Economy of the Fisherwomen in Ganjam District of Orissa: Conditions for Environmental Governance and Sustainable Development

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ABSTRACT

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1. Introduction

Fisheries and aquaculture activities have been the means of livelihood for the small scale coastal fishing communities from time immemorial. Even though the fisheries have now become a market-driven dynamically developing sector, the subsistence and decentralised forms of fisheries remain resilient in Asia. The rights of the traditional fishing communities have been in focus in the wake of increasing commercialisation and consequent unsustainability of marine fisheries. The repercussions have been felt even in Ganjam coast of Orissa in India. In this context, a closer look at the socio-economic problems of fisherfolk, particularly fisherwomen assumes significance. In Orissa, the indigenous tribals and the traditional fisher people are the most marginaised groups. Because of depletion of marine resources, the hardships of the traditional fisher people, particularly women, have enormously increased. This has led to dependency of fisher people on middlemen for survival, which leave them in the vicious cycle of poverty-exploitation-poverty.

As in all subsistent economies, women play an active role in the fishing communities of Ganjam district in Orissa. In fact, fisherwomen have made the survival of the coastal communities possible. Though they have very limited control over the conditions and

products of their labour, women have almost exclusive responsibility of running the household and caring for the children. Despite this, they remain invisible. As governance is influenced by economic power, and because they are a minority, these women do not have any weight in decision-making. In this context, this study enquires into the nature and extent of the socio-economic and ecological problems associated with the decline in the control of resources by fisherwomen which hinder sustainable development of the community.

2. Materials and methods

The research is undertaken in the coastal region of Ganjam district, which is one of the six maritime districts that span the 480 km. coastline of Orissa. The traditional fish workers of coastal Orissa, except of Balasore which was part of Bengal presidency, have been a Telugu speaking community. At present there are one lakh marine fishermen belonging to this community in the State. Since Ganjam is the border district of Andhra Pradesh, it has the highest number of traditional fish workers who belong to the 'Nolia' community. Historically the fish workers' settlements are much older than many towns and semi-urban areas of Orissa.

The primary data for the study were collected through field survey. Stratified random sampling method was adopted first to select sample villages and then to choose the sample respondents. Thirteen out of 28 marine fishing villages situated in Rangeilunda, Chatrapur and Chikiti blocks of the district, around Gopalpur-on-sea, were selected. The focal group is the traditional women fish vendors. From the list of all households of the sample villages, 360 fisherwomen are selected by using the random numbers generated through computer software. The sample fish vendors constituted about 12% of the total number of households in the villages.

Besides general information about the respondents and their families, the questionnaire-based interviews covered the reasons for indebtedness, contribution of

fisherwomen to the families and communities, women's control over natural and human resources, their hardships and problems, and their opinion on environment, governance and sustainability. Standard statistical tools including simple and multiple regression analysis are used to derive analytical inferences with respect to the objectives of the study.

3. Observations and discussion

The average family size of the marine fisherwomen respondents is 5.25. The fisherwomen are Telugu speaking with almost no education, and most of them had child-marriage. They live in ill-built houses, mostly on government land. The infrastructural facilities available in the villages are very poor. The fishing capital of the households comprise of boats and nets, which some own and others share.

Several problems have been identified that increase the hardships of the fisherwomen. Their health conditions are not good and suffer from subordinate socio-economic status. Their effort and contribution are invisible. Industrialisation of coastal areas and shrimp aquaculture have resulted in huge profits for the big investors on the one hand and loss of livelihood and displacement for fish workers on the other. The policy of increased production has also led to the destruction of traditional skills and management norms that existed in the fishing villages. There is a reduction in the quantity and the variety of fish consumed by the fishing and the inland population.

It is seen that men take over women’s work as production has changed from subsistence to the market economy. Earlier fish processing and marketing was controlled by fisherwomen. However, now many women in the study area find it difficult to buy fresh fish at the landing centres. Many small-scale women traders selling fresh fish on foot also have been adversely affected. Thus women who were once independent and self-employed are forced to engage in uncertain casual jobs.

The fisherwomen of Gopalpur have a vibrant organisation called ‘Kalinga Fish Workers Union’ that fights for their rights. The women also assert their rights through self-help groups (SHGs) and through participation in the Panchayat. The girl children are now sent to school. Women in the area with the help of the local NGOs began to protest against child marriages and child labour. They have also fought against illegal taxes.

The economic contribution of fisherwomen to their families is quite significant. The income of the fisherwomen is mainly determined by the amount of time allocated to collection, processing and marketing of fish. The age, body weight, marital, maternity status and education do not significantly influence their income. They spend bulk of their time on fishery and household activities. There is no scope for leisure and pleasure. They are being exploited by the middlemen and traders belonging to their own community and others. The fisherwomen are aware of the conditions of sustainability such as diversity, alternative sources of income, community harmony and familial equilibrium. Their *traditional ecological knowledge* (tek) needs documentation, recognition and appreciation. The natural fishery capital stock in the sea and land resources in the coast need protection. The fisher people's council should be recognised as a socio-political institution.

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1. Introduction

The rights of the traditional fishing communities have been in focus in the recent years in the wake of increasing commercialisation and consequent unsustainability of marine fisheries. World fisheries have become a market-driven dynamically developing sector representing technological dualism in the fish economy. Along with the highly organised sector using massive capital inputs, the subsistence and decentralised forms of economic organisation in fisheries remain resilient and dynamic particularly in the developing economies of Asia. Artisanal fisheries provide approximately 25% of the global fish catch and about 40% of the fish used for human consumption (Watson *et al*., 1996).

