Theme 3

WOMEN'S OCEAN CAUCUS

Tuesday 6th November
(Parallel Session - morning)

Chair: Janet Mifsud
Rapporteurs: Hannah Alexandra & Christina Cassar

Impact of Coastal Disasters on the Economic Activities of Fisherwomen in Kanyakumari District, Tamil Nadu, India

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Abstract

Fisher women play a vital role in marine fisheries in the Kanyakunmari district. They are greatly involved in the fabrication of nets, marketing of fresh fish and dry fish and in the preparation of dry fish. Women working in fresh fish marketing earn a higher income than their counterparts in other activities. Unfortunately, this coastal region was greatly devastated by the killer waves of the Tsunami of 2004 and also affected by the frequent advancement and withdrawal of the sea. Most of the people are small and coolie fishers and their household income was reduced by one third since after the tsunami.

The fish catch has also fallen by the same proportion, underpinning the importance of supplemental livelihood, and fishing activities on the shore assisted by women have been brought to a halt. Catching of Nethili fish by men and collection on the shore by women and children now no longer take place. The Tsunami has also driven 89% of the victims to fall prey into the clutches of private money lenders.

Now the residents of the Tsunami colony in Melamanakudi are demanding the banning of trawling, that is negatively impacting small fisheries, and the women residents are insisting that Self Help Groups be given loans by financial institutions so that the women could become the bread winners, since the men of their folk remain hopeless.

The study pinpoints the importance of seaweed mariculture, fish farming and ecotourism in the coastal areas, and training on identification and processing of marine herbal plants for generating employment opportunities for women.

Introduction

The term marine fisherwoman refers to the woman who is involved in fish related activities such as marketing, processing, net making and picking. (Gracy, 1998). In India, the fisherwomen's participation in marine fisheries has been confined to activities such as net making, fish handling (sorting, grading, weighing, gutting and icing), fish marketing and drying. The activities of fisherwomen in the shore differ significantly between regions and also within the same region.

In the east coast, especially in the coast of Tamil Nadu, fisherwomen are engaged in fish curing, marketing, net making and seaweed collection. In the west coast, in Maharashtra, the entire fishing economy is in the hands of women. Handling and processing of fish is done by women in Gujarat. In Kerala net making, fish curing and drying, shrimp processing, fish and clam shell collection are the areas in which women have a major role to play.
Apart from fishing activities in Tamil Nadu, in salt production from seawater, women play a significant role and the ratio of labour contributed by women to men is 4:1. Further, in the coast of the Gulf of Mannar, fisherwomen of the coastal area are also involved in seaweed collection. Thus, the fisherwomen perform two kinds of functions in the post-harvest operations, one as the manager of the entire post-harvest operations and the other as laborers in the fishing industry (CMFRI 1985).

In the traditional fisheries sector, it is always the women who bring money home, interact with market economy and struggle with the fluctuations in prices. Fisherwomen's employment and income play an important and primary role in their families. The expenditure on basic necessities, especially food and nutrition, is often found to be more closely linked to women's earning rather than men's earning. (Agarwal, 1985).

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From the moment the boats reach the shore, they virtually take over all the activities of unloading the fish, grading and marketing. All the activities related to unloading of fish, marketing and processing require nearly 12 hours of almost continuous work, over and above their usual household and child rearing duties. (Shanthi and Prema 1989). Thus, fisherwomen are usually confined to shoreline activities where the work will not conflict with childcare duties (Pollnac, 1988).

Economic Activities of Fisherwomen in Tamil Nadu
Pre-harvesting Activity - Net Making / Mending

Fishing net fabrication is the area where women are involved in the pre-harvesting activity. Net making is a female dominant industry. It is a leisure time activity. Fisherwomen engage themselves in hand braiding of fishing nets. In Tamil Nadu, about 30 percent of fisherwomen are undertaking it as full-time work and 50 percent as leisure work. But the introduction of mechanised net making has reduced the number of women engaged in this activity. Now hand braiding of net is slowly vanishing.

Harvesting Activity

In the fisheries sector, division of labour is gender specific. Generally men are engaged in production and women in distribution. Since the primary and exclusive responsibility of fisherwomen is marketing, it does not mean that fisherwomen are not involved in production. Fishing in the canals and shallow water is the important activity of women in harvesting. They also help the menfolk in cast netting and shore seine operations.

Shore-Seine Operation

In Tamil Nadu, one of the traditional methods of fishing is by shore-seine operation. Fishermen used to go to the sea in the early hours of the morning, spread the net and come back to the shore. After 3 or 4 hours, they will go to the place where they have spread the net and start dragging it. The fisherwomen in the shore will join them, dragging the net from the end, which is tied to the poles in the shore. As fish has the habit of moving in shoals in large numbers in the early hours, the fishermen get a good catch. It takes at least two or more hours to drag the net, depending upon the distance covered. The quality of fish caught by shore-seine is usually better, as it is caught fresh, than the fish caught by motorized boats. This type of fishing needs a lot of physical labour as the net has to be dragged against the sea. Women are actively involved in shore–seine operations in almost all the coastal areas. When the sea is rough in the Gulf of Mannar during the South–West monsoon, this operation is temporarily suspended and the shore-seine operations can be found in Palk Bay, as it is calm. During the North-East monsoon, the activity will be in the Gulf of Mannar. The fisherwomen work along with fishermen in dragging the net. If they are the owners of the net, they get a share from the catch; otherwise they work for a wage. The women are usually paid less than the men (Ramani, 2004).

