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Gender, fisheries and aquaculture: Social capital and knowledge for the transition towards sustainable use of aquatic ecosystems

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ACP-EU Fisheries Research Report Series

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Abstract

The context of massive aquatic ecosystem degradation, engendered largely by the fisheries sector with associated socio-economic challenges, and mixed signals from aquaculture, which shows high growth rates, but has some unsustainable segments, raises the question on how women in fisheries and aquaculture can contribute to the transition towards sustainability through restoration of lost productivity. Empirical evidence of women's roles in all continents shows patterns of unrecognised, unpaid labour that clouds the economic signals of increasing resource rarefaction. Historically, women have been associated with resource conservation embedded in traditional belief systems, which have been progressively eroded. Where social recognition is achieved through e.g. enforcement of modern equal opportunity legislation – especially when combined with access to formal education and training - women regain capabilities for enhanced social organisation and leadership. This can lead to significant contributions to restoration of natural resources. A participatory method is proposed to render women's role visible and enable development of socio-economic organisation supportive of social justice and sustainable resource use. Further reading and selected web resources are intended to further help readers to take practical follow-up action.

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Gender, fisheries and aquaculture: Social capital and knowledge for the transition towards sustainable use of aquatic ecosystems

Please note that this is only the English version of the report – the final edition will contain four language versions: English, French, Spanish and Portuguese

1. Introduction

In 1990, of a total of 27.8 million people engaged in fisheries and aquaculture globally, nearly 12 million people (43%) were full-time fishers according to the definition used in FAO surveys (receiving at least 90% of their livelihood from fishing or aquatic farming), another 10 million derived between 30 and 89% of their livelihood from it, while the remainder were only occasionally involved. This compares to approximately 37.8 million people estimated in 2002, representing 2.8% of the 1.33 billion people economically active in agriculture worldwide. This compares with 2.3% in 1990.

Global production increased from some 65 million tonnes (GT) of fish or 5 GT/fisher and year in 1970 to some 98 million GT in 1990 or 3.4 GT/fisher and year. Based, on a statistical analysis correcting for Chinese over-reporting (Watson & Pauly, 2001), production in 1990 was rather closer to 85 million GT or 3 GT/fisher and year.

Much of the employment increase in the 1980s (72% of aquatic activity increase) was attributed to the growth of aquatic farming, particularly in Asia. Asian fishers and aquatic farmers increased from 77% of global numbers in 1970, 84% in 1990 (of which 9 million in China, nearly 6 million in India and 4 million in Vietnam, Indonesia, Bangladesh and the Philippines taken together) to 32.8 million in 2002. The numbers of African fisheries, mostly in the small-scale sector, increased by 37% to 2.6 million in absolute terms in 2002, but decreased from 10.4% to 6.5% of the global numbers. In 1990, 95% of world fishers and aquatic farmers were from developing and emerging economies. In industrialised countries offering occupational alternatives, numbers have been falling or stationary at best. The age of their fishing workforce is increasing, with younger workers (< age 40) in marine fisheries in 2002 halved to 12.1% compared to 1982 (FAO, 2004).

During the same period, the built-up of fishing capacity reached alarming proportions, though aggregate tonnage of the global fleet above 100 GT as recorded in the Lloyd's Maritime Information Services database, started shrinking in 1993 and is now stable around 12.7 million GT (FAO, 2004). FAO estimated that more than 3½ million fishing vessels were operated globally in the early 2000s. Within this broad category, industrial vessels compete directly with large numbers of small-scale coastal fishing crafts for the over-exploited and dwindling fish supplies in the world's ocean and seas.

The biomasses of the large number of exploited fish stocks and their ecosystems supporting today's fisheries in the North Atlantic, where industrial fisheries developed more than a century ago, are estimated to rely on perhaps as little as 10% of the biomasses in those bygone days (Christensen *et al*., 2003) when industrial fisheries were still in their infancy and markets not globalised. Trends indicate that fisheries have been progressively catching smaller and smaller individuals of target species and that as large species became scarce there has been a shift to targeting smaller species, a process that became to be known as 'fishing down marine food webs' (Pauly *et al*., 1998), but is also observed in inland waters.

While it might have been argued that fishing at lower trophic levels (lower in the food web) might increase production, world fisheries landings testify to the contrary. This is because individual species are 'embedded' in nets of interactions with others and usually do not form independent trophic cascades of predators and prey. Consequently, ecosystem approaches to fisheries management have been called for by various world fora since the mid-90s, starting with the Jakarta Mandate of the Convention on Biological Diversity.

The global trend of increased fishing capacity against the backdrop of decreasing resources is indicative of diminishing economic returns. However, even though fish prices have increased as a result of growing scarcity, the price signal does not reflect the true decline as should be expected in a perfect market (Sumaila, 1999).

Aquaculture production has been on a steep rise particularly over the last 20 years. FAO (2004) estimates that by 2002, it accounted for 29.9% by weight of all fish production, with China being by far the largest producer.

Despite many indications of acute or latent unsustainability, particularly in capture fisheries, many people do not seem to perceive these signs clearly enough to change or might not see how currently unsustainable practices can be changed. One could speculate that this is because

- Modern industrial vessels due to technological advances from GPS to global mapping appear to have high catches per fisher, often in the order of 5 to 20 GT/fisher – implying by the same token, however, that production of small-scale operators must be significantly less (as in the case of India, e.g. less than 1 GT/fisher).

- Fishing capacity has grown while global catches have declined. Thus, catch per unit of effort measured in various ways (e.g. per unit of fuel, per unit of installed capacity, time at sea) shows downward trends. The ageing fleets of bigger vessels that are partially being replaced by smaller (but not necessarily less effective) boats may be an indication of attempts at some adjustment to the wide spread overexploitation.

- The trend towards fishing further south and in deeper waters following sequential over-fishing and depletion of traditionally rich fishing grounds in northern cold and temperate shelf areas masks the scale of decline in the minds of many citizens. According to a recent analysis by Froese and Pauly (2003) in 83% of 617 datasets from the Northeast Atlantic and the North Sea the majority of fish were juveniles, a worrying confirmation of unsustainability.

- Subsidy schemes mask the true cost in many fisheries, especially those of industrialised countries with the financial resources to do so, thus slowing the response of the industry to a shrinking resource base (Milazzo, 1998, for a conservative partial estimate).

- Increasing prices of many fishery products compensate at least partially for increasing costs of fishing, although rapidly increasing costs of fuel, which represent upwards of 60% of the basic costs of long-distance fleets, may be expected to make this form of unsustainable fishing less attractive in the future.

– Similar conditions appear to develop in some forms of aquaculture, where feed prices tend to increase (e.g. for the farming of shrimp and some carnivorous fish species), while product end prices are either stable or declining.

– Aquaculture is still perceived by many as a natural substitute for declining capture fisheries, which might partially be the case for farming organisms low in the food web, currently the majority of global aquatic farming (FAO, 2004). However, the long-term viability of aquaculture of carnivores high in the food web and requiring substantial amounts of feeds (fish meals and oils derived from small pelagic species themselves directly edible by humans) has been questioned (Williams *et al*., 2001), together with the accuracy of reported increases of overall aquaculture production in the last two decades (Pauly *et al*., 2002).

In the meantime, the social costs of these trends in fisheries and aquaculture are high. Among other effects, they translate into an inability of populations with poor purchasing power to maintain continued access to traditional food fish. This is reflected in the food balance sheets of FAO suggesting, e.g. a reduction from 9 to 7 kg/capita and year of apparent fish food consumption in sub-Saharan Africa between 1990 and 1997. This was also recently highlighted in several contributions at the Conference entitled 'Marine fisheries, ecosystems and societies in West Africa: Half a century of change' convened in Dakar in June 2002 (Chavance *et al*., 2004).

The now largely globalised market moves products from capture fisheries and increasingly aquaculture anywhere in the world to where the purchasing power is, mostly to Europe, Japan and North America and urban centres elsewhere in the world: such trends are only partially apparent in national averages. It is with the markets in mind that Froese (2004) suggested simple indicators to enable citizens to make conservation-minded purchasing decisions. Indeed, FishBase, the global electronic encyclopaedia on all fish in the world facilitates a quick estimation of the minimum size at which a fish species matures (www.fishbase.org) thus opening new ways to use the best available science in individual and societal decision-making.