Along side the processes of modernisation and commercialisation there occurred enormous ecological perturbance to the marine ecosystems. The most threatened sector in this process is the traditional fisheries. In the face of aggression from the corporate sector threatening the very survival of the traditional fishing communities, it is imperative, first on the part of the traditional sector and secondly on the part of those who promote it to find ways and means to keep their economy and culture dynamic and resilient. Sustainability of the marine fisheries economy will very much depend on the process of protection and promotion of the traditional sector. Instead of invading and suppressing the traditional knowledge and culture, modern technology can be used to enrich them, provided the traditional communities are empowered to regain their lost control over resources.

As in all subsistent economies, women play an active role in the fishing communities of Ganjam district in Orissa, which is the study region of this paper. In fact, fisherwomen

have made the survival of the coastal communities possible. Though they have very limited control over the conditions and products of their labour, women have almost exclusive responsibility of running the household and caring for the children. Despite the fact that they play an important role in fisheries, they remain invisible. Their contribution to the sector and their struggle for survival remain unnoticed. The consequences of the damage done to the traditional fisheries and their ecology through the commercial sectors, hurdles and imperfections in fishing and marketing activities, the increasing hardships faced by the fisherwomen in fish vending, alienation and marginalisation of the fisherfolk in Orissa are the major problems of the economy of the fisherwomen in the region.

To come out of the subsistence economy to the surplus economy, women need to engage themselves in diversified fish related activities like fish processing and marketing. As in all poor communities fisherwomen also bear the double burden of work for the market and for the household. Their most basic struggle revolves around trying to get enough for their families and for themselves, and procuring the most basic necessities of life such as food, fuel and water. The growing tourism and commercialization of the coastal areas are making women victims of economic and social exploitation. As economic power is very much linked to political power and because they are a minority, these women do not have any significant power to influence decision makers of the state. In the context of all these, there is a need to critically appreciate the economy of the marine fisherwomen with special focus on the degree of the loss of control over resources, which hinder the scope for sustainable development (SD). This study is basically an inquiry into the nature and extent of the socio-economic and ecological problems associated with the control of resources by fisherwomen which hinder SD of the marine fisherfolk in Ganjam district. The specific objective is to analyse the core reasons behind ongoing and increasing misery of the fisherwomen in the study region, so as

to enable them to evolve appropriate structures for gaining control over the resources to build a sustainable economy.

2. The study region

Historically traditional fish workers of coastal Orissa, except of Balasore district which was part of Bengal presidency, have been always of Telugu speaking community. At present there are one lakh marine fishermen belonging to this community in the Orissa coast. Since Ganjam is the border district of Andhra Pradesh, it has the highest number of traditional fish workers who belong to the *Nolia* community. Ganjam has the longest history of traditional fisheries of Orissa. Historically the fish workers' settlements on these areas are much older then many towns and semi-urban areas of Orissa. The economy of Ganjam district operates through the interactions of agricultural, forest and fisheries (inland and marine) ecosystems. The economy is predominantly rural and agrarian in character. The scope of the work covers the fisheries ecosystems of the coastal villages.

The fisherwomen of Ganjam district are illiterate and they do not have any other skill than selling fish. In the ever-increasing competition for scarce fish resources it is difficult for women to procure fish. Fish vending is a difficult occupation in the absence of transport facilities, which compel women to walk 8 to 12 km a day with heavy loads of fish on their heads. Fish vending despite its hardships has continued to be the most lucrative return for women's labour in the fisheries. The lack of alternative income generating opportunities in the coastal communities, reduces the opportunity cost of labour to the point where it continues to be employed within the fishery in spite of very limited returns. With high rate of growth of population in the coastal communities, the pressure on the resources is likely to be more and supplies may be reduced further. The fishworkers of Ganjam district have not upgraded their fishing techniques for the last fifty years while their counterparts in Andhra Pradesh have upgraded their skill. As a result they have better catch even in lean seasons. The

Andhra Pradesh fisher people also have better marketing system. The economic inadequacy leads fisherwomen in Ganjam to obtain money from moneylenders who in turn exploit them with usurious credit, which keep them perpetually indebted. Because of the regular drinking habits of the fishermen all the money they earn through their hard work get siphoned away by the liquor merchants. The moneylenders, the fish merchants and the liquor merchants together manage to keep the fisherwomen always in the subsistence economy.

3. Materials and methods

The study is built upon both primary and secondary data. While the secondary information are collected from official sources and libraries, the primary data are gathered through field survey. Stratified random sampling method is adopted in this study, first to select sample villages and then to choose the sample respondents. Thirteen out of 28 marine fishing villages of the district, around Gopalpur-on-sea, are selected for field survey. These villages are situated in the three coastal blocks of Rangeilunda, Chatrapur and Chikiti of Ganjam district (Table 1). Rangeilunda block has the largest number of fishing villages, of which nine are taken for the study. Rest of the four villages are chosen from the other two blocks, selecting two from each. The focal group is the traditional women fish vendors from the age group of 16 to 70 years. It is observed that women of this age group are active fish vendors, and they have no occupation other than fish vending. The total number of sample fish vendors selected for the study from the thirteen sample villages is 360, which constitutes about 12% of the total number of households in the villages. The list of all the households in the sample villages were procured from different organisations such as People's Rural Education Movement (P.R.E.M.), Luthern World Service (L.W.S.) and Ganga Devi Mahila Vikash (G.D.M.V.). The above mentioned NGOs had prepared this list after the Gopalpur super cyclone of the 17th October 1999. The list were first verified in each of the villages,

then they were put to one list for all the villages, from which 360 fisherwomen are selected by using the random numbers generated through MS Excel computer software.

