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The Journal of the Asian Fisheries Society

GENDER IN AQUACULTURE AND FISHERIES:

MOVING THE AGENDA FORWARD

SPECIAL ISSUE

Gender in Aquaculture and Fisheries: Moving the Agenda Forward

Papers from the 3rd Global Symposium on
Gender in Aquaculture and Fisheries
21-23 April, 2011
9th Asian Fisheries and Aquaculture Forum
Shanghai Ocean University
China

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Guest Editors

Meryl J. Williams
Marilyn Porter
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Message from the Past and Current AFS Presidents

The 9th Asian Fisheries and Aquaculture Forum held on April 21-25, 2011 at the Shanghai Ocean University was privileged to host the 3rd Global Symposium on Gender in Aquaculture and Fisheries, as a follow up to the women/gender and fisheries Symposia held in the previous triennial Fora. In fact, since the 5th Forum in 1998, the Asian Fisheries Society (AFS) has blazed a proud tradition by providing a venue for professionals and advocates to share their research and action programs, exchange ideas, and network on, initially "women in fisheries," and into its current format as "gender in fisheries." Every triennial meeting has since drawn a growing delegation of new researchers and advocates, and the continuing presence of committed persons who regularly participate in the symposia.

For the first time the AFS Journal (Asian Fisheries Science Journal) is publishing a special issue on Gender in Aquaculture and Fisheries featuring papers presented during the 2011 Global Symposium. We believe it is a credit to the Society to publish an issue dedicated to the concerns and challenges of women and gender in the fisheries sector in the Asia-Pacific region and even beyond. The themes captured by the journal articles are wide ranging – descriptions of women's changing status, gendered dynamics in fisheries development projects, tools for mainstreaming gender, women's livelihoods in aquaculture and fish-processing, micro-finance in coastal communities – showing the complexity of women and gender issues in fishing and aquaculture but also highlighting the common threads that run through these issues despite separation of culture and physical boundaries.

We congratulate the Co-editors for their diligence in seeing this volume through to publication. A special note of thanks to Meryl Williams, the convenor of the Global Symposium for her sustained leadership of the "women and gender in fisheries" theme.

Ida M.L. Siason

AFS Past-President (2009-2011)

Derek J. Staples

AFS President (2011-2013)

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This Special Issue of Asian Fisheries Science, *Gender in aquaculture and fisheries: moving the agenda forward,* has been made possible by many people and organisations. We first acknowledge its genesis in the 3rd Global Symposium on Gender and Fisheries (GAF3) held 21-23 April 2011 in Shanghai, China at the 9th Asian Fisheries and Aquaculture Forum (9AFAF). For the conduct of that successful event, we are grateful for the organisational support from the Asian Fisheries Society, its past and present Council and Presidents, and the Shanghai Ocean University team, especially Dr T.T. Zhou.

The Food and Agricultural Organization of the United Nations (FAO) deserves our special appreciation as it made many aspects of GAF3 and the Special Issue possible. Firstly, FAO provided the Society greatly appreciated support which enabled participation of representatives from many developing nations. Very importantly, it also supported the publication of this Special Issue which can now be freely available immediately online on the *Asian Fisheries Science* journal website, and to produce a run of print copies for distribution to key stakeholders. To supplement the gender deliberations of GAF3, the FAO Department of Fisheries and Aquaculture, with support from FAO's Multidisciplinary Fund on Gender and Food Security, convened a Special Workshop, *Future Directions for Gender in Aquaculture and Fisheries Action, Research and Development*, on 23-24 April 2011, immediately following GAF3.[1]

A special mention also goes to the FAO Regional Fisheries Livelihoods Programme for South and Southeast Asia, funded by the Spanish Government, that supported several oral presentations at GAF3 and papers in this Special Issue based on work in the Programme, as well as helping produce the brochure for the accompanying FAO Special Workshop and GAF3.

In addition, the National Network on Women in Fisheries in the Philippines Inc., the Indian Council of Agricultural Research and Mundus Maris supported the organisation and conduct of the GAF3 Symposium.

GAF3 was honoured with a wealth of knowledge shared by all 48 oral and poster presenters (Appendix II), eight session chairs, and the audience, many of whom stayed throughout all presentations and contributed to lively questions and discussion. The support from over 100 home organisations of the presenters and attendees is greatly appreciated. Throughout the publication process, we also acknowledge the hard work and perseverance of the authors of the 21 published papers.

[1] http://genderaquafish.files.wordpress.com/2011/04/gender-brochure-afaf9-gaf3.pdf

We are also very grateful to the "unsung heroes" on which any journal depends – our reviewers. In this case, we thank the 33 expert reviewers (Appendix I) from international organisations and from countries in Africa, Asia, Caribbean, Europe, North America and the Pacific.

Disclaimer

The contents of the papers and other articles of this Special Issue represent the views of their authors. They do not represent the views, position or policies of the Asian Fisheries Society, FAO or any of the other organisations acknowledged above.

Gender in Aquaculture and Fisheries: Moving the Agenda Forward
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Guest Editorial: Gender in Aquaculture and Fisheries - Moving the Agenda Forward

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In this Special Issue of *Asian Fisheries Science,* we are pleased to present 21 papers that resulted from the 48 presentations and posters[1] of the 3rd Global Symposium on Gender in Aquaculture and Fisheries (GAF3), 9th Asian Fisheries and Aquaculture Forum, April 2011. GAF3 was the fifth triennial women/gender Symposium organized by the Asian Fisheries Society. The proceedings or selected papers from each can be found in Williams et al. (2001), Williams et al. (2002), Choo, Hall and Williams (2006), Development (2008), and in this Special Issue. Thus, beginning in 1998, the Asian Fisheries Society has supported gender topics for over 15 years, and even longer if we take into account the earlier work led by Dr M.C. Nandeesha in Cambodia and Indo-China (Nandeesha and Tech, 2002). This is the longest continuous series of women/gender symposia for a professional fisheries society.

Following GAF3, on 23-24 April 2011, the Food and Agriculture Organization (FAO) of the United Nations convened a Special Workshop on "Future Directions for Gender in Aquaculture and Fisheries: Action, Research and Development" in order to generate strategic ideas and actions that could be used to develop a "road map" for future directions on gender in aquaculture and fisheries. Attended by 24 experts, the Special Workshop concluded that those working in the field first needed a vision for engendering aquaculture and fisheries. We trust that this Special Issue will contribute to the knowledge underpinning such a vision.

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[1] http://genderaquafish.org/gaf3-2/

Yet, along with the pleasure of introducing this Special Issue, we feel a mix of optimism and pessimism - pleasure because of the breadth and depth of the knowledge contained in the papers, optimism because of emerging interest in gender in aquaculture and fisheries, and pessimism because we feel that gender in aquaculture and fisheries research has not progressed as strongly or as rapidly as it should. Despite the evidence that women play large, though undervalued, and functionally critical roles in fish supply chains, the slow progress in advancement of women reflects a global lack of priority and resources, evident also in Asia, to women and gender issues in aquaculture and fisheries.

Let us first explain the causes of our pessimism and optimism through three observations before turning to an outline of the papers.

First, we observe that women and gender topics are "not on the agenda" in aquaculture and fisheries. Research and action receives very little support from governments, universities and external funders such as development donors and non-government organizations. In Asia, a few exceptions stand out. One is the Mekong River Commission Fisheries Program and its 4 member countries fisheries departments that, for 12 years, have conducted a Mekong basin-wide Network for Promotion of Gender in Fisheries (NGF). Another exception is the International Collective in Support of Fishworkers (ICSF) which has the biannual Yemaya newsletter on women in fisheries, takes up women's issues through its regional partners and recently held a global workshop on the gender agenda in fisheries (ICSF, 2010).

The lack of attention to women and gender starts in policy-blindness. Women and gender issues are missing from key global normative fisheries (and aquaculture) products such as the Code of Conduct for Responsible Fisheries (FAO, 1995) and many of its succeeding instruments and technical guidelines (Williams, 2010). These instruments reveal how aquaculture and fisheries are presently framed, and hence the priority issues addressed – gender is not visible. Other human dimensions are similarly lightly treated. Technical production, market driven and environmental issues predominate, such as illegal fishing, aquaculture production and product certification, and the ecosystem approach to fisheries. Even where these areas of focus would be expected to encompass significant gender and other human dimensions, they rarely do. A turning point may have been reached, however, as the 2010 Global Conference on Aquaculture, conducted by FAO, the Network of Aquaculture Centers in Asia and the Thailand Department of Fisheries, included a gender and human capacity development segment (Williams et al. 2012).

Without focus and resources, progress is difficult and slow. Many of the authors in this Special Issue are conducting gender studies as a sideline to their main fields of work and some have entered the field as non-specialists who have realized the need, in the course of other studies.

We have also witnessed the phenomenon of women and gender specialists in social science research departments moving on from studying aquaculture and fisheries to studies in other sectors or overarching themes such as climate change and women's mobility. Some among us are part of this shift. In order to flourish, any field of research and education needs resources – researchers, funds, students. Like other researchers, women and gender researchers and students "follow the money." Because gender and fish sector funding is minimal, some of the most significant researchers in the field have moved on to study gender in other fields.

To compound the problem of low support, many researchers and activists have been disheartened because their advice was rarely sought, or accepted and used when given. For example, inshore fishers, and especially women, warned that the North Atlantic cod stocks were in decline years ahead of Canadian government recognition of the crisis (Neis, 2000, Grzetic, 2004).

Development assistance agencies often fund research and then they use the results to inform their actions or set new programme directions. Few aquaculture and fisheries projects, however, have gender components and hence development assistance agencies are providing little support to research in gender in aquaculture and fisheries. A current exception is the FAO-Spain Regional Fisheries Livelihoods Programme (see papers by Lentisco and Arenas, Nguyen Dang Hao and Segundia et al. in the current Special Issue).

The lack of attention to gender in fish sector projects could be partly compensated by borrowing from gender work in other rural sectors. The quantum of gender and agriculture work seems to be increasing since FAO highlighted the "gender gap in agriculture" in its State of Food and Agriculture report (FAO, 2011). The report also touched lightly on aquaculture and fisheries. Following this report, more attention to women in agriculture is evident among the multi-lateral development agencies such as FAO, the International Fund for Agricultural Development (IFAD) and the World Bank. Several new electronic platforms have been created to promote gender and agriculture research and action, and other significant development actors have distilled practical lessons learned from helping women, e.g., Anonymous (2012). In March 2012, the Indian Council for Agricultural Research and several international professional bodies sponsored the first Global Conference on Women in Agriculture. Agriculture researchers are addressing land rights issues for women, measuring women's empowerment and assets and mapping women's activities. The fish sector was acknowledged to some extent in the 2012 Global Conference on Women in Agriculture.

We cannot take for granted that this flurry of attention to women in agriculture will also stimulate more research and action on aquaculture and fisheries. It is, however, a positive development that should be harnessed. Choo et al. (2008) pointed out that fisheries and aquaculture are influenced ultimately by global trends in development. So far, no large scale quantitative study on gender and fisheries has been conducted in any part of the world, unlike on gender and agriculture.

As we write, other signs of optimism closer to aquaculture and fisheries include that several mainstream institutions are beginning to include gender work and strategies in their programs. For example, The CGIAR recently adopted a new research program on aquatic agricultural systems. The program focuses squarely on food security and integrated livelihood for the poor. It is an innovative and ambitious research program that has strong focus on gender mainstreaming, as can be seen from the fact that one of the six research themes is on gender equity. Noting that the total requested budget for the program is US$59.4 million with projected partner funding of US$300 million over a three years period, it may provide substantial resources for advancing gender and fisheries research. What is important to note is that such strong gender focus is possible because the program moved away from component crops and fisheries and focused on integrated livelihood systems. By looking at the system that women and men are working/living in, rather than looking only at fish, there is greater opportunity to address the issues of gender equity as well as other social issues.

Further optimism comes from the rising interest in value chains in fisheries research. Just because few women go out in large boats to fish, they are often not considered fishers and marginalized in fisheries sector analysis, as many of the papers in this volume pointed out. The focus on value chains puts a new light on women's role in aquaculture and fisheries, and highlights the importance of post harvest activities such as trade and processing. This is becoming all the more important because of the regional economic integration, such as in the ASEAN region.

Our second observation is that women/gender studies in aquaculture and fisheries are not monolithic and they will not be addressed by a single discipline or epistemology. This methodological plurality contrasts with the case in technical fields such as fish diseases, stock assessment, hatchery technology and safety at sea. Indeed, considerable differences of opinion prevail over gender research, and even whether "gender" approaches are weakening attention to the very urgent problems that many women, especially poor women, experience in the fish sector, e.g., Biswas (2011).

One of the problems of advancing the gender and fisheries/ aquaculture field is the difficulty in conducting truly multi-disciplinary research. Fisheries biologists realize that they need to understand about the people who are engaged in fish production, hence focus more on gender division of labor in fish production. Social scientists are concerned with social relations and structures as well as livelihood systems but often lack knowledge of fisheries/aquaculture systems and technologies and fish species that people are engaged with. In order to advance the field, we need to combine both perspectives. For example, the following questions can only be answered through work by multi-disciplinary teams.

- With increased demand for water for agriculture/industries/tourism/fisheries, how much water would be available for fisheries and aquaculture? How much would fisherwomen be able to negotiate for water for their own production, giving their weak negotiating power and low

visibility in the sector? How would that affect the fish availability for fishing/fish culture households? What are alternative livelihoods or possibilities of upgrading women and men's present positions in aquaculture and fisheries?

- How would fish production technology help in improving food security? For whom? Why?
- With cross-border trade facilitated, what are the implications for food security for the poor? How would aquaculture and fisheries play a role in food security for the women and men in poor households? How can poor women maintain access to fisheries resources for their food security? How can women retain or gain access to fish for processing and sale against other competitive buyers?

Another problem of gender and fisheries research is that when we look at only the gender division of labor, we often cannot deny that women are playing a marginal role vis-à-vis men. However, when we look at the dimension of household food security and livelihood, we find that women contribute as much and sometimes more than men. What are the species available for women to catch and trade, or to be consumed at home? What are the aquatic resources available for poor women for processing and trade? What are the technologies available for them? What bargaining power do women have in the value chain, including rights to exploit fisheries resources? Gender and fisheries needs to take a more systems approach in order to reveal the gender relations and problems that women face in fisheries. To do so requires collaboration between social science and fisheries biologists.

Compared to fisheries, gender and aquaculture needs a totally different framework of analysis. The issues for gender and aquaculture are more similar to issues in gender and agriculture or gender and enterprise development. Hence, basic gender analysis concepts such as gender division of labor and access/control over resources provide us considerable insights into the gender issues in gender and aquaculture. IFPRI together with USAID and the Oxford Poverty and Human Development Initiative (OPHI) has developed a women's empowerment index in agriculture (IFPRI et al 2012); gender and aquaculture can learn much from them. In terms of methods, the IFPRI researchers conducted a questionnaire survey for both wives and husbands in households, allowing better insights into the intra-household gender relations in farming, and to some extent in fisheries.

Thus, looking at fisheries as a system and aquaculture as a household economic production activity, existing methodologies can be expanded into the field of gender in aquaculture and fisheries.

We need to integrate and build on the skills and knowledge of both the fisheries scientists and the social scientists if we are to address the problems confronting the fish sector. We need to investigate, in depth, the complex relationships among resources and environmental sustainability, and the conditions of harvesting and processing fish resources and the social and cultural context in which fishing and fish processing takes place.

Each fish production system has its own needs for research and action. At the broadest level, we need to stop simplifying the fish production sector by lumping aquaculture and fisheries, and by failing to take local soci-ecological settings into account within each type of production system.

This leads to our third observation which is that: much work is needed to develop and disseminate better conceptual frameworks for studies on gender in aquaculture and fisheries. Building the new foundations requires the engagement of the more academic researchers and activists who have been engaged in Asian Fisheries Society symposia, and more besides these. Until more financial and institutional support is available to this field of research, progress will continue to be modest.

Experience has shown that women/gender issues are invisible to many in the fish sector and advocacy is required to raise the profile of gender. Credible, dedicated and persistent champions are needed. One initial target of action is to bring about policy changes to engender aquaculture and fisheries because, without this, the mandate and platform for gender focus is lacking.

Above, we commented that many of those doing gender research are not educated in gender research methods. Beyond this small group, most experts in aquaculture and fisheries have no gender education and very little awareness of the issues. Gender training, education and extension, therefore, are needed to reach a wide spectrum of people in aquaculture and fisheries. Basic concepts need to be defined, disseminated and understood; gender disaggregated data should be routinely collected; and research and comparative analysis conducted. With development and broader use of conceptual frameworks for data collection and research design, cross country comparisons would become possible. They are presently impeded by statisticians and researchers using different approaches. To illustrate the demand for more solid foundations, on our Genderaquafish website, the glossary of terms, compiled from authoritative sources, is the most visited page apart from those dealing with GAF3 (http://genderaquafish.org/resources-3/glossary-of-terms/).

In summary, we find that women/gender studies are progressing only slowly in aquaculture and fisheries because they: (1) are not on the policy agendas and action plans and therefore minimal resources are devoted to them; (2); are not amenable to a single epistemology and different visions compete; and (3) require stronger conceptual foundations to be developed, disseminated and used.

The Special Issue

In terms of topics and study approaches, the GAF3 Special Issue papers are heterogeneous. They examine some of the major themes of gender in aquaculture and fisheries, using different disciplines including sociology, political science, geography, economics, anthropology, rural development and supply chain analysis.

In this overview, we categorize the papers into three streams of work, but we recognize that they could also be grouped in other ways. The reader should note, however, that in the Special Issue, the papers are grouped according to their classification as research papers (as defined for regular volumes of *Asian Fisheries Science* journal), technical papers (containing significant new technical information gathered from original studies), and short reports (on development work, surveys or projects).

In this thematic overview, the first and largest set, 13 papers, explores gender roles in widely varying aquaculture and fisheries socio-ecological systems, *sensu* Elinor Ostrom (Ostrom, 2009). The second set of six papers explores or reveals women's agency in fish supply chains and ecosystems. The third set, of just two papers, probes inclusion of women in aquaculture and fisheries institutions.

Gender roles in aquaculture and fisheries socio-ecological systems

Women and men exist in complementary (Della Bacaltos et al.; Mohammad Nuruzzuman) and competing (Ramachandran C. Nair) spheres in aquaculture. GAF3 papers in this Special Issue show that support to address gender inequity in the aquaculture sector is heavily focused on poverty alleviation aimed at addressing short term goals and do not take long term goals into account. Solutions are piecemeal, and bigger issues involving property rights, advocacy and male-dominated monopolisation of profit have not been given much attention (Ramachandran).

Aquaculture development support is aimed mostly at poor women to operate low technology and low input systems (such as mussel farming, seaweed culture and backyard shrimp farming), which help to supplement their incomes. Ramachandran described mussel farming as almost "do-nothing farming" because of its simplicity and quick production. In Bangladesh where women were previously not actively involved in aquaculture, Md. Nuruzzaman described how they were introduced to small-scale shrimp farming where they worked as labourers in low-skilled jobs like bund repair, pond and feed preparation. Hazard and Critical Control Point (HACCP) and Good Aquaculture Practice (GAP) training programmes were attended mainly by men. Women were often left out and had little opportunity to pick up higher level or new skills, even though the pioneering household and community development project on which he worked and reported showed that women as well as men picked up well on course materials.

When an activity becomes commercially profitable, very often women doing the work are displaced, lacking the use rights to farming areas and the economic power to resist, as seen in the mussel culture activity in India (Ramachandran). By contrast, in the Philippines, the collaborative seaweed industry platform, incorporating women and men's roles, appears to offer, simultaneously, the means for small-scale operators to engage more positively in the value chain (Della Grace Bacaltos et al.).

The fisheries papers of this Special Issue analyse many different ways in which women and men participate in the harvesting sector. While women are still a very small proportion of harvesters, particularly in offshore fisheries, their contribution is vital, especially in the small scale inshore fisheries and in small communities. Two papers address overarching issues. Marilyn Porter makes the sociological argument that policy is often directed narrowly at improving fish harvesting and processing, without taking account of its impact on women, families and the community, drawing on data from the contrasting situations in coastal Tanzania and Atlantic Canada. She argues that studying coastal communities through a gender lens would have greater impact if the research could be commonly framed and attention paid especially to power, inequality and discrimination and how women manage to negotiate better positions for themselves and their families. Holly Hapke's paper uses feminist commodity chain analysis, livelihoods analysis, and insights from feminist studies of gender and development to examine different impacts of globalization rooted in gender divisions of labour, taking her examples from Kerala, India.

Two papers deal with the unique practices and experiences of women who free dive for shell fish, seaweed, sea urchin, lobster, sea cucumber, oyster, octopus and abalone in Japan and Korea. Cristina Lim and her colleagues contrast the skill and high earnings of Japanese women divers with their low social status. Sun-Ae Li makes similar points about Korean divers, but also traces the long and complex history of the women divers and accounts for the dwindling of the occupation. Nguyen Dang Hao moves our attention to Vietnam, with a detailed account of the unequal and inferior position of women in fishing communities in central Vietnam. Despite their longer hours of work and active participation in fish processing and trading, they have higher rates of poverty, lower levels of education and are excluded from all the significant locations of decision making and social power. The education, income and asset patterns across better-off, average and poor households showed that women in average and poor households were the most poorly educated and engaged more in small scale and less remunerative activities, than was the case for men. Even in better off households, women's activities were less remunerative than men's.

Two papers present women's role in coastal cities and remote fishing communities in Indonesia. In fishing communities in two coastal cities of Central Java, Zuzy Anna used rapid quantitative appraisal (rapfish) research methods to analyze the ecological, economic, social and institutional uncertainties challenging women. The most important indicators for the different dimensions of uncertainty were: drought, pollution and season (ecological), uncertain production and income (economic), high divorce rates, high unemployment and poor health (social) and high dependency on credit and local financiers (institution). The women cope with the uncertainties by controlling spending and by taking part-time employment outside the home. In the remote Pantar islands of Indonesia, women were not as highly regarded as men as users of marine resources. Ria Fitirana and Natasha Stacey used participatory rural appraisal and focus groups discussions to analyze the gender dimension related to fishing activities throughout the supply chain.

Fishing activities included a wide range but some women and men's activities overlap. Yet, the women of the Pantar fishery ran the real risk of not being included as key stakeholders in consultations over the local emerging marine conservation plans under the Coral Triangle Initiative.

Xijie Xu and colleagues' paper on women's roles in China's new inland and coastal fishing villages emphasizes the pivotal roles and opportunities for women in the newly constructed villages. Women make up about 60% of the labor force and have a heavy work load. Although women's organization skills have strengthened the construction of new fishing villages, women are still considered marginal and still lack full participation in China's new economic era.

Microfinance has become popular for many vulnerable fishing households in Kerala, India. Microfinance is often given to women without any study undertaken on its impact. In their paper, Nikita Gopal and colleagues reported that microfinance schemes have supported family finances and have improved household financial decision-making in poor households. Most of the microfinance funds have supported household expenses and have had very little impact on developing entrepreneurial opportunities for women. The credit has encouraged consumption rather than production. The study stressed the need to further examine the use of credit as a financing mechanism in poor households.

In different ways and drawing on data on women and men from different societies and in different socio-ecological settings, all these papers draw attention to the significant contribution that women make to fisheries – but also that in all cases women benefit less than men do, carry heavier loads of work and responsibility and have much less access to decision making and resource management.

Generally, the role of women in fisheries has been most visible in post harvest activities but this Special Issue has only one paper focusing just on post-harvest. While the physically demanding sea fishing was primarily (though as evidence shows, not exclusively) a male domain, women were the main handlers, processors and marketers of fish on shore. This division in labour was observed in the study from Philippines by Corazon Macachor and colleagues. The men were involved in fishing activity but the production of smoked frigate mackerel was predominantly a female preserve based on traditionally acquired knowledge. When it came to marketing, the women processors' area of operation was limited and the far off markets were catered to by men.

Women's agency in fish supply chains and ecosystems

Six papers discuss women's own agency in aquaculture and fisheries production. All highlight the important roles women can or could play in this sector. Importantly, all papers explore how through proper intervention, women's roles can become more visible and their agency can be strengthened through their involvement in aquaculture and fisheries. Three papers discuss different ways involvement in aquaculture and fisheries can benefit women.

In Nepal, Sunila Rai and co-authors analyzed how household ponds can lead to increased consumption of micro-nutrient rich small indigenous fish species, benefiting nutrition levels of women and children. Rosaria Gaerlan Segundia and co-authors demonstrated how value-added fish products can lead to women's empowerment in the Philippines. For Thailand, Cristina Lim and Amporn Laowapong argued that with leadership opportunities and training, women in coastal communities can take a greater leadership role through their involvement in fisheries. Their position is illustrated by five compelling case studies.

The other three papers explored how organizing women through self-help groups in fisheries can empower women in their fisheries related activities. B. Shanthi and her colleagues, by describing various cases of women entrepreneurs involved in fish related business, showed that self-help groups as well as better education in general supported their businesses as well as helped them to achieve higher entrepreneurial skills. However, one catch was that most of these women were involved in traditionally defined women's activities. Md Ghulam Kibria and Gosbert Hamutenya described a case in Namibia where a women-run aquaculture project, though producing only a small harvest, has provided women with a place to discuss future plans to improve future yields. Farisal Bagsit and Caridad Jimenez, in their case in the Philippines, showed how women call their work on mangroves "meetings", and demonstrated excellent feedback mechanism that lead to well-managed mangrove reforestation program. This project was considered to be an exception where most of the other mangrove programs were dominated by men, although the women's group still had difficulty in getting acceptance from the community as a whole.

Women in aquaculture and fisheries institutions

Two papers dealt with women in aquaculture and fisheries institutions.

The first paper, by Angela Lentisco and Enrique Alonso, on gender mainstreaming strategies and tools in fisheries development projects gave as an example the Spanish-funded Regional Fisheries Livelihoods Programme (RFLP) implemented by FAO which considered gender mainstreaming as an important cross-cutting issue of its implementation. The RFLP is aimed at improving the livelihoods of small-scale coastal communities while contributing to sustainable management of aquatic resources.

A set of actions contained within the broad theme of information gathering, knowledge sharing, implementation, monitoring and evaluation, and capacity development comprise the overall strategy for gender mainstreaming of the RFLP.

To support the implementation of this gender mainstreaming strategy, a handbook was developed, presented during a workshop on best practices, and improved prior to publication, taking into consideration the debate on policies, concepts, tools and frameworks for gender analysis, and

including field experiences, case studies and other strategies towards addressing and integrating gender dimensions in development projects.

Key lessons for effective gender mainstreaming in the fisheries sector based on RFLP experience include: (1) the need to highlight the roles and contribution of women; (2) the importance of gender analysis throughout all phases of project development; (3) the value of local context and the skills and knowledge of researchers when applying gender mainstreaming tools; and (4) the need for more policy and institutional support from governments and relevant organizations.

The second paper, by Hillary Egna and co-authors, on improving gender equity in aquaculture education and training was based on 30 years experience under the AquaFish Collaborative Research Support Programs (CRSP, 2006 to present) and its predecessors, i.e. the Pond Dynamic/Aquaculture (PD/A CRSP, 1982-1996 and the Aquaculture CRSP, 1996-2008). These programmes were dedicated to improving gender equality in the aquaculture and fisheries sectors by creating equal opportunities for women and men to participate in the programmes' research, training, educational and other activities – thus creating tools to empower especially women, increase their bargaining power and enter new career opportunities. A multi-faceted approach was adopted to promote and integrate gender equality through specific actions including: (1) collection and analysis of disaggregated data; (2) setting a 50% benchmark for women's participation in both formal and informal training opportunities; (3) requiring a gender strategy for all core research projects; (4) ensuring at least one gender-focused investigation in all of the core research projects; and (5) providing extension and technical services directed at women in sustainable aquaculture and aquatic resource management.

While great strides have been made recently in terms of equal rights, educational and professional opportunities, better wages and political power for more women in the formal sector, statistics from AquaFish showed characteristics of a "leaky pipeline". The paper makes recommendations to help overcome this phenomenon in the programme.

Conclusions

Although the field of gender in aquaculture and fisheries is still under-researched and under-funded, an increasing number of people and institutions are interested in it, as can be seen by the number of papers submitted to the 3rd GAF symposium, and the number of papers in this Special Issue. As presently comprised, GAF researchers form a loose network comprised of biologists as well as social scientists from several disciplines, placing interested parties in a good position to coordinate innovative research with a multi-disciplinary approach. The collection of papers in this volume shows that we have become quite successful in visualizing women's contribution to fisheries and aquaculture. We have also been able to come up with more structural analysis by looking at value chains and institutions, dealing squarely with the relations of women in fisheries/aquaculture with other actors. The field is now faced with more challenges with climate

change and economic integration, which would require us to do a more nuanced analysis on different contexts and ecological/economical/political/cultural systems.

We also need to highlight the issues of inter-sectionality – the axis of analysis is not only about women and men, but how the other factors such as class, age, ethnicity, race, caste, religion etc all come into play to define/condition the relations that one would have in the fisheries/aquaculture systems. We hope that in the near future, we will be able to report very optimistically on progress in gender in aquaculture and fisheries research and development.

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"A Sea of One's Own!" A Perspective on Gendered Political Ecology in Indian Mariculture

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Abstract

In India, mariculture is a sunrise enterprise. Technologies that have attracted the imagination of coastal stakeholders include mussel farming, seaweed farming and open sea cage culture. Mussel *(Perna viridis*) farming technology has diffused along the Malabar coast (southwest India), and seaweed (*Kappaphycus alverezii*) farming prevails along the Coromandel coast (southeast India), after it found a niche in the Gulf of Mannar. Having proven their potential as empowerment platforms for coastal women, the theatres where these technologies were adopted raised a number of issues in the realm of a gendered political ecology. The aim of this paper is not only to diagnose these issues but juxtapose them with some of the epistemological concerns being brought by "gender lens" scholarship, especially in the neo-liberal context of global fisheries. A paradox brought out by the present study is the ambivalence of the State in manifesting itself as a positive "bargaining" force in the intra-household domestic space (by providing State-sponsored platforms through the Self Help Groups) while leaving the "common access resource" space, from which these platforms gain sustenance, less amenable to its democratic ideals.

Introduction

Recently political ecologists have started using the gender lens while traversing areas other than agrarian issues. Bavington et al. (2004) argued that political ecology - defined as an interdisciplinary field of study that was originally devoted to combining the concerns of ecology and political economy and focused on the 'constantly shifting dialectic between society and land based resources - has expanded to include marine ecosystems. In addition, it has opened itself up to themes like non-hierarchical, multifaceted, context-specific and often ambiguous relations between biophysical, knowledge production and socioeconomic processes, especially those involving domestic politics, class, gender, race and ethnicity.

The role played by gender as a social construct in shaping the contours of any discourse centred on the political ecology of sustainable development is increasingly recognized thanks to relentless efforts of gender scholars spanning a multitude of academic disciplines as well as theatres of transformative grassroots level action. Women are increasingly "redefining their identities and the meaning of gender through expressions of human agency and collective action emphasizing

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struggle, resistance and cooperation" (Rocheleau et al. 1996) in turn redefining environmental issues to include feminist epistemologies. Though these discourses have helped us to create a more just society, which is the fundamental aim of gender studies, entrenched notions of male dominance still prevail in the case of the marine fisheries, probably due to a paucity of gender sensitive research (Williams, 2010).

Gender lens and political ecology of mariculture - a theoretical perspective

I have chosen the title of this paper to resonate with that of a path-breaking study by Bina Agarwal (1996) which raised the discourse on gender to a new level, offered a new perspective on the dialectic between conflict and cooperation in the household, and gave a persuasive analysis of the relationship between gender consciousness and political resistance. Though the analysis attempted in the present paper owes much to the insights gleaned from that study, the point of departure is on the "materiality of nature" (the biophysical realities of natural systems and the way these have influenced ecosystem dependence) in the fluid context of the marine ecosystem.

Mariculture, the science dealing with the study of cultivation of beneficial organisms in a marine environment, marks a significant paradigm shift in the way we look at controlled marine production systems. The production from coastal ecosystems through farming, which was less than 0.5 million tonnes in 1950, increased to 10 million tonnes in 1990 and to 36 million tonnes by 2007 (FAO, 2009). Currently 106 nations are involved in farming marine organisms. Just as agriculture makes the terrestrial production system a contested space, mariculture makes the marine production system also a contested space. The struggle for human livelihood, having ecological as well as political dimensions, is affected by a nested system of complex factors that emerge in the neoliberal context of market integration and globalization, the consequences of which are unlikely to be unidirectional.

Bringing gender relations into this arena is poised with many challenges. Gender relations are conceptualized as relations of power between women and men (as revealed in a range of practices, ideas, and representations including the division of labour, roles and resources between women and men, and their attribution to different abilities, attitudes, desires, personality traits, behavioural patterns etc.) and largely seen as a social construct varying over time and space (Agarwal, 1996). Since "it is not just an increase in women's command over economic resources but also the "process"' by which that increase occurs that has a critical bearing on gender relations" (Agarwal, 1996), these challenges are not confined just to the lack of gender disaggregated data but also to epistemological ambiguities. For example, the levels of analysis usually considered by gender scholars such as household, community, market and State are inadequate if we want to provide a political ecology perspective. Moreover, some scholars argue that these institutions (e.g., community) should be viewed as dynamic processes rather than as conventional bounded units in space (Kuhl and Sheridan, 2009).

Property rights are one major form in which relations between natural resource users and the ecosystem manifest. These can be categorized as private, State owned, open access and common (Ostrom, 2000). The marine space is generally conceived as a common property system with higher institutional complexity than other ecosystems. In marine common property fisheries, the role played by women has attained better visibility and recognition (both in academic and political terms). However, few efforts have been made yet to understand the gendered way in which the various dimensions of tenurial relations like control, access, use and responsibilities get put into practice and achieve legitimacy. Many reasons could be proposed for this gap. The whole debate on marine Common Property Rights (CPR) issues arose following the 1982 United Nations Convention on the Law of the Sea and initially centred around harvest rights like ITQs but, later, on spatial issues. In the case of marine customary rights, gendered aspects remain silent either because the marine domain is historically considered as an exclusive male domain or due to the stigmatized nature of certain coastal property, e.g., the mangrove clam gathering areas used by women in Ecuador (Kuhl and Sheridan, 2009). Unlike the agrarian scenario, the vexed issue of women getting excluded and dispossessed in the marine property rights regime is yet to emerge either as a serious intellectual debate or activist-led struggles. But absence of resistance (overt and covert) doesn't mean absence of inequality (Sen, 1990). As mariculture is a sunrise enterprise in the coastal ecosystem, demand exists for the intervention of maritime States to thrash out appropriate leasing policies. The present analysis is being attempted in this context.

Methodology

The present analysis draws on the author's insights derived from conducting studies on gender issues in Indian marine ecosystems for the last four years. The current study is a follow up of an earlier study (Ramachandran et al. 2007) which analysed gendered spaces in the technology-sustainability interface in two fisheries contexts, mussel farming and tuna fishing. Along with mussel farming, two more technologies, open sea cage culture and seaweed farming, were subjected to similar analysis from 2008 to 2010. Field studies were done in several locations where these technologies were diffusing: Padanna and Kollam in the State of Kerala for mussel farming; Visakhapatanam (Andhra Pradesh), Karwar (Karnataka) and Balasure (Orissa) for open sea cage farming; and Ramanathapuram district (Tamil Nadu) for seaweed farming. The study was conducted using a combination of household socioeconomic surveys done along the two coasts and case studies of different stakeholders along the value chain of mussel as well as seaweed farming. A number of secondary sources also were consulted before arriving at conclusions.

Results and Discussion

a) Mariculture in India – a comparative overview

In recent times, mussel, seaweed and open sea cage farming are mariculture technologies that attracted the imagination of Indian coastal stakeholders. While mussel *(Perna viridis*) farming technology has diffused along the Malabar coast, seaweed (*Kappaphycus alveressii*) farming prevails along the Coromandel coast after finding a niche in the Gulf of Mannar. Open sea cage culture is the latest entrant; it was only successfully demonstrated in 2007. Since the technical details of these technologies are detailed elsewhere (Kripa and Surendranath, 2008; Laxmilatha, 2009; Rao, 2009), what is attempted here is a comparative overview. However, to amplify the comparison in Table 1, a brief description of the socioeconomic context of each technology is given below.

Mussel farming

Mussel farming in Kerala has a remarkable trajectory. In the late 1970s, the Central Marine Fisheries Research Institute (CMFRI) originally developed the technology for open sea mariculture but it took anchor in estuarine systems in 1995-96 and finally became popular as a women's empowerment tool in coastal Kerala from 2000 onwards. Padanna, an estuarine village on the north Malabar coast, where the first demonstration was successfully conducted, acted as the epicentre of mussel farming in India. The major driver for diffusing the technology was a Muslim male entrepreneur in the village who took the initiative to organise commercial production through women's Self Help Groups (SHGs) in the village (Ramachandran et al. 2007). Until the emergence of mussel farming, the major alternative vocation for these women was collection of clams from the estuary. Now, clam collection is very rarely practiced.

In 2010, the total production of farmed mussels from five districts of Kerala State reached 20,000 tonnes, compared to nil before 1995. Occupying a mere 0.002% of the potential area for adoption the technology has yielded an estimated US$8.64 million as net direct and indirect benefits (Ramachandran et al. 2007). Apart from the economic aspects, the most important feature of the technological change is that mussel farming is dominated, all over Kerala, by female-led SHGs. It has gained popularity and more than 3,000 women have become owners of mussel farms (Kripa and Surendranathan, 2008).

Apart from profitability, what made the technology more women friendly was the fact that, once the racks are made and placed in the water, a job mostly done by men who can be hired at a cost of about $\$5.5 day^{-1}$, the rest of the activities could easily be done by women. These activities included seeding in specially stitched cloth bags tied on ropes, monitoring of growth, harvesting, cleaning (depuration), and shucking. Mussel farming is almost "do-nothing farming" with a short growth period of 4-5months. The seeds and other inputs are brought by male agents who also act as

procurers of the produce. But another important factor was the subsidy support (about $100 per woman farmer in 1996-97 and US$300 per women's SHG in 2004) provided by the State through the *Kudumbasree Programme.* This fact was not mentioned by Kripa (2008) and Laxmilatha et al. (2009). During 2007-8 under the Tsunami Assistance project, the Agency for Development of Aquaculture Kerala (ADAK), which is an autonomous body under the Government of Kerala, released an amount of US$24,000 as subsidy to about 100 woman SHGs. Although State financial support and the licenses issued by the Panchayats (ie, village level local government bodies) were restricted to women SHGs initially, since 2008 these benefits have been extended to men's SHGs, having seen how lucrative the ventures were. This is a very significant change in terms of gender ideology.

Seaweed farming

In coastal India, seaweed farming underwent a transition from an activity based on organized "collection" from the sea by women (*Gelidiella spp*, *Gracilaria spp*, *Sargassum spp* and *Turbinaria spp*), which was started commercially in the late 1960s by fisherwomen in the Gulf of Mannar region, to that of "culture" (again mainly by women) which began in about 2000. Seaweed mariculture in India received a decisive impetus with the entry of red seaweeds like *Kappaphycus alverizii,* the cultivation techniques of which were standardized by a public funded research organization (Central Salt and Marine Chemicals Research Institute (CSMCRI)) and popularized by a transnational company (Pepsico). Production of *Kappaphycus* increased from 21 tonnes (dry form) in 2001 to more than 700 tonnes in 2009.

A seaweed farmer typically earns US$65-120mth^{-1}. About 1,000 people, mainly women, are currently engaged in Kappa farming using the bamboo raft method which was standardized in 2003 after the mono-line method was found to be unviable due to severe grazing. Until 2008, the cultivation is organized mainly as a contract farming system under Pepsico, after which it was continued by Aquagri Processing Private Limited, a company formed by former Pepsi officials to which Pepsi transferred its seaweed business operations in India along with a global patent.

Since seaweed is being grown as a cash crop which is exported as raw material for extracting carrageenan, it is subjected to fluctuations in international markets. The price spread along the value chain is also large: the price is US$0.05.kg^{-1} for wet weight, US$0.41. kg^{-1} for dry weight (conversion ratio 1:10) and US$7-10. kg^{-1} (conversion ratio 1:30) for refined carrageenan. Domestic processing facilities are being developed now in India. Apart from carrageenan, other products like liquid bio-fertiliser and cattle feed supplements are derived from seaweeds.

Seaweed farming receives support from the State in terms of a subsidy (50% of the project cost but limited to a maximum of US$227 person^{-1}) as well as capacity building support. In the absence of leasing policies, the State exercises control in two ways: one, by making training in seaweed cultivation by a State-run training institute compulsory; and two, by restricting the

cultivation to persons holding a food ration card for the Public Distribution System. A group comprising five members is allowed to grow 45 rafts (1 x 1 m size) each. Though the crop duration is 45 days, farmers ensure continuous harvests through staggered planting. A one hectare farm can yield a net income of US$10,409 with a total cost of production US$15,772 and gross revenue of US$26,181 (Krishnan and Narayankumar, 2010). The monopsony enjoyed by Aquagri in the market has been recently shaken with new entrants like SNAP.

Kappaphycus is an introduced crop and, therefore, allegations of bio-invasion threats have been made, mainly because the Gulf of Mannar is a marine sanctuary. Although seaweed culture is now allowed only in Palk Bay, accidental entry of *Kappahycus* is (controversially) alleged to have the potential to cause damage to coral reefs in the Gulf of Mannar. This demands the attention of coral reef ecologists.

Open sea cage farming

Open sea marine cage culture is the latest innovation in Indian mariculture. The logic of floating cage culture is the conversion of marine space into a controlled production system. In India, the first open sea cage farming was demonstrated in Visakhapatanam in 2007-08 by CMFRI. The frontline demonstrations were conducted in 10 more locations from 2008 to 2010 under a Public-Private Partnership mode where the project cost was met by the National Fisheries Development Board (NFDB) under the Ministry of Agriculture. The technology was transferred to selected fishermen's groups who received financial support from NFDB and technical backup from CMFRI.

When contemplating importing cage culture technology from Norway in the early 2000s, the cost of installation of the cages was of the order of tens of millions of rupees. The high cost discouraged many interested entrepreneurs. Moreover, no country was willing to share the technology *per se*. Once the cages were designed and fabricated indigenously, the cost of investment was scaled down from about US$11,364 for a 15m diameter cage to US$1,364 (for an epoxy-coated cage of 6m diameter excluding nets) over a span of four years of R&D effort. In 2010, the average revenue realized through open sea cage farming was US$9,090 depending on the species (sea bass or lobster) farmed. The capital turnover ratio (with respect to sea bass cage farming) works out to be 2.54 with a benefit:cost ratio of 2 (at 20% discount rate). The innovation is on the verge of takeoff on a wider scale of adoption. Currently about 600 people are engaged in open sea cage farming in 11 locations.

Because the marine fisheries production of India is plateauing at around 3.0 million tonnes, the scope for further increases in capture fish production is limited. In this situation, meeting the Indian XII Five Year Plan target of 12 million tonnes in total fish production is a big challenge. But the Indian EEZ, with an area of 2.02 million square km, if viewed as an alternate food production system, apparently offers immense potential by way of mariculture. This is the potential that the CMFRI innovation aimed to tap for the benefit of the coastal communities. Open sea cage farming,

which is being operated and owned as a community enterprise, has come as a boon to the multitude of coastal stakeholders.

Gender issues across the technologies

Table 1 below reveals common issues of interest for a gendered reading of the political ecological context of the three mariculture innovations discussed above. The elements of comparison in the Table have been used to work out four cross cutting gender issues that follow.

Table 1. Mariculture in India - a comparative overview.

Element of comparison	Seaweed farming	Mussel farming	Open sea cage culture
Technology details			
• **Type**	Raft farming	Rafts	HDPE* cages
• **Source**	CSMCRI	CMFRI	CMFRI
• **Promoter**	A transnational company (PEPSICO)	A national research institute (CMFRI)	CMFRI
• **Epicenter of diffusion**	Gulf of Mannar and Palk Bay	Padanna, Kerala	Visakhapatanam, Andhra Pradesh
• **Year of demonstration**	2000-02	1995-96	2007
• **Diffusion status**	Large scale	Large scale	Niche
• **Crop window**	45 days	6 months	9-12 months
Social and economic dimensions			
• **Gender**	Largely feminine	Largely feminine	Masculine
• **Market**	Export	Domestic	Domestic
• **Recent drivers in value chain**	Domestic production of seaweed sap	Technology for extracting green mussel extract	Low cost cages
• **Value chain integration**	Mostly as raw material exported	Domestic consumption	Domestic consumption
• **Property rights regime**	Common property resource	Lease + common property resource	Common property resource
• **Resource conflicts**	Not yet reported	With estuarine fishers	Nil

• **Institutional support**	Bankable project Subsidy to groups	NABARD* approved Subsidy to SHGs under Kudumbasree programme	NFDB support
• **Ownership unit**	5 member group Condition for at least one woman per group removed recently	SHGs mostly female , men's SHGs also allowed	Fishermen groups
• **Human resource development support**	Training by Fisheries Department	Training by CMFRI	Training by CMFRI
• **Sourcing of wild seed done by**	Women	Men (women purchase)	Men (women purchase)
• **Livelihood option substituted**	Seaweed collection Fishing	Collection from wild, fishing,	Fishing

*HDPE=high density polyethylene; SHG=self help group; NABARD=National Bank for Agriculture and Rural Development.

1. Mariculture as women's empowerment platform

Except for open sea cage farming technology, mariculture has proved to be a successful platform for women's empowerment. In the cases of mussel and seaweed farming, women adopters had earlier depended on collecting natural resources (clams and seaweed, respectively) from the wild for their livelihood. Wild collection was more labour intensive. Their empowerment was manifested as economic (improved income under their control), political (more women members in the decision making bodies), and social (women able to exercise group pressure to eliminate or diminish vices like alcoholism, afford to send children to school for longer durations and prevent dropouts). The availability of disposable income has improved many women's "fall-back position" which in turn has increased their "bargaining power". A common mode of savings observed used by the women farmers was purchasing gold for their daughters, a tactic generally kept as a secret from their husbands. The women's self perception also has undergone positive changes. They reported "feeling more confident to meet government officials", "mustering courage to question consumption of spouses", "being able to appease mother-in-law with a saree which in turn helps to command respect". Expressions such as "able to buy foods of choice" or "afford to buy rations during lean seasons" were more often heard among women seaweed farmers of Tamil Nadu than mussel farmers of Kerala. This indicates the inherent difference in the level of living standards existing between the two locations namely Tamil Nadu and Kerala.

2. Erosion in State support for women's empowerment

This is a serious problem which demands more attention from gender scholars. When started, the State promoted mussel and seaweed farming as women-only enterprises. In the case of mussel farming, the frontline demonstrations initiated by CMFRI were supported by State agencies such as Development of Women and Children in Rural Areas (DWCRA) which was further carried forward by the *Kudumbasree* programme, a Kerala Government women's empowerment networking initiative. Since these agencies had women's empowerment as their stated mission, financial support in terms of subsidies and loans were provided only to women farmers. But once the profitability of the technology was established by the women's SHGs, the enterprises became bankable and banks came forward with loans. However, the banks could not keep the slogan of women's empowerment for long as competition in the banking sector increased after liberalization of the economy. "Initially they (men farmers) had to include at least a few of us (women) as members in the group to avail of loans, … and we felt a superiority …but now banks give loans to all-men groups also, so we are now competing with men" said a woman mussel farmer in Padanna. Though the women mussel farmers don't find getting bank loans difficult, they feel that they are being deprived of the monetary and consequent privileges they had previously enjoyed. With men starting their own SHGs, inputs like labour and quality seeds are becoming more expensive and effective operational aquatic space is getting reduced. These female mussel farmers fear they may lose out to the male "muscle power" soon. It is suspected that the phenomenon of "male dominated monopolisation" of profit from common property resources is emerging as another reason for marginalization of women.

The case of seaweed farming is slightly different but similar. The experimental stage of *Kappaphycus* culture (2000-2002) was financed fully by the transnational company. But the diffusion stage (2004-2005 onwards) received financial support from the State through SHGs. Since in Tamil Nadu it is mandatory to have 50% women members in each SHG, the room for gender imbalance is less. But, as in the case of mussel farming, the profitability of seaweed farming is luring more men's groups to the enterprise and banks have come forward to assist them with loans.

3. Feminization losing grip in maricultural space

Coastal/maricultural space is becoming masculine despite the avowed earlier objectives of women's empowerment by the State. In 2010, the upper house of the Indian parliament passed the much-debated Women's Reservation Bill which will ensure that 33% of positions in all elected decision-making bodies are reserved for women. Thus, while on the one hand the State legitimizes genuine gender concerns on a macro-political level, it is becoming invisible, perhaps satisfying a neo-liberal agenda, in those very spheres where women were historically rendered as invisible entities both economically and politically.

4. Gender balancing or biasing Common Property Rights?

New drivers are appearing in the value chains for marine products. For example, in the case of mussel farming, CMFRI has developed technology to extract a nutraceutical called green mussel extract; and in the case of seaweed farming, domestic processing facilities and new products are now available. The prospects of these mariculture technologies being disseminated more widely are bright. As competition increases, the expansion in farming area will make it a contested space. Thus, it is the benign duty of the State to come out with proactive, rational and gendered leasing policies to keep these enterprises robust. Such policies should also take into consideration the ecological vulnerability of these fragile ecosystems.

Most accept the truism that women tend to be the better economic stewards at home. They are expected to be otherwise when it comes to ecological stewardship. Responsible management of natural resources depends on a sense of ownership. Unlike landed communities, the concept of inherited property rights is alien among fishing communities and this makes fisherwomen more likely to be disempowered. Inheritance of means of production like fishing vessels and gears strictly follow notions of patriliny in the communities studied in all the locations. The dowry system, though legally banned in India, is still prevalent among the coastal communities. The grave concern "they (men) can go back to the sea, but where shall we go" raised by women mariculturists needs to be addressed by the State.

In this context, a marine common property leasing policy should have an inherent feminine bias which can be pragmatically defended by keeping the shallow water areas in the sea (for example, up to a depth of 6 m) reserved for women mariculture farmer groups alone. This depth is sufficient to establish even an open sea cage culture unit. A lease amount can be fixed as the license fee, based on the production and income realised by the women farmers. In 2000, even Pepsico paid the Tamil Nadu Government a fee, in this case about US$4,500 for a 10 km stretch of bay. But future lease deeds or licenses must rest securely with the women's groups. Carrying capacity studies should be mandatory before renewing year to year licenses. Incentives, such as concessions in the lease amount, can be given to those groups who ensure ecosystem health through responsible management measures.

Conclusions

As a sunrise enterprise, the mariculture enterprise in India is composed of three prominent technologies, namely mussel farming, seaweed farming and open sea cage farming. These provide alternative or, more correctly, additional income avenues to the coastal fisherfolk. Out of the three technologies which were subjected to a comparative analysis in a gendered political ecology context, two technologies, mussel farming and seaweed farming, were found to act as women's empowerment platforms on economic, social and political dimensions. However, women's assurances to continue using these technologies as empowerment platforms are getting vitiated by

emerging issues. The most important one is the ambivalence shown by the State. On the one hand, it manifests itself as a positive "bargaining" force in the intra-household domestic space by providing State-sponsored platforms through the Self Help Groups, while on the other hand, staying outside the "common access resource" space, from which these platforms gain sustenance, and thus rendering the space less amenable to its democratic ideals.

Only a visible State can bring fisher-women out of sociopolitical invisibility. Or will the market, instead, do the job, undercutting the role of mariculture as a women's empowerment platform? Nevertheless, it is time that gender scholars the world over are encouraged to proactively support the cause of women mariculturists by rallying behind the argument that leasing policy should be gender biased, protecting the interests and role of women farmers, rather than gender neutral.

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Braving the Sea: The Amasan (Women Divers) of the Yahataura Fishing Community, Iki Island, Nagasaki Prefecture, Japan.

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Abstract

Ama, or amasan which literally means "sea person", are women and men divers who use rapid diving techniques without using scuba gear or compressed air. Honed by years of experience, the ama are professional divers whose diving prowess depends largely on their lung capacity, diving speed, resistance to cold, intuition for finding their target organisms and determination to succeed. Ama dive for seaweed, shellfish, sea urchin, lobster, sea cucumber, oyster, octopus and abalone, this last being the most preferred catch. Despite their significant contribution to the fishing industry, the ama remain invisible and marginalised.

Using participant observation, focus group discussion and key informant interviews, the present study provides a picture of the women ama in the fishing village of Yahataura, Iki Island, Nagasaki Prefecture, Japan. Female divers' access to and control over resources, activities and time allocation, and access to administrative decision-making processes were examined in relation to that of male fishers. The results of the study substantiate the important role of women in the fishing communities and affirm the long standing social problem of their low status in society, especially compared to that of men. Some ways to improve their social standing in the community are suggested.

Introduction

Having been in existence for 2,000 years, ama (or amasan), which literally means "sea person," are men and women divers who use high-speed diving techniques but without scuba gear or compressed air. Honed by years of experience, ama are professional divers whose diving prowess depends largely on the lung capacity, diving speed, resistance to cold, intuition for finding their catch and determination to succeed.

The term ama was first used in the 12th century to mean "fisherman," regardless of sex as both men and women sourced their income from the sea. The numbers of male and female ama found vary with location. Data from Toshifumi's (1989) nationwide survey of 774 fisheries cooperatives (with a response rate of 67% from 34 prefectures) showed that Chiba, Mie and Nagasaki had the greatest number of amasan numbering 3,472, 3,378 and 3,337, respectively (Table 1). Of these prefectures, Mie (3,063), Chiba (1,743), Nagasaki (553) and Iwate (550) had

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the greatest numbers of women divers. Since ancient times, Bouchy (1999) found that, in some regions of Japan, women were the only divers. In some places, ama were mobile, moving from west to east along the Japanese coastline. As the male ama found other jobs in fishing, women divers were left to do most of the diving. Over the years, the word, ama, became associated with women divers.

Table 1. Distribution of ama, 1985 (Toshifumi 1989).

Prefecture	Males	Females	Total
Hokkaido	0	2	2
Aomori	130	0	130
Iwate	535	550	1,085
Miyagi	170	70	240
Akita	92	0	92
Fukushima	231	0	231
Ibaraki	99	0	99
Chiba	1,729	1,743	3,472
Tokyo	395	30	425
Kanagawa	286	0	286
Niigata	114	51	165
Toyama	8	0	8
Ishigawa	8	278	286
Fukui	223	486	709
Shizuoka	186	493	679
Aichi	5	0	5
Mie	345	3,063	3,378
Wakayama	859	126	985
Kyoto	14	0	14
Hyogo	74	0	74
Tottori	13	40	53
Shimane	116	30	146
Yamaguchi	737	239	976
Tukushima	658	195	853
Ehime	207	30	237
Kochi	192	1	193
Fukuoka	484	160	644
Saga	191	11	202
Nagasaki	2,784	553	3,337
Oita	175	13	188
Kumamoto	88	0	88
Miyasaki	24	0	24
Kagoshima	448	0	448
Okinawa	76	0	76
Total	**11,696**	**8,164**	**19,824**

Dressed in torso-covering wetsuits, ama dive for seaweeds, shellfish, sea urchins, lobster, sea cucumber, shellfish, oyster, octopus and abalone. Abalone are the preferred catch because they are one of the most prized seafoods. The average price for a kg of abalone is nearly 8,000 yen (almost US$70 on 2011 exchange rates).