The above sketch of the dynamic change in fisheries and aquaculture over the last decades forms the background against which gender issues in relation to fisheries and aquaculture were examined by an international group of experts convened by the European Commission's International Scientific and Technological Cooperation Programme (INCO) from 9 to 10 December 2002. The objective of the meeting was to discern how different social roles of women and men in fishing and aquaculture in a wide range of human societies shaped their relations to the resource base and which direction should be given to future international scientific cooperation on aquatic ecosystems to account for this social dimension in a better way.

Moreover, the question was how such research can inform planning and decision-making processes at various levels in promoting the goals of sustainability. Sustainability implies, among others, equitably distributed costs and benefits from aquatic ecosystems in society and strengthening the link from knowledge to action.

2. Key contributions and findings from the case studies

In a seminal paper Collet (1991) re-analyses a massive dataset on key features of fishing societies and suggests a profound change in the classification of human societies over archeological times and the recognition of gender in the fishing communities. This paper is the point of departure for a new scientific approach to research of coastal and fishing communities and marine anthropology in general. His analysis shows how the prolonged absence of men at sea or on fishing trips along rivers obliges the women to take charge of running the household. Women thus engage in much of the decision-making in stark contrast to the public image of patriarchal arrangements in fishing communities.

Gender is defined as a social role based on resources and responsibilities of women and men as they relate to one another and to their natural environment. Further, these roles vary across different times, places and regions according to changing values, practices and technologies. These largely socially constructed roles and responsibilities are the basis for the structure and organisation that are employed to show women and men's differential relationships with their environments, their resource utilisation patterns and strategies.

More often than not, however, women's contributions and roles in fisheries and aquaculture are 'invisible', not the least, because national accounting systems and statistical surveys tend to organise information based on data collected from 'Heads of households' - automatically assumed to be male -, irrespective of the social organisation in the respective society. Also because `fisheries' is equated with `fishing', and all shore based work, often the work of women, remains invisible and unaccounted for. The cultural biases underlying much of the international statistical standards has been analysed extensively by Evans (1982). In order to broaden the cognitive maps and provide more relevant detail to underpin policy and management, FAO has started to collect 'gendered' primary employment data since 1995, but is obliged to make many estimates due to unspecific reporting by many of its member states.

A rich series of examples from literally all regions of the world show that women are active in all economic segments dealing with aquatic resources, providing evidence of gender division of labour in coastal and inland riverine households in terms of the roles and responsibilities. In addition to the growing literature (e.g. ICSF, 2002; Williams *et al*., 2002), case study after case study demonstrates the productive activities that are undertaken by both men and women in households in order to acquire incomes in cash and in kind. In numerous coastal households in Africa, Asia, Europe, Latin America and the Pacific, women's productive activities range from fisheries, fish processing, marketing, agriculture and fish culture to participation in the informal and formal labour markets and governmental employment.

In the following, key points of the papers presented at the meeting or brought to participants' attention for consideration in the analysis are synthesized with emphasis on any pattern arising across individual cases/studies. Many of the extended papers show the

extent to which women have become involved themselves in the extractive part of the sector rather than management and land-based post-harvest activities. These may be consulted at the cordis website (http://www.cordis.lu/inco2/src/docs_pub.htm).

Socio-economic transformations and the gender roles in artisanal fisheries in the Canary Islands, Spain: the case of La Graciosa - Gloria Cabrera Socorro

La Graciosa is the smallest of the Canary Islands (27 km^2), without freshwater springs and also the last to be settled in the late 19^{th} century. At that time, the natural harbour of Caleta del Sebo, became a welcome deepwater harbour for the fleets exploiting the rich fishing grounds off the nearby NW African coast. Peasants brought over from Lanzerote to work the island's factory during an economic crisis there remained and developed some agriculture and inshore fishing after the failure of the industrial project at the end of the century. In 1910, some 169 lived on the island. Following the civil war in the mid 1930s, the military government constructed only the most basic infrastructure. The mayor, José Toledo, appointed shortly afterwards, remained in place for the next 40 years overseeing a population increasing to 680 persons in 1960 and who remained largely in poverty.

Accumulating wealth from a variety of economic activities from real estate, shops and maritime transport and excursions of tourists, restaurants and apartments, he and his family diversified further to own 80% of the tuna fleet operating out of Lanzarote and 25% of the big sardine vessels.

As a result of over-fishing and overuse of the resources, the 1960s witnessed emigration of some 30% of the population of La Graciosa to Lanzarote, mostly young men and women. It took until the second half of the 1980s with the end of the dictatorship that electricity and telephone services were brought to the island. The tourism boom in Lanzarote in the 1990s increased interest in the scenic island and progressively, the fishermen's houses in the second small settlement of Pedro Barba were purchased by wealthy islanders from Lanzarote. The entire area then was transformed through the construction of the big Mirador del Río tourism complex targetting 1 million tourists per year.

These profound social transformations naturally had effects on the gender relations of the local fishing community. Traditionally, the men went out to sea as sailors on distance fishing vessels, while most of the land-based activities, earning a basic living and even representing the community during the occasional visit of a central administration representative were the realm of the women in a pattern similar to that analysed by Collet (1991). The poverty of most families translated into endless working hours – for the men at sea and the women processing sardines and other fish artisanally, selling or bartering the produce, bringing up the children and ensuring all other household chores.

Progressively, the economic role of fisheries has declined as a result of over-fishing and employment in the tourism sector that now provides more stable income for the younger women, although the other roles of producing a family and maintaining the household have remained. In the prevailing economic and governance context, the demands for marine protected areas from the tourism industry are perceived by the artisanal fishermen's families as the ultimate marginalisation instead of an opportunity to carve out a new socio-

economic role for themselves. The remaining coastal fishers have not played a role in elaborating their ideas and experience, thus resulting in the loss of the last remaining bit of the resource, income and even lifestyle.

Galician women change strategy, Spain – Begoña Marugán Pintos

Against the backdrop of the perception of a high risk society, which led Galician fisheries over the last decades to diversify, different fleet segments ranging from (few) industrial distant water ships, (more) coastal 'artisanal' vessels of family enterprises and (many) small open near-shore boats evolved.

Women use subsistence strategies in relation to fishing, culture, the economy, the ecosystems and their future survival. These strategies range from (1) the traditional role as housekeepers, mothers and spouses of fishermen providing a significant, but not financially compensated effort in addition to affective support and labour; to (2) unpaid labour in fishery support activities such as net mending for the family boat, unloading of fish to quai, sale of catch, etc., and (3) their financial contribution both as labourers on personal fishing tasks (as seafood harvesters, netmakers and fishers) and as employees in canneries.

The invisibility of female labour has enabled and continues to enable the fishing profession to compensate at least for the cost of 'modernising' Spain. The sea holds progressively less resources and thus the fishers, paid in shares, earn less and less. The contribution of other family members enables the men to continue, thus presenting another case of 'Malthusian' over-fishing (Pauly, 1990).

Another production system deserves attention: The Galician *mariscadoras*, female inshore shellfish producers, exercised an old and previously low-status extractive occupation under very harsh conditions. Few of these women had access to formal education. The implementation of the Equal Opportunities Programme and the Semi-Cultivation Programme promoted by the European Union and Galician government led to a change of attitude in the women following access to education and various types of functional training underpinned by the social recognition conferred by the public programmes. They began to organise themselves and started cultivating shellfish on the beaches. This in turn led to an increase in production and improved economic status. Nowadays, they collectively plan almost the entire exploitation cycle paying attention to long-term sustainability of coastal resources: the seeding process in beaches and near-shore areas, the gathering of the resources and also the 'farm-gate' sale of the clams. In more than one sense they have clearly improved the environment. Moreover, once the women started to get trained they realised that they had more rights in the *Cofradías* (corporate representations of fisherfolk) than the sector had previously recognised. They then understood that if they joined together they could and should also be represented in the governing body of the *Confradías*. As a result of this engendered policy implementation in combination with regulations on resource conservation and associated infrastructure measures, in some places *mariscadoras* have even risen to leadership positions in traditionally male dominated *cofradías* (Meltzoff, 1989; Marugán Pintos, 2004). Might this be a model for the required shift on a larger scale towards sustainable use of precious marine resources?

Women in Brittanny fisheries - Kátia Fragoudes

The Brittanny region of France has long-standing fishing traditions. Previously and similar to many other regions, women were involved in the land-based production side of the fisheries industry. They sold fish and sorted sardines and oysters. In the recent past, women's roles have become more diversified due to the reduction of economic space for the coastal fisheries and expansion of a smaller number of high-tech industrial operations. Women tend now to be involved in the management of a family enterprise, banking and accounting, communications, human resources relations, and so forth. Women run restaurants for summer tourists and are helping to develop maritime tourism in the region to compensate for lost income in fishing, but also manage the risk associated with the capture sector. Women spend around 20-25 hours per week on land-based activities related to high seas fisheries, while 42-54 hours per week are spent on small-scale fisheries.