Table 1. Number of sample women fish vendors selected from the sample villages

Sl. No.	Name of the block	Name of villages	No. of fisher households	No. of sample respondents
1	2	3	4	5
1.	Rangailunda	Boxipalli (Old)	147	13
		Boxipalli (New)	154	22
		Sana Deegipur	080	11
		Bada Deegipur	080	09
		Garampeta	288	31
		Golabandha	562	61
		Gopalpur	271	28
		Markondi	288	46
		Venkatraipur	234	23
2.	Chikiti	Anatharaipur	103	11
		Sonapur	378	47
3.	Chatrapur	Bada Arjipalli	069	10
		Sana Arjipalli	379	48
Total	3	13	3033	360

Since the fisherwomen are illiterate, questionnaire-based interviews were conducted. Prior to the preparation of the questionnaire, several informal discussions were conducted with individuals and groups from the selected villages. The questionnaire has covered 25 vital issues of traditional fishing communities with special focus on women. Besides the general information about the respondents and their families, the questionnaire covers the reasons for indebtedness, contribution of fisherwomen to the families and communities, women's control over natural and human resources, their hardships and problems, and their opinion on environment and sustainability. The primary data collected from the field was meticulously entered into computer for processing and tabulation. The value of the main variables such as, assets, income, indebtedness etc., are converted into per household/per capita units to arrive at more appropriate and meaningful results. Standard statistical tools, paired t-test, and simple and multiple regression analysis are used to derive analytical

inferences with respect to the objectives of the study. Spread sheet (MS Excel) and econometrics (Limdep) computer softwares are used through the quantitative analysis.

4. Review of literature

The vast mass of environmental/ecological economics literature suggests that an ecological conscience be incorporated in to the process of economic growth in order to avoid an ecological catastrophe. Fish is a bio-economic resource, now subjected to pressures from economic agents (Brown, 1998). Because of the competition for the marine resources, attempts have been made to understand about the dependence of fisheries on marine environment, which is the most ancient life-supporting systems from which other natural systems have evolved (ICSF, 1996). It is believed that life on earth owes its past, present and future existence to the oceans. The bio-geographical interlinkages of the oceans unite us, while the land masses divide us (Kurien, 1998). The marine systems produce a variety of natural resources, including corals, seaweeds and algae, fish, minerals such as lime and salt, sand, oil and gas provide food, fuel, construction material and so on, which are indispensable for human existence. Coastal habitats and resources are also vital because of their role in stabilizing the shoreline, and in protecting coastal areas and habitations from cyclones, tidal waves and other natural disasters, as well as because of their natural capacity to assimilate and absorb waste and pollutants. There are also diversity of natural processes occurring in coastal areas, such as upwelling, seasonal sand banks, sand dune formation, sea erosion, siltation and sedimentation, the lunar and diurnal cycles, seasonal winds and cyclones, sea breezes, waves, tidal bores and flows, salinity changes and seasonal migration of fish and birds, all of which contribute to maintaining the coastal ecosystem in complex and often unknown ways. The use of destructive technologies causes disruption of ecological linkages and species extinctions (Field, 1997). The cost of increased productivity in the organized sector is the loss of resilience in the marine ecosystem (Perrings, 1994). Because of the inter-

linking of species and processes in the marine environment, harvesting of the species, especially some key-stone species, affects many other species, initiating the process of depletion of biodiversity. Perrings *et al* (1995) has observed that by depleting population, it is possible to disrupt a wide range of economically important ecological services.

The unorganized fishing sector uses appropriate labour-intensive technology. It has established a permanent relationship with nature. Fishing is done as household enterprise undertaken in pursuit of a livelihood leading to a culturally conditioned way of life. They fish primarily in the coastal waters using small craft and simple gear of relatively low capital intensity. Their fishing operations are skill-intensive. Fisherfolk have an intuitive understanding of the coastal aquatic milieu and the fishery resources in it. The traditional ecological knowledge (tek) and skills are passed down from generation to generation. They are linked to locally oriented market networks. The internal driving force of the fisherfolk is towards sustainability. The sensitivity of fisher people towards the health of the marine environment helps them not to overexploit the resources therein as it would disrupt the harmony of the ecological system and their economy. They live within the limits imposed by the environment as they vie the sea and its resources as intergenerational natural and social capital. The fisherfolk personify the sea as a mother, generous to the children who respect her and harsh to those who do not.

In India, studies on fisherwomen are not many. A few empirical studies available point out that with technological advancement, the condition of fisherwomen have deteriorated in fisheries of the maritime states of India. The new technology in fisheries induced by the modernisation package has been monopolised by large business firms rather than the fishing community. It is pointed out that the sexual division of labour in fishing communities exclude women from the central economic task of fishing. In a case study of three fishing villages of Kerala, Gulati (1984) has observed that women's work participation

has changed qualitatively and quantitatively and independent self-employed women have become employees for men engaged in prawn processing. Vijayan and Nayak (1997a and 1997b) have concluded that women's role is undergoing significant change with the advent of commercial fishing, and as a result fisherwomen are sidetracked by larger male merchants and are slowly being marginalized from the marketing process in Gujarat and Maharasthra. Vijayan *et al*. (1997) highlight the need to safeguard the spaces women occupy in fisheries in the context of modernization and a programme of action should find solutions to the problems of exploitation of women in Kochi, Kerala. According to Gracy (1997) establishment of credit and marketing co-operative societies managed by women is the solution to the serious problems faced by women fish workers in Karnataka. Nayak and Navta (1997) have examined the problems of women fish processors and dry fish vendors of Andhra Pradesh and concluded that they are forced to give up their traditional occupation of fish drying and vending due to scarcity and high prices of fish, and most women are caught in the debt-trap. Nayak (1997) has looked into the marine fisherwomen's struggle against displacement due to military installations, construction of hatcheries and tourist complexes in Orissa and observed that they play a vital role in the struggles for survival of their families and communities.

5. Observations and discussion

Villages around Gopalpur typify the pattern of life prevalent in the southern part of the coastal Orissa. Fisherfolk constitute the largest population in all the villages here. Occupational convenience forces fish workers to live in the narrow stretch of coastal land. They live in impoverished thatched and mud walled houses. With the increase in their population, the house sites and even the houses are divided and subdivided. As a result the fishing villages look very much like the urban slum. Transport and communication facilities are good in a few villages like Gopalpur and Arijpalli because of their importance as tourist

centres. These facilities do not exist in Markondi, Sonapur and Garampeta. The village Markondi is situated near the Markondi creek. Culturally the villages are homogeneous with similar life styles, traditions and customs.