Abalone features in the cultural history of Japan as much more than a choice seafood. It used to be served to the Emperor, other high ranking members of the court (Bouchy, 1999) and at Ise Shrine.

Our interest in ama stems initially from the image that they project to outsiders, in contrast to geisha stereotypes or the widely held image of Japanese feminine beauty and behaviour as quiet, slim, shy, demure, self-effacing, and pale. But as we investigated the ama through the works of writers, Japanese and foreign, we were struck by the many different pictures that have been painted of ama. Some are complementary, and some are derogatory. In an apparent contradiction, women ama are highly regarded for their professional diving skill in male-dominated fishing communities but they are accorded lower social status than men as ama diving has been perceived as a job only the poor and uneducated would choose. The amas' contributions to Japanese society and culture have remained hidden and unacknowledged.

For a developed country that promotes gender equity, the lower status of ama cannot be ignored. However, in the Japanese fishing sector women are highly marginalised and the realisation of their dreams and quest for social justice is elusive. One manifestation is the employment data which shows that women's labour participation is lower than that of men. In 2005, women's participation was highest in the service (or tertiary) industry at 46%, followed by agriculture, forestry and fisheries (or primary industries) at 41% and manufacturing (or secondary industries) at 26% (Table 2). In fisheries, while men's participation rate was 84%, women's (self-employed and hired) was 16% only (Ministry of Agriculture, Forestry and Fisheries, 2005). Women's participation in many fisheries-related activities could not be presented due to the absence of statistics.

Table 2. Employment by Industry and Gender, Japan, 2005 (Ministry of Internal Affairs and Communications, 2005).

Industry	Male		Female		Total
	No.	%	No.	%	
Agriculture, Forestry, Fisheries	1,736	59	1,204	41	2,940
Manufacturing	14,454	74	5,044	26	19,498
Service	8,633	54	7,499	46	16,132

The present paper examines the situation of Women ama in Japan. The study was conducted in 2008.

Materials and Methods

This paper presents ethnographic research using a feminist approach (Kabeer, 1994; Naples, 2003; Reinhartz, 1992; Stanley and Wise, 1993). Several different data gathering techniques were used, including key informant interviews, participant observation and focus group discussion, to obtain information on women's access to and control over resources, their work activities within and outside the household, the time allotted for household activities, their views on their work, and their problems and aspirations in life.

We carried out a documentary analysis to supplement the primary information obtained from the respondents. The key informants, selected based on their detailed knowledge of the amasan, were the head and staff of the Fisheries Cooperative Association (FCA) of Tobu where the amasan reside, the male boat operator who accompanied the ama to sea, the leader of the amasan group and the older women divers. Interviews with the head of the cooperative and the staff were done separately at the office of the cooperative over three consecutive days while those of the women divers were carried out in their houses, on the boat before and after diving, and at the fishing port itself. A female staff member of the cooperative, in charge of coordinating and facilitating all the activities of the ama, selected participants for focus group discussion based on the women divers' willingness, availability, position in the group and active participation in the cooperative's coordinated activities. The discussion was conducted exclusively with women divers to allow them to voice their opinions freely and spontaneously.

The FCA facilitated participant observation. To explore the village context, accommodation was arranged at an inn in the village. The FCA provided access to its office and facilitated direct observations of the fishers' fishing facilities and fishing-related activities and the operation of the cooperative, and participation in women divers' activities after diving. A tour of the cooperative's fishing ground was organised by the head of the cooperative to show the fishing boundary of the cooperative and the fishing ground allotted to the women divers. Examination of local abalone outlets, and talks on the prevailing demand and market prices of abalone, pollution problems, and the declining productivity of the sea confirmed the information already provided by the women divers. For firsthand experience with women divers at sea, a diving trip with a group of women divers who dived at a deeper fishing ground was arranged by the FCA on one of the diving days. This provided access to the detailed activities involved in the ama's diving; private conversations were thus enabled between the researcher and the subjects, although underwater observations were not made. An interview was also conducted with the male boat operator, covering his role and the diving skills and experiences of ama. Following the diving trip, the lead author helped in hauling and de-shelling sea urchin. A second, shorter trip was arranged by the FCA to observe another group of ama who dived at relatively shallower fishing grounds without the aid of a boat.

To explore activities the ama divers engage in during the diving season, we used a structured questionnaire to interview five married ama divers, with grown-up children, about their activities and time allocation. The information we obtained from these cases was validated by the ama diver participants in the focus group discussion and by staff of the FCA. Information on the activities of ama divers in the community was gathered from the records of the FCAs and validated by the ama diver leader and active ama divers of the cooperative.

We conducted the key informant interviews and the focus group discussion in Japanese and recorded them. The documents analysed included: socio-demographic and economic reports of Ashibe town; historical records on ama; the organisational structure and operations of the FCA; the annual reports of the FCA; and income of the ama from diving.

The site for this study was Yahataura village of Ashibe Town, Iki City, Nagasaki Prefecture. The study site was determined mainly by the willingness of the FCA to accommodate the research, the right timing for ama diving, the presence of 54 women divers, and their willingness to participate.

Results

The study site

Iki island is located in the Genkainada (sea) 67 km from Fukuoka City and 26 km from Yobuko-cho, Saga Prefecture. It is shaped like a turtle, running 17 km north to south and 15 km east to west (Fig. 1). Ashibe town is located northeast of the city of Iki and has a land area of 45.09 km^2, accounting for almost a third of the city's total land area. In 2004, the population was 10,544 persons, the average household size was 2.9 and the population density was 226.9 persons· km^{-2}. The average age was 47.6 years. At 52.9%, women formed the majority of the population.

Fig. 1. Approximate location of Iki City. Source: Wikipedia

Ashibe's economy was dominated by the service (tertiary) industry employing 2,195 persons or 52% of its productive labour force, followed by farming and fishing (primary) industry 1,235 persons or 29%, and manufacturing (secondary) 816 persons or 19% (Table 3). Women's labour participation rate was highest in the service sector (52%) and lowest in the manufacturing sector (29%). Their participation in farming, forestry and fisheries was 40%. While women comprised half of those employed in the farming sector (50%), they were only 18% of employees in the fisheries sector. This local pattern of women's employment mirrors the national pattern. No statistics were available on women's participation in the various fisheries.

Table 3. Employment by industry and gender, Ashibe Town, Nagasaki Prefecture, 2005 (Statistics section, Iki City Hall, Nagasaki Prefecture 2005).

Industry	Male		Female		Total
	No.	%	No.	%	
Primary	742	60	493	40	1,235
Farming	428	50	424	50	852
Forestry	3	100	0	0	3
Fisheries	311	82	69	18	380
Secondary	580	71	236	29	816
Tertiary	1058	48	1137	52	2195

One of the sites of fish production in Ashibe is the Yahataura fishing village, noted for the presence of many women ama. Economic activities in the village were quite limited; the majority of people relied mainly on fishing. Farming was confined to a few people only. Because no factories were located in the area, many people, especially women, were forced to find employment in the nearby villages.

The Yahataura ama women divers

The ama and the Tobu Fisheries Cooperative Association (FCA).

In Japan, fisheries activities are governed by the Japanese Fisheries Law and the Japanese Fisheries Cooperative Law. The Japanese Fisheries Law is the principal law that regulates fishery activities including granting fishery rights solely to the FCA operating in a particular fishing village. The Japanese Fisheries Cooperative Law provides the legal framework for the local FCA, which bears the responsibility for the village (Food and Agriculture Organization, undated). Engagement in any fishery activities requires membership in the FCA for that geographical area.

In Yahataura, the Tobu FCA bears responsibility of managing all fisheries-related activities. To engage in diving requires membership in the Tobu FCA. Thus, all ama women divers in Yahataura are registered members of the Tobu FCA. As members, they are given access to the fishery rights granted to the Tobu FCA by Nagasaki Prefecture, subject to a number of fishing regulations set by the prefecture and the FCA, and to services offered by the FCA including marketing of catch, credit, supply of inputs, insurance, warehouses, training, and resource enhancement. For marketing their catch, ama divers have to bring their catch to the FCA, after which the FCA weighs, records, packages, sells and credits the payment of the catch directly to the ama's account. In return, the FCA takes a commission from the sales. There is no employee-employer relationship between the divers and the Tobu FCA.

The ama's origin, number and types.

No formal information is available on the origin of amasan in Yahataura. People believe that Yahataura amasan, who used to frequent Ise Shrine every year to pay homage to Ise, came from Ise of Mie prefecture (Miki, Natsuko, personal communication, August 11, 2008).

The 2004 Tobu FCA's report indicated a total of 54 female ama: 24 of the 54 were in their 50s; 17 in their 60s; 5 in their 40s; 4 in their 70s; 3 in their 30s; and 1 in his/her 20s. The number of ama, however, is projected to continue to decline (Table 4). The decline is attributed to the continuing out-migration of the younger people, lack of succession, and general population decline.

Table 4. Projected numbers of ama divers, 2004-2019, Tobu FCA (Tobu FCA, 2005).

Age Bracket	Year 2004	2009	2014	2019
20-29	1	0	0	0
30-39	3	3	1	0
40-49	5	4	3	3
50-59	24	13	5	4
60-69	17	22	24	13
70-79	4	12	17	22
Total	54	54	50	42

There were two types of ama in Yahataura: *cachido* and *funado*. The *cachido* (walking people) ama, easily distinguished by the light blue tubs they carry, relied on the services of boat men, who take them to a breakwater from where the ama swim to their fishing ground. The same boatmen collect the divers and return them to the fishing port. The *cachido* ama dive to a depth of 4-6 m to collect seashells. Each dive lasts for about 30 sec. After 30 sec of rest, they make their next dive. This dive pattern is repeated for about 5 $hr \cdot day^{-1}$. The *cachido* tend to be older women. The oldest was 74 years old.

The *funado* ama, distinguished by their colourful tubs (orange, yellow, or pink), dive in groups, usually of 5 to 6 members, assisted by a boat operator. The men ama belonged to this group. *Funado* ama dive from an anchored boat to a deeper fishing depth (7 to 15 m). Each dive lasts for 30-40 sec, and, after 30 sec of rest, the next dive is undertaken.

The ama's swimming suit and tools.

For body protection when diving, the Yahataura amasan do not wear the black rubber wet suits prescribed by cooperatives in other parts of Japan or the short pants or long white cloth used in the early days. Instead, they wear modern stylish tights of plain dark colours or coloured prints and tops of coloured cotton or polyethylene. Long necked and sleeved shirts are worn during cold months of autumn and winter. They have resisted wearing black wet suits to avoid over-harvesting resources. They argued that the warmth offered by the black rubber wet suits would encourage them to stay longer in the sea and so harvest more. The ama now wear a

facemask to protect their heads, goggles to enable them to see underwater, and a pair of flippers of varied colours to improve kick strength, ankle flexibility, body position and speed.

The ama's tools.

The ama women divers were equipped with simple traditional fishing tools. These were: the *hanzo*, a metal colour-coded floating tub used to contain their catch and also acting as a buoy marking the location of the diver; two *awabi okashi* metal scrapers, one short and one long, for picking abalone from crevices and crannies and cleaning them; *awabi ami*, a net bag for holding the abalone catch; *uni-tori*, a hand tool with a hooked tip for picking up sea urchins; *pumpo*, a plastic siphon hand-pump used to bail water out of the tub; *uki*, a float; and *omori*, an anchor tied to a rope.

The amas' goya.

In the past, an *amagoya* was a hut built along the coastline in which the ama rested and relaxed with their companions. For Yahataura ama, a shaded part of the boat served as their *amagoya* or social centre where they rested, ate, changed clothes before and after diving, laughed, told jokes, talked and gossiped. Subjects ranged from family and community concerns (bills, who is who, divorce, marriages) to beauty care, fashion and the spiraling prices of basic commodities including their swimming wear. The women considered the *amagoya* as their space, away from the demands of husband and family. That is where they felt a degree of freedom and independence.

Ama's diving.

For the ama divers, the most enjoyable time was that spent in the boat before and after diving. They typically made two diving trips a day. The first, for at most 3 hr (from 11:00 to 13:00 , if harvest was good, and could be extended to 14:00 if the harvest had been scanty) to one fishing ground. The second trip, to a different fishing ground, lasted for 2 hr (from 2:30 or 3:00 PM to 5:00 PM). Total diving time was 5 $hr \cdot day^{-1}$. The diving day normally ended at 17:00.

The ama divers follow certain practices before diving. Due in part to modern influences and cultural expectations of a Japanese woman, the women divers apply a heavy foundation cream to their faces to guard against the drying effects of saltwater and the scorching heat of the sun; they thus maintain unblemished facial skin. They prepare a gum as an ear plug to keep water out of their ear canals and to control pressure effects from diving to depth. For their health, the divers consume vitamins and medicines believed to protect them from hypothermia. Before donning them, each diver washes her goggles with a *ramin* leaf and sea water. Wearing their modern flippers, they climb down the boat's ladder, take their tub and gear and swim out to their chosen spot.

An ama diver then holds her breath and dives to the bottom, amid heavy thickets of vegetation, where the abalone and sea urchin feed. She searches the vegetation or rock crevices for abalone. Each dive takes about 30-40 sec, depending on the species sought. Prying abalone from the substrate takes longer than harvesting other species. Once one is seen, it is quickly cleansed with the scraper and placed in the net bag attached to the diver's waist. The ama swims to the surface unassisted, lets out a sharp whistle, readjusts her breathing, swims towards the bucket, empties the catch from her net and places it in the tub. Sea urchin and turbo shells are placed directly in the tub. In between a set of dives, ama divers rest for 3-4 min. When they feel that they have had enough for the first trip, they swim towards the boat. The boatman then hauls the catch onto the boat and places it in rectangular plastic boxes.

When the second diving trip is completed, the catch is sorted in the boat while the boatman motors back to port. The catch is unloaded with the help of men at the fisheries cooperative, weighed, recorded and, except for sea urchin, readied for marketing. After weighing, sea urchins are taken home for de-shelling and scooping out the gonads. These are then sold to local buyers. Processing sea urchin takes about 30 min or more, depending on the catch.

The ama's whistle sound (*isoboue*).

The Yahataura ama make a whistle sound, either short or long, that resembles that of a "deep sigh or gasp". The *isoboue* varies in sound. Some divers let out a short "ha", others a long "haay". To an outsider, it can be disturbing as it suggests pain. The ama explain they have to whistle to expel the pain in their lungs, to purge a feeling of heaviness, to gasp for air, and to re-adjust their breathing. At sea, the ama divers' whistle coming from beside their floating colourful tubs is distinctive.

The ama's income from fishing.

The income of ama women divers varies depending on factors including the diver's age, fishing experience and skill in diving, the weather, the species caught, and location of fishing ground. Records from the FCA showed the 2007 annual average per capita for a ama diver reached 61,086,603 yen or US$ 52,329.97. The highest average annual income, 1,522,232 yen or US$ 13,040.23 was earned by those in the age bracket 50-59 years. Many of these ama divers were *funado*, diving in the deeper fishing grounds.

Income from diving is dependent on the market prices of the species caught. In 2008, the average price of a kg of sea urchin was 8,000 yen (US$ 68.53), abalone 6,300 yen (US$ 53.97) and turban shells 600 yen (US$ 5.14). On average, a woman diver's daily catch of sea urchin was 1.1 kg, abalone 0.5 kg and turban shells 3.8 kg. (Shimojoh, Akihiko, personal communication September 27, 2011). A day's income from diving, therefore, earned her an average of 14,230 yen (US$ 121.90). That was higher than the average daily income of 6,400 yen (US$ 54.82) she might have earned from a part-time job, derived from multiplying the maximum working hours of 8 in a day by the hourly part-time rate of 800 yen (US$ 6.85). Information from Grenald (1998) and Kadri (2003) corroborated this conclusion. During the diving season, the amas' earned income was higher than that of their husbands.

Projected income, however, showed a declining pattern with the declining number of ama divers and their aging (Fig. 2).

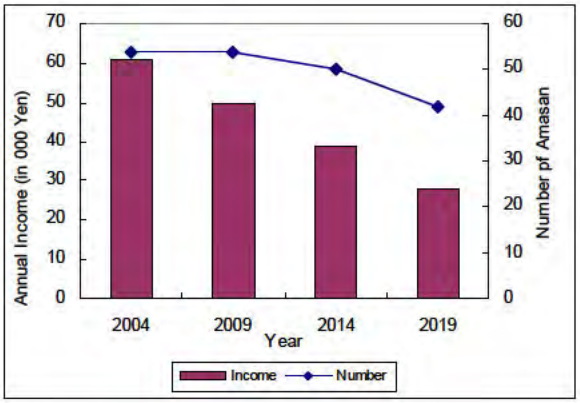

Fig. 2. Trend in annual income and number of amasan, Tobu FCA, 2004-2019.

The women ama said, despite this high income, their daughters and daughters-in-law showed no interest in following their mother's or grandmother's footsteps (Grenald, 1998; Kadri, 2003; Shimamura, 2009). The risks and hazards they face when searching for their catch, the possibility of having their skin tanned by the sun, and the grime associated with diving have kept many young people from diving (Grenald, 1998; Kadri, 2003). Most of the male fishers in Yahataura did not engage in diving for a number of reasons: they already have their own fishing activity; they were not trained to be an ama; and women could withstand the cold better than men.

Ama's access to and control of resources.

Ama's access to and control of fishery resources was regulated by the male-dominated Tobu FCA which took charge of distributing its fishery rights (Types 1 and 2) to its members and regulating their fishing activities. The fishing ground assigned to the ama was the one granted with Type 1 fishery rights.
[a]

[a] Type 1 fishery rights refer to those for fisheries: 1) for seaweeds, shellfish, crustaceans, and sedentary fin fish species, 2) employing fixed gear, e.g. traps and the like, 3) beach seines, non-motorized trawling (boat seine) and others that are relatively immobile or stationary gears on the fishing ground, and 4) those in inland-waters. Type 2 fishery rights are granted for aquaculture and are within waters governed by joint fishing rights. Type 2 fishery rights are of two types: special demarcated rights which relate to aquaculture using sea-ponds, raft nets and long-lines, exclusively given to FCAs, and demarcated rights granted for pearl culture and large-scale aquaculture projects involving the partition of sea inlets by dykes or nets, given to FCAs, individuals and private companies with the technical capability and required investment capital.

It had a rocky shore and reefs where shells such as turban shell, abalone and sea urchin would thrive and was located about 2 to 3 km offshore.

In the case of the *funado*, the identification of the fishing ground for the day was largely decided by the male boat operator, whose boat was equipped with a fish finder to measure depth and a Geographical Position System (GPS). The boat operator selects the ground based on tidal currents, water depth and the amasan's physical ability to collect the shellfish.

The fishing season for abalone, turban shells and sea urchin used to be from May to September each year. But to conserve the resources, the Cooperative decided to shorten the fishing season to four months, from June to September.

Ama's access to administrative/managerial decision-making positions.

The structural organisation of the Tobu FCA showed that women ama have no participation in administrative/managerial decision-making processes. The 5-member Board of Directors tasked to review the budget, policies and programmes of the cooperative was all male and so were the three committees created to examine the qualifications of members of the FCA, investigate fisheries-related concerns, the Executive Directorship of the FCA in-charge of implementing the policies of the FCA, and maintain the welfare and sustainability of the cooperative.

When asked why no women ama were in managerial positions, the head of the Cooperative responded that "the women are noisy. They talk a lot. Better leave things to men. They (the ama divers) have their own group. It is enough." This is one way of saying that the managerial positions are not for women, a reflection of the traditional idea of women as mothers and wives while men are breadwinners and leaders, concepts deeply ingrained in the minds of Japanese women and men (Hendry, 2003; Morley, 1999; Shinotsuka, 1995, all cited in Kitamura, 2008).

The core staff of 13, 6 males and 7 females, who assisted the Executive Director in the FCA's operations were young college graduates and they appeared to have no ambition of becoming an ama. Most female staff were assigned to such less physically strenuous tasks as finance and recording of daily catch and fish prices. The males were involved in weighing the catch, ice-making and refrigeration, fish culture, and transporting the catch.

Ama's activities and time allocation.

In general, ama's activities are divided into three spheres: household; diving; and community. Information on the household and diving activities was gathered from the five ama interviewed and pertained only to activities during the season for harvesting abalone, sea urchin and turbo shells. Community activities were obtained from the FCA's annual report and validated with ama.

Household activities

The harvest season for abalone, turban shells and sea urchin keeps an ama busy. She starts her day at 05:00, doing laundry, preparing breakfast and lunch for the whole household, cleaning the house and gearing up for her diving. Those activities take an average of 4 hr. When ready, she then leaves for the fishing port, boards the boat, waits for her other companions and sets out to sea to dive at around 10:00 AM. When diving and marketing of the catch are done, the ama hurries back to the house to wash her swim wear, buy groceries, and prepare dinner while getting the bath ready for her husband and children. Dinner is served, with the television on, immediately after her husband takes his bath. Usually, the ama is the last one to sit down for dinner, after other members of the family have been served to their content.

If no female children are available, the ama washes the dishes, cleans the house (seldom do male children perform household chores) and folds laundered clothes. Rest is taken after her bath, and she is usually the last one in the family to bathe. Even then, an ama takes time to update the records of her income and household expenses. By the time she is finished, midnight is near and time for bed. When an ama lives with a daughter-in-law, the situation is better for the ama because household chores are shared with her daughter-in-law.

Usually, the women's husbands worked much fewer hours. The men spend most of their time (from waking to unloading catch) at sea and on the farm. The husbands do not participate in household chores.

The above household arrangement reflects the traditional beliefs of Japanese family members where the head of the family reigns in the household. All must obey the head, the females must obey the males. So wives obey their husbands and the younger members of a family obey their elders. Any young woman or man who joins the family as wife or husband becomes an adopted daughter or son and thus submits to the elders. The law of seniority requires that the younger members obey the elder members, even in small matters such as at meal time where the elder boy is served first, then the second son and so on. In this family system, a woman is expected to attend to her husband's every need and a man is seen as superior to women (Hearn, 1904; Hendry, 2003; Morley, 1999; Shinotsuka, 1995, all cited in Kitamura, 2008). A woman could not become the head of a family. This explains why, even in this modern era, women continue to stay at home, do the household chores and nurture their families while the men work outside to provide for the family's financial needs. No matter how talented and capable a woman is, she has to take on her responsibilities as wife, mother and caregiver to elder-in-laws. Even if she has time for a managerial position in an institution, she has a small chance only of being accepted.

Community activities

The women ama engage actively in community work, mostly related to fishing. This includes: the ama cooperative general assembly; ama meetings; ama and boatmen meetings; meetings with other ama in Iki; stocking of red sea urchin, abalone and scorpion fish; and cleaning of the seashore. They also participate in a special religious ceremony where ama offer food to the gods for prosperity, happiness and good harvest, marking the opening of the diving season for abalone, turban shells and sea urchin. This celebration coincides with the celebration of the religious ceremony called *Mikazuki shinji* during which ama from various places offer food to the gods. This happens every year on the 10th day of the sixth month of the lunar calendar at Mikazuki beach, situated along the border between Kuzaki and Ijika of Mie Prefecture. Many considered this ceremony so important that it was said, "better to offer food to the gods (that is, participate in the diving ritual) once than to visit Ise shrine seven times" (Bouchy, 1999).

Ama's views of their work.

In the absence of alternative employment opportunities within the community and given their low education, many women ama view diving as a comfort as it is a source of additional income. Married women who relied solely on the limited income of their husbands were forced to learn to dive. This was the case of a woman ama who migrated to Yahautara after getting married to a fisher and who, at the age of 40 and because of financial need, had to learn to dive from a local ama. Most of them considered diving as economically empowering because it permitted them to buy the things they liked without being answerable to their husbands, who are considered the breadwinners of the family. If they have a leadership position in the group, it also earns them higher regard from fellow women divers. Some see diving as something that unites them with nature. Though diving is hard and dangerous, as some said, they came to like it because it connects them with nature, the sea, the wind, and the stars. Others also view diving as a venue for socialisation with their neighbours, and as a time to share their experiences. Diving is seen as exercise, helping them to stay physically healthy as it allows them to trim the weight they may have gained during the off-season.

For all the ama divers interviewed, doing the household chores and taking care of the husband, children and elder-in-laws were viewed as women's responsibilities.

Problems and aspirations in life.

Asked about the problems confronting them, the ama named three: health; water pollution; and declining catches. For ama whose livelihood relies greatly on their physical and mental ability, health is something that is not to be taken for granted. Taking vitamins and pain killers have become common practices. Women ama aspire to have good health to enable them to continue diving. Women ama also complain of polluted water which adversely affects their catch. Their use of a *ramin* leaf to clean their goggles instead of a detergent was seen as a

simple way of limiting further water pollution. In addition, the Cooperative has engaged in stock enhancement and mariculture of abalone, sea urchin and kelp to clean polluted seawater and improve the catch.

When asked of their aspirations in life, most of them mention good health to enable them to continue diving, greater catches, higher prices for abalone, sea urchin and turban shells, more productive fishing grounds, and gainful employment for their children.

Discussion and Conclusion

The women ama continue to play a crucial role in Japanese fisheries and community life, being involved in spheres of reproduction, production and community activities. The stories of the ama affirm the long standing social problems in Japan caused by the low status of women. Renowned for their courage, stamina, diving skill, endurance, and strength, the women ama live a life of danger and hard work and contribute substantially to sustaining the fisheries, family and community, but yet are unrecognised and marginalised.

Gender divisions of labour in the study site underscore the deeply-rooted nature of inequality in the gender roles and relationships in Japan. Gender roles are characterised by a strong sense of patriarchy in the community and society at large, accounting for the rigid delineation of the productive and reproductive spheres. This rigid sexual division of labour validated the results of the survey on time use and leisure activities conducted by the Ministry of Internal Affairs and Communications in 2001 which found that among Japanese married couples, husbands spent little time on household duties, child care and nursing care, regardless of whether their wives worked or did not work (Gender Equality Bureau, Cabinet Office, 2004). This situation forced working wives to shoulder heavy responsibilities both at home and work, leaving them little time to engage in other more economically productive activities outside the home.

In the family, the gender division of labor means that the man is expected to be the primary breadwinner of the family and the woman to be the primary caregiver. This is shown by the activities pursued by the women ama and their time allocations in relation to those of their spouses. But the analysis of women ama's time allocations shows that they are more than primary caregivers. Forced by the declining number of male fishers and the need to augment family income, they have also become breadwinners themselves although to a lesser and limited extent. Economic empowerment in the form of a seasonal higher income from diving is limited to providing a certain liberty in household decision-making (buying things they want for the family without being directly accountable to their husbands) and higher respect from among fellow women divers which, sometimes, gets translated into leadership positions in their own groups.

The ama's access to administrative decision-making position is quite limited. The dominance of men in managerial positions in the organisational structure of the Cooperative as well as among the management staff demonstrates the marginalisation of women and their relegation to non-leadership positions.

Gender inequality is still deeply rooted in the Japanese psyche. While the Cooperative could be commended for finding ways to increase production of abalone and sea urchins to relieve women ama of even more laborious efforts in diving for such resources, the attitude that women should stay home to be wives, mothers and homemakers, that women are noisy, that membership in their (ama) group is enough and that diving is mainly for women, remains pervasive and thus, a barrier to the personal growth of women who desire a greater sense of freedom, confidence and control of their live. With the rigid sexual division of labour in the family, the ama women divers' *amagoya* where they enjoy themselves, even if for just a few hours of freedom and self-expression away from the burden and demands of their families, will continue to play a very important role in their lives.

To improve the status of ama women divers, the present study also argues that the community needs to respect women ama and promote policies that increase their personal wealth, power and political influence. This may mean opening up opportunities for greater participation in the decision-making of the cooperatives, elevating women to positions of leadership in the FCAs, and increasing men's participation in domestic chores.

To break free from the deeply-seated patriarchal mindset which characterises the community, and which gets translated in the local institutions such as family and cooperatives, educational reform must be instituted (Lim, 2009). This reform could be done through public information campaigns, training, and changes in school textbooks. This will be a long process but definitely an empowering one.

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Why do Korean Women Dive? A Discussion from the Viewpoint of Gender

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Abstract

This paper explores the phenomenon of the women divers of Korea, especially those of Jeju Island, long famous for this activity. I describe the activities of the women divers, and explore the contradictions between the high earnings of the divers and their low social status. Korean history demonstrates that fishers have always had a very low status, and for the women divers this was compounded by the introduction of Confucianism, with its emphasis on the strict separation of gender roles and the subjugation of women to their domestic roles. Today, while women divers continue to benefit economically, their numbers are decreasing and young women are not drawn to diving. The paper presents the details of how women divers operate, their levels of skill and endurance and the continuing challenges they face, both from the decline of the stock and from discrimination and social stigma.

Introduction

In Korea women, and only women, dive to catch marine resources – a phenomenon that has been of interest to sociologists, folklorists, anthropologists and even physiologists (e.g., Hong and Rahn, 1967). From the perspective of gender, Cho (1979) showed the transformation of gender role structures caused by modernisation through an analysis of Jeju woman divers' economic activities (Cho, 1979). Women specialising in the dive fishery are called "Jamnyeo", "Jamsu" or "Henyeo" in Korean. "Jamnyeo" is the word in the dialect of Jeju Island, "Jamsu" is the name of the woman divers on the Korean mainland, and "Henyeo" is a word of Japanese origin. The men and women fishing divers are called "Ama" in Japan, but the word is written in a different way for each sex. "Woman diver" is written in kanji as "the woman of the sea", and this is read as "H(a)enyeo" in Korean. Women diving is integrally connected with both the economic and cultural life of the fishing villages. Economically, women divers may provide the only income in the family, and the rewards for successful diving are high. Even women with only elementary education can derive considerable self respect from their relatively high income. On the other hand, they also feel ashamed because diving is considered to be low status physical labour. So, while the women do feel proud of the work they do and their capacity to earn, they also suffer from the 'shame' of having a physical occupation with lower status than women in blue collar jobs. Women divers need to develop special techniques to enable them to dive to great depths. They also feel that their diving symbolically expresses the cultural identity of Jeju Island. While the men on Jeju Island catch

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finfish, the harvesting of shellfish, sea urchins and seaweeds is considered to be women's work. In this article, I explore some of the economic, social and historical background and reasons why Korean women divers continue fishing in spite of the drawbacks.

"The order forbidding leaving Jeju Island" and the spread of Jeju women divers in East Asia

Geographical distribution of Korean and Japanese women divers

In 1993, about 10,000 Korean women were divers, although by 2010 that number had dropped to about 8,000. At the time of my research in 1993 there were approximately 6,700 women divers on Jeju Island, but by 2010 that number had decreased by approximately 24% to 5,100 divers within the village where I carried out my fieldwork. Ninety eight women were divers in 1993, a number which had dropped by 34% to 65 by 2010. Nowadays, there are few young women divers in their 20s and 30s, and most of the divers are over 50 years old. In addition, some women divers have been driven out of diving by a decrease in the marine resources. Nevertheless, because Jeju Island is a World Heritage Site, the Jeju Island local government is keen to keep women diving there in good condition.

Most of the women divers are widows or the sole economic support of their families. They also have to carry out the farming and retail work to support the family. Unfortunately both the highest value catches - wild sea mustard and abalone - have restricted seasons. Wild sea mustard can only be fished for a few days in a year; and abalone needs to grow for more than three years before harvesting, even if it is cultured. Both these limitations must be observed if the species are to be sustained. For this reason, women cannot live by diving alone but must also find other forms of economic activities.

History of Korean women divers

Korean women began diving about 100 years ago, under the influence of women divers from Jeju Island. Korean men have never engaged in diving, considering it 'unmanly'. This is compounded because the women divers do not have the opportunity or the right to reflect their knowledge and claims about the marine environment and resources to influence government fishery policy. Almost all divers dive without breathing equipment, depending on their own breathing to harvest shellfish and seaweeds. On the tideland coasts, both sexes participate in shellfish gathering, but on the reef shore, only women dive for shellfish and seaweeds. The most effective place for the diving fishery is provided by Jeju Island, where there is a well established group of professional women divers. Thus, Jeju women divers are considered to be the cultural identity and symbol of Jeju Island, and recently the administration of Jeju Island has provided a diving school to try to prevent the decrease in number of women divers. Most of the other Korean women divers began to dive because of Jeju Island women divers. The Jeju island divers have been successful in maintaining the family budget of their family and the social system of the community while also managing the

coastal marine resources, despite their lowly social position.

For my research I also wanted to broaden my attention to women divers in other parts of the Korean Peninsula, who are relatively understudied in comparison with those on Jeju Island. Because women divers across the Korean Peninsula play important roles in household economies, maintenance of communities, and sustainable management and utilisation of coastal resources, this study focuses on the mechanism of gathering activities and how the concept of gender deepens and shows the importance of women's role in environmental issues and the sustainable use of marine resources.

As mentioned above, in 2010 approximately 8,000 Korean women were divers. Estimating the exact number of women divers today is difficult because of the way numbers have been recorded in Korea since 1996. However on Jeju Island they continue to record the number of women divers.

In Japan, according to the Manichi Shimbun (2011), statistics from a Japan Fisheries Agency survey in 1979 and the Mie Prefecture Sea Museum survey in 2010 showed that the number of Japanese women divers had decreased by 76% from 9,134 in 1977, to 2,160 in 2010. Very few Japanese men dived (Figure 1), and most of those combined diving with work such as other fishery, agriculture, agriculture and stock farming, and migrant work. Women divers in both Korea and Japan are aging and there are fewer and fewer young people entering the occupation (see also Lim et al., this volume).

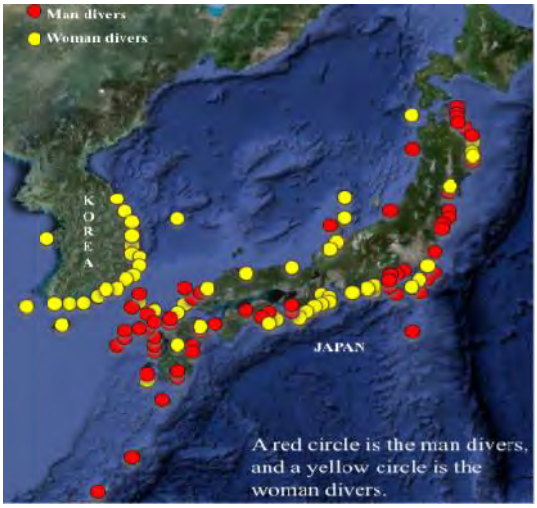

Fig 1. Distribution of the men and women divers (2010).

Social position of Korean fishers and Confucianism

In ancient times, fishers and others who caught marine products, as well as those who consumed them occupied lowly social positions. According to "Koryeo Dogyeong", during the Koryeo Dynasty period (A.D.918~1392) the king and nobles ate lamb, mutton and pork and poor

people ate fish and other marine products. All fishermen and their families occupied the humblest social positions at that time, and that has continued until recently. However, everyone, nobles and slaves alike ate abalone, oyster and seaweed as recorded by SuJing of the Chinese Soong in "Koryeo Dogyeong" in 1123. In the "Joseon Dynasty" (A.D.1392-1897), Confucianism became the state religion, and that creed dominated the law and the customs of the general people. Agriculture was respected, and while the social position of the farmer was lower than that of the governing classes, it was higher than the craftsman and the merchant. However, the social position of the fisherman remained at the lowest level, without social respect. The Confucian creeds also determined men's preeminence over women and strict physical separation of the sexes, something which continues to this day.

According to "Samgukchih", a Chinese chronicle, the existence of women divers on mainland Korea traces back to the third century, but no record written since then has been found, so women divers today may have originated from migrant divers from Jeju Island. Jeju Island, which is famous for its women divers, has only a few farmlands but abundant marine resources along the coast, accessible to the women divers (Ii, 2001). In the 12th century, the administrative head of Jeju Island commanded that men and women divers should not dive naked together (History of Koryeo, 1105), although he did see men and women dive for abalone together. In about the 15th century a large number of Jeju islanders escaped from the island in order to avoid heavy land tax and compulsory labour. The King gave "the order forbidding leaving Jeju Island" to prevent a population decline in Jeju Island and checked the comings and goings of the islanders strictly, and forbade island women from marrying mainland men. During the "Joseon Dynasty", Jeju Island became the place for the banishment of central officials who committed crimes. According to the "Jejudo Pungtogi", which was written about the culture and history of Jeju Island when Ii Gun of the imperial family was exiled in 1629, it is recorded that men and women divers on the island paid their taxes in abalone and seaweeds gathered, and made their living by selling the remainder. According to the "Tamna Sunryeodo", which was written by Ii Hyungsang who was the governor of Jeju Island in 1703, he had devised underwater working clothes, to prevent men and women diving naked. By the early 18th century, Confucianism, with its strict regulation of sexual proprieties, was beginning to dominate daily life. The influence of Confucianism, "the order forbidding leaving Jeju Island", and the heavy burden of tax may have resulted in today's situation where only women divers remain in Jeju Island.

Jeju Island women divers as migrant workers

Today's Korean women divers probably originate from migrant women divers from Jeju Island, who began to move to mainland Korea in 1895. Then, the red seaweed *Gelidium amansii* (agar agar) and large brown algae *Ecklonia cava* fisheries were developed for industrial use and food, so that their value as merchandise appreciated. With such a trend, Japanese seaweed traders came to Busan in search of seaweeds that were virtually ignored in Korea (Yoshida, 1954). This triggered the shift of the economy in Korea from a self-sufficient economy to a commodity

economy, which was thus incorporated into the economic bloc of Japan. As women divers from Jeju Island began to work in mainland Korea, Japanese women divers working in Korea gradually decreased in number under the pressure of their longer working hours and lower wages Around 1929 Japanese women divers' visiting Korea for fishing ended totally. In 1945, the area of Jeju women's activities ranged from the whole of Japan through Qingdao and Dalian of China to Vladivostok of Russia. They returned to Jeju Island every year in autumn and spring to dive in Korean waters and to Japan as migrant workers.

Geographical and age-specific distribution of the Korean women divers

As I have already documented, the number of women divers is decreasing and their average age is increasing, with fewer young women entering the fishery. The number of Jeju Island women divers account for about 60% of the total Korean women divers (Table 1). Approximately 90% of them work along the south coast while about 8% and 2% dive respectively along the east and west coasts. The reason is that along the south coast women divers began to engage in diving in 1945, whereas along the east and west coasts the participation of women divers in fishery was not initiated until 1953. Apart from the good fishing grounds, good markets were also found in nearby cities. As the percentages of women from Jeju Island and local women are almost the same along the south coast and more women from Jeju Island work along the east coast, it may be argued that the diving fishery by local women took root after women from Jeju Island moved to the south and east coasts.

The fact that fewer women in their 20s work as divers indicates the decline of this industry. Young women think diving is both hard physical labour and has low status, despite the fact that women divers have much free time and a good income. Unmarried women of marriageable age, in particular, think that the seawater and exposure to sun will spoil their white skin.

Table 1. Native place and age of the Korean women divers (1993).

Coast name	Province name	Native place		Age						Unknown	Total
		Jeju	Native	20-29	30-39	40-49	50-59	60-69	70-79		
East coast	Gangwondo	269	351	25	74	165	248	23	0	85	620
	Gyeongsangbukdo	53	224	0	30	122	92	31	2	0	277
West coast	Chungcheongnamdo	154	22	12	50	64	34	16	0	0	176
	Jullabukdo	7	0	0	0	2	5	0	0	0	7
South coast	Jullanamdo	105	115	3	64	98	43	11	1	0	220
	Gyeongsangnamdo	1,536	1,545	88	303	407	347	147	42	1,747	3,081
	Jejudo	6,727	0	143	850	1,855	2,490	1,323	66	0	6,727
Total		8,851	2,257	271	1,371	2,713	3,259	1,551	111	1,832	11,108

Fishing qualifications and fishing methods

The type of qualification is determined by natural environment and location of a village, social status, fishing methods, and so on. Korean women divers may dive as members of a village, as members of a fishermen's union, as employees of an individually owned company or as employees of a joint-stock corporation (Figure 2). These identities form their qualifications to dive and provide some regulation of the use of the scarce marine resources. As members of village communities, women divers share their joint profit equally from harvest to sale according to the custom of the village. The fishing market is far from their village, and because the women dive daily, the fishermen's union sells their catch and shares the profit with them. The profit is used for the expenses of the fishermen's union, including the culture of abalone. An individually owned company gives a boat and a captain to women divers, although the women bear their own risk. They do not have legal protection in case of an accident. Because of the distance to the market, an individually owned or joint stock company sells the women's catch and shares the profit, retaining money for miscellaneous expenses. Even so, the women get about 50% of the total profit. Most women have to commute to the diving sites each fishing day. In many parts of the coast, especially the south and west coasts, the women must dive from a boat. This means that they must share their profit with the boat owner or broker.

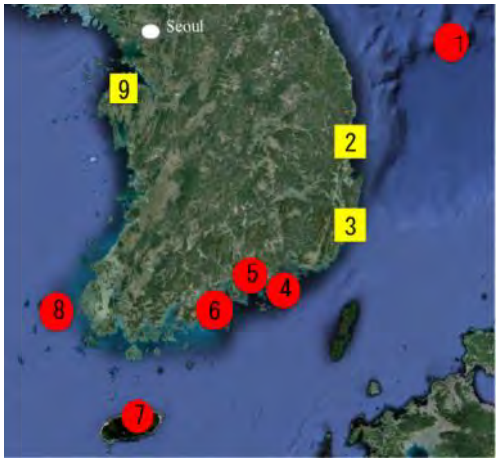

Fig.2. Differences in qualification for dive fishing. Circles (●) indicate women divers using a boat, squares (■) women divers not using a boat. In terms of the geographic distribution of the four types of diving qualifications,, sites 1 and 8 had divers as members of a village community; sites 2, 3, 7 had divers as contractors for the village fishermen's union; sites 4, 6, 9 had divers as employees of an individually owned company; and site 5 had divers as employees of a joint-stock corporation.

Because the fishermen's union has many more men members than women, the voice of the women divers is very weak. Even if the women divers' fishing ground is destroyed by a power station or by harbour construction, they are neither informed nor included in the discussion, and do not receive compensation for the destruction of the habitat. It has happened that their fishing grounds have been destroyed by development and power station construction, both government and

privately owned, and, more frequently, by oil spills from stranded vessels which do heavy damage to the fishing grounds. The diving women do not receive any compensation for these losses. For example, women divers were excluded from the fishing grounds damage compensation from the Taean oil spill accident in 2007, and also from losses resulting from the construction of the Taean thermal power station, the breakwater construction, the Samchunpo thermal power station construction, and the Uljin nuclear power plant construction.

In order to secure opportunities to assert their rights and reduce burdens in case of marine accidents, women divers in some areas formed mutual-aid societies to pressure local and national administrations, but in other areas with only a few women engaging in diving, divers were utterly helpless. Recently in those areas such incidents as marine resources being stolen and the use of illegal fishing means (e.g. air cylinders) occurred, but they could not appeal to the police who just pretended not to notice. With long experience in the marine environment and a good knowledge about the ecology of their target creatures, women divers should be considered to be experts in the sustainable use of marine resources. Therefore, the government should protect their fishery activity by legal means. Sustained use of marine resources would be possible, and the social prejudice and discrimination against them could be reduced. Therefore, I think that the gender recognition for the diving fishing should change.

Major catches and methods for diving fishery

Korean women divers may fish from the shore or from a boat. Along the south coast, the Rias coast lined with numerous islands has a large tidal range, so the divers go to fishing spots by boat during low tide. These boats are characteristically equipped with a portable stove and toilet, and divers can take a shower after fishing. In other areas, they are equipped with snorkels and swim to fishing spots.

The major catches are abalone (*Haliotis discus discus*), topshells (*Batillus cornutus*), sea urchins (*Anthocidaris crassispina*), oysters (*Crassostrea gigas*), octopuses (*Octopus vulgaris*), sea cucumbers (*Stichopus japonicus*), sea mustard (*Undaria pinnatifida*) and so on. Abalone, sea mustard and a common sea urchin (*Hemicentrotus pulcherrimus*) are especially valuable as goods. The dried abalone, sea cucumber and seaweeds have been exported to China for a long time.

The high value of these products can be explained by Korean custom. Dried sea mustard is prepared for the goddess of childbirth and for a parturient woman (Ii, 1999). Dried seaweed is offered to the goddess with rice, water and a thread for four weeks and people pray for the longevity of the baby and the health of the mother every day (Ii, 2004). Korean mothers must continue eating sea mustard soup for about 4 weeks after childbirth. Korean people think that sea mustard improves mother’s milk because it contains a lot of calcium and iodine, which are necessary for the mother's body (Ii, 1999). The economic value of abalone and seaweed are high now. Korean people never fail to eat steamed rice with red beans and sea mustard soup on birthdays.

The average price of wild natural abalone per kg rose from about US $129 in 1995 to US 161 in 2010. On the other hand, the price of rice was about US $134 for 80 kg in 2010, or approximately US $1.68 for 1 kg, making abalone about 95 times more expensive than rice. In addition, rice requires more labour and takes about one year from planting to harvest, but abalone take less than a day. Dried sea mustard also appreciated in price from US $77 a piece of 180 cm in length and about 35 cm in width in 1995 to US $143 in 2010. Dried sea mustard is about 85 times more expensive than rice. Abalone and sea mustard are priced twice as high as high-quality Korean beef, demonstrating how marine products have become more valuable commodities than agricultural products (Table 2).

Table 2. Sale price changes by year for food products (1974-2010, US$) (Note that quantities for each product are Korean standard measures).

Products \ Year	1974	1980	1990	1995	2010
Abalones (1kg)	47	95	113	129	161
Sea mustard (180×130cm)	5	9	42	77	143
Elegant sea urchins (1kg)	—	—	42	52	107
Rice (80kg)	8	13	47	90	134
Beef (1kg)	—	—	38	—	71

Diving seasons and implements

Divers use a variety of implements in their work, such as “Nat” for sea mustard (Fig. 3-3), “Golgaengyi” (Fig. 3-4, 5) for octopuses and sea urchins, “Bitchang” for abalone (Fig. 3-6), “Dureongbak” which is a float (Fig. 3-7), and “Mangsari” which is a net suspended on the float to store catches of the women divers (Fig. 3-8).

Fig. 3. Diving fishery implements according to the catches

Abalone sometimes take almost 10 years to reach a marketable size, but wild abalone are often gathered too soon, because of their value as commodities. Therefore, the size of abalone that can be caught is limited to 8 cm or longer, and abalone seeds are produced from hatcheries and released to the abalone fishing ground every year to enhance the natural population. Also, abalone feed on seaweeds which are not collected except for sea mustard. Further, September and October are designated as closed season for fishing since these two months are the spawning season of

abalone. For the conservation of abalone as natural resources, average days for catching in a year are limited to about 20 days.

Women's involvement income diving and the household

All women divers earn good money and divers in their 40s and 50s earn the most, earning as much or more than the starting salary of a man who graduated from high school or college. Most women divers are also involved in another job, such as farming, retailing at the local market, running a restaurant, and working in the factory. Women in their 50s have a wide variety of such side jobs. Most women divers engage in farming, which is followed by businesses at summer bathing places and restaurants specialising in raw fish. Some women retail vegetables they grow and seaweeds that they harvest on the shore. Farming makes up 57% of the additional jobs taken by women divers; 22% are employed in retail; 9% are self-employed; while 6% are in other occupations. Only 40% of the husbands of the married women divers are employed, which makes both the diving and other employment of the women a crucial economic resource for the family. Of those men, 36% work in factories. 38% of the divers are widows.

The divers fish for an average of five hours a day for 50 days per annum. The income from diving is so important that it is only families in their communities that are able to pay for university education for their children. Annual catches of divers in their 40s account for about 23% of the total income of their entire family, while annual catches of divers in their 50s make up about 14%. Women divers in their 60s earn 40% or more of the total income of their families and their incomes occupy a larger percentage than those of the divers in their 50s.

By the early 1960s, the men would leave their village for about 2-3 years to engage in squid fishing or coal mining. Then even owners of sea mustard rocks could barely make a living, so many women sold sea mustard to earn a bare living. Daughters of poor families in Busan were sent to Jeju divers' families to work as maids or nannies, where they knew that Jeju divers earned a lot, and these women started to engage in diving fishery. Jeju divers were not granted the right to harvest sea mustard in a licensed area, so they worked under the condition that 10% of the sea mustard they gathered was to be given as a wage, but what often happened was that they did not receive wages and a smaller share of their harvest was given to them.

From the 1970s, divers began to wear wet suits that cost them USD 500 to 700 each. Divers of Ulsan paid the price of a wet suit with the money they got by selling rice, whereas Jeju divers continued to wear traditional working clothes made of textiles. To warm their bodies in winter, Jeju divers got out of the water more than 6 times a day, but Ulsan divers could keep on diving. Learning that rubber diving suits shut out the cold so that divers did not feel chilly, Jeju divers them decided to borrow money to buy the suits.

Between pride and inferiority: Korean women divers

In this section, I present a number of case studies to illustrate some additional aspects of the Korean women divers. These show how women became divers, how they thought about their occupation and what advantages and disadvantages they faced. All ages were as at 1995.

Woman diver O (71 years old; born in Jeju Island in 1924) lives with her husband who works for a private company. When he was out of work, she learned diving techniques from another woman diver in her hometown and began diving. She also works with her husband as a wholesale trader specialising in abalone and sea urchin selling to fish markets in Busan. She tells of local people saying, "your bodies smell like smoke" and "you were born in a place fit to be inhabited only by the cattle and horses". Facing such harsh discrimination, she said they "eat tears as their diet". "We are not robbers. We are just making our efforts to survive. We do nothing wrong.", she said.

Woman diver J (78 years old; born in village A in Ulsan in 1917) was the first woman who became a diver in her village in Ulsan. In 1930, as her family was poor, she was sent to a family of a woman diver who came from Jeju Island as a baby sitter at the age of 13. Longing to be a diver as she witnessed the large income of the divers she worked for, she learned diving techniques from Jeju divers. In those days, the area was abundant in abalone, mussels, and large brown seaweeds. During the period of colonisation by Japan, they had a hard time financially, so that only 5 or 6 women dived in the years of a bad harvest. From among them, however, she alone continued to work as a diver, and her marriage induced her to be more earnestly engaged in diving fishery.

Woman diver U (50 years old; born in village C in Ulsan in 1945). This woman started diving for pleasure, earning pocket money during the lunch time recesses when she was a fourth grader in 1956. When she arrived at the age of puberty, however, her parents often scolded her saying that such behaviour was shameful. Then, she kept on working secretly as a diver to earn money. Her husband had been involved in fishing by using diving equipment since 1958 when he was 16 years of age. However, the abalone farming initiated by the local village fishing unions in 1979 prohibited catching abalone in the wild with diving equipment. Consequently, he had to find a job in a company and has been working for it until today. At this point, U began to work as a professional diver, and at the same time farmed and peddled vegetables when she didn't dive for gathering. She said, "Working as a diver is certainly profitable, but brings about inexpressible shame. From among all the occupations, it is the most disgraceful and very hard. I have no other choice than continuing my job in order to make a living, but I don't want my daughter to become a diver."

These cases show how Korean women divers had developed into professionals from the 1930s through the 1980s, and especially during the 1950s and 60s immediately after the Korean War. During the 1930s, although they were few in number, local women from poor families of mainland Korea learned diving techniques from Jeju divers to become divers. The 1930s was a

period when food had to be to be delivered to the Japanese colonial government, so that women became divers to prepare for a famine. However, only a few local women became divers both because they could not acquire sufficient diving techniques or because of the fear of discrimination in society against women divers in this humble occupation. Even in the 1950s, local women felt that becoming a diver was repugnant, but even so some young girls began to dive to earn pocket money. In the 1960s, local people's feeling that diving was a humble occupation became less strong, and diving techniques were introduced to local people through Jeju women divers. In the modernization of the 1970s, abalone aquaculture was initiated and the demand for marine products grew as exports to Japan expanded.

Local women, therefore, actively participated in diving in pursuit of cash. With the introduction of wet suits and the exportation of sea urchins, even those women who had avoided diving for fear of prejudice from society started to engage in the diving fishery. The introduction of wet suits not only meant the possibility of making longer operations possible in winter but also greatly contributed to easing views and prejudice against women divers that it was disgraceful to work without clothes. Still, discrimination against divers persisted in local villages, so that there were many women who refused to work as divers in spite of its recommendation as an income source.

In the 1980s, a series of reforms took place one after another, such as fishing village unions obtaining corporate status, transfer of ownership of sea mustard rocks to fishing village unions, local women becoming members of fishing village unions, and establishment of distribution system of marine products. Thus, to become a woman diver brought about economic advantages to them. At the same time, the price of abalone and sea mustard, the major catches of women divers, soared in the 1980s compared to the 1970s. After the 1990s, women divers have been satisfied with their financial situations but still suffer from an inferiority complex about their occupation. To dispel such a feeling, they are devoted to the education of their children as well as to pursuing a material life more and more similar to that of downtown since the 1980s.

Conclusion

In this paper, I have tried to show how women divers in Korea developed, something of their work practices and the problems they face. These include the destruction of the habitat due to pollution but the chief problem faced by existing divers is the social discrimination against them. This also causes fewer and fewer young women to enter diving as a profession. This diminishment of Korean women divers is especially unfortunate as the value of the product they catch is increasing, and the income that they can gain from diving is a major source of income for their households. Thus, there are problems of the marine resources use, the aging of the women divers and the lack of young successor women divers.

The social and cultural importance of women divers remains underestimated. In Korea, the Confucian model remains strong, with husband and wife called “the inside and the outside”, and as this expression indicates, wives should be concerned with domestic chores and raising their children and men should be in charge of work outside the house. Thus the division of roles between men and women is clearly divided. In this context, women divers’ work is simply considered extended housework by society, although it is also considered inappropriate because of where and how it is carried out. The discrimination against low status occupations, such as fishing, is combined with long held prejudices about gender divisions of labour. The Korean women divers exemplify the ways in which traditional gender prejudices can prevent women from entering an occupation that will secure them an adequate income as well as preventing women’s hard earned ecological knowledge from protecting the valuable stock.