Historically, entering the fishery was a process of social reproduction very much embedded into coastal communities and the culture of fisher families. Boat owners and crew members had learnt the job with their father or a close relative. Nowadays, attracting young people into fishing is becoming a problem in most places in France and elsewhere in Europe. Working conditions, income prospects and an increasing number of opportunities for mobility in society have contributed to this progressive loss of attractiveness. Mothers, more than fathers, play a key role in pushing their children to go for higher education, to leave fishing and to find a better job in other economic sectors. This is particularly obvious in places where fisheries activity has gained a bad image (the vast majority). Women do not want their children to step in their father's shoe steps. This is the reason why a great number of foreigners are today crew members on French boats. This degraded state of resources is a major threat to the continuity of fishing in coastal communities.

Despite advances in labour legislation however, even today, there is no social recognition for women in fisheries and aquaculture or their organisations in France. This was different during the early 1980s when women in the oyster business enjoyed some status and had access to training opportunities. But after the crisis of 1993, and because of the 1997 Act on Maritime Fishing and Maritime Culture, married women may only claim rights through their roles as a 'collaborating spouse'. Unmarried women are not recognised. This is tied in with the payment of social insurance in France. Moreoever, men run the Trade Unions in France, from which women are virtually excluded. Women thus lack experience on how to establish an organisation and manage it. There is no fisheries management programme open for women's concerns, let alone their historical interest in resource conservation.

'We do fish as women's groups and individuals': Perspectives from Lake Victoria, Tanzania, Kenya and Uganda – Modesta Medard and Kim Geheb

Because of the pivotal roles that women play in the fishing and farming communities on Lake Victoria, they are very sensitive to the deteriorating quality of life and the environment that grips contemporary Tanzania. These conditions will not improve unless the contributions of Tanzanian and other riparian country women to households and the social well-being are recognised and incorporated in development planning.

In-depth interviews with 14 members of a women's group called 'KIMAWAKA' based in Katunguru Village in Tanzania's western Kagera Region during repeated field visits between 1999 and 2001 and additional interviews with both men and women (within and without the group) in Obenge, Kenya, and Lwalalo, Uganda, and village leaders were gathered using various Participatory Rural Appraisal (PRA) techniques.

Findings show that women are the primary household livelihood and family caregivers and that their contribution to the household economy is substantial. As Lake Victoria's fishery declines with the rise of industrial types of fishing and the removal of large fishes (the fishing down food web phenomenon), economic benefits are also concentrated in fewer hands of industrial processing plants and exporters. Supplementary incomes are increasingly more important as fishing incomes become insufficient to sustain many families in riparian communities. Out of necessity, women are in the front line in identifying and exploiting new income-making opportunities to maintain their families. With few exceptions, however, women remain reactive and do not manage to accumulate enough capital for an increased margin to manoeuvre. Prevailing resource management mechanisms have not been able to prevent economic and biological over-fishing. The failure to recognise women's roles has increased social dumping of women through obliging them to fish themselves, to cross-subsidise male activities that only accentuate resource overuse and/or even engage in prostitution to gain access to fish for their trade. The net result is a degraded social tissue and ecosystem.

Rural Women and Sustainable Fisheries Management in Southern Nigeria - Stella B. Williams, Funmilola Omotoso, Nike Adewoyin, Mercy Adeogun and Iyabo Adeogun

Information gathered from published articles, field visits in 36 fishing villages from 30th January 1998 to 1st December 2001 and personal interviews of various stakeholders, men, women, youth and fishers, who are leaders of their cooperative organisations in some of the Niger Delta fishing communities scattered over the nine states of the Niger River Region (Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo and rivers) revealed the following picture. In the Niger-Delta as a whole, fishing and farming were the most dependable community economic activities. These activities were the mainstay of the rural communities long before the discovery of the 'black gold' – petroleum which changed the economic base of the nation from an agriculture-dependent economy to a petroleum-based economy. The men in the coastal fishing communities used to migrate with the fishes. The well-known migratory fishers from Nigeria were the Ijaws, Ikales, Ilajes, Itshekiris, Urhobos, Delta Ibo and the Aworis. These ethnic groups – in addition to Ghanaian migrant fishers - inhabit the remotest islands within Lake Chad, Cameroon, Porto Novo in Gabon, and other fishing out-posts on the West Central African coast.

The long-term migratory habit of the coastal fishers led them to become polygamous, leaving wife and children behind, only to start a new family in the next settlement. The fishermen's wives and children participate in the fish production by helping with off-loading the boats, processing, preserving and marketing the products, making nets and traps or repairing torn nets in addition to providing an agricultural backbone to the livelihood of the extended household (Adekanye, 1989; Altieri, 1993; Williams & Awoyomi, 1996). If they have to, only the older women (35-50 years old) will also fish themselves in the

creeks, streams and sometimes in the rivers. They use open, medium to large dugout canoes, which are made from either timber log or planks. None of them use motorized outboard engines for fishing. Their common fishing gears are the traditional fishing nets (set, gill or drift nets) and cane or reed traps. With many men not returning at the end of the fishing season, some 75% of women head the households and have to cater alone for all family needs. Thus, women put in particularly long working hours, but since they are not considered on an equal footing to men, none of this is reflected in National Household Surveys.

With the beginning of petroleum extraction in the Delta almost 50 years ago, labour was drawn mostly from outside the region, leaving local resident women, youth and migrant fishers with a degraded environment for their traditional economic activities and few alternative income sources. The National Policy on Natural Resource Sharing is insensitive to the local women's priority placed on sustainable development based on gender equity. They desire education programmes; livelihoods improvement of the rural population that will result in an economic boost through skills development; infrastructure development for welfare and economic empowerment; environmental impact assessment and rehabilitation of land and aquatic ecosystems; environmental protection policy development, implementation, monitoring and evaluation process to check-mate future public and private action plans for the population; auditing of all actions approved by the government and private companies. Demanding the authorities to listen to them and make good on the many promises made by different private companies with a stake in the economic future of the area has not yet led to significant redress.

Women do fish, Sierra Leone - Patience B. Browne

In every fishing community, men, women and children have clearly defined activities to perform on a daily basis. The actual fishing operation is performed by the men. They go out in their canoes with their various types of fishing gears. Other activities performed by men in their various fishing communities are boat building/repair and net (fishing gear) mending.

Besides the role of being housewives, women are now becoming more involved in diverse fishing activities ranging from processor/trader to boatowner. Traditionally, the physical harvest of fish is a man's job, but as women are now getting more involved, some women occasionally resort to pre-harvest activities of net mending and repair. In the post-harvest sector their predominant role is in purchasing, processing and marketing. Women sometimes spend 8-10 hours/day in fishing related activities for which they receive very little or no assistance (Browne, 2002).

At the end of each fishing trip, the landed fresh fish catch is sold to female fishworkers, who then market the fish either raw or dried. If the fish are to be sold dried, women and children jointly wash, remove the fins and enterons (in the case of some species), fetch firewood and do the drying on a processing banda which is a platform of mud and sticks or metal 3-31/2 ft. high on which the fish are laid. The sales of either the fresh catch or processed fish are carried out by both women and children.

During the civil war, most economic activities were badly affected and where people could not flee war-zones to the cities or camps for internally displaced people, in the best of cases they lost their productive assets. Under these conditions, little of the coastal canoe fishery responsible for some 70% of production in the period from 1971 to 1993 was sustained. Wherever possible during the dry season from September to March, small groups of women would operate scoop nets in rivers and creeks to produce some fish for domestic consumption.

Very few women have successfully overcome these conditions of degenerating livelihoods if not an outright poverty trap to become entrepreneurs of fishing companies of varying size. Among them was one women taking advantage of a development project (AFCOD project supported by the European Development Fund through the 1980s) to obtain a loan for an artisanal fishing boat and enhancing her assets over time through good management.

Women in coastal and Amazonian Brazil considering livelihood and resilience – Alpina Begossi

Female activities from nine Atlantic Forest (AF) communities along the coast of Rio de Janeiro and São Paulo states (starting in 1986) and seven Amazonian river stretches in the Araguaia-Tocantins Basin and from the Upper Juruá Extractive Reserve (1987-97) are documented. The economic activities of women include slash and burn agriculture, house/child care, manioc processing, handicraft, plant collecting, fishing and tourist house keeping, and still others.