Out of the 360 households surveyed, 62.5% have four to six members and 20.6% of families have seven to nine members. Nine are single member households and three households have more than ten members. The average family size in the sample is 5.25. The predominant type is the lineally extended family followed by the nuclear family. Unlike other communities children in fishing communities do not normally inherit income or property from parents, and so they prefer to live separately after marriage. Women headed households are the poorest in the area. Very often the woman is the only earning member in these families. Of the total sample households, 50 are headed by women. Most of these women are widows. In a few cases the husbands are seriously ill and bed-ridden and the women have to take the entire responsibility for the household. There is also a category of nine women who stay alone. Their sons and daughters are separated from them and have their own families. Of the total population 96.1% are Hindus and the rest are Christians. The families belong to two main sub-castes of the *Noliya* community namely '*Jalaris*' and '*Vodabalijas*'.

Fisherwomen in the area are mostly illiterate. Only one respondent has education up to 6^{th} standard. After marriage she came here from West Bengal. However, 99% of women exhibited a natural talent in arithmetic when a game was conducted for them in small groups with coins and rupees of different denominations. With ease they were able to add, subtract, multiply and divide. Their traditional occupation of fish vending might have helped them to acquire this particular skill. Only 50 respondents are able to write their own names. Of the 763 children of the sample households only 183 are attending schools. Though there are more female children in the sample population, school going girl children are less than the male children attending school. Even among the few girls who attend school, many drop out before

completing five years of elementary education. Majority of the respondents (64.17%) consider that education is not important for girls and they believe that girl children are responsible for household work. Child marriage is still a reality in fishing community. 21.84% of the respondents were married before the age of 10. Only 50 women (13.97%) were 18 years and above (maximum upto 25) at the time of their marriage.

The property of the fisher households comprises of house, land, boats and nets. The fisher people in the sample villages do not own cultivable land. Quite a sizeable proportion of the people do not even own the house site. 55% of sample households, mostly belonging to Markondi, Sonapur, Arjipalli and Gopalpur own both the site and house. 44% of the respondents' families have built houses on government land. Three households live in rented houses. The condition of the houses is not good. 318 respondents live in thatched and mud-walled houses, which do not provide protection during rains and cyclones. The concrete and asbestos roofs are available to 42 households. All the houses have a raised verandah, which is used to keep the net and other fishing equipments. Almost all houses have one or two rooms. Only 29 houses have three rooms. Even though electricity is available, people are not able to use it in their houses except 44 households. The houses of only 3 respondents have toilet facility.

Fisher people have very limited assets. A few families have two boats and several nets. 60.56% of households do not have any productive asset. There are some families who share the boats and nets. All household assets in the family are owned by the male members. However, the little gold and silver ornaments that a woman brings at the time of her marriage belongs to her. In the absence of land and other valuable assets, gold and silver are often used as security against borrowing. Only 125 sample households were found to save in some form or other. Of these, majority of the households save through self-help groups. Some save through chit funds and only a few through banks. Households with larger amounts of savings

were found to possess some productive assets such as boats and nets. Only 7 families have savings above Rs.20,000/-. People in the fishing community normally borrow from traditional as well as institutional sources. Traditional sources include moneylenders, rich fishermen, boat owners and fish traders. The scattered nature of landing centres and the seasonality of the production favour the reach of informal finance to fisherfolk through traders, persons belonging to godown network and boat owners. Only 42 families have borrowed from banks and 33 households have used the credit facilities of self help groups. The fishermen mostly need consumption loans in the lean season. The most prevalent form of credit from unorganised sector relates to the advance to the fisherfolk by the traders during May and June, when the income is low and for contingencies such as marriage and death. Boat owners give loans to poor fishermen through labour contract system. In this system the boat owner provides a lump sum amount of money to few fishermen in April or May to work for him for the whole year on wage basis. This system ensures cheap and steady supply of labour to the boat owner. If they decide to discontinue the system, they have to pay the entire amount and in some locations there is requirement to find a substitute. The moneylenders provide credit only after the fishermen mortgage some of his valuable assets like boat, house or gold as a security. The interest rate varies from 36 to 60 percent per annum. It has been found that about 89% of the households in the study area are in some form of debt. Besides consumption expenditure the men spend a lot of money on alcohol, which naturally forces them to borrow heavily. This binds them to the fish traders. The respondents feel that the moneylenders wish the indebtedness of the fisherfolk to continue so that their interest is safeguarded. The money lenders depend on the fisher people for progressive enrichment, whereas the latter's dependency on the former leads to their enslavement. In the process the fishing communities loose control over their resources, produce and economic life. Co-operative societies of fisher people in the area are mostly controlled by the fish merchants

and moneylenders. The fish marketing society in Garampeta village in the study area is controlled by a rich non-fisherman dry fish merchant. He buys fish from women vendors at a very low rate and sells it to the wholesale dealers securing a very high margin of profit.

Even though the fisherwomen are not directly engaged in sea-fishing, they participate in a number of related activities. Of the 360 respondents, 254 are regular fish vendors. Others do fish vending occasionally. In fishing season 219 (64.22%) fisherwomen spend 9-12 hours per day in fishery activities, besides attending to the regular household activities. During the off season, the fish vendors work for 5 to 12 hours a day. Apart from the adult members, girl children above 7 years of age are also involved in fishery activities. They learn cleaning, salting and drying of fish at a very early age. The time spent for these activities by girl children ranges from 4 – 5 hours. Apart from these activities girl children play a supportive role by cooking food and looking after the smaller children at home, making it possible for the parents to work outside for longer hours especially during the fishing season.