As a coda to this study, the fisheries administration of Korea has announced it intends to meet future marine luxury product demands by overcoming the problem of the diver women’s lack of successors and the issue of decreasing and aging woman divers through encouraging male divers with compressors. This plan might cause a new problem, including indiscriminate hunting and fights over fishing ground use.

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Why the Coast Matters for Women: A Feminist Approach to Research on Fishing Communities

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Abstract

Issues of gender are neglected in fisheries research and issues of fisheries are also neglected in feminist research. These twin omissions hamper our efforts to understand women's experiences in coastal and fishing communities. This paper addresses the problem that policy is often directed narrowly at improving fish harvesting and processing, without taking account of its impact on women, families and the community. The paper makes use of data from studies in two countries in different regions, Tanzania and Atlantic Canada, to illustrate how a feminist approach can uncover unequal gender relations of power and inequality in fishing communities and how these are integrated and justified in political, cultural and social structures. To overcome the limitations of small scale, context specific studies of women in coastal or fishing communities, we need to develop common frames, focusing on power, inequality and discrimination and, more positively, the ways in which women negotiate a better position for themselves and their families.

Introduction

At the 2nd Global Symposium on Gender and Fisheries, Meryl Williams argued for the necessity of applying a gender lens to both define fisheries issues and to provide a better basis for action. While men dominate in the harvesting sector of fisheries, women are usually the majority of workers in fisheries services and post harvest sectors. Male based fisheries research tends to focus on "fish stocks, their production and directly related knowledge", whereas a gender lens describes the complete fish harvest and supply chain (Williams, 2008). On the other side of the same problem, in the special issue of *Development* (2008) Wendy Harcourt pointed to the continuing neglect of issues of women and the environment and, *a fortiori,* of women and fisheries in mainstream feminist discussions. Bemoaning the collapse in constructive feminist thinking since the high point of the Planeta Femea at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, she called for a "new political ecology". These two writers have identified key objectives in discussions about gender and fisheries. One of these is the problem of integrating a serious consideration of gender issues into discussions, especially policy discussions, about fisheries and aquaculture; the other is the problem of the neglect of fisheries and aquaculture issues, and more

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generally, natural resource management, especially at a conceptual level, in feminist discussions, and therefore a failure to develop an appropriate theoretical basis for discussions about women in fishing and coastal communities.

Despite vigorous feminist efforts, gender and more particularly women's issues are still often ignored in aquaculture and fishery literature and natural resource issues are still usually ignored in feminist debates.[1] The literature on fisheries is still dominated by "hard science" reports and explorations. In very few of these studies do we find recognition that behind the hand that fishes there lies a fully social person (usually male) and behind him, a family and a community (which includes women and children as well as men). Each of these communities is situated within a specific social, political, cultural, geographic, religious context. All the people within that community are also structured by ethnicity, age, sex and a number of other factors. It is not just gender that is ignored in such science-based accounts but all social factors. This does not weaken the science, but it does have a negative impact on the policy implications of such studies and it leads to persistent misunderstandings of the way in which women are located in multiple social, economic, and cultural structures. While the body of feminist literature is growing rapidly, there are few signs that it is being seriously integrated at the policy level.

Another weakness in the current state of research lies in the way in which many researchers carry out very specific local studies, but then their studies are generalised as if all women experienced the same situation in all fisheries. There are real distinctions between the way in which women live on large lakes (e.g. Lake Victoria and the lakes in Mali), the ways in which women participate in aquaculture either close to larger bodies of water or some distance from them, and women who live in marine coastal regions. To start from the fish and the ways of capturing and processing them is to miss the significant differences in the circumstances in which women build their lives. In the process of "tacking on" considerations of gender to fishery concerns means that there is a tendency to conflate "coastal" with rural. Many fishing communities are the poor, rural and isolated communities of the stereotype. Yet there are often fishing communities within or just outside large cities (e.g. Bombay and Calcutta) and in northern countries the fishing industries have often become centralised into large ports with associated fish processing plants (e.g. Bergen in Norway, Victoria in Canada and Peterhead in Scotland). Such an "adding on" approach to gender is usually quite incapable of noticing and integrating social, cultural, economic and political factors into an understanding of how women actually live in such communities.

On the other side of the coin, gender and fisheries are still sidelined in feminist discussions except in specialist fora. For example, there were some 132 papers presented at the 2nd Congress of the Asian Association of Women's Studies in December 2010. Held in Penang, at the centre of

[1] For example in Janet Momsen's recent (2010) and otherwise excellent update of her 2004 *Gender and Development* work, fisheries gets only the most passing mention, and then in terms of women's limited access to the more lucrative forms of harvesting. Signs of change for the better can be found in the recent review of the literature on gender and fisheries produced by the International Collective of Fishworkers (Biswas, 2011), in the arguments for integrating gender and fisheries in Macdonald (2005), and in such earlier lone voices as Harrison (1995).

considerable interest in fishery research, there was one paper on the role of women in alternative agriculture development, one on land rights among the Minangkabau and just one on a fishery related issue: how the quality of group relationships influences empowerment among members of a fishermen's wives association in Malaysia. Even more recently, the Women's Worlds conference in Ottawa in July 2011 had fewer than half a dozen sessions, out of more than 300, devoted to any aspect of natural resources and their management.

The strong tendency in contemporary feminist thinking towards (broadly defined) post-modern approaches contributes to this exclusion. Post-modernism challenges the assumed certainty of scientific (and social scientific) efforts to explain reality, insisting that general explanations are invalid; only relative, or interpretive, truths are available to us. Post-modern and post-colonial authors have been useful in challenging the kinds of "totalizing" or comprehensive accounts that have historically dominated both scientific and social scientific analysis, which have led to privileged groups (e.g. men, the rich and powerful, governments) presenting their perspective as the only legitimate one, and thus excluding the equally legitimate views of the less powerful. But postmodernism's challenge to this traditional thinking has too often led to situations of perpetual philosophical doubt rather than to ways of thinking that would allow practical solutions to actual problems. There is a general post-modern tendency to focus on abstractions such as "signs", "signifiers", and "symbols", rather than on the nitty gritty of lived experience, or on the concrete issues that affect so many women such as the changing patterns of ownership and control in fisheries, the collapse of fish stocks, and the impact of that on fishing households and other major structural changes.

Within the more enlightened fishery studies, we find efforts to supply some gender specific data. Mostly this is a form of the old formula of "add women and stir" (Oakley, 1972). But if women and their experiences are not central to the analysis it risks simply adding a layer of "thin" descriptions, without interrogating the social contexts in which women live, and thereby deepening the analysis. We need to do more than that and, as Williams (2008) indicated, start by looking through a "gender lens", recognising that if we change the perspective, we change what we look at, how we interpret it and how we address the issues it raised. There is now a body of writers within the relatively confined orbit of specialists in aspects of gender and aquaculture and fisheries who have begun the exploration of the neglect of gender, usually by drawing attention to the contribution of women to aquaculture and fisheries activities (e.g. Medard, 1995; Hapke and Ayyankeril, 2004; Frangoudes and Keromnes, 2005; Faustine, 2007). Each study and each article points in more or less the same direction, but we are not yet equipped with an overall understanding of gender and fisheries, or the ways in which globalisation, climate change and other macro processes impact on women. With such a small data resource, usually from studies with very specific framings and focus, it is also difficult to make any appropriate comparative conclusions. While we are so short of studies that focus on the speed and profound nature of the consequences for women brought about by economic and social changes, we find it difficult to connect the local situations with the more structural and global accounts of macro processes. There is, I believe, no short cut to developing a

framework in which we can examine the interconnectedness as well as the specificity with which such changes play out in the lives women live in their social, cultural and economic specificity.

Every study has a different focus, depending on the theoretical and substantive interests of the researcher. How women are located in different social, cultural and economic contexts, how those contexts interact with different fisheries, and how women negotiate their agency are multiple and complex. Among the different approaches feminists have used, comparative methodology is especially relevant. Mostly such researchers have based their research on the quantitative analysis of very large data sets (Bennett, 2005; Williams, 2008; Biswas, 2011; MEP, 2011). This provides us with an effective overview and the basis for analysis, especially at the level of policy. However, feminist analysis also needs to probe behind the picture at the macro level to explore the lived experience behind the statistics. Traditional anthropological and sociological approaches have carried out intensive fieldwork in particular locations and situations. The data and analysis produced by such small scale studies is very rich, but it is hard to relate such studies to each other and thus develop our analysis. In this paper, I have tried to broaden the qualitative approach by drawing data from two very different locations while approaching each set of data with the same questions and overall framework. By doing this I hope to begin the work of connecting the insights of the particular with macro level analysis. Through the examples that follow I want to suggest that awareness of how dimensions of power, inequality and discrimination are affecting women and their responses should be at the core of feminist understandings of coastal women and their experiences. I suggest that by drawing attention to exactly how changes in the pursuit of marine resources are constructed in different situations, we can obtain a greater understanding of how gender is one (very important but not exclusive) dimension in how power, culture and economy interact. This paper also offers a starting point for thinking about how we can develop systematic and rigorous approaches that work at the level of small scale studies of women in fishing communities.

The situations of women in Atlantic Canada and coastal Tanzanian fishing communities appear very different. Yet both examples show us how women's position in a fishery is defined culturally and politically. They illustrate the unintended consequences for women of changes in fishery policies or the decline of the stock, and they show women not as passive shadows behind men's activities but as active agents negotiating within the limitations of their cultural and economic contexts and resisting the inequality they face.

An example from Tanzania

The Kilwa region of Tanzania is home to the most productive fishery in the country, but it is also the poorest, with the lowest education, health and transport resources in Tanzania (Government of Tanzania, 2002; WWF, 2005; TCMP, 2003; Mascarenhas, 2007). In previous work, my colleagues and I showed how women's relationship to the fishery was quite different to that of men (Porter et al. 2008; Porter and Mbezi, 2010). While men dominated the high value harvesting of fin fish, women marketed and processed such fish as they could obtain from the boats as they landed (Mwaipopo, 2008). Most high value fish was shipped directly to Dares Salaam by middlemen. Women's move into seaweed harvesting was initially successful (Msuya, 2006), and while it was seen as profitable men also began seaweed farming, although women remained dominant. In recent years the seaweed, especially on the previously rich Songosongo farms, has suffered bleaching and is no longer commercially viable, although some women continue farming because any income is better than none. Octopus also provided women with a role as harvesters of a valuable stock. But as the prices for octopus rose, men began to dive in deeper water, and thus sidelined women's activities (Mbezi, 2009). The fisheries development projects with which I was associated focused almost exclusively on improving fish harvesting and processing methods so as to increase the value of the product and thus the economic rewards of the fishers. But the fishers in question were usually (although not always) male. Both the fishery scientists and the policy makers assumed that improving male wages would automatically improve the livelihoods of poor fishing families. It is this false deduction I want to draw attention to here, because it is such a common way of thinking in policy oriented fishery research.

In the Somanga and Songosongo districts of Kilwa our research demonstrated that while men were focused on fishing activities, women combined their much less profitable fishing activities with other kinds of income generating and subsistence work to enable the household to survive (Porter et al. 2008). The women in Somanga, on the coast, could collect sea cucumber and catch shrimp using mosquito nets in shallow water. Otherwise their fishery efforts were confined to marketing such fish as they could obtain, as well as frying and selling fish in the market place. On Songosongo Island, women were engaged in seaweed farming and octopus collection, although both these activities were increasingly less profitable. It was clear from the studies that women's economic involvement in the fishery was not enough to sustain a family. The fact that so many women were also involved in non-fishery economic activities (including small scale production of maize and other crops, coconut trees, raising poultry, making salt, and collecting sea shells) but remained extremely poor, drew our attention to the failure of men's increased income to improve the household prosperity. In both the communities we studied the most lucrative fisheries were in the hands of men, with women's incomes from marine-related activities barely sufficient to cover household needs. Our study revealed that there was a discrepancy between men's incomes from fishing and other sources and what was available to women for their families. This raised the question of why households continued to be so poor despite efforts to increase income from fishing (Masawe, 2008).

The coastal region of Tanzania is a Muslim area. This had specific consequences for how families operated and, indeed, for how households were constructed, especially as polygamy was practised. In investigating how far the practice of polygamy contributed to the poverty of households, we found that households were constructed in several ways, including polygamy, but nearly all resulted in women living in what were effectively women-headed households without male support. Alerted to the far greater number of effectively women-headed households, we dug further into how such households managed economically and what the connection was with men's income. In our study we found relatively small differences between the situation of women in polygamous, *de jure* monogamous, and female-headed households (single, widowed or divorced). They were all, economically, woman-headed households.

It is, of course, difficult to arrive at any accurate assessment of either men's sexual practices or the impact on the household of their informal arrangements. It is estimated that approximately 20% of marriages in Somanga and 10% of marriages in Songosongo are formally polygamous, although this is certainly an underestimate. Government statistics, especially the census, allow people to declare themselves married (monogamously or polygamously), single, divorced, or widowed. But many women will define themselves as divorced if their husband takes another wife. She may also be divorced if the husband follows the route of serial monogamy, which under the sharia law simply requires the husband to declare divorce. Even if a woman is married and her husband has not taken another wife, it is more than probable that he will take a mistress or, more often, a series of mistresses (known locally as concubines). In this case, the woman's situation is often worse than that of a polygamous wife, with fewer rights and even less certainty. Finally, she may be widowed. In a time of increased HIV infections this is an even greater likelihood. One indication of the scale of the problem is that 14% of households were recorded as headed by children under the age of 14, orphaned as a result of AIDS (Mbezi, 2009).

In terms of the economic standing of the household, the actual form of the household does not matter. Whether a woman is married to an unfaithful husband, is one of several wives, is divorced (*de jure* or *de facto*), or widowed, she is essentially the sole support of herself and any dependent children or parents. Despite the Quranic injunction that men must treat all their wives equally, feminists and others have long argued that it is impossible to ensure equal treatment of more than one wife, and poor fishermen can clearly not provide adequate support for one wife, never mind several. In practice, in Somanga and Songosongo, there are no sanctions against men who do not support their wife or wives and no way for women to claim their shares either during or after a marriage. Essentially men could make whatever arrangements suited them, and women, wives or not, must make the best of it.

In most polygamous households, wives live in separate houses (at some distance from each other) with their biological children so as to avoid domestic conflicts with other wives. In practice, wives in most cases live in a state of semi-conflict and competition over the household scarce resources: land, condiments such as tiny pieces of fish, meat and vegetables that add flavour to

cereals, money, and even the husbands' favour. Husbands in polygamous households visit their wives in turn and usually spend 2-3 days each week in each house. Husbands do not have a permanent dwelling and are supposed to supply essential needs to each wife in each household. In poor fishing communities most men are simply too poor to fulfil this obligation for several wives, even if they wished to. As one polygamous wife put it: "Nowadays women cannot dare to wait for their husbands to provide each and everything in the house as sometimes they get very little fish to sustain a house. That is why I am currently engaging in different petty businesses and I always provide for my house so I do not depend on him entirely. People sell even green vegetables. That is why we are really busy looking for cash income and at the same time making sure that other things in the households such as cooking, fetching water are also done properly".

Sometimes even married men admitted that if it was not for their wives' income-generating activities, life would have been very difficult. For instance one polygamously married man admitted: "My wives helped me a lot indeed. I do not know what I would do with three wives I married if they would have been depending on me entirely. I remember last *bamvua* (spring tide) I got no fish to sell but thank God my wives are working too and are able to take care of my homes often".

Because husbands in most polygamous households had no permanent dwelling, women in those households were forced to do most of the things socially expected to be done by (male) heads of households. One polygamous wife said: "My situation has no big difference with the one who is not married - we are three (wives) and our husband spends two days for each one of us. So I and the children see him at most two days a week. If anything happens within the days he is not supposed to be in your home you have to solve the problem on your own. He can give you some advice but at the end of the day it is your problem".

Many polygamous wives will describe themselves as "divorced" on official forms because they know that effectively they are on their own: "Last week our child, who is in the secondary school, was sent back home because the school fees (was unpaid). Our husband spends three days in each house. It was my co-wife's turn, so my husband was at my co-wife's house at Miteja. It is far from here. I went there and told him about that and he told me to find ways so that the child could go back to school. I therefore had to give her the savings from my petty businesses. That is why I sometimes do not consider myself being married. There are so many things I do and decide on my own. For instance I am the one who has to think of what we will eat and in most cases I have to find the means to get what I and my children will eat especially during the days my husband goes to my co-wife or shifts to other fishing grounds".

But these *de facto* female-headed households, in which the male partner is effectively absent, are often invisible in the planning context. Very often husbands are still considered to be heads of households and wives are perceived as dependants even if for most of their married life the wives have primary, if not total, responsibility for the financial and organisational aspects of their households (TGNP, 2005; REPOA, 2006). One recent example in Somanga occurred when the

Rural Integrated Project Support (RIPS) project gave goats to several households on condition that they distributed newly born goats to other households. Being considered heads of households, husbands were the custodians of the distributed goats. Naturally this was a source of conflict in polygamous marriages, not only about the ownership of the goats, but because husbands took the money their wives had earned from the sale of milk for their own personal use (including spending the money on drinking or on their concubines) or even gave it to another wife who had not taken care of the goats.

This kind of study, which looks at the actual economic and cultural situation of women, can challenge the current directions of fisheries policies and development projects aimed at increasing men's fishing income. It was clear from the Kilwa example that women were culturally constrained in their fishing activities. Women did not go out to sea in boats and were excluded from the most profitable fisheries. It was also clear that men were not fulfilling their obligations to the several households dependent on them. Nor was there any sign that increasing men's income would necessarily improve the situation. Most men had several households with conflicting claims on them, and no overarching allegiance to any one of them. Realistically, women had to depend on their own resources to feed and support their families. Development projects aimed at increasing women's income would be much more likely to alleviate poverty in those households. Research and policy need to look at how fishing and its rewards in Somanga and Songosongo are deeply embedded in structures of social and cultural power relationships.

An example from Atlantic Canada

A number of feminist studies in recent years have looked at the impact on coastal communities and the women in those communities after the collapse of the northern cod fishery in the northwest Atlantic. The Canadian Atlantic seaboard was not alone in experiencing a decline in marine resources, but the impact on coastal communities in Atlantic Canada, especially in Newfoundland and Labrador has been likened to the Great Depression of the 1930s. The decline in the cod fishery culminated in the Moratorium of 1992. The Moratorium effectively ended the inshore cod fishery that was the economic mainstay of most rural fishing communities. About 100,000 people directly or indirectly employed in the fishery were affected (Hamilton and Butler, 2001; Dolan, 2005; Ommer, 2007).The collapse in the early 1990s was not unforeseen. Many commentators linked it directly to the transformation of the fishery from a small scale coastal fishery to one dominated by large capitalist concerns. Barbara Neis and Susan Williams (1997) looked at the close connection between the rise of a neo-liberal ideology and the collapse of the fishery and its impact on women. As Martha MacDonald (2005) said: "Fisheries have long provided interesting vantage points from which to explore processes of capital accumulation and relations of class and gender".

Most of the studies based in Atlantic Canada have focused either on the macro social and economic effects of the crisis (e.g. in terms of out-migration, public sector cuts, health issues) or on the practical difficulties faced by women. For example, Marian Binkley (2002) studied how the wives of fishers in both the inshore and offshore fisheries had to juggle their time and energies to carry out various economic supportive roles, in most cases increasing their workload and their stress. Jane Robinson (1995) studied the uneven and unfair way in which the compensation packages were allocated among men and women affected by the closures.[2]

To uncover the deeper ramifications of the crisis, we need to move away from examining the specific impact on women's economic situation and look at the changes in cultural and political relations between men and women. Two examples are the works of Brenda Grzetic (2004) and Nicole Power (2005). Brenda Grzetic's work focused on how the changes in both government policies and the decline in the fishery brought more women into active fishing roles, usually working alongside their husbands in small, inshore boats. Nicole Power made her central concern the plight of men caught in a rapidly changing world that threatened their traditional masculine roles.

In both these cases we find women's traditional roles and sites of power fundamentally undermined by the macro changes in the economy. In Grzetic's work, we catch glimpses of women's concerns about the state of the fishery long before the collapse. Inshore fishers of both sexes had been sounding the warning about declining fish stocks for many years (Neis, 1992; Neis et al. 2005) but in Grzetic's work we find women naming the overly masculine and aggressive approach to the fishery, as exemplified by both the large companies operating the offshore draggers and the government policies that encouraged rapacious and competitive methods. As one informant, Gloria, remarked: "it was over-fished by the draggers. They're dragging up all the species in the area. The foreign boats have a by-catch that's bigger than the entire catch for this area…the eco-system is ruined."

Cuts in the quotas and changes in regulations created a situation in which it made economic sense for women to take the place of (paid) male crew on their husbands' boats. As Grzetic (2004) wrote: "it also creates room for women to maneuver and negotiate in order to ensure their safety and survival in the inshore fishery. Women in fishing households have lived a strange doubly occupied space for decades where their fishery work onshore and aboard boats has been essential to the success of the small-boat fisheries, but invisible and uncompensated by governments and institutions. With the current wave of restructuring, they have once again stepped up their efforts to secure family incomes from fishing" with the numbers of women harvesters rising as more men are driven out of the fishery.

[2] Working in the 1980s on the history of women's work in fishing communities in Newfoundland and Labrador, I found that women's contribution to the fishery (especially in terms of drying the cod) was vital to the family income and that women were often the only members of the household to be paid in cash, e.g. for berries they picked and sold to the local merchant (Porter, 1983, 1985).

While many women welcomed the opportunity to work alongside their husbands and enjoyed being on the water, their entrance did not mean greater equality between male and female fishers. Sixty-five percent of women fishers were certified at the Apprentice level of professionalisation (the lowest) and only 2.2% of licence holders were women. They saw themselves as "helpers" and recognised that their main role was to help the household qualify for more EI (Employment Insurance). When women moved onto the boats, it did not mean any necessary decrease in their domestic and childcare responsibilities. Many of them described an impossible triple workload. In this sense, they joined the women, described by Binkley, in a ceaseless round of negotiating to increase their contribution to the household economy and at the same time maintaining it emotionally and socially.

Apart from women's failure to enter the harvesting sector on anything like equal terms, they also posed a threat to the male fishers. As Grzetic (2004) put it, "Yet for all the efforts at co-operation and bonding, women's very presence on fishing boats represents a constant displacement in the collective imagery about fishers, disrupting male-defined ideas about skill and place that are closely tied to gender".

It is to these notions about masculinity and the fishery and the consequences for women that I now turn. Power (2005) started from the now accepted position that "development processes and economic restructuring impact women and men in different ways because they are differently and unequally located in local and global cultures and economies". So far, so good; we have a growing number of studies that look at the immediate effects on women, including Neis et al. (2005).

What Power instead attempted was to look at the social and emotional (as well as economic) effects on men that then transfer to women (because of men's great power in the household) as additional effects. In contrast to what she called "the uncritical, often self-indulgent, stance of men's studies", Power took a critical feminist perspective that described and challenged 'hegemonic masculinity". Rather than the supposed "masculinity crisis", she preferred to examine the crisis in the fishery that created obstacles for "men to live their lives *as men* in culturally prescribed ways", which as she suggested may have led them to question their identity as men and "engage in negative behavior". As one might expect, such negative behaviour as excessive drinking or violent behaviour has significant impacts on the women with whom the men lived. There are, of course, many responses to downsizing, unemployment or the collapse of local employment, some of which suggests that men both have more opportunities to adapt, e.g. by commuting (Winson and Leach, 2002), and have ideological resources to develop what Connell (1998) has called "radical pragmatism". However, most studies indicate that men react to challenges to their masculinity by defensively asserting a kind of hyper-masculinity. What Power describes in the Newfoundland situation is what she calls "the patriarchal dividend", which is how men use their power as men to overcome the difficulties they face, with detrimental results for their families. As a result of either being displaced from the fishery or losing jobs in fish plants or fishery related jobs, men had greater freedom to move either for training or to look for other work. If a man does move, his expectation is

that his wife will either take the full load for the household at home in his absence, or up sticks and move to the husband's new location, often many thousands of miles away in another province.

Several studies have found that when women are laid off and spend time at home, it has a less dramatic effect on self image than when it happens to men (e.g. Morris, 1984). What it means for women is an intensification of their work, coupled with anxiety and stress about how the household will manage with fewer resources. Men clearly worry about this too, but the main burden of accommodating to the new situation falls on women. When Power carried out her fieldwork, most of the people she interviewed were about to be cut off from the compensation packages put in place immediately after the moratorium, thus intensifying the vulnerability of fishing households. "Because of their domestic responsibilities, such cuts to the household budget often meant new or intensified work and increased anxiety and heightened burdens for women. Since the moratorium women have had to reorganise inadequate household budgets and make do with less. As members of the household are cut off from compensation packages, this obviously becomes more difficult" (Power, 2005). Apart from the worry of meeting basic needs, women also felt that some money needed to be left in men's pockets so that they could sustain their "manly" activities such as drinking, buying tools and hunting. Power also suggested that such "pocket money" allowed women to get men out of the house for longer.

Safer places for "men to be men" included cutting wood for fuel, hunting and helping friends with household repairs and construction. What they did not do, or did very reluctantly, was increase their participation in child care and domestic tasks. Older men were more inclined to "help out" domestically, but this, too, was seen as a sign of their ageing and thus becoming less like "real men". Women tended to respond to the increased presence of their menfolk in the house both by working to provide "safe", i.e. masculine, tasks (like taking out the garbage) and trying to reinforce their husband's superior "masculine" role any way they could. Far from enhancing equality between men and women in fishing households, the crisis appears to have reinforced and even intensified existing sexual divisions of labour.

The women in Binkley's study found that the extra time their husbands were at home as a result of the collapse of the fishery particularly trying (Binkley, 2002). They were "under my feet" and prevented women from their usual efficient ways of carrying out domestic tasks. Men were also "needy" and women felt they had to take extra measures to ensure their masculine pride was maintained. Power (2005) found the same. Most men tried to keep their previous schedules and spend as much time as possible out of the house, preferably outdoors. Many continued to gather on their fishing stages to make or repair nets, even though this was unnecessary. Power said "such uses of time and space, as well as the reasons for such uses, are contrived and necessarily signify a loss" (Power, 2005). Unfortunately fishing stages were also good places for sustained and destructive drinking, which easily turned into a full scale domestic and social problem. It is women who talk about this and other problems; men tend to deny any form of problem. "A lot of people, idle time, trying to find things to do…Cause everybody around here got little sheds for doing their gear and

one thing or another. And they're always, they go over to this guy's shed today and they probably be there for 4-5 days and then they go over to another guy's shed for another 4-5 days. I even told them myself, I said they're going to become alcoholics. 'Ah, that doesn't hurt. A few beers don't hurt.' But see, it went from probably half a dozen between two of them per day, now it's gone to a dozen or two dozen each per day…".

Given these material and social strains, and the inability of men to deal with their changed circumstances, instead preferring to cash in their "patriarchal dividend", it is hardly surprising to find various forms of family strain, including violence and marital breakup. One woman put it: "If I see somebody now that I haven't seen for a number of years, I don't dare ask about the spouse. I've been putting my foot in my mouth too often and said 'Well how is so and so?' And they say, 'Oh, didn't you know? We separated 2 years ago" (Power, 2005). Drinking, domestic violence, and marital breakup are the obvious and manifest outcomes of the collapse of the fishery. There are also more hidden consequences. These include additional strains on women, a decrease in economic opportunities for women, and reinforcing rigid and traditional sexual division of labour. These consequences can all be understood within the framework of the "patriarchal dividend". In difficult times, the male sense of identity and power must be maintained, even at the expense of women's. Women must combine their increased workload with a decrease in their autonomy and power within and outside the household.

Conclusion

In this paper, I have tried to take the notion of applying a "gender lens" to fisheries and aquaculture research one step forward. By emphasising that socially or policy oriented fisheries research must start from, and be rooted in the fishing communities themselves, we can better inform fisheries policies – at least with regard to their impact on those communities. Such research challenges the assumption that simply improving the resource or the benefits that derive from it will automatically benefit the communities that exploit them. In particular, by focusing on women, I have tried to show the very different impacts policy can have on their lives and their ability to negotiate satisfying lives for themselves and their families.

I have chosen to examine examples from Atlantic Canada and coastal Tanzania as contrasting cases from different parts of the world and with different social, cultural and economic frameworks. In both cases, I have argued that we have to go beyond the fishery itself and examine closely the impact changes in the fishery have on the communities that exploit them. Furthermore, by focusing particularly on women's experience in different contexts we can see that women tend to be more vulnerable and to have less autonomy and power than men, especially in worsening situations in fishery dependent communities. We can also see that women continue to take primary responsibility for the welfare of their households and that men are more likely to cash in their "patriarchal dividend", either when times are bad or because they have cultural "permission" to spend extra resources on themselves. Qualitative studies highlight the importance of taking seriously

the complex interaction of economic, cultural and social factors, together with all the other factors of difference and inequality in human societies. Women are held in a complex mesh of such factors, but they are not helpless. They continue to negotiate pockets of both autonomy and power and we can learn from their successes as well as from their challenges. Such studies should alert us to the complex context in which fishing, aquaculture and coastal fishing communities should be understood. Economic analysis, even when it includes the unpaid work of women, does not fully account for the situation in which women find themselves trapped.

This paper has also tried to overcome the limitations of the small scale, context specific studies of women in coastal or fishing communities that are now emerging. For these studies to have their full impact we need to develop some common framings, focusing on power, inequality and discrimination and, more positively, the ways in which women negotiate a better position for themselves and their families. While such an approach would not enable us to be strictly 'comparative' in the way that fisheries science studies can be, it would move research on gender issues in aquaculture and fisheries in a more broadly analytical direction. Initially, I suggest that we already have sufficient sensitive and well grounded small scale studies to begin bringing these together on a systematic basis. Such synthesising work would lead to discussion around appropriate frameworks for future large scale, genuinely comparative, research that would fully integrate aquaculture and fisheries practices with the needs of the communities that depend on them. Only such grounded and broadly based studies can help us to understand how power interacts with and influences cultural, social and economic change.

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Capturing the Complexities of Globalization in Fisheries: Gendered Divisions of Labour and Divisions of Labour and Difference

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Abstract

The gendered nature of globalization has received considerable analysis across several economic sectors, and much has been learned about its general impacts, although less about the specifics. Within a particular locale and/or general pattern of impact, what factors shape a person or group's ability to adapt to changing economic contexts? Why are some groups and/or individuals more adversely impacted than others? Using the fisheries sector of Kerala, India, as a case study, this paper delineates a framework for understanding complexity and difference within general gendered patterns of economic processes. Combining feminist commodity chain analysis, livelihoods analysis, and insights from feminist studies of gender and development, I examine different impacts of globalization rooted in gender divisions of labour, and assess their implications for fisherfolk livelihoods. The results are usually complex and often paradoxical.

Introduction

Over the past 60 years, the world's fisheries have experienced a dramatic expansion of production and trade and the intensification of global economic relations. According to the UN Food and Agriculture Organization (FAO, 2010), total world fish production reached a record high of 142 million tons in 2008, and international trade in fish products increased to a record level of US$ 102 billion, up nearly 50% since 1998. In fact, fish has been referred to as the most international form of food production, evidenced by the fact that "over 40% of the world's fish production by weight enters international trade" (ODI, 2002). This intensification of global economic relations within the fisheries sector has led to an interest on the part of fisheries development professionals to understand the impacts of globalization, especially the expanding international trade in fish products, on local fishing communities around the world (Salagrama, 2002). However, until fairly recently and apart from a few notable exceptions (ICSF, 1997; Salagrama, 2002; ICSF, 2004; Neis et al. 2005) and Global Symposia on Gender and Fisheries 2004, 2007 and 2011, relatively little attention has been paid to gender as an inherent aspect of globalization, within the fisheries. There exists a growing body of empirical work on women's roles within fishing communities but there has been less effort to theorize gender relations and gendered aspects of globalization, within the fisheries.

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This paper focuses on the gendered nature of globalization and its impacts on small-scale fishing communities in the south Indian state of Kerala (Figure 1).

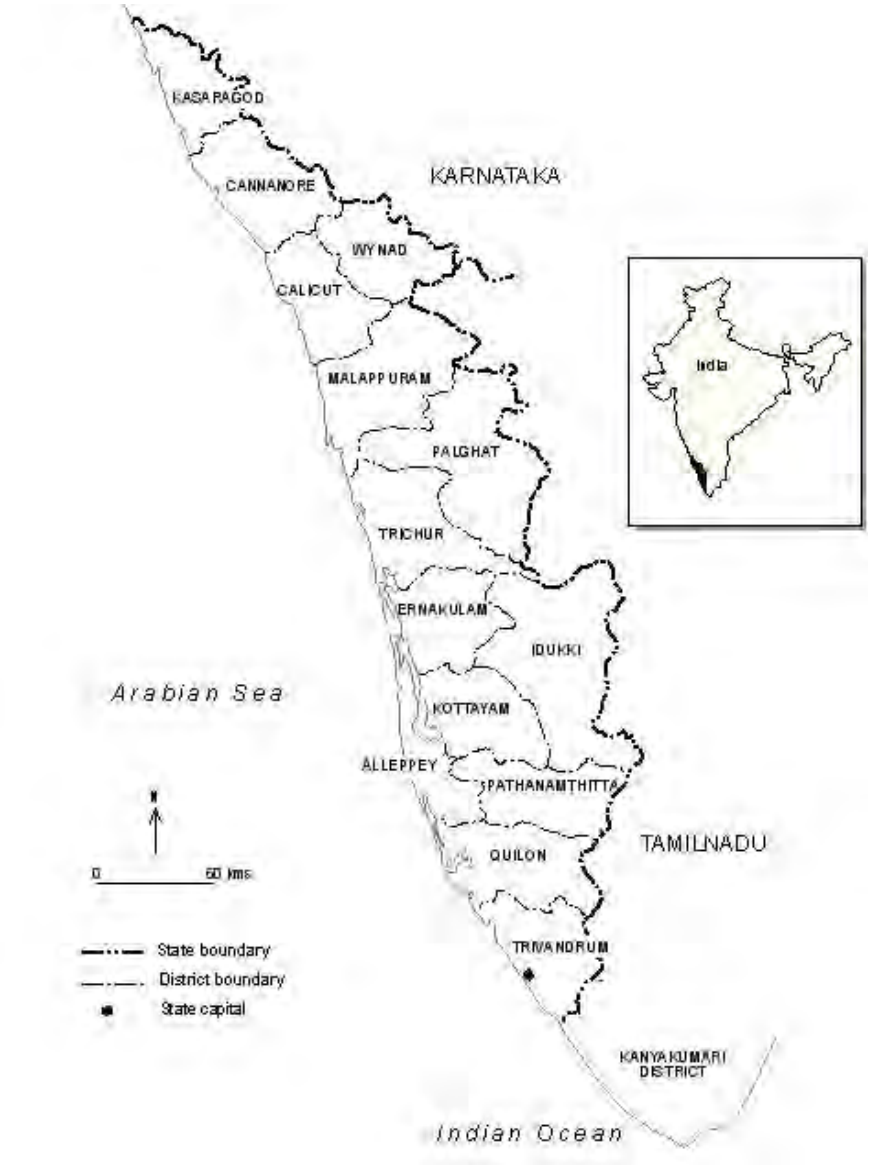

Fig 1. Kerala State and Districts, India.

By 'globalization' I refer to a set of trends and transformations through which local systems of fish production, processing, and trade have become increasingly organized and spatially integrated in a global fish-food economy (Bonano et al. 1994; Goodman and Watts, 1997). Utilizing a commodity (or value) chain analysis combined with a livelihoods approach, I examine how globalizing trends and processes within the fisheries sector differentially impact men and women in fishing communities in the south Indian state of Kerala (Figure 1). In doing so, my primary purpose is to delineate a framework for the incorporation of gender analysis into fisheries research. My objective is to offer a set of ideas about how we might theoretically analyze globalization and its gendered aspects within the fisheries, as well as how we might capture and comprehend the

complexities of its impacts. Different households and individuals experience broad-scale processes of economic change (globalization) in diverse ways. This paper seeks to illustrate some of the factors that shape a person or group's ability to adapt to changing economic contexts and how these factors are rooted in gender norms and divisions of labour. Understanding these complexities is necessary if we are to formulate effective policy. My argument is that commodity chain analysis provides a very useful starting point for identifying general pattern of impact, and combining this with insights from livelihoods analysis allows us to understand the diversity of experience and impact of general trends and processes.

Theoretical framework and methods

The analytical framework adopted in this paper uses a combination of feminist commodity (or value) chain analysis (Barndt, 2002; Bair, 2009) and livelihoods analysis (Ellis, 2000; Salagrama, 2006). Following Jarosz (1996) and Ramamurthy (2000) it centers on the concept of "local divisions of labour" through which I link processes of globalization to the production, processing, distribution, and consumption of fish, analyzing the gendered nature of globalization's impacts at various points along the global fish-food commodity chain.

Commodity chain analysis. Commodity chain analysis – variously referred to as "commodity systems," "global value chains," "commodity networks," or "systems of provision" – has emerged as a useful tool for examining global-local linkages associated with globalizing food systems. "Commodity chain analysis" is an analytical framework focused on understanding the organizational and spatial structure and dynamics of food industries across geographic scale (Sturgeon, 2009). Commodity chains are networks or structures of labour and production processes that connect actors to each other and to world markets across space (Bair, 2009). Commodity chain analysis presents a methodology to study a specific commodity (or group of commodities, e.g., fish) from its origin in production to consumption (Friedland, 2004) through mapping linkages and examining social relations of production and exchange along various nodes that constitute the chain, including the institutions, governance structures, and power relations that shape chains and inform their internal dynamics (Sturgeon, 2009).

Feminist commodity chain analysis involves examining the way each node of a chain is embedded in gendered relations in households and economies and asking a series of questions about both material and non-material processes that underlie the relations of production and exchange that constitute the chain (Dunaway, 2001). One way to approach this is to examine local divisions of labour and investigate the way labour processes in specific places get reworked in relation to those at the global level and how social categories such as gender, ethnicity, class, and/or caste shape the meanings people make and the actions they take, which in turn shape regional development and change, livelihood strategies, and agro-food industries themselves (Jarosz, 1996). This involves deploying a commodity chain analysis that identifies where women and men are the key agents at different nodes along the chain and maps the consequences of international and national state

policies for women and men's labour (Ramamurthy, 2000). Such an analysis then reveals general patterns of the differential impacts of globalization on women and men within a given food economy. To further understand the complexity and diversity of everyday experiences of globalization within and across different communities and households, one could then link a gendered commodity analysis to an analysis of livelihoods and the way different livelihood factors shape experiences of economic change.

Livelihoods and feminist theories of the household. Over the past decade, the sustainable livelihoods approach has received increasing attention from fisheries development agencies. However, until quite recently relatively little research has been conducted on fisheries from a livelihoods perspective (exceptions include Allison and Ellis, 2001; Salagrama, 2002; and Salagrama, 2006). Yet, as Allison and Ellis argue, "livelihoods analysis could provide a means by which to better understand the nature of small-scale fish production systems … and to identify appropriate entry-points for development intervention or policy support for poverty reduction in fishing communities" (2001). While traditional models of fisheries management and development tend to treat individual aspects of fish production systems (production, processing, marketing) in isolation from one another, a livelihoods approach offers a more holistic understanding of these systems and the complexities surrounding fisherfolk's adaptive strategies (Allison and Ellis, 2001).

"Livelihoods" refers to "the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household" (Ellis, 2000). Within this framework, individual and household livelihoods are understood as shaped by local and distant institutions, social relations, and economic opportunities. Assets and access (opportunities) interact to define the possible livelihood strategies (activities) available to individuals or households in an iterative process in which the various elements may change from season to season or from year to year as assets are built up and eroded and as access to resources and opportunities change "due to shifting norms and events in the social and institutional context surrounding … livelihoods" (Ellis, 2000).

Livelihoods research has provided a rich understanding of how individuals and households construct a living at the local scale, but it has been criticized for neglecting macro-level processes and structural shifts (Challies and Murray, 2011) and for failing to adequately deal with processes of economic globalization and long-run trends in economic change (Scoones, 2009). Combining livelihoods analysis with a commodity chain analysis provides a means for overcoming these problems.

Utilizing this combined approach, I first discuss globalizing trends within the global fish food economy that create the macro-level context within which national fisheries development policies and local fish economies and communities are situated. My focus is on marine capture fisheries. I then briefly discuss national and state-level fisheries development initiatives and use a commodity chain analysis to show how post-colonial development policies, responding to global

level economic opportunities and imperatives, have transformed local fish production systems in Kerala, India and how this transformation has impacted women and men fishworkers differently. I then present four short livelihood profiles of individual women fish traders to illustrate diverse experiences of globalization within general patterns of gendered impacts. Finally, I conclude with a discussion of the policy implications of gendered analyses of globalization within the fisheries sector.

The site for this research is Trivandrum District (Figure 1). Data for this research were collected during three periods of extended field research in 1993-94, 1999 and 2005 and in shorter follow-up visits in 2001 and 2008. The methods used included (1) extensive observations of fishing and post-harvest activities at numerous sites throughout the District; (2) over 100 in-depth interviews with fishermen, male and female fish traders, wholesale merchants, commission agents, auctioneers, social worker-activists, and government officials in charge of fisheries development; and (3) approximately 300 household surveys across three fisherfolk villages in Trivandrum District (Figure 2). Information obtained from the household surveys included household composition and demographic data, adult work histories, household assets, credit arrangements, divisions of labour and labour deployment strategies, financial management and decision-making, and notable events such as marriages, deaths, injuries, etc. I have used this information to develop an understanding of the livelihood strategies fisherfolk households are adopting and how these are shaped by intersections of local gender norms and ideologies and processes of globalization in the sector as a whole.

The fisheries sector is one of the most productive sectors of the Kerala economy (Kerala Economy, 2003), and Kerala's fish harvests constitute a significant portion of all-India fish production. Fishing is a caste-based occupation that ranks among the lowest strata of the caste hierarchy. Despite the importance of the fisheries sector to Kerala's economy, fisherfolk communities are among the poorest and most socially disadvantaged groups, lagging behind other communities in literacy/education and overall socio-economic well-being. Trivandrum District has the largest fisherfolk population in the state. Eighty-one percent of the district's fisherfolk population is Christian. Muslims comprise about 18% of the fisherfolk population in the district, and Hindus one percent (Marine Fisheries Census, 2005). Gender divisions of labour differ somewhat across these communities, however, in this paper I focus primarily on Christian fishing communities.

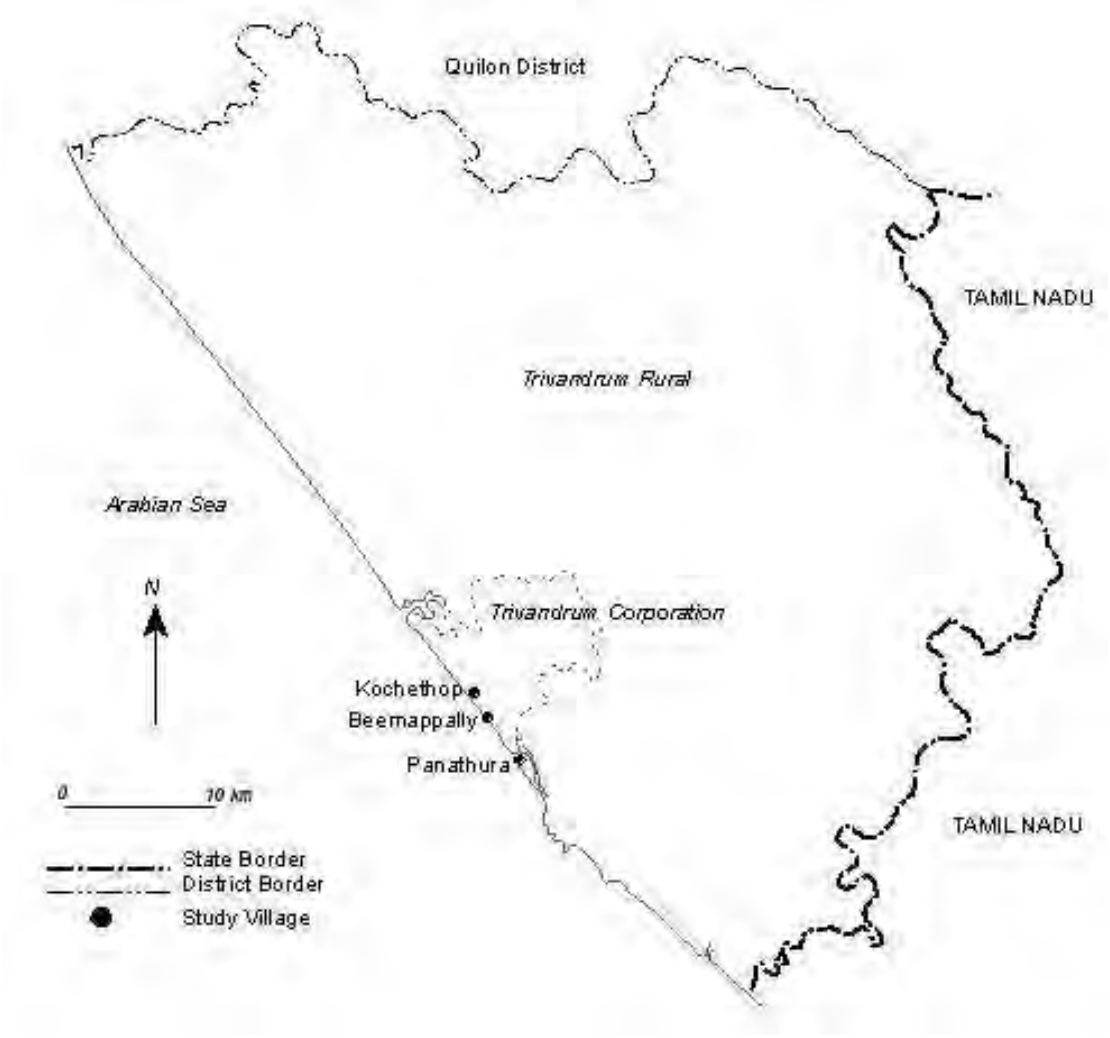

Fig. 2. Trivandrum District, Kerala State, India

Globalization and the global fish food economy

Through a series of trends and transformation, local production systems become increasingly organized and spatially integrated into a global food economy. In developing countries, these transformations are often driven by national fisheries development policies and programs pursued with the explicit objective of capitalizing on global market opportunities. In recent decades, four trends characterize globalization within the world's fisheries: (1) dramatic expansion of fish production and international trade; (2) transformations in fish processing industries; (3) elite consumption habits in industrialized countries shape development of national agro-food/fisheries sectors – shrimp is main item of export; and (4) geographical unevenness in per capita supply of fish as food.

Since the 1950s, production in the world's marine fisheries has increased four-fold and world trade five-fold (FAO, 2006). This development is the result of increased production capacity, technological innovations in production and processing (e.g., purse seine nets; freezing and freeze drying), and rising global demand for marine products, particularly from industrialized countries (Platteau, 1989). In trade, developed countries and regions such as Japan, the United States, and the EU account for more than 80% of the value of imports (FAO, 2006), while developing countries account for 50-51% of the value of exports (an increase from 37% in 1976) (FAO, 2010). "For many developing nations, fish trade represents a significant source of foreign currency earnings … [and fish] trade tends to flow from the less developed to the more developed countries" (FAO, 2002).

Over the past two decades considerable diversification into high value products and a marked shift from traditionally processed (dried, cured) items toward frozen fish has taken place. Fish processing has become "more intensive, geographically concentrated, vertically integrated and linked with global supply chains. … More and more producers in developing countries are being linked with, and coordinated by, firms located abroad" (FAO, 2010). With respect to shrimp, which is the dominant export item from fisheries – 15% of all export value in 2008, substantial restructuring is taking place in terms of capital flows, production modes, marketing, distribution and consumption such that transnational and/or national firms and groups are emerging as the dominant actors in the production, financing and marketing of shrimp in several countries around the world (Skladany and Harris, 1995). The desire to capitalize on global demand for shrimp, especially in industrialized countries, has driven the direction of national fisheries development programs in many developing countries.

More than one billion people rely on fish as an important source of animal protein and in some countries fish contributes 50% or more of total animal proteins (FAO, 2002). Yet, distinct geographical differences emerge in the role and importance that fish plays in nutrition. With few exceptions, per capita fish supply tends to be greatest in industrialized countries and China and lowest in South America, Africa, and central and South Asia. Although these patterns may be explained in part by relative population size, physical environment, species availability, and local dietary preferences and traditions, they are also indicative of the global market and the way consumer demand in wealthy countries has driven fisheries development in developing countries.

Fisheries development, local divisions of labour and gender – Kerala

Over the past 60 years, fisheries development in Kerala (indeed India as a whole) has been strongly state-led and characterized overwhelmingly by efforts to take advantage of global markets for shrimp and seafood through the introduction of mechanized & motorized production technology, ice and refrigeration technologies, and the construction of modern harbors. This technological transformation has entailed sweeping economic and social, transformations as well as a significant shift in the geography of production (Kurien, 1994). The nature, form and impact of these transformations, however, vary across different fishing communities in the State depending on type

of gear used and proximity to the new harbors.

Mechanized trawlers were introduced in the 1960s in only a few communities and operate out of a handful of centralized, modern harbors. Motorized boats have been adopted more extensively throughout the State since the 1980s, but a significant number of non-motorised craft and gear continue to fish. Whereas the mechanized sector is entirely geared toward export markets, connections of the motorised and non-motorised fleets to export markets vary and are more tenuous. These fleets tend to harvest domestically consumed species of fish – sardine and mackerel being the most important. Half of the non-motorised fleet is located in Trivandrum District and constitute the bulk of the district's fishing fleet. Local fishing communities and economies in Trivandrum thus are not directly connected to export markets and the global fish economy, but their livelihoods have nevertheless been impacted by globalization and economic transformation.

To understand the nature and impacts of the transformation, I begin with local gender divisions of labour, which among Christian fisherfolk in Trivandrum, are such that men fish and women process the catch and take it to market. In Muslim communities, women generally do not engage in fish marketing but do work in related activities such as net making. Women are also responsible for household chores, caring for children, procuring goods for household consumption, securing medical care for ill family members, and managing household expenditures and finances. Underlying this gender division of labour is a set of gender norms and ideologies about male and female identity, sexuality and cultural constructions of male and female space (Ram, 1992) that shape men and women's relationships to the fish economy, and for women, constrain their mobility and movement through public space and how they may conduct their market work (Hapke, 2001a). The influence of gender on how women and men as groups are impacted by globalization becomes evident as we examine the various points of the fish commodity chain.

Production. The main impacts of globalization stem from new forms of production technology and shifts in targeted species. These include a geographic shift toward centralized landing sites; overfishing, and within the artisanal sector, declining harvests and declining incomes from men's work in fish harvesting. Technological change and the race to tap export markets has led to overcapitalization and overfishing. The effects of overfishing have been felt most acutely by fishermen in the artisanal sector. Strategies men have adopted to cope with these impacts include: (1) attempts to intensify effort by acquiring new technology (outboard motor boats); and (2) migrate to work in mechanized sector in other parts of state. Neither of these strategies by themselves, however, has been sufficient to ensure household survival. Strategies to move out of fishing include migration for work in the Middle East, taking up second and third jobs such as painting, coolie labour, taxi driving, or obtaining education for employment in alternative occupations, which young men are increasingly pursuing. In general most families have tried to education their children with the objective of leaving fishing as an occupation altogether. The problem with this strategy is that unemployment levels in Kerala are quite high. This has created a situation in which young men are unemployed, but because they have some education they no longer can or want to work in fishing.

This has ironically led to a labour shortage particularly in beach seine fishing, and new labour arrangements have emerged in which boat owners must offer advances of cash in order to secure labour for a given season.

Processing. First, as a result of ice and the development of fisheries in neighboring States, fresh fish is available year-round. This means that traditional fish processing industries, namely dried fish, are in decline. Opportunities to earn an income from fish drying, consequently, have diminished, impacting women in particular who may be constrained from engaging in fish marketing or other work outside the home. Second, new processing industries associated with frozen shrimp and seafood markets have emerged, which have created new employment opportunities for women in prawn processing facilities. However, the work environments in seafood processing are highly exploitative and unhealthy (Desai, 1990; D'Mello, 1995; Samudra Dossier, 1995; Warrier, 1998; Sudhakara et al. 2008). Wages are low. Women are forced to work in a squatting position on the floor for long hours. They have to handle ice and frozen product with inadequate protective covering. Many complain of swollen hands, rheumatism, and spinal problems and have little access to entertainment or relief from work (Vijayan, 1995). Second, since prawns tend to be landed in specific centers rather than all along the coast, seeking employment in processing plants requires long distance migration either to other parts of Kerala or to other states in India where migrant labourers then face social isolation as a result of language barriers in addition to exploitative work environments.

Distribution. Within the stratified market system that has emerged, women are concentrated in the lowest echelons. Commercialization has had both positive and negative effects on women fish traders. Fish is now available year-round and more consistently than at local shores; the expansion of the middle class has increased consumer prices and profit margins, and many women make very decent incomes. Some women have become wholesalers while the most skilled women traders have been able to turn transformations in fish marketing into economic opportunities. On the negative side, commercialization and the geographical shift in fish landings have impacted women traders' access to fish. Although fish may be obtained more cheaply in centralized harbors than at local shores, women must travel long distances and pay for fish in cash. As a result of cultural constraints on mobility and household responsibilities, most women are restricted from accessing fish in the new landing centers. They thus continue to rely either on diminishing local sources for fish or more expensive fish in urban wholesale markets. The need for capital, centralized landing sites, and bulk landings, combined with household responsibilities and cultural factors limiting women's mobility, have in general placed women at a disadvantage in the market hierarchy at the same time the local ecological crisis has increased household reliance on their work in fish marketing for survival (Hapke, 2001b). To cope with these new challenges, some women have pooled resources to share transport and buy fish in bulk (Hapke, 2001a). Women have also organized politically to press the state to support their work in marketing such as providing transportation (Nayak, 1990).

Commodity chain analysis linked to an understanding of local divisions of labour as they are informed by gender provides us an understanding of the general pattern of globalization's impacts on fisherfolk households in a given region. Extending this analysis to the level of the household and questions of livelihood additionally provides a more nuanced understanding of how global economic processes impact households and individuals in particular ways. For example, women's actual relations to the fish economy/commodity chain and fish marketing in Trivandrum are much more complex and varied than suggested by the local gender division of labour and differ according to the type of fishing craft and the size and composition of fishing crews (Hapke, 2001a). In *kattumaram*[1] fishing, for example, female kin often take the catch directly to the market. However, in beach seine fishing, the entire catch is usually auctioned on the beach. Women also take up fish marketing under a wide range of contexts and circumstances. Not all fishing efforts are successful, and not all households own fishing gear. When necessary some women may buy fish from non-kin boats to take to market; other women go to the market only when their husbands (or sons) have fish. Examining these variations is crucial is to understanding the complexities of the gendered nature of globalization. One way to examine these variations is through the analysis of livelihood strategies and the household economy.