Post-Harvesting Activities
Fresh Fish Marketing

Marketing of fresh fish is predominantly in the hands of fisherwomen in Kanyakumari. They act as a link between the suppliers and the consumers in other areas. The fishermen, after a tough day or night in the sea, return highly exhausted. They have to dry the net or mend it, if there is any need. Hence they prefer to stay at home. Therefore, the entire post harvest activities such as emptying the net, unloading, sorting, cleaning, gutting and marketing fall in the hands of fisherwomen. Auctioning, unloading and sorting are considered as part of the marketing activities and separate wages are not paid for that. Two types of marketing women are identified in Kanyakumari, namely those who market through others and those who sell by themselves. The women cover a distance of a minimum of 5 km to a maximum of 20 km daily. They prefer to carry the fish by head load and cover a distance of 5 to 10 km by walk; for longer distances they use the bus or train service. This limits the amount of fish that can be carried by fisherwomen. Head load is the most common and cheapest method to transport the fish to nearby places.

Dry Fish Preparation and Sales

In the marine district of Kanyakumari, fisherwomen play a predominant role in the sun drying of fish on the beaches and in the fish drying yards. Those who are involved in the preparation and sales of dry fish get the fresh fish either from the boat owners or from others. They clean the fish, fill these with salt and after a day or two spread it under the sun to dry it. It will take at least 4-5 days to dry and they sell the dried fish either directly to the consumers or through traders. The fisherwomen engaged in drying the fish find it convenient to dry them on the beach near their houses or on the roadside. They still use primitive methods of salting and drying. There are no separate drying yards for drying the fish. There are no separate markets for selling dried fish either. It is sold mainly in the weekly markets in nearby towns.

Women in Fish Drying Yards

Fish is used for both food and non-food purposes. It may be either in fresh or in processed form. Processing of fish for food includes methods like freezing, canning, drying and salt curing. The non-food use includes extraction of fish oil, fish meal and fish manure. Fish of a cheaper variety is usually sun dried first and then the scrap is ground. Fisherwomen work along with men in the fish drying yards. Their work includes cleaning the yard, unloading the fish, spreading on the ground and checking it at regular intervals. They are casual laborers, earning a daily wage of Rs.80 while the men receive about Rs.120 daily. (Ramani, 2004).

Other Activities
Women in Saltpans

Salt manufacturing is an important non-agricultural activity in the coastal areas of Kanyakumari. It is a highly labour-intensive sector, providing employment to rural agricultural surplus labour. The major works in the salt pan are paddling, watering, scrapping and loading the salt. They work for 7–10 hours daily with a small lunch break. The female workers are paid about Rs.70 per day and the male workers get a wage of about Rs.100 daily. There is no job security for the salt workers. They are only casual laborers and there is no organization working for them. As such, the women workers cannot raise their voice for equal wages along with men and for better working conditions. These workers cannot find jobs during the rainy season. They also suffer from some occupational diseases, especially skin problems.

Women in Seaweed Collection

Seaweed, an important renewable marine living resource, includes all macroscopic algae growing in the sea and in brackish coastal waters. Commercially important varieties such as Gracillaria, Sargassum, Turbinaria and Ulva grow abundantly along the Gulf of Mannar coast in Tamil Nadu. Seaweed collection is routine work for the fisherwomen along the coast. The women cover a distance of 5 to 10 km daily. Each day they collect about 10-20 kg by diving into the sea and collect it in the gunny bags brought with them. After reaching the shore, they sell the product to the local agents either in fresh or in dried condition. On average, they collect about 15 kg per day. It takes nearly 6-10 hrs to complete the work. They prefer to sell dried seaweeds, as wet seaweeds fetch a low price. There are no proper sheds for drying and hence they dry it only on the beachside.

Socio – Economic Conditions of Fisherwomen

Women in the fishing communities are the most disadvantaged group. Despite their contribution to the development of their families and the fisheries sector, they have a very low status in the society. Social, economic and cultural barriers have been found to be the major reasons which prevent the fisherwomen from equal participation in various economic activities and political decision-making. Even though they are actively involved in fishery related activities, their contribution to the development of small-scale fisheries is not recognized and adequately compensated. Thus, they have acquired a secondary status in social life, economic activities and decision making.

Coastal Disasters and Their Impact

To add to the woes of the fisherwomen, the coastal area is frequently affected by disasters such as tsunamis and cyclones. In 2004, a tsunami struck the coastal areas of Kanyakumari and devastated the entire coastal economy of the district; about 852 people lost their life and the economic loss in the area runs to Rs.84.46 crores. In the district, 9,714 catamarans with engines, 13,130 boats without engines, 141 boat with engines, 235 fiber reinforcement catamarans without engines, 758 catamarans without engines, 88 mechanized boats, 71 trawlers and 1,491 outboard engines were damaged. A total of 19,650 nuts were also damaged. (Selvam, 2007).

Melamanakkudi, a fishing hamlet in Kanyakumari district, was greatly devoured by the killer waves of the tsunami in 2004 and in this village there are about 2,124 males and 2,072 females who depend largely on fisheries for their livelihood. Most of the people are small fishers and coolie fishers. Fishing activities are seasonal, with the peak period being only four months in a year, during which the fishers obtain their maximum income. The study reveals that the household income of the small and coolie fishermen before the tsunami was just around Rs.3,000, indicating the widespread prevalence of poverty among the community.

