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# Foreword

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Fish is an important source of protein and foreign exchange and also provides livelihood to the coastal fisher community. Post harvest handling of fish from time immemorial has been carried out by women in coastal areas. The fish handling practices at landing centres, processing sites and markets have been poor which leads to losses of a considerable percentage of this valuable commodity. One of the means to avoid the post harvest losses and to ensure good quality fish products to the consumers, is improvement of fish handling and processing practices at the producers' level in which women are an important stakeholders. The studies conducted by the Central Institute of Fisheries Technology on the harvest and post harvest loss of marine fish at different channels have indicated that the loss in the dry fish production sector amounted to above 58 percent. Much of this loss can be reduced by empowering the coastal community particularly women by building their capacity through training, demonstration and entrepreneurship development. Efforts are going on in the country by various R&D agencies and development department to address the issue; however, in many cases it is found that the sustainability of such investments needs to be further strengthened by improving the method of implementation of such projects. The project on Capacity building of coastal fisher women through post harvest fisheries technology was sanctioned by ICAR in a net work mode with the aims to address this issue through a pilot study, by developing a capacity building model with the participation of the stakeholders and convergence of the effort by demonstrating hygienic production of dry fish and other products by imparting technical know-how and skill development in a participatory approach. I congratulate the efforts of Dr. Abha Singh and her team for documenting the results and experiences of the project and bringing out a publication '**Socio-economic status of coastal fisherwomen involved in fisheries post-harvest**' which can be a reference material for planners, researchers, students and extension agents.

Bhubaneswar



M.P.S. Ayra

Director

Directorate of Research on Women in Agriculture



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# 1.

## Introduction

Fish has been associated with man as a food commodity since ancient times. It is one of the most lucrative food commodities all over the world. Its popularity has taken a great leap in recent years, irrespective of the poor and the rich, due to scientific explorations which have revealed that fish is not only an excellent source of high grade nutrients, it is also a panacea against several dreaded diseases like blood pressure and heart problems. Fish is nutritionally rich as it has high content of good quality proteins which are abundant in all the essential amino acids. It is also a good source of vitamins and minerals. Its medicinal properties are due to its low calorie, low cholesterol, high content of n-3 PUFAs (Poly unsaturated fatty acids), particularly EPA (Eicosa pentaenoic acid) and DHA (Docosa hexaenoic acid).

Fish is a highly perishable food commodity. Among all the food commodities, it is the most perishable one next only to milk. The spoilage of fish starts immediately after its harvest. The most important agent of its spoilage is the microbes present in its gut, gills and skin. After death of fish they go on degrading the various tissue components with the production of off-

odour and off-flavour substances, the presence of which distracts the consumers thereby resulting in the spoilage of the fish. This type of spoilage is called microbial spoilage. The second important agent of spoilage is the endogenous body enzymes present in the muscles, gut and internal organs. These enzymes hydrolyse the various complex tissue components into simpler units which become a good source of nutrients for the microbes.



Such type of spoilage is called enzymatic spoilage. The third agent of spoilage is the atmospheric oxygen which reacts with the unsaturated fatty acids of the tissue fats to produce chemical substances which impart a rancid flavour to the fish thereby distracting the consumers. Fish fat is abundant in highly unsaturated fatty acids which are very susceptible to attack by

atmospheric oxygen at the points of their unsaturation. This type of spoilage is called chemical spoilage.

As fish is highly perishable, it needs preservation immediately after its harvest. The spectacular advances made by modern science and technology have brought several sophisticated methods of fish preservation like chilling, freezing, canning, freeze-drying and irradiation. However, these methods are capital intensive and require sophisticated equipments and high technical knowledge. Therefore, these methods have not gained wide popularity in a tropical developing country like India except for the export of fish. As a consequence, a large share of the harvest which cannot be utilised fresh is preserved by curing. Fish curing includes the traditional methods of fish preservation like drying, salting and smoking. These methods have their origin in ancient times. Even now these are the most widespread and cheapest methods of fish preservation. The popularity of these methods remains in the fact that they require little capital investment, running cost is very low, require no artificial energy sources like mineral oil or electricity and is therefore eco-friendly, need less technical knowledge, products are shelf-stable and require no refrigeration during storage and distribution and above all cured products are greatly relished by many people all over the world due to

their characteristic odour and flavour not found in any other food product. Even in advanced countries like Japan, cured fish delicacies are consumed in appreciable quantities and are often used in the preparation of specific dishes like stews and soups.

According to FAO, in 2009, out of the total world fish production of 144.6 million metric tonnes, about 12.4 million metric tonnes was utilised for production of cured fish which accounts for about 8.6 per cent. It is interesting to note that the percentage of fish catch utilised for curing is more in the developed countries than in the developing countries. In the developed countries, out of the total production of 27.6 million metric tonnes, 3.16 million metric tonnes was used for curing which accounts for about 11.4 per cent. In contrast, in the developing countries, out of the total production of 117 million metric tonnes, 9.3 million metric tonnes was used for curing which accounts for about 7.9 per cent. In India the percentage of total fish catch used for curing is very high (12.5 per cent) as compared to the global figures:

There has been a tremendous growth in the marine fisheries sector because of the developments made in the fish harvest and post harvest sector and also there is an increased demand for seafood both in domestic and export markets. Fish is considered as the cheap and accessible source of protein for economically



weaker population. In India a large number of populations depend on fisheries for their livelihood.

In India, fish curing, with its origin in the ancient times, has established itself through years with widespread production centres, a vast network of marketing channels and an enormously large consumer sector whose preference for cured fish is due to its typical flavour and odour not found in fresh fish or any other products. In spite of the immense importance of fish curing in the disposition of total fish catch of India, the fish curing sector has not made any remarkable advancement with science and technology as compared to other agriculture and agro-food sectors, industry, transport and communication.

Women play critical roles in fisheries, particularly in the pre- and post-harvest sectors. Even though the fishing activities are men's domain a small percentage of women do take part in passive fishing like collection of seaweeds, mussels, clams and other



bivalves from the near shore waters. According to the Marine Fisheries Census, 2005, the total marine fisher folk population of nine coastal States and two Union Territories in mainland India is 3,519,116. Notably, of the 756,391 fisher folk involved in fishing-related activities, 365,463 are women (approximately 48 per cent) Sharma (2010). In fisheries, the post-harvest



sector provides maximum employment to women. Every 5 kg of fish produced provided employment for 2 persons - one in active fishing and one in Post-harvest sector. About 5 lakh women are employed in pre and post-harvest operations in the marine fisheries sector alone in the total work force of 12 lakh persons. The involvement of fisherwomen in the fisheries related activities provides additional income to their family. But the income they are getting is not always the same as compared to the wages that men gets for the same work.