Gender, household economies and livelihoods

Factors such as current asset base (boat ownership/non-ownership), household size and composition (age, number and gender of members), education and skill levels, work identities and family ideologies, and entrepreneurial initiative (agency) shape the particular livelihood strategies individuals and households adopt. For example, households that are able to expand their asset base are not only able to withstand the shocks of ecological crisis, they may even benefit directly from new market trends and opportunities. The willingness of households to deploy women in remunerative work, the extent of their mobility, and their level of skill shapes the particular strategies households adopt, which then shapes future options for livelihood strategies. To illustrate how these factors influence particular experiences of globalization, I turn now to four individual household examples. These individuals were interviewed in different years over the course of my field research between 1993-94 and 2008. Although the details of their individual situations have changed over time, the overall structure of fish marketing processes has not changed substantially during the period of field research with the exception that the proportion of nonlocal fish in consumer markets appeared to have increased somewhat by 2005. This would have increased the reliance of women fish traders on wholesale markets for their supply of fish. Collectively, their stories are representative of the different ways households are connected to the local fish economy and the strategies they have adopted to cope with commercialization and ecological crisis.

[1] Small canoe-type boat made from strapping 3-4 logs together.

*Lily***.** (Interviewed in 1994 and 2005.) In 2005 Lily is 49 years old. In her household are her husband, age 55, and an unmarried son, age 25. Her two daughters, also in their 20s, are married and live in their own houses. Lily currently works as a wholesale fish trader in one of the capital city's large marketplaces. Her husband previously was a fisherman but has worked as a porter at the airport for most of their married life.

When I was young I really wanted to go to school, but I was not allowed to because I was needed to look after my younger brother. I started doing the fish business when I was ten years old. My mother took me to the market. I would go with her to her line of household clients. She would sit on a corner and ask me to take small baskets of fish to different houses. At noon we would go together to collect money and get food. When I was 13, my mother was in an accident and couldn't go to the market for three years. During this time I still went. I bought fish at the shore, not at the market, and took it to my mother's line. When my mother could work again, I stopped going with her and joined my aunt in a small marketplace selling fish we bought at the shore. I got married when I was 18. My husband used to fish so I would take his fish to the market. Two years after marriage, I formed a partnership with three other women. We bought fish in Palayam (the main wholesale market at the time) -- two boxes – divided it up between us and sold it in Kaithamukku (a retail marketplace). At that time we didn't have the intelligence to sell it in Palayam itself (do a wholesale business), but later we decided we could make more money if we sold fish to women traders in Palayam. So that's what we started doing. We buy five to seven crates of fish in Pangode (current main wholesale market) every morning. We arrive at 5:00 AM. By 7:00 AM we have our fish and hire cycle loaders to carry it to Palayam where we sell it to women traders. If there's leftover we sell it to customers (consumers) who come around 10:00 AM. Then we buy whatever we items we need in the market and go home by 12:00.

Selin. (Interviewed in 1999 and 2005.) In 2005 Selin is 35 years old. Her husband is 39. She has one daughter, age 15, and 1 son, age 13. Both attend school. Her father-in-law who is retired also lives in her house. Selin works as a fish vendor. Her husband is a fisherman who has owned his own boat for most of their married life. First he owned a *kattumaram*, which was purchased with her dowry funds. For the past 6 years he has owned a outboard motor boat which they purchased partly with a government loan. Selin organized several private loans to make up the balance.

I am from Marianad originally. I started going to the market with my mother when I was 10. We went to Mudikumpuzha and would carry the fish on our heads to the ferry and take a boat to the other side. I helped my mother for 4 years, and I learned how to do the business in that 4 years. Then I started my own separate business, but I went to the same market as my mother. I would spend my earnings on my own clothes and then give the rest to my mother who saved it for my dowry. After marriage I came to Thope (this village). So then I started going to Chalai (large wholesale market in capital city) and to Vadakada (a nearby market). My husband is a fisherman. He had a kattumaram for 8 years, but before that he worked for other people (boat owners). When we had the kattumaram, I would take the fish to the market if the prices on the shore were too low.

But first we would try to sell the fish on the shore. Now he owns an outboard motorboat. With that, I'll take whatever I can handle to the market, and the remainder will be sold on the shore. The reason (for this) is that to meet daily expenses, we need cash. If we sell all the fish on the shore, we won't get cash right away. If I take part of the catch to the market, I'll get cash that day itself. If he doesn't get a catch, then I go to Chalai and buy fish to sell or I get fish here on the shore if it's available.

Tracy. Tracy was 60 years old when I interviewed her in 1999. She lived with her husband, age 70; a son, age 26; 2 daughters, ages 20 and 23; a son-in-law, 32 years old; and a 2-year old grandchild. She was working as a small-scale retail vendor in a city marketplace. Her son and son-in-law were working intermittently for other fishermen with boats when work was available.

I've been going to the market (selling fish) for the past 20 years. Even before marriage I went to the market. I started when I was 15 with my mother. After marriage I stopped for a while. After we had our first two children (about 30 years ago) we bought a "kambavala" (beach seine net and large canoe). We had the kambavala for 10 years, and I used to manage it. I kept track of how much fish was sold, who worked. I divided money among the workers. Like that. So, I didn't go to the market during this time. Then the boat got ruined so we sold the net, and I started going to the market again. After selling the net, my husband, Thomas, would go to Calicut (northern Kerala) every year to fish and send money home. But, he's now 70 years old. He has diabetes and had to stop working six or seven years ago.

*Kochetracy***.** Kochetracy was 47 years old at the time of her interview in 1999. She was working as a fish trader but only went to the market when there was fish available at the local shore because she did not have the necessary connections to get credit in the wholesale market. Her husband, Seril, age 50, sometimes worked as a fisherman for others on both boats with outboard motors and *kattumaram*. They had four adult children – two daughters (Stella, 24, and Serafin, 23) and two sons (Sunil, 21 and Reetus, 20). Stella had been working as a maid in Kuwait for the past year and a half. Serafin was recently widowed, so had moved back into the house with her two young children. Sunil and Reetus had attended school to the 10^{th} standard (grade) but both failed the final exams and were working in a restaurant.

I am from Vizhanjam (a large fishing village and harbor for boats with outboard motors south of Kochethop). My father owned a boat, and his catch was auctioned in the harbor so we (mother and sisters) did not have to work in fish marketing. We also had a net-making business and so we worked in that. But, then machine-made nets were introduced so we lost that. I started selling fish five years after marrying Seril. His family had a kattumaram for 18 years. There would be more fish than buyers so Seril's mother asked me to help her take it to the market and taught me how to sell it. I also had an illicit liquor business until 10 years ago (i.e., 1989). It was a small business but provided enough to run the family. I started this business because my husband was an alcoholic. Whatever money he earned he drank, and we were in poverty. Now he just plays cards. Then (in the

late 1980s) the Church began a campaign to stop illicit liquor brewing so I shut down my business and now just go to the market when I can get fish. Before Stella went to Kuwait she attended a sewing/bookbinding class in which she earned about Rs 150/month (US $50). Before marriage, Serafin worked in a prawn-processing factory in Chennai for about a year and a half, but she left this job after marriage. Her husband worked in construction but was killed in an accident at work. After he died she came back to Trivandrum and now looks after her children and helps with the housework. We live on what I make in the market and what Sunil and Reetus make in the restaurant.

Discussion

. These four cases represent different ways households and individuals are connected to the fish economy and different experiences of the economic transformations associated with globalization as a result. They also show that the extent to which men responsibly contribute their earnings to household budgets help determine women's livelihood options. Over the course of Lily's life we see different connections to the fish commodity chain at different times. When she was young, fish was more plentiful on local shores, and for some time her husband harvested fish that she then took to the market. Her shift to procuring fish from a city wholesale market roughly corresponds to the period when wholesale market expansion began to take place (1970s). Commercialization and expansion of the fish market structure at that time presented an opportunity to move into wholesale trade, which she seized entirely on her own initiative, that is, without any advantages of State support. Lily also represents an example of the advantages of diversifying sources of household income. Her husband's regular employment at the airport, though low-wage, has been critical for their household support, allowing her to save and invest a greater share of her earnings in her fish trade business than what may have been possible without his income. This has ensured her a solid livelihood. When I revisited her in 2005, she was clearly financially secure. She reported having a stable income, and she had been able to arrange very good marriages for her two daughters to men working in the Middle East, which required substantial dowries. Both were living very comfortably in well-furnished, two-story concrete houses.

Selin is another example of entrepreneurial skill and flexibility in being able to adapt to changing conditions. First, her skill in fish vending, savings, and financial acumen underlay her household's ability to acquire first a traditional boat, and then later build on this asset base to acquire an outboard motor boat. Second, at the time of Selin's marriage (around 1990), urban wholesale markets had expanded and presented an alternative source of fish independent of her husband's fishing efforts. Procuring fish in the market while her husband sold his catch on the shore represents a livelihood strategy that expands sources of household income. If her husband can sell his catch on the shore for a sufficiently high price, and if she conducts an independent market-based fish trade business, they enjoy two streams of income instead of the one if she were to take his fish to the market directly. Or, if shore prices are low, she can take the fish to the market as a backup strategy. Taking a portion of the current catch from the outboard motor boat also represents an entrepreneurial flexibility that meets their daily needs for cash without overburdening her workload.

The third aspect of Selin's entrepreneurship is her ability to take advantage of government loan programs and marshal other sources of capital to expand her household asset base. These skills and actions represent an ability to adapt to transformations embedded in the fish food commodity chain and weather the challenges of globalization and its impacts. It is important, however, to emphasize that despite the relative success of these strategies, the overall situation of Selin's household is still precarious. A week before the interview with Selin took place, her husband's boat had sustained damage that was quite expensive to repair and caused considerable financial stress.

In Tracy's household we see cyclical patterns of boat ownership and loss. When they owned the beach seine (in the 1970s), overfishing had not yet affected local harvests, and their income from the net supported their household. The loss of the boat forced a change in their livelihood strategies. The mechanized sector presented an opportunity to her husband to migrate for work while he could, but at the time of the interview the household was relying on her work in fish vending and her son and son-in-law's work as hired fishermen, which, in the ecological context of declining local harvests in the late 1990s, was quite precarious. Few households could survive only on male work in fishing. Although the existence of urban wholesale markets provided her access to fish and an ability to earn an income, her age, lack of financial resources, and the medical expenses associated with her husband's illness posed significant constraints. Although able to operate within the transformed marketing structure, she was just barely surviving.

Kochetracy represents a different way in which women fish traders can be connected to fish marketing and fish commodity chain. Kochetracy is the de facto head of her household. Although her husband, Seril, owned a boat, his alcoholism undermined his household's economic security. Kochetracy has had to be very creative in forging a livelihood, undertaking different activities at different times as opportunities presented themselves and then vanished, e.g., operating a liquor brewing business until the Church intervened. In contrast to the other women profiled above, Kochetracy took up fish vending as an adult. Typically when women take up fish vending as adults, they do so at a point of economic desperation, which means that they lack capital and must spend time learning how to do the business before they are able to glean much economic benefit. Although Kochetracy was able to learn the business as a helper under the tutelage of her mother-in-law, she does not possess the same level of business acumen as Lily and Selin. The fact that she reports not having credit connections in the wholesale market that would allow her to get fish is a limiting factor in operating a fish trade business and adjusting to the shifts in fish marketing that have followed globalization. Many women are connected to the fish economy in this way, and their livelihood needs have been completely overlooked in State intervention programmes. As a result, they struggle to survive.

The work experiences of Kochetracy's children illustrate an emerging trend among the younger generation of fisherfolk seeking employment opportunities outside the fish economy as well as new avenues of employment (prawn processing, Gulf migration). The work experiences of Kochetracy's daughters also present an interesting paradox. The cultural context of Kerala strongly

favors the male breadwinner-female housewife model. So, on the one hand, the willingness to send young women far from home to work speaks to economic desperation. On the other hand, both the girls' and boys' work experiences also indicate flexibility and willingness to find whatever work they can. Over the long run, this flexibility and willingness may be key to household survival. The literature on livelihoods indicates that work/income source diversification should be interpreted in two ways. Depending on the particular economic circumstances of a household, it can facilitate income strength and stability. Among low-income households, it also tends to indicate economic instability and thus should be read as a coping strategy for financial stress.

Conclusion

Collectively these stories begin to show us how adoption of a multi-faceted, multi-scalar framework combining commodity chain analysis with livelihoods analysis allows us to probe the complexities of globalization and more fully understand the diversity of experience and impact within general trends and processes. As the above stories illustrate, the impact of globalization on local people is quite complex and paradoxical. Individual impacts derive in large part by how one is situated within the local economy, which is shaped by factors such as household asset base, household size and composition, education and skill levels, work identities and family ideologies, socio-economic networks, and entrepreneurial initiative.

The emergence of global markets for fish and seafood products beginning in the 1960s shaped national fisheries development initiatives in developing countries in ways that dramatically transformed regional and local fish economies. The differential impacts of these transformations on women and men fishworkers as groups are revealed by a commodity chain analysis that incorporates gender and local divisions of labour as the root focal points of inquiry. Probing these impacts through examination of livelihood factors at the household level further reveals diversity of experience within these general patterns. The way different livelihood factors shape and are shaped by gendered patterns of globalization also become apparent. Different livelihood factors (assets, access and activities) embodied within individual households create different opportunities and constraints as local fish production systems undergo transformation. Some individuals benefit tremendously while others experience intensified economic stress. Understanding these differences is critical if we are to formulate development policies and programs that support fishing livelihoods at the local level.

The policy lessons that this analysis reveals are three. First, within research that informs planned intervention is the need to view production and post-production activities as equally important constituent parts of a single, integrated economic system. Our assessments of local fish production systems and proposed development programs need to be premised on an understanding that interventions in one sphere (production) will impact the other (marketing) and that different groups of workers in each sphere are likely to be impacted in different and often conflicting ways. Second is the need to recognize women's economic roles within local fishing economies and incorporate

their interests and needs in planned intervention. The tradition within fisheries development has been to overlook the centrality of women's economic activities to the household economy and thus to local fish economies as a result. Ignoring women's roles within local fish economies undermines household livelihood viability and generates economic stress among the very populations State intervention often seeks to assist. Finally, this analysis points to the need to acknowledge the multiple strategies people adopt to cope with economic change and ecological crisis and plan State interventions to support the livelihood context in which people are situated. Fundamentally, planned Sate intervention needs to be directed at ensuring individual, household and community survival over the long run.

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Edging Up the Ladder: The Women in Ban Thung Maha, Thailand

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Abstract

This paper provides an insight into fisheries conditions for women in Ban Thung Maha, Thailand, a typical coastal fishing community. The studied women made significant contributions through their multiple activities in both the reproductive and productive spheres. Gender inequality was prevalent in the village and manifested in gender divisions of labour, differential access to and control over resources, and access to political and administrative decision-making. The stories of five women showed their struggles against gender stereotyping, marginalization, multiple burdens, subordination and violence against them and their efforts to reverse the trends. With support from the Department of Fisheries, some of them learned to empower themselves, set their lives' directions and help to also empower others.

Introduction

In Thai fisheries, women play active roles. In aquaculture, women are engaged in hatchery and nursing operations, fish farming, aquatic feed production, fish product processing, trading, as "'middlemen", in cold storage facilities, importing, exporting and ornamental fish rearing. In fishing villages, in addition to household chores and nurturing the family, Thai women work alongside men in buying fuel, nets and other supplies, fishing at sea, weaving and mending nets, and selling the catch (Kittitornkool, 1996a; Kittitornkool 1996b cited in Quist and de la Cruz, 2008). They also engage in community activities such as religious functions, funerals, weddings, mangrove reforestation, and artificial reef production. Despite their substantial contributions, women fishers continue to be invisible and rarely recognized. (Kittitornkool, 1996b; Siason et al. 2002). This lack of recognition, partly due to limited research and information, limits understanding fisheries conditions and the success of fishery development efforts (The Technical Advisory Body for Fisheries Management, 2006).

The present study aims to fill some of the knowledge gap by investigating the productive activities of selected women fishers in Thung Maha, Pathew District, Chumphon Province, Thailand, a typical coastal village in Thailand. This paper focused on women's and men's access to

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and control over resources, access to political and administrative decision-making, the work they were engaged in and their time allocations, the women's views of their work, and their aspirations in life. The stories of five women are featured to illustrate the situation of women in different occupations and to reveal other important issues related to gender.

We obtained most of the information for this paper from focus group discussions (FGDs) with groups of fishermen and women fishers and key informant interviews (KIIs) with the women fishers, processors and traders and with leaders and officials of the Department of Fisheries (DOF) who were knowledgeable about the village. We sought the support of the researchers of the Chumphon Marine Fisheries Research and Development Center of Paknam, Muang, Chumphon in arranging the field visits and facilitating the FGDs and KIIs. We also benefited greatly from the technical reports provided by the Southeast Asian Fisheries Development Center (SEAFDEC) and the DOF. The data gathering was carried out at varying times in the months of February and March 2009.

Empowerment: a critical aspect of gender equality

A key idea that this paper emphasizes is the importance of women's empowerment in promoting gender equality for sustainable development of fisheries. But what is empowerment? What is women's empowerment?

Defining empowerment requires an understanding of its root word, power. Kreisberg (1992 cited in Page and Czuba, 1999) defined power as, "the capacity to implement," allowing the concept to mean domination, authority, influence and shared power or "power with." Page and Czuba (1999) claimed that it is this definition of power, a process and occurring in relationship to others, that makes empowerment possible. This led them to define empowerment as "a multi-dimensional social process that helps people gain control over their own lives, a process that fosters power in people, for use in their own lives, their communities, and in their society, by acting on issues that they define as important."

The process and multi-dimension aspects of empowerment were captured by Kabeer's (2001 cited in Malhotra and Schuler, 2005) view which was "the expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them." Kabeer's (2001) definition also tracks the changes in a person's situation, from a powerless situation where one's abilities are constrained to an empowered situation where one's abilities are utilized to improve one's well-being.

The same aspects of empowerment were also emphasised by Narayan (2005) in her more specific definition of empowerment which was "the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control and hold accountable institutions that affect their lives." This definition monitors the changes in: (1) the unequal relationships within households and between poor people and the state, markets, or civil society; and (2) gender

inequalities manifested by marginalization, subordination, multiple burden, stereotyping and violence against women. Narayan (2005) also identified key factors that facilitate or constrain poor people's efforts to improve their own well-being and thus affect development outcomes. These factors were the institutional, social and political context of formal and informal rules and norms within which actors pursue their interests, and individual and collective assets and capabilities. Assets refer to the material assets which can be physical and financial while capabilities pertain to the ability of the person to use their assets to increase their well-being. These capabilities could be human (good health, education, and other life-enhancing skills), social (social belonging, leadership, identity, capacity to organize) and political (capacity to represent oneself and others, access information, form associations, and participate in the political life of the society.

Women's empowerment, on the other hand, encompasses two important features: a process of change which is towards greater equality or freedom of choice and action, and agency where women themselves must be significant actors in the process of change (Malhotra and Schuler, 2005). This definition viewed women not only as beneficiaries of change but as agents of change as well. The active involvement of women as agents of change in the development process was earlier stressed by Kabeer (1994) when she said that those whose voices have been suppressed for a long time must be the main actors in various areas of development. Thus, women must be given the necessary space, time and resources to allow them to articulate their own interests.

The village and women of Ban Thung Maha

Ban Thung Maha, a Thai-Buddhist community, is one of the seven villages comprising Tambol Pakklong, Pathew District, Chumphon Province, east coast of Southern Thailand. Thung Maha is noted for its fisheries and agricultural resources. Anchovy, squid, crabs, shrimps and other types of aquatic resources are caught with traditional fishing gears such as squid cast nets, anchovy purse seine and fish, shrimp and crab gill nets, and crab traps. Cultured fish like sea bass, grouper and green mussel are also grown in the area (Nasuchon, 2007). Large areas of land are allocated to rubber and palm oil production, and small areas to the cultivation of coconuts and vegetables.

In 2002, Thung Maha had 196 households engaged in both fishing and farming. While the majority of people were employed in fishing, a number were involved in farming and provided labour, mostly to rubber and palm plantations, especially during the off-season for fishing. Seasonally, some farmers also engaged in processing squid and anchovy products. A few were engaged in small businesses such as small scale grocery stores, vegetable shops, seafood processing and eateries.

The village lacks access to sanitary toilets, safe drinking water, health services, good access to roads and public transportation. Lack of transport constrained mobility. Mobile phones, television and radio were available for communication but the village had no internet access.

We assessed the women's positions in the village, relative to those of the men, with emphasis on their access to and control over the use of fisheries resources, access to political and administrative decision-making, and their activities.

Access to and control over fisheries resources. While access to the fisheries resources is open, their use and control are traditionally assumed by the men, especially in case of mobile species in coastal and off-shore areas where fishing activity is considered to be physically strenuous and risky. For sedentary species and/or less mobile fish species such as cultured seabass and shellfish, women have direct access and control. Such differential access to and control over the use of fishery resources also results in differential economic benefits. The preferential treatment of men is also shown in the fishers' official registration records, where all recorded fishers were male, and in membership in fishers' groups, which is largely dominated by men.

Access to political and administrative decision making. In Thung Maha, access to political and administrative decision-making is mostly given to men. The village head position, elected by the community, is expected to be a man. Except for public health, the same pattern is reflected in the 15 member committee tasked to assist the village headman by handling various community concerns, e.g., public relations, sports, culture, development, protection/surveillance, public health and the Tambol Administrative Organization. The under-representation of women in these leadership and/or administrative positions affirms the general perception in Thai society that public representation is a masculine domain. Women's positions in public health are just extensions of women's reproductive roles. This implies that politics remain a protected sphere of the men.

Women's activities. Women's activities were divided into household, economic and community. The household activities (cleaning, cooking, washing and ironing, rearing children and taking care of husbands) remained solely women's responsibilities.

In economic activities, women were involved in capture fishing, fish culture, shrimp farming, fishing port operations, fish processing, farming (rubber, palm and coconut) and retail trading. In capture fishing, women engaged in post-harvest activities such as sorting, weighing, selling a small portion of the fish catch to the community, and record keeping. In fish culture and shrimp farming, women shared in feed preparation, feeding, hauling of catch and selling of catch to the fish traders. Men's jobs revolved mainly around land preparation and cleaning and watching/guarding the ponds/cages. Fish processing was mostly woman's work, from sorting, cleaning, slicing, drying and packing, to selling to fish traders. While the law is silent about women's rights in fishing, cultural norms dictate that fishing is not a female domain, being strenuous, and dangerous.

In farming, women were found marketing coconut products, and tapping rubber trees, collecting latex, milling, transporting and marketing rubber products. In business, while women mostly managed small grocery stores and eateries, men shared in the task of watching the store and loading the goods into vehicles.

Women's involvement in community activities included the celebration of the Songkran (Water Festival) and Loi Krathong festivals where they took charge of cleaning their houses, temples, public places and official buildings, offering alms to the monks, listening to sermons, and watching the bathing rite for Buddha images and the monks. A similar pattern of activities is observed during traditional competitive boat racing which is celebrated in the month of October. Women also participated in mangrove planting, and the release of juvenile sea bass, shrimps and gravid crabs at the shore during the birthday celebrations of His Majesty the King and Her Majesty the Queen.

Case stories: women in the productive and reproductive spheres

To better understand the situation of women and explore issues confronting them, five Thung Maha women (Darina, Pin, Nin, Puk, Nit) who were engaged in different undertakings, productive and reproductive, were selected to illustrate their regular daily activities, time allocations and marital relationships. A 24-hour clock was used to record times. The women's views on their work and their aspirations in life were also obtained for a clearer understanding of why their activities were undertaken. Fictitious names are used for all cases.

DARINA. A hardworking woman trader, Darina, 37, is married to a 42 years old trader named Dato. They have two children, both in primary school. From an early age, Darina used to be a fisher, setting out to sea with her father and then, after marrying, with her husband. But the unstable income and the risks involved in fishing forced them to engage in less hazardous undertakings, namely selling banana and yam fritters and other local sweets.

Like most of the hardworking women in Thung Maha, Darina starts her day at 03:00, doing household chores – cleaning the house, cooking breakfast – and making local sweets, while her husband prepares fish-balls and fries bananas and yam for sale in their shop. At 06:00, Darina rides her motorcycle and sets off to the rubber plantation to sell her homemade local sweets to the workers while Dato stays home, watches their shop and takes care of his mother and children. Darina comes home at 13:00 for lunch.

Darina's afternoon break is spent watching their shop while Dato goes to the market to buy yams, bananas and other ingredients for the local sweets. Darina prepares dinner while Dato washes the dishes – an arrangement well accepted by both parties. After dinner, both watch TV. Bedtime is usually at 21:00.

Darina likes her work because it allows her to drive around the village, see her friends and be updated on the latest news in the village. Darina dreams to own a rubber plantation someday for she believes that there is much money in rubber plantations.

*PIN***.** A woman of influence, Pin, 62 years old, is married to a fish trader and occupies a position in a women's group. She has two sons, both already working and helping in the fish port.

Pin benefited a lot from training and an educational tour facilitated by the DOF. After assuming a leadership position in a women's group, Pin formed her own women's group primarily to help those who needed additional income. Using all her knowledge gained from the training given by the DOF, she ventured into buying and processing fish into fish crackers. She hired some members of her group and paid them 100 Baht for half a day's work. In addition to fish processing, Pin also engages in rubber cultivation.

Typically, Pin gets up at 03:00 to wait for the fishers to land their catch, buys fish and brings it to the factory for processing. During the lunch break, Pin usually makes a short visit to her rubber plantation and then goes back to the factory again.

Pin has stopped doing household chores which are now taken up by her daughter-in-law who is living in the same house. Pin used to keep the proceeds from fish crackers and the rubber plantation to herself. But, due to the declining income of her husband, she has to put out some of her earnings towards household expenses.

Pin believes that a wife should not be confined to the house. Women should find work outside to augment the family's income. Life would be easier if women had their own money. Pin related how the proceeds from her rubber plantation enabled her to travel and buy tracts of land in the North without the knowledge of her husband and thus, increased her sense of security. She also believes that as a member of the community, one must be involved in community work to change one's perspective in life and increase self-confidence. Pin claims that her training in Thailand and abroad allowed her to see the world outside, enhanced her understanding and appreciation of people and of women, provided her some business ideas and strategies which she applied to the group's livelihood activities, stimulated her entrepreneurial spirit and increased her passion to contribute to the development of the community.

Pin confessed that it was not easy for her at the start because of her husband's opposition to her new activities and the stereotyped role of women in the family. She recounted the many times that she had to argue with her husband who was against her long absences, especially when attending training courses and field exposure. Pin contended that women's standing in the community was much better now than before. She cited the fact that many women have multiple jobs outside the house and some travel by car.

NIN. Nin, 41, also holds a position in a women's group. A quiet yet strong woman, Nin is married to Bon, 57, and they have two grown children.

Nin and Bon are hardworking aquaculturists, raising sea bass in 32 cages with a total area of 60 m^2. Bon is almost always out of the house, spending 2-3 days at a time attending to the cages for 8 consecutive months of the year. Nin used to help Bon raise sea bass. After assuming a position in the women's group, however, Nin had to divide her time among household chores, aquaculture activities and management and operation of the seafood processing activity of the women's group. The last one she took on in her personal capacity.

Nin starts her day at 06:00 doing household chores – preparing breakfast, lunch, washing clothes and cleaning the house - before working at the factory. She works full-time at the factory, overseeing the processing, weighing, packing and marketing of the processed fish. She takes care of employing members of the group and pays them 200 Baht a day. Nin stays at the factory until 18:00, then goes home and prepares dinner for her family. Bedtime for Nin is usually 21:00.

Nin said she has no dreams for herself.

PUK. A food shop owner, Puk, 37, is a single parent. She was separated from her 35 year old husband five years ago, on the grounds of repeated infidelity. Tired of being lied to, Puk decided to end the relationship, with the understanding that her husband, Nyi, would provide some financial assistance for their child, but this has not materialized.

Puk finished high school and had a job in a computer company before she married Nyi. When Nyi moved to Songkla Province, Puk decided to transfer to Pathum Thani to be closer to Nyi. Puk's mother asked her to co-own her eatery so Puk would have additional income.

As a co-owner of the eatery, Puk works from 06:00 to 18:00, leaving her child under the care of her mother-in-law. Assisted by a female helper, Puk works in the eatery, including going to the market to buy vegetables and meat to washing the dishes. She usually drops by her friend's place for a chat before going home to rest. Puk believes that she is fortunate to have her own business for it provides her some money to finance her basic needs. When asked of her dreams, she said she had none for herself.

NIT. Nit, 52 years old, is a committed community leader. She is married to Ben, a fishermen. They have 3 grown up children. When she was little, Nit used to go out fishing with her father. When she married and had children, she stopped going to sea and engaged herself in drying squid for additional income. Often, she starts her day at 05:00, preparing food and doing some household chores while waiting for Ben's return from fishing. If Ben's catch of squid is not enough, Nit buys some more squid from other fishermen.

Nit spends at least 4 hours a day slicing the squid, laying them out on a flat sheet for drying while Ben takes his rest. Nit takes a short break during lunch and helps Ben prepare his fishing paraphernalia. After sending Ben off to sea, Nit resumes her work, packing some dried squid and selling them at the nearby market. Often, Nit goes home at 17:00, cleans the house and prepares dinner. Usually, she retires to bed at 20:00.

Nit is happy being able to work outside the house and has been delegated the community work of taking care of the community's guests. She is also grateful that her work as a squid drier and trader allows her to move around and socialize with people. Like Puk, Nit does not have a dream for herself.

Conclusions

The above analysis and stories show that women make significant contributions to sustaining the fishing village by engaging in multiple activities in the households, fishing, farming, business, resource conservation and socio-cultural activities, complementing the work of the men. The engagement of the five women (Darina, Pin, Nin, Puk and Nit) in reproductive and various productive activities confirms this. Their stories also tell how they provided income for their families. While the women have moved from home to the productive sphere, however, men have made very limited comparable movements into doing domestic work to ease the overall work of the women.

Women's access to low valued sedentary and/or less mobile species such as sea bass and shellfish, men's access to higher value species, male fishers' names being listed as registered fishers in the fisher's official registration record, and the male-dominated fishers' group show the traditional stereotyping and the unbalanced power relation between men and women which is highly skewed in favour of men. This gender imbalance is also reflected in the under-representation of women in political and administrative decision-making positions that deprives the community a large portion of an available pool of expertise to tap for its development efforts. Both Puk and Nin exemplify those women in the village with leadership potential and who could lead others to a development path. The experiences of Puk as she resisted the control of her husband and of Pin's separation from her unfaithful husband are evidence that gender subordination occurs. In particular, the infidelity and economic abuse by Pin's husband is a strong manifestation of gender bias. Their stories imply the need to consider these various forms of gender bias when addressing the concerns of women in a fishing village. Puk and Pin are just two of the village women undergoing similar experiences but who are powerless to resist.

Darina, Pin, Nin, Puk and Nit are cases, however, of women who have gained and exerted some degree of power and control over their relationships with the opposite sex and have attained some economic independence. The stories of Pin and Nin reveal how membership in women's group and capability trainings provided by the DOF have empowered them by enhancing their self-

confidence and skills in product development and marketing and provided them the courage to determine their life's direction and lead others. This shows that intervention efforts through women's organizations and the provision of skills and livelihood training, although extending women's domestic work, are effective. Such efforts provided good opportunities, especially leadership opportunities, for the women to realize their development potentials. Gender equality in the village could further be promoted through the provision of gender sensitivity training and education campaign on women's rights. It is also important that training provided to women should also encourage them to dream about their own futures.

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TECHNICAL PAPERS

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On Gender Mainstreaming Strategies and Tools in Fisheries Development Projects: RFLP Gender Strategy and Lessons from the Asia-Pacific Region

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Abstract

Traditionally, most fisheries development projects have focused on technical aspects, lacking consideration of gender issues during the identification, implementation and monitoring stages. This paper highlights the importance of undertaking gender mainstreaming as part of fisheries interventions and summarizes, as an example, the gender strategy of the Spanish-funded FAO Regional Fisheries Livelihoods Programme for South and Southeast Asia (RFLP). As part of this strategy, RFLP developed a handbook for gender mainstreaming in fisheries project cycle management and organized a workshop to discuss and validate the tools contained in the handbook as well as to come up with best practices for gender mainstreaming in fisheries project management and policy making. Participants agreed on factors that should be in place for effective gender mainstreaming in the fisheries sector, like improvement of social networks, promotion of women's leadership and business skills, improved access and control over resources and social capital, among others. The need for in-depth research during project design and flexibility during implementation were also highlighted as important for successful interventions. At the macro-level, of note is that amongst the participating RFLP countries, only Cambodia has a specific gender policy for the fisheries sector.

Introduction

The small-scale fisheries sector in developing countries employs 25-27 million people on a full-time and part-time basis, with 70 million people employed in post-harvest activities, and with women representing about half of the workforce (FAO, WorldFish Center, World Bank, 2008). Despite the importance and extent of women's roles in the fisheries sector (e.g., Williams et al. 2002), fisheries management and policy making have traditionally not been sensitive to gender. This gender-blindness extends into global normative documents such as the FAO Code of Conduct for Responsible Fisheries "which does not mention the word 'gender' or 'women' and those programs that implement the Code have focused on ecosystem effects of fishing, illegal fishing, or improving statistics" (Williams, 2010), rather than on the specific needs of women and men involved in the sector. However, when looking at the fisheries sector through a gender lens (Williams, 2008), women do perform a wide range of activities, including post-harvest and processing, gleaning molluscs, inshore fishing, aquaculture, marketing and trading (Weeratunge and Snyder, 2009). Some have challenged the traditional belief that fisheries is a male sector, arguing that it could be instead a female domain (Weeratunge and Snyder, 2009).

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The extent and ways that women are involved in the fisheries sector can be diverse and can differ to those of men (Harrison, 2001). These roles also vary across regions, countries and localities, being dependent on culturally rooted working practices, local ecological conditions, seasons, ritual cycles, economic models and social structures, traditions, symbols and worldviews, or a combination of all these factors. Besides roles in pre-production, production and post-harvest, women's contributions are also important when it comes to their roles as primary caregivers to all family members (especially children, the elderly and sick), family nutrition, as well as household and financial management.

Despite their important roles and contributions to the sector, women are usually excluded from decision-making mechanisms for the management of fisheries (MRC, 2006; Blomley et al. 2010 Williams, 2010). Documentation of their contributions remains isolated as case studies, rarely appearing in the official statistics, due to most countries not collecting sex-disaggregated data on fisheries related matters (Weeratunge and Snyder, 2009).

The need to incorporate gender into the management of natural resources (Bennett, 2005) or livelihoods development (Allison and Horemans, 2006; Williams, 2010) is being recognized as increasingly important for fisheries interventions (SFLP, 2007). However, the sector still struggles to acknowledge the full relevance of gender relations and how these are impacted by, and influence, fisheries and aquaculture interventions (Harrison, 2001).

Gender related issues and risks in the design and implementation of fisheries development projects

If the complex relationships between women and men in fishing communities in the context of the current changing and complex social structures are ignored by externally-planned development interventions, the development of livelihoods in fishing communities or of the society at large may be impacted negatively. For this reason, an effective intervention in fishing communities should take into account gender roles in pre-production activities (such as preparing fishing bait) through to the final marketing and consumption. Planning also need to consider the myriad of actors (female and male, young and old) involved at all levels as well as the systems of values used to classify them.

Changes are now occurring in fisheries development projects, as in many other interventions linked to natural resource management. Many projects developed today include the word "gender" in their project document, however, this is too often translated simply into activities targeting women as marginalized beneficiaries (Harrison, 2001), in stereotypical roles. A common way of addressing gender is to include specific activities targeted at women in post-harvest processing, diversification of livelihoods, or/and microfinance. Beyond the crucial importance of these income generating activities, projects may fail to acknowledge existing roles and responsibilities (i.e. the context specific gender division of labour) and their importance, or may ignore the potential risk of the double burden (Bennett, 2005; Williams et al. 2002).

The way fisheries projects address gender issues could bring the risk of failure if they are being addressed with a Western bias about the sexual division of labour, the social organization (see Yanagisako, 1979) and the household distribution of income and resources (Ostergaard, 1992). "Gender" being a social construct, gender relations change over time and across cultures. Gender therefore is an area of continuous study and interventions need to be based on empirical, contemporary evidence. Fisheries projects should be formulated questioning the status of women while activities should be planned trying to challenge power and power relations and aimed towards the empowerment of women (Aguilar and Castaneda, 2001). Furthermore, the impacts that the project will have on women (whether participating or not in project activities) need to be assessed, as well as how the changes brought will affect relationships between women and men.

Gender mainstreaming is about assessing the implications for women and men of the fisheries development actions planned. We use the concept of gender mainstreaming to refer to "the process of assessing the implications for women and men of any planned action, including legislation, policies or programs, in all areas and at all levels. It is a strategy for making women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programs in all political, economic and societal spheres so that women and men benefit equally and inequality is not perpetuated" (ECOSOC, 1997). It should take place at all practical levels in order to ensure that development interventions are designed in response to specific needs of women and men, while contributing to gender equality. Hence, gender analysis - "the study of differences in the conditions needs, participation rates, access to resources and development, control of assets, decision making powers, etc. between women and men and their assigned gender roles. (European Commission, 1998) - should be an integral stage of project formulation. Gender analysis is also crucial during project implementation as well as during project monitoring, evaluation and measurement of impact.

Project planners and managers face a new challenge: how to do all this given the surprising lack of concrete guidance, specifically in the context of the small-scale fisheries sector.

The gender mainstreaming strategy of the RFLP

The work of the Regional Fisheries Livelihoods Programme for South and Southeast Asia (RFLP) provides an example of gender mainstreaming in practice. The RFLP is a four-year programme funded by the Government of Spain which is being implemented by the Food and Agriculture Organization of the United Nations (FAO) in six countries – Cambodia, Indonesia, Philippines, Sri Lanka, Timor-Leste and Viet Nam. Its aim is to improve the livelihoods of small-scale coastal fisheries communities while contributing to sustainable management of aquatic resources. The RFLP has gender mainstreaming as an important cross cutting issue of its implementation.The overall strategy for gender mainstreaming of the RFLP is incorporated in a set of actions in information gathering, knowledge sharing, implementation, monitoring and evaluation, and capacity development (Table 1).

Table 1. Gender mainstreaming strategies in RFLP.

Information gathering systems:
- Gender analysis carried out in the RFLP countries during the initial baseline surveys helped to define activities in national work-plans and the setting of gender targets and indicators. - Data is being sex-disaggregated in all project activities, especially in training and relevant meetings
Knowledge sharing and advocacy:
- Establishment of the RFLP Gender Focal Points at regional and national levels, for the dissemination of information, knowledge sharing and gender advocacy purposes. - Liaison with the Gender Focal Points from the National Fisheries Administration and other relevant government agencies. - Presentation and/or organizing national and regional meetings relevant to gender (e.g. the development of gender awareness campaigns and participation in the Gender Fisheries Symposium organized by the Asian Fisheries Society, among others) - Facilitate discussion on gender-related information with RFLP stakeholders, especially government counterparts, encouraging debate on gender dimensions at RFLP country office, during meetings with stakeholders, other agencies and NGOs, in order to design and implement strategies which will maximize benefits to both women and men. - Creation of the Women in Fisheries Award. The purpose of this Award is to highlight the activities carried out during two years of project implementation and to share the impact and results obtained at country levels with regards to gender equality and women's empowerment.
Implementation of activities:
- Increased flexibility with regards to activity implementation facilitates the participation of women in RFLP interventions. For example, carrying out training and meetings near villages or by providing child-care makes it easier for women to participate in activities. - Screening agreements and other contracts with implementing stakeholders to ensure they indicate the number of women and men participating in project interventions and assessing the likely impact that activities would have on female and male beneficiaries. - Increase efforts to raise and improve women's participation in project interventions (e.g. activities related to post-harvest, diversified or improved livelihood options and improved access to microfinance services) and in decision-making mechanisms, especially in co-management, taking into account the double burden and/or a potential lack of mobility.
Monitoring and Evaluation:
- Gender targets and indicators have been set in the RFLP national log-frames, for measurement of the gender related impact of RFLP implementation during monitoring and evaluation missions. - Reporting, Monitoring and Evaluation (M&E) with a gender perspective, including the disaggregation of all M&E data by sex.
Capacity Development:
- Capacity building is done by identifying the needs of RFLP country staff and government officers and other stakeholders at country level for training aimed at improving their understanding of gender equality and the principles of women's empowerment.

In addition to these initiatives, RFLP also developed a specific handbook for gender mainstreaming in the fisheries sector (Arenas and Lentisco, 2010). We describe this handbook as well as the best practices workshop for gender mainstreaming in the fisheries sector organized by the RFLP.

Frameworks, approaches and tools for gender mainstreaming in fisheries projects

Since the widely quoted work of Boserup (1970) on the roles of women in economic development, and the gender division of labour, a broad body of literature has been produced on the topic. We note, however, that the critical apparatus of the social sciences has had an uneven influence in much of the literature produced, so that many works still carry some of the weaknesses of Boserup, specifically in regard to the descriptive and non-analytical character of her study, as well as the weak theoretical framework applied (Beneria and Sen, 1981). A number of approaches and tools have also emerged from development and research institutions, especially since the 1992 Earth Summit and the gender inclusions in Agenda 21 (Resurreccion, 2010). When undertaking a gender analysis, the adoption of any one approach will have an impact on the planning process, as certain facts will be highlighted while others remain hidden, according to the information gathering methods used. Following Nadel-Klein and Davis (1988), three types of analytical approaches are considered: a descriptive approach that addresses women's and men's roles separately, as being different but complementary; a second that considers power relations in a context of colonialism, capitalism and class; and a third addressing micro-level studies that allow a view of the complexity and multiplicity of roles (Aslin, Webb, and Fisher, 2000).

Different authors and development agencies have developed a variety of analytical frameworks for use in development projects. The five more common frameworks are the Harvard Analytical or Gender Roles Framework (HAF), the Moser or Gender Planning Framework (MF), the Gender Analysis Matrix (GAM), the Women's Empowerment Framework (WEF), and the Social Relations Approach (SRA). These are summarized in USAID (n.d.) and UNDP (Keays, McEvoy and Murison, 2000) and reviewed by March, Smyth, and Mukhopadhy (1999). Beyond these, the Socio-Economic and Gender Analysis (SEAGA) Programme of FAO (Wilde, 2001), developed a toolkit suggesting complementary means to gather information and perform analysis. The gender analytical matrix for fisheries and aquatic systems designed by WorldFish Centre (2010) is built using a selection of elements from the above-mentioned frameworks in combination with the Capabilities and Vulnerabilities Framework and the Sustainable Livelihoods Frameworks. Some authors have preferred to put into use tools such as the Participatory Rural Appraisal (PRA) (Sriputinibondh, Khumsri and Hartmann, 2005) with a gender emphasis, while the work of Aguilar and Castaneda (2001) provides an integral Participatory Appraisal from a Gender Perspective tool of use in different stages of marine coastal zone projects. A documented example of gender analysis for gender mainstreaming in the fisheries sector in Africa can be found in the FAO Sustainable Fisheries Livelihood Programme

(Westlund, Holvoet and Kebe, 2009)[2] that draws also upon the Sustainable Livelihood Approach, combined in some stages with Value Chain Analysis, covering macro/meso and micro levels for analysis and interventions. Holvoet (2008) provides a valuable experience-based explanation on these concepts.

Practitioners interested in using the above mentioned frameworks should consider the recommendation of Hunt (2004) that technicians should not use the frameworks in isolation; instead they should combine them in a manner that reflects the needs, sector and stage of the project. In addition, the frameworks are just "the means to a bigger end" for gender mainstreaming (March, Smyth and Mukhopadhy, 1999).

The RFLP handbook was based largely on the Harvard and Moser frameworks but adapted to the fisheries sector. The aim of the handbook is primarily to raise awareness on the importance of gender mainstreaming in fishery-related projects and to facilitate gender analysis as part of project management (Arenas and Lentisco, 2010). This handbook was presented for feedback to fisheries practitioners in a workshop that discussed best practices for gender mainstreaming. The following section describes the main findings and recommendations from this workshop.

Outcomes of the 2010 RFLP Workshop on "Best Practices for Gender Mainstreaming in the Fisheries Sector"

In order to improve the draft RFLP handbook, learn from Asia-Pacific experience, and design better development interventions (Mehra and Gupta, 2006), RFLP organized a Workshop on "Best Practices for Gender Mainstreaming in the Fisheries Sector", from 2 to 5 November 2010 in Siem Reap, Cambodia. The workshop was attended by 33 government staff, field project staff, researchers and practitioners from intergovernmental, international non-governmental, and non-governmental organizations working in small scale fisheries. They discussed policies, concepts, tools and frameworks for gender analysis, field experiences, case studies and strategies to address and integrate gender dimensions in development projects (RFLP, 2010).

Participants experiences were that access to financial, social and symbolic capital, means of production and business skills were crucial to promoting women's empowerment. The experience in Kampong Tralach Village, Kep province-Cambodia (Seltik, 2010), showed that savings/self help groups were one means of helping women escape from the trap created by the collusive strategies of lenders. The creation of fishery by-product social enterprises in Tiwi (Philippines) helped improve well being in the communities (Coralde, 2010). In other places, such as Timor Leste, entrance into the market economy and the rapid process of modernization involving a shift from community to individual-based rights, could produce negative side effects for certain peripheral sections of society (women, children or the elderly) by producing

[2] A partnership between the Food and Agriculture Organization of the United Nations (FAO), the Department for International Development (DFID) of the United Kingdom of Great Britain and Northern Ireland and 25 participating countries in West Africa, ran from November 1999 to October 2006. The Programme aimed at enhancing the livelihoods of artisanal fishery communities in coastal and inland lake areas.

transitional states of social anomy (Pena, 2010). Interventions should be able to assess these risks to reduce potential negative impacts.

Resource management and environmental issues also need attention during project implementation. As shown by the bottom-up resource management experience in Sihanoukville, Cambodia, self regulatory management systems can help women to enhance their leadership capabilities and awareness of conservation issues while improving their access to the management of productive and natural resources (Ruangsivakul, Etoh and Sorn, 2010). With regards to environmental changes related to climate change, the experience of the 2006 tsunami (see Davis et al. 2005) revealed that women were more vulnerable to extreme weather events due to the fact that they are far less mobile and have less access to information. More women than men work in the informal sector, which is often the worst hit and least able to recover from the effects of disasters, due to lack of capital, and limited access to credit and information, among other obstacles (Epps, 2010).

Workshop participants agreed that although no universal formulas for gender mainstreaming in fisheries development projects exists, a number of factors, when put in place, can contribute to success. These were the constitution and improvement of social networks and the promotion of women's leadership and business skills as well as improved access and control over resources, means of production, social capital or other symbolic capital. Efforts must target both women and men and monitor potential side effects such as any increase in domestic violence. Knowledge upon which interventions are formulated needs to be increased, in both global (effects of climate change, globalization); and local domains. Project interventions should take into account the changing roles (productive and reproductive) played by women and the new roles that need to be played by men, for example, providing greater support in the household, as well as local culture, norms, economic practices, access to resources, social structures, power relations, world views and value systems.

Project implementation must leave room for flexibility. Whilst project documents and texts remain static, social reality moves on.

The policy or macro level

The workshop reviewed existing (or non-existing) gender mainstreaming policies in the fisheries sector of RFLP countries. From among the participating countries, only Cambodia has a specific policy devoted to the promotion of gender equality in the fisheries sector (Fisheries Administration, 2007). Each of the other countries have only general or national gender policies and strategies that may be applied to the fisheries sector, but that would need strong institutional support to apply them in fisheries.

From the experiences of the different countries (Alonso and da Cruz, 2010; Hoang Tam and Bao Duy, 2010; Khim and Ponley, 2010; Munoz, 2010; Pellu and Suwardi, 2010 Vithanage and Dissanayeke, 2010) showed that the implementation of gender policies is constrained by traditional social structures and beliefs, conceptual misunderstandings, lack of knowledge

concerning the complex sets of roles played by women, as well as significant intra-national differences in beliefs, religion, and everyday practices. The lack of skilled human capital or funding appeared as common obstacles. Despite the many constraints and gaps identified in policy making and implementation, however, significant advances have been made at the macro level.

At the macro-level, the recommendations were that: government institutions and other relevant fisheries organizations must provide the normative and policy framework to increase the visibility of women's roles (e.g. through specific gender policies aimed at the fisheries sector), the creation and promotion of women's organizations, the empowerment of women and their participation in decision making bodies (e.g. in co-management mechanisms), the wider dissemination of information on gender issues, the increase of access to markets and food security for women and their families and the improvement of women's skills in the realms of production and income generating activities. Additionally, agencies should support research targeting nuanced analysis of gendered impacts of larger processes and structures on fisheries, such as climate change, markets, industrialization and technological changes (Weeratunge, 2010). To assist the research and for planning purposes, state institutions and organizations must be encouraged to produce gender disaggregated statistics.

The methodological and conceptual dimensions

Traditional conceptual tools arising from the social sciences must be taken into consideration (Arenas, 2010) until new conceptual tools demostrate their usefulness. Divisions like sex/gender, equity/equality or concepts like gender mainstreaming are known and recognized concepts used to understand social inequalities. However, Pena and Alonso (2010) pointed out that binary sets such as sex/gender, public/private, productive/reproductive or domestic/politic, are divisions by which Western cosmologies understand and explain social and gender hierarchies and frontiers. These authors challenged the traditional concepts of analysis, drawing upon ethnographic evidence of the human-nature relationship from different places around the world. Anthropology is nowadays calling for a revision of these conceptual sets, but such a revision, which currently remains in the academic sphere, has not yet been incorporated into the development sector or even into gender analysis as a sub discipline.

With regards to the methodological dimensions, participants agreed that every tool available for gender analysis (such as the ones contained in the handbook), as well as the research methodologies, must be carefully selected for the given social context.

To attain knowledge on the local dynamics for use in project identification and evaluation, medium or long term ethnography will be needed, based on rigorous qualitative and quantitative research methods, including careful analysis of secondary information, bibliographic analysis and data. Through these techniques, local worldviews and social structures, e.g., lineages, casts, class, systems of values (Pena and Alonso, 2010), networks of interchange and the operation of customary and new economic practices outside of the market (Pena, 2010) would be known. Also through rigorous social research, the needs and aspirations of the local

people can be drawn out, understood and included in project planning, as demonstrated in presentations by Bunthoeun (2010), Kwaenjaroen (2010), Dubois (2010) and Weeratunge (2010). Knowledge will be gained on the differential contribution of women and men to livelihood activities and household economics, gender disparities in intra-household practices (such as nutrition levels, income, education, health services, water and sanitation) as well as decision making/bargaining power (Weeratunge, 2010). Emically driven locally based research, i.e., with local communities driving the research directions, is one way to fill the gaps in the knowledge of the aspirations of the local communities (Bunthoeun, 2010; Dubois, 2010). In applying this approach, the role of the researcher must be that of an active listener, gathering the concrete wishes of the individuals, groups and organizations of the community/region or locality (Kwaenjaroen, 2010). The otherwise gender "neutral" Value Chain Analysis also may be a very useful research method for gender analysis when applied with a gender perspective, by describing the different actors (women and men) across the value chain (Kusakabe, 2010). Such in depth research, however, is often neglected due to limitations in time and resources.

Researchers must complement any information gathered through the tools included in the handbook with notes on nuances and exceptions. Checklists establish boundaries that cannot match reality, therefore, researchers must test and adapt the available templates to the needs and the changing contexts of analysis. Where checklists are filled in with participation of the community members, researches should also take into account information gathered through direct observation and complementary techniques. Researchers must become cultural translators, providing the shift from local categories to analytical ones. To achieve this, experienced researchers are needed.

With regards to how knowledge gained is further transformed into the design of project interventions, participants pointed out the risks of using etically (culturally neutral) based problematization techniques abstracted from their context. The Logical Framework Approach, for instance, has been criticized for being too rigid. Current trends appear to point to an increasing incorporation of the wishes and aspirations of local communities in project design, but most donors and institutions still demand the use of logical frameworks. With this demand, responses to non-planned effects during project implementation are difficult to incorporate, unless flexibility is allowed. Participants stressed the need to include local views in project planning, expressing the need to change from designs based on logics of etic problematization to emically (culturally explicit or meaningful) driven project designs. But they also noted that this need has yet to be recognized by donors.

Finally, any gender mainstreaming strategy depends not only on knowledge, but also on the gender awareness and sensitivity of institutions and development planners as well as the level of relativism they apply when designing interventions. A degree of knowledge-based creativity should be permitted in project design while a degree of flexibility should be applied during project implementation, in order to respond to changing realities.

Conclusions

To effectively mainstream gender in the fisheries sector, the roles of women and their contributions to the sector need to be continuously highlighted. Instead of taking their roles for granted, they must represent a constant area of study and awareness, as they change over time, and depend on local context. They will also evolve as a result of project interventions and social change. This is why undertaking gender analysis prior, during and after project implementation is so important. However, information on how to do this in the fisheries sector remains scarce, and more examples are necessary. RFLP, as part of its overall gender mainstreaming strategy, has developed a handbook containing gender analysis tools to help manage fisheries development projects. The research methodologies selected to apply these (or other) tools will largely depend on local context and will depend upon the knowledge and skills of the field researchers. Gender research should be conducted during the project identification phase and be an integral part of the monitoring and evaluation strategies. Additionally, project implementation needs to incorporate local views and be flexible enough to respond to changing realities. Finally, it is important to note the need for more policy and institutional support from governments and other relevant organizations for gender mainstreaming and women's empowerment in the fisheries and aquaculture sectors.

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Improving Gender Equity in Aquaculture Education and Training: 30 years of Experiences in the Pond Dynamics/Aquaculture, Aquaculture, and AquaFish Collaborative Research Support Programs

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Abstract

The AquaFish Collaborative Research Support Program (CRSP) is dedicated to improving gender equality in the aquaculture and fisheries sectors and in the CRSP by creating equal opportunities for women and men in research, training and educational activities. Recognising the barriers and complex issues women face, the AquaFish CRSP has taken a mindful approach towards gender integration by focusing on women beneficiaries of its research and outreach, and on women in the Program. Gender must be included in projects in a cross cutting and an individual way. Despite these steps, gender-segregated statistics from AquaFish display characteristics of a "leaky pipeline" as seen in other fields of science. During the original Pond Dynamics/Aquaculture CRSP (PD/A) and the subsequent Aquaculture CRSP (ACRSP) (1982-2008), 36.8% collectively, of degree students were women. In the AquaFish CRSP (2006-current), 55 women (55%) of degrees have been awarded to women. Although reaching a 50% target for women is a major accomplishment, the same proportion is not entering higher positions in science or research careers. Surprisingly, women still make up less than 50% of the CRSP short-term trainees. More research is needed to understand leaks in the pipeline and barriers to women's participation.