At some sites along the AF coast, such as at Búzios Island, young women avoid agricultural activities and concentrate on home and child care. In the vicinity of urban centres, they also engage in small-scale fish marketing in the informal sector. At other sites, such as at Jaguanum Island and Picinguaba, tourism pushes women to work as housekeepers.

Amazonian sites show similar trends, but some women also fish for subsistence. Propositions for local management seldom pay attention to women's activities, despite the fact that women may play an important role in traditional medicine, maintenance of cultural knowledge and practices, food processing and trade. Resilience of these communities' livelihoods, including the women's strategies, cannot be taken for granted in the face of wider transformations of the economy and society around them. Resilience modelling can thus be an useful approach in order to understand the multi-scale and multi-resource interactions of women in forested areas of Brazil.

Women on the water? The participation of women in seagoing fishing off Southeastern Brazil – Maria A. Gasalla

Female participation in Brazilian fisheries is more diverse than expected from the male stereotypes normally put forward. In the South Brazil Bight area (States of São Paulo and Rio de Janeiro), women contribute in multiple ways to the production, processing (both artisanally and in industrial plants), marketing, and distribution of fishery resources. Moreover, they play important supportive roles - which are generally unrecognised and under-rewarded - as shore-side collaborating spouses. There are even cases where women get involved on board the artisanal motorised and unmotorised squid jigging vessels.

However, their most pervasive roles are in shore-based activities, including adminstration of the fishing venture, representation vis-à-vis authorities and the like, thus really exercising managerial responsibility in addition to numerous unpaid and unrecognised labour in support of the fishing and marketing of fishery products. Drawing on wider social studies, the paper discusses the connection between female empowerment and sustainable development in fisheries. Social recognition and upgrading of the women's roles are proposed as important elements for the transition from crisis to sustainable development in the southeastern Brazilian fisheries.

How to ensure gender issues in coastal resource planning in Mexico – Margarita Velazquez

Mexico had an affirmative gender policy to government functions in fisheries over a long period, so that women even reached ministerial positions and played active roles, e.g. in Mexico's active preparation of the Rio Earth Summit through the Cancún Conference and Declaration leading to the FAO Code of Responsible Fisheries and other international initiatives. Nevertheless, research on their role in fisheries and aquaculture is not extensive, even though the Ministry of Environment (SEMARNAP - Secretaría de Medio Ambiente, Recursos Naturales y Pesca) estimates that fisheries represent one per cent of the GDP, with coastal states of Baja California Sur, Sinaloa, Sonora and Veracruz accounting for most of it.

Mexico's production hovers around 1.5 million GT and some fisheries show signs of overexploitation. The Pacific fleet is bigger in size, but smaller-scale operations prevail in the Gulf of Mexico on the Atlantic side. Mexico exports about 15% of its fishery and aquaculture production, with shrimps accounting for the highest value. Environmental degradation from land-based pollution due to industrial waste, the petroleum industry and mega-tourism affects coastal waters in some areas.

Links between research and coastal communities and sector operators are not very strong. It is felt necessary to improve interactions and also link the ecological and environment dimensions with social dimensions. Participatory forms of study and iterative 'learning-by-doing' approaches to improving management of coastal areas have potential to improve people's livelihoods together with greater environmental protection.

Research with the following focus is considered particularly useful in relation to coastal zones and their social and ecological systems in Mexico:

(a) Divisions of labour and responsibilities.
(b) Property rights, access to credit and resources of women and men in different coastal states.
(c) Institutions for resource management; how funding agencies assist households and can target support to vulnerable groups without jeopardising the resource.
(d) Impact of wider political economy on fisheries (e.g. markets, environmental and food safety rules).
(e) Marine ecosystems functioning, dynamic change and economic productivity.

Women fish harvesters in Newfoundland and Labrador: An exploration of their work, learning and health, Canada - Brenda Grzetic

With the current wave of restructuring in Newfoundland and Labrador following the collapse of the cod fisheries, women in small boat fishing households have stepped up their efforts to secure family incomes from fishing. Since the 1980s, while men have been exiting the industry to retire or seek work elsewhere, the number of women working on fishing boats has increased dramatically. Fisheries and government employment insurance restructuring have created an environment where lower real incomes coming into households, higher cost of living, and the lack of onshore jobs for women in fish processing and other areas since the moratoria, have acted as a catalyst for women to derive incomes from fishing (Neis & Grzetic, 2000).

Some women fish harvesters have benefitted from having husbands, co-workers, friends and family around them who clearly do not have intransigent views on the gender of the workforce and women's place in it. Others have not had the same degree of support. Regardless, most of these women know there are limits to their support and do not venture too far into institutional domains outside the household. They have been taught the skills they need for their immediate duties aboard the boat and over the years some of them have learned new skills. They feel good about the contribution they are making to their household incomes. Their incomes from harvesting have helped them cope with the increasing expenses associated with fisheries restructuring and the restructuring of social programmes including post-secondary education since the 1980s. For many women in this study, their incomes from harvesting have meant the difference 'between life and death' for these fishing enterprises.

The women fish harvesters' work environment poses certain threats to their health and well-being. A policy environment that has ignored the relationship between health and gender, environmental degradation, work environment, physical environment, education and training, and support networks has put the health of all fish harvesters at risk. Women are particularly at risk in such an environment. These risks are the result of the loss of groundfish, changes in work environments, social stigmas associated with their work, workloads and responsibilities, work relations, the fit between their skills and the skill requirements of their jobs, and professionalisation and training measures. Aspects of their work that are a cause for concern include their triple workload during the fishing season, the pressures of new fisheries rules and regulations, and the segregation of their work and learning aboard the fishing boats. Their continued marginalisation in the fishery through restrictions on their work and license ownership undermines their ability to see themselves outside the 'helper' role.

Fisheries restructuring policies and stock shortages are threatening people's incomes in the small boat inshore fishery and seem to be putting pressure on fish harvesters to take more risks in their work. In the absence of safety training, some women have felt the need to take on more responsibilities for safety aboard the boat – further increasing both the pressures on them and their workload which is already very heavy. Some women interviewed felt that the increasing trend in women fishing will continue as fish stocks become more scarce, costs associated with fishing continue to increase, and access to fish becomes more

restricted. Women also felt that increasing monitoring and pressures from stigmas related to Environmental Impact (EI) would ensure that women be *seen* to be fishing thereby further increasing their presence on the water.

Fisheries institutions need to work to create a respectful space for women fish harvesters and to promote their rights and needs in relation to their future employment, incomes and health. They also must work together to ensure sustainability of fish stocks. People in fisheries and government institutions must make a strategic effort to reach out to these women as serious and important workers with much to contribute to fishing and fishery policies.

Women in two Pacific island fisheries and aquaculture – Mecki Kronen and Aliti Vunisea

Results presented here are based on data collected as part of the DemEcoFish project. The project targets two countries, Fiji and Tonga, to represent Melanesia and Polynesia, respectively. In each country, three major geographical regions are selected: Ha'apai, Vava'u and Tongatapu in Tonga, and Viti Levu, Vanua Levu and Lau in Fiji. Within each of these regions, two coastal communities are selected, using both socio-economic parameters (proximity to an 'urban' centre, degree of isolation) and ecological characteristics of their fishing grounds (high-low island, with-without access to an extensive lagoon system).

Methodologically, a one-time snapshot approach is applied to test the hypothesis that social dynamics significantly determine the nature and level of the fishing pressure. In the case of the socio-economic survey, each village survey includes a combined set of community and participatory methods (resource mapping, ranking and scoring), questionnaire-based census and surveys, the use of focus groups, key informants and open-ended discussions.

Case study results from the rural settings in **Tonga** show that: (a) Women's fishing activities go far beyond shellfish collection, and the use of fishing gear seems to be determined by access and availability rather than gender specific taboos (i.e. the 'traditionally' suggest a distinction between fishing and reef gleaning activities by men and women respectively), although women rarely use motorised boats. (b) Women's contribution to household food supply is at least as regular and reliable as men's contribution. (c) The factor determining the significantly longer finfishing trips undertaken by men is their preference for fishing from motorised boats at night. Women prefer daytime fishing as it does not conflict with their household and family duties. (d) Both have similar ecological knowledge and skill levels, but women tend to fish more for household food security than for other purposes.