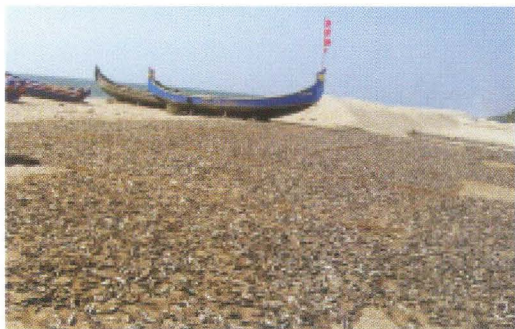
Among the various methods of fish curing which includes drying, salting

and smoking, drying has tremendous importance in India. The fish curing method in India mainly involves sun drying of fish, very often after salting it. In this way two types of dry fish are produced; namely dry fish (without salting) and salted-dry fish. The main reasons for the backwardness of the fish drying/ fish curing sector in India are as follows.

1. The quality of the cured fish products is very low. Usually fish is dried in the sandy beaches on mats made of split bamboo, cocanot or palm leaves or even on open beaches during peak



seasons. As a result, the fish gets contaminated with sand either due to direct contact with it or due to blowing of sand by the



constant winds prevalent in the beaches. Thus, sand contamination reduces the quality of the dry fish as it is highly objectionable to the consumers.

2. Due to exposure of the fish to the open sandy beach and its environment which usually harbour a high load of microbes, the cured fish gets contaminated with several spoilage microbes which reduces its shelf-life.
3. Contamination of the fish with pathogenic microbes abundant in the beaches results in the outbreak of gastro-intestinal disorders in the consumers who eat the cured fish.
4. Due to drying in open air, the fish gets contaminated with dust which harbours a high load of microbes.
5. Contamination with bird droppings increases the microbial load considerably.
6. Another prominent problem of open air drying is insect infestation. The insects feed upon the fish and lay eggs which hatch out to larvae. The larvae undergo metamorphosis to become adult insect. Both, the adult insects as well as their larvae feed upon huge portions of flesh of dry fish during its storage and distribution resulting in great losses and poor

quality of the product.

7. Another problem is infestation by blowfly which gets attracted to the fish during processing and initial phase of drying when moisture content in the fish tissue is very high. They also deposit eggs on the fish which causes problems similar to insect infestation.
8. Constant watching is required during drying to avoid poaching by birds and other animals which is a tedious task.
9. As sun drying exclusively depends on solar radiation, which is not under the control of man, the products are of non-uniform



quality. For example, in a sunny day, the high solar radiation reduces the drying time and the moisture content of the fish is lowered below the desired level in a short period. On the contrary, in a cloudy day, due to low solar radiation, it takes a long time to dry the fish and bring its moisture



level below the desired level or not at all reach it. As a result, fish remains in its high-moisture state for a prolonged period during which microbial activity continues leading to production of off-flavour off-odour substances accumulation of which drastically reduces the quality of the cured fish and very often leads to its rejection by the consumers.

10. Drying cannot be done in extremely cloudy or rainy days.
11. Drying cannot be done at night. For example, if a good quality of



fish is available towards the end of a day, it cannot be dried and therefore needs some other forms of preservation like icing, freezing or salting to prevent the fish from spoiling and to keep in good condition for drying in the next day. Thus a very good quality dry fish using prime quality fresh fish cannot be produced if it is available toward the end of a day.

12. As drying takes place at low ambient temperature (25-35°C), the rate of drying is slow due to which the drying takes very long time thereby producing poor quality products.
13. As sun drying of fish takes place under uncontrolled conditions of temperature, relative humidity and air velocity, the products are of non-uniform and unreliable quality. Mainly, these three factors influence the rate of drying.
14. In case of salted-dry fish, salting of the fish is done using poor quality salt with high load of halophilic bacteria and other chemical contaminants. Though the high salt concentration of salted fish prevents the growth of most of the bacteria, the halophilic bacteria can grow in it resulting in a type of spoilage called pink or red spoilage. Moreover, the chemical contaminants reduce the quality of the salted-dry fish in many other ways.

15. The salting method used is not standardised. The amount of salt is determined by eye estimation. No definite salt to fish ratio is used. This gives non-uniform product quality.
16. The salting vats which are used for the salting of fish are not cleaned regularly after each use. The brine exudates formed by salting of one batch of fish is not drained out from the vat, rather a fresh batch of fish is salted in that vat. Thus, the high load of microbes and intensely concentrated off-flavour, off-odour substances which get



accumulated in the exudates contaminate the subsequent batches of fish leading to their loss of quality and consequent reduction of shelf-life.

17. The packaging of dry fish is not done properly. It is usually packed in gunny bags made of jute or plastic materials as well as in baskets made of split bamboo, cocconut leaf or palm leaf. These packaging materials are not impervious to moisture due to which the dry fish can absorb atmospheric moisture leading to early mould growth and spoilage of the dry fish. Moreover, these packaging materials are not leak proof due to which they cannot prevent insect and pest infestation or poaching by rodents and other animals. Vacuum packaging and gas-flush packaging in multi-layered pouches, which have been widely adopted for agri-based products like potato chips and extruded cereal products and which have revolutionised their popularity by ensuring consistent good quality, have not been adopted for dry fish.
18. The storage facilities for dry fish are of poor standard. Dry fish is usually stored in thatched sheds on the beaches where they are dried or in small cottages. Storage in such damp places leads to

moisture absorption from the atmosphere and consequent mould growth. Moreover, such storage places cannot prevent insect and pest infestation or poaching by rodents and other animals.

19. As most of the fisher families involved in the fish curing process are uneducated, not aware about hygiene, sanitation and proper process of hygienic production of dry fish. Their poor personnel hygiene results in the microbial contamination of the fish without their knowledge. Traditional beach drying is practiced in the coastal areas. As soon as the catch is landed the women take part in the post harvest activities including curing and drying. The average number of hours spent by a woman labourer in a year in curing work is 1944 (Sathiadhas et al 2005). The vast stretches of coast are used for fish drying activities. Mainly fishes are dried on coir mats/old net, for human consumption and directly dried on old fishing nets for fish meal production.