Introduction

Globally, women play an integral role in the aquaculture and fisheries sectors. Even though women's roles and responsibilities are beginning to change in some countries, there are still constraints that can limit their participation. Some constraints that women face in aquaculture and fisheries are: time availability and allocation, land ownership and access to water, credit and labour, and access to training and extension services. Lack of training opportunities can trap women in these vulnerable and poorly paid positions without any prospects of getting ahead (UNFAO, 1998).

According to FAO, gender discrimination stems from the low value attached to women's work

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and, in fisheries, is perpetuated in their limited access to credit, processing technology, storage facilities and training (FAO, 2010). Even in developed countries today, such as the United States of America, women earn US $0.82 for every dollar a male earns in an equivalent job, or about a 15% disparity in equal pay for equal work. Few women reach the upper echelons of management in medicine, science, business, fisheries, or agriculture. The International Decade for Women, beginning in 1975, stimulated efforts to improve the living conditions of women and to correct the imbalances between men and women, but more is yet to be achieved.

Methods and challenges of involving women in science programmes

The AquaFish Collaborative Research Support Program (CRSP) (2006-present) and its predecessors - the Pond Dynamics/Aquaculture (PD/A) CRSP (1982-1996) and Aquaculture CRSP (1996-2008) - have long recognised the marginalisation of women, inherent social and economic inequalities, and the vulnerable positions that women occupy in the aquaculture and fisheries sectors. Through equity in training opportunities, the CRSP (refers to all three CRSPs: PD/A, ACRSP, and AquaFish CRSP) has been able to provide women the tools to empower themselves, increase bargaining power, and enter new career opportunities. The increasing number of women graduates in academic, entrepreneurial, and governmental positions as well as their visibility in training courses and through community and regional involvement is helping to influence the enrollment of women students in degree programmes. However, the involvement of women in high power positions in the aquaculture and fisheries sectors has been a challenge and the same stands true for the involvement of women graduates in high positions in science and research fields.

Women have long been under-represented in science, engineering, and technology careers (Blickenstaff, 2005) and academic employment (Bagihole, 2000 as cited in Bebbington, 2002). While women's representation has improved at the global scale in more recent years, the collective quantitative data on women in the science fields still show that women are not remaining in science at the same rate as men – a phenomena called the "leaky pipeline." Blickenstaff (2005) and others have described the system that carries students from secondary school through graduate school and on into their careers as a pipeline in which various holes or leaks occur, causing students to drop out. For example, a student may begin university pursuing a science degree and change course halfway through or a student might graduate with a science degree and decide to pursue a different career. The concern is that women leak out more often than men (Blickenstaff, 2005). The problem appears to be progressive and persistent, meaning that women's participation continues to drop along the whole pipeline, and that over time this issue has not gone away (Cronin and Roger, 1995).

The CRSP is no stranger to this issue and for the past 30 years has actively worked toward gender equity in all its projects. The CRSP data on women graduates support this leaky pipeline metaphor despite the extra attention given by the CRSP to gender equity and equality. After years of informal equity standards, an officially sanctioned 50% benchmark was set with the start of the AquaFish CRSP for training equal numbers of men and women in short- and long- term training.

If given equal opportunities and access from the beginning of their schooling, men and women could potentially enter research careers in equal proportions. However, the increase in women graduates has not been accompanied by an associated increase in the proportion of women in academic science, engineering and technology careers (Bebbington, 2002). A study in the UK showed women were 2% or less of the professors in many sub-disciplines of science, engineering and technology (Bebbington, 2002). A similar phenomenon is seen with CRSP students and researchers as explained later on in the paper. Glover (2002) showed that even in science fields where women are well represented, such as biology, they aren't necessarily reaching the top of their fields. Equal pay for women has been and continues to be an issue, as well as the fact that women are more likely to be employed on short-term contracts and less likely to apply for research grants, even though they are as successful as men when they do apply (Blake and LaVelle, 2000 as cited in Bebbington, 2002). Why is this happening? What are the barriers that prevent women from moving through the pipeline into careers in science and research?

A number of theories have been proposed as to the barriers facing women in science. The following are a few possible explanations for the leaks in the pipeline that keep women from moving up the ladder in science. The explanations below are adapted from Bebbington (2002), Blickenstaff (2005), and Glover (2002). Most of these hold true in developed and developing countries.

- *Balancing work and family demands*. The demands of family and work are inescapable for women and are exacerbated in developing countries where women spend large amounts of time fetching water, caring for children, and harvesting food. The CRSP short-term training data show that this issue is more complex than initially thought. When CRSP training courses were local and short-term, they were not necessarily better attended by women. And, conversely, when training is far away and long-term - requiring the student to leave their home country to pursue a degree in the US - we found a greater percentage of women participating.
- *Societal gender roles.* Gender roles are imposed on us almost as soon as we are born. Women may feel pressure to be the primary care provider at home and men and women both may be reluctant to wholly accept and encourage women in the field of science because those are not the traditional gender roles to which they have grown accustomed.
- *Science curricula and pedagogy are more geared toward men*. This can start from a very young age with science books featuring significantly more boys than girls doing the science or teachers paying more attention to male students and continues through graduate school with more male students and professors moving into higher positions.
- *Women's work is often overlooked/ undervalued.* People have little incentive to get ahead if it is perceived they will not be recognised for their work. This is often the case with women's contributions to research.

- *Women's personal values*. Ultimately a woman may value the education itself more than the career. Women may hold different definitions of success based on ethnicity, culture, and personal values.
- *The culture of science itself*. Many of the explanations above could be considered part of the culture of science. The masculine nature of that culture may contribute to the under-representation of women. If women have a sense that they won't get ahead or won't feel welcome in the field, they might choose other career paths.

The challenges of mainstreaming gender in science and technology research projects are many. Key elements of a framework CRSP uses to address these challenges include developing an initial process, defining programme objectives, identifying leaders and mentors, and accountability measures to vet the overall process and ensure success (Figure 1). The initial process looks at the big picture for achieving gender equality; programming describes more specific programme level objectives for gender mainstreaming; leadership discusses the importance of empowering champions and role models; and accountability is a reflective approach to help identify what works and does not work in gender mainstreaming. This model is meant to be an iterative process where successes, actors, and outcomes are fed back into the system creating a positive feedback loop of mentoring, development, and eventually gender mainstreaming.

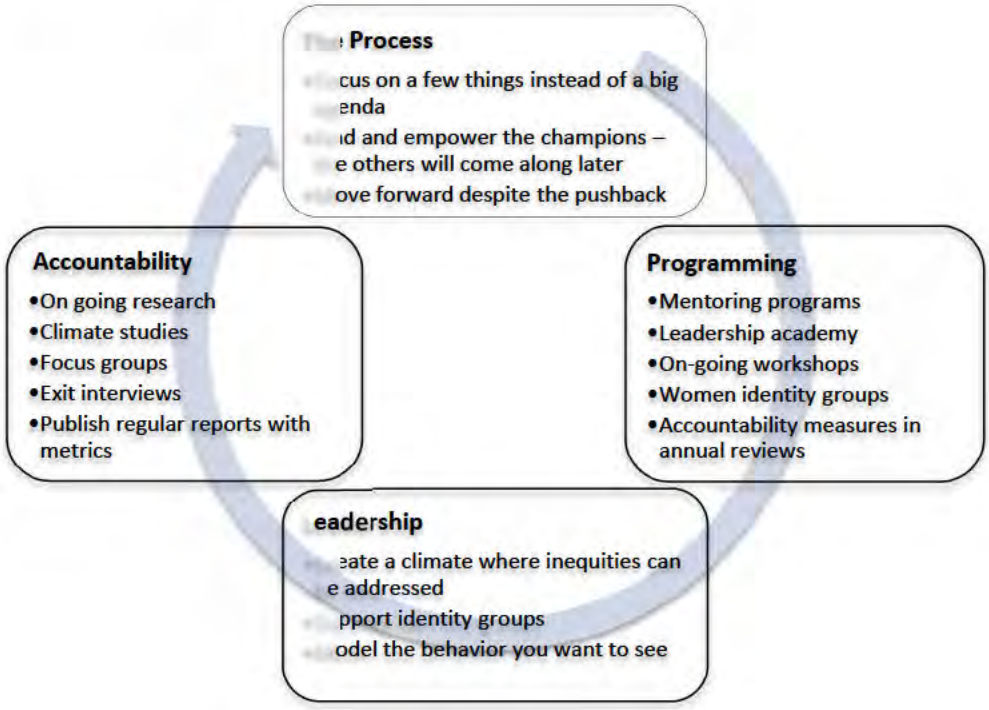

Fig 1. Contextual diagram outlining the process for mainstreaming gender into science and research programmes

The AquaFish CRSP has addressed some of the challenges of involving women in science and creating equal opportunities for women and men to participate in the Program's research, training, education, or other activities. As a gender-responsive organisation, the CRSP has adopted a multi-faceted approach to promote and integrate gender equality. Some of the specific actions taken by the AquaFish CRSP include:

a) collecting and analysing disaggregated data from individual projects to gauge the gender inclusiveness success;
b) promoting participation of women in formal and informal training opportunities provided through the CRSP by setting a 50% benchmark for women in training courses;
c) mandating that all core research projects have a strategy for integrating and addressing gender (a Gender Strategy);
d) working with each of the core research projects to ensure it has at least one gender-focused investigation; and
e) providing specific extension and technical services for women related to sustainable aquaculture and aquatic resource management.

A synopsis of AquaFish CRSP training

Long-term training

The CRSP has strived to provide training for students who were interested in aquaculture and fisheries, and would presumably go on to work in these fields, whether as owners or managers of private farms, officials in government organisations, members of non-government organisations, or faculty in institutions of higher education involved in research and extension. As such, CRSP long-term training efforts focused on teaching general biological and ecological knowledge, scientific principles, and research methodologies, and provided students with early experience in conducting experimental work. Long-term training typically took the form of participation in degree programmes (BS, MS, or PhD) at higher educational institutions, either in the US, a participating Host Country, or a third country. The hope is that these students will be the next generation of researchers and research administrators in aquaculture, fisheries, and related sciences. The goal is to empower these graduates with the ability to do research, generate new knowledge, and solve pressing problems in their home countries.

During the Pond Dynamics/Aquaculture CRSP (PD/A) and ACRSP (referred to collectively from now on as ACRSP) from 1982-2008, 683 students completed degree programmes with full or partial support from CRSP (Aquaculture CRSP 2008). Of those students for which gender data were reported, 36.8% were women (Table 1). The number of women completing degree training programmes supported by the CRSP increased dramatically beginning in about 1999, and the percentage of women candidates was consistently greater than 40% during the last three years of the Program (2006-2008). The percentage of women seeking degrees decreased as the degree level

increased: of those seeking a BS, 41.8% were women; of those seeking a MS, 33.1% were women; and of those seeking a PhD, 30.5% were women (Table 2). This finding is consistent with the idea of the losses of women being progressive and persistent down the career pipeline. That said, at least 30% participation by women was achieved at all degree levels over a nearly 30-year period.

Table 1. Numbers of students completing degree programmes with CRSP support from 1984-2010. ACRSP data for degree completion is presented from 1984-2008 and AquaFish from 2008- 2010. Data for degree completion starts after program inception; thus, degrees were completed in 1984 even though the first CRSP began in 1982. For AquaFish, the first degrees overlapped with the final year of ACRSP (both CRSPs ran concurrently) and thus, independent data for 2008 is presented for ACRSP and AquaFish.

Year	Total Number (data not collected)	% Women	Year (cont'd)	Total Number	% Women
1984	4	0.0	2000	34	32.4
1985	16	37.5	2001	54	38.9
1986	13	38.5	2002	15	20.0
1987	17	47.1	2003	3	0.0
1988	6	16.7	2004	76	34.2
1989	16	12.5	2005	47	38.3
1990	20 (2)	33.3	2006	37 (1)	50.0
1991	10	10.0	2007	36	47.2
1992	13	38.5	2008	29	44.8
1993	9	11.1	Year Unknown	98 (3)	41.1
1994	11	27.3	**ACRSP Total**	**683(7)**	**36.8**
1995	25	36.0	2008	17	72.2
1996	12	25	2009	63	50.8
1997	12 (1)	54.5	2010	20	50
1998	27	29.6	**AquaFish Total**	**100**	**55**
1999	43	44.2	**TOTAL**	**783 (7)**	**39.1**

Table 2. Degree programmes completed by men and women over the 25 year history of the ACRSP (1982 -2008).

Degree	Total Number (gender data not collected/reported)	% women
BA/BS	304	41.8
MS	274 (3)	33.6
PhD /PostDoc	82	30.5
Data not available	23 (4)	31.6
All degrees	**683 (7)**	**36.8**

As of 2010, the AquaFish CRSP (as differentiated from PD/A and ACRSP) has trained or is currently training 273 students in degree programmes with 130 being women (47.6%) (AquaFish CRSP, 2010). In 2008-2010, at least 50% of the students completing degrees each year were women (Table 1). When combined with the previous three years of ACRSP data, it shows that over half (51%) of the graduates in the past five years were women. Increasing gender equity in educational opportunities is a major achievement in itself. But while it appears that the Program has equal number by gender, this does not yet mean that the same proportion are entering higher positions in research careers. So who is doing the work now?

With regard to women in science leadership roles, the AquaFish CRSP has one woman US Principal Investigator (PI) out of seven total PIs (14.3% women), only slightly higher than the three out of 24 (12.5%) in the older ACRSP. In addition, the CRSP's Lead Principal Investigator and director is a woman. An analysis of all the PIs, Co-PIs, and Investigators across all seven core research projects in the AquaFish CRSP, however, shows 25 women out of 99 personnel (25%). Where have all the women graduates gone? One of every potential two women degree holders is not yet represented in the scientific leadership of the Program. More women should be in the pipeline as recent graduates. Since smaller percentages of women graduated before 1999, fewer were available to be senior researchers, principal investigators, and executive research administrators. This number might increase in the coming years as women graduates make it further down the pipeline.

Short-term training

Short-term training supported by the CRSP over 30 years includes learning opportunities focused on specific topics and the courses are compressed into short time periods of between half a day to two or three weeks up to six months. Learning opportunities most frequently occur as short courses, workshops and seminars, and participation in conferences. The target audiences for this type of training are typically farmers, extension agents, government officers, other stakeholders, or students who want to learn about aquaculture and fisheries basics or need specific new skills to apply on their farms, in their research or production facilities, in their private enterprises, or in their education and outreach efforts. Information presented includes the current state of knowledge about targeted species, whereas skills training included topics such as pond construction, broodstock management, fish propagation, hatchery rearing of larval fish, fingerling production, water quality monitoring, computer and software training, extension methods, survey methodologies, marketing, record keeping, to name a few. Other examples of short-term training include individualised aquaculture information relevant to a specific situation; on-the-job mentoring and training at field sites; and short internships to help participants develop particular skills.

Preliminary gender data for short-term training in the current AquaFish CRSP, since its inception in September 2006, shows over 100 short-term training events with over 3,000 participants, of which approximately 34% were women. Women's participation was approximately 30% for the first two years of the Program, with an increase to about 40% in 2010 (Table 4). While

these numbers may be increasing, they still do not reflect the level of participation seen in long-term training.

Table 4. Non-degree programmes undertaken by men and women over the history of the AquaFish CRSP.

Year	Total Number	% Women
2008	888	33.9
2009	1,440	31.8
2010	694	39.6
TOTAL	**3,022**	**34.2**

Women are assumed to undertake short-term training more readily than long-term training because it is typically local and does not require a significant time commitment. These data do not support this assumption and, furthermore, they suggest a greater percentage of women participating in long-term and long distance degree training. Perhaps the short-term training opportunities have not been well advertised or accessible, or are not of as much interest to women as to men.

Other factors may be cultural mores and gender roles in the locations where the short-term events are held. Lower percentages of women were trained in events in Africa (such as Kenya, Uganda, and Mali) than in Asia and Latin America. Unequal access to training may be a consequence of the geographical popularity of the subject matter, or how widespread aquaculture is in a country or geographical area. Asia accounts for over 80% of the world's aquaculture production while Africa and Latin America account for about 4% together. That aquaculture is commonplace in Asia may account for the increased numbers of women trainees from Asia; however, this would not explain the higher numbers from Latin America, where aquaculture is not a mainstream activity. As more concerted efforts such as mandatory gender-focused investigations and country specific strategies are beginning to take place in short-term training efforts, and aquaculture becomes more geographically widespread, the number of women participants is expected to continue to rise.

Conclusions on mainstreaming gender into science and research programmes

Recently, women have made great strides in terms of equal rights, educational and professional opportunities, better wages, and political power. More women are in the formal workforce today than any time in history. Because of the aging of the cohorts that made up the vanguard of aquaculture science, a large number of retirements are on the horizon and many top leadership positions will soon be vacant and some could be filled by women. Combined with an increase in women graduates, this might start the process of blocking the holes in the leaky pipeline. To achieve this, women will need to be retained in the pipeline for long enough to reach these leadership positions.

In order to have a better understanding of what the leaks are in the aquaculture science pipeline, future research should include follow up studies of CRSP women graduates. We need to think critically about the leaks and undertake intentional actions to bridge the gap between training and employment, and between employment and promotion to the highest levels. Qualitative research is needed to look at how and why these barriers persist. A deeper understanding of the leaks at different stages will require evaluating the processes beyond the statistics. Another aspect of the complex issue involves an epistemological approach (Bebbington, 2002) to understand women's relationship to science and the production of scientific knowledge. As the body of scientific knowledge continues to be built and refined, we need all perspectives and an ability to ensure the most objective and accurate accumulation of knowledge. Over the past many years, the PD/A, Aquaculture, and now AquaFish CRSPs have promoted gender equality and engaged women in training activities by collecting gender disaggregated data, setting explicit goals, and evaluating outcomes. These sustained efforts have been successful in increasing women's participation in long- and short-term training over time. It is our hope that these efforts will have lasting effects on gender equity in the aquaculture and fisheries sectors all the way through the pipeline.

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Gender Issues in the Fishery Communities of the Central Coastal Provinces of Vietnam

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Abstract

Under the Regional Fisheries Livelihoods Programme (RFLP), a baseline survey of 601 fishery households was conducted in the Central Coastal Vietnam provinces of Quang Tri, Thua Thien Hue and Quang Nam. The survey used a participatory approach to explore gender issues in fishery communities in 16 communes. This region presents economic challenges, especially for women who depend on rapidly depleting fisheries resources. On average, women in these provinces bear more children than the national average and work 12 to 14 hour days, three to four hours longer than the men. Education levels, especially of women, are low. Women have almost no voice in natural resource management because they have subordinate status due to traditional beliefs and prejudicial stereotypes. Women have fewer opportunities than men except in raising livestock, fish processing and trading fish. Although they have access to credit, women know little about financial management. Although women and men participate in the Women's Union and Farmers Association chapters, these bodies offer little more than sympathetic support and the opportunity to share experiences. The communities need better access to education, health care, social services, and professional training. Gender equality should be taken into account in rural development and local authorities need to raise their awareness of gender issues.

Introduction

Over the last two decades, Vietnam has achieved impressive socio-economic development. From 2000 to 2010 and despite the unfavourable world economy, Vietnam's annual economic growth has been sustained at approximately 7%. Such an economic performance should create the opportunity to improve people's standards of living and reduce gender inequality. To ensure women's rights and gender equality, the Vietnamese government introduced several policies through its Constitution, the National Plan of Action for the Advancement of Women (2006–2010), and the 2006 Law for Gender Equality. These efforts have significantly improved Vietnam's gender equality indicators. In comparison with other developing countries in the Asia and Pacific region, Vietnamese women have better access to education and health care services (World Bank, 2006; ADB, 2007a, b). Vietnam has the highest regional participation rates in economic activities: 74.2% for women and 80.6% for men (UNDP, 2010). As a result, Vietnam's Human Development Index has increased from 0.599 in 1990 to 0.725 in 2007. In 2010, Vietnam ranked 113 out of 169 countries with comparable data. At the same time, there was also a rapid reduction in gender

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inequality. In 2008, Vietnam's Gender Inequality Index[1] was 0.53 which gave the country a rank of 58 out of 169 countries, higher than other countries in the region such as Thailand and the Philippines. The Gender Inequality Index takes into account losses in potential national achievement because of gender inequality in reproductive health, empowerment and labour market participation.

In spite of its achievements, Vietnam's economy is still mainly based on the rural sectors and gender gaps exist in these sectors. Apart from the Confucian tradition, there are many gender issues associated with the economy becoming more market oriented. The shift to a market economy has created a new social hierarchy with new intra-household relations, mobility and social differentiation, and new forms of political participation and knowledge.

Focusing on the Central Coastal region of Vietnam, the present study was undertaken to assess existing gender relations related to household economic status. It looked at such factors as the division of labour between men and women, income, access to resources and benefits. It identified the factors that influence or determine women's access to resources and benefits, their participation in social networks and rural organizations. It also identified possible policies to improve gender equality in the study area.

In the Central Coastal region of Vietnam, many disadvantages are still specific to women, particularly to poor women. Intangible barriers to gender equality have been created by cultural beliefs, traditional stereotypes and rural institutions that disadvantage women and subordinate them to men in both the private and public domains. For example, women often work longer hours than men, but their salaries are lower even for similar work. In addition, access to education and job training, health care, social services and credit is still more limited for women than for men. Women's voices are poorly represented in the process of decision-making, especially at the local level.

Methodology

Study sites

The Central Coastal region (North Central Coast and South Central Coast regions) comprise 14 of Vietnam's 61 provinces, and extend from Thanh Hoa province in the north to Binh Thuan in the south. The total population is 19.8 million. This region is prone to weather hazards, has a relatively poor resource endowment, low land area per capita and relatively low soil fertility. The Central Coastal provinces often suffer high levels of risk of natural disasters, such as floods and typhoons. The most vulnerable groups live in the remote, less productive and most ecologically fragile areas. They face constraints such as lack of credit, inputs, information and market access as well as extremely limited opportunities for alternative livelihoods.

[1] http://hdr.undp.org/en/statistics/gii/

From November 2010 to February 2011, the FAO-Spain Regional Fishery Livelihood Program (RFLP) for South and Southeast Asia conducted a survey in 16 communes, namely Vinh Thai, Trieu Van, Trieu Lang, Hai An and Hai Khe commune in Quang Tri, Phong Hai, Phu Thuan, Vinh Thanh, Loc Tri and Phu Loc town in Thua Thien Hue and Duy Hai, Duy Nghia, Binh Minh, Binh Hai, Binh Nam and Tam Tien in Quang Nam province (Figure 1). For each commune, two to three villages were selected. Geographically, these villages were equally distributed and they were representative of socio-economic conditions of the Central Coastal region in the target provinces.

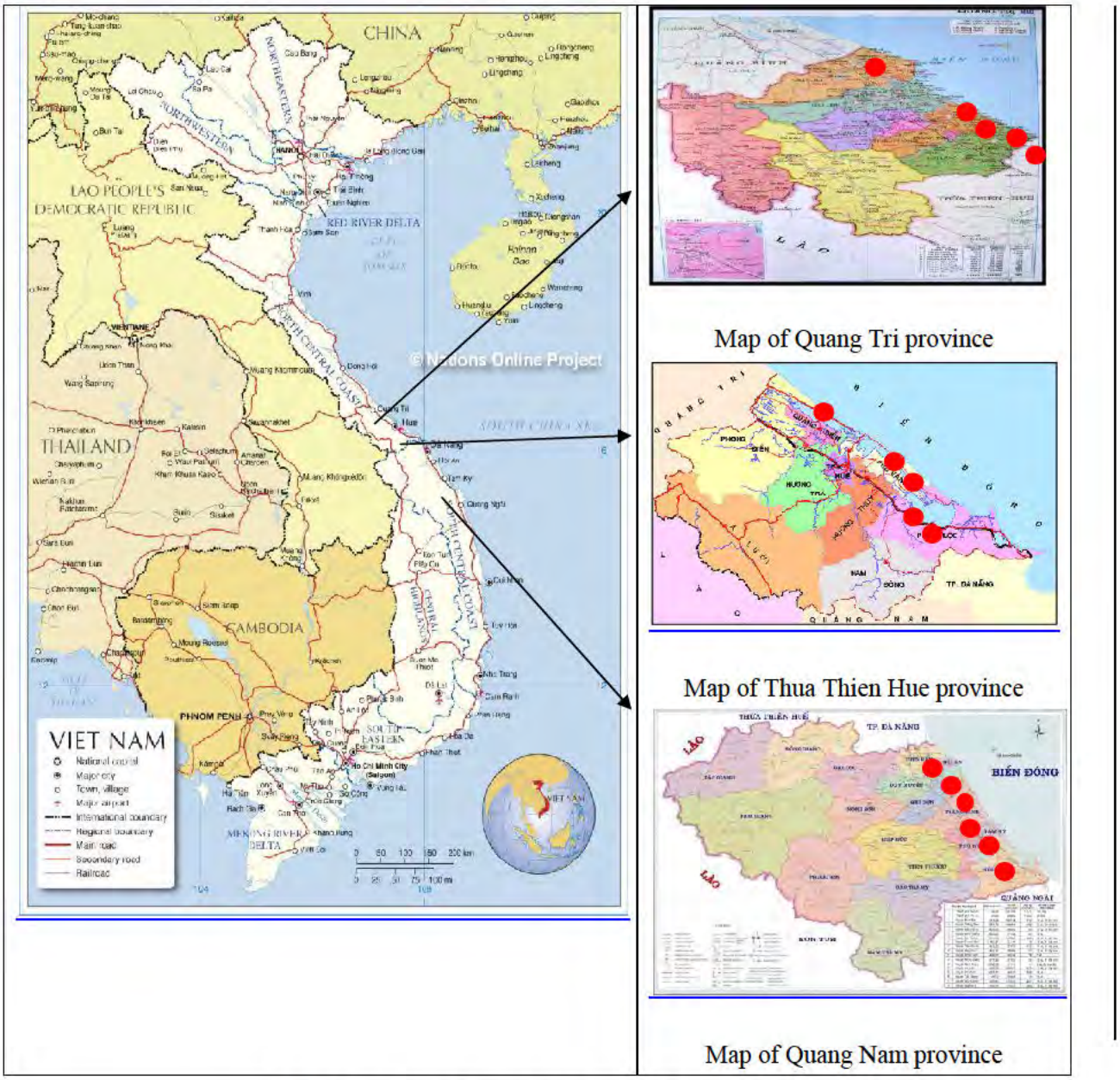

Fig 1. Target Central Coastal provinces and the study sites.

Sampling method

In this study, a two stage design for household surveys was applied. In the first stage, in addition to selecting the RFLP's 16 target communes in the target provinces, finer scale selection was made from a list of "clusters" of fishery villages. To make the selections, meetings were organized with key informants and local partners. The local partners included the Provincial Department of Agriculture and Rural Development, Extension Centres, District Divisions of Agriculture and Rural Development, and People's Committee and Social Organizations such as the Women's Unions and Farmers' Associations at various levels. In addition, documents and maps relating to the ecological diversity as well as socio-economic conditions in the target communes were analyzed.

The following criteria were used in selecting the survey areas (villages):

- The survey areas should be representative of the fishery livelihood patterns as well as of the diverse agro-ecological and socio-economic conditions in the coastal fishery area.
- The survey areas should capture the various levels of access to infrastructure (e.g. proximity to or remoteness from public infrastructure and services such as main roads, markets, district towns and cities, availability of services such as schools, health stations, etc.
- The selection of the survey areas should consider the variations in livelihood activities such as fishing, farming, non-farm wage work, migration.
- The selected villages should have various rural institutions and organisations.

In the second stage, two to three villages were selected from each of the target communes and, in each, group discussions were held with local partners to discuss and select the fishery households for the surveys. The main criterion for household selection was that the household should be representative of the village well-being level. In a wealth ranking exercise, the key local informants were asked to define the criteria for the well-being classification, resulting in three groups according to their well-being level, namely "better-off", "average" and "poor", based on key characteristics (Table 1).

Table 1. Criteria for household classification (better-off, average, poor) of the local people.

Criteria	Better-off households	Average households	Poor households
Housing	Concrete house or row house with spacious and attractive design and 2 roofs, large area.	Grade 4 permanent house with surrounding wall	Grade 4 permanent house with surrounding wall and small area.
Durable assets	Many good assets: beds, tables, chairs, fridge	Few durable assets	Very few durable assets and poor condition
Human capital	More workers and healthy, higher literacy, younger	Medium	Fewer workers, more elderly, children; low literacy level
Means of transport	Motorcycles, scooters, normally with 2-3 per household	Motorcycles, of less expensive type, below VND 17 m.	Old bicycles, or no means of transport
Means of production	High powered fishing boats, machines and engines, trucks, water pumps, processing equipments, big areas of shrimp ponds	Small fishing boats, few fishing gears, small-scale processing and shrimp and fish pond, cages	Few small boats and fishing gears. Some fish cages.
Means of recreation	Japanese colour television set, karaoke equipment and digital video recording	Cheap colour television set	Old colour television set
Means of communication	Desk telephone and mobile phone	Desk telephone and mobile phone	Desk telephone and mobile phone
Income	High income, much surplus for saving	Enough for living or little surplus	Low income, not enough for living
Children's education	Higher level of education	Medium	Lower level of education, stopped studying earlier

From the lists of households in each wealth group, households for the surveys were randomly selected, the number from each group being proportional to the total number of households in the village. This rule was likely to ensure that the household sample represented the full range of livelihood typologies in the village, the village gender balance and that the households were representative of different locations in the village. Due to budget limitations, in each commune about 30-35 households corresponding to each well-being level were chosen (Table 2). During the interviews, gender balance also was taken into account.

Table 2. Distribution of the surveyed communes and the respondents by the study sites.

Provinces	No. of communes surveyed	No. of respondents
Quang Tri	6	188
Thua Thien Hue	6	195
Quang Nam	7	218
Total	**19**	**601**

Source: Base-line survey, unpublished RFLP (2011).

Survey approaches

The participatory method was used for household surveys. Based on a bottom-up approach, the participatory method is a combination of several tools of Participatory Rural Appraisal (PRA) and, with respect to gender analyses, mobilizes and motivates the stakeholders to map and analyze gender related issues. In participatory learning and action, workshops and focus group discussions were conducted using the gender analysis matrix, the women's empowerment framework and the social relations framework (Arenas and Lentisco, 2011). Other tools such as trend analysis, day-time use analysis, social mapping, Venn diagrams, life-line, and ranking matrices were used to structure discussions.

Results and Discussions

Livelihood capital and access

Family structure and gender relations. According to the PRA survey, people in the study sites were relatively young (Table 3). Except for the poor, the population was equally distributed between female and male. On average, family size was 5 to 6 persons per household. Although family size had slightly been reduced in the last five years due to lower birth rates and high rates of out-migration, the average family size in the coastal regions was significantly larger than that of families nationally where average family size is 4.7 people. Traditionally, fishing couples preferred more children, especially male children who could contribute to fishing and later take care of them. Such traditions can cause difficulties for women, such as the preference for male children. Many couples have three children.

Table 3. Demographic characteristics of the fishery households in the study sites of the Central Coastal region, Vietnam

	Better-off	Average	Poor
Family size (average)	5-6	5-6	5-6
Gender ratio (male: female)	50%	50%	40%
% of people of working age	80%	70%	40%
% of labour under-employment	0%	20%	40%
Workers/household (people)	3.5	3	1-2

Source: PRA reports from the target communes.

To fulfil their reproductive functions, women spent considerable time pregnant, giving birth and taking care of children. In addition, women were mainly responsible for the house-work, traditionally a women's duty. Information from group discussions indicated that women often spent about 7 hrs day^{-1} for their house work, while men spent only 1.5 hours. In order to do their housework, women woke early in the morning and went to bed late. Housework included preparing food; feeding animals; and feeding, cleaning, washing, and taking care of the children. In addition, women in the Central Coastal regions participated increasingly in economic activities such as agriculture, non-farm and off-farm work. Consequently, the women's working days were longer than those of the men; women worked from 12 to 14 hours while men worked from 9 to 10 hours. However, due to feudal practices that have persisted for a thousand years women were considered to be weak or inferior to men. In families, men often made the decisions and although matters were discussed, women's inputs were limited.

Access to education. Education levels were low in the fishery households of the Central Coastal region (Table 4). Of the poor, only about 65% of workers had completed primary school and 20% of them were illiterate. About 80% of working age people did not have professional training and education.

Table 4. Worker Education Level and Literacy in study sites of Central Coastal Vietnam (% of household members).

	Better-off	**Average**	**Poor**
Illiterate (%)	5	10	20
Primary	40	50	65
Lower secondary	35	30	10
Upper secondary	20	10	5

Source: PRA reports from the target communes.

In recent years in the study sites, gender equality in access to education has significantly improved. However, there is still a disparity between the educational attainments of girls and boys and between the average education levels in the Central Coastal region compared to the national average. For example, in the Central Coast the enrolment rates at all education levels were 78% for girls and 83.7% for boys, compared to the Red River Delta with 85.1% for girls and 91.6% for boys. Due to the high cost of education, households tended to give priority to boys if they could not afford to educate all their children. Girls of poor households tended to have fewer opportunities for education than those in others. The dropout rate for girls was higher than that for boys, because they were not encouraged by their parents. After graduation from secondary school, most students stopped studying and began earning a living, girls in particular.

Access to resources. Access to natural resources and finance has been central to rural development. The ways in which these resources are used and ownership is defined and transferred have profound effects on economic, social and political outcomes, especially on the position of women and men in rural society. The study sites all have open access to marine aquatic resources. Over 70% of the local fishery households depend heavily on near-shore fishing for their livelihood. The main near-

shore resources include shrimp, crab, fish (tuna, mackerel, scads, anchovies) and squids. Information from group discussions in all sites indicated that aquatic resources, particularly fish stocks, had been gradually depleted due to overexploitation and unsustainable fishing practices such as use of bottom trawls, electric fishing, explosive fishing, and very small mesh sizes.

In Vietnam, following the economic reforms in agriculture in 1988, land was still controlled by the State but the farmers obtained land use rights. In 1993 a Land Law (Law on Land, 1994) was enacted to define the long-term and stable use of land use rights for households, granting 20 years for annual crops and 50 years for other perennial crops and forestry. Unfortunately, the land use rights certificates in accordance with the Land Law carried only the name of the husband who was considered the household head, resulting in unequal access to land use rights for women and men. Women, therefore, often meet difficulties in using land-use right certificates as collateral for loans. With improvements of the land registration system and clearer administrative procedures, the Land Law of 2003 (Law on Land, 2004) stated that both husband and wife have equal access to land. A new feature is the requirement that the land use certificate certifies the names of both husband and wife, if the land belongs to both. However, the implementation of the 2003 Land Law is slow because the reissue of previous land use certificates is slow. Many fishing community families also own land.

As in other Vietnamese households, many women in the Central Coastal area are responsible for household financial management. Women often make household financial decisions on small expenditures but they must discuss major financial decisions with their husbands. Many women reported that they found keeping cash a burden because they could not spend it without their husband's approval. For poor women, the situation was worse because their family incomes were not sufficient to cover needs. Consequently, poor women often fell into debt to traders and private money lenders.

Access to social capital. Social networks, institutions and organizations play important roles in rural areas. Access to social networks was considered an important element of social capital that strongly influenced household livelihoods. In rural Vietnam, complex and wide social networks at different levels linked the fishery households with the governmental institutions, non-governmental organizations and social organizations. In addition, informal social networks existed, based on local cultures. The official social networks included the Women's Union (WU), the Farmers' Association (FA), the Youth Union, the Veterans' Union, the Fatherland Front and professional groups dealing in extension, shrimp, gardening and livestock raising However, the WU and FA were the most popular social networks and they attracted most of the fishers in the study sites (Fig. 2).

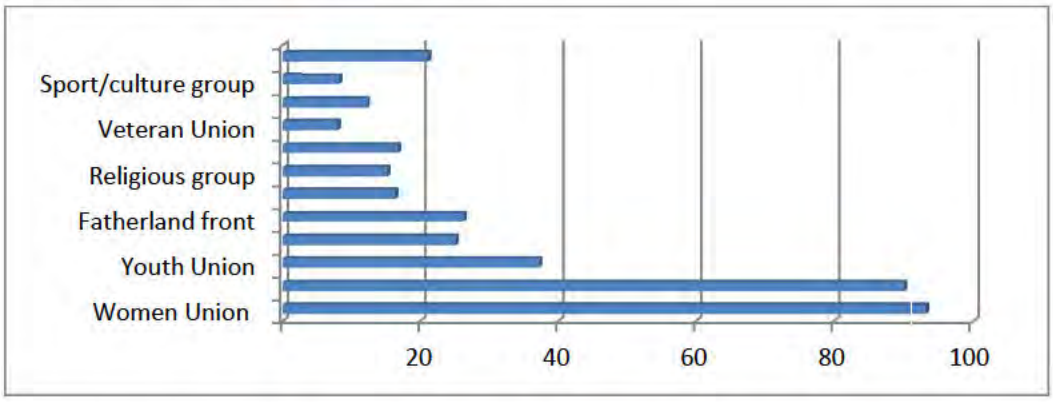

Fig 2. Extent of fishery households' participation in social networks in the study sites (% of households, N=601).

The WU and FA had wide networks from the centre to the grass root levels. Most WU activities focused on protection of women rights, engaged women in social life, provided training and gave advice on reproductive health and family planning. The main functions of the FAs were the transfer of government agriculture and fishery policies to farmers and assisting farmers in production. In recent years, both WUs and FAs have increased their participation in activities such as financial guarantees, for the poor in particular, to facilitate bank loans, and organizing study tours and training courses on animal raising and crop production.

The surveyed households, however, reported that they saw the WU and FA as too bureaucratic and not generally attractive to members. Despite high levels of membership, the survey participants reported low levels of participation by fishers, women and the poor in the WU and FA's activities. Many fishers said that they participated only in a passive manner. Both WU and FA bodies offered little more than sympathetic support and the opportunity to share experiences (Figure 3).

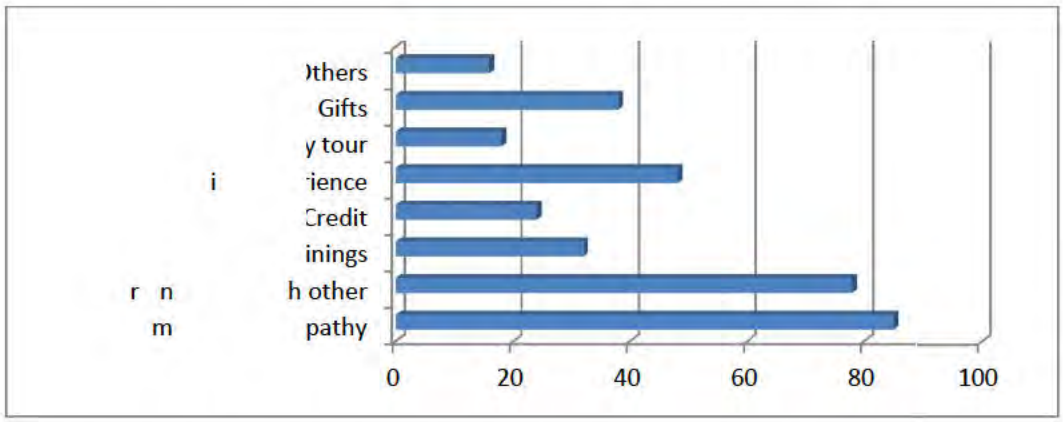

Fig 3. Major benefits gained from participation at WU and FA's related activities (% of surveyed households, N=601).

Participation in training and meetings. Information from group discussions and household surveys indicated marked differences in the level of participation in the meetings and training sessions between women and men. In general, men's participation was greater than that of women. Except for meetings and training courses in which the organizers ensured a gender balance, women took part less often. In most study sites, men were dominant in the extension training since they were traditionally considered more supportive of new technologies: "men know everything and they understand better than women". Men often had greater say in decision making on technology use, even though they may have been less responsible than women for activities such as livestock production. Similarly, men were assumed to be the ones to attend the village and commune meetings, rather than women because of traditional beliefs, or women being considered "slow to understand", and women's voices being less respected. Also, meetings were often at night when most women were busy with house work, and when tradition was against their venturing out.

Gender divisions in economic activities

In the Central Coastal regions, gender divisions in household tasks were well acknowledged (Figure 4). Women had fewer opportunities to work in sea fishing because it was considered dangerous and risky. Information from group discussions indicated that hundreds of fishermen were killed annually by hurricanes and storms. For example, in 2006 the storm Chanchu killed 257 fishermen in the Central Coastal region. Consequently, a lot of women were widows and trapped in poverty.

In aquaculture, except for pond cleaning which was equally shared, men were responsible for important activities such as pond building, seeding, feeding, weeding and harvesting. Men also took more of the marketing decisions. By contrast, women had fewer opportunities to engage in shrimp raising, especially in intensive farming where women were not allowed to go to the shrimp ponds because they were considered unlucky.

Although both men and women were engaged in farming activities, men were often responsible for heavy tasks such as ploughing, pest control (spraying herbicides and insecticides) and irrigation; women were in charge of seeding, transplanting, weeding and post-harvest activities (processing and marketing). For some tasks such as fertilizer application, harvesting, and planting the gender division was less clear since they were shared by both women and men. For livestock raising, women did most of the work such as collecting and preparing animal feed, feeding and cleaning. Men were little involved in these activities, but they had equal power with women in marketing decisions.

For non-farm activities, women's involvement was greater than that of men. Women were mainly engaged in fish processing, petty fish trade and handicrafts. Fish trade is hard work. To buy fish, women had to wake up very early and compete at the landing docks. They often had to stand in the sea and struggle with others to get the fishes when the boats arrived. After purchasing, the

women usually went directly to the market, still wearing wet clothes. As a result, many women had gynaecological diseases. In fish processing, women's health was also of concern, e.g., from muscular injuries. Most fish processing workers were women; men were more involved in transportation and as construction workers, because they were relatively free from housework.

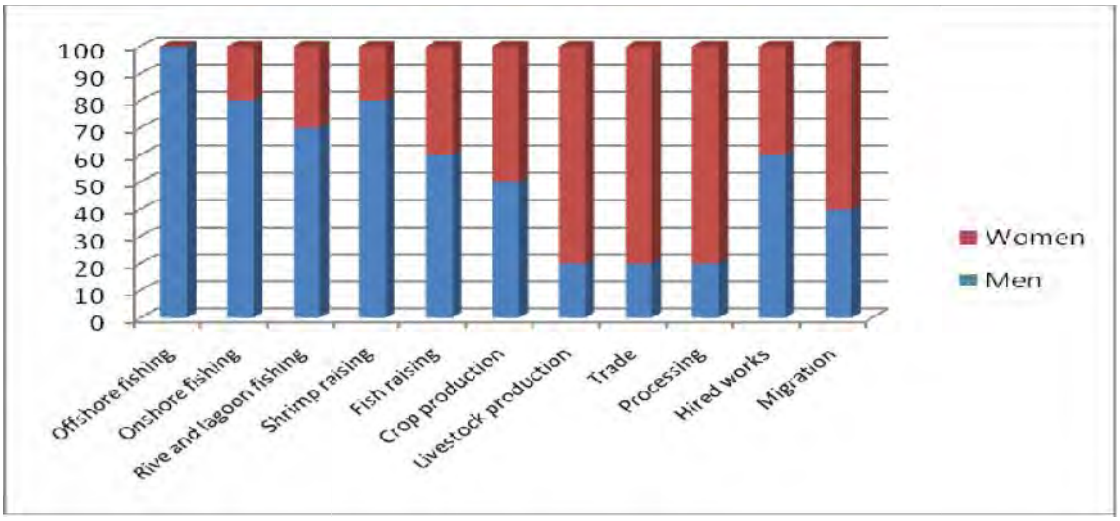

Fig 4. Division of labour between men and women in the income activities (% done by men and women, N=601).

The Central Coastal regions are densely populated, have limited land farming area and relatively poor access to income earning opportunities. Migration was thus common and the remittances they sent were becoming important. In recent years, migration has also been motivated by better employment and income opportunities in the urban centres, especially in Ho Chi Minh City.

In the survey, many households had migrants. People from poor households were more likely to migrate than those from average and better-off households. About 62% of the poor households reported that a household member has worked in other locations such as in Ho Chi Minh City, Central Highlands or the Southern provinces. Most of the migrants were young and their education and professional skills were limited. Most migrants did unskilled work. Female migrants were mainly tailors, shoe makers, traders, housekeepers and coffee harvesters; male migrants were likely to do fishing, construction work, and mechanics.

Migration generated many difficulties. First, a rapid increase in migration depleted the local labour force for fishing and farming. Second, due to the migrant's low education levels, most were unskilled labourers, their employment unstable and their wages low and not sufficient to cover expenditure, i.e., they generated no surplus. Third, fishing migrants had met difficulties such as poor housing conditions, long working hours, and lack of a social safety net. Information from group discussions indicated that most migrants did not have social and medical insurance. Consequently, they faced special difficulties when they fell ill, were involved in accidents or losses. Finally, there was a serious concern about the spread of HIV/AIDS for women when their husbands migrated.

Living far away from home, some of men had unprotected commercial sex, became infected with HIV and later passed it to their wives.

Household income and gender contribution

In the provinces surveyed, incomes and their components from various activities differed (Table 5). On average, annual household incomes in Thua Thien Hue were highest, perhaps due to differences in livelihood assets, particularly in access to land and the livelihood strategies chosen by the households. As the households in the survey were chosen for their fishing orientation, fishing was the most important activity in income generation, but households showed considerable differences in income.

Table 5. Composition of household annual income in the target provinces.

Household income and components	Quang Tri		Thua Thien Hue		Quang Nam	
	x 1,000 VND	%	x 1,000 VND	%	x 1,000 VND	%
Total	**19,400**	**100.0**	**62,824**	**100.0**	**47,136**	**100.0**
- Fishing	11,800	59.0	49,420	78.7	38,396	81.5
- Fish processing	2,100	10.5	2,376	3.8	463	1.0
- Other activities	6,100	30.5	11,028	17.5	8,277	17.6
Number of respondents/households	188		195		218	

Source: Base-line survey, unpublished RFLP (2011).

The total income and its components varied remarkably between household groups as well as between women and men. For example, for better-off fishery households in Duy Hai commune, Duy Xuyen district, Quang Nam province, trade (fishing tools, input materials, groceries), sea product collecting, seafood processing (fish sauce, dried fishes), and seafood trade (for export or providing to restaurants) were the main income sources (Table 6).

Table 6. Income generating activities of the better-off households in the study sites of Duy Hai commune, Duy Xuyen district, Quang Nam province (N=48).

Income activities	Amount of income (1,000 VND/year)	Rating	% Women's Contributions
Fishing and aquaculture	100,000 -150,000	2	20
Trade	120,000 -150,000	1	80
Sea product collecting	100,000 -150,000	2	20
Fish processing	150,000 - 250,000	1	80
Outsourcing activities	120,000 – 140,000	1	60
Migration	5,000 -10,000	5	70

Ratings: 1 very important; 2 important; 3 average; 4 less important; 5 least important.

For the average households, the important income generating activities were fishing, hired labour, and agricultural and unskilled labour. Income from fishing was the most important. Income from agricultural production was also important for this group of households. Small business, small-scale processing and trade (buying and re-selling) activities played an average role in providing income for these households. In general, men made most of their income in fishing activities, while women made more income of their income in small-scale processing, agricultural and trade activities (Table 7).

Table 7. The income generating activities of the average households in the study sites of Duy Hai commune, Duy Xuyen district, Quang Nam province (N=48).

Income providing activities	Amount of income (1000VND/year)	Rank	% Women's contributions
1. Fishing and aquaculture	40,000 - 50,000	1	20
2. Small buying	25,000 - 30,000	3	40
3. Small selling	15,000 - 20,000	3	100
4. Small processing	10,000 - 20,000	3	80
5. Agricultural	20,000 - 30,000	2	70
6. Hired labour	40,000 - 50,000	1	50

For the poor households, livelihood assets were very limited (Table 8). These households were dominated, in numbers, by the elderly and people who could not work, and/or dependents such as children, especially small children. Because they did not have capital or the means of production (such as ships, machinery, etc.), people in the poor households depended on hiring out their labour (to ship owners, processing and outsourcing units), and doing unskilled work (as masons, motorbike taxi drivers, fish carriers, etc.). They also took part in small scale trade (fish, vegetables, waste materials, lottery tickets, etc.). Agriculture did not provide much income as poor households did not have enough land to plant. Except in the hired labour activities, women played a more important role in income providing activities.

Table 8. The income generating activities of the poor households in the study sites of Duy Hai commune, Duy Xuyen district, Quang Nam province (N=48).

Income providing activities	Amount of income (1,000VND/year)	Rank	(%) Women's contributions
1. Small-scale trade	5,000 - 10,000	3	80
2. Hired labour	15,000- 20,000	1	20
3. Unskilled labour	10,000- 15,000	2	70
4. Agricultural	5,000 – 10,000	4	70

The contrasts between the income providing activities, shares of household income and women's and men's contributions show that options become narrow in the poorer households.

Except in the better-off households, women's contributions were much higher than men's from small scale and less remunerative activities. Men's income dominated in fish production from fishing and aquaculture.

Conclusions

In Vietnam, despite significant improvements in recent years, such as the provisions of the Land Law of 2003, women still experience many disadvantages in the Central Coastal regions. Discrimination is often intangible, for example, women have less access to and control over resources such as education, health care, information, technology, land and social capital. Traditional gender stereotypes and cultural beliefs stress the importance of men in the family, while women are considered as weak or inferior. Although various social organisations exist in the Coastal areas, of which the WUs and FAs are the most important and do help by organizing training courses, credit, and social services, women in the Coastal areas have fewer opportunities for social activities and meetings due to their overall responsibilities. In planning and policy making, their voices are weak because women have low levels of participation and their opinions are not well respected by men.

Thanks to Vietnam's high economic growth and Government support policies, economic opportunities are significantly improved for both women and men. However, in the Central Coast regions, household income is lower relative to that in other regions. The majority of fishery households in the Central Coastal regions are strongly dependent on fishing for their livelihoods. Due to overexploitation and destructive fishing practices, aquatic resources have been depleted and so too has income from fishing. In the region, women and men have different income earning opportunities. Due to their housework burdens, women are mainly engaged in agriculture and home-based income generating activities such as fish processing and petty fish trade while men are more engaged in fishing and cash earning activities. Generally, men have contributed more cash income compared to women. In most study sites, women experienced a severe lack of alternative income activities, making them dependent on their husbands.

In order to improve conditions for women in the Central Coastal region, women need better access to services from health to education. In education, although uuniversal primary and secondary education has been achieved, about 70% of the children have no access to upper secondary school, especially the girls. Socio-cultural biases against educating girls need to be removed. Health care and social services also must be improved in the Coastal region so that fishery populations have better access to these services.

Rural development policies need to be gender sensitive in order to permit equal access to resources, income generation, a voice in development planning, training courses and decision making processes. The relatively lower income of the women suggests that women need support to access alternative income generating activities. They need help in getting credit, training on starting

new businesses, business skills and technology transfer. Local as well as national authorities need raised gender awareness.

Gender is a complex and multidimensional concept which has complicated interrelationships with culture, socio-economic conditions and other cross-cutting issues such as institutions, policies and legislation. Although the present study examined several dimensions of gender differences in the Central Coastal regions of Vietnam, much more needs to be understood. In particular, we were able to obtain limited data only on other important issues, such as the trends in gender relations over time and violence within families. As this was a preliminary baseline survey, more specific treatment of gender differences in fishing and aquaculture were not analysed.

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The Role of Fisherwomen in the Face of Fishing Uncertainties on the North Coast of Java, Indonesia

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Abstract

Those engaged in fishing, especially in small scale fishing, are very susceptible to uncertainties. Women members of fisher families, who tend to be responsible for managing the family's food, face the problems of uncertainty first, especially when income is threatened. This paper assesses the roles of fisherwomen in adapting to uncertainties in two coastal communities of northern Java, Indonesia. It developed indicators of uncertainties with respect to fisheries livelihoods and tested these indicators using a multi-dimensional scaling method based on a modified version of the Rapid Appraisal for Fisheries (Rapfish) method. This technique is used for the first time to analyse the role of women in dealing with uncertainty in fishing. The paper also describes how empowerment of local communities can be used as a cushion for absorbing income fluctuations due to uncertainties. The research concludes that development programmes should also take into account the uncertainty in fisheries from the women's point of view. Governments should pay attention to the dynamic of all dimensions of uncertainties, especially the fisherwomen whose husbands are fishermen as this group suffers the most, directly and indirectly, from uncertainties in fishing and changing climate.

Introduction

Fisherwomen, defined as fishermen's wives and women who themselves work in fisheries activities, play an important role in coastal economic activities. Their contribution is often overlooked in analyses of fisheries. Fisherwomen are actively involved in input and output markets as well as in supporting markets for fishing activities. In the fisheries along the north coast of Java, Indonesia, at input markets women provide logistic support for fishing activities, while at output markets fisherwomen are often the main players in fish selling and distribution. Fishermen's wives are also involved actively in generating additional family incomes from activities inside and outside fisheries. When fishermen face uncertainties such as seasonal variations, women often become the backbone of the family and are important for its survival. Fisherwomen are therefore an integral and functional part of coastal fishing industries.

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Fishing is regarded as a business with a high degree of uncertainty from many causes. Acheson (1981) notes that fishing uncertainty stems not only from the physical environment, but also from the social environment in which fishing takes place. The nature of fishing forces fishers to endure long work hours away from their families, causing physical and psychological problems for them and their families (Acheson, 1981). Under such circumstances, family members, including wives and children are forced to play roles in the survival of the household economies. On the other hand, the involvement of coastal communities as a whole helps to reduce the socio-economic impacts arising from the uncertainties of fishing. Social networks, for example, are often regarded as cushions in the case of uncertainties, such as when catches and incomes fluctuate. Within social networks, fishermen are able to borrow and lend money and other necessities. Fisherwomen often play the most significant roles in these networks, bridging the gaps among the social hierarchies. The complex economic networks for catching, selling, distributing and processing of the fish products often involve the women. The role of fisherwomen in these activities can have an important influence on the way economic networks function. Therefore, analysis of fisheries and the coastal economy needs to incorporate gender as an essential element if their functioning is to be fully understood.

Methods

Analysis of uncertainty was carried out using primary data obtained from field surveys. A structured questionnaire of 55 questions was used. The questionnaire was divided into three blocks of questions consisting of those for demographic profiles, economic and social profiles, and the perception of uncertainties. Fifty fisherwomen each from the two coastal cities of Semarang and Pekalongan were surveyed (Figure 1). Focus group discussions (FGD) were also conducted to obtain in-depth information on the perceptions of uncertainties.