By comparison the setting in **Fiji** with higher penetration of the monetary economy shows increased fishing effort and often a higher mechanisation of fishing, and a lesser distinction between gender roles. Fijian women are much more involved in finfish fisheries. They use motorised boats and very often accompany their husbands on fishing trips. Their share is sometimes accounted for under their husband's catch, especially if gillnetting was done together and hence women's fishing impact and contribution are often underestimated.

However, women's catch is first used to supply family and friends with food, then any surplus is marketed. Men's catch may also provide for a household's protein supply, however, the emphasis on marketing is generally stronger.

The changing roles between women's and men's fishing strategies and practices in the South Pacific strongly suggest that reef and lagoon fisheries continues to be one of the most important resources for food security of coastal communities. Tongan and Fijian surveys have demonstrated that alternative and more lucrative income sources are preferred over artisanal fisheries prompting emigration of breadwinning household members who seek cash paid jobs in nearby or distant urban centres. As a result, women have and continue to supply the regular protein needs for their families. Moreover, if remittences are sent irregularly, women's fishing is increasingly aimed at fulfilling cash needs that accrue seasonally (school and church fees), occasionally (funerals, weddings, etc.) or even regularly (basic household expenditures).

Fishing effects are evident in the actual status of reef resources, indicating the need for alternative uses of coastal marine resources and /or alternative sources of income? to ensure subsistence and income needs Aquaculture is seen by some as a viable alternative option to sustain income and livelihood of coastal rural communities. However, aquaculture is a recent introduction to the Pacific and not yet widespread. Women have been successfully involved in seaweed farming in Fiji where they have taken over the running of most operations. However, precautions are necessary concerning the introduction of any new species, their promotion and handling to avoid escape into local ecosystems and subsequent colonisation. Adequate feasibility studies, training and support are required to develop the skills that render aquaculture operations successful given certain constraints in the South Pacific, such as remoteness of locations, long distances and lack of marketing infrastructure.

Women in coastal fisheries in Asia - Chandrika Sharma

Millions of people depend on fisheries for a living in the Asian region and undoubtedly, the sector is a major source of employment, income and food security. According to the FAO (2004) already cited above, in 2002 of the estimated 38 million people worldwide directly obtaining revenue from fishing and fish farming, 87 per cent or 32.8 million people active mostly part-time were estimated to be in Asia.

In an Asian context, emphasis has traditionally been on production rather than management for sustainable use. Many recent research studies indicate that resources in nearshore areas are optimally fished if not overfished. Rapid changes have taken place over the last few decades, among others, technological change in the fishing industry, tourism development, shrimp farming and urbanisation.

These changes have had several consequences, often negative, for women of fishing communities. For example, the introduction of new technologies, such as net-making machines and monofilament nets, have displaced many women engaged in this work, as in parts of India. With centralised landing facilities, many women are forced to travel larger distances if they are to get access to catches. With greater presence of export agents and

middlemen, women (with little access to credit facilities) find it difficult to compete for the catch, implying that women have access mainly to low-value species which they can process and/or sell, with correspondingly lower profit margins. Government policies have largely supported the harvesting sector in which men dominate and women's access to credit and other policy support continue to remain marginal.

The rapidly changing scenario has also meant that women have had to find new niches in the fishery. For example, many women can be seen processing by-catch of trawlers at landing centres. Some other women in the region have expanded the scale of trading and processing activities. Women have also found employment in fish processing plants in countries like Thailand, India and the Philippines. In general, while some women have been eased out of the sector, others have found new niches and are able to benefit from the changes.

At another level, with greater pressure on coastal resources and degradation of coastal habitats, in many areas time spent by women on subsistence activities (collecting water and fuelwood for example) has increased. At the same time, with takeover of coastal lands and beaches, fishing communities have been displaced from their traditional habitats, women have lost access to beaches for drying and sorting fish.

Women of fishing communities have started to oganise to some extent, to draw attention to issues and problems they face as not only fishworkers, but also as members of their communities, and as those responsible for the care of their households.

Given this background, future research, should, in the final analysis, lead to a better understanding of women in the fisheries sector and improved policy outcomes that adeqately support not only women in the fisheries sector, but a form of fisheries development that is more sustainable and equitable. The most glaring gap, even after the role of women in fisheries has been extensively highlighted for over two decades, is the lack of comprehensive and accurate statistics on women's roles in fisheries. The policy implications of such an absence of statistics are obvious. This gap must be filled.

Gender in fisheries and aquaculture: Initiatives in the Mekong Region - Kathleen I. Matics

Women engaged in fisheries and aquaculture in Cambodia, the Lao PDR, Thailand and Viet Nam face a wide range of problems that were unrecognised a few years ago. Some of the difficulties, including lack of training opportunities and access to natural resources, were aired by women themselves during a benchmark Seminar in March 1996 on Women in Fisheries in Indo-China organised by the Partnership for Development in Kampuchea (PADEK). A series of workshops to establish four national networks to address gender challenges led to the launch, in 2000, of a regional network. Since then, the MRC Fisheries Programme has offered an annual venue for this regional forum to meet, exchange views and seek solutions to the challenges facing women in fisheries. Thus, over the years women involved in fisheries are becoming more visible to policy-makers and the general public alike. The impact of women on the economic and social development of the countries is

substantiated by the national statistical data. Many of the landless women in the Mekong Region are the 'poorest of the poor'.

Cambodia: Agriculture accounts for 40% of GDP and fisheries contribute 8-10% of this. It is estimated that 40-50% of animal protein comes from fish, which is important to food security. In the past women's contribution to fisheries was overlooked and women were 'invisible' despite their active role in support activities to capture fisheries and predominance in fish marketing. Curiously when development projects were planned, women were not involved in the decision-making process and they were often excluded from the development altogether. Now, at long last, the constraints that tend to limit the participation of women have been identified and women are far more active than before.

The Department of Fisheries has taken to supporting activities of the Cambodian Women in Fisheries Network (CWIF), which is well connected to similar networks in neighbouring countries. Further capacity building supported by selected development projects remains high on the agenda in view of the women's still disadvantaged access to education and social services.

Lao PDR: The agriculture sector accounts for 54% of the GDP. Women play a very important role in this sector. They occupy 32% of the government posts related to the agricultural fields, and assume considerable responsibility. Of the 972 persons working at the livestock and fisheries offices throughout the country, 24% are women. Their aim is to develop the country step by step. The fruits of their labour are shown by the achievements of the fisheries sector in the Lao PDR.

The fisheries production for 2001 was 73,153 tonnes, reflecting a 152 per cent increase compared to the production for 1996. The fisheries sector accounted for 7-8% of the GDP in 2001 and according to a recent women's survey about half is attributed to their work. The aquaculture production was 43,100 tonnes in 2001; that was 1.38 times higher than the production of only 18,000 tonnes in 1996. At present the per capita consumption of fish and other aquatic animals is around 14 kg/year.

In the Lao tradition of fishing, both men and women have clear roles, although there can be overlapping roles. For example, in capture fisheries men primarily make nets and catch fish. Women repair nets and catch fish at subsistence levels. Lao women process the fish for preservation, consumption and small-scale enterprises. More than 50% of the people in the Nam Ngum area in central Laos are women engaged in fisheries and fish culture activities. Women's aquaculture activities comprise pond cleaning, fertilising, feeding the fish, fish capture, fish selling, etc. They also cook and preserve fish for domestic purposes. In 1999-2000, 13 fish processing training courses for fishers in Vientiane Province and Vientiane Municipality had a total of 264 participants, of which 80% were women. The Lao government supplied materials and equipment to improve household fish processing activities in villages near the Nam Ngum reservoir.

Thailand: Despite important increases in fishery production, most recently in shrimp aquaculture, little research has been carried out on the conditions of the people involved in the sector. Only about 1.3% of the 600 projects approved dealt with socio-economic aspects

of the fisher population. Studies related to gender aspects were non-existent. Moreover, until recently, the fisheries statistics and data published were not disaggregated by sex.

Only lately has there been some recognition that women as well as men are key actors in the success of fisheries management and production. In October 2001, the Department of Fisheries agreed to serve as the focal point of the Thai National Women in Fisheries (TWIF) Network in Thailand. Since April 2002 the TWIF Network has been conducting a joint one-year research project with the Asian Institute of Technology (AIT), Chulalongkorn University (Social Research Institute) with the support of the Royal Thai Government. The Department of Fisheries is now under the newly created Ministry of the Environment and Natural Resources. The Department has also been split in two: (a) the Marine and Brackishwater Fisheries Section and (b) the Inland Fisheries Section. The post for a 'Gender Focal Person' has been established by the Department of Fisheries.