The division of labour within the fishing communities is such that the men go out on the seas for fishing while the women take care of distribution. Women are involved in all the shore-based post-harvest activities such as handling, sorting, grading, gutting, drying and marketing. Majority of the fisherwomen (70.56%) in the area are engaged in fresh fish marketing. Many women in Boxipalli, Venkatraipur, Deegipur, Golabandha and Sonapur are involved in dry fish marketing. In case of small landings made by fishermen through small wooden catamarans the women easily buy the catch. The wives of the fishermen take charge of the catch once it is landed. The good varieties of fish go directly to the merchants who have advanced loans to the fishermen. The women then carry the remaining fish in baskets, on their heads over distances of 10–15 Kms and sell it from door to door. As the operation of small catamarans comes down, the women have to buy fish to sell fresh and also for drying.

With technological changes and fish resources becoming scarce, competition has become stronger. For example at Arijapalli and Gopalpur landing centres, one can see women waiting anxiously with their baskets for smaller crafts to land. In the large landing centres women participate in the auction, where they have to compete with male merchants having cycles and ready cash. To cope with the situation and survive in vending, women form themselves into groups of 5 or 6, pool their resources and buy fish. They either divide the fish and sell it individually and take the profit or pool the profits together and divide it equally. Some women sell in big markets and others at roadside markets. On an average, women spend 8-10 hours outside the home travelling and vending. Majority of fisherwomen sell fish outside their area of residence. Some of them sell in the surrounding villages. Others sell in the rural as well as urban areas. The time of marketing depends on the landing of boats. In case of dry fish, the normal pattern is to hire trucks jointly and take the catch to the wholesale market at Humma. Expenses like truck charges, loading and unloading charges, market entry charges etc. reduce the total earnings.

The fisherwomen in the area not only work in the fish trade but also work as daily wage labourers whenever work is available. Lean fishing periods are extending in the region to nearly six months in a year. During lean season men go for fishing only occasionally. They remain at home playing cards, but never try to seek work elsewhere. Women on the other hand work in the agriculture sector during transplantation and harvesting of paddy and in construction works in order to save the family from starvation. However work is not available round the year. Non-fishing activities are generally less than 3 months in all the villages. In Sonapur village some women are engaged in coir work to earn an additional income. In all the villages women resort to shrimp seed collection in the absence of any other alternative income generation activity, to ensure the survival of their families.

Unhygienic living environment, extreme poverty, lack of pure water and over-work put the fisherwomen at a disadvantage. The prevalent social attitude, which favour male children, result in girl children getting less attention and care. Malnutrition among girls leads to problem during pregnancy. In the sample population, all the women who had medical checkups reported that they suffer from anaemia. Over-work, lack of nutritious food, worm infestation and continual deliveries affect women's health. Women fish vendors in this region suffer from severe back pain. The high morbidity rate among fisherwomen has impact on the economic status of the family.

In the context of social and economic stratification, women's work outside home, instead of leading to gender equality, gives rise to relentless weariness of too heavy work, and deprivation of childhood and schooling for their daughters. The fisherwomen play only a subordinate role in decision-making, except in women-headed households. Wife beating, male control over women and girls, sexual harassment at work, lack of educational opportunities for girls, lack of inheritance or property rights for women, and lack of control over fertility are the cause of male domination that persists in fishing communities. As the fisheries sector began to modernise, women became greater victims of violence as their husbands are forced to work longer at sea and when this pays no dividends, come ashore to drown their sorrows with liquor and aggression on women. The problem of fish scarcity gives rise to more strenuous burden for women leading to further insecurity for the future. With the greater focus on fish exports women's access to fish for sale and processing has been reduced.

Women in all the villages are very much aware of the decline in catches. According to them, encroachment of inshore and near shore waters by Andhra based trawlers and fishing in breeding season and capture of shrimp seed by traditional fisherfolk are important reasons for resource depletion in the area. The other reasons stated by the respondents as responsible for

low catch include the use of destructive nets and air defence operations of a military training establishment. While the state governments provides subsidies and assistance for mechanisation of fishing crafts and to build infrastructure facilities like ice plants and cold storages, fish harbours and landing centres, there is no support structures available for the fisherwomen who are losing their space in production, processing and marketing. Fish markets are managed by men even though majority of the vendors are women. In the Humma dry fish market 80-90% of the vendors are women, but it is controlled by men, who exploit the fisherwomen in all possible ways. Prices fixed by the merchants are distressingly low. Women have no control in the fixation of prices and consequently no control over their labour. Moreover, their effort and contribution are invisible.

So far as the monthly income of the sample households is concerned, in eight out of thirteen villages the largest income group is in the Rs.501-1000 bracket, the next largest group is in the Rs.1501-2000 range at the constant prices of 2000. The average monthly income of the households is highest (Rs.3,230/-) in Bada Arjipalli and lowest (Rs.1090.32) in Garampeta. The reason for higher income in the village Arjipalli may be due to the regular employment available at the Indian Rare Earth Ltd. (IRE) and Gopalpur port there. Men and women from fishing communities are involved in loading and unloading of ships. It has been found that in all the villages average monthly current income has increased between 1990, 1995 and 2000. However, the situation is totally different when the real income change is considered at constant (1990-91) prices. Table 2 shows that while there is a rise in average annual income of all the sample households of all the villages from 1990 to 1995, and to 2000 at current prices, there is significant decline in real income. The paired t-test analysis done for the means of the annual income differences for the years between 1990 and 1995, 1995 and 2000, and 1990 and 2000 shows that the rises (positive mean difference) in incomes at current prices and declines (negative mean differences) in average incomes at constant (1990-

91) prices are statistically significant. The t-values are high every where, but are stronger for the constant price cases in comparison to current price cases. This is in agreement with the overall feeling of the fisher people that their economic condition has deteriorated during the last decade due to decline in fish catches in the region.