In order to capture a variety of women's activities in coastal areas, the study divided fisherwomen into two groups. The first group consisted of the wives of fishermen who had fishing vessels of less than 10 gross tonnes (coded as FW1) and the other group was of women who were engaged in fishing related activities, not necessarily the wives of fishers (coded as FW2). The husbands of this second group might engage in non-fishing activities such "*ojek"* (motor taxi driver), trader at local market, worker in property business and road development, house builder, and other non formal jobs, including those who were unemployed.

Fig 1. Map of Java and study area.

The analysis of uncertainties concerning fisherwomen in coastal areas was carried out using the Rapid Appraisal for Fisheries (Rapfish) technique developed by Pitcher and Preikshot (2001) and Alder et al. (2001) for fisheries and modified for this study. First, indicators of uncertainties associated with women's activities in relation to fishing and fishing-related activities were developed.

These indicators were then assessed by assigning Likert scores indicating the degree of severity in terms of uncertainties within economic, social, ecological and institutional frameworks. On this scale, poor scores indicated severe uncertainty and high scores indicated low levels of uncertainty. The assessment was based on first-hand observations, information gathered from focus group discussions and secondary data available from several sources. After assessing the indicators, the next step was to compute the uncertainty index using Rapfish software to determine the relative position of each fisherwomen's group within the index. The leverage level was also calculated for the possible changes in determinant indicators which were sensitive to uncertainties.

The ecological indicators of uncertainties included the relative indicators such as seasonal factors, flood, pollution, and erosion (Table 1). The economic indicators were indicators of uncertainties which impacted the income of fisherwomen both directly and indirectly, including volatility of fish production which indirectly affected the financial portfolio of households in which women were in charge. With regard to the institution dimensions, indicator of uncertainty included variables which were related to the role of fisheries and government, as well as financial institutions and the roles of women in institutions. Uncertainties in these institutions can lead to instability in the

fisher's household as a whole. Within the social framework, the indicators of uncertainties included variables associated with social disturbances such as local political situations, levels of unemployment, crime, health conditions and family instability.

The inclusion of family instability is important. The northern coastal area of the Java Sea is an area well known for high numbers of divorces. Divorce leads to family instability and women usually suffer the most. Divorce is even more difficult in low income families such as fishing families. To survive, women have to deal with the consequences of divorce. Berman (1981) noted that family instability such as divorce could also lead to economic uncertainty. In his study of families in Israel, he showed that divorce rates and economic uncertainty were strongly correlated.

These indicators, to some extent, are compatible with the framework of response to uncertainty in fishing developed earlier by Acheson (1981). Acheson (1981) emphasised that in response to uncertainties, fishers and their families used clusters and institutions for support. Clustering included developing sharing systems, using kinships, and developing relationships with middlemen to reduce uncertainties in marketing and distribution. In terms of mechanisms to develop institutions, Acheson (1981) mentioned the role of cooperatives and other institutional arrangements such as information exchange to reduce uncertainties.

Table 1. Indicators of gender uncertainty in north coast of Java to be used for Rapfish analysis.

Dimension	Indicators of gender uncertainty
Ecological	High frequency of floods; seasonal factors/tides; coastal erosion; pollution; stock availability; impacts of drought, coastal degradation
Economic	Volatility in husband's income; volatility in woman's own income; accessibility to resources; production volatility/input volatility; volatility in prices; volatility in markets
Social	Instability in local politics; crime; family instability; unemployment of family members; health condition; conflict status
Institutional	Uncertainty in government support; women's participation; dependency on local financiers; dependency in credit and saving; dependency in social network; dependency on other family members to support; participation in local organisations; uncertainty in costs of children's education

Once all indicators have been scored and assessed, Rapfish uses Multi Dimentional Scaling (MDS) techniques to arrange the units of the studies according to their range of attributes. The results of the MDS-Rapfish analysis were in the form of index numbers ranging from 0 (bad index score) to 100 (good index score). These results were then converted into kite diagrams to describe the relative positions of each of the units of analysis within ecological, economic, social and institutional dimensions.

Results

Overview of north coast of Java fisheries

The area of the north coast of Java is heavily fishery-dependent and poverty and over fishing are well documented. Several factors contribute to these conditions. First, historically, the north coast of Java is very densely settled due to its easy road access. Second, fishing has been practiced since the Dutch era and the area has been one of the main engines of growth for Indonesian fisheries. Third, the north coast of Java has become the center of industries that discharge their pollution to coastal areas. Fourth, this coastal area is also experiencing climate change, characterised by sea level rise, high tides, droughts and floods. The interaction of these factors contributes to the overfishing of the coastal resources which leads to uncertainties in livelihoods and to poverty (Fauzi and Anna, 2010).

Two important fishing areas are around Pekalongan and Semarang. These two coastal cities have been the main hubs of fishing networks on the Java coast. Pekalongan has been the center of landings of small pelagic fish which are then distributed across the country. Besides the production of "*batik*" (handcrafted decorated cloth), fishing is still the dominant economic activity. The total local production of small pelagic fish is 338,970 tons compared to 15,946 tons of large pelagic fish, and 257,986 tons of demersal fish (Indonesian Fisheries Statistics, 2011). Landings of fish, however, are declining, leading to slowed economic contributions from fish related activities. Some contend that overcapacity of fishing vessels too many boat chasing too few fish) in the Java sea is the main cause of the decline in fish production (Squires et al. 2002), whereas others believe that natural phenomena such as climate change are contributing to the decline in fish stocks and catches (Fauzi and Anna, 2010). This latter claim has been supported by the fact that those two areas are the most vulnerable to inundation from sea water or sea level rise, locally known as flood or *rob*. The *rob,* due also to land subsidence as well as sea level rise, has become more frequent over the years (50 cm rise in average sea level, including the land subsidence, over the past 12 years in Semarang) and has caused drastic declines in the ability of fishermen to go to fishing, resulting in lower productivity (Diposaptono et al. 2009). The *rob* has also caused an enormous economic loss due to coastal infrastructure damage, including to fishermen's houses. Few people are aware of the climate change dimensions, which many believe is a *salah mongso* or false climate phenomenon.

As elsewhere in coastal areas, fishing on the north coast of Java is predominantly carried out by men. However, by tradition, women are actively involved in the fishing economy. Even though they do not directly go to sea or fish, women are now the main players in fish trading and in the distribution of fish products as well as in fish processing. They are also commonly found in other supporting economic activities such as running kiosks and providing financial support at local scales (Figure 2).

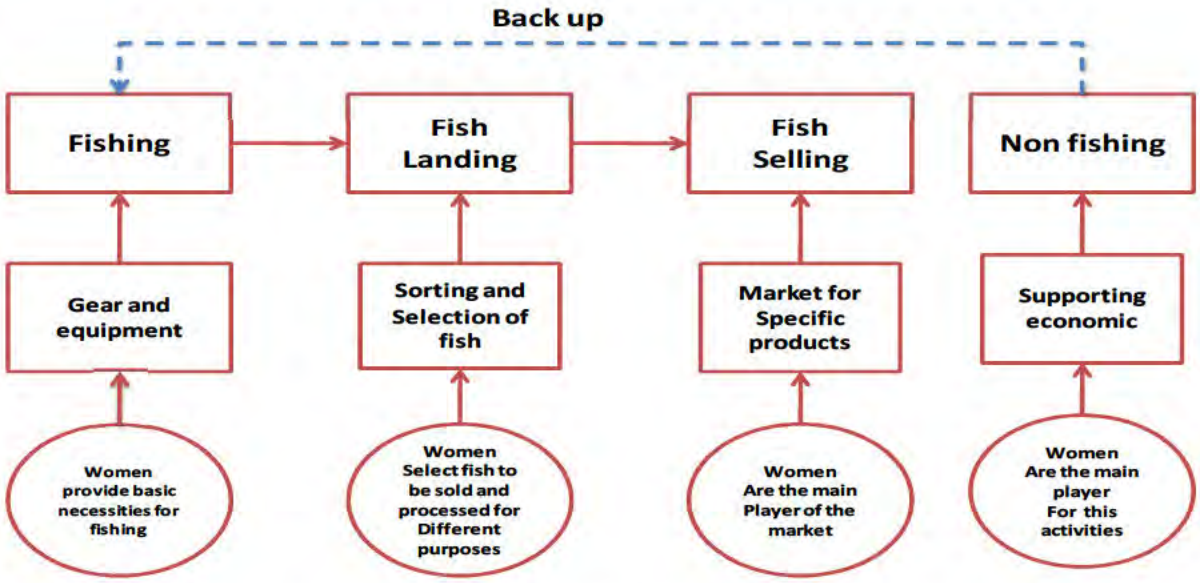

Fig 2. Gender dimension in fishing activities in north coast of Java.

Rapfish uncertainty assessment results

Data on fisherwomen's daily time budgets were combined for the two cities (Semarang and Pekalongan) and the averages of the aggregates compared for the two different types of fisherwomen and the high and low fishing season. Fisherwomen in the coastal area of Semarang and Pekalongan spend considerable time working and looking after household affairs (Figure 3). During the low fishing season, wives of fishermen spend on average around half (46%, 11 hrs) of their day working, compared with 22% (5 hrs) during the high season (FW1LS versus FW1HS in Figure 3). This indicates that during the low season, women worked harder to compensate for the fluctuation in household income due to low catches. They compensated for the low income from fishing related activities by engaging in other productive activities such as working as house maids and selling food in the neighborhood. In contrast, the group of other women who engaged in fishing related activities showed a different seasonal pattern of work (FW2LS versus FW2HS). They worked less during the low season (21%, 5 hrs) but worked more during the high season (50%, 12 hrs). The reason of this different pattern is that these groups depended very much upon the fish landed by fishermen but in different ways. When fishing was low, the number of fish to be processed and sold for different markets was relatively low so that the FW2 fisherwomen's group worked less and spent more of their time in leisure. When the fishing season was high (FW2HS), they spent more time working in processing the fish.

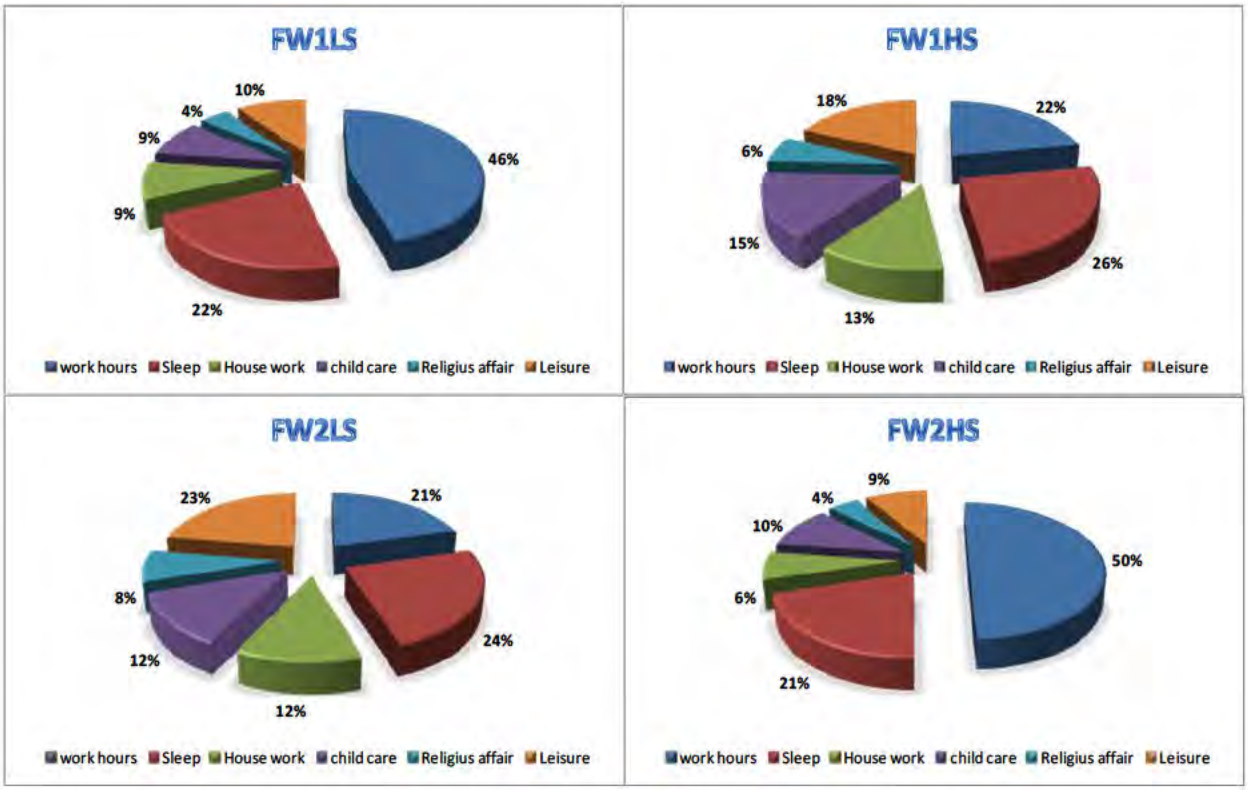

Fig 3. Women's daily activity patterns.

These results can be related to those from a study by Amirullah (2003), which found that the time spent on fishing activities by women in coastal areas of North Sulawesi was about half of that spent by the fishermen. He concluded that women played a significant role in maintaining the food security of the fisher's family and that their contributions could not be neglected since it supported the family's food security. Women in the coastal area of North Sulawesi frequently assisted their husbands in fishing; some even took the boats out and fished by themselves. In addition, they were also involved in seaweed culture and the collection of sea cucumbers. These activities significantly added to family incomes and, to some extent, women were the saviors of the household family income.

Considerable differences in income were found between the women's groups with regard to the proportion of income relative to expenditure and to their husband's incomes (Table 2). Wives of fishermen from Semarang (FWS1HS and FWS1LS) earned about US$50 mth^{-1} during the high season and US$75 mth^{-1} during the low season. These numbers were approximately 32% and 90% of their husband's incomes, respectively. The ratios of income to expenditure of the first group during the high season and low season were about 72% and 65%, respectively. The second group of women (FWS2HS and FWS2LS) earned around US$120 mth^{-1} during the high season and US$80 mth^{-1} during the low season. For this group, the ratio of their income to that of their husbands in the two different seasons was 67% and 40%, respectively. The proportion of household expenditure to income for this group was slightly less than that for the first group, namely 60% and 64%,

respectively for the high season and the low season. The profile was approximately the same for comparable groups from Pekalongan (FWP1HS, FWP1LS, FWP2HS and FWP2LS).

Table 2. Income and expenditure profile of north Java coastal communities. (WI = wives income; HI = husband's income). N=50 in each group; values in brackets are the standard deviations.

Group	Women's Income (WI) (US Dollars)	Husband's Income (HI) (US Dollars)	Total Expenditure (TE) (US Dollars)	Ratio WI to HI	Ratio WI to TE	Ratio HI to TE
Semarang						
FWS1HS	50 (4.7)	157.5 (40.0)	220 (48.1)	0.32	0.23	0.72
FWS1LS	75 (8.4)	83 (15.1)	127.5 (44.8)	0.90	0.59	0.65
FWS2HS	120 (27.4)	180 (42.2)	300 (41.3)	0.67	0.40	0.60
FWS2LS	80 (14.3)	160 (27.2)	250 (33.9)	0.50	0.32	0.64
Pekalongan						
FWP1HS	62(11.4)	148 (432.9)	250 (43.8)	0.42	0.25	0.59
FWP1LS	70 (10.6)	102 (18)	170 (46.8)	0.69	0.41	0.60
FWP2HS	138 (23.4)	180 (55.6)	310 (39.4)	0.77	0.45	0.58
FWP2LS	89 (8.1)	150 (43.9)	216 (24.5)	0.59	0.41	0.69

Figure 4 describes the relative position of four groups of women with regard to four dimensions of uncertainties i.e. ecological, economic, institutional and social uncertainties. The severity of the degree of uncertainty was measured by an index from 0 to 100 within the horizontal and vertical axes, with those scores close to zero indicating the worst situations and those close to 100 indicating better situations when facing uncertainty. Most women in Semarang and Pekalongan faced critical situations when dealing with economic uncertainty (Figure 4). The first group of fisherwomen in Semarang even faced the most severe situation with a score close to zero. This group of fisherwomen who were wives of fishermen and who worked in fishing related activities received relatively low scores on all dimensions. The kite diagram showed in general that fisherwomen in Semarang faced higher degrees of uncertainties in all aspects, while those in Pekalongan, even though facing the same problems, were relatively less prone to the impacts of the uncertainties.

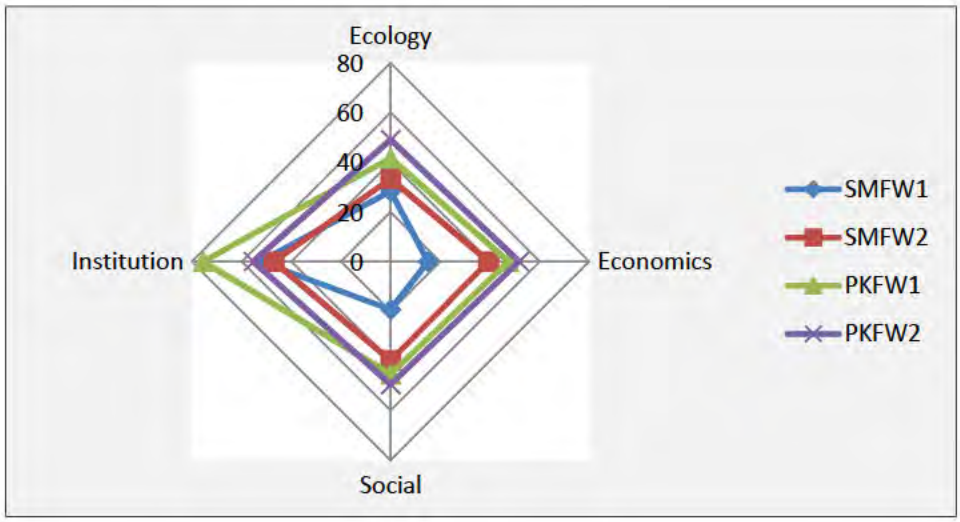

Fig 4. Kite diagram representing the relative position of uncertainties faced by fisherwomen. SMFW1 = FW1 group, Semarang; SMFW2 =FW2 group, Semarang; PKFW1 = FW1 group, Pekalongan; PKFW2 = FW2 group, Pekalongan.

To determine which variables were more sensitive to the uncertainty faced by fisherwomen, Rapfish's leveraging technique was used. For the ecological dimensions bar chart (Figure 5), the seasonal factor, pollution and drought were the attributes that mattered the most to the fisherwomen's livelihoods. And indeed, coastal communities at both sites were suffering from disturbances in ecological conditions and climate phenomena. For economic dimensions (Figure 5), both production volatility and volatility in women's own incomes were sensitive to the degree of uncertainties.

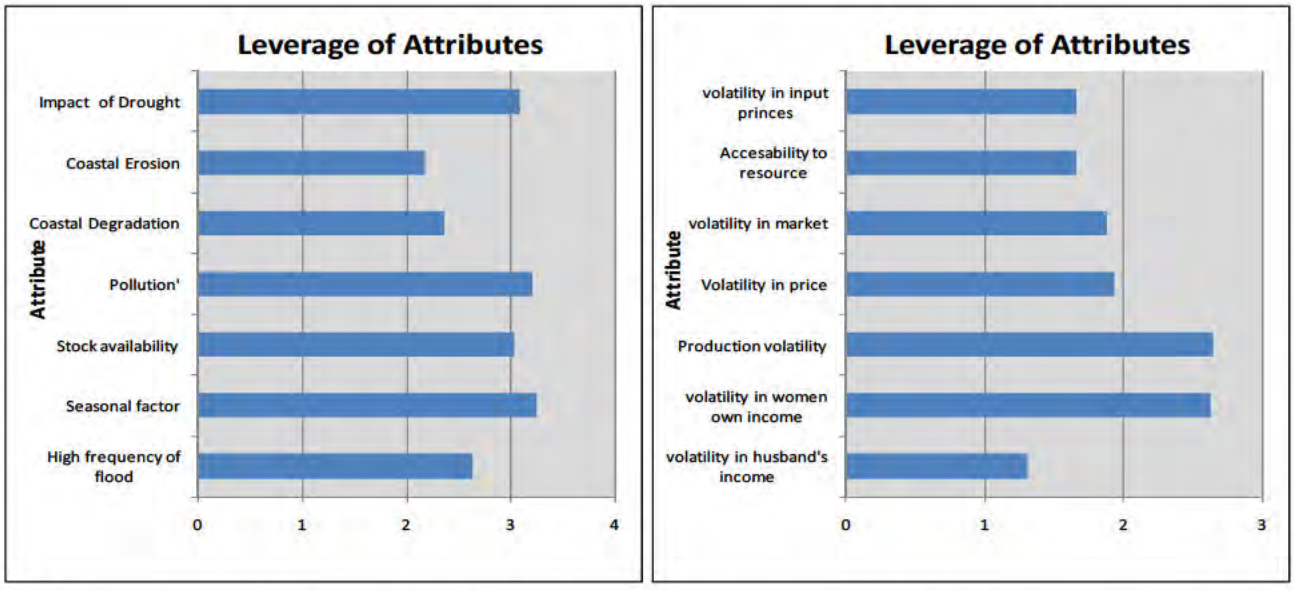

Fig. 5. Leverage of attributes for ecological (left hand chart) and economic (right hand chart) dimensions of uncertainty. For both charts, the bars represent the root mean square change in ordination when selected attribute is removed (on sustainability scale 0 to 100). The longer the bar, the more sensitive the variable is to uncertainty.

On social attributes, both family instability and unemployment are sensitive to the degree of uncertainty (Figure 6). This result agrees with the results from Berman (1981) who found that family instability jeopardised livelihoods of women. This result is not surprising given the high divorce rate on the north coast Java. The level of unemployment is also a determinant variable. High levels of unemployment could lead to a high degree in social uncertainty which could lead to livelihood disruption. With respect to institutional aspects, dependency on local financiers as well as local banking were both sensitive to the degree of uncertainty (Figure 6). This result is in line with that Acheson (1981) who found that fishers and their families establish many different kind of ties with middlemen to spread the risk. Women often deal with the financial issues. On the north coast, local financiers such as middlemen provide easy loans to coastal community households, including groups of women, but their interest rates are high. Women's groups can become very dependent but disrupting such relationships can lead to economic hardship.

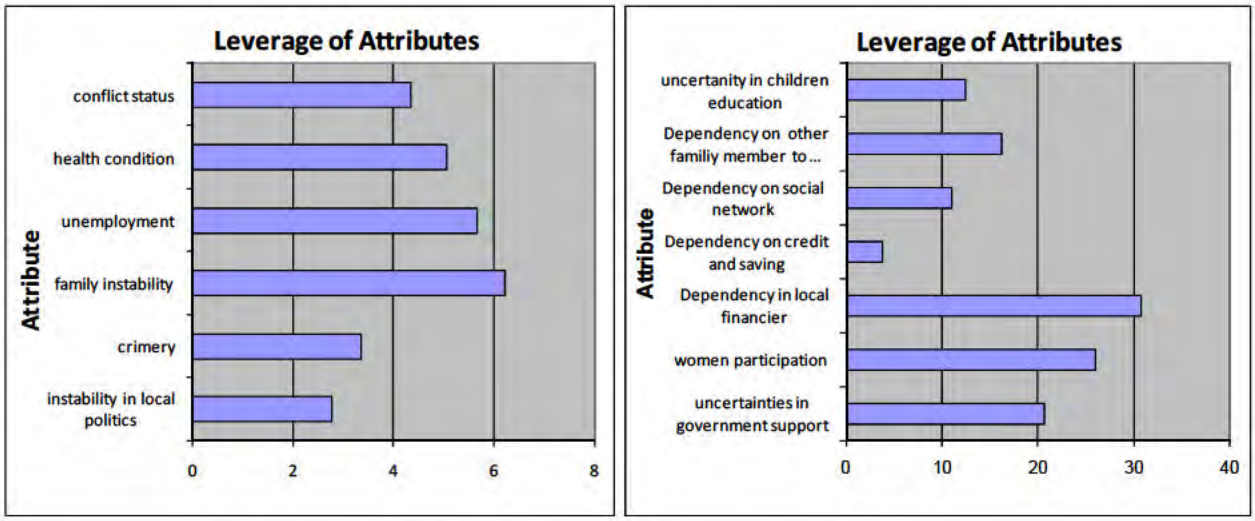

Fig 6. Leverage of attributes for social and institutional dimension of uncertainties.

Women's strategies to cope with uncertainties

Results showed that among the four groups of fisherwomen, the two most vulnerable groups were those who directly engaged in fishing activities by helping their husband to support the family's livelihood – the FW1 groups. Thus, these two groups merit further attention when examining coping strategies. In general, they tend to exercise two basic strategies. First is the strategy to deal with their internal family livelihood issues, and second is the strategy to deal with external forces. Within the family, women often act as "finance ministers" to organise the sustainability of the family's livelihood.

Women charged with the responsibility of managing the household finances have to smooth out financial ups and downs in the household due to fluctuation in fish production and other uncertainties. In order to do this, about 84% of the respondents in the two FW1 groups invested in community saving groups known as *arisan.* In this system, each woman contributes a certain amount of money which has been agreed by the group, normally between Rp 10,000 to Rp 25,000 (between US$1 and US$2.5) per rotation. If a group has 10 women members, then, in one period of *arisan,* the group has 10 rotations. Each week or month they meet to pick the winner of the *arisan*. The winner is chosen by random selection or by agreement and no interest is usually charged. The winner receives the total amount of money collected by the group. So if each contributes Rp 10,000, then the winner will receive a total amount of Rp 100,000 (US$10). This strategy is usually preferred to gambling with a low probability of winning. Here the probability of winning is not only high, but the randomly selected winner can bargain also with those who desperately need the money to trade the turn. This kind of strategy has been described by Hanson et al. (2003). Diamond et al. (1997) also noted that fisherwomen in Indonesia are often engaged in community savings and credit associations or *arisan* which help them through financial uncertainties. With *arisan* they hedge the uncertainties by risk pooling with other fisherwomen. Through it and other actions, fisherwomen in Indonesia's coastal area are not only actively involved in producing fish but also play a primary role in overseeing household finances.

Some FW1 women (66% from respondents) also developed strategies to deal with shortages in household goods and basic necessities. They developed their own "credit system" to deal with sudden and unexpected needs. They either obtained household goods by leasing or paying by installments. Under rare circumstances, they also went to pawn shops in order to obtain cash to buy basic needs.

Several women (28% of FW1 respondents) worked more than the 8 hrs normal work in order to cope with low incomes during the low fishing season. They worked as part time housemaids for families of higher income groups within the coastal area. As part time housemaids, they usually worked from 07:00 hrs to 17:00 hrs. This work helped to cover daily necessities and reduced the budget for food for the family. Women who worked as maids received extra food for themselves and for their family members. Some families sent their daughters and other family members to work as professional housemaids overseas, e.g., in Malaysia, Singapore, Hong Kong and Taiwan. Those who worked abroad often sent their wages home to help their families ease their hardships. Thus, to deal with uncertainty, the labor of family members is maximised and pooled throughout the family, including children who sometimes work to help their parents.

Other strategies are to be thrifty and spend less on living expenses. During the low fishing season, women tend to reduce their spending on clothing and leisure. Similarly, they spend less on food by eating less frequently or change the composition of foods in order to save money. This

strategy, however, has resulted in a relatively higher number of malnourished children in these coastal areas compared to other areas.

With regard to external forces such as uncertainty in the husband's productivity, family instability and poor government assistance, fisherwomen develop several coping strategies. One was to sell certain types of longer lasting fish products. They tended to be the dominant sellers of by-products of fish and of small shrimps destined to be processed as *terasi (*fermented shrimp), often acting as oligopolistic sellers of these products. Since these are processed products, they last longer and can be sold over longer period of time than fresh fish. This form of selling was often used when their husbands could not go fishing due to bad weather or the low season.

Another coping activity was to form a group and invest to open up a kiosk business known as *kedai pesisir* or coastal café. Through the *kedai pesisir,* members could buy daily necessities at a cheaper price. They could also borrow goods with zero interest rate based on membership and trust among members. The cafés also serve as cushions when their husbands return back home with empty pocket.

These findings also echo some of those of Williams (1996), who noted that women were very mobile and adaptable, including to market and seasonal uncertainties. Women in coastal communities move from one job to another, changing commodities they trade or varying their activities according to the season as survival strategies in order to maintain the livelihood of the family.

To help avoid family instability, divorce was avoided as far as possible. Nevertheless when break ups occurred, women tried to adapt and not to take the divorce seriously. "Life goes on" was a common phrase used by the fisherwomen of the north coast of Java. Some found another partner and remarried and thus the remarriage rate was also high. Based on statistical data (Semarang Religious Agency, 2009), the number of divorces in Semarang was 1,900 yr^{-1}, while in Pekalongan the average was 1,500 yr^{-1} (Pekalongan Religious Agency, 2009). This was slightly higher than the average of the other cities in Central Java, which was under 1,000 yr^{-1} $city^{-1}$.

Conclusions

The present study has shown that fisherwomen of the north Java coast of Indonesia play essential roles in the economic chain fish chain through facilitating the fisheries activities of their husbands and through distributing fisheries products within the communities and the market. In addition, this form of employment can also play a significant role in acting as a buffer against insecurity and risk faced by other fishers whose position in competitive markets for fishery products and a changing environment is at the weakest point. Fisherwomen play a greater role in the coastal economy than just their role in fisheries. Ignoring their contributions would mislead our understanding about the dynamics of economic and social issues of the coastal communities.

Uncertainties have exacerbated the poverty in coastal communities. By empowering fisherwomen, poverty could be addressed in a more comprehensive manner. Empowerment programs which directly address women issues in coastal areas and target the right groups could benefit not only those within the women's groups but also the coastal community as a whole because of the women's pivotal role. In developing countries such as Indonesia, most government programs target fishermen's groups by giving them direct subsidies and other economic programs such as PEMP (Economic Program of Coastal Empowerment) but these often end in failure due to mismanagement at local levels. Direct subsidies given to fishermen are often misused and misallocated, and economic empowerment programs for fishermen often end up wasting money due to ineffective delivering programs. Yet little attention has been paid by fisheries authorities to the potential resource of fisherwomen as leverage for economic development at the local level. Future programs in fisheries development must include women as integral actors in economic development in coastal areas. The present study has demonstrated the utility of studies of uncertainty, leading me to conclude that development programs should also take into account the uncertainty in fisheries from the women's point of view. Women especially face uncertainties in their livelihoods reliant on fisheries economic activities. Governments should pay attention to the dynamic of all dimensions of uncertainties, especially for groups of fisherwomen communities who suffer the most, directly and indirectly, from uncertainties in fishing and the changing environment and climate. To make their policies more efficient and successful, the government should also pay attention to the critical dimension of uncertainty that lead to vulnerability of livelihoods in coastal communities.

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The Role of Women in the Fishery Sector of Pantar Island, Indonesia

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Abstract

In Indonesia, marine resources make an important contribution to rural local livelihoods for both food security and cash income. Small scale fisheries typically involve men in catching and women in post-harvest, with overlapping roles. Both activities contribute to household livelihoods. The Indonesian fishing sector is seen as a male domain and the contribution of women is poorly recognised. This paper examines the role of women in the small scale fishery sector in Pantar Island, Nusa Tenggara Timur Province, located in the area of the Alor Marine Conservation Plan of the Coral Triangle Initiative. It examines women's participation in pre-production, fishing and seaweed farming activities, and post harvest, including marketing. The data were collected in four communities through focus group discussions with women and men, and key informant interviews with village leaders and fisherwomen. The results provide a local context-specific analysis of the role of women in small scale fisheries, demonstrating that women do fish and participate in a range of fishery related activities which in turn contribute significantly to household food security and income and are an important, but frequently overlooked, stakeholder group in the small scale fishery sector. Women must be included in future conservation and fishery planning.

Introduction

In the developing world, women living in coastal areas participate in many different ways in the small scale fisheries sector – as gleaners, fishers, traders, fish farmers and processors (Weeratunge et al. 2010; Arenas and Lentisco, 2011). Paid and unpaid, their employment contributes to the individual, household and community at many different levels such as for food, income, and in cultural traditions (Weeratunge et al. 2010).

Although the involvement of women in the fisheries sector has been recognised globally (Williams, 2008), more remains to be done to recognise and understand women's work in the sector (Weeratunge et al. 2010). The Food and Agriculture Organization of the United Nations (FAO) has set targets to mainstream gender equity in their global fisheries and aquaculture programmes by 2013.[1] In some countries, increasing recognition of the often overlooked role of women in the small scale fisheries sector is gaining momentum such as through organisational movements of fisherwomen in Brazil, Thailand, Chile and Tanzania advocating their rights to access fish resources (Sharma, 2010). However the lack of gender disaggregated data on fishers globally has hindered the

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[1] http://www.fao.org/gender/gender-home/gender-programme/gender-equity/en/, Accessed 30 August 2011

recognition of the role and "invisible" work of women in the fisheries and fisheries production sector (Choo et al. 2008; Williams, 2010). This is especially relevant in countries like Indonesia, and most especially in remote island communities.

Gender and Fisheries in Indonesia

Indonesia is an archipelagic nation that covers 5.8 million km^2 of marine area and has approximately 17,504 islands, a coast line of 95,181 km (Ministry of Marine Affairs and Fisheries, 2009a) and 8,090 coastal villages (Ministry of Marine Affairs and Fisheries, 2009b). Millions of Indonesia's poor belong to small scale coastal fishing households in the eastern region of Indonesia and are heavily reliant on fish for daily food and to generate income to meet daily living costs as well as other basic needs such as education. Per capita fish consumption of capture fish across Indonesia in 2007 was about 25 kg (FAO, 2010). In many eastern Indonesian coastal communities, average consumption is certainly higher.

Coastal fishing households include a large but unknown number of women who are engaged in fisheries activities using small capital commitments and simple technology (such as hand lines and canoes) to harvest and catch marine resources. They also play an important role in processing or selling fish catches (Salagrama and Salka, 2010). The Coral Triangle Initiative (CTI) on Coral Reefs, Fisheries and Food Security, a six country conservation effort (Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands, and Timor Leste), identified the Indonesian small scale sector as a strategic sector to alleviate poverty, improve food security and improve livelihoods, especially for women (Coral Triangle Initiative, 2009).

Women in coastal villages are usually identified by the government as fishermen's wives and their work is considered part of the domestic work of caring for families (Parawansa, 2002) and households, such as reproduction, fetching water, firewood, preparing food and house cleaning (Momsen, 2004). Due to this classification, the work of women in fisheries is not counted in national government census collections under fisheries related employment at district administrative level. For example, the Indonesian Statistics Bureau (BPS) collects and produces fisheries related data for each province, regency and sub-district on the number of (male) fishers employed in the fishery sector either on full time, part time major or part time minor basis (e.g., statistics for Alor, Nusa Tenggara Timur Province, which contains the Pantar Islands) (Table 1). BPS Indonesia classifies fishers based on the amount of time spent fishing: (i) full time fishers who spend all of their working time fishing; (ii) part time (major) fishers who spend the majority of their working time fishing but may have other work activities; and (iii) part time (minor) fishers who spend a minor part of their working time fishing. Information is also collected on the gear used (such as types of boats, canoes, motorised, non-motorised) by household, the species caught, and the total fish production (BPS Kabupaten Alor, 2009).

In the Indonesian Fisheries Law No 31/2004 (and amendments thereafter) "fishers" are called *nelayan* in Indonesian which although does not have a gender associated with it, is usually translated as "fishermen", defined specifically in the law as "a person whose way of living is catching fish" (Law No 31/2004 Article 1, subsection 10). The work conducted by women in the fishery sector comes under the definition of a "fishery" under the Republic of Indonesian Law No 45/2009 (amendment to Law No 31/2004 on Fisheries) article 1, subsection 1. Fishery is defined as "an activity related with the management and utilisation of fish resources and its environment from pre-production, production and processing up to its marketing performed in a fishery business system" (http://faolex.fao.org/docs/pdf/ins97600.pdf, accessed on 09 September 2011).

Table 1. Number of fishers (male) in Alor and Nusa Tenggara Timur Province, Indonesia in 2009.

Type of fishers	Indonesia	NusaTenggaraTimurProvince	Alor Regency*
Full-time fishers	1,096,289	21,698	8,178
Mainly part-time fishers	762,997	32,863	4,080
Part-time fishers as additional work	309,993	11,565	2,805
Total	2,169,279	66,126	15,063

Source: The Ministry of Marine Affairs and Fisheries, 2009.

* Adrianto et al. 2010 reports on the type of fishers from Alor regency in which Pantar Island is located.

Because the activities of women in fishing households are considered domestic work, women are generally not involved in activities in the public domain. For example, women have been left out of decision making regarding village development plans in the coastal villages in South Sulawesi (Koban et al. 2011), and discussions about marine resource management in other regions (Novaczek et al. 2001; Balai Taman Nasional Wakatobi dan Pemerintah Kabupaten Wakatobi, 2006; Adrianto et al. 2010).

The present paper aims to provide a local context-specific analysis of the role of women in fisheries in a rural coastal community in eastern Indonesia with a case study of selected communities from Pantar Island in the province of Nusa Tenggara Timur. It examines their involvement and role in fisheries activities in pre-production, production (the gear used and products fished), post harvest and market chains. The results demonstrate women do fish and participate in a range of fishery related activities which contribute significantly to household food security and income and other household needs. In this region, little is known about the maritime livelihoods of communities. While the results relate to a coastal mixed ethnic population in the eastern islands of Indonesia, this community is reflective of other such coastal communities.

Location and people

Pantar Island is situated between Alor and Lembata Islands in Nusa Tenggara Timur Province of Indonesia (Fig. 1). Pantar Island is 728 km^2 while the areas of small surrounding islands vary in size (BPS, 2004). The area was recently included in the Alor Marine Conservation Plan which includes the Pantar and Alor Straits designated by the District local government in March 2009, under the CTI.

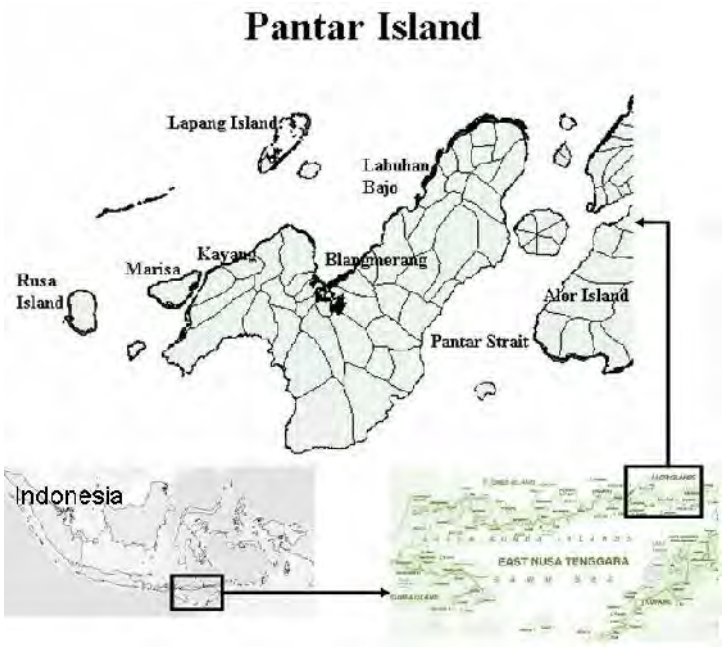

Fig. 1. Indonesia, East Nusa Tenggara and Pantar Island group.
(Source of Pantar Island map: Bakorsurtanal 2007)

The total population of Pantar was 42,100 people in 2008, including those on offshore islands (BPS Kabupaten Alor, 2009). Pantar Island has 38 coastal villages (BPS Kabupaten Alor, 2008) of which just under half are dependent on marine resources as their main source of livelihood or, if inhabitants in inland villages, as food fish. Approximately 15,000 fishers are reported to live in Alor Regency in which Pantar Island is located (Adrianto et al. 2010, and Table 1), but specific information on fishers residing in Pantar Island is not available. Pantar is located in one of the poorest provinces of Indonesia, Nusa Tenggara Timor (NTT), with approximately 30% of people living below the poverty line. Pantar Province was ranked 31st out of 33 provinces in terms of the Human Development Index (HDI) (http://www.bps.go.id/tab_sub/view.php?tabel=1&daftar=1&id_subyek=26&notab=2, accessed 14 July 2011).

Four locations were selected as case-study sites: Labuhan Bajo, Blangmerang, Kayang and Marisa villages (the last three are *desa*'s – rural villages - under the Indonesian government

administrative system and Labuhan Bajo is a hamlet of Kabir *desa*). Labuhan Bajo is located in Pantar sub-district (Kecamatan), Blangmerang is part of Pantar West sub-district, Kayang and Marisa Villages are in Pantar Northwest sub-district. The four locations were selected because their populations represented communities highly dependant on marine resources and were the main users of the surrounding waters where a marine conservation area was established in 2009. In 2009, the population of these four villages was 4,160 people, with the proportion of women in these four villages approximately 53% (Table 2). Women comprised between 48% of total population (Labuhan Bajo hamlet) to 60% (Marisa). The average number of people in a household was five in Labuhan Bajo, Kayang and Marisa Villages, and seven in Blangmerang. However, some Marisa households contained 2-3 families living in one house and these communities are often highly mobile, moving between settlements within Pantar and beyond.

Table 2. The demographic characteristics of four locations in Pantar.

	Labuhan Bajo hamlet	**Blangmerang village**	**Kayang village**	**Marisa village**
Administration	Part of Kabir village, sub district of Pantar	Sub-district of West Pantar (*Pantar Barat*)	Sub-district of Northwest Pantar (*Pantar Barat Laut*)	Sub-district of Northwest Pantar (*Pantar Barat Laut*)
Popunlatio*	1,017 (December 2009)	1,498 (August 2008)	717 (December 2009)	937 (December 2009)
Number of women	489	779	409	563
% of women *	48%	52%	57%	60%
Number of households*	239	224	158	189
Main ethnic group	Sama Bajau	Alorese	Alorese	Alorese
	-Sama Bajau	-Alor	-Alor	-Alor
Languages spoken	-Indonesian	-Indonesian	-Indonesian	-Indonesian

* Source is from village leaders' record.

Most of the occupants of Labuan Bajo belong to the Sama-Bajau ethno-linguistic group, the most mobile and specialised of all seafaring groups in Indonesia, and commonly referred as "sea nomads" (Stacey, 2007). The number of ethnic Bajo in Indonesia is estimated to be between 90,000–150,000. The majority of Sama-Bajau Bajo live in settlements in areas with high marine biodiversity, in particular, Sulawesi, and provinces of West and East Nusa Tenggara, and they are generally landless (Stacey et al. 2012). The population of Blangmerang, Kayang and Marisa villages belongs to the Alorese ethno-linguistic group. Indonesian language is also spoken in these areas and is the main language in trade.

These ethno-linguistic coastal populations are engaged in multiple livelihood strategies. Broadly the people and villages are categorised as (a) full time fishermen and/or heavily reliant on marine-based resources for food and income; or (b) part-time fishing communities (mixed-fishing/agriculture/other). Among these two groups are (a) long established local coastal populations with "clear claims to tenure" (such as the Alorese) and (b) migrant fishing populations, who are either long-term (fishers and families) or seasonal migrants most commonly belonging to the "Bugis-Buton-Makassar-Sama-Bajau" maritime populations of eastern Indonesia (Fox et al. 2009). The economic activities of the populations of the four villages include small scale fishing, gleaning and trading in daily food supplies through village kiosks. However, people in Blangmerang, Kayang and Marisa also own agricultural plots where they grow cassava and corn. The harvest normally provides domestic supply for households for a year. A small number of households in Blangmerang also grow cashews but the earnings are smaller than fishing. Other female income generating activities include textile weaving by women in Kayang and Blangmerang villages and local cash trade in tamarind (peeled and dried) by women from Blangmerang and Labuhan Bajo.

Study Methods

We used a gender division of labour approach to highlight the "invisible" work of women in fisheries and production and marketing and the links between women resource users and their lack of participation in marine or fisheries management (Choo et al. 2008). The gendered division of labour is a key concept for understanding the processes on the form of women's and men's economic activity in the fishery sector (Harrison, 2000). It refers to actual activities, the relationship between both women and men in society, and the interdependency between fishermen and women traders.

The data for this paper were collected by the lead author through focus group discussions, open forum feedback sessions and interviews with selected participants in the four communities. The data were collected over three periods: June to August 2008, November 2009 to January 2010, and June and July 2010. These visits allowed fishing activities to be observed during the east and west monsoon seasons.

Across the four locations, 164 adult women and 152 adult men, all of whom were married, attended a series of focus group discussions (FGD) and open feedback sessions (Table 3). Participants were identified for the meetings either by the lead researcher or they nominated themselves on hearing announcements broadcast through the mosque. The meetings were held outside, in informal settings, i.e., in locations where women normally gather to work together, to make the participants feel comfortable enough to engage in a dynamic discussion (Liamputtong, 2009). Each meeting took 2-3 hrs. The format for the first three FGDs consisted of introductions by the lead researcher and discussion around several guiding topics relating to fisheries and the fishery sector. Topics included marine resource use, species sought and gear used; time spent conducting activities; daily household expenses, incomes and contributions from fishery related activities to

households (food and income). The format of a further two FGDs focused more on post harvest and marketing activities. These meetings were attended by much larger numbers of people, especially in Marisa village. The lead researcher applied a number of methods to ensure that the information gathered during the FGDs was objective and representative of the livelihood activities of the population in each location. In cases where a few participants were less inclined to contribute, the lead researcher approached the reluctant participants later to discover whether they did agree or not with the outcomes of the discussions and, if the latter case, seek further information to raise in follow up group discussions. The facilitator adopted a neutral role.

Table 3. Number of men and women involved in FGDs and feedback sessions.

Period of FGD	Group discussions	Villages							
		LabuhanBajau		Blangmerang		Kayang		Marisa	
		F	M	F	M	F	M	F	M
June-	FGD 1	7	5	14	5	7	8	15	12
August	FGD 2	5	12	6	5	8	-	17	-
2008	FGD 3	5	5	-	-	4	-	-	-
Nov 2009-	FGD 4	10	-	5	6	10	8	30	16
Jan 2010	FGD 5	-	-	3	-	-	-	5	-
Jun-July 2010	Feedback sessions	3	23	9	9	2	10	3	28
Total		30	45	37	25	31	26	70	56

Note: F= Female participants; M= Male participants; FGD= Focus group discussion

Participatory Rural Appraisal (PRA) (Pretty et al. 1995) methods were used also during some of the FGDs. These included actor analysis, village maps, resource use mapping, pie charts of time and seasonality relating to economic activities. These FGDs were complemented with key informant discussions with between 8-10 other women and men (either identified by members of the FGD for their local knowledge and/or seniority and experience in the fishery sector activities) to clarify and cross check the information gathered during the FGD. The first author also observed a broad spectrum of fishing activities in different seasons.

Results

We documented the many ways women and men were involved in the fisheries sector in Pantar from pre-production; in the production stage through catching and collecting fish and invertebrates, and in post production.

The pre-production stage

At the pre-production stage, women from all four villages were involved in preparing fishing equipment such as lines, bait, hooks and nets for their own fishing activities in the intertidal areas. For example, older women (grandmothers) in Labuhan Bajo collected sea worms in mangroves to use as bait for hand-line fishing along the coast for 1 hr day^{-1} during low tide. Women in Labuhan

Bajo also helped their husbands, unmarried brothers or fathers in repairing cast nets. Women in Marisa prepared their own lines and hooks and paddled dugout canoes to fish in the waters close to their village. Women in Kayang and Marisa maintained their own fishing gear.

The production stage

The fishing activities of women were conducted in mangrove areas, intertidal areas and inshore coastal waters out to approximately 2.5 km. In the production stage, women from all four villages caught fish and collected invertebrates in the intertidal areas using several methods (Table 4). Women gleaned shells and *trepang* (Holothuria), while some men from each village were also involved in this activity. The shells commonly collected by women were turban shells, mud creepers, oysters, clams, cockles, and bivalves (Table 4) as well as juvenile fish (such as groupers (*Epinephelus spp)*, soldierfish (family *Holocentridae*), fusilier fish (family *Caesionidae*), and surgeonfish (family *Acanthuridae*). Spider conch (*Lambis spp*) was mostly collected by men. The women in Marisa and Blangmerang villages collected shells in the mangrove areas using sticks or by hand. Only women from Labuhan Bajo collected edible sea urchins (*Trineustes gratilla*) for domestic consumption from the intertidal areas in front of their villages. Women did not free dive to collect top shells (*Tectus niloticus*).

Table 4. List of the most common marine products collected in four villages in Pantar Island collected over one year.

Marine products	Women	Men
Shells*	Y	Some
Juvenile fish	Y	Y
Demersal fish	Y	Y
Sea urchin	Y	N
Trepang	Y	Y
Topshells	N	Y
Pelagic fish	N	Y

Note: *shells cover turban shells, mud creepers, oysters, clams, cockles, spider conch, and *Anadara sp.*
Not all products are collected every day of the year.

Almost all women in the four villages used fish traps (*ker*) which were not used by men. Fish traps were positioned in front of rocky sea bottom or coral reef areas. Women banged sticks on the surface of the water or stirred up the sea with their hands to scare fish towards the traps. Based on FGDs, all women in the four villages spent on average at least 3 hr day^{-1} gleaning for shells and catching fish using fish traps during low tide in almost all seasons, depending on weather conditions and when they were not preparing fish to be taken to market. During low tide in all seasons, women collected shells, sea urchins and *trepang* and catching fish using *ker.*

In inshore waters using handlines from outrigger canoes, most women in Labuhan Bajo hamlet, Blangmerang and Marisa villages caught various species of demersal fish (such as trevally) (Table 5). Meanwhile, women in Kayang village caught fish when other protein sources were not available or they had no cash to buy food. The women of Labuhan Bajo hamlet and Blangmerang village spent at least 3 hr day^{-1} on average fishing by hand lines. This included preparing the bait and returning home. However women from Marisa village spent up to 8 hr $trip^{-1}$ catching fish in Rusa Island which is located 10 km from their village. These activities were conducted mainly when other sources of protein were not available or when nothing was available to be bartered for food.

Table 5. List of fishing methods used by men and women in four villages in Pantar Island.

Fishing methods	Women	Men
Shell collection (gleaning)	Y	Y
Fish trap (*ker)*	Y	N
Handline from canoe	Y	Y
Cast net from the shore	Y	Y
Cast net with outrigger canoe	Y	Y
Handline from outrigger canoe (out board engine power <7hp)	N	Y
Spear gun	N	Y
Cast net with motor boat	N	Y
Mid water trawl (*lempara*)	N	Y
Drift/bottom longline (*jala*)	N	Y
Kite fishing from motor boat	N	Y
Shark net	N	Y
Free dive	N	Y
Dynamite fishing	N	Y

Y= Yes; N=No

Several women in Kabir used cast nets from the shore while a small number of women from Blangmerang used cast nets from outrigger canoes. Women were not involved in catching pelagic fish (Table 5). Pelagic fishing was normally conducted by men from the late evening until dawn or by mid-water trawl from vessels crewed by men from Blangmerang and Labuhan Bajo. Pelagic fish were abundant during the west monsoon, from December to April.

All villages also farmed seaweed. The women's activities included preparing materials and the area for seaweed farming, tying the seedlings to ropes, daily maintenance, collecting seaweed dislodged onto the seabed and harvesting and drying the seaweed. Those activities were conducted together with other members of the family, such as husbands or children. However, the men were normally responsible for transporting the sacks of sundried seaweed to local buyers. During the seaweed season, Blangmerang villagers spent the most time, approximately 15 hr day^{-1}, on seaweed farming in Lapang Island. The women in Kayang also allocated 4 hr day^{-1} for seaweed farming

almost year round. When they cleaned the rope or retied the seaweed, they also opportunistically collected shells or *trepang*.

Women's fishing activities were influenced by the east and west monsoons. For example, small pelagic fish such as halfbeaks *(Hyporhamphus dussumieri)*, round scad (*Decapterus spp*), and bigeye scads (*Selar chrumenopthalmus)* were abundant during the west monsoon. During the east monsoon, demersal reef fish were commonly caught and sold fresh at the local village markets. In the intertidal and mangrove areas, women collected shells year round.

The post harvesting stage

Women's post harvest activities were centered on the processing and sale of pelagic and reef fish and the meat of mussels. They served and used the small weekly markets of their own villages, as well as a weekly market in Bakalang market in the north of Pantar Island, and markets on neighbouring islands in Nusa Tenggara Timur (NTT). Weiriang market in neighbouring Lembata Island was reached by regular inter island wooden ferry. For purchases, this market was a favorite for Pantarese as the products were cheaper than in the Pantar town market and in Kalabahi, the capital city of Alor District. Some fish products from Pantar were also sold in Atapupu market on Timor Island.

The post-harvest stage commenced when a canoe or motorised boat crew returned from a fishing trip. The local traders, who were mostly women (called *papalele* in local language), approached the boat as it docked on the shore to bargain with the captain, crew and/or owner of the fishing equipment or boat on price. For example, with a mid-water trawl fishing operation for pelagic fish (such as long tom (*Tylosurus crocodilus)* and halfbeaks), women traders bargained with the owner of the boat. For small boats using hand lines or cast nets (for yellowfin tuna, *Thunnus albacores,* round scad and *Euthynnus affinis*), the traders bargained with the wives of the fishermen. Once a price was agreed, the women traders collected the fish in baskets.

The method of processing depended on the species of fish, the season, and the time the fish were landed. For example, during the west monsoon (December-February) in 2009-2010, a group of women traders in Labuhan Bajo hamlet purchased hundreds of pelagic fish (e.g. halfbeaks, round scad and bigeye scads) from a boat and processed the fish with salt over 2 hr. The round scad and bigeye scads were abundant during the west monsoon, but options to process them were limited due to limited availability of ice and salt. Ice was only available in Blangmerang and Labuhan Bajo Village, while salt was in limited and irregular supply.

In the case of a mid-water trawl boat landing thousands of halfbeak fish purchased by women from Labuan Bajo, some of the catch was sold directly by the roadside in their village or sold door to door on foot (over a 3 hr period) or in nearby Kabir market early the following morning. A portion of the catch was also sundried for at least 2 days and later sold in another market

(Weiriang or Bakalang Market). Women traders in Labuhan Bajo could spend up to 12 hr to buy, process and sell the catch.