Out of the 100 samples surveyed for the study, 13 are vallam owners, 58 are coolie fishers and 29 are engaged in fish marketing and such other activities. The major finding of the study is that the income after the tsunami, especially of the small and coolie fisher people, has fallen by one-third of their income before the tsunami. The fish catch has also fallen by the same proportion, underpinning the importance of supplemental livelihood. As there is no sufficient alternative livelihoods, coolie fishermen migrate to the neighbouring state and small fishermen become coolies. Women who assist fishing activities on the shore have also been brought to a halt by the Tsunami. The catching of Nethili fish by men and its collection on the shore by the women and children now no longer takes place on the beach. Children who used to enjoy bathing and swimming in the sea are now even afraid of playing on the coast, leaving the beach deserted. The tsunami has not only driven the people to seek shelter, but has also driven 89 percent of the victims to permanently fall prey into the clutches of private money lenders to meet the shortfall in their income. While analyzing the reasons for the fall in income, 36 percent of the respondents replied that the income from fisheries is dwindling after the disaster and 49 percent replied that lack of alternative jobs is the major cause of this.

In this disaster, women and children, the vulnerable section of the society, suffered a lot. Fisherwomen are actively involved in post-harvesting activities and, thus, their income has also fallen to the same extent after the disaster. Since all their income is spent on running the family, including food, clothing, education and health, the living standard of the fisher people has decreased.

Suggestions

The seasonal nature of fishing and the risks and uncertainties associated with it, often push fisherfolk into poverty. Alternate employment opportunities are very few and the opportunity costs of fisherfolk in general and fisherwomen in particular, is zero. They are caught up in the low-income trap due to diminishing returns. There is no scope to increase fishing efforts in the inshore waters as it is already overexploited. It is essential, therefore, that some alternative employment schemes, suitable to different localities, be made to improve the standard of living of the coastal poor. A most effective step will be the generation of employment for fisherwomen based on fisheries technology, especially in post-harvest activities, so as to enable them to contribute more towards the needs of their families.

By adopting suitable technologies and equipment, large-scale production of pickles out of fish and shellfish (prawns, clams, mussels etc.) can be gainfully introduced. The fisherwomen could take up part-time work, based on proper training in the production of diversified products such as fish wafers, cutlets, fish sauce, fish soup powder, etc. in attractive consumer packs, so that the under-utilised and low priced fish can find a good market for internal consumption and export market.

Seaweed collection is routine work for a large section of fishermen and women along the coast. Fine quality seaweeds, such as Gracillaria, Sargassum, Turbinaria and Ulva, are collected here and are being sold to the local companies available within their reach. Seaweeds have a wider applicability in medicine, industries and agriculture. They are used for edible purposes also. They may be made available in consumer packs in different quantities. The sales of this product may be increased by properly advertising the nutritive benefits of seaweed. The seaweed processing units with low cost technology offer good scope for the employment of women.

Aquaculture seems to be a potential sector for the development of fisherwomen. The different sectors of aquaculture in which women can play a developmental role are: common fish culture practices; integrated aquaculture; prawn culture; coastal aquaculture; aquarium fish keeping; fresh water pearl culture; and aquaculture in enclosures. The State Fisheries Department should identify the sector of aquaculture which is most suitable for the fisherwomen of this area.

Thus in the Kanyakumari district fisherwomen are encouraged, through suitable policy measures, to adopt the latest technologies and strategies in production and marketing in the fisheries sector. It is also suggested that schemes like the Sethu Samuthuram Canal Project take care of the welfare of the fisher community. This will go a long way to improve the socioeconomic conditions of the fisherwomen and also to protect them against coastal disasters.

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Using innovative exhibitions to attract sponsors and inspire the public to conserve their marine environment

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Abstract

Education takes many forms. With SiteSea we created a unique space for learning attractive to both the public and sponsors on whom it depends. The SiteSea photographic exhibition promoted excellence in ocean imagery to inspire community awareness and action for our marine environment. The exhibition was held at Tamarama Surf Life Saving Club in Sydney, Australia, where it attracted over 30,000 visitors in its first year. We also exhibited at Sydney's Westfield shopping mall, where we reached over half a million patrons. As a free public cultural event we were nominated to join UNESCO's Global Alliance for Cultural Diversity. Our role as educators in marine conservation is acknowledged by our membership in UNESCO's Decade of Education for Sustainable Development. We secured sponsorship by choosing well-patronized locations that provided significant exposure for our sponsors' business. SiteSea continues to win support to bring its marine conservation message to the public in innovative new locations.

The widening of economic activities at sea created a social demand for highly qualified marine specialists, first of all specialists in the use and protection of the marine environment. The experience in teaching marine disciplines in higher education institutions of CIS continuously confirms that marine education is a specific one and needs earlier professional orientation. That is why IOI Caspian Sea, since the beginning of it establishment, has been working on the necessity of implementing the IOI Programme for children based on the methodology of active education, which was named "Children and the Sea" and later became Women/Youth and the Sea.(W/Y&S).

In the wile scale of IOI, the programme is intended to enhance the capacity and participation of women and youth in poor developing countries in ocean and coastal affairs and helps ensure environmental sustainability. In the Caspian Sea region, the programme focused mainly on developing youth activities, where the main goals were:

- Ecological education and training of people in view of tasks of international cooperation of littoral states;
- Introduction of the principles of the scientific-educational program of IOI "Children and sea" into the fields of marine sciences for the formation of international solidarity and responsibility for the future of the Caspian Sea.