The project on Capacity building of coastal fisher women through post harvest technologies in fisheries was sanctioned by ICAR in a net work mode and aims to address this issue through a pilot

study by developing a capacity building model with the participation of the stakeholders and convergence of the effort by demonstrating hygienic production of dry fish and other products by imparting technical know-how and skill development in a participatory approach. Fisher women play very important role in post harvest handling and processing of fishes. Among the various processed products, dry fish is the most common and has a good domestic market. It is an

established fact that while preparing the dry fish the producers give very little attention to the hygiene. No doubt that hygienic preparation and good packaging increase the production cost. So, technological intervention for hygienic production and the forward and backward linkage of marketing can result in the sustained livelihood of the coastal fisher women. Diversification of activity by introducing other value added product can improve the economic conditions of the fisher women.

## 2.

# Socio-economic Conditions and Gender Roles of Coastal Fisherwomen

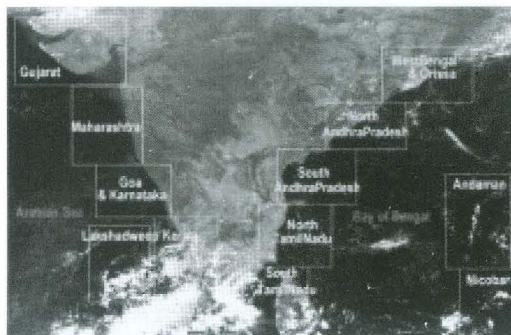
## METHODOLOGY

### ODISHA (SIX COASTAL DISTRICTS)

The state of Odisha has a coastline of 480 km., and one of the most dynamic coastal environments in India due to its location, and physical factors especially its network of barrage, powerful rivers with their delta and estuarine systems, each with a variety of ecological niches and habitats. The coastline traverses six coastal districts of Odisha, viz. Balasore (80 km.), Bhadrak (50 km.), Kendrapara (68 km.), Jagatsinghpur (67 km.), Puri (155 km.) and Ganjam (60 km.).

Under the objective assessment of socioeconomic conditions, women's role and gender issues, policies and programmes in fisheries post harvest technologies, survey was conducted in six coastal districts namely Puri, Balasore, Kendrapara, Jagatsinghpur and Ganjam of Odisha. The methodology included was both primary as well as secondary data collection. For primary data collection, semi-structured interview schedule, group discussion and meetings were conducted. A total of six districts, 16 blocks, 32 villages and 910 households were covered for primary data collection in Odisha (Table-1). Information for secondary data was collected from state fisheries departments, block office, village panchayats, etc.

### Fishing Zones of Coastal India

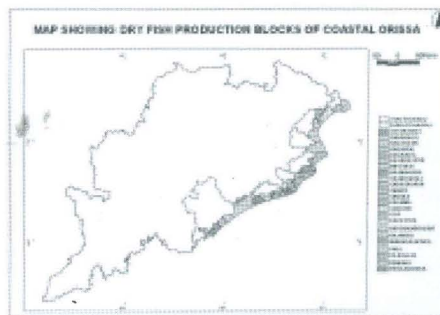


Ref: Indian National Centre for ocean information services (INCOIS)

### Dry fish Production Blocks of Coastal Odisha



### Dry fish Production Villages of Coastal Odisha



**Table -1 : Districts, Blocks, villages covered under data collection in Odisha**

Sl No	District	Block	Village	Number of Household Surveyed
1	Jagatsinghpur	Kujang	Bijaya chadrapur Sukhua Khala, Sandhakud, Rice Mill	910
		Ersama	Nolia Sahi, Trilochanpur, Ambiki	
		Balikota	Balipatana, Phulapatana, Marichpur	
2	Kendrapara	Rajanagar	Rajanagar, Rajendranagar	
		Puri	Chandrabhaga, New Chandrabhaga	
3	Puri	Krushnapsrad	Arakhakuda, Sanapatana	
		Puri	Penthakota	
		Balasore	Balaramgadi, Mirzapur	
4	Balasore	Basta	Sahada, Churmara, Pagarpada	
		Baliapal	Basudevpur, Madhupur	
		Remuna	Remuna Market	
		Bhogarai	Bhogarai Market	
		Bhadrak	Chandabali	Paikasahi, Dhamara
6	Ganjam	Rangailunda	New Golabandha	
		Chhatrapur	Haripur, Bada Nolia Nuagon	
		Ganja	Purunabandha, Gokhurkuda	

**KERALA (KOCHI)**

Out of 7517 km sea coast of India, Kerala has a coastal line of 589.5 km. The state is enriched with inland water bodies consisting of 44 rivers, 30 major reservoirs, fresh ponds and tanks, 45 backwater bodies and extensive brackish water area. Because of the south - west monsoon and the north-east monsoon, the Kerala coast is also rich in marine fishery resources. The southwest monsoon coincides with the period of upwelling and phytoplankton bloom, which is commonly called as mud banks results in a large number of fish and crustaceans in the area providing good catches during the monsoon season.

Alappuzha and Ernakulam districts were selected for the implementation of the project.





The field survey was carried out for getting first-hand information about the methods of existing fish drying and storage practices in the selected area, socio economic conditions of the fisherwomen, and constraints in the fish drying sector, markets of dried products etc. The information thus gathered was used for selecting the fisherwomen group, who really needed the capacity building activities.

Primary data was collected by using a standard interview schedule. The questions were directly asked to the fisherwomen. The socioeconomic conditions of the fisherwomen of the selected area were collected. The existing methods of drying and their experience in the field of drying were also included in the interview schedule.



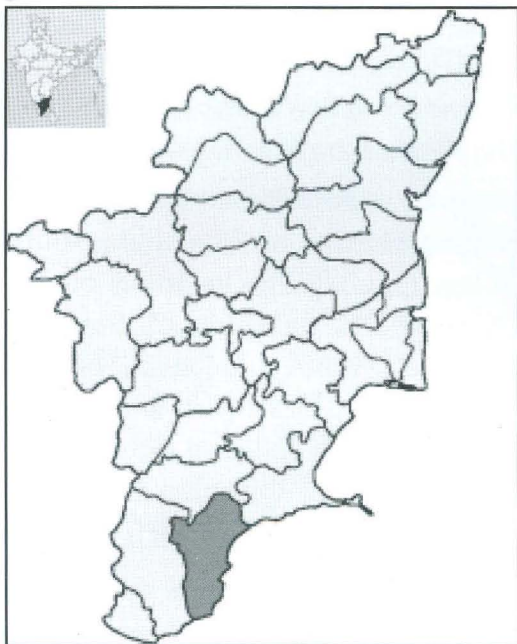
Secondary data was mainly collected from the district fisheries DD offices. Secondary data was also collected from the Kerala state fisheries website.

