employment opportunity.
D.	**Resource Management**	- Are you interested to form a Self-help groups. - It was a new programme, we have never attended before. - Do you feel your financial problems will be solved for forming such groups.
E.	**Social Awareness Programmes**	- It gave us an opportunity to create an rapport with the police official - Earlier we were afraid to visit police station.
F.	**Visit to the Directorate of Fisheries**	- It was our first visit to the Directorate of Fisheries - Had an opportunity to meet the Director in person and express Our problems.
	Visit to the EXNORA Office	- We were exposed to various EXNORA Programmes

- We were inspired by the officer's speech and formed a new association to get more benefits.

11. Motivational Factors in inducing Participants

	Features	Scores
1.	Loan facilities for the Participants	
2.	Participation would ensure job opportunities	
3.	Subsidiary occupation on self-employment can be undertaken.	
4.	Government subsidies can be claimed	
5.	Urge by friends and relatives	
6.	Opportunity to attend with friends and relatives	
7.	Repeated persuasion by the extension staff	
8.	Subject matter knowledge of the staff created the desire to know more.	
9.	Timely help and follow up extended by the staff	
10.	Mahalir mandram meetings	
11.	Opportunity for gain in new information	
12.	Inclination for awareness and exposure to new places	
13.	Desire for better performance	

12. Constraints Limiting Participation

1. Household responsibilities
2. Lack of interest in the subject matter of the programme
3. Illiteracy
4. Inadequate communication

13. Reasons for you not being able to adopt new ideas and improved technology

1. Cumbersome official procedures
2. Time delay in availing supportive services
3. Non-availability of necessary inputs in relation to the subject matter of the programme

APPENDIX II

Copy of the Petition submitted to the Directorate of Fisheries, Chennai

From

SMT.B.SHANTHI, IARS
Scientist (CTCRI – Trivandrum)
Ph.D. Scholar
Avinashilingam Institute for Home Science and Higher Education for Women (Deemed University), Coimbatore
52, Padmavathy Street
Thirumalai Nagar
Ramapuram
CHENNAI – 600 089

To

SHRI.HANS RAJ VERMA, IAS
THE DIRECTOR
Directorate of Fisheries
Teynampet
MADRAS

Respected Sir,

I'm a Scientist working at CTCRI, Trivandrum and undergoing my Doctorate Studies at Avinashilingam Deemed University, Coimbatore, on deputation.

I'm undergoing my Doctorate Research on the topic **"CAPACITY BUILDING OF FISHERWOMEN – A PARTICIPATORY APPROACH"**. My area of study is Mattaankuppam, Triplicane, Chennai.

I have conducted a few action programmes and introduced a low – cost Bamboo and Solar drying racks for drying salted fishes. Extension staff of your office have also visited and conducted a programme on "Awareness Programme on Government Welfare Measures" for the women fisherfolk.

On conducting the action programmes, I have identified few problems and the measures to be taken for solving the problems and the upliftment of the fisherfolk.

The measures to be taken by the Directorate of Fisheries are as follows :

1. **Transportation :** Transporting fish from Royapuram Auction Centre and to the local markets is of great difficulty, because
   a. Auto and Rickshaw fairs are too high.
   b. Public transports do not permit fish load.
   c. Due to the delay the fish is not reached in time and spoilage takes places

   Measures to be taken : A van is requried on hire for transportation.

2. **Preservation :**

a. In storing ice and transporting ice from local markets, the rates are too high.
b. Cost of salt is also too costly.

Measures to be taken : Construction of ice-plant at the landing centre and salt at a subsidized rates are required.

3. **Drying of fish** : Fish drying is very un-hygienically done. And a great difficulty was faced in drying the fishes at the sea shore area.

Measures to be taken :

1. Portable drying rack is required.
2. Permanent shed for drying fishes is required.
3. Portable mats for drying is also required.

4. Other measures to be taken :

1. Annakoodai (Aluminium Container) : More of aluminium containers to be supplied.

2. Auctioning : Need small baskets to sort out and carry the fishes at the auctioning centre.

3. Job opportunities : Unemployed youth and school and college drop outs are more in strength. So, they all need some employment opportunities and training programmes on income generating activities is also required.

4. Sports : Lots of girls and boys are talented in sports activity like Khabi, Volley ball, Cricket and Athlete Events. Hence, action to be taken towards encouraging these activities.

These are the areas of problems, which are to be tackled. Therefore I kindly request you to you sir, to consider these problems and do the needful action immediately.

The request is made on behalf of the fisherfolk.

Thanking you sir,

Yours sincerely,

(B.SHANTHI)

Chennai
Dated : 07.11.1998

Contact Address at the Kuppam
Smt.R.Kala
No. 7/1, Karpani Amman Koil Cross Line
Triplicane, Madras – 600 005