Viet Nam: Over 3.4 million Vietnamese are involved in capture fisheries, fish farming, transporting, processing, distributing and marketing the fish and fishery products. More than half are women living in rural areas and coastal fishing villages. 84% of labourers in the seafood industry are women. The Vietnamese Women in Fisheries (VWIF) Network established in March 1999 is operating under the guidance of the Committee for the Advancement of Women in Fisheries (CAWF). It is an integral component of the Network for Gender in Fisheries Development of the Mekong Region.

The VWIF Network has reiterated to the CAWF the importance of setting up the gender database and of assessing gender equality within the Ministry of Fisheries (MOFI). The CAWF and the VWIF Network have developed the gender action plan for 2003-2005 with the aim of empowering women through capacity building to make them equal partners with men in terms of the work place, education, health care and in the political, cultural and social life of Vietnam.

3. What can be learnt from the case studies and other available evidence?

A number of general features are observed: Considering the United Nations global data on women, it is observed that women comprise half of the world's population and work approximately 2/3 of the total working hours. In developing countries, women produce half of the total agricultural products (this includes fisheries and aquaculture in most countries), yet earn only 1/10 of the total income and own a mere 1/100 of the total property. Nearly 2/3 of women in developing countries are illiterate, although there are conspicuous exceptions, such as Kerala in Southern India with its policy of seeking development through education. One third of the households around the world are headed by a woman; in Cambodia this is one half. Even with a male household head, usually the woman holds the actual power at home because she tends to manage the household's resources. In the public sector and the political arena, however, nearly 9/10 of the representatives in local and national politics in developing countries are male. Many of the case studies summarised here validate these global features.

3.1 Ancestral conservation roles of women

The two principal roles of women – the biological and social role of reproduction and holding the family together and the economic role of contributing to income and food security – are intertwined. The historical record shows that the female realm was closely associated with nature conservation and sustainable use in several ancient societies where women had specific rights over conservation spaces, e.g. in the Mediterranean and the Pacific, usually supported by religious or mystical beliefs surrounding the Earth Goddess, sacred groves, and the first marine protected areas of humanity (Collet, *pers.comm*.; Eisler, 1988). Collet (1992) gives a detailed account of the strong symbolic power of women in fishing economies, their role in traditional whale hunting in North America and the Mediterranean swordfish fishery in places looking back on four millennia of uninterrupted human settlement and maritime orientation. His further studies into the conservation role of women in many Pacific islands in the past also reveal that the powerful magic women used to exercise is progressively being lost in the on-going transformation of their societies. Hochet-Kibongui observed similar trends in rural societies in Africa.

The intention is not to romanticise the role of women in conservation. Many of the systems which today are interpreted as signifying a conservation ethos (no fishing in certain areas, on certain days, banning of certain type of gear, etc.), may actually have emerged due to social reasons or as mechanisms to reduce social conflict. The low level of technology available and the limited demand in earlier times (both for demographical and marketing reasons) would have ensured that resources were more or less sustainably harvested. Nevertheless, the evidence points clearly towards a different relationship towards nature of those societies and the association of women with forms of restraint.

3.2 Present subservience of women is associated with unsustainable use of nature

The cases presented here pertain predominantly to artisanal fisheries in recent decades, when much of the older belief systems and female roles in relating to nature were already seriously undermined or gone. They illustrate that a major income source of many households is from the open-water fishing activities of the males, but that many of the women are also engaged in shoreline or tidal pool fishing. Many women glean for other aquatic organisms or participate in fish culture, particularly in Asia. Women tend to dominate in fish curing, processing and marketing, net mending, bait preparation and other land-based support activities from paper work to painting boats and/or agriculture as evidenced from the cases here presented and other publications from all regions of the world.

Where economic and social hardship of coastal and riparian communities have increased over the last decades, such as in some countries in Africa and other parts of the world, evidence points to increasing instances of women participating in actual fish capture. The women's fishing activities tend to be in small-water bodies of the rivers, streams, creeks and lakes, but also coastal areas.

Women's roles in artisanal post-harvest activities such as processing, distribution and marketing are particularly important in coastal and riverine communities where there are no adequate storage or freezing facilities. Fish and fishery products are perishable items and it is the women who perform the role of 'middle trader' in most societies where religious activities do not prevent them from working in public. The women are involved in retailing the products after adding value through their processing activities, often in collaboration with their children.

Industrial operations tend to redistribute raw material away from the artisanal channels with their social and economic distribution mechanisms, except where cheap industrial fish is still channelled into traditionally organised markets, such as in Nigeria. Especially with the increasing penetration of global markets and the pull exercised by the purchasing power of wealthy consumers in the three big importing regions and urban markets elsewhere, artisanal fisheries in most parts of the world are feeling the squeeze and the reduction of the traditional role of women as self-employed processors and marketers. Where the supply of raw material justifies industrial conditioning or processing, women are likely to work as dependent labour in plants as is the case from Spain, through the Gambia, Canada and Chile to various Asian and Pacific countries.

A common thread through much of the evidence in the case studies presented during the workshop and in the literature is that female labour and thus their social role, although very substantial, **tends to be invisible, unacknowledged and unaccounted for**. The pattern of strategies adopted by women is remarkably similar across very different social systems and degrees of economic development. There appears to be an inverse relationship between the recognition of women's contribution and the conservation status of the resource, concomitant to a general disregard for long-term ecosystem health and productivity and in favour of short-term gain.

As such, the extra-effort expended by women to keep their men in the fishing activity and the families fed can easily amount to social dumping and enable further over-fishing of an already seriously degraded resource, which may otherwise have been given up as economically unviable. Often, as a last resort to ensure access to food and/or secure some additional income, women go fishing themselves or glean seafood from coastal flats. Such perverse effects have also been characterised as 'Malthusian over-fishing'. Conversely, women in some Asian countries, such as Bangladesh, the Lao PDR and Viet Nam have been able to increase household food security through managing flood depressions or permanent aquaculture ponds, especially where proper support was provided to them. This is, however, not generally the case.

3.3 A new type of relation with nature through reinventing women's conservation roles?

The pattern thus emerging from the evidence suggests strongly that women, despite their earlier association with conservation and their predominant role in caring for their human and social environment, can not be expected by themselves to revert currently unsustainable trends in fishing and some parts of aquaculture, if the prevailing short-term extractive logic is not broken. The combination of excessive fishing capacity and over-emphasis on aquaculture of carnivorous species with blindness for the social role of women in these activities requires more than a few additional gender studies. Moreover, destructive fishing or farming methods that harm the structure and long-term productivity of aquatic ecosystems tend to be scaled up significantly in certain types of industrial (compared to artisanal) operations, where gender specificity is least recognised.

In traditional fishing societies, there was a division of labour, often with men fishing and women handling shore-based work, where both men and women had a role in primary production. However, technological changes and high market demand have changed the situation, and the pressure on resources has increased manifold. In this fisheries development model, women's niches have also been reduced, and there is often a shift from self-employment (in primary or postharvest production) to wage labour (as workers in fish processing plants, etc.).

It therefore would be appropriate to say that where women are socially recognised and retain their niches in the fishery, the fishery is less likely to be over-fished (mainly because it means that the fishery is not capital intensive, export-oriented, etc.). The level of women's participation in artisanal shore-based work is, in other words, indicative of a traditional, more sustainable fishery provided that the demography of people in the fishery does not compensate through sheer numbers for the social and technological restraints characteristic of such fisheries.

Moreover, as the majority of small-scale fisherfolk, both men and women, engage in other activities as well – the women, e.g. in collecting water and firewood, men, e.g. in agriculture – direct dependence on various ecosystem services is heightened and awareness of systemic interconnections is often acute. Women's concern for sustainability would thus be mediated by their material reality and immediate survival concerns. However, the scale

of ecosystem degradation over time may not always be fully apparent to such communities given their lack of access to ecosystem records accumulated over long periods through scientific research, the "shifting baseline" syndrome.