Samples were collected from the fish drying centres of Cherthala South village for analyzing the initial quality of samples. Samples of Sardine, Mackerel, Anchovy, Ambassis, Sole fish, Silver bellies, Lizard fish and shrimp were aseptically collected for analyzing the microbial quality of the dried fish.

### TAMILNADU (THOOTHUKKUDI)

Thoothukudi district was selected for the study. Eight fishing villages namely Periyathazhai, Manappad, Aalanthalai, Amalinagar, Veerapandiyanpattinam, Punnakayal, Threzipuram, Vellapatti, Tharuvaiyur, Vembar of Thoothukudi districts were purposefully chosen for the present study based on the intensity of fish curing practices and trade.

An interview schedule was developed for this purpose and pilot study was conducted with the respondents. Detailed survey was undertaken by personal interview using the pre-tested interview schedule. Proportionate random sampling technique was used for selection of respondents and total samples selected for the study were 120. The numbers of samples were selected based on the total number of active fisherwomen who were involved in the dry fish production and trade.



## ANDHRA PRADESH (WEST GODAVARI)

The Andhra Pradesh is having 974 km length of coastal line, 9 coastal districts, 508 fish landing centres and 260780 fisher women population. The percentage of fish eaters is about 65 per cent. The Survey of the marine villages and the fish catch availability in the coastal area of the West Godavari District were under taken. There are two coastal mandals i.e. Mogalturu and Narsapur in West Godavari District. There are 6 villages in Narsapur mandal and 8 villages in Mogalturu Mandal involved in fish drying activity. There are 5 marine fish landing centre in the district. There are about 6 varieties of fishes which are mainly used for Fish drying/ curing purpose in the District. Most of the Fish drying/ curing activity is taken up by the women. The district marine fisheries data and the

developmental activities and schemes implemented for the fishermen and women community were collected from the Department of Fisheries.

Considering various factors, the hamlet Mollaparru (Perupalem South village) of Mogalturu mandal was selected for implementing the project activities.

## MAHARASHTRA (MUMBAI)

The study was conducted in coastal districts of Maharashtra. For the socio-economic study four coastal districts out of five were selected and information was collected from selected villages (Table-2). As regards to the identification & refinement of post harvest technologies, the study was conducted at Arnala village in Thane.

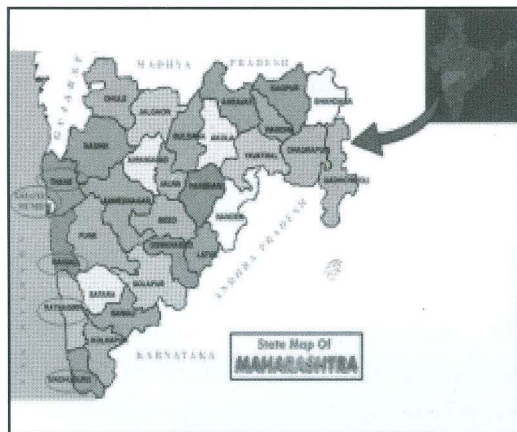
**Table-2 : Locale of the study**

S. No.	Districts	Villages
1.	Thane	Satpati, Pachu Bander, Arnala
2.	Raigad	Agrav
3.	Greater Mumbai	Mahim, Khardanda, Juhu
4.	Ratnagiri	Mirkarwada

As mentioned before, Arnala village in Thane was selected for the refinement of post harvest technologies. As per the reports of Department of Fisheries (2010-11) in Thane district, Bombay duck catch is more than rest of the coastal districts of Maharashtra. Here Bombay duck fish are sold fresh in local markets and also preserved by

traditional drying methods. Fisherwomen of Arnala are mainly engaged in drying activity of fish.

An Interview schedule was prepared with an objective to assess the socio-economic status of fisherwomen along with the fish post harvest methods adopted by them. A predesigned pilot tested interview schedule was administered to 70 women from 4 different coastal districts of Maharashtra i.e. Thane, Greater Mumbai, Raigad and Ratnagiri.



## MAJOR FINDINGS

### 1. Type of houses

#### Odisha

Majority of the fishermen involved in dry fish production had kacha house. Some of them were having Pucca, the number was very less. As per the survey majority (61.04%) of fisherwomen were having kutchu houses and only 32.56% had semi-pucca houses.

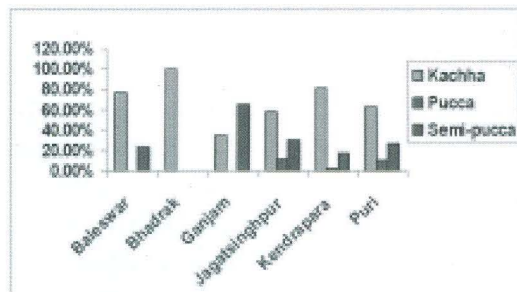


Fig. - 1 : Type of houses Odisha

#### Tamilnadu

Table-3 : Type of Houses Tamilnadu

Sl No	Housing pattern	Percentage
1	Concrete	47
2	Tiled	41
3	Thatched	12

A little less than half of them (46.1%) lived in concrete houses while about 41 % dwelled in tiled houses. Only about 13 % lived in thatched huts.

#### Maharastra

A total of 71.43% of respondent families owned pucca houses (Table-4). The houses were on the name of male members of family. None of the families owned any water body like ponds.

Table-4 : Type of Houses Maharashtra

Sl. No	Districts	N	K.H.	S.P.H	P. H
1.	Thane	33	-	4	29
2.	Raigad	14	-	10	4
3.	Greater Mumbai	15	-	1	14
4.	Ratnagiri	8	4	1	3
	<b>Total</b>	<b>70</b>	<b>5.71%</b>	<b>22.86%</b>	<b>71.43%</b>

K.H. - Kutchu House, S.P.H. - Semi Pucca House, P.H.- Pucca House

## 2. Land holding

### Odisha

Majority of the fisher families were staying in Government land for longer period. Some fishermen having their own land with records. The families staying near beach and near by village to sea were suffering great losses during monsoon and natural hazards. But for their livelihood they have to stay near sea beaches to collect fish from sea. As there were not much facilities for transportation and storage for bulk amount of fish harvested from sea, they were preparing dry fish immediately after collection on the sea beach.