The programme was implemented in coastal community regions in three of five Caspian surrounding countries e.g. Aktau, Astrakhan region, Makhachkala – Daghestan, and Turkmenbashi. However, most of these events were attended by participants from Azerbaijan, Kazakhstan, Russia, Ukraine and Turkmenistan. The strengths of the implemented programme in the Caspian Sea Region were its multidisciplinary side, e.g. different approaches and types of activities were realized: ecological camps, International Festival on Underwater Swimming and workshops and training trough research cruises for mid-career specialists, postgraduate students, students and school children. For women, different seminars were held for improving their knowledge in ocean governance, especially in the management of biological resources. In total, during 5 years more than 1, 000 participants attended the events organized within the framework of the W/Y&S.The paper is the outcome of a 16-month study of certain selected coastal hamlets along the 590km coastline of Kerala, in the south western part of the Indian Subcontinent. The women in the communities are at the receiving end of all forms of marginalization, with limited access to natural resources like safe fresh water and sanitation. The study attempts to analyze the silent crises and disasters in the coastal areas through the eyes of women and children. The perceptions of the so-called future leaders and decision makers – the youth - were also collected. On the whole, the study makes an environmental appraisal of the coastal areas in Kerala in the wake of the emerging decentralized governance in the State and the role of women and youth in the local self-government decision and policy level processes. It also assesses the coping strategies and solutions of the community through a series of participatory research methods like semi-structured interviews, focus group discussions and joint narratives. The major learning of the study is being incorporated in the local decision and community joint discussion forums, called the GRAMASABHAS or village councils, that is being conducted now all over the State. The need for a comprehensive development plan for the coastal areas with focus on sustainable and wise use of marine and terrestrial bioresources, along with inputs from the vital knowledge base of the coastal communities, has been established and accepted through this study. The need for people oriented scientific studies with a bottom-up approach in data collection and validation, has also been significantly proven by this study.

Theme 3

WOMEN'S OCEAN CAUCUS
(Continued)

Tuesday 6th November
(Parallel Session - afternoon)

Chair: Janet Mifsud
Rapporteur: Hannah Alexandra & Christina Cassar

Eco-friendly prawn farming with *Pokkali* cultivation – Role of women and children in coastal resource management and poverty reduction

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Abstract

One of the most eco-friendly of all farming practices is the Pokkali paddy cultivation – cum-prawn farming in the wetlands of the southwest Indian coast, which relies on the '*symbiotic nature of prawn and paddy*'. The pokkali paddy, to some extent, is saline tolerant, flood and acid resistant is the wonder crop cultivated in vast areas of marshy waterlogged southwest Indian coastal zones. This singular method relies on the symbiotic link of prawn and paddy. After the paddy harvest, the decaying stubbles of the paddy serve as food for the prawns and, likewise, the prawn excreta make the field fertile. Absolutely no pesticide or fertilizers are used in the fields, making it vastly different from the other prevalent farming practices. The other paddy varieties require several rounds of pesticides, fungicide, weedcide and fertilizer spraying before the grain gets to the market, while the pokkali paddy is organically grown.

The pokkali paddy cultivation in the coastal region seems to be shrinking rapidly from 26,400 hectares of potential pokkalli area to 8000- 10000 hectares of actual use. Compared to the main paddy fields of Kuttanadu (south Vembanadu lake), the pokkali cultivation is less expensive due to low incidence of diseases in the high saline environment. But farmers seem to be disinterested in cultivating pokkali, as the market is not good for pokkali rice due to the lack of awareness of people that it is eco-friendly and organically grown. The farmers do it just for the sake of feeding the prawns (*P. indicus* & P*. monodon*), which is by far more lucrative. The farmer may get 1.2 to 1.5 tonnes/ hectare of pokkalli, but he will harvest about 400 to 500 kilos/ha of prawns during one season. The pokkali will fetch about Rs. 12 to Rs. 13 in the market, while a kilo of prawns will fetch anywhere between Rs. 450 to 800, depending on the size and variety. It is high time for socially and health conscious people to propagate the use of organic food and to encourage this farming practice to other wetland regions of the world. This farming, a community-based coastal resource management with participation of women and children, which is indeed healthier and more sensible moneywise, needs to be encouraged to protect the coastal wetlands. This alternative income-generating programme contributes to improve coastal environments and to conserve the biodiversity of the ecosystem.

Introduction

Coastal districts of Kerala:

The paddy fields along the coastal tract of Kerala are essentially reclaimed mangrove forest areas near estuaries, coastal wetlands or the shallow reaches of the seasonally brackish backwaters (called *Kayals* in Malayalam). Vast areas are marshy and water logged. Marshy tracks lie near the mouth of rivers and are prone to flooding and salinity. The nature of the soil is also highly acidic and has elemental toxic content and makes the area unsuitable for paddy cultivation. The *Pokkali* paddy fields of the Ernakulam district, the *Kole* paddy lands of the Thrissur district, the typical *Kayal* paddy of Kuttanad and the *Kaipad* paddy lands of Kannoor district are examples of paddy cultivation in the backwaters of Kerala.

The Pokkali rice fields are a unique ecosystem prevailing in the coastal saline tract of central Kerala, with rich biodiversity and amazing capacity to grow the organic paddy and shrimps alternatively. This exclusive farming system of Vypeenkara (Ernakulam district) is locally known as *Pokkali krishi*. Pokkali fields are low lying and immersed in water during most of the year. The tidal flows have to be regulated to do the farming activities. These fields are naturally connected to the Arabian Sea through backwaters and canals (Fig.1). The total Pokkali lands were originally estimated to be 25,000 hectares. Large areas are converted for coconut cultivation and for other construction purposes. The present area is estimated to be 9,000 hectares**.** Year after year, the area under pokkali cultivation is declining. The present area under regular cultivation is 5,000 htrs. In another 2,000 hectares, paddy cultivation is done occasionally, i.e., only when the climatic conditions are favorable. The numbers of farmers involved in regular Pokkalli cultivation are estimated to be 11,605.