During the market day, women traders in Blangmerang village spent up to 10 hr buying the catch (e.g. round scad and bigeye scad) from boats, processing, and transporting fish to the nearest markets, such as in Weiriang (4 hr away by wooden boat) or in Wolu village (3 hr away by motorbike), to sell it.

In Kayang and Marisa villages, the fish caught by hand line were commonly sun dried by the wives of the fishermen, taking about 4 hr day^{-1} of labour. Once dried, the fish were sold to local village kiosks that also sold daily items such as spices, eggs, snacks, salt, cigarettes, fishing lines and hooks. In return, the women and their families obtained cash or goods on credit. The local kiosk owner then sold the sun dried fish at the nearest market such as Weiriang, Wolu and Kalabahi, taking up to 6 hr in travelling time.

Once a week in each of the four villages, most of the women engaged in the fish value chain spent more than 50% of their day at a local market. The time included preparing the fish for sale, transporting it to the market, selling or bartering the fish in the market and returning home. The number of hours these activities took varied depending on the catch and distance to market but could take up to 7-14 hrs.

The results of the FGDs indicated that across the 4 villages, women spent between 40-50% of their time engaged in fishing and fishing related activities.

The purposes of fishing for women

In the four villages, marine products were collected and caught by women for household food consumption and cash income. The fish caught by trap, hand line and gleaning were mostly consumed within the household and extended family. Excess catch were sold for cash or bartered with inland or "mountain people" for other foodstuffs. For example, in Kayang village, sun-dried fish was bartered for locally grown corn, cassava, vegetables and fruits. These foods were consumed daily by household members and sometimes stored for later use to supplement the household diet when fish was scarce.

The cash income from fish trade was used to support the family's daily expenses and for savings. One woman trader in Labuhan Bajo hamlet explained how employment in fish trading over nine years had brought prosperity to her family. She had repaired the family house, paid for her children to go to high school, saved cash, and bought a number of items of jewellery as a form of savings. Her income had generally been higher than that of her husband. The most regular income for fisher households (households comprised of both women and men who were engaged in fishery activities) was from the sale of fresh and sun dried pelagic and demersal fish, and the meat of

shellfish, top shells and *trepang*. Top shells and *trepang* were not a regular source of cash income as their availability was not guaranteed, but, when harvested, provided significant one-off cash income. Three examples from three women in Labuhan Bajo hamlet, Blangmerang and Marisa villages illustrate how fishing and trading contributed to household livelihoods.

MW was a Sama-Bajau from Labuan Bajo, who generally crewed on a mid- water trawl boat, but also caught yellowfin tuna by kite fishing from a motor boat during the west monsoon and reef fish by handlines from a motorised boat during the east monsoon. He stated he could earn approximately US$3,075 (Rp 24,600,000) per year. His wife, a fish trader, estimated her earning around US$2,584 (Rp 20,670,000) over the same period, comprising US$2,219 (Rp 17,750,000) from fish trading and US$365 (Rp 2,920,000) from cake selling. This household earned approximately US$5,659 (Rp 45,270,000). Participants in the FGD in Labuhan Bajo reported that a household needed at least US$ 3,796 (Rp 30,367,667) annually to fulfil daily needs, for education, and to participate in annual feasts.

SK was a fisher from Blangmerang village. He caught fish (round scad, big eye scad) using a cast net and a motorised boat during the west monsoon. He also dived to collect *trepang,* top shells, nautilus and other shells. His earnings were approximately US$1,305 (Rp 10,440,000) per year while his *papalele* wife earned about the same as MW's wife in Labuhan Bajo, US$2,219 (Rp 17,750,000) per year. They also farmed cashew nuts and corn, but their cash earnings from these were very low. This household earned around US$3,529 (Rp 28,232,000) per year. Participants in the Blangmerang village FGD indicated that a household required at least US$2,721 (Rp 21,765, 000) for annual living expenses.

AM was a fisherman from Kayang village. He used hand and line fishing method from a canoe to catch coral trout, skipjack tuna, grouper and trevally year round. He earned US$1,313 (Rp 10,506,667) per year from fishing. His wife was not a trader but she processed the fish he caught and bartered it for food with the mountain villagers or the owners of the kiosks in their village for daily food and household items. They owned 0.5 ha of land for growing corn. During the Kayang village FGD, participants estimated that one household needed at least US$2,626 (Rp 21,009,667) per year.

The earnings from fish caught by the men as well as from fish traded by the women varied depending on the season. However, from these three examples, we note that the earnings from *papalele* fish traders were a major contribution to their households. In addition, the work of women in fisheries also supported the household for daily food necessities and goods through barter and exchange.

Discussion

This paper highlights the roles, involvement and contributions of women in fishing activities and household livelihoods in the fishery sector of Pantar Island in eastern Indonesia and complements other such studies. As in Pantar, women play a significant role in fishing and in the post-harvest activities and selling of fish in East Kalimantan (Susanto et al. 2005), North Java (Fauzi and Anna, 2010), Sulawesi (Broch, 1981; Gaynor, 2010), Maluku (Soselisa, 1998; Novaczek et al. 2001), and Nias-West Sumatra (Salagrama and Salka, 2010). Our results, however, contrast with those from recent research by Adrianto et al. (2010) who reported that women in the Alor Regency, which includes Pantar, were involved in pre and post-harvest fishery operations such as drying and salting fish, and as retailers or merchants, and in seaweed farming, but they did not acknowledge the role of women in actual fish catching.

In the production stage, women normally fished close to their home villages during the day time. However, we found that women did fish further than the intertidal areas if they had access to motorised boats and the requisite fishing knowledge that enabled them to carry out day trips. Currently, most only had access to non-motorised boats although the households often have a motorised boat. Some women in Marisa said that having access to a motorised boat would help also for transporting water for household purposes.

Trading of fish and the actual fishing activities were interrelated, and women played a dominant role in fish processing and distribution. Women participated in selling either in the village or more distant markets. Women traders processed marine products based on local market demand (for example, inland communities prefer either sun dried or salted fish) and the availability of materials (such as ice or salt). They can be considered the entrepreneurs of the village and are able to respond to consumer demand (Allen and Truman, 1993; Overa, 2003). To sell fish, they managed to overcome challenges such as poor roads, long distances, and lack of regular ice and salt supplies, and infrastructure and service shortcomings.

As indicated by the amount of time spent, fishing related activities dominated people's daily routines. Our research illustrates how women as well as men invested their time in fishing activities and contributed to household food needs and earnings. In 2005 in Nusa Tenggara Timur Province, protein from fish contributed almost 20% of total protein consumed (BPS NTT, 1996-2005) compared to 14.1% for Indonesia (BPS, 2010). This figure is likely to be even higher in the Pantar coastal communities, especially the Sama-Bajau communities who have no access to land and are highly dependant on marine resources (Stacey, 2007).

Recognising the key stakeholder groups and facilitating their participation in decision making processes are critical to effective fisheries resource management (Pomeroy and Douvere,

2008). As Williams (2008) suggests applying a gender lens in the fisheries sector – that is with a "deliberate focus on gender, and age differentiation of roles, responsibilities, access and opportunities" provides a more complete view of the entire fishery and fishery industry, and can lead to appropriate management action. Women should be included in resource management planning because they have knowledge to contribute. Also, they should not be disadvantaged in management plans and strategies, such as having to walk greater distances to access reef resources where no-take areas are established. In addition, they must be recognised in the distribution of benefits. A study in the Roviana Lagoon, Solomon Islands showed that involving women and incorporating their knowledge with western fisheries management knowledge has been integral to a successful programme for monitoring and managing invertebrates (Aswani and Weiant, 2004). A first step to including women is to identify activities which are conducted by women in order to enable women to participate appropriately in marine resource management. This is especially pertinent in Pantar Island where the Alor Conservation Area has been recently declared and a management plan will be developed. Adrianto et al. (2010) noted that the rights of women in Alor District to access fisheries and marine resources were low. In addition, they noted that women were also generally unable to access training provided by government and non-government organisations. Under the CTI, any future efforts to manage this area in Pantar should involve women in coastal communities.

Conclusion

This paper has examined the role of women in fisheries activities in pre-production, production, post harvest, and marketing in four coastal communities of Pantar Island in eastern Indonesia. To date, fishery related employment data by women are not recognised in national government statistical census collections and studies leading to conservation and management plans. Our results demonstrate that women are key economic actors in small scale fisheries in Pantar Island and one of the key stakeholder groups in coastal resource management and conservation initiatives. This is particularly important for Pantar Island and its surrounding designated Marine Park. Better understanding of the gender division of labour, will improve accounting of women's participation in the Indonesian fishery sector and should lead to their interests being taken fully into account. As the fishery sector is a major economic and social sector, and particularly important in remote communities such as Pantar, better gender accounts in fishing will, in turn, help inform better gender policies in Indonesia.

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Successful Women Entrepreneurs in Aquaculture: Case Studies from Tamil Nadu, India

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Abstract

The nature and extent of women's involvement in aquaculture vary greatly from place to place and, within a place, they vary among castes, religions and positions in the family hierarchy. The present study covers 13 cases of successful women entrepreneurs in Tamil Nadu, India who were engaged in production, input supply and export and marketing through shrimp farming, crab culture, crab fattening in cages, pens and concrete tanks, shrimp hatchery management, crab hatchery management, live feed farming and processing, shrimp processing, fish meal formulation and feed development, aqua by-products management and exports. Analysis of the case studies demonstrated that women can take part in different parts of the aquaculture value chain, especially if it involves a traditional activity they have been carrying out. The presence of organisational structures such as Women Self Help Groups (WSHGs) helped to galvanise women to take up more complex activities. Women with low formal education levels also played a role as workers. However, women with higher education or with family business connections exhibited high entrepreneurship skills, usually with family support, and could manage complex aquaculture activities.

Introduction

Women are involved in many fisheries activities, although their degree and type of participation is variable depending on local cultural conditions. In small scale aquaculture, rural women's involvement could augment fish production, uplift their social and economic conditions and promote gender equality. This will enable them to participate productively and independently to improve their family's nutritional and living standards. In some cases, they may even be the main source of family income as urban male migration and other social problems have led to an increased number of permanently or temporarily women headed households.

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In southern India, women are proving to be well suited to many of the new activities in aquaculture, beyond their well-established and traditional roles in fisheries marketing, processing and administration. Although women have proved to be competent in adopting new aquaculture technologies, their role is very restricted and often ignored. Major reasons for this include the location of aquaculture sites and socio-cultural taboos against women who strive to earn their family's subsistence in rural areas. To ensure that women utilise their full potential in profitable activities like aquaculture, rural women in southern India need capacity building support which will eventually lead to their empowerment. (Shaleesha and Stanley, 2000).

The present study illustrates how women are actively engaged in aquaculture in Tamil Nadu state, India, through case studies that show a wide range of opportunities for the women principals and women workers and group partners. By analysing individual cases, we show opportunities to improve women's participation and avenues for getting more women involved. The objectives of the study were to document the success stories in the aquaculture sector and study the socio-economic factors for success for women in aquaculture.

Materials and Methods

The present investigation was carried out in Tamil Nadu, South India. Primary data were collected from 13 successful women entrepreneurs engaged in shrimp farming and culture, crab culture, crab fattening in cages, pens and concrete tanks, sea bass farming and culture, shrimp hatchery management, crab hatchery management, live feed farming and processing, shrimp processing, fish meal formulation and feed development, aqua-byproducts management and exports. All the women were married and all the entrepreneurs were located in Chennai, Tiruvallur District and Kancheepuram District. Purposive sampling was adopted because of the nature of the study, availability of samples and time limitations. Direct personal interviews and interview schedules were used to elicit the data. The interviews were conducted by the first author from 2006 to 2008. The 13 cases have been organised according to value chain category, viz; (1) production, (2) input supply, and (3) marketing and export. Fictional names have been given to all the cases to protect the identity of the entrepreneurs.

Results

1.0 Production

1.1. Hatchery manager

Mrs. Renuka was the manager in a mud crab or green crab (*Scylla serrata)* hatchery at Kancheepuram District, Tamil Nadu. She was educated only up to elementary level and possessed strong expertise in hatchery management. Mrs. Renuka also possessed good leadership qualities, good knowledge and experience in fresh water prawn and mud crab hatchery management. She had

strong expertise in seed production of fresh water prawns (*Macrobrachium spp)* and hatchery production of mud crabs, brood stock maintenance, induced maturation, spawning/hatching, larval rearing, live-feed culture, post-larval rearing, maintenance of biological stock, seawater supply systems, air-supply systems, cleaning of brood stock and larval tanks and monitoring of water quality parameters. Twenty women employees worked under her supervision. Mrs. Renuka was a Jamsetji Tata National Virtual Academy (NVA) Fellowship awardee for 2007. She was awarded this fellowship by the M. S. Swaminathan Research Foundation (MSSRF), nominated by the Central Institute of Brackishwater Aquaculture (CIBA), Chennai for her expertise in hatchery management.

1.2. Crab farmer (Crab farming in ponds)

Mrs. Annai was the first woman crab farmer in Tamil Nadu state, and she had been culturing crabs for 15 years. Mrs. Annai and her group lived in Tuticorin, Tamil Nadu. In 1992, Mrs Annai started mud crab farming. She was 45 years old and was educated to primary level. She supported her group members and husband in crab farming activities. Mrs. Annai and her husband were pioneers in short and long term mud crab culture in earthern ponds. They were perhaps the longest standing crab farmers in Tamil Nadu. The crab species *Scylla tranquebarica* was cultured for about 9 months a year. The culture was being done over 101 ha consisting of 25 ponds of varying sizes (0.1 to 1.0 ha each), each with a depth of 1-2 m. These ponds were frontier ponds, where seawater was passed through one pond after another and finally reached the salt pans for salt production. Water crabs, i.e., those that had recently moulted, were purchased on a daily basis from Chennai and transported to Tuticorin by train and by road. Water crabs with size ranging from 50-750 g were stocked in each pond. The water crabs were purchased at Rs. 75 – 180 kg^{-1}. Trash fish was fed to these crabs at 10% of the body weight of the crabs. Crabs with an average weight of 800 g were collected from ponds by hand and sold live to the exporters. Crabs weighing below 500 g (medium) were sold at Rs. 300 kg^{-1}, crabs of 500 g at Rs. 400 kg^{-1} and crabs of 750 g–1 kg at Rs. 500 kg^{-1}**.** Mrs. Annai was a Jamsetji Tata National Virtual Academy (NVA) Fellowship awardee for the year 2007. She was awarded this fellowship by the MSSRF, nominated by CIBA for her expertise in crab farming. Thus, Mrs. Annai played a major role as a flag bearer of mud crab fattening by women in Tamil Nadu, and was a role model in the village and played a major part in community development.

1.3. Crab farmers (Crab fattening in Cages)

Mrs. Kayal played a major role in the diversification of aquaculture species by taking up crab fattening (in fibreglass cages) as an alternative livelihood for Self Help Group (SHG) members. Under the leadership of Mrs. Kayal, a Women's Self Help Group (WSHG) consisting of 15 members was engaged in mud crab fattening in fibreglass cages in Kancheepuram District. Mrs. Kayal's leadership qualities and drive had led to the success of adopting this venture among the groups**.** Fibreglass cages with 6 and 9 compartments were used for crab fattening. Each

compartment was stocked with 1 crab weighing 500-700 g. The four sides of each cage were well perforated for free circulation of water. Trash fish collected from the fisheries landing centres was fed at a rate of 10% of the biomass of the crab. Feeding was done twice a day. Algal and barnacle fouling on the carapaces of the crabs were brushed off. Harvesting of fattened crabs was carried out by hand picking and scoop nets. Hardened crabs were packed in bamboo baskets and marketed live. The water crabs weighing 500–1000 g were purchased at Rs. 150–180 kg^{-1} and hardened crabs weighing 500–1,000 g and above sold at Rs. 300-450 kg^{-1}. Water crabs were purchased from export companies at Chennai.

1.4. Crab farmers (Crab fattening in pens)

Mrs. Sumathi lived in Tiruvallur District, Tamil Nadu. She was a crab farmer fattening crabs in pens. Mrs. Sumathi was the leader of a WSHG. There were 12 members in Mrs. Sumathi's group and they were actively involved in crab fattening in pens in the village. Each day she and her group members walked more than 4 km to reach their work spot. In spite of walking such a long distance every day, Mrs. Sumathi motivated them to keep going. Mrs. Sumathi worked hard to diversify livelihoods among her co-members by making them understand that they need not solely depend on the income earned by their husbands. Crab fattening was carried out by Mrs. Sumathi and her group in small, fenced pens ranging from 100 to 200 m^2 in size and water depth of 1.5 m. The water crabs ranged in size from 350- 1500 g and were stocked at 1-3m^{-3}. Crab fattening took about 3 to 4 weeks. Crabs were fed with bivalve meat or trash fish daily at the rate of 5 to 10% of the body weight. Harvesting was done using scoop nets and ring nets with baits. The harvested crabs were sold at the local and city markets. The WSHG had substantial savings in the local commercial bank. This bank had provided the group with a loan of Rs. 60,000 for crab fattening activities. In 2010, Mrs. Sumathi was one of the Jamsetji Tata National Virtual Academy (NVA) Fellowship awardees. She was awarded this fellowship by the MSSRF, nominated by CIBA for her expertise in crab fattening in pens. Mrs. Sumathi and her group's experience suggested that the WSHG concept could be a tool to improve the living standards not only of women members but of their community.

1.5. Crab farmers (Crab fattening in concrete tanks)

Mrs. Mariammal, aged 54 years, headed a WSHG at Cuddalore, Tamil Nadu. There were 20 members in the group practising crab fattening in concrete tanks. Mrs. Mariammal and her group had 3 years of experience in this practice. Mrs. Mariammal's group was the only one engaged in this enterprise. She displayed self–confidence, leadership qualities and drive and these had benefited her family and her group members through additional income. The group under the leadership of Mrs. Mariammal was also able to save and was granted a loan from the Indian Bank. The profit gained from this enterprise was used to repay the loan and the remaining amount was shared among the group members. Ten concrete cement tanks were constructed for crab fattening. These tanks were erected on the banks of a brackishwater canal to facilitate water exchange. A concrete tank of 2.5 m x 2 m x 1.5 m was used for stocking water crabs. Sixty six water crabs weighing 23 kg and of size

300–400 g per piece were stocked at 6 $tank^{-1}$. The total height of the tank was 1.5 m and the water level 1 m. Water was exchanged daily. The culture period was 45 days. Trash fish at 10% of the body weight of the crab was given as feed. Feeding was done twice a day. Mrs. Mariammal promoted to her group that this enterprise could help provide them with livelihood income.

1.6. Shrimp farmer

Mrs. Akila, Nagapatinam District, had been engaged in tiger shrimp (*Penaeus monodon*) and sea bass (*Lates calcarifer)* farming since 1994. She was 38 years old and had a B. Sc (Home Science). She also worked as a consultant for other shrimp farms located in Nagapatinam and helped her husband, who was a consultant for fish feed exporters. Her own self interest and the motivation given by family members encouraged her to take up brackishwater shrimp farming seriously. The farm had fifteen men and three women workers. The women's work on the farm included scraping out old pond bottom sediments, pond preparation, weeding and hand picking. Thus, Mrs.Akila was a pioneer in generating local employment and income. She bought shrimp seed for 25–35 paisa PL^{-1}. Six lakh (1 lakh = 100,000) seeds were stocked in her farm i.e. 100,000 ha^{-1}. For 6 ha, 3 tonnes of shrimp were harvested and, therefore, the total harvest·$year^{-1}$ was 6 tonnes. The harvested shrimp were sold at Rs. 260 kg^{-1} (30 counts) to seafood companies in the cities. She was also a role model for shrimp farmers by encouraging quality production to achieve good returns.

1.7. Ornamental fish farmer

Ornamental fish culture was being practised by 5 WSHGs of Irrular tribal women in Kancheepuram District. Mrs. Latha was an ornamental fish farmer and also a leader of a WSHG. Traditionally, Mrs. Latha and her group members were engaged in catching snakes and rats but with urbanisation this was no longer viable and was also of low social status. She has worked hard to diversify livelihoods among her group members by making them understand that they need not depend solely on the income earned by their husbands. Each day she and her group members worked hard and had established an ornamental fish culture unit at Kancheepuram District. She and her group devoted most of their time to managing this unit. Six varieties of ornamental fish were being cultured. The fish were measured as "M" size, "S" size or "SM" (small medium, a size in-between medium and small) size. The breeding time for a crop was 15 days and 200 fish were stocked per tank. The price at which these fish were sold ranged from 70 ps. to Rs. 300/-. Fish traders from different places around Chennai come to purchase these fish. The WSHG had also received a bank loan of Rs. 200,000 from a self-employment scheme. This group was successful. They had good savings in a local commercial bank and the bank had also provided many loans to this group because of their prompt re-payments. They had also received two awards from the State Government for being a very successful WSHG.

2.0 Input Suppliers

2.1. Clam collector (Live feed processor)

Mrs. Kamatchi of Kancheepuram District, Tamil Nadu, was a clam (*Meritrix* spp) collector and a clam marketing agent. She supplied clams to five-star hotels and hatcheries in Kancheepuram, and as a feed for crabs and shrimps. Mrs. Kamatchi was a woman of great mettle for field work. She rode motor cycles and traveled 60 km$\cdot$ day^{-1} to supply clam meat to hotels and hatcheries. She gave employment to more than 100 women in the village through the clam meat enterprise. She was conscientious and prompt in her service of supplying clams to hotels and hatcheries. She played a vital role in community development and capacity building of rural coastal women. The steps involved in clam collection were, first, collection of clams; second, meat separation from clam shells; and, third, drying clam shells. The women only collected clams after they had received an order from a hatchery or hotel. The women's work started at 6 am and ended at 3 pm. The WSHG members helped Mrs. Kamatchi in collecting clams. The group members wore very light clothing and did not consume food when they went clam collecting in the brackish water canals or rivers. They changed their areas for collecting clams when they realised that the availability of clams was falling. After some time, they would return to the original area. By this means they helped in the growth of clams. Mrs. Kamatchi and her group members would search in rows in the brackish water canals or rivers, swimming, although only in shallow depths. They knew from experience where to find the clams. They ate when they returned to shore, and sometimes not even then because of nausea from swallowing brackishwater from the canal or river. When collecting clams, they were immersed in water or wet for more than 6-7 hr day^{-1} because they tended to keep collecting until they had sufficient clams. They often hurt their feet and palms on sharp mussel shells in the water. Mrs. Kamatchi was a Jamsetji Tata National Virtual Academy (NVA) Fellowship awardee for 2007. She was awarded this fellowship by the MSSRF and CIBA, Chennai for her expertise in clam collection and processing. She was a role model to other women in clam collecting.

2.2. Fish meal processor

Mrs. Latha was educated to primary school level. She and her group lived in a fishing village in Tiruvallur District, Tamil Nadu. They were fish meal processors. She had expertise in fish meal production. Mrs. Latha and her group supplied fishmeal to ornamental fish growers at Kolathur, Redhills, Oothukottai and to fish traders in and around Chennai city. She was a leader of a WSHG of 18 women who produced fish meal. She displayed good leadership qualities, a dynamic personality, self confidence and perseverance and had good knowledge of fish feed preparation. She built the capacity of the rural women by providing employment opportunities in her feed meal production unit. Fish meal production involved trash fish drying, storing, powdering, sieving, drying and packaging. The fish meal was tested at CIBA and its quality certified. The fish meal was produced with the savings money of the group and the profit was shared among the group members. Mrs.Latha acted as a role model in the village. In 2007, Mrs. Latha was awarded a Jamsetji Tata

National Virtual Academy (NVA) Fellowship by the MSSRF and CIBA for her expertise in fish feed processing.

2.3. Aquaculture accessories business manager

Mrs. Sai was the Managing Director of an Aquatech Company in Chennai. She had a post-bachelor degree qualification. She was also working as a part time manager of another Aquatech Company in Chennai that supplied inputs such as feed and aquamedicines. Mrs. Sai had emerged as a successful woman in the field of aquaculture accessories business management. She had 10 years experience in this business**.** She was supported by her family and friends in managing this business. Mrs. Sai supplied products such as shrimp feeds, medicines, probiotics, chemicals and farm implements (net, aerators, tubes, air stones, air valves, filter cloth, bags, lead weight and tube rolls) for shrimp and crab farms and hatcheries in Tamil Nadu, Andhra Pradesh, Kerala and Karnataka in India. She started as a full time manager of a company that supplied aquaproducts. While keeping her position as a part time manager of a company, she was able to start a company of her own. She had been innovative in recognising a niche area for self employment in aquaculture.

3.0 Marketing and Export

3.1. Shrimp processors (Small-scale cottage industry)

Mrs. Sony was the leader of a WSHG in a fishing village in Chennai, Tamil Nadu. In this SHG, 25 coastal women members were engaged in processing white shrimps (*Fenneropenaeus indicus)*. Mrs. Sony and her group members had 2-7 years of experience in this venture. White shrimps were used as an ingredient for making live feed for the brooders and shrimp seeds stocked in the hatcheries. Mrs Sony and her group members purchased white shrimps from the coastal areas of Tiruvallur District. The WSHG led by Mrs. Sony was involved in the following processing steps: collection of white shrimps from local villages, weighing shrimps, processing and ice packing. The ice packed shrimps were supplied to hatcheries. The raw white shrimps purchased for processing were first weighed and then divided into different quantities by Mrs. Sony. She then distributed the divided portions to the members in her WSHG for processing. One kg of shrimp were peeled either individually or as a group. The processed shrimps were then returned to Mrs. Sony. Each member was paid a wage for the shrimps she processed. Every day, 25-40 kg of white shrimp were processed and sent to market agents and hatcheries. Raw white shrimp were bought Rs. 80 kg^{-1} and the processed shrimps were sold at Rs. 160 kg^{-1}. The processed white shrimp were supplied to hatcheries at Kancheepuram District. This venture was her traditional occupation. She also ensured that the members of the SHG found alternative occupations during the off-season to ensure that the group members remained faithful and loyal to her. In this way, Mrs Sony displayed leadership qualities by keeping her group happy both economically and socially.

3.2. Shrimp processing plant technicians

Mrs. Lakshimi and Mrs. Rani were pioneer technicians leading a group of women wage labourers at a marine products company in Mandapam, Tamil Nadu. They were educated to primary school level. They possessed 10-12 years of experience. This experience had helped them gain good knowledge in processing, packing, maintaining official records of the workers and market techniques. Their duty began with collecting raw fish stocks from the marketing department in the company, taking attendance records of the women wage earners, deciding the day's work for the workers and the distribution of raw materials for processing by the labourers. One hundred and fifty women wage earners who worked in this processing plant were supervised by the two women. They also allotted labour for each processing activity and decided the quantity to be processed. Although they had minimal formal education, their leadership qualities and good management techniques led to the growth of this company and helped the women workers. The wage earners became loyal and hard working. The operations in the processing plant included de-heading, peeling, removal of alimentary canal, back scraping, final checking and packing.

3.3. Crab exporter

Mrs. Selvi was a partner in a sea food export company at Chennai. She had 5-6 years experience in crab export. She was educated to primary school level. Despite having only primary education, she used her knowledge, intimacy with the staff in the company and with the other crab export traders to learn business techniques and to keep track of daily market rates through the Internet. She was innovative and self confident and her keen interest helped her to thrive in this business. She purchased both water and hardened crabs from Orissa, Andhra Pradhesh, Tamil Nadu, Karnataka, Kerala, Maharashtra and Andaman. With the support of her husband, Mrs. Selvi had become knowledgeable in crab marketing. Her interest in this business gave her an opportunity to become a partner of the company. She was capable of managing company staff and could run the business even in the absence of her husband. Daily, her company exported 1-2 tonnes of 600 g crabs to different destinations. The company traded in crabs of 500–800 g size. Fattened crabs were sold to domestic markets in Mumbai and New Delhi and to international markets such as Singapore, Taiwan and Bangkok.

Discussion

Women involved in production were mainly working in hatcheries or on farms or growing short term crops, e.g., crab fattening, that involved less capital. The exceptions were: (i) the shrimp farmer whose education level and work on an activity started by her husband had helped her to succeed in a field dominated by men; and (ii) the crab farmer (crab farming in ponds). From the small data set of these case studies, education and family businesses appeared to give women an added advantage. The successful women needed strong entrepreneurship and support from their families to succeed in the complex processes involved in the longer production cycle businesses.

The first input supplier case study showed how traditional clam collecting had changed into a promising livelihood supplying hatcheries to meet a niche requirement. The second case study involved more complex fish food processing and showed it could be managed by women themselves. The institutional structure of WSHGs and the technical support provided by a research institute had helped women succeed. In the third case study, as for some of the production examples, educational background and family support played roles. Among the three case studies of women involved in marketing and export, the first one involved processing. Again, the presence of the institutional structure of the WSHG had helped in translating what is normally a large scale business activity into small scale cottage industry operations, even though the education level of the women was low. As observed in the production sector, the women employed as workers in shrimp processing plants were educated only up to primary level. In the third case, the business was started by the woman's husband and though she did not have a high education level she managed the export company with the encouragement of her husband, including during his absence seeking more business.

Conclusion

Analysis of the case studies demonstrated that women can take part in different parts of the aquaculture value chain, especially if it involves a traditional activity they have been carrying out. The presence of organisational structures such as WSGHs helped to galvanise women to take up more complex activities. Women with low formal education levels also played a role as workers. However, women with higher education or with family business connections exhibited high entrepreneurship skills, usually with family support, and could manage complex aquaculture activities. Thus, depending on the circumstances of the women, their families and the industry segment, women can work successfully in many levels of aquaculture. The challenge is to create more opportunities by constructing an environment conducive to their participation and benefit.

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Gender Roles in Development of Small-Scale Shrimp Farming and Recent Challenges in the Coastal Region of Bangladesh

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Abstract

In coastal areas of Bangladesh, small-scale shrimp farming is important because of its potential to generate employment and income. Export earnings from the shrimp sector constitute the second largest source of foreign exchange earnings, contributing about US$487 million in 2009/10. However, recent challenges in the shrimp sector include its inability to respond quickly to evolving market demands such as food quality standards stipulated by importing countries. A post-project evaluation of the United Nations Industrial Development Organization (UNIDO)-implemented Bangladesh Quality Support Program (BQSP) was conducted to strengthen the capacity of the Department of Fisheries (DOF) in Good Aquaculture Practice (GAP) as well as to introduce inspection methods for shrimp and seafood products in line with international market demands. Observations made from this exercise suggest that involving female farmers and farming couples is a useful entry point to develop the fisheries sector and overcome many challenges. This paper presents the results of gender-focused training for female farmers and farming couples in GAP held in three coastal districts of south-western Bangladesh. It also sheds light on factors affecting the success of gender-focused GAP training in a conservative society.

Introduction

In Bangladesh today, more women participate in economic activities than ever before. Apart from domestic chores, Bangladeshi women work in offices, commerce and agriculture including fish and shrimp farming. As a result of urbanisation, the evolution of the ready-made garment (RMG) sector and development of other rural non-farm activities, the labour force in the broad agriculture sector fell from 59.7 % in 2003-04 to 48.1 % in 2005-06. At the same time, while the agriculture sector in Bangladesh was downsizing its personnel, the aquaculture sector was absorbing more people than ever before. One consequence of all these shifts was the higher proportion of women in

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the active labour force. Female workers now constitute one fourth of all those employed (BBS, 2009).

Unlike the agricultural sector where women tend to be more visible, women in aquaculture are not very conspicuous. Globally, at least half of the population involved in small-scale fisheries and aquaculture may be women, including those actively engaged in fish processing, distribution and marketing (FAO, 2009). The lack of statistics on women in aquaculture and fisheries was pointed out by Meryl Williams at the Ninth Asian Fisheries and Aquaculture Forum in April 2011. She remarked that women constitute 24 percent of the workers in aquaculture in India, 33 percent in China and 80 percent in Vietnam (Williams, 2011). However for Bangladesh, no known survey of women involved in aquaculture has been undertaken, although the role of women is significant from a gender development point of view. In shrimp production, women and children from poor and middle income families play a significant role in several steps. The utilisation of household labour is very important for small and marginal farmers as it reduces labour costs and helps maximise profits.

Unlike the traditional agriculture and livestock sector in Bangladesh where women play a significant role, actively involving women directly in aquaculture is still a work in progress. In the case of shrimp farming, the Department of Fisheries (DOF) estimated that in 2010 there were over 200,000 farms covering approximately 0.2 million ha in coastal districts of Bangladesh. Wherever small-scale shrimp farming is conducted, women are engaged in a wide array of tasks. They repair dykes and plant crops on them, clean ponds, select and buy larvae for stocking, acclimatize and release the fry, collect feed and disperse it, monitor growth and guard small-scale shrimp ponds located near their homes. As they participate more in fish farming activities, women have a greater sense of ownership. Women also participate further along the shrimp-value chain in post-harvest shrimp processing activities that employ more than 30,000 women. However, the seasonality of shrimp farming tasks makes the livelihoods of women in this industry quite precarious. Vulnerable women fight against poverty constantly since they are often deprived of a fair wage and other labour rights. As Kamaluddin pointed out, over 68 % of the households in Bangladesh do not own their land (Kamaluddin, 2002). Small-scale aquaculture communities tend to be poor and vulnerable due to this landlessness.

Though not well accounted for, the involvement of women in the shrimp farming industry is changing. In the past, the roles of women in shrimp farming meant supplying labour for dyke construction and repair, clearing weeds out of ponds and, in some cases, serving as a maid cooking in a farm shed for permanent workers/guards. However, these tasks were often marred by incidents of abuse, torture and discrimination against women working at shrimp farms in remote locations (BCAS, 2001). Women's traditional roles changed when they became involved in small-scale shrimp production and earned independent incomes. The supplemental earning enabled them to meet some of their families' immediate practical needs (Halim, S. et al. 2001).

The change in women's roles was largely consequent on land use changes. A new land tenure system adopted by the farming community during the late 1990s led to fragmentation of large-scale farms into smaller ones. Simultaneously this allowed easier access of women and children to productive economic activities such as fish farming. Small-holdings enabled freer access for local land holders to develop small-scale farms for Golda shrimp (*Macrobrachium rosenbergii*) and Bagda (black tiger shrimp, *Penaeus monodon)* aquaculture (Nuruzzaman et al. 2001). In 2010, a DOF survey indicated that the farm sizes of over 65 % of farms in Khulna district were reduced to 0.01-0.5 ha for Golda shrimp; and over 30 % of farms in Bagerhat district also were split up. By 2009 over 68 % of the Bagerhat farms were from 0.01 to 1.0 ha. In both cases the small-scale farms were owned by individual households. This comprehensive agrarian restructuring of the coastal districts allowed for the construction of new dykes and digging of canals for fish-shrimp refuse, while keeping a portion of the land free from flooding and tidal inundation for rice. Farmers benefitted from their land by producing rice, shrimp, finfish and dyke crops such as fruit and vegetables. Small-scale integrated farms that produce both crops and fish have proven to be resilient to sudden shocks and crises. These farms make a significant contribution to food security, poverty alleviation and natural resource management in Bangladesh.

Recent challenges and interventions in shrimp farming

Starting from the mid-1970s, the export of shrimp and frozen foods from Bangladesh rose steadily; it peaked in 1995 with a value of over US$322 million. The increase in exports was partly due to the three-fold expansion of the shrimp farming area, from about 40,000 ha in 1975 to 146,000 ha in 1995. However, since then, both production and exports dropped sharply for several consecutive years, and only in 2000 started to rise again. Analysts pegged these fluctuations to the global economic recession. Simultaneously, the European Union (EU) and the United States of America Food and Drug Administration (USFDA) imposed stringent new market standards on food safety and product quality for shrimp and frozen foods exported from Bangladesh. As a consequence, some shrimp consignments were rejected due to the presence of banned antibiotics and other contaminants deemed hazardous to human health. In the wake of the rejection of over 50 shrimp consignments in 2009, Bangladesh banned the export of fresh water shrimp to the EU market for six months. This incident adversely affected the image of Bangladesh in the international export market and resulted in a serious economic setback for those concerned.

In order to regulate the export commodities including shrimp and frozen foods and to mitigate the shortcomings and inadequacies of the export sector, Bangladesh made several interventions to improve the quality of its fisheries produce. An improved laboratory testing system to create traceability of hazardous substances was strictly implemented.

The EU, as the most important development partner and largest importer of frozen foods from Bangladesh, has been associated with the institutional development of the fisheries sector. One priority is to promote and diversity its exports. The EU is helping to increase the quality, efficiency and productivity of Bangladesh's fisheries sector. To this end, the EU is providing technical assistance in the areas of better compliance with international standards, quality control and capacity strengthening in order to compete in the world market. These interventions are meant to achieve stable economic development, as well as alleviate poverty.

From 2006 to 2010, a number of training and awareness programmes on Hazard Analysis and Critical Control Points (HACCP) and Good Aquaculture Practice (GAP) under the EU-funded and UNIDO-implemented Bangladesh Quality Support Program (BQSP) were conducted in three coastal districts. Over 15,000 stakeholders participated. However, in most cases only male farmers attended. If a few women were present, it was assumed they were intentionally invited for only cosmetic purposes to impress the organizers. Unfortunately, women who are actually engaged in aquaculture were not given the chance to upgrade their knowledge and skills.

Gender-focused interventions

During field investigations by the Women in Development (WID) component of the BQSP, it was learned that women were keen to participate in training, but they required *in situ* demonstrations rather than classroom lectures such as those usually held at the district and/or Upazila headquarters. Indeed, during focus group discussions (FGD), farming women expressed their belief that they were just as capable as men in maximizing profits and reducing losses in shrimp farming. They insisted they could face the challenges of food safety and product quality if provided with additional skills and knowledge. The organizers realized that training women could be a useful entry point to mitigate some of the challenges facing the shrimp industry in Bangladesh. In turn, this could help reduce poverty and encourage socio-economic development for the poor and marginal farm households. They perceived that training could motivate rural women to utilize untapped household labour in productive ways. Consequently, a training manual entitled 'Women in Small-scale Golda Shrimp Farming' was prepared by the WID component. With the help of seven experienced extension specialists from the DOF and an international gender consultant, the manual was developed during a week-long course formulation workshop. It was written in concise, short sentences. The rigorous exercise engaged an artist to design the layout of the manual. It is envisioned that this manual will be upgraded through subsequent pilot workshops.

Materials and Methods

Two groups of gender-focused GAP training

Field investigations and research findings revealed that contamination of shrimp and deterioration of product quality started on the farm through improper feeding practices, exposure to hazardous habitats and faulty post-harvest handling. The involvement of women in feed preparation and feeding allows room to ensure food safety and better compliance with international hygienic standards. Through hands-on, practical demonstrations and extension programmes, the BQSP trained small groups at the village level in five pilot Upazilas (Tables 1 and 2). The DOF invited farming couples and female farmers to participate, *in situ,* in practical aspects of small-scale shrimp farming including food safety and quality control. Ample use of the gender-focused training manual was made with a view to improving it for future courses.

Table 1. List of farming couple groups undertaking Good Aquaculture Practice (GAP) Training.

District	Upazila	Village	# Groups	# Participants
Khulna	Phultola	Putiabandha	3	66
		Piprail	1	20
		Daokona	1	21
		Chatiani	1	21
		Jamira	1	21
		Dhopakhola	1	21
		Damodor	1	20
		Garakhola	3	77
		Baniapukur	1	24
		Choyghoria	1	27
	Dumuria	Rajibpur	1	24
		Ghonaborodanga	1	30
		Komolpur	1	28
		Hasankhali	1	30
	Batiaghata	Char Shailmari	1	28
		Hogladanga	1	30
Jessore	Avoynagar	Payra	1	30
Total		**17 Villages**	**21**	**518**

Table 2. List of female farmer groups undertaking Good Aquaculture Practice (GAP) Training.

District	Upazila	Village	# Groups	# Participants
Bagerhat	Rampal	Vorshapur	2	51
		Dholdaha	1	21
		Gobindapur	1	21
		Maniknagar	2	46
		Ronshen	2	47
		Mollikerber	1	21
		Madardia	1	26
		Boro Shonnasi	1	25
		Ujalkur	2	55
		Shibnagar	1	30
		Sunatunia	2	42
		Kodomdi	2	48
		Bamondohor	2	50
		Hogoldanga	1	21
		Boronobabpur	1	23
		Ramdevpur	1	27
	Avoynagar	Damukhali	1	31
Total		**17 Villages**	**24**	**585**

Evaluation

In March 2010, a post-project evaluation assessed the effectiveness of the local demonstrations (BQSP, 2010). It considered the knowledge, skills and attitudinal changes that took place among the participants and evaluated the immediate benefits accrued by the trainees in terms of higher production and profit in comparison with their pre-training situation.

Assisted by an international gender consultant, the DOF Extension Officers chose four village groups randomly: two villages in Bagerhat district and two in Khulna district. To ascertain the effectiveness of the technical assistance, the evaluators employed structured questionnaires, held focus group discussions, conducted personal interviews and visited a few farms. The team met 46 female farmers in Bagerhat district and 50 wives in Khulna district to discuss different technical aspects of small-scale shrimp farming.

Results and Discussion

The overall majority of women and men who had received training in shrimp production informed the team that their profit increased after taking the course. The Golda shrimp farmers experienced reduced mortality of larvae and believed this was due to the correct bottom-cleaning procedures. Also, appropriate feeding methods made a difference. The post-project evaluation likewise revealed better compliance with GAP.

'Women Only' Training. Assessment of the impacts of the training was based on three trainee groups of women comprising 30 farmers in each group in two villages in Bagerhat district. Two 'women only' groups had two training courses. The third group had only one training session. One of the groups had two courses, both held during the harvest season. Thirty-three women out of 90 reported increased profits after taking the courses; three women remarked that the profits were less than before; and one woman said it was the same as previously. Nine women were 'newcomers' who had just become interested in Golda shrimp farming, partly due to the training. Forty-six women did not report on changes in productivity, most likely because they did not have the baseline data to make an assessment. In some cases, women reported that after the training they assumed sole responsibility for one pond if their family had more than one. Some women claimed they made a higher profit than their husbands did.

Another positive result of the training revealed in the personal interviews was that 72% (33 out of 46) of the shrimp farmers began keeping records of their expenses and income. In most cases it was the woman who maintained the books after taking a 'women only' course, while the man did the book keeping after the 'farming couple' course. Another outcome was that husbands started to listen to their wives more and showed them greater respect after the course. As a consequence they were given more responsible jobs. Husbands began to appreciate how their wives could contribute to the economy of the family. During the 'women only' course in Bagerhat district, it was noted that five husbands of the trainee-wives were listening very carefully in the back of the room. Therefore, it was assumed that they also benefitted from the course materials. Thirty-two trainees remembered the major topics discussed, 60% took written notes, 21 women reported that they read the training material often after the training while 10 of them shared the course material with other family members including son, daughter, brother, father, father-in-law and niece. When asked, the wives observed that their husbands had approved that they receive training in Golda shrimp farming and were prepared to listen to their advice afterwards.

'Farming Couple' Training. The findings were based on interviewing three trainee groups of couples in Phultola Upazila. Comparing pre-training and post-training profits, 21 couples reported an increase after taking the course. Five couples claimed their income was less than before; and one couple said there was no difference at all. Six couples had only begun Golda shrimp production after taking the course so they could not judge its impact. None of the couples interviewed received more than one training session. After the 'farming couples' course, both husbands and wives remarked

that they shared the responsibilities to a greater extent than before. The husbands realized that women's routine work, such as preparing the feed and distributing it, was as important as the tasks men did.

Personal interviews revealed that the majority (86%) of trained couples remembered major topics discussed, 40% of husband noted major points, 65% of couples started record keeping and 40% could show materials given during training. Talking to the wives separately revealed that husbands tended to dominate in discussion and practical training. The evaluation found less change in the knowledge, skills and attitudes (KSA) among the wives.

During the evaluation the DOF Master Trainer arranged practical exercises for 'farming couples' *in situ* along the banks of a small-scale shrimp farm. At the beginning when the trainees' participation was limited, there was little benefit. However, the course improved substantially with additional demonstrations and visual displays of various ingredients used in shrimp farming. The participants were involved in demonstrations on how to check that the fertilizer is of good standard, how to acclimatize the larvae before putting them in the pond, checking the health of the larvae, how to handle them and which feed to use. The training manual now functions as an integral tool during such 'hands-on' sessions.

The DOF trainers who were involved in preparing the shrimp farming manual have been transferred to other geographical locations, so there will be an additional spin-off effect. The good results of the pilot training sessions need to be conveyed to other Upazilas. The manual outlines all important issues pertinent to small-scale shrimp farming and is a basic tool describing the steps to be used by both trainers and farmers. When the revised manual is printed it is recommend that additional DOF shrimp farming trainers be instructed on how to use it successfully.

After evaluating the effectiveness of the courses, an overall assessment was made. The overall assessment concluded that the main issues applicable to Golda shrimp farming had been learned well and were retained by the trainees a year after the course. This was the first time in Bangladesh that female farmers/farmer couples had been trained *in situ* on gender focused training on Golda aquaculture. Given that Golda is a high value crop, many farmers were keen to take the opportunity to access the training to help improve their profits.

Seven groups of women had received two training courses; eleven groups of women received only one training session, while the twenty-one groups of 'farming couples' each received more than one training session. Initially, DOF had recommended that shrimp farming husbands and wives should be trained separately.

During candid interviews with trainees, it was revealed that a few participants were not farmers at all but had taken the opportunity to join and were accepted on the courses. Although the problem of non-farmers attending training sessions has decreased, due attention still needs to be paid to the qualifications of attendees as the courses are expensive and useful training opportunities for

genuine shrimp farmers are lost when non-farmers sit in for the sake of free meals and training materials.

The most efficient courses were those where sessions had been carried out twice, once during the preparation for shrimp farming and the other during the harvesting season. This did lead to some groups being trained twice during the same season on the same subjects and this should be avoided in future by keeping a ledger of who has been trained when. Likewise, a forward planning schedule should be prepared indicating who will be trained when (BQSP, 2010).

Conclusion

The objectives of assisting women involved in small-scale shrimp farming in Bangladesh were to enhance their technical capabilities and to increase their incomes from aquaculture. In addition, the women's positions in their households were strengthened due to the fact that their efforts helped generate their families' profits. Female shrimp farmers of the selected groups within the three pilot Upazillas were trained in effective shrimp farming methods. The activities involved DOF extension officers in preparing the manual, training of separate groups of shrimp 'farming couples' and 'female only' farmers.

'Women only' training courses had the disadvantage that if the husbands were not trained in shrimp farming techniques, the wives sometimes had difficulty in convincing their husbands about changing the method of farming shrimps according to the new information acquired. 'Farming couples' training courses had the drawback that the husbands tended to dominate the discussions and their wives were reluctant to come forward, especially during hands-on exercises. In addition, women did not take notes as this was done by their spouses. These indicators of social behaviour reflect a conservative society, one aspect of which is the limited literacy and accountancy skills of Bangladeshi women.

When the trainees assessed the courses, they suggested it was preferable to train both the husband and wife within each family, but separately in order to ensure that both genders achieve as much as possible from the experience. Most wives emphasised that they preferred 'women only' courses and their husbands agreed that separate courses would be more effective to transfer technical aspects of shrimp farming. Both the trained women and farming couples are passing on their new information to other shrimp farmers in their respective communities. Several of the women are now actively helping their neighbours with technical aspects of aquaculture. Such women in aquaculture are more 'visible' than ever before. UNIDO intends to continue its support to Bangladesh under its Better Work and Standards Program (BEST) - Better Fisheries Quality (BFQ) Component with EU assistance.

Gender-focused training course on small-scale shrimp farming could be useful to do in every Upazila. The manual should be used on a larger scale in Bangladesh and should initiate a process where comments and approval from a higher level is achieved and followed-up by training-of-trainers (ToT) programmes on how to use the manual. It should be translated into English so it can be posted on the web in order to solicit comments and suggestions from a wider group. The training manual could have instructions to the trainer and suggestions for practical exercises with the active involvement of the trainees.

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Appendix: A Case study

I am Shoma Mondol (25). My husband Gobinda Modol (35) and I live in a village called Putia Bandha under Phultola Upazila in Khulna district. We have two small-scale Golda shrimp farms with a total area of 2.5 *ha* where we culture shrimp from April to November and grow rice from December to March. We also grow crops on the dykes, such as fruit and vegetables, which give us some additional income. One farm is located 1.5 km from my house and the other is close to home. Shrimp and rice farming is rain-fed, but we have been incurring losses from both types of farming. We get a low price for the shrimp. People say our shrimp exports face problems in the foreign market and may be banned by importing countries.

In March 2008, my husband and I attended a training course held on the bank of my shrimp farm near my house. The local Fisheries Extension Officer selected us as a shrimp 'farming couple' on behalf of a donor-supported project working for gender-focused extension of Good Aquaculture Practice (GAP) to make Golda shrimp farming profitable and to correct quality problems in shrimp reared in Bangladesh.

Being selected for the shrimp 'farming couple' group, we received three types of training held *in situ* up to December 2010. The first was on pond preparation and pre-stocking activities, the second on post-stocking feed and water management, and the third was an evaluation of the two previous demonstrations plus tips on harvesting shrimp and post-harvest handling methods. We received printed hand-outs, a notebook, pen and a project folder during the training.

The *in situ* training at the farm gate allowed us to learn about the basic causes of low production. We learned the steps of better practices through participatory discussions and the practical demonstration of important aspects of shrimp farming. Now, I keep all the records, especially expenditures and sales for both ponds. I do most of the feeding; I monitor the shrimp growth regularly and call a Fisheries Extension Officer through a mobile phone for trouble-shooting.

Last year (2010) we earned BDT 55,000 from Golda shrimp farming and managed to grow 60 mon (1 mon = 40 kg) of paddy. This is enough to feed our family of five. Since participating in the 'farming couple' training courses, my husband has begun to respect me for my practical contribution to our shrimp farming activities on top of my regular household chores as a rural housewife. Now I feel better and share my knowledge with our neighbours so they can contribute to shrimp farming in a better way. I believe that women can influence men to change society for the better if they receive good knowledge, gain skills and are involved in the process of development.

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Enhancing Rural Women's Participation in Fisheries: Post-Harvest Livelihoods, Ilocos Region, Philippines

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Abstract

In Region 1, Northwestern Luzon, Philippines, the aquaculture subsector contributes about 68% of the total fish production. Milkfish (*Chanos chanos*) comprises 87% of aquaculture production. Women have received little attention in fisheries and aquaculture development. In 2004, to improve the livelihoods of women and to enhance the contributions of this major aquaculture industry in Region 1, the Philippine Bureau of Fisheries and Aquatic Resources (BFAR) in collaboration with the Local Government Units (LGUs), trained women's groups to develop skills, add value to the excess produce and create jobs and increase incomes. The BFAR Gender and Development (GAD) Project assisted nine Rural Improvement Clubs (RICs). Women were trained to debone and smoke milkfish deboning, GAD orientation, fish value-adding, packaging and labeling, simple book-keeping and financial management including leadership management for some of the officers and field tours (*lakbay-aral*). Equipment and materials were granted to facilitate implementation, improvement and expansion of their fish deboning and smoking activities. This paper reports on how the RICs developed and coped with their different circumstances as the project matured after its inception in 2004. It concludes with suggestions on what is needed to sustain and improve these women-centered activities.

Introduction

In the Philippines, women form a large part of the agricultural workforce and are involved in the preparation, processing and marketing of agricultural commodities. Women constitute a substantial economic resource, yet their status in this sector is low. Generally, existing strategies for improving the situation of women tend to emphasize their roles as wives, mothers, child-rearers and home-makers (e.g. cooking, gathering fuel, fetching water, cleaning, and maintaining the family budget). Accumulating evidence shows that women also have broader roles in planning, implementing and evaluating as Filipino women increasingly take part in the labor force, including in the fisheries and aquaculture sectors, and in community organizations.

In spite of their involvement, women and young girls in the Philippines still often have very low incomes, including in the fisheries sector. Of the total workers formally employed in Philippine

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fisheries and aquaculture, women constituted only 6.3% in 2002 (BFAR, 2004). Whereas men are primarily involved in catching fish, women are engaged in pre- and post-fishing activities. Women undertake 50-70% of local fish processing and marketing activities. They are also involved in mending nets and tending fishing equipment, and other activities (FAO 2005; Raquiza, 2005).

In view of the basic roles and responsibilities of women in fishing and aquaculture communities, special efforts should be made to provide for the needs of women workers and their families. In Region I (Northwestern Luzon), the aquaculture sub-sector contributes about 68% of the total fisheries production. Eighty-seven percent (87%) of the aquaculture production is milkfish (*Chanos chanos*), making a surplus of 48,235 tonnes. Of this surplus production, 43,000 tonnes are taken to the greater Metro Manila area and other neighboring regions such as Cordillera Administrative Region and Region II (Northeastern Luzon) while the remaining production is used by fish processing plants in Region I (BFAR-BAS 2006). Milkfish production is a resource for household consumption and for the business sector. Women in the fisheries sector, in collaboration with Local Government Units (LGUs), have responded to household and business demands for value-added fish products. Fish is a very perishable commodity and people handling it need knowledge and skills to prolong its shelf life and add value to capture higher prices in markets.

In accordance with the Philippine Fisheries Code of 1998 (RA, 8550), the Local Government Code of 1991 (RA 7160) and the Women in Development and Nation Building Act (RA 7192), the state is mandated to uphold the rights and privileges of fisherfolk with special attention to women for priority development assistance. With the assistance of the government through the Gender and Development (GAD) Project of the Bureau of Fisheries and Aquatic Resources (BFAR), nine Rural Improvement Clubs (RICs) participated in the Post-Harvest Livelihood Project. Equipment and materials were provided including capability building training on milkfish deboning and smoking, gender and development orientation, value-added products, field trips (*lakbay-aral)* for the members, packaging and labeling of products, simple book-keeping and financial management including leadership management for some of the officers to facilitate implementation, improvement and expansion of the projects. The present paper presents the significant roles of women and their contributions through this government intervention to the development of the fisheries industry through post-harvest livelihoods.

Objectives and Methods

The intervention aimed to develop skills of rural women of the Federated Rural Improvement Clubs (RIC) in Region I in fish processing essential for adding value to fish products that increase their chances of earning a modest income. Specifically, the intervention sought to develop women's skills in processing fish into deboned, smoked, and other value-added products such as *longaniza* (fish sausage), *embutido* (fish loaf) and *shanghai* (fish roll). The long term goal was to generate income and employment, enhance women's skills, entrepreneurship and business acumen.

The project is located in Region I in the northwestern part of the Philippines on Luzon Island. Region I includes four provinces. The project started with two recipient associations in each province. The implementation strategy began with planning by LGUs. Annual planning workshops were conducted in which programmes and projects were discussed, using BFAR approved project guidelines and requirements. Project recipients were then identified by the LGUs and the Provincial Fishery Officer (PFO). Each recipient who accepted the requirements then signed a Memorandum of Agreement (MOA) with relevant parties, such as the BFAR and the LGU. The MOA specified requirements and responsibilities for the recipient.