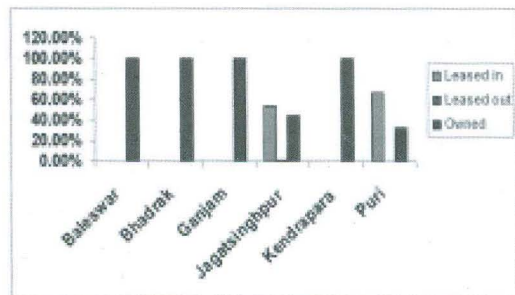


Fig.-2 : Land Holding Odisha

### Tamilnadu

Nearly 34 per cent of families occupied free houses provided by the government. Seventy nine per cent of the fisherwomen families lived in own houses, 12 per cent occupied rented houses and 9 per cent occupied leased houses.

Table - 5 : Land Holding Tamilnadu

Sl. No	Land	Percentage
1	Owned	72.5
2	Lease	17.5
3	Rent	10

## 3. Income

### Odisha

Income of fisherwomen was very low as compared to their male counterpart but they used to do dry fish activity to support their family. The traditional method, followed by them always resulted in low quality dry fish, hence the cost realised low in the market. Annual income of majority of the fisherwomen was more than 20000.

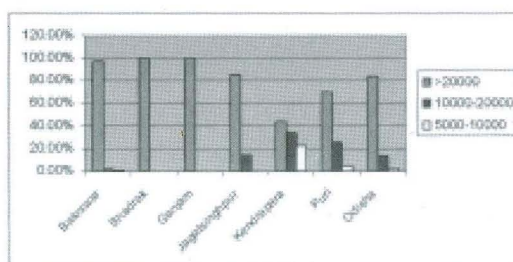


Fig-3 : Annual Income of Fisherwomen Odisha

### Tamilnadu

In majority of the fisherwomen families, the major share of income comes from selling the dry fish. About 48.6 per cent of income comes from dry fish trade (If their spouse are wage earners in fishing activities) and income from dry fish trade is improving their livelihood status.

Table-6 : Source of income (Annual) in Tuticorin, Tamilnadu

Sl. No	Category	Average amount	Percentage
1	Fishing	22400	37.7
2	Dry fish trade	28900	48.6
3	Wages	4400	7.4
4	Others	3800	6.3

## Maharashtra

The average annual family Income of fisherwomen families was Rs.110043.5 ranging from Rs. 20000 to 650000.

**Table-7: Annual Income Maharashtra**

S. No.	Districts	Average (Rs.)	Range (Rs.)
1.	Thane	66718.75	20000-185000
2.	Raigad	60714.29	37500-85000
3.	Greater Mumbai	259533.33	60000-650000
4.	Ratnagiri	89375	37500-200000
	<b>Total</b>	<b>110043.5</b>	<b>20000-650000</b>

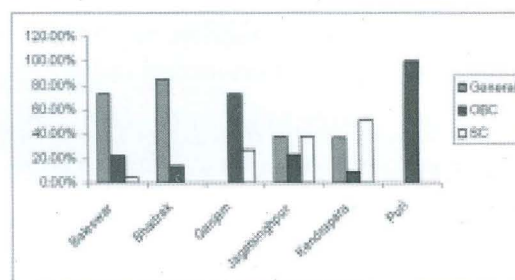
## Andhra Pradesh

As per the Annual Income concerned most of them (75 per cent) come under Rs. 10,000-20,000 category and others were under Rs. 10,000 categories. 48.8 per cent of income comes from dry fish trade and major share of the income is spend for food. Types of houses in most of the cases were semi-pucca and a few were kachha houses. No one was having own land holdings. The drying activity was taken place in common village land. They do not had ponds either own or for lease. Major occupation was fresh marketing or dry fish marketing and daily agriculture labour activity. They do not use any type of equipment for fish processing purpose.

## 4. Age and Caste

### Odisha

Majority of the fisherwomen involved in the dry fish production and trade were middle-aged (25-50 years), belonged to OBC category and were illiterate.



**Fig-4 : Caste Category of women involved in dry fish production**

The women involved in dry fish production in Puri district were cent per cent from OBC category. In Bhadrak district the majority were General (85.71%) category. Overall 52.21 per cent were from OBC category. It shows that most of the middle aged women in the villages were actively engaged in fish curing in comparison to young and old aged

### Tamilnadu

**Table-8 : Age group of women involved in Dry fish activity**

Sl. No.	Category	Percentage
1.	Young (up to 35 years)	29.17
2.	Middle (36 - 45 years)	59.17
3.	Old (above 45 years)	11.66

Majority of Fishwerwomen involved in dry fish production process in Tamilnadu belong to middle age group

**Table-9 :Caste category of fisher women**

Sl. No.	Category	Percentage
1.	General	-
2.	OBC	88
3.	SC	12
4.	ST	

Majority of the fisherwomen belonged to OBC category and few SC fisherwomen were also involved in dry fish production.

### 5. Education, Occupation and Experience

#### Odisha

In Puri and Ganjam more than 90 per cent women were illiterate (Fig. - 5)

Over all 72.41 per cent fisher women were illiterate

The major occupation of fisher women was only dry fish production except in Kendrapara district where they were also involved in agriculture (Fig. - 6)

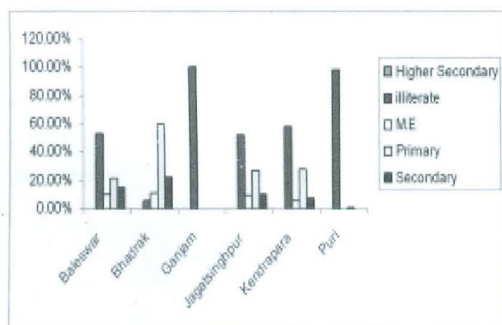


Fig. - 5 : Education Level of women involved in dry fish production

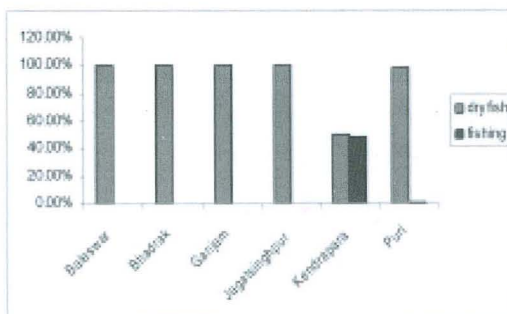


Fig. -6 : Major Occupation of women involved in dry fish production in Odisha

Major secondary occupation of women involved in dry fish production was wage labourer in Shrimp exporter company, Ice Factory, net weaving, poultry, prawn peeling, farming, icing, etc.