Objectives of the study

The objective of this study is to evaluate the ecological benefits of the pokkali paddy- cum-shrimp cultivation on the ecology of wetlands and of the potential economic advantages to the local farmers from the farming practice. It is in our scheme of things that only after we lose something, we sing praises to it and makes great lamentations about how good it was…. Pokkali cultivation is not different. Even as scientists sing paens to this cultivation and newer varieties of Pokkali paddy, like Vytiia1, Vytilla2, 3, 4 and Vytilla 5 were developed at Rice Research station, Vytilla, India to give better yields (Fig. 2), the Pokkali paddy fields seem to be shrinking rapidly.

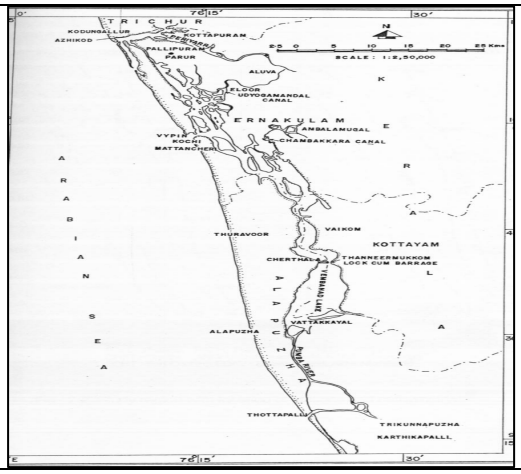

Fig. 1: Cochin Backwater system

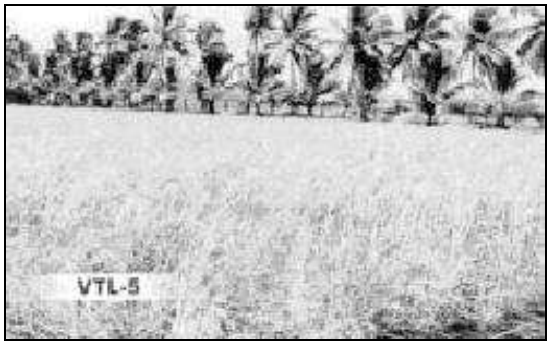

Fig. 2: A General view of the VTL 5 Field

The Pokkali paddy

One of the most eco-friendly of all farming practices in the world is the Pokkali paddy cultivation – cum prawn farming, which is practiced in the wetlands of Alleppy, Trissur, Ernakulam and Kannur districts (India). The Pokkali paddy, to an extent, is saline, flood and acid resistant and this wonder crop is cultivated in these coastal parts (Fig.1). Absolutely no pesticide or fertilizers are used in the fields and it is vastly different from the other prevalent farming practices in the coastal region. Potential Pokkalli area is 26,400 hectares in the Trissur, Ernakulam, Alleppy and Kannur districts of Kerala state. Pokkali is cultivated in 8,000 to 10,000 hectares. A typical Pokkali field is shown in (Fig.3a) and Pokkali harvesting in (Fig.3b).

Fig. 3a: A typical Pokkali field

Fig. 3b: Pokkali paddy harvesting

Due to high labour wages, the wetlands are reclaimed to build houses. There is no good market for Pokkali rice, largely because people are unaware that it is eco-friendly and organically grown. The changes in the Pokkali cultivation area, production and yield are shown in table 1a and 1b.

Table 1a: Change in Area, Production and Yield of Paddy in Kerala

Change in Area, Production and Yield of Paddy in Kerala

Year	Area (000 Ha)	Production (000 tons)	Yield (kg/ha)	Index (55-56=100)		
				Area	Prod.	Yield
55-56	759	884	1164	100	100	100
60-61	779	1068	1371	103	121	118
65-66	802	1000	1246	106	113	107
73-74	875	1257	1437	115	142	123

Table 1b: Production of Pokkali paddy in the Cochin estuarine area (2001-02)

Area cultivated ha	Production tonnes	No of households	Production / ha kg/ha	Loss / gain per ha in Rs
6003	8356.78	11739	1392.1	-1655.00

Pokkali cultivation practice

In Pokkali fields, only one crop is cultivated during the monsoons (June – October), which is the low saline phase. At least two tonnes of seed per hectare were needed for planting the Pokkali crop. The important dates and times in Pokkali cultivation are shown in (Table 2)

Table 2: Dates and times in Pokkali cultivation

Important dates and times in Pokkali cultivation	
April 15 (Medam 1)	Right of the lease holders of prawn cultivation extinguishes and “Kettukalakkal” by traditional fisherman for next 10 days begins
April last week	Drying up the lands, strengthening of bunds
June 1st week (Depends upon raining)	Leveling the tops of mounds and sowing
July/August (after 28 days)	Replanting
August	Removing of weeds
October/November	Harvesting
November 15th	Prawn filtration starts/fixing sluices
November last week	Prawn siblings are introduced into the field
After 69 days	Naran harvest starts
After 90 days	Kara harvest starts
April 13th	Final harvest

The nature of labour (Purushan, 2004) involved in Pokkali paddy cultivation along with corresponding man days for Paddy cultivation (monsoon) is given in Table 3. The crop will be ready for harvest after four months from planting (Fig. 4). The new variety (Fig. 5) VTL-5 is giving an average yield of ~3500kg/ha.

Farmers are reluctant to do Pokkali cultivation due to so-called economic un-viability and non cooperation of agricultural laborers mostly during harvest season.