Conversely, putting women's specific social and economic roles 'on the map' of national accounting systems and political and development plans – not the least through their direct and active participation - would be an important step towards recognising their current roles and creating an important additional potential for future improvements and social justice (Evans, 1992). Recognising gender roles in conjunction with increased public discourse on ecosystems-based management would offer supplementary leverage to make the difficult choices needed for the transition towards a reinvented respectful relationship between societies and nature based on restraint. This would increase implementation chances of the ecosystem restoration and protected area goals set for 2015 in the Plan of Implementation adopted by Heads of State and Government at the World Summit on Sustainable Development (WSSD) in September 2002 in Johannesburg, South Africa. In this context, it is important to:

- Review existing fisheries and aquaculture policies from ecosystem, gender and governance perspectives;
- Establish historical baselines for coastal ecosystems, gender and governance to reconnect to desirable future states with the past;
- Identify key issues relating to the role of women, men and children in specific contexts of different developing and industrialised economies;
- Identify and apply methodologies for carrying out gender-aware research;
- Examine how and in what capacity women, men and children participate in the fishing and aquaculture industries, including how they can contribute to and benefit from concrete measures towards restoring degraded ecosystems as anticipated by the WSSD Plan of Implementation?
- Develop gender-responsive policies and strategies that would facilitate the advancement of currently disadvantaged women, men and children through their involvement in restoring degraded aquatic ecosystems, including networks of protected areas to be established by 2012, to achieve sustainable fisheries and aquaculture;
- Identify and apply methods to develop the upstream and downstream links of sector restoration activities through education, training, extension and innovation strategies supported by public and private investment.

The above-listed perspectives and approaches indicate opportunities for stepped up interaction between research, managers and men and women particularly in small-scale fishing and fish farming communities in the context of mobilising the full range of ecological, social, economic and institutional knowledge and competences for action on the WSSD agenda.

4. Orientations

This last section proposes a final set of conclusions and practical steps that flow from the case material and its interpretation in a wider historical and socio-political context. It summarises key points and opportunities with particular emphasis on international S&T cooperation.

The contributions point to the usefulness and even necessity of participatory gender and sustainable development strategies for fisheries and aquaculture that take into account the social roles and responsibilities of women, men and children. Such strategies recognise that, in order to effect long-term change in the socio-economic condition of women, the actions and attitudes of men must change as well – through integration of gender into every aspect of sustainable development plans and implementation and mainstreaming gender and ecosystem approaches. They require active work towards the ecosystem restoration target set by WSSD and supported by scientific research on the one hand and to the need of a participatory and reflexive governance style on the other.

(a) It is necessary to consider gender in fisheries and aquaculture in **local, national, regional and global contexts**. The focus has to be on disadvantaged citizens.

(b) **Social recognition** and respect for women and men, particularly those not having strong political representation are vital: Awareness-building (for both men and women) is necessary and resources need to be allocated to this. Restoration and sustainable development projects must seek locally adapted ways to pursue the global objectives, recognise the rights of coastal communities and address social and economic roles in gender-sensitive ways. Extension agents and activities need to become gender-aware, be implemented in participatory ways and set quantitative and qualitative targets for the participation of women. Education, media and other sources of information should be mobilised to this effect.

(c) **Governmental policy-makers** have adopted a strong gender focus in the Millennium Development Goals and need to pay heed to their practical implementation across the board, especially in relation to fisheries and aquaculture. Dialogue platforms and increased levels of information and awareness can be helpful in the process creating a useful environment for public and private investment in gender-aware sustainable development.

(d) **Research projects** on sustainable use of water resources, biodiversity, to support food security and safety, etc., should be developed factoring in an explicit gender perspective and address problems from the angle of social actors with particular emphasis on the specific conditions in developing countries. Conducting high quality participatory research will **increase the impact** of research by empowering citizens to play active roles in resource governance.

Step-by-step outline of an approach to 'engender' research – Anne-Marie Hochet-Kibongui

The starting point is to identify comprehensively the technologies traditionally utilised by the women on the assumption that they are operating in a given physical, geographical and economic context, and refined through practice and the fruit of experience. The external perceptions of women's roles often equate fishermen's wives, who use fuel wood to smoke fish to increase its shelf-life as artisanal destroyers of the environment. However, that is a gross misrepresentation of the realities of the women's harsh living conditions which encourage rather parsimonious use of environmental resources, but where structural forces, such as lack of titles to land, access to credit and social recognition impose unsustainable practices when a large population is involved.

It is important to analyse in depth the feasibility criteria met by the technologies in terms of context and objectives, such as:

1. Determine a 'contextual framework' in relation to the
   i. Geographical environment;
   ii. Economic environment;
   iii. Social environment.

2. Identification of the traditional technologies including
   - Detailed description of every operational step (with duration and indication of the human resources required); and
   - Types of product (identification, role of each product for domestic consumption and monetary income of the women fish worker).

3. Elements of the technology will correspond directly to the advantages and constraints mentioned in the framework (#1):
   - E.g.: fish are cleaned on the beach and washed with seawater, an approach saving water, transport, etc.

4. Evolutionary trends for each of the technologies presented:
   - in the past and now
   - analyse: adaptation of the technologies to the current context.

Particular aspect of this research methodology

The elaboration of the framework requires using the knowledge capital accumulated by the women and other stakeholders themselves, particularly the most experienced women operating in the fishery or aquaculture under study, so that key functional elements are properly identified and acted upon.

Value judgements, which could bias the objective description of the context in any way, must be carefully avoided. The history of past (development) projects steered from outside are mostly due to the fact that the various constraints and opportunities of prevailing technologies are not fully appreciated and that 'improvements' proposed from outside jeopardise other aspects.

It is advisable to carry out some smaller-scale testing with a limited number of groups before generalising the framework to a larger scale.

The women must be put in a position to understand that their expertise is warranted and sought, that their practices contain 'take-home messages' for others, so as to overcome a much-practiced self-defence of the type 'our grandmothers did it this way, so we do the same'. The approach can be applied to women's groups in completely different cultures that have as a common concern a professional activity in the fisheries and aquaculture sector.

Additional practical steps to 'gender' cooperation and steps to implement the WSSD decisions on aquatic ecosystems:

- Mainstream gender in international S&T cooperation projects and programmes (assessment of gender awareness is already part of the external peer review process in the EU Research Framework Programme (FP), although not a weighted selection criterion).

- Register in the expert database (http://www.cordis.lu/fp6/experts.htm) and encourage scientists with gender expertise to register, so that sufficient expertise is brought to bear on the evaluation process in the EU FPs.

- Bring such expertise to the attention of national and international boards, centres and development cooperation programmes to promote interdisciplinary work commensurate with the interconnectedness of social, economic and ecological issues.

- Offer support to research for development and other cooperation activities lacking sufficient gender expertise and looking for ways to better combine social science competence with ecosystem research in order to support the restoration of ecosystem health and productivity.

Everyone working in or in relation to fisheries and aquaculture can assess their specific local conditions, use the step by step guide to actively seek to understand women's conditions, recognise their roles and help open educational and other opportunities for them. In order to lend support to small-scale fishing communities' rebuilding the aquatic ecosystems on which their livelihood depends, the public should take conservation action by refusing to buy fish that has not reached the size at which they have reproduced (see www.fishbase.org).

5. Literature cited and further reading:

Adekanye, T.O., 1983. Rural Fish Marketing in Africa: Some Empirical considerations from Nigeria. *J.Rur.Dev.(Korea)*, 6(6):77-85

Adekanye, T.O., 1989. The Role of Women in Nigeria Agriculture. Paper Presented at a workshop on Farm Management in Nigeria, held at Akure, Nigeria, 30p.

Altieri, M.A., 1993 Agro-ecology - A new research and development: Paradigm for World Agriculture. *Ecosystem and Environment*, 27:37-46.

Barbosa, S.R.D.C.S. & A. Begossi, 2004. Fisheries, gender, and local changes in Itaipu beach, Rio de Janeiro, Brazil: An individual approach. *Multiciência*, 2 (http://www.multiciencia.unicamp.br)

Beattie, A., U.R. Sumaila, V. Christensen & D. Pauly, 2002. Ecological and economic aspects of size and placement of marine protected areas: A spatial modeling approach. *Natural Resource Modeling*, 15(4):413-437.

Bennett, E., Rey Valette, H., K.Y. Maiga & M. Medard (eds.), 2004. Room for manoeuvre – gender and coping strategies in the fisheries sector. Report of a workshop held in Cotonou, Benin, 1-4 December 2003. INCO Contract No. ICA4-2002-50034, Portsmouth, IDDRA.