Over all 35.32 per cent fisherwomen were working as labourer

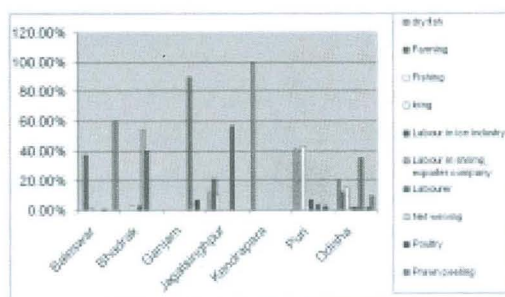


Fig. -7: Secondary Occupation of women involved in dry fish production in Odisha

Fisher women had more than 10 years (10-25 years) of experience in dry fish production and handling with high social participation through SHGs and better decision making power in family and their trade.

## Tamilnadu

Fisherwomen under this study were categorised into illiterate, functionally literate, primary, middle, secondary school and collegiate level of education.

**Table-10 : Education Level of fisher women**

No.	Educational level	Percentage
1	Illiterate	30.96
2	Functionally literate	28.33
3	Primary school	15.93
4	Middle school	13.43
5	Secondary school	9.37
6	Collegiate	-

It is seen from the table-10 that higher the educational level, lower the distribution of respondents. Majority of the fisherwomen were illiterate (30.69 per cent) and functionally literate (31.31 per cent). The percentage of the respondents who had primary level of education was only 15.93 per cent. About 13.43, 9.37 per cent of respondents had middle, secondary school level of education respectively.

## Kerala

Average experience in fish drying activities of fisherwomen in the Alappuzha coast is around 15.33 years and average age is 47.3. Average family size is 4.7 and the average family income is Rs 890/ month. Average land owned by each family is 10.33 cents. 70% of the women stay in concrete houses. Majority of them have

no savings and other working assets like craft or gear. 10% had television in their houses. Only one person had a land phone, all others had mobile. 60% had gas connection in their houses. Very few had other consumer's durables at home.

## 6. Major species used in drying

### Odisha

Most of the fisherwomen involved in the dry fish trade concentrate on low and medium valued fishes. These varieties were targeted for the local and adjacent area consumers. Anchovies, Lamba lanji, borei, khainga, Hilsa, Becti, Morua, Kantia, ribbon fish, kokli were the major species for dry fish production in Odisha.

### Kerala

The major species dried in the area for fish meal production were Sardine, Anchovies and Ambassis. The natural beach drying was practiced in the place. So no cost was involved for water and electricity. The dried products were mainly used for the production of fish meal and for feeding ducks. The dried products were packed in sacks for storage and transportation. The dried products are mainly marketed to Tamil Nadu. Major market for dried sardine is Nagarcoil. Anchovies and Ambassis are marketed to Tuticorin. Local markets for Ambassis are Tannirmuckam, Muhamma, and Vachoor. Good quality

anchovies go into the local markets for human consumption.

### **Maharashtra**

The major species of fishes procured for drying by fisherwomen are Bombay duck, Anchovies, Shrimp, Ribbon Fish, Acetes, Dandi, Scieanids, Sole, Lizard Fish, Sardines etc and fishes procured for salting were Mackerel, Cat Fish, Shark, Ghol etc

## **7. Marketing**

### **Odisha**

Fisherwomen sell their products in adjacent villages and town markets. They were not permitted to travel in Public buses to carry their products to the markets due to foul smell of dry fish. In few villages fisherwomen collectively arrange for trucks to reach the markets in distance. Very little portion of dry fish is sold to markets of distant places. Transportation of the dry fish was found to be the important problem for them. Marketing channel at most of the places was not well defined and there were also fluctuations in the rate of same variety of dry fish at different places.

### **Kerala**

About 750 kg/month of fish are dried by fisher women during the season (6 months in a year). Dried products are packed in small retail packets on count basis and also used to sell in bulk quantities according to the demand of

the products. The dried products marketed through direct marketing, through local agents, and also through local shops. The drying activity is carried out for approx 6 months in a year. The quality of the products both the initial and the hygienically prepared samples were checked and found the difference between both the trials. The initial samples were of poor quality and contaminated with sand and dirt. The microbiological limit was also high to those samples.

### **Tamilnadu**

Concentrate on low to medium valued fishes. Except addition of salt no preservatives or additives were added to improve the quality of the dry fish.

Most of their products were sold in adjacent villages and nearby towns. Very little portion is sent to markets in distant places. Transportation of the dry fish was found to be the important problem for them. In few villages women transport their products collectively by arranging trucks. Common infrastructure facilities for dry fish production lack in the villages. Financially they were not in problem since the micro credit programmes help them out. It was found that a standardized and improved method to enhance the quality of dry fish can benefit the fisherwomen.



## 8. Time involvement/participation profile of fisherwomen in dry fish production process

### Odisha

Majority of the fisherwomen spent 225-250 days (7.5-8 months) in dry fish production process. They go for the fish that were available in the season. In the lean period they work as labourer in prawn peeling factory, net weaving or in the agriculture fields to sustain their livelihood.

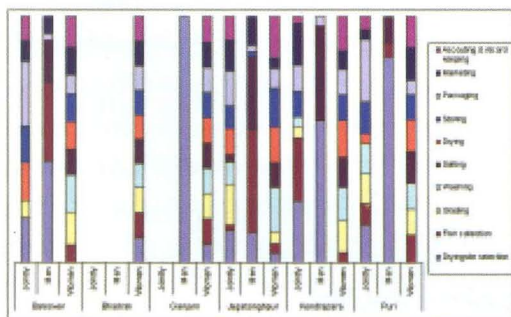


Fig.-8 : Participation profile of men and women in dry fish production process

More than 50 per cent women in Puri and Ganjam districts were involved in fish collection/procurement from the Sea coast but in other districts this work was mainly done by men

Grading, salting and drying was mainly done by women in all the districts

Packaging and marketing was done by both men and women

The participation profile of fisherwomen families revealed that

women need their counterpart support in the dry fish production process. Very few fisherwomen independently manage whole production process as well as marketing. Majority of fisherwomen receive support from men for raw material procurement and marketing related functions. Except fishing and to some extent marketing other activities in dry fish production process such as sorting, cleaning, salting/curing, drying, packing and storage and marketing were done by women only.



### Tamilnadu

About 68 per cent of fisherwomen independently manage the production processes well as marketing. About 26 percent of women receive support form men for raw material procurement and marketing related functions. Rest of the women receive maximum cooperation from men. The percentage of women who receive spouse support coincides with their age, i.e., old fisherwomen receive help from their spouse.