Prawn cultivation:

Subsequently, during the high saline phase, the fields are used for prawn filtration (November to April), as Pokkali cannot withstand very high salinity. When the paddy is mature (October), only the panicles are cut off, leaving the stubbles in the field to decay and this forms the natural feed for the prawns. In shrimp aquaculture, the success is largely based on the quality of post-larvae. When the monsoon subsides, the backwaters and canals become saline and juvenile prawns and fingerlings of other fishes come in large quantities in the outer canals. They are guided to the

Type of work	Details Man days	
	Men	**Women**
Bund raising and channeling	**10**	**0**
Mount Raising	**35**	**5**
Seed soaking and soil	**5**	**3**
Payal removal	**2**	**25**
Weeding	**2**	**25**
Transplanting	**2**	**25**
Preparation of threshing ground and fabrication of shed	**4**	**2**
Harvesting	**11**	**20**
Post harvest labour	**10**	**15**
Measuring and storing	**3**	**3**
Total	**84**	**123**

Total man days 207/ha

Table 3: Labour involvement in Pokkali paddy cultivation

fields through trap sluices and the sluice gates prevent them from going out. Thus they are allowed to grow in the field. From November onwards, wild prawn seedlings gravitate towards the fields in search of food and the prawn seedlings gorge on the decaying stubbles. It seems to be beneficial for the juvenile prawns to feed on the decaying stubbles and it keeps the incidences of disease low and prawn excreta is a good natural fertilizer for the paddy. Sluice gates play an important role in prawn farming in Pokkali area. This is used for regulating the water flowing in and out of that field throughout the prawn farming season. It is fitted in such a way so as to have the maximum entry of saline water and fish seed to the field. These trap sluices prevent the escape of fingerlings and fish from the farm, but help easy water exchange. Also, during harvesting period sluices have a vital role.

Fig. 4: Pokkali Rice ready for harvesting

Fig. 5: A New rice variety

At the time of low tide fish will be caught in the sluice net, locally known as *thoombuvala*. This is a cheap, but effective system of fishing. Based on the size of the padasekharam (field), the number and size of the trap sluices are decided. Traditional sluice gates are made of local timbers like Kanjiram, Irul, Thembavu, Mango, etc. The size of the gate is four meters long, 1.5 meters high and 1 meter wide. Master sluices to the main channel are usually double in size. When *thoombuvala* is in operation, a hurricane lamp is hung at the inner mouth of the sluice gate to attract prawns. Prawns are periodically harvested 2 –3 days before the new and full moons till the

middle of April. Fishing operation continues for 2 to 3 hrs. The majority of the prawns are caught during the initial one to one-and–a-half hour.

White prawns (Penaeusindicus) and Tiger prawns (Penaeus monodon) are cultivated. Estimation of man day (Purushan, 2004) requirement for *shrimp culture* in Pokkali (summer) are shown table 4.

Details	Man days Men	Man days Women
Fabrication of sluice gates and its installation	**8**	**0**
Raising of dikes and excavation of canals	**18**	**6**
Eradication of weeds and predators	**4**	**4**
Fabrication of work shed and shelter	**2**	**0**
Fabrication of bamboo/plastic screens	**2**	**0**
Setting of nets, baskets and basins	**3**	**2**
Nursery operation and feeding	**4**	**2**
Sluice gate operation, filtration etc.	**90**	**0**
Fishing operations such as cast netting, gill netting and hand picking	**35**	**25**
Terminal operations	**5**	**5**
Cleaning and categorization of yield	**2**	**5**
Icing	**2**	**3**
Peeling and deveining	**2**	**8**
Weighing and packing	**2**	**5**
Transporting/ marketing	**2**	**0**
Total	**181**	**65**
		Total man days 246

Table 4: Estimation of man day requirement for *shrimp culture*

The traditional shrimp farming provides around 60-70 labour days for women. This mostly constitutes hand picking of fish and prawn peeling. After *kettukalakkal* on 14th April of every year, the older generation *Pulaya* women go to the field for the hand picking of fish. But because of the limited fish resources remaining in the field after *kettukalakkal*, the hand pickers could only pick fish which may satisfy their kitchen needs. On very rare occasions they may get 50-100 Rupees ($1.2 – 2.5) for their catch.

Benefits of Pokkali cultivation

This eco-friendly fish culture is not drawing down the ocean resources, as in the case of aquaculture, and not polluting the coastal waters. Compared to the paddy fields of Kuttanad (South Kerala), the farmers have less expenditure because of the low incidence of diseases due to the high salinity. Other paddy varieties require several rounds of pesticide, fungicide, weedcide and fertilizer spraying before the grain gets to the market, while the Pokkali paddy is organically grown. Some of the serious coastal environmental issues facing the Indian region, such as the loss of biodiversity, overexploitation of living resources and destructive harvesting practices, and destruction of habitat and coastal degradation due to poor land practices that lead to pollution and siltation, are touched by this eco-friendly cultivation practice. This cultivation practice will contribute to improved coastal environments and an alternative income-generating program**.**

The Pokkali rice yield is 1.2-to 1.5 tonnes/ hectare in one season and 400 to 500 kilos/ha of prawns during one season. The Pokkali will fetch about $0.5 in the market and one kilogram of prawns, anywhere between ($12 – 25), depending on the size and variety. Prawn culture is cost-effective, because artificial feed is expensive. Prawns require high protein feed with a price of $0.75 /Kilo and the requirement is 2 kilos for one kilo of prawn. In Pokkali fields, the natural feed needs to be supplemented with artificial feed only in the last phase - just before the prawns are harvested. Without Pokkali, the entire area will be flooded, acidity will increase, and toxicity will be high, with less oxygen and more hydrogen sulphide - which can kill the prawn larvae. All these can effectively be removed by the farming operation, which ensures good drainage.

An ecologically sustainable and economically viable farming practice for the giant freshwater prawn (Macrobrachium rosenbergil), developed on the basis of data generated from 122 prawn farms in Kuttanadu (Kurup et. al, 2003), representing both mono and poly culture, with and without integration of rice, had also revealed that it was necessary to carry out paddy cultivation as a follow-up of prawn farming.