The RICs in the municipalities of Vintar and Batac in Ilocos Norte, Sto. Domingo and Sta. Cruz in Ilocos Sur, Sudipen, Paraoir and Rosario in La Union, and Calasiao and Labrador in Pangasinan were the recipients of the post-harvest livelihood projects.

Results and Discussion

The identified RICs were existing women's organizations sponsored by the Department of Agriculture. RICs were created to address the development needs of rural women. Each RIC has a large number of members engaged in various activities. Those active members who intended to be part of the fisheries livelihood component were initially chosen through criteria such as status and capacity of the organization for implementation and expansion. The project started in the latter part of 2004 and reached 241 housewife/homemaker members from eight RICs and one Fish Processing Association (Table 1). The RICs are managed by a set of officers headed by a President who facilitates project implementation. The post-harvest project was named the Fish Deboning and Smoking Project.

Table 1. Location, Name of Associations and Membership.

Location	Name of Associations	Membership
Ilocos Norte		
- Vintar	Bulbulala Homemaker Fish Processing, Inc.	23
- Batac	Federated RIC	30
Ilocos Sur		
- Sto. Domingo	Suksukit RIC, Sto. Domingo	20
- Sta. Cruz	Villa Garcia RIC	30
La Union		
- Sudipen	RIC of San Francisco Sur	30
- Balaoan	Paraoir RIC	30
- Rosario	Integrated RIC	33
Pangasinan		
- Labrador	Federated RIC	30
- Calasiao	Federated RIC	15
	TOTAL	**241**

MOAs were forged by BFAR with the relevant Provincial or Municipal Government Unit and the Project Recipients of the nine associations. BFAR provided capacity building on gender and development orientation, training in skills, and technical assistance and materials for the project operation. The technical materials included deboning kits, knives, freezers, smoking chambers, stoves, tables and chairs, chopping boards, basins, trays, and measuring equipment. The LGU provided continuous technical assistance, counterpart funds, and regular monitoring and coaching for its operation. The recipients attended the training sessions conducted by BFAR and LGU, and operated and expanded the project activities by increasing membership, capital build-up and fund sourcing. The project was officially turned over to the association six months after full endorsement by the BFAR and LGU evaluation team.

During the launching of the projects, a two-day training session was conducted by BFAR in collaboration with the LGUs. BFAR provided the deboning materials and 20 kilograms of milkfish, while the recipients and the LGUs shouldered the training expense. The initial training included gender and development orientation, values formation, Good Manufacturing Practices/Sanitation Standards Operating Procedures (GMP/SSOP) and fish deboning. To facilitate its operation, BFAR devised a reporting format to track the progress of the project. The report was submitted to the Regional Office on a specified date each month. Further assistance was provided to the RICs by BFAR based on the monthly reports and the action plan prepared by the association with assistance of the LGUs. Following the project acceptance, the Fish Deboning Project was expanded to include smoking activities and other value-added products using other marine and freshwater fish abundant in the locality. Some recipients purchased additional materials and equipment, such as freezers.

To strengthen the organization, BFAR facilitated leadership, management and organizational development courses, including simple book-keeping and financial management. The association members also participated in two field trips (*Lakbay arals*) conducted by BFAR to successful fish processing establishments such as Anjo Farms Incorporated in San Fabian, Pangasinan; Bagoong Processing Plant and other BFAR projects for additional learning experiences.

For the first two years, deboned and smoked milkfish and other marine fish, such as round scads, were the initial products produced by the associations. Milkfish was used as the main product because Region 1 is the primary producing area and has a surplus. Deboning was the first skill transferred because milkfish has numerous bones and spines integrated in the muscles. The bones are difficult to remove to create an acceptable product. Clients soon requested other fish-based products for their associations to sell. BFAR then began a succession of training courses on value-adding, focusing on products such as fish sausage (*longaniza*), fish roll (*shanghai*), fish "sisig", fish tapa, fish paste from bangus entrails, dried tilapia (*tilanggit*) and fish loaf (*embutido*). Of these, fish roll, fish paste and fish loaf were the most sought after products. With the start up materials from BFAR, the nine RICs projects became operational and produced the following quantities and income (Table 2).

Table 2. Production and Sales from the Processed Products of the Associations

Association	**Processed products (kgs)**			**Value (₱)**
	Deboned	Smoked	Value-added products	
Bulbulala Homemakers Fish Processing	575.5	155.5	28	P68,860.00
Batac Federated RIC	860	230	28	P162,200.00
Suksukit Sto. Domingo	4221	717	349	P652,319.00
Villa Garcia RIC	21	40		P9,470.00
San Francisco Sur RIC	769	460		P116,318.00
Paraoir RIC	630	30	900	P131,300.00
Integrated RIC of Rosario	40		40	P5,920.00
Federated RIC of Calasiao	528	61	10	P46,510.00
Labrador RIC	480	50		P46,240.00
TOTAL	**8,124.5**	**1,743.5**	**1,355**	**1,239,137.00**

Source: BFAR RFO 1 2008.

Agreements on manpower requirements, scheduling of operations, and product marketing strategies were made. Fish processing was normally carried out by members of the RICs. Some of the associations hired their members as laborers on a piece work basis, paid ₱5.00/deboning process. The Suksukit RIC had all its small number of members working. In other associations, members supplied their services without remuneration. In such cases, all the profit obtained was retained and rolled over for project expansion. Villa Garcia RIC in Ilocos Sur and Integrated RIC of Rosario, La Union had very low production (Table 2) because the associations were dependent on members' contributions and orders from buyers. The Integrated RIC of Rosario reorganized its association last year when the previous president did not pursue the project. The Labrador RIC was only established last year. Most of the other associations considerably expanded their production capacity as the project progressed. To expand operations, the RICs of Calasiao, Bulbulala and Suksukit requested financial assistance from their LGUs and from the Department of Social Work and Development's *Puhunang Pangkabuhayan* (Livelihood capital) programme, while other associations sourced their capital from their existing funds. The RICs of Bulbulala and Suksukit have permanent workplaces but the other associations only had temporary venues. Such temporary arrangements sometimes caused the loss of equipment and materials and significantly affected the quality of the processed products.

To sustain the source of raw materials, BFAR assisted the organizations by linking them to assisted fish farms in other areas within the four provinces, especially during lean months. The orders were consolidated and delivered to them, based on an agreed schedule and payment. Bulk orders meant that additional capital was needed to operate a project, with the LGU helping the associations gain funding. Marketing of the processed products was done by the members by linking with Non-Governmental Organizations and other government agencies. Regular monitoring was conducted by the LGU and the Monitoring and Evaluation Committee of the BFAR regional office.

Conclusion and Next Steps

Through the project, the national agencies and the LGUs have seen the importance to livelihood of working with women as development partners. The project proved to be a worthwhile and profitable activity for the RICs. In addition to direct income, the project generated funds for the associations to construct a temporary food processing center for their activities, sponsor livelihood projects for their members and help finance other activities. Over time, more orders were received and more retail outlets found for the products. The associations also developed innovations for the fish smoking chambers originally provided and fostered closer working relationships among their members.

The project also fostered and strengthened relationships among the different associations. Through the training courses and meetings attended by the members and officers, individual members and the associations exchanged ideas and activities and more advanced associations became models for the others. Some of the associations were selected to represent their group in the national annual search for the best women's groups in agriculture.

The project served as a venue for other agencies to come together and assist in the entrepreneurship of the associations. The Department of Trade and Industry provided trade and marketing assistance; and the Department of Science and Technology assisted in product labeling and packaging.

The project could be institutionalized in the regular programmes of the national and local government units for economic advancement. Five areas for improvement were identified. (1) Longer term members need continuous skills enhancement and new members need help to maintain and upgrade product quality. (2) More advanced training should be given on Hazard Analysis and Critical Control Point (HACCP) based standards to assure product safety and quality. (3) Improvements are needed to ensure a continuous supply of affordable raw materials between fish producers and processors. (4) Capital must continue to be built and credit linkages forged. (5) Better product packaging and labeling are needed to assure product safety.

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Gender Roles in the Mangrove Reforestation Programmes in Barangay Talokgangan, Banate, Iloilo, Philippines: A Case Study Where Women Have Sustained the Efforts

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Abstract

A study was conducted to understand the roles played by female and male members of the Talokgangan Concerned Citizens Association (TaCCAs) in the mangrove reforestation programme in Barangay Talokgangan, Banate, Iloilo, Philippines. When established in 1997, more members were men than women, but by 2010 most of the members of TaCCAs were women. Most members now are over 50 years of age, have elementary education, and have been residents since birth. Respondents reported that they joined the TaCCAs to help their community, to benefit from government projects, to organise as a group and to have other sources of income. Women's participation was higher in the planning process, during meetings, nursery development and in maintenance, as well as in mangrove management and protection. Men were involved in the construction and maintenance of fences in the mangrove area. Some of the benefits the respondents enjoyed from the mangrove replanting included protection from strong waves during typhoons, stability of the soil where their houses stood and monetary incentives from selling mangrove seedlings. Some of the issues encountered by the members included lack of support from other community members, lack of funds, and conflict within the household over time devoted to the work.

Introduction

Banate-Barotac Bay has traditionally been recognised as one of the richest fishing grounds in Panay Island, Philippines. However, fisheries production has significantly declined due to illegal fishing practices and the destruction of important habitats. Hence, the Banate-Barotac Bay Resource Management Council Inc. (BBBRMCI) was created in 1996. The BBBRMCI is an inter-local government unit (LGU) alliance between the municipalities of Barotac Nuevo, Anilao, Banate and Barotac Viejo, in the Province of Iloilo, which aims to restore, preserve, and create opportunities and save the Bay from further deterioration.

Starting in 1997 under the resource generation component of a unified coastal resources management (CRM) plan, one of the early initiatives of the BBBRMCI was the rehabilitation of mangrove forests. In total, the four municipalities combined have 180.68 ha of mangrove cover

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(BBBRMCI et al. 2010). One of the major efforts under this initiative was awarding 3.5 ha of mangrove area in Barangay Talokgangan, Banate, Iloilo to the Talokgangan Concerned Citizen Association (TaCCAs), a people's organisation (PO) that was also established in 1997. The BBBRMCI, the Philippine Department of Natural Resources (DENR) and TaCCAs entered into a Memorandum of Agreement (MOA) in 2006 for the co-management of the mangrove area. The Local Government Code of the Philippines mandates that the LGUs enlist the support of POs and non-government organisations (NGOs) in the formulation and implementation of development policies and programmes (IIRR, LGSP, and SANREM CRSP/Southeast Asia, 2001).

While detailed information on the techniques for mangrove reforestation is available, and the government as well as the private sector appears willing to invest substantial amounts of funds into mangrove rehabilitation, the success of these efforts varies greatly, and is often limited in scale and time (Erftemeijer and Bualuang, 2011). People's participation and responses play an integral part in project implementation. Sound policies and programmes should draw on insights from development projects with respect to understanding the roles of women, men, and institutions and of people's interactions with the environment (Rola, 1995). To date, there is little information on gender in natural resource management. Most empirical studies on gender focus on agriculture (Kumar, 2011; Lu, 2010; Rola 1995), water and sanitation (Rathgeber, 1996), post-harvest activities and trade (Tran-Nguyen and Zampeti, 2004; Siason et al. 2001; Lopez-Rodriguez, 1996).

Hence, this study was conducted to describe the roles played by female and male members of the TaCCAs in the mangrove reforestation programme in Barangay Talokgangan, Banate, Iloilo, Philippines. Specifically, it aimed 1) to determine the gender roles in the protection and management of mangroves and 2) to identify the issues encountered in the implementation of the mangrove reforestation project.

Materials and Methods

Primary data were generated using a semi-structured interview complemented by a Focus Group Discussion (FGD) with all active members of the TaCCAs. The questions referred to information on the roles played by the women and men relative to mangrove nursery development and maintenance, mangrove planting, mangrove management, protection and maintenance, reasons behind participation in the mangrove reforestation project, the benefits they derived from the mangrove resource, as well as the issues they encountered in the project implementation. Secondary data were also used.

Results

The study was conducted in Barangay Talokgangan in the municipality of Banate (Fig. 1). Barangay Talokgangan is a coastal barangay located about 1 km north of Banate town proper. It has a total land area of 17.72 ha and a total population of 2,488, with 520 households (JICA and

BBBRMCI, 2008). Some residents are engaged in farming, fishing, fish trading, fish processing, hired services (e.g. motorcycle/pedicab driver, carpentry work, laborer, etc.) and government service, while others are employed in private agencies (e.g. as security guards or salesladies). There were two POs established in the area, the Talokgangan Small Fishermen Association (TaSFA) and TaCCAs.

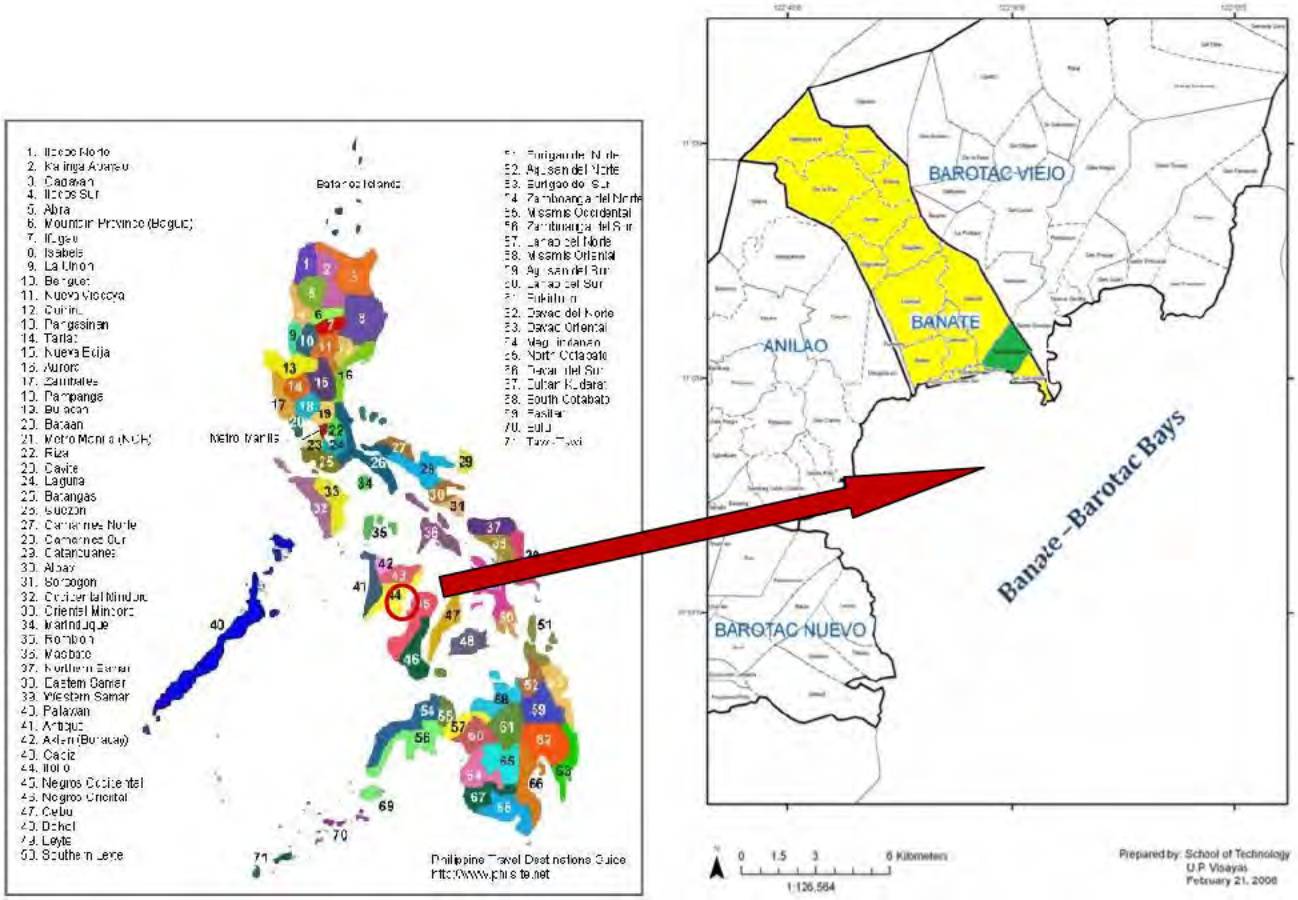

Fig 1. Maps showing Barangay Talokgangan, Banate, Iloilo, Philippines.

The majority of the 13 respondents were women (11), of whom most were married (12) and older than 50 years of age (12). All members had attained elementary education and most had been residents of Barangay Talokgangan since birth (10). The average number of children of the respondents was four, the majority of whom were older than 18 years (12). The average annual income was PhP 35,199.84 (~US$ 819). Some of the respondents augment their meager earnings by selling mangrove seedlings/propagules from the mangrove reforestation project nursery. TaCCAs members are able to sell large quantities of mangrove seedlings/propagules in a single transaction (e.g. US$ 133) to students and government agencies engaged in mangrove tree planting. Net proceeds from selling the seedlings/propagules are divided equally among the TaCCAs members

who participate in the potting and selling of mangrove seedlings/propagules for a particular transaction. In a household, the person who earns the money decides on how and where to spend his/her income.

The respondents' primary reasons for joining the TaCCAs included: to help other people and their community (8); to benefit from government projects/avail of loans (6); to be organised as a group (3); and to have another source of income (3).

Household chores fall within the responsibilities of the women. Women also played a significant role in most of the activities of the mangrove reforestation project, compared to their male counterparts who undertook fewer tasks (Table 1). Women's participation was higher than that of men's in the mangrove nursery development and maintenance, and planting, protection, management and maintenance of mangroves. Men on the other hand, were more involved than women in preparing fencing materials (cutting bamboo), and constructing and maintaining fences in the mangrove area. Planning and decision-making however were tasks shared by women and men.

Table 1. Gender roles in the mangrove reforestation project.

Activities	Men	Women
Mangrove nursery development and maintenance		
1. Preparing planting materials		✓
2. Preparing nursery area		✓
3. Potting seedlings/propagules		✓
4. Cutting bamboo stakes (for the fence)	✓	
5. Fencing	✓	
6. Purchasing polybags and other materials for the nursery		✓
Mangrove planting		
7. Transfering of mangrove seedlings/propagules to the planting area		✓
8. Digging holes prior to planting		✓
9. Planting mangroves		✓

Mangrove management, protection and maintenance			
10.	Attending meetings		✓
11.	Planning	✓	✓
12.	Decision-making	✓	✓
13.	Coordinating with other agencies/organization		✓
14.	Sales		✓
15.	Monitoring		✓
16.	Clean-up of mangrove area		✓
17.	Accounting of income and expenses		✓
18.	Safekeeping of funds		✓
19.	Installing sign boards		✓

Respondents spent an average of 3-4 hr· wk^{-1}, usually from 06:00-09:00 hrs, depending on the workload, to perform their duties as co-managers of the mangrove area.

Some of the benefits the respondents enjoyed from the mangroves included protection from strong waves during typhoons and stability of the soil where their houses stand. Respondents recognised that mangrove stands along the shore had helped buffer their houses by serving as wind and wave breakers. Before the reforestation project, seawater reached the barangay's main road, about 0.3 km from the shoreline, during typhoons. In recent years however, with the mangrove reforestation project, residents noticed that during typhoons their houses were no longer inundated by seawater.

Another benefit the respondents enjoyed was the monetary incentive from selling mangrove seedlings/propagules and this motivated the TaCCAs members. While respondents acknowledged the remuneration they received from selling mangrove seedlings/propagules, they expressed their concerns about the unpaid balance for the planting materials and labour in their previous transactions with a government agency which hired their services.

Issues encountered by the TaCCAs members during project implementation included lack of support from other community members, loss of planting implements, lack of funds to support their activities and marital disputes in the household.

Discussion

The TaCCAs was organised, through the assistance of the BBBRMCI, in response to deteriorating conditions in the coastal barangay of Talokgangan. It initially started with 28 members: 17 men and 11 women. Some of the male members were also members of the TaSFA while the females were wives of fisherfolk who were TASFA members. At the time of the study (October 2010), only 13 of these members remained active and 11 of them were women. Membership diminished when the Aquasilviculture Livelihood Project implemented by the TaCCAs within the mangrove area failed. Gradually, the men lost interest in the PO since they could no longer see potential income in the mangrove reforestation project. Since the establishment of TaCCAs in 1997, its leadership changed twice but each time it was headed by a man. At present, a male heads the organisation.

The average age of the respondents was 59, an observation that raises concerns for the sustainability of the mangrove reforestation project. Younger members will need to be recruited to TaCCas if the initiative is to continue.

The average annual income (~US$ 819) of the respondents is well below the PhP 62,000.00 (~US$ 1,442) annual income of the Philippine bottom 30% income group which is considered poor (Ericta, 2011). With this very minimal income, most of it is spent on food for the family. Others leave some provisions for their children's education and medicine. Since incomes are inadequate to cover other expenses than food costs, proceeds from the mangrove nursery, although small, contribute significantly to the household expenses, giving the women a greater sense of self-worth.

The women's performance of household chores is a reflection of their traditional roles as mother, wife, and housekeeper (Santiago, 2008). Although half of the women respondents had work such as operating a small store or dressmaking, they reported that they gave priority to their mangrove activities when their participation was especially needed. This was demonstrated in their high participation in most of the mangrove activities. A similar study entitled "Role and contribution of men and women in mangrove rehabilitation in Region VI, Philippines", presented by Dr. Alice Joan Ferrer during the 9th Asian Fisheries and Aquaculture Forum and the 3rd Global Symposium on Gender in Aquaculture and Fisheries (GAF3) also showed high levels of women's participation in the mangrove rehabilitation activities in three of the six sites in Western Visayas, Philippines.

In the TaCCAs case, most respondents had grown-up children who had started their own families and this allowed the women to be more involved in the mangrove reforestation activities than if they had been raising their own children. Because it gave additional family income, the women found time to do their mangrove reforestation duties especially when there was a large order for mangrove seedlings/propagules and even when there was a conflict in their schedules. Most of the women's work (e.g. acting as a barangay official or dressmaking) was done within the community, allowing them to go to the mangrove reforestation site at times convenient to them. The

women considered maintenance activities in the mangroves to be "meetings". Since they were all neighbours, they relayed discussions about recent plans and commitments of TaCCAs during their meetings to those who were not able to attend. The woman Barangay Councilor, who was a member of TaCCAs, facilitated effective coordination and communication with the Banate LGU and with the BBBRMCI. Consequently, a good feedback mechanism was in place for monitoring and extending technical assistance related to the co-management of the mangrove resources. This observation is contrary to the results of the study conducted by Plaza-Moralde (2007) in Samal Island, Davao Province, where men had higher participation rates compared to women in all phases of mangrove rehabilitation activities. In Barangay Talokgangan, the men were not always around to participate in most of the mangrove reforestation activities because they have regular employment activities.

Although women and men in coastal communities are dependent on coastal zone ecosystems for their livelihood, women and men depend upon, exploit and manage coastal resources in different ways. In the Philippines, a number of initiatives highlight the significant role of women, particularly in coastal resources management (Lopez-Rodriguez, 1996; Tambuyog Development Center, 1999). As shown by the members of the TaCCAs, women perform multiple roles. Rola (1995) showed that women involved in upland farming systems in the Philippines undertake household tasks and also generally do farm work, off-farm work and non-farm labour. In addition, activities of women have a direct bearing on the welfare of the family as they generally look after all the members of the household.

Planting mangroves entails time and effort. Government agencies that contract the services of TaCCas for their own mangrove planting activities need to realize that people's time has a cost to them. Replanting their own mangroves, however, also benefits the local community and people should be prepared to make some investment of their own time.

One of the issues encountered by the TaCCAs members during project implementation was the lack of support from other community members because the others considered mangrove activities a waste of time. One respondent reported a marital dispute due to her absence from the household. Domestic violence/abuse occurs particularly when the wife takes part in resource conservation activities rather than remains at home and does household chores (Jimenez, 2004).

This paper highlights the significant role played by women in a mangrove reforestation project. The members of TaCCAs, almost all of whom are now women, are determined to sustain the organisation in spite of its low membership. The commitment and cooperation of the members to serve TaCCAs has increased their consciousness of coastal resource management. The reforestation project has afforded them protection along the coastal zone and has also provided them additional income through the sale of seedlings/propagules. These are concrete benefits, felt by TaCCAs members and the community as a whole, which can serve to promote more active participation in

the organisation and other similar initiatives. Community involvement, particularly in this case women's participation, can sustain a development project. By contrast, the fishermen's association, TaSFA has not remained active because some of its members transferred to other places in search for alternative employment. According to one respondent, the declining catch from the seas can no longer feed their families. Another reason that contributed to the inactivity of the TaSFA was that no member took the lead in reviving the organisation. The previous leadership had issues with the management of finances, resulting in loss of confidence among the members.

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Improvement of Women's Livelihoods, Income and Nutrition through Carp-SIS-Prawn Polyculture in Terai, Nepal

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Abstract

Many poor Nepalese women and children suffer malnutrition caused by vitamin and mineral deficiencies. In December 2008, the project "Improvement of women's livelihoods, income and nutrition through carp-SIS-prawn polyculture in Terai, Nepal" was launched in Chitwan, a district, to test the possible role of small indigenous fish species (SIS) in combating malnutrition. Fifty household ponds of 100 m^2 each were constructed and stocked with carp such as rohu (*Labeo rohita*), silver carp (*Hypophthalmichthys molitrix*), bighead carp (*Aristichthys nobilis*) and mrigal (*Cirrihinus mrigala*), and SIS such as dedhwa (*Esomus danricus*), mara (*Amblypharyngodon mola*), pothi (*Puntius sophore*) and prawn (*Macrobrachium rosenbergii*). Average total production was 2.6 t ha^{-1} $year^{-1}$ but was affected by low stocking rates and mortality caused by poisoning from canal water. On average, the farmers' households consumed 54% of the production. Farmers, all of whom were women, and their families consumed all SIS and sold surplus carp and prawns. Their fish consumption was above that of the national average, which is still low by world standards. Farmers earned Nepalese rupee 1,523 $household^{-1}$ in 250 days. The study's results, although modest, are a promising start to introducing new farming practices to increase the income, food and nutritional standards of women and their households.

Introduction

Among poor women and children in Nepal, malnutrition caused by vitamin and mineral deficiencies has been well recognised as a serious health problem (Ministry of Health and Population (MOHP), 2006). Essential micronutrients such as iron, zinc, vitamin A and calcium are lacking in the Nepalese diet, and consequently large population groups are suffering from diseases and disorders associated with micronutrient deficiencies. The most common forms of malnutrition in the country are protein energy malnutrition (PEM), iodine deficiency disorders, vitamin A deficiency, and iron deficiency anaemia. Nearly 48% of children under five are anaemic and 49% are stunted (MOHP, 2006). Similarly, 36% of women aged 15-49 are anaemic (MOHP, 2006). The situation is dire, especially among rural, ethnic minority women and children because they are

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resource-poor and have very little education. Limited access to resources affects women's nutrient intake, underlining the importance of nutrient-rich food sources.

Small indigenous fish species (SIS) are of special interest because SIS are rich in essential micro-nutrients including vitamins and minerals (Roos et al. 2007a). Nutrient analyses of common Bangladesh SIS such as mola (*Amblypharyngodon mola*) and darkina (*Esomus danricus*) have shown that they contain much higher vitamin A, calcium and iron than do cultured fish (Roos et al. 2006). Studies in poor, rural households in Bangladesh and Cambodia showed that even small quantities of the vitamin A-rich fish, mola, produced in household ponds, can meet the annual vitamin A requirements for 2 million Bangladeshi children. A traditional, daily meal with the iron-rich small fish, trey changwa plieng (*Esomus longimanus*) can meet 45% of the daily median iron requirement of Cambodian women (Roos et al. 2007b).

Semi-intensive carp polyculture is the major established aquaculture system in Nepal. Existing carp polyculture systems do not however promote household fish consumption because carp are usually grown to a large size and sold in the market, rather than being consumed by the farmer. Developing a production system that increases household access to nutrient-rich fish consumption, in parallel with the carp production, also carries potential to increase household income.

Polyculture of SIS with carp and prawn appears to be one of the possible options. Incorporating SIS and prawn in carp ponds can benefit farmers in two ways: i) by improving the nutritional status of farming families through regular partial harvesting and consumption of nutrient-dense, self-recruiting SIS fish; and ii) by increasing household income from selling valuable carp and prawn to local markets. Realising the potential role of SIS to address the malnutrition problem, a project entitled "Improvement of women's livelihoods, income and nutrition through carp-SIS-prawn polyculture in Terai, Nepal" (carp-SIS-prawn project) was launched in Chitwan District in Terai, Nepal by the Institute of Agriculture and Animal Science (IAAS), Nepal in collaboration with the Bangladesh Agricultural University (BAU), Bangladesh and the University of Copenhagen (KVL), Denmark. The project, which is still in progress, aims to improve the health and nutrition of women and children through increased intake of nutrient-dense SIS, and to empower women by providing additional income to the family. The total duration of the project is 3 years, December 2008 to November 2011.

The project was launched in the Tharu community. Tharu are a marginalised ethnicity in Nepal. They make up 6.8% of the total population (Central Bureau of Statistics, 2006). They are traditional fishers, capturing fish from rivers, swamps, lakes, and ponds to feed their large families. The catch from such fisheries is low and inconsistent. Hence, producing fish in their own ponds can provide more consistent yields while also improving household income and nutritional status. In addition it may also decrease fishing pressure and improve fish stocks in natural water bodies.

Activities

Site and farmer selection

Since the project aims to empower women through fish farming, only women farmers were selected for the project. Women were involved in the income generating activity to help empower them economically and socially. In total, 50 women farmers were selected at Fulloria, Mudovar, Jeetpur and Simara in Chitwan District. Criteria used to select participants in the project included their access to resources, especially water sources, and their interest in fish farming.

Pond construction

Farmer selection was followed by pond construction. Altogether 50 ponds were constructed at the site. The average pond size was 98.5 m^2. Pond size varied between 35 m^2 and 236 m^2. Pond size depended on the land available to the farmer and the farmer's willingness to devote land area to pond construction. The surface area covered by all ponds in the project amounted to 0.5 ha. Pond construction began in February and continued to the end of March 2008.

Pond stocking and management

Ponds were stocked with fingerlings of four carp species (rohu (*Labeo rohita*), mrigal (*Cirrihinus mrigala*), silver carp (*Hypophthalmichthys molitrix*), bighead carp (*Aristichthys nobilis*)), three SIS (dedhwa (*Esomus danricus*), mara (*Amblypharyngodon mola*), pothi (*Puntius sophore)*), and one prawn (*Macrobrachium rosenbergii*) in May 2008. Fingerlings of rohu, mrigal, silver carp, bighead carp and juvenile prawn were stocked at rates of 3,000, 1,000, 1,000, 2,500 and 10,000 ha^{-1}, respectively (Table 1). SIS were stocked at a rate of 25,000 ha^{-1}. Farmers adopted five different farming practices: i) carp farming, ii) carp + prawn farming, iii) carp + dedhwa + prawn farming, iv) carp + pothi + prawn farming and v) carp + dedhwa + mara + pothi + prawn farming. Ten farmers adopted each type of farming system as shown in Table 1. Prawn juveniles were brought from Bangladesh and nursed at IAAS ponds for 1 month prior to introduction into the ponds. Fish were fed a daily mixture of rice bran and soybean cake at 3% of total estimated biomass. Ponds were fertilised with urea, di-ammonium phosphate (DAP) and cow dung monthly at the rate of 0.4 g $N \cdot m^{-2} \cdot day^{-1}$ and 0.1 g $P \cdot m^{-2} day^{-1}$ (Shrestha and Pandit, 2007). Each farmer was provided with a record keeping book so that she could record the numbers and weights of fish consumed in the household, sold, harvested and that have died, as well as the amounts of feed and fertiliser applied to the pond. Records in the notebook were monitored by the Field Supervisor and a Research Student associated with the project. The record books were later used to estimate the fish production and income earned by the farmers.

Table 1. Stocking density (number of fingerling/juvenile per hectare) of carp, SIS and prawn in different farming systems. Ten farmers adopted each type of farming system.

Species	Types of farming systems				
	Carp	Carp-Prawn	Carp-Dedhwa-Prawn	Carp-Pothi-Prawn	Carp-Dedhwa- Mara-Pothi-Prawn
Rohu	3,000	3,000	3,000	3,000	3,000
Mrigal	1,000	1,000	1,000	1,000	1,000
Catla	1,000	1,000	1,000	1,000	1,000
Silver carp	2,500	2,500	2,500	2,500	2,500
Dedhwa	-	-	25,000	-	8,334
Pothi	-	-	-	25,000	8,333
Mara	-	-	-	-	8,333
Prawn	-	10,000	10,000	10,000	10,000

Training

Two training sessions were conducted: training for the trainers and training for farmers. Eighteen senior and experienced women farmers (13 from the Rural Integrated Development Society (RIDS) and five from the Rural Empowerment Society (REST)) were trained to be trainers by experts from IAAS and the Nepal Agriculture Research Council (NARC). Training focused on the fundamentals of carp-SIS-prawn farming and the role and importance of SIS in nutrition of women and children. The training was followed by a field trip to Madi, where participants observed successful integrated fish farming and were able to interact with farmers in Madi. Those 18 senior and experienced farmers, who had received training on carp-SIS-prawn polyculture, then served as Project Trainers. One month later, the Project Trainers trained the project farmers. Farmers were taken on a field trip to Pokhara to observe pond and cage fish culture, and interact with farmers. A written manual in Nepali on carp-SIS-prawn polyculture was prepared and provided to all farmers during the training

Women fish farmer groups

Three women fish farmers' self help groups were formed and farmers were allocated to a group based on their location:

i. Farmers of Fulloria were allocated to the Namuna Bikash Mahila Machapalan Krishak Samuha
ii. Farmers of Mudovar were allocated to the Janmukhi Mahila Machapalan Krishak Samuha
iii. Farmers of Jeetpur and Simara were allocated to the Rai Mahila Machapalan Krishak Samuha

Each group had between 15 and 18 members. The women worked, developed plans and shared their problems in the groups. This enhanced their ability to work together and also developed social harmony in the community. Each group held monthly meetings and members deposited Nepalese rupee (NPR) 10 mth^{-1} each into their group's fund. This fund was then to extend loans of NPR 500 – 5,000 $person^{-1}$ to needy group members, at an interest rate of 1-2% mth^{-1}, and to repair equipment such as pump sets and fish nets.

Partial harvesting of SIS

SIS bred in the ponds within 2 months of the ponds being stocked. Farmers and their families began consuming SIS soon after the new juveniles were seen. They periodically harvested SIS by seine net until the end of the culture period.

Results

Fish and prawn production

After stocking in May, fish were grown for 250 days and prawns were grown for 150 days. Prawns were harvested by the end of November before temperatures dropped below the limits required for good growth and survival. Average total production was estimated at 16.5 $kg \cdot pond^{-1}$ which was equivalent to 2.6 $t \cdot ha^{-1} \cdot year^{-1}$. Total production represents the average of both fish (carp and SIS) and prawn consumed and sold in all 50 ponds. The total production per pond varied by pond size and farmer, and ranged from 3.4 to 40.3 $kg \cdot pond^{-1}$. Production of some ponds was affected by using poisoned canal water to top up the ponds; most of the fish died in those ponds. Canal water was poisoned due to application of pesticide to fish in Rapti River. Eight affected ponds were cleared and dried in the middle of the project.

Total production in SIS-stocked ponds was 27% to 33% higher compared to that in non-SIS ponds (Figure 1). Carp was the major contributor (88%) to the total production while SIS and prawn contributed 8% and 4%, respectively. Among SIS, dedhwa gave the highest average production of 2.4 $kg \cdot pond^{-1}$ whereas mixed SIS and Pothi gave 1.9 and 1.7 $kg \cdot pond^{-1}$, respectively. Average prawn production was 0.73 $kg \cdot pond^{-1}$ and was from 0.01-3.27 $kg \cdot pond^{-1}$. Total production did not vary significantly ($P<0.05$) among different farming systems. However, average total production was higher in SIS-stocked ponds than in carp ponds. Highest (18.7 $kg \cdot pond^{-1}$) total production came from carp + dedhwa + prawn farming and lowest (13.1 $kg \cdot pond^{-1}$) total production came from carp farming, both after 250 days.

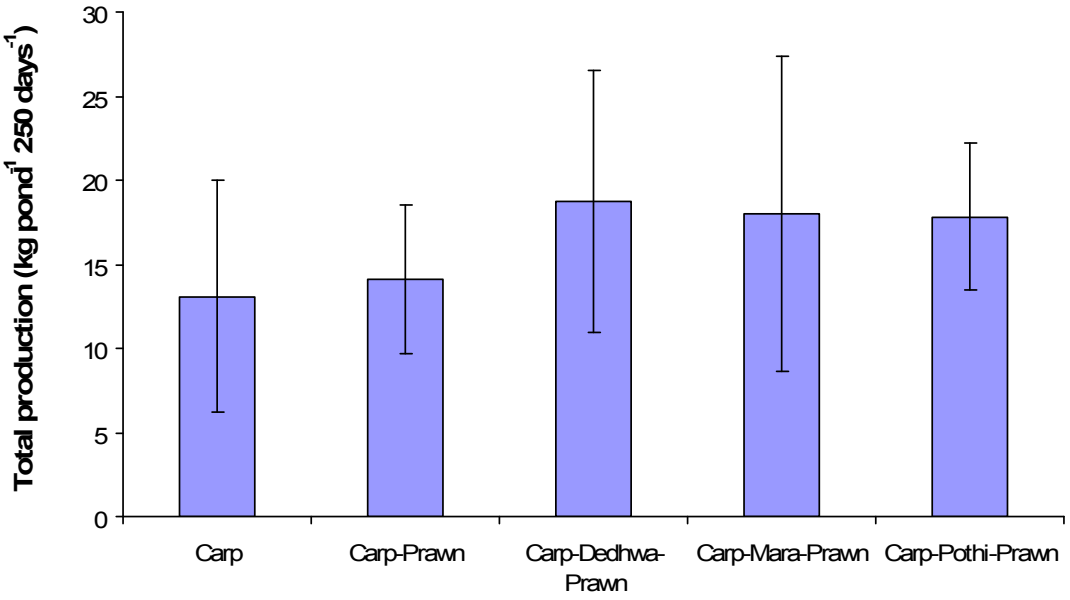

Fig 1. Total production (mean±SD) of fish and prawn (kg pond^{-1} 250 days^{-1}) under different farming practices. Bars represent average production of 10 households.

Fish consumption

On average, the farmers' households consumed 54% of the total production. Consumption varied from 0.8-22.4 kg·household^{-1}. By farming group, the highest (10.2 kg·household^{-1}) and lowest (7.3 kg·household^{-1}) amount of fish and prawn was found to be consumed by carp-dedhwa-prawn growing farmers and carp growing farmers, respectively (Figure 2), although the differences were not significant. Carp was the major commodity consumed by farmers (81%), compared to SIS (12%) and prawn (7%). All farmers growing SIS consumed but did not sell them. SIS consumption ranged from 0.03 to 5.3 kg·household^{-1}. SIS contributed 15% to the total fish consumption. Similarly all farmers growing prawn ate them, though in small amounts because the giant freshwater prawn was a new species to them. Prawn consumption was from 0.02-1.7 kg·household^{-1}.

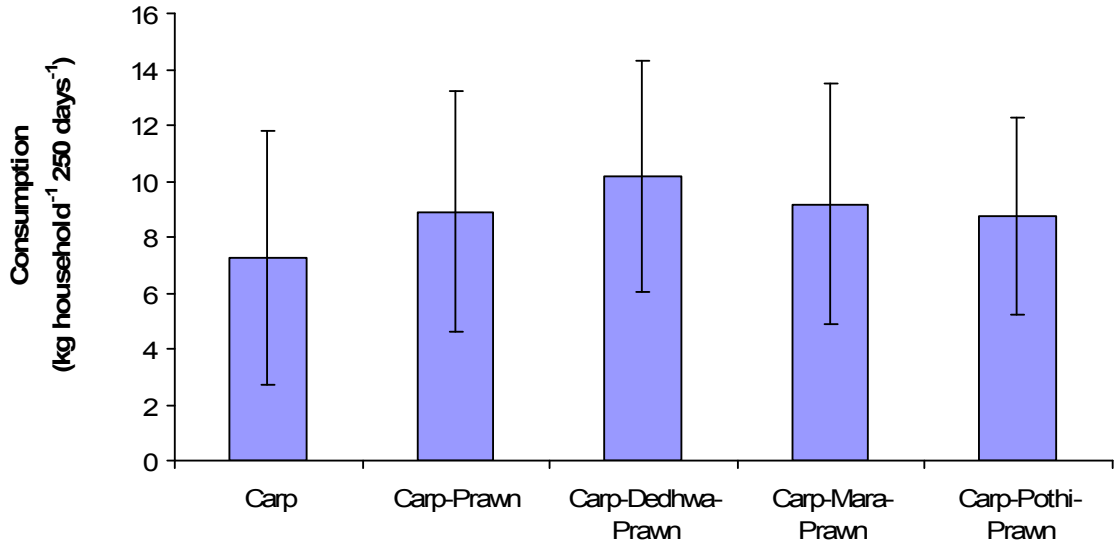

Fig 2. Total household consumption (mean±SD) of fish and prawn under different farming practices (kg household^{-1} 250 days^{-1}). Bars represent average consumption of 10 households.

Income generation

Farmers sold surplus carp and prawn. They sold carp and prawn at rates of NPR 200 kg^{-1} and NPR 600 kg^{-1}, respectively. The total amount of carp and prawn sold was from 0.7-24.2 kg·household^{-1}. Farmers earned NPR 135-4,846 for a growing season, which they used to cover household expenses. Farmers earned more than NPR 1,600 from carp-SIS-prawn ponds and less than NPR 1,200 from carp-only ponds (Figure 3), showing a substantial increase in income from these polyculture systems. However, the differences between average incomes by farming practice were not significant.

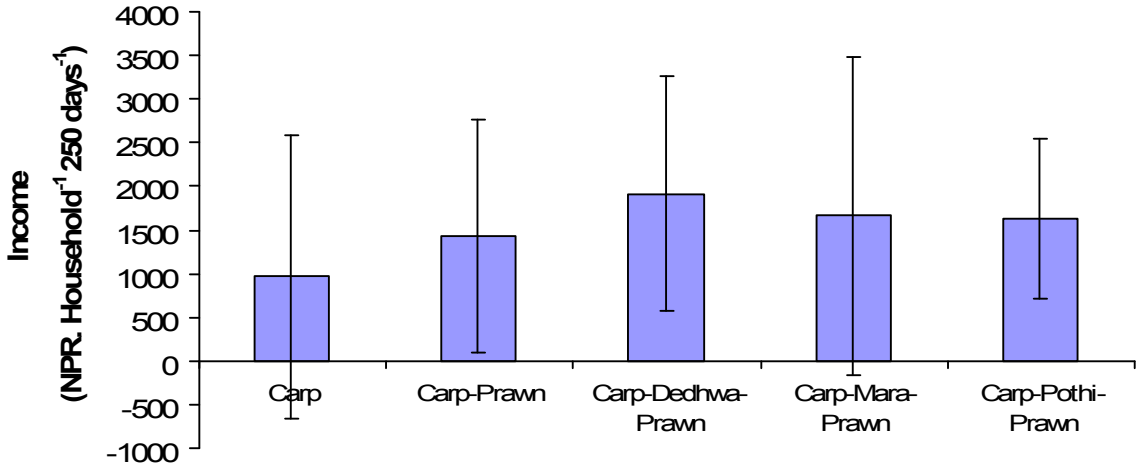

Fig 3. Total income (mean±SD) generated by farmer from fish and prawn sales (NPR ^{household} 250 $^{days-}$1) under different farming practices. Bars represent average income from 10 households.

Discussion

The project supported 50 women farmers. They actively participated in production and capacity building activities. Altogether, the carp-SIS-prawn project was able to help around 70 women, including all involved in training, research and supervision.

The carp-SIS-prawn growing farmers began consuming SIS regularly through partial harvesting of the ponds while carp and carp-prawn growing farmers had to wait until carp and prawns were large enough to eat. All farmers sold excess carp and prawn, and earned some income which helped them to be more empowered economically.

Total production was higher in carp-SIS-prawn ponds than in carp ponds. Average total production was lower than the national average production of 3.3 $t \cdot ha^{-1} \cdot year^{-1}$ (Ministry of Agriculture and Co-operatives, 2009), and it varied greatly among pond producers. This variation can be attributed to uncontrolled conditions including lower stocking density, fewer carp species stocked in ponds, poisoning from source water and water turbidity. In Nepal, stocking density of carp is typically 10,000 ha^{-1}, which is higher than the 7,500 ha^{-1} used in the present study. Similarly, farmers stock six to seven carp species in polyculture ponds to maximise the production by utilising all available niches, compared to the four carp species used in the present study. Some farmers used poisoned canal water from the Rapti River to top up the ponds. The chemicals were thought to be from fishermen who illegally used pesticides in the river to capture fish; the poisoned river water then reached the ponds through canals. This killed fish in the ponds and decreased production.

Among SIS, mara did not perform well. This may have been because it was stocked together with dedhwa and pothi. The latter two species may have been superior to mara under the pond conditions. Mara is not endemic to Chitwan, but dedhwa and pothi are widely available, found in almost all ponds in Chitwan, and enter ponds with canal water. However, their contribution to the total production is not counted in national statistics because these are considered weed fish. Although the Tharu community are not aware of the nutritional value of dedhwa and pothi, they do consume them.

Though prawn production was comparatively low, it made a significant contribution to total household income through its high economic value.

Fish are an integral part of the diet and income of Tharu people. Farmers and their household members consumed 8.9 kg of fish in 250 days with an average consumption rate of 2.3 $kg \cdot person^{-1} \cdot year^{-1}$, which was 31% higher than the Nepalese national average of 1.77 $kg \cdot person^{-1} \cdot year^{-1}$ (Ministry of Agriculture and Cooperatives, 2010). This is low by comparison with the global average consumption. The fish consumption rate among carp, SIS and prawn growing farmers was 65% higher than the national average. Household fish consumption was 20 to 40% higher in carp-SIS-prawn farmers compared to carp farmers. Increased intake of such nutrient rich SIS by farmers

is believed to improve their nutrition. Since SIS are eaten whole without loss of nutrients from cleaning or as plate waste, these contribute greatly to the micronutrient intake of farmers. Farmers growing carp, SIS and prawn together earned more income because production was better and prawn fetched a higher price. Income generation and pond ownership helped the women to be empowered financially.

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SHORT REPORTS

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Women's Roles in the Construction of New Fishing Villages in China, as Shown from Surveys in Zhejiang Province

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Abstract

With the continuous economic development of China, including in fisheries, the position of women in fisheries has undergone great changes. Under the 11th Five Year Plan, which aims to construct a new socialism in the countryside, the importance of women in the construction of New Fishing Villages is becoming gradually evident. This essay analyses women's roles in the construction of New Fishing Villages, based on research in some typical fishery villages in Zhejiang province. The results show that women have gradually become the main force of production and development, the safeguard of community and family well-being and the advocates of civilisation in the countryside. They have dominated clean and tidy village movements and are viewed as being at the forefront of democratic management in the fishing villages. Some factors, however, hinder women's opportunities and contributions. These factors are: many grassroots women's organisations need improving, many women are not aware of available jobs or how to start their own businesses, or are not interested in starting their own business. Strategies have been suggested to further enhance women's roles in the construction of New Fishing Villages under the countryside reform programme.

Introduction

In 2005, in approving its 11th Five Year Plan, the Fifth Plenary Session of the Sixteenth Central Committee Meeting of the Communist Party of China spelled out the conditions for constructing a new comprehensive socialism in the countryside, including fishing towns and villages. These were: improving production, improving people's wellbeing, civilising local customs, making villages neat and tidy, and creating democratic administration. China faces a major historic task to promote and create such a new paradigm in fishing towns, based on the long-term policy guidance of the Central Committee.

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As China's social conditions and the economic power of its workforce have improved, the status of women also has improved gradually. Currently, women account for 60% of the total rural workforce, making rural women the mainstay of agricultural production. Women are also considered the builders and creators of spiritual life, civilisation and of harmonious families and society. As rural women play important roles in both economic production and family life, the status of women during the construction of the new socialist countryside should not be ignored.

In the fishing villages and towns of China, the status of women also is changing. By organising and mobilising women to actively participate in the construction of the new countryside, women can become construction practitioners, facilitators and beneficiaries. The focus on rural change provides opportunities for large numbers of rural women to use their skills and talents. Women's benefits from the social change must be realised, maintained and developed during the process of constructing the New Fishing Villages.

Along with the fast changes in industrial and labour structures in fishing villages, women are playing greater roles, changing their functions and positions, especially in the formation of material and spiritual civilisation. From the perspective of social development, can women's "sky" role, i.e., that of "holding up half the sky", be maximised or not? In the transformation, what problems will they face and what obstacles will they meet?

Evolution in the status of women in fishing village development

Soon after China was liberated in 1949, as in most rural societies, the social conditions in fishing villages were still like those of feudal societies. Women faced serious traditional forms of bondage to males. Women undertook housework, and provided auxiliary labour in fisheries production, such as making, cleaning and mending nets and peeling shrimps. In addition, as men stayed away fishing at sea for long periods, most of the agricultural labour also fell on the shoulders of the fishing village women. As many fishing villagers lacked sufficient arable land for their crops, their agriculture income was low and so women's labour showed only small apparent returns. Moreover, in the society of that time, family economies were managed overall by older parents to whom personal incomes were handed over. The division of housework between women and men was clearly demarcated. Women did the cooking, laundry and stayed home with the children; men never participated in household work but were responsible only for fishing and fisheries work, such as preparing for and following up on fish catching. In the family income, because women's labour was only in unpaid housework, women had no obvious income and therefore, in the fishing villages, their positions were very weak.

As the new China developed, fisheries productivity also improved. Traditional marine fisheries production developed from primarily nearshore operations to offshore production; production tools developed from wooden junks to mechanised vessels; and inland fisheries productivity was also improved. Despite the development of production methods, fishermen's outputs still failed to meet the growing demand for aquatic products, raising questions of how to further increase production. In an historic move in 1958, the State removed the prohibition on women going to sea in order to overcome the constraints of restricting women and men to only their traditional production roles.

In addition, as a large number of women joined the fisheries workforce for the first time, this freed the special skills of men and increased their productivity and further promoted other industries to develop in fishing villages. The new industries provided opportunities for additional paid work for women. As women's functions in production changed, the sexual division of labour within families changed and women's economic status also changed. Women also gradually became more educated. Overall, the status of women improved.

Since the late 1970s and following China's reform and the opening of the economy, the stimulation created by the market economy drove further fisheries development with fisheries productivity given an unprecedented release. Fish processing, transportation, retail, catering and other industries often led to fisheries becoming dominated by other industries in fishing villages. In addition, since the end of 1990s, fisheries resources have been protected by fishing industry restructuring that caused many fishermen to transfer to other industries. With additional economic development, recreational fisheries developed rapidly. Diversification of the Chinese economy has greatly increased the incomes of the average household and people now want not only to meet basic sustenance needs but also purchase other consumer goods. Women are expected to play wider roles in the new economy.

In recent years, with reduced fisheries resources, men's fishing incomes have become unstable and women's incomes have increased and improved the stability of family incomes.

The function of women in the construction of New Fishing Villages

With the deepening of the reform of villages and the expansion of industrial development around fishing villages, women have become more pivotal in developing fishing village economies, and could play a vital role in the new social and economic transformation.

In order to better understand the changing roles of women under the rural transformation, a survey questionnaire was administered in 2009 in four locations in Zhejiang Province. Investigators recorded the location and conditions of each fishing village, including the basic layout of all industries, fishing ancillary industries, fish cultivation activities, sea ranching,

fisheries supplies traded, fish processing raw materials, catering and retail, hotel, fishery management and public service details for fisheries production activities.

Women's participation. Women's opportunities for participating in fish production activities have greatly improved, according to Zhejiang provincial statistics. They actively participate in fisheries production, although as yet few women go to sea to fish. Most women, especially in inland fishing villages, are active in aquaculture. In coastal areas, marine aquaculture now exceeds marine fisheries production and women's participation in aquaculture is, on average, 60% of total participation. In some villages, women constitute up to 90% of participants. Aquaculture is the most important fish production industry in inland fishing villages and in these, women make up 50% of participants. Women have advantages in agriculture, aquatic products processing and trading, recreational fishing, and fishing materials trade. In addition, in fisheries-related fields, women also occupy important roles, such as in transportation, catering, clothing, etc.

More women than men are engaged in industry in fishing villages, as illustrated by the case of Chinese Wolfberry Island mussel production in Sheng Si town, Zhou Shan Island in Zhejiang Province. In the fishing village of Sheng Si town, the survey found that, apart from production from the nearby sea, the main local aquatic production was mussel breeding. Nearly 65% of Island women took part in mussel production, 25% of women were engaged in fisheries support such as selling wholesale materials, trade in aquatic products, hotel accommodation and catering. The survey also showed that village women provided 70% of the local productive labour and, even during the annual fishing moratorium, women made up as much as 45% of the work force.

On Lycium island, Zhejiang Province, in the three fishing villages of "Big King", Longquan and "Temple Dry", a total of 300 questionnaires were issued to equal numbers of women and men. Among the women, the age range was 19-52, with an average age of 32 years; men's ages were from 18-58, with average age of 38 years.

The data from Zhou Shan Dinghai district found that women's fishing labour had risen gradually as a proportion of total labour. In 2009, in NongYu village of Dinghai, the female labour force grew 4.1% over that of the previous year and the proportion of women increased from 43.8% in 2008 to 44.9% in 2009.

Women's income has increased. In recent years, China's inshore fishing pressure has increased and off-shore resources have dropped sharply. Some fisheries resources show large year-to-year fluctuations. Inland aquaculture space is shrinking, and water quality is deteriorating. These production stresses result in apparent lower and less stable male labour productivity. At the same

time, the fishing villages are fundamentally changing. Since the 11th five-year plan period (2006-2011), China's coastal fishing villages have been applying the "professional" policy which supports diversified industries, aquatic products processing and trade, recreational fishing, environmentally friendly aquaculture, and public service secondary and tertiary industries. Inland fishing villages have been transforming traditional cultivation modes to fish farms for recreational fisheries. The historic transformation has offered opportunities for women in all these industries and their incomes have increased more smoothly than has been the case for male workers. This result, for example, was shown from the results of a questionnaire administered to 80 women in 2009 in four fishing villages in Ru Dong town of Nantong, Zhejiang Province.

Ants Island in Zhou Shan, Zhejiang