From the study it was found that the fisherwomen involved in dry fish productions were independent and most of the fisherwomen were able to perform all the operations in dry fish production process.

## Maharastra

It is clear from figure that participation of women is high in all the post harvest activities.

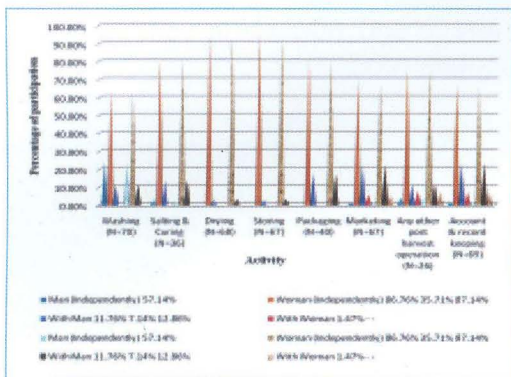


Fig.-9 : Participation profile of fisherwomen in dry fish production process

## 9. Views of women on their needs in dry fish production

### Odisha

Fisherwomen expressed that social support is the most important need for dry fish production followed by support from their counter part and financial and technical support from Government.

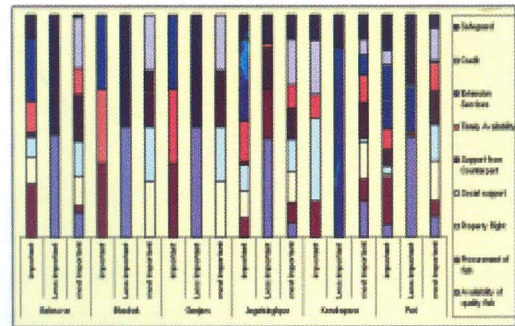


Fig.-10 : Women views on their needs in fish drying process Odisha

## Maharastra

Majority of the fisherwomen preferred to attend training on value addition and improved drying methods for production of high value dry fish. Most of the fisherwomen were not aware about the improved practices in site management, packaging, quality assessment, etc.

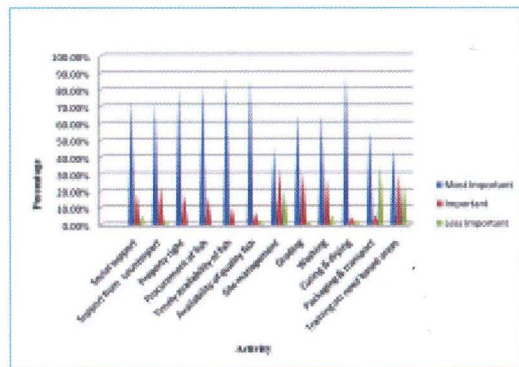


Fig.-11 : Fish processing needs perceived by women



## Major Issues of Fishewomen in Fisheries Post Harvest Sector

### 1. Training needs

Majority of the fisherwomen preferred to attend training on value addition and improved drying methods for production of high value dry fish. Most of the fisherwomen were not aware about the improved practices in site management, packaging, quality assessment, etc.

### 2. Status of the trade

In earlier days, the fisherwomen were exploited by non-institutional sources of credit. The common sources of non-institutional credit were large traders, moneylenders and wholesalers. For a long period of time the fisherwomen had limited access to institutional credit sources. The introduction of Self-Help Group movement paved the way for their access to institutional credit sources. This micro credit programme considerably increased the marketing margin in the dry fish trade. Improvement in capacity building, infrastructure facility, and marketing channel and credit facilities are needed for better livelihood of fisher families.

### 3. Level of Dependency

Most of the fisherwomen involved in dry fish production were dependent on

the men of their family in dry fish trade. They have their own decision making power in only few area of their business. They were dependent on their male counterpart in taking decisions in their dry fish business.

### 4. Institutional Support

Only few fisherwomen had training from Government institutions and NGOs for technical aspects. The training programmes were mainly on value added fishery products. They did not attend any training for improving the dry fish production process, packaging and storage and quality of the product.

### 5. Production process of dry fish

Mainly low to medium valued fishes were used for fish drying. Except addition of salt, no preservatives or additives were added to improve the quality of the dry fish. Adopting hygienic and standard procedures were not in place for dry fish production.

In majority of the area the dry fish production process involved was

Fish collection from the sea → Sorting  
→ Salting / Curing → Sun Drying →  
Storage → Marketing



Curing and Drying

In dry fish production process common infrastructure facilities, cleanliness, drying platform and proper water supply for dry fish production lack in the villages.

#### **6. Constraints**

Non-availability of good quality raw materials, lack of alternative drying methods during rainy season, lack of

proper infrastructure facilities for drying, lack of open and clean space, contamination with sand, microbes, attack of insects, birds, and animals, non- availability of proper storage facilities, less credit facilities, middle men interference and transportation during marketing were the major constraints in dry fish trade as perceived by fisher families.

# 4.

## DRWA'S initiatives to empower coastal fisherwomen in Hygienic Production of dry fish process

### Technological intervention-1

#### Training and Demonstration

1. A two day training programme on "Hygienic handling and production of dry fish" was conducted on 3-4th February 2012 at Penthakota , Puri, Odisha.



During training programme a manual on Hygienic handling and production of dry fish was also distributed among the fisherwomen in local language as reference material.

2. Training and demonstration on value added products of marine fish



## Technological intervention-2

### Model Fish Drying Unit

Six Model Fish Drying units were created in five States for quality dry fish production with the financial support of National Fisheries Development Board (NFDB). DRWA'S Model Fish

Drying Unit for hygienic production of dry fish process created at Penthakota, Puri, was inaugurated and handed over to Shanti Marine Fisherwomen Society for the production of hygienic dry fish in group approach.



DRWA, Puri, Odisha



CIFE, Mumbai, Maharashtra



Tutikorin, Tamilnadu



CIFT, Kochi, Kerala



OUAT, Behrampur, Odisha

## Technological intervention - 3

### Drying rack at DRWA and other centres

A fish drying rack was constructed by using PVC pipe, connector and net. The frame consists of length 7' 9", height 5' 7.5" and width 3' 6" which holds four

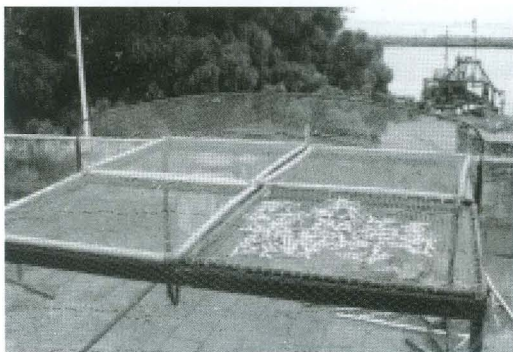
removable drying beds of 3' 6" x 3' 6". Height from ground to first rack is 3' 5.5" and the gap between two racks is 2' 2". Each network centre developed low cost drying rack for hygienic drying of fish.