Impact of conversion of Pokkali fields

The total labour involved for Pokkali farming in 207 man days per hectare is 84 men and 123 women. Conversion of Pokkali fields can ultimately result in displacement of female laborers, who are traditionally farm hands. On the traditional front of rice-fish cultivation, the labour days of women and their income is systematically decreasing. There is displacement, but the concentration of shrimp peeling sheds in the region is providing job opportunities to these displaced women agricultural laborers. The shrimp peeling activities are capable of providing 150-200 days of employment to these women. In regions without export oriented peeling sheds, the displaced women are not easily absorbed. The employment scene is worse for men than for women, and hence it is difficult to conclude that the gender inequalities prevalent in this section are the sole result of income disparities resulting from displacement from Pokkali fields. On the traditional front of rice – fish cultivation - the labour days of women and their income is systematically decreasing. We can, therefore, conclude that there is displacement from the agricultural front.
The wetlands under rice-fish farming has been facing severe threats owing to a variety of factors, including the shift from ecologically sensitive rice-fish farming to semi-intensive or intensive fish/prawn farming affecting adversely the environment and livelihood of the poor.

Impact of climate change

There is an extent of unpredictability, because the successful crop depends upon the correct combination of rain and tide. The *pokkali* paddy cultivation is carried out only during the rainy half of the year (from June to November). By November–December, when fresh water inflow from the rivers decreases and salinity starts increasing, the harvesting will be over and the paddy lands would then become fish or prawn farms.

This cultivation practice is also vulnerable to climate change, climate variability and sea level rise and will be among the first to suffer the impacts of climate change and forced to adapt or abandon. Water management for a few days is of utmost importance. Water management is done by managing the sluices. Once the seedlings are established they will grow quickly without being affected by floods, which may follow. The recent unprecedented floods had resulted in large scale uprooting of paddy, with an increased incidence of weeds due to excessive natural nutrient supplies. This means that these systems are less well placed to accommodate any unprecedented changes in climate and related environmental conditions that are anticipated to occur during the remainder of the current century and could lead to high social and economic costs in the future. The change in the frequency and timing of monsoon rains in this year had flooded most of the fields ready for harvesting and damaged the paddy (Fig 6). Migratory birds and ducks had their share in wasting the paddy (Fig. 7).

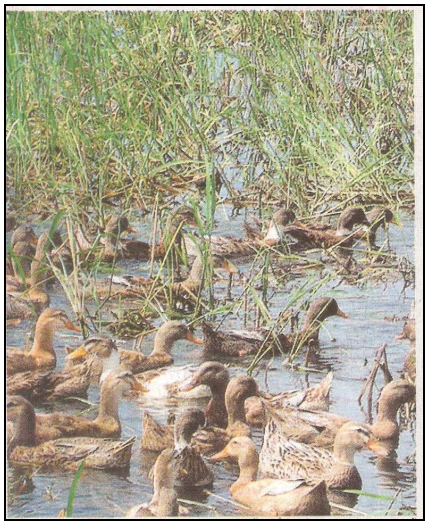

Fig. 6: Ducks feeding on Pokkali fields

Fig. 7: Delayed harvesting and germinating paddy seeds due to lack of man power

Conclusion

The best combination of eco-friendly sustainable aquaculture for the wetlands of Kerala would be a rotational system between rice and prawn; necessary to carry out paddy cultivation as a follow up of prawn farming. Instead of filling up land and creating monstrosities in concrete, would not some agency encourage this kind of farming which is indeed healthier and more sensible moneywise? The symbiotic relationship of pokkali paddy with shrimp farming contributes towards a deduction in nutrient loading of the wetlands. On the adaptation of this practice to the entire Kuttanadu paddy fields, considerable improvement on the overall water quality of the wetlands can be expected. This farming, a community-based coastal resource management, needs to be encouraged to protect the coastal wetlands. This alternative income-generating program contributes to improve coastal environments and to conserve the biodiversity of the ecosystem. The demand for the organic farm produce is very high in the international markets. With the Pokkali rice being purely an organic produce, there is ample scope in the international markets. The export demand of Pokkali prawns is already very high.

The fast changing scenario of conversion of indigenous Pokkali cultivation to a variety of other activities, can ultimately result in displacement of female laborers who are traditionally farm hands. The displacement, if any, can result in greater gender disparities and a financial over dependence on their male counterparts. Since the age groups of the laborers are more or less around 55, the general nature of displacement is hard to assess. The younger generation is totally absent in Pokkali related work. A very complex socioeconomic and political situation prevails in Pokkali cultivation.

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WOMEN AND THE SEA

Peter Serracino Inglott

Many years ago I was asked to give a paper on the different ways in which artists have depicted the Sea over the centuries. So when this year I was invited to speak about Women in the Sea, I thought that one way of tackling the topic was to examine in my memory the appearances of women in depictions of the Sea, even though I knew that these appearances were sparse. In fact many thinkers who have sought to understand the change in women's participation in the history of humankind have turned towards the history of art for evidence. Actually the history of art does not only furnish us with a record of perceptions of the place of women in reality, but also of an important factor that has affected woman's position in the world. The artistic portrayal of the feminine has often served not just to raise awareness of it but also to enable the popular imagination to envisage alternatives.