Table 2. Average annual income of the sample households in different years at current and constant* (1990-91) prices (n=360)

Sl. No.	Year	Mean income	Standard deviation	Standard error
1	2	3	4	5
At current prices				
1.	1990	17355.00	11701.68	616.73
2.	1995	19299.45	13142.59	692.68
3.	2000	20201.67	13719.31	723.07
At constant (1990-91) prices				
4.	1990	17355.00	11701.68	616.73
5.	1995	10842.38	7383.52	389.15
6.	2000	7891.38	5359.14	282.45

Note :* Computed from index members of wholesale prices for food grains in India (average of weeks) from Economic Survey of the Government of India for various years.

Source : Computed from survey data

In Table 3, monthly income and expenditure are compared for the different villages. In two villages, the entire average income is fully spent. In three other villages, the expenditure is less than income, but the former constitutes as high as about 99% of the income. In rest of the eight villages, expenditure is higher than income. As a result of high intensity of expenditure and particularly because of the requirement of the occupation for investment in marine fishing assets, all the fisher villages have the problem of indebtedness. In the different villages, the per capita existing debt burden was found to range between Rs.2032.61 and Rs.4714.98. Apart from the equipment linked loans, the fisher people suffer from indebtedness due to consumption and other social reasons.

Table 3. Monthly income and expenditure, and total debt burden of the sample households (Hh) in 2000 (Rs.)

Sl. No.	Name of the Village	Income		Expenditure		Debt	
		Average Per Hh	Per capita	Average per Hh	Per capita	Average per Hh	Per capita
1	2	3	4	5	6	7	8
1.	Boxipalli (Old)	1719.23	290.26	1689.23	285.19	18230.77	3077.92
2.	Boxipalli (new)	1302.27	251.32	1302.27	251.32	21724.00	4192.35
3.	Sana Deegipur	1618.18	291.80	1672.72	301.63	17860.36	3220.72
4.	Bada Deegipur	1333.33	300.00	1338.88	301.25	12800.00	2880.00
5.	Garampeta	1090.32	244.93	1090.32	244.92	9048.38	2032.61
6.	Golabandah	1640.16	324.84	1744.50	345.51	13048.00	2584.18
7.	Gopalpur	1953.57	357.52	1953.50	357.51	25764.00	4714.98
8.	Markondi	1714.13	345.83	1761.84	355.46	10694.87	2157.73
9.	Venkatraipur	1280.43	265.31	1276.08	264.44	16144.87	3345.33
10.	Anantharaipur	2245.45	392.06	2427.27	423.80	22405.82	3912.13
11.	Sonapur	1715.95	291.16	1743.62	295.84	16541.78	2806.73
12.	Bada Arijipalli	3230.00	659.18	3050.00	283.08	18900.00	3857.14
13.	Sana Arijipalli	1598.95	282.17	1604.17	622.44	13791.66	2389.09

Source: Computed from survey data

The claims on the expenditure of the fisher households show that in all the villages food is the most important item, which is not unusual considering their economic status. However, it is quite an unhealthy indicator that the fisher households spend about 16% of their total expenditure on drinking and gambling. The items that follow in importance are interest and loan repayment, and rituals and festivals. The least important claimant is the head of children's education (Table 4), which again is an unhealthy trend. The percentage of food consumption expenditure to total household expenditure is 69.83, which is roughly the average propensity to consume food. This is very high in the sample in comparison to the state average of 67.55% and all India ratio of 38.96%.

Table 4. Average monthly consumption expenditure pattern of the sample households in different villages (Rs.)

Sl. No	Name of village	Food	Educat-ion of children	Repaying of loan & interest	Drinking & gambling	Rituals & festivals	Total
1	2	3	4	5	6	7	8
1.	Boxipalli (old)	1273.08	23.85	130.77	126.92	134.62	1689.24
2.	Boxipalli (new)	910.45	9.09	109.09	186.36	87.27	1302.26
3.	Sana Deegipur	1214.55	4.55	181.82	141.82	130.00	1672.74
4.	Bada Deegipur	964.44	5.56	100.00	170.00	98.89	1338.89
5.	Garampeta	812.10	0	40.32	52.58	56.29	961.29
6.	Golabandha	1213.28	4.02	112.30	282.62	132.38	1744.60
7.	Gopalpur	1187.50	16.07	225.00	371.43	153.57	1953.54
8.	Markondi	1241.85	3.26	78.26	325.98	12.50	1761.85
9.	Venkatraipur	922.39	12.83	43.48	214.78	82.61	1276.09
10	Anatharaipur	1570.45	1.82	272.73	436.36	145.91	2427.27
11	Sonapur	1245.43	6.91	64.89	324.47	101.91	1743.61
12	Bada Arjipalli	1682.50	0	95.00	550.00	247.50	2575.00
13	Sana Arjipalli	1158.13	14.06	118.75	320.83	91.35	1703.12
Total		15396.20	102.02	1572.41	350.15	1474.80	22049.53
Percentage		69.83	0.46	7.13	15.89	6.69	100.00

Source: Computed from survey data

It has been found that about 67% of the households are poor as per the IRDP manual. There occurs inequality among the respondents so far as distribution of income, value of assets, value of property, value of fish products, food expenditure, total expenditure and total debt are concerned. Income inequality is relatively less (with the Gini coefficient of 0.36) in comparison to inequality in respect of values of assets (0.52) and property (0.52). The extent of inequality is the highest for distribution of total property followed by debt and the value of

assets. Relatively wealthier fisher families have not only more of fishing assets but also larger amount of debt. It is but quite obvious to conclude that property basis is the origin of inequality. Within the limits of lower income as observed for the respondents' families, higher property, higher assets and higher income do not mean much to the economy and welfare as long as the degree of indebtedness is high. Low income and low debt leave the households as worse off as those who have relatively higher income and higher debt.