Browne, P.B., 2002. Women do fish: A case study on gender and the fishing industry in Sierra Leone, pp. 169-174. In: Williams, M.J., N.H. Chao, P.S. Choo. K. Matics, M.C. Nandeesha, M. Shariff, I. Siason, E. Tech & J.M.C. Wong (eds.). Global symposium on women in fisheries. Sixth Asian Fisheries Forum, 29 November 2001, Kaohsiung, Taiwan. Penang, ICLARM -World Fish Center.

Chavance, P., M. Bâ, D. Gascuel, M. Vakily & D. Pauly (eds.), 2004. Marine fisheries, ecosystems, and societies in West Africa: half a century of change. Proceedings of the Conference, Dakar, Senegal, 24-28 June 2002 / Pêcheries maritimes, écosystèmes et sociétés en Afrique de l'Ouest: Un demi-siècle de changement. Actes du Symposium international, Dakar, Sénégal, 24-28 juin 2002. Brussels, *ACP-EU Fish.Res.Rep*. (15) and Luxembourg, OPOCE, and Paris, IRD, 532 p. + annexes.

Christensen, V., S. Guénette, J.J. Heymans, C.J. Walters, R. Watson, D. Zeller & D. Pauly, 2003. Hundred-year decline of North Atlantic predatory fishes. *Fish and Fisheries*, 4:1-24.

Collet, S., 1991. Guèrre et pêche: quelle place pour les sociétés de pêcheurs dans le modèle des chasseurs-cueilleurs? *Information sur les sciences sociales*, 30(3):483-522.

Collet, S., 1992. De la fonction symbolique des femmes dans les économies halieutiques. *Anthropologie Maritime*, 4:181-194.

Eisler, R., 1988. The chalice and the blade: Our history, our future. San Francisco, Harper, 304 p.

Evans, A., 1992. Chapter 2. Statistics. pp. 11-40. In: L. Oestergaard (ed.). Gender and development. A practical guide. New York, Routledge.

FAO, 2004. The State of World Fisheries and Aquaculture 2004 (SOFIA). Rome, FAO, 153 p.

Froese, R., 2004. Keep it simple: three indicators to deal with over-fishing. *Fish and Fisheries*, 5:86-91.

Froese, R. & D. Pauly, 2003. Dynamik der Überfischung, pp. 288-295. In: J.L. Lozán, E. Rachor, K. Reise, J. Südermann & H. von Wesernhagen (eds.). Warnsignale aus Nordsee und Wattenmeer – eine aktuelle Umweltbilanz. Hamburg, GEO, 448 p.

ICSF, 2002. Gender and coastal fishing communities in Latin America. Workshop proceedings, Prainha do Canto Verde, Ceara, Brazil, 10-15 June 2000. Chennai, International Colletive in Support of Fishworkers, 149 p.

Hochet, A.-M. et N'Gar Aliba, 1995. Développement rural et méthodes participatives en Afrique. La Recherche-Action-Développement: Une Ecoute, Un Engagement, Une pratique. Editions l'Harmattan, 16 rue des Ecoles, 75005 Paris, 210 p.

Kumar, K.G. (ed.), 2004. Gender agenda. Women in fisheries. A collection of articles from *SAMUDRA* Report. Chennai, International Colletive in Support of Fishworkers, 91 p.

Marugán Pintos, B., 2003. Estrategías laborales ante los desafíos ecológicos globales. *La Ventana*, 17:107-139.

Marugán Pintos, B., 2004. Y cogieron ese tren. Profesionalización de las mariscadoras gallegas. Santiago de Compostela, Consellería de Pesca y Asuntos Marítimos, Xunta de Galicia.

Meltzoff, S.K., 1989. Marisquadoras of the shellfish revolution: The rise of women in co-management on Illa de Arousa, Galicia.

Milazzo, M., 1998. Subsidies in world fisheries: a re-examination. Washington, *World Bank Tech.Pap*., 406:86 p.

MPA News, 2002. International news and analysis about marine protected areas (with material about gender and MPAs). MPA News, Vol. 4 No. 5, Nov. 2002 (http://depts.washington.edu/mpanews/MPA36.htm#gender).

Nauen, C.E., 1994. La participación de las mujeres latinoamericanas en el sector pesquero. Una questión estratégica, pp. 263-279. In: C. Tassara (ed.). Pesca artesanal, acuicultura y ambiente. Experiencia y perspectivas de desarrollo. Prefacio de Emma Bonino, Comisaria de la Unión Europea para la Pesca. Santafé de Bogotá, CISP-MOVIMONDO, realizado en colaboración y con el patrocinio de Ente Autónomo Feria de Ancona; Ministerio de Relaciones Exteriores de Italia, Dirección General para la Cooperación al Desarrollo, Comisión de la Unión Europea, Oficina de la Cooperación Italiana en Colombia.

Neis, B. & B. Grzetic, 2000. From Fishplant to Nickel Mining: Policy Implications, Policy Development and the Determinants of Women' Health in an Environment of Work Restructuring within Fisheries and from Fisheries to Mining/Smelting in Newfoundland. St. John's, Memorial University of Newfoundland.

Oestergaard, L. (ed.), 1992. Gender and development. A practical guide. New York, Routledge, 220 p.

Pauly, D., 1995. Anecdotes and the shifting baseline syndrome in fisheries. *Trends Ecol.Evol*., Vol 10:430.

Pauly, D., 1990. On Malthusian overfishing. *NAGA – The ICLARM Quarterly*, 13(1):3-4.

Pauly, D., V. Christensen, J. Dalsgaard, R. Froese & F. Torres, Jr., 1998. Fishing down marine food webs. *Science*, 279:860-863.

Pauly, D., V. Christensen, S. Guénette, T.J. Pitcher, U.R. Sumaila, C.J. Walters, R. Watson & D. Zeller, 2002. Towards sustainability in world fisheries. *Nature*, 418:689-695.

Sumaila, U.R., 1999. Economic analyses of fisheries impacts on food webs: pricing down marine food webs. pp. 13-15. In: D. Pauly, V. Christensen & L. Coelho (eds.). Proceedings of the EXPO'98 Conference on Ocean Food Webs and Economic Productivity. Lisbon, Portugal, 1-3 July 1998. Brussels, *ACP-EU Fish.Res.Rep*., (5):87 p.

Watson, R. & D. Pauly, 2001. Systematic distortions in world fisheries catch trends. *Nature*, 424:534-536.

Williams, M.J., N.H. Chao, P.S. Choo. K. Matics, M.C. Nandeesha, M. Shariff, I. Siason, E. Tech & J.M.C. Wong (eds.), 2002. Global symposium on women in fisheries. Sixth Asian Fisheries Forum, 29 November 2001, Kaohsiung, Taiwan. Penang, ICLARM -World Fish Center, 209 p.

Williams, S.B. & B. Awoyomi, 1998. Fish as a prime mover of the economic life of women in a fishing community. pp. 286-292. Proceedings of the IXth International Conference of the International Institute of Fisheries Economics and Trade (IIFET) held in Tromso, Norway, 8-11 July, 1996.

Williams, S.B. & C.E. Nauen, 1998. Fisheries Economics and Trade in West African Region: A gender perspective. Department of Fisheries and Wildlife, University of Ibadan, Ibadan, Oyo State, Nigeria. *Journal of West Africa Fisheries*, Vol. VII:321-334.

6. Selected Web Resources:

Artisanal fisheries, gender and participation -
http://www/multiciencia.unicamp.br

Femmes dans la pêche et les cultures marines (CALENDA) -
http://calenda.revues.org/nouvelle4258.html

Fisheries and participation (Participatory Learning and Action) -
http://www.iied.org/sarl/planotes/pla_backissues/30.html

Gender and aquaculture: information needs and guidelines (FAO) -
http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/x0180e/x0180e03.htm

Gender issues in aquaculture (DFID) -
http://www.dfid.stir.ac.uk/dfid/gender/gender.htm

Gender and food security (FAO) -
http://www.fao.org/gender/

Genero y pesca (La Ventana, Vol. 17) -
http://publicaciones.cucsh.udg.mx/pperiod/laventan/volumens/ventana17.htm

Global Symposium on Women in Fisheries -
http://www.worldfishcenter.org/Pubs/Wif/pub_wifglobal.htm

Marine Protected Areas (MPA) and gender - http://depts.washington.edu/mpanews/MPA36.htm

Mekong River Commission (MRC) gender and fisheries publications -
http://www.mrcmekong.org or e-mail: mrcs@mrcmekong.org

Mekong River Commission -
http://www.mrcmekong.org

Women in fisheries (ICSF) -
http://www.icsf.net/jsp/english/pubPages/dossiers/dos07.jsp