DRWA



CIFT



Toothukkudi



OUAT

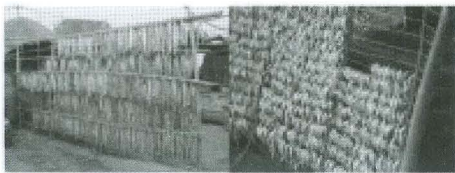

# Technological intervention - 4

Training manual on Hygienic handling and production of dry fish for fisherwomen was developed in Oriya, Tamil, Marathi and Malayalam

language for fisherwomen and distributed to the fisher women as reference material during training and demonstration.


**ସାମ୍ବାଦିକ ଶୁଖାଆ ଉତ୍ପାଦନ ପ୍ରଣାଳୀ**

ଆର.ସି.ଏ.ଆର ନେଟୱାର୍କ ପ୍ରୋଜେକ୍ଟ  
ଉତ୍କଳ ଉପକୂଳର ଯୁଗ୍ମାତ୍ମକ ମହିଳାମାନଙ୍କ ଉନ୍ନତି ପାଇଁ  
ମତ୍ସ୍ୟ ପ୍ରକ୍ରିୟାକରଣ ବୈଷୟିକ ପ୍ରଣାଳୀ

**କୃଷିକଳା ମହିଳା ଅନୁସନ୍ଧାନ ବିକାଶକର୍ମ**  
(ଭାରତୀୟ କୃଷି ଅନୁସନ୍ଧାନ ପରିଷଦ)  
ଭୁବନେଶ୍ୱର - ୭୫୧୦୦୩, ଓଡ଼ିଶା, ଭାରତ

**ପରିଷ୍କାର ପରିଚ୍ଛନ୍ନ ଉତ୍ପାଦନରେ ଶୁଖାଆ ପ୍ରସ୍ତୁତି**



ଆର.ସି.ଏ.ଆର. ନେଟୱାର୍କ ପ୍ରୋଜେକ୍ଟ - ୧  
ଉତ୍କଳ ଉପକୂଳର ଯୁଗ୍ମାତ୍ମକ ମହିଳାମାନଙ୍କ  
ଉନ୍ନତି ପାଇଁ ମତ୍ସ୍ୟ ପ୍ରକ୍ରିୟାକରଣ ବୈଷୟିକ ପ୍ରଣାଳୀ

ଫୋନ୍: ୦୬୭୪୨୩୩୩୩, ୦୬୭୪୩୩୩୩  
ୱେବ୍: ୦୬୭୪୩୩୩୩, ୦୬୭୪୩୩୩୩

**ମତ୍ସ୍ୟବିଜ୍ଞାନ ମହାବିଦ୍ୟାଳୟ**  
(ପରିଷଦ ବୃତ୍ତି ଓ ବୈଷୟିକ ବିକାଶକର୍ମ)  
ଭୁବନେଶ୍ୱର, ଉତ୍କଳ-୭୫୧୦୦୩

**ଉତ୍କଳ ଉପକୂଳର ଯୁଗ୍ମାତ୍ମକ ମହିଳାମାନଙ୍କ ଉନ୍ନତି ପାଇଁ ମତ୍ସ୍ୟ ପ୍ରକ୍ରିୟାକରଣ ବୈଷୟିକ ପ୍ରଣାଳୀ**

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## 5.

# Major Achievements of the Project

1. DRWA conducted Socio-economic survey of six coastal districts namely Puri, Balasore, Kendrapara, Jagatsinghpur and Ganjam of Odisha. The methodology included both primary as well as secondary research. For primary data, semi-structured interview schedule, group discussion and meetings were conducted. Information for secondary data was collected from state fisheries departments, block office, village panchayats, etc. A total of 910 households of 32 villages from 16 blocks were included in the survey schedule. Socio-economic survey of coastal fisherwomen involved in dry fish production was also conducted at each network centre in five states namely Odisha, Maharashtra, Kerala, Andhra Pradesh and Tamilnadu.
2. Protocol of CIFT was adopted for hygienic production of dry fish and it was transferred to Fisherwomen through training and demonstration at each centre. A booklet in regional language on 'Hygienic handling and production of dry fish' was developed in Oriya, Tamil, Marathi and Malayalam as reference material which was distributed among fisherwomen during demonstration and training programme.
3. Six Model Fish Drying Units for hygienic production of dry fish were created in five states, two in Odisha, one each in Tamilnadu, Maharashtra, Kerala and Andhra Pradesh with the financial support of National Fisheries Development Board. After completion of project these created Model Fish Drying Units were handed over to Fisher women Societies, for further use and production of quality dry fish in group approach.
4. Low cost fish drying rack has been developed for the hygienic drying /production of dry fish at small scale at each network centres.

## 6. Conclusion & Recommendation

The traditional method of fish curing/drying produces cured fish in an unhygienic way thereby produced cured fish having poor quality and short shelf-life. Therefore, the fisher communities involved in fish curing should be trained on hygienic methods of fish curing, particularly they should be made aware about the importance of personnel hygiene. Public institutions and governments must rise to the need and impart skills and provide resources to the fisherwomen, so that they can take up enterprises on their own. They can be encouraged to work in small groups or activity clusters so that they can share the risks and make the enterprises economically viable. The fisherwomen should be equipped to adopt the latest and economically viable technologies in their selected enterprises for better and continued returns. Development of a suitable policy framework to address fisherwomen specific livelihood options is also essential.

Fresh fish should be used for curing instead of using almost left over towards the evening attempting to sell a whole lot of fish in fresh condition.

For this at the landing counter, an estimate should be made about the consumption demand of fish in fresh condition and based on this estimate, surplus fresh fish should be taken for curing / drying immediately from the landing center without allowing it to deteriorate and spoil.

For huge quantity of dry fish, rack drying method should be adopted, as the unit can be of any size without much investment.

For excellent quality and long shelf life dry fish solar cabinet drying method should be adopted.

Dry fish should be packed in pouches or bags made of moisture-impersmeable plastic and should be sealed air tight.

Dry fish should be stored in moisture-proof, fly proof and insect-proof buildings which should be disinfected periodically.

For socio-economic improvement of fisher-families, development agencies should take proper initiatives for hygienic environment and infrastructure development.