The determinants of household income are estimated through a series of regression models. Out of several simple and multiple models tried for HINCOM (annual income of the households), the best estimated regression equation is:

$$\widehat{\text{HINCOM}} = 1272.32 + 0.99\ \text{FISVAL}$$
$$(9.55) \qquad (175.07) \qquad\qquad \bar{R}^2 = 9884$$

It implies that if the value of the products received from marine fisheries per year increases by Re.1/-, then the annual household income increases by almost 99 paise. Further, the variation in FISVAL explains about 99% of the variation in HINCOM. Thus it is necessary to find out the determinants of FISVAL, which is explored in another set of models. Several types of FISVAL models representing the different combinations of the regressants are tried, from which it is observed that the value of the assets (ASTVAL), household size (HDSIZE), daily work time of the respondents and others in the family (RHOURS and OHOURS), number of literates in the family (LITRAT) and working day of the respondents in a year (RWKDAY) have positive influence on FISVAL. The only variable having a negative relationship with FISVAL is the number of working days of family members other than the respondent (OWKDAY). In other words, value of the fish products increases with the number of the working days of the fisherwomen (respondent). But the same decreases when the other members of the family increase their number of working days per year. Thus the income of the marine fisher households is positively sensitive to the effort of the woman in the family.

Out of seven models, the best estimated equation from the point of view of high t-statistics and $\bar{R}^2$ is:

$$\widehat{\text{FISVAL}} = \underset{(-5.64)}{-11724.02} + \underset{(14.43)}{0.13}\ \text{ASTVAL} + \underset{(8.32)}{2145.80}\ \text{HDSIZE}$$

$$+ \underset{(10.41)}{116.75}\ \text{RWKDAY} - \underset{(-5.49)}{59.23}\ \text{OWKDAY} \qquad \bar{R}^2 = 0.6205$$

It is found that ASTVAL is the most significant determinant of FISVAL from the point of view of the statistics. If the value of fishing assets increase by Re.1/-, then the value of products received increase by 13 paise. Quantitatively the significance of household size and respondents' work time is relatively high.

6. Contribution of fisherwoman to family welfare and sustainability

Table 5 shows that the fisherwomen spend a considerable amount of time on fishery and non-fishery household and other activities. On an average during the fishery season the woman spend about 7.43 hours on fishery activities. In Sana Deegipur village the women are observed as spending a lot of time on economic activities. We have estimated that on an average the woman contribute about 27% of the family income. However, there are families where the share of woman's income is as high as 90-100%. 96 out of 360 fisherwomen respondents contribute in the range of 30-40%. 65 women constituting 18% of the sample contribute more than 50% of the family income.

Since women's economic contribution is considerable, in one series of models we have examined as to what explains the component of income annually earned by the respondent (RINCOM) for the welfare of the fisher families. At the outset it is pertinent to note that RINCOM is not directly influenced by educational level, age, body weight, children delivered, and non-fishing time of the respondents, and household size. The value of assets has significant positive contribution to the income of the fisherwomen. But the quantitative

Table 5. Average time spent (daily) in fishery & non-fishery activities by respondents in different sample villages (hours and minutes)

Sl. No.	Name of the Village	Fishery activities		Non-fishery activities		Total	
		Season	Non-season	Household activities	Other activities	Season	Non-season
1	2	3	4	5	6	7	8
1.	Boxipalli (old)	8.45	5.52	4.00	2.22	15.07	12.14
2.	Boxipalli (new)	8.26	5.04	4.55	2.03	15.24	12.03
3.	Sana Deegipur	11.00	5.08	3.49	1.18	16.07	10.55
4.	Bada Deegipur	10.20	6.52	4.40	1.20	16.20	12.52
5.	Garampeta	6.35	5.24	5.27	2.16	14.18	13.07
6.	Golabandah	10.18	5.52	3.16	1.48	15.22	10.56
7.	Gopalpur	5.29	5.19	5.15	1.53	12.37	12.27
8.	Markondi	7.45	5.53	4.14	1.40	13.39	11.47
9.	Venkatraipur	7.34	7.10	3.42	1.39	13.55	12.31
10.	Anantharaipur	5.44	5.00	4.27	1.53	13.04	11.20
11.	Sonapur	6.55	6.13	3.40	1.50	12.25	11.43
12.	Sana Arijapalli	5.58	5.30	3.56	2.56	12.50	12.22
13.	Bada Arijipalli	6.00	5.54	3.30	2.12	11.42	11.36
14.	The study region	7.43	5.47	4.13	1.55	12.53	11.55

Source: Computed from survey data.

significance of the coefficient is very low. The time devoted to fishery activities every day and through the year directly influences their earnings. When the work time of the respondents is divided into the component devoted to collection and processing (ANCPTM) and the amount spent on marketing (ANMKTM), it is observed that the coefficient of the former is quantitatively larger then the latter, but the level of significance determined from the t-statistics is observed in the reverse order. This is what one would normally expect from the economy of the fisherwoman. The *material cause* of income (ANCPTM) and the *efficient*

cause of income (ANMKTM) are complementary to each other. Nevertheless, the former contributes to income more, while the significance of the latter is more. The model that fits our data best yields the following estimated equation.

$$\widehat{RINCOM} = \underset{(4.34)}{978.97} + \underset{(6.98)}{0.01}\ ASTVAL + \underset{(15.14)}{3.69}\ ANCPTM + \underset{(17.18)}{1.83}\ ANMKTM \qquad \bar{R}^2 = 0.5839$$

Increase in collection and processing time of the fisherwoman by one hour per year raises their annual income by Rs.3.69. Similarly rise in the marketing time by one hour in a year raises income by Rs.1.83.