A great painting immediately came to mind. It is the Birth of Venus by Botticelli (Sandro Filipebi) in 1485. There are two reasons why this painting of a woman emerging out of a shell fertilized by the Sea is emblematic of a turning point in human and world history. First, the woman is shown as being born not out of a male as in the Bible and other mythological accounts but out of the surf. Later on it came to be realized that for any human being, birth is a kind of reliving on an individual plain of the emergence of life as such from sea to dry land. Botticelli was placing the emergence of human life in the context of the natural environment. Secondly, it is a sort of emblem of the new age that was dawning in the history of human relations with the Sea. In fact seven years later, thanks to the new mastery achieved by man over the sea, America was discovered as it happens by a close friend of the Florentine painter of the Birth of Venus, namely Amerigo Vespucci. The great American "projectivist" Charles Olson links imaginatively the Birth of Venus with the discovery of America in his quasi-epic *The Archaeology of Morning*. Both of them signify the emergence of a new world and a change in the status of Woman.

History is constituted not only factually, by happenings such as the discovery of America, but also by the images which human beings make of events and of themselves. Art is often the precursor and the agent of social change. Botticelli's Venus is generally considered to be the first great picture produced by the Renaissance. It seems to express the connection between the exploration by means of new marine technologies of the Ocean by explorers like Vasco da Gama and Magellan who sailed round the world, on the one hand, and on the other the new humanistic philosophy constituted by the exploration of what it is and means to be a human being, of which the Birth of Venus is a harbinger. When Botticelli painted his woman being born out of the Sea (supposedly here in the Mediterranean, near Cyprus) he was going against an ancient association of the Sea with masculinity. Actually in the classical languages words referring directly to the Sea as such (such as Peragos) were masculine, but words referring to the whole system of water in the world, both fresh and salt, were feminine. Thus ocean space (male) was treated as a part of hydrospace, the ensemble of both land water and sea water, and this whole was treated as female.

In fact in the Mediterranean at first the central figure of the divine sphere was the Mother goddess related to the fertility of the earth. This pantheon was ousted when the Greeks descended upon the Mediterranean and the divinities of the earth were supplanted by the Sky gods, of whom the greatest was Zeus, whose superior weapon by which he defeated the earth divinities was lightning. Alongside the Sky gods, there appeared also a sea god, namely Poseidon, brother and rival at the same time of Zeus, and hostile both to Athena, guardian of the city with the same name and hence a land goddess, and to Ulysses, the unwilling sea traveler anxious to reach his home on land, Ithaca.

Thus the Greeks joined the Hebrews in their tendency to picture the sea as the habitation of evil powers and the Sea gods as on the whole being enemies of humankind. Homer in the Odyssey opposes the sirens, who are marine demi-deities, to the nymph Calypso, who is the daughter of Atlas and hence an earth-goddess, although associated also with water, as forces attempting to drag man down to bestiality as compared with Calypso, the earth goddess, who tempts the

human being represented by Ulysses to renounce his human nature and become immortal like her. Ulysses refuses in the end the offer, apparently mainly because he does not wish as a male to be subservient to a female.

If we survey the history of Art, up to the Renaissance and the turning point represented by Botticelli's Birth of Venus, the representations of the Sea are not very abundant. They consist mainly of Biblical illustrations of tempests, among which the deluge can be counted and the comic experiences of Jonas, and shipwrecks such as that of St. Paul in Malta. In these images women only appear to increase the pathos of the scene and on some occasions perhaps to add a tinge of eroticism to the pangs of suffering.

For evident reasons the sea comes to figure prominently in the art of Venice and thereafter in Baroque art. There is a strong marine element in Dutch landscape painting, influenced sometimes by the Phoenicians for two reasons. The first is nationalistic celebration of their naval power. The second is the Calvinist doctrine of divine election which leads them to depict such biblical scenes as the abundance of the fish catch from the lake through the grace of Jesus, which served them also as accounting for their extraordinary prosperity in the years of their greatest maritime power. Nevertheless, in these paintings women are still most notable by their absence or the rarity or insignificance of their presence.

It should be remembered that the Romans never swam if they could avoid it, although they enjoyed going on boats or walking by the shore, a practice that is recommended in later Christian centuries by such saints as Frances of Salles. In fact the sea becomes a more popular figure in painting because of the increasing representations of the interface between land and sea. This interest develops first with the sea as an object of contemplation suggesting infinity to the land-lubber in contrast to the limitations of land as existential environment. But in later times a second motivation led to an increase of interest in coastal areas – namely health. People and particularly women frequented spas and were pictured by the artists doing it. Contact with the sea was believed to be especially effective as a cure for two types of gynecological weakness, the first was hysteria, and bathing in the sea was supposed to provide a pacifying psychological cure. The second is sterility because the sea was supposed to have a fertilizing and fecundating power, more or less in continuity with the mythological source of the Birth of Venus. Today Thalassotherapy has again become popular with the cult of "wellness" and again women are represented by the artists as its most assiduous practitioners. Very much later, bathing, especially as it came to be undertaken with less and less clothing, and erotic motivation in the representation of women by the sea greatly increased. Once again women came to figure prominently in paintings illustrating water sports in summer and the hedonistic use of leisure time in places besides the sea.

In the context of the European Union's plan for marine development, there has been talk of roles for women in relation to the sea. Clearly the scarcity of female representation in marine related art is quite simply due to the fact that life on ships has until now been an almost exclusively male preserve, leading to such results as sailors often notoriously having a wife in every port or being homosexual. Notably the new roles envisaged for women in the European Union plans are mostly shore based, for instance, packing in relation to fishing, or in aquaculture in land based operations. There are, however, two developments which seem to open greater prospects for increased female participation onboard. The first are the jobs related to info- technology, and the second is that the size of ships has grown to be equivalent to that of small cities and hence to provide the facilities that enable women to live on ships even in times of pregnancy and without neglecting child rearing responsibilities. When this happens there will be no doubt a much richer representation of women in the sea in art.