There are certain elements in fisherwomen's economy which are conducive for sustainable development. Fisherfolk have a natural and friendly relationship with sea and its resources. The fisherwomen enjoy fish vending and their life style is built around fish and fish-related activities. The women consider it as their birth right to manage the fish economy. Unlike in the market economy where people move from less profitable to more profitable occupations, fisherfolk enter into a lifelong relationship with the sea resources, and they do not shift from fish-related activities to any other occupation.

Fisherfolk have vast internalised knowledge. In recent years, the importance of traditional ecological knowledge (tek) has been recognized for the management of ecosystems (Gadgil *et al.* 1993). Indigenous knowledge has proved useful for supplementing scientific information, assisting development planning and impact assessment studies (Berkes and Folke, 1994). Fisherfolk's system of marine resource management has been sustainable over centuries. If the fisherfolk's knowledge and practices are documented, it can add to the existing scientific knowledge regarding marine ecosystem and its resources. With the onset of modernisation in fisheries, there is a threat to this traditional knowledge system. As the fisherfolk have a right over the knowledge, there is a need for documentation of the fund of

knowledge, lest they will be lost in the process of globalisation. The documented knowledge can be incorporated in the educational curriculum of their children. The affirmation of fisherfolks' knowledge by the scientific community would give them the positive outlook needed for the SD of small scale fisheries.

The sustainability element is evident in the resilience and dynamism of the small-scale, subsistence, decentralised forms of economic organisation. The highly seasonal and dispersed character of fish species in tropical waters warrant a natural bias towards decentralised and small scale operations. The benefit sharing system rather than a wage system in small scale fisheries is another element of sustainability. The existence of a village council in all fishing communities which has the power to regulate fishing activities with the object of sustainability is yet another positive element. Their village councils could be approved as the official political institution. This would provide them with the critical political process for empowerment so as to take control over and for better governance of resources for sustainability.

Along with the positive elements of sustainability inherited from the past through customs and traditions, some elements of unsustainability are now seen in small scale fisheries economy. The younger generations prefer a well paid job. In the absence of an agency to support and promote their interests, their aspirations do not find fulfilment. They become frustrated and join the groups of middle-men and fish traders, and tend to exploit their own communities to earn their livelihood. Women are predominantly responsible for the food needs of the families. But they are increasingly getting alienated from the sources of income and employment. With improved transportation facilities and better marketing facilities men are taking over women's jobs. Destructive technologies used by commercial fisheries for harvesting marine resources are causing ecological unsustainability. The export-oriented industrial aquaculture and fish farming are destroying local and community

structures and cause degradation of the marine environment. The use of the so called efficient modern technologies in fisheries has brought in increased gender-biased discrimination increasing the vulnerability of fisherwomen. Since women contribute substantially to food security and sustainability of fishing communities, better gender equality will promote SD.

Women are concerned and sensitive about the deteriorating quality of life in coastal fisheries. They are organizing for collective struggles to retain their spaces in production, processing and marketing. It is not the control over marketing but mainly control over the marine fishing resources, which they believe would ensure SD. Large number of respondents are aware that ban on trawlers and destructive methods is a necessary condition of sustainability. Around 50% of the women see the importance of diversifying their activities especially in the area of fish processing to get better results. They feel that improved practices in fish processing and drying with small additional investments, and the use of ice, will increase their income.

7. Conclusions

In this paper an attempt has been made to examine the socio-economic problems of fisherwomen in a traditional fishing community living in the coastal area of Ganjam District in Orissa, India. Primary data have been collected from 360 fisherwomen of 13 marine fishing villages of the region. The average family size of the marine fisherwomen respondents is 5.25. The fisherwomen are Telugu speaking with almost no education, and most of them had child-marriage. They live in ill-built houses, mostly on government land. The infrastructural facilities available in the villages are very poor.

The fishing capital of the households comprise of boats and nets, which some own and others share. The fishing technology, which was traditional, is changing fast with the modernised efforts of the aliens in their land and sea. Several problems have been identified that increase the hardships of the fisherwomen. Their health conditions are not good and

suffer from low and subordinate socio-economic status. Their effort and contribution are invisible. Modernisation of marine fisheries renders the fisherwomen to loose control over their life-sustaining resources.

Taking the general clues of sustainability we tried to examine the condition for SD in the fisher community, particularly the fisherwomen. It is observed that a community that is endowed with relatively better features of sustainability has gradually drifted away from the process of SD during the last one decade. This observation is derived from the following evidence found in the economy of the fisher community :

- ✓ Socio-economic conditions of the people have deteriorated.
- ✓ Expenditure on the necessities almost equals or exceeds their income.
- ✓ The intensity of indebtedness is very high.
- ✓ The real income of the fisher people has fallen.
- ✓ About 67% of the fisher households are below the poverty line.
- ✓ Economic inequality is a function of the distribution of debt, property and assets.
- ✓ The income of the fisher families is predominantly determined by the value of the fish products derived from the sea.
- ✓ Fish production is a function of traditional equipment and "tek"- supplemented labour of the fisher people.
- ✓ Intrusion of modern mode of production is a threat to the marine ecosystem in general and the economy of the fisher people in particular.
- ✓ The community is gradually loosing control over the resources.

The economic contribution of fisherwomen to their families is quite significant. The income of the fisherwomen is mainly determined by the amount of time allocated to collection, processing and marketing of fish. The age, body weight, marital, maternity status and education do not significantly influence their income. They spend bulk of their time on

fishery and household activities. There is no scope for leisure and pleasure. They are being exploited by the middlemen and traders belonging to their own community and others.

The fisherwomen are aware of the conditions of sustainability such as diversity, alternative sources of income, low ecological impact of their fishing practices, community harmony and familial equilibrium. Their "tek" needs documentation, recognition and appreciation through a process of participatory environmental governance for SD. The natural fishery capital stock in the sea and land resources in the coast needs protection. The fisher people's council should be recognised as a socio-political institution. The revitalisation of the social, economical, cultural, political and ecological systems within their community can work for better control and empowerment which are necessary for SD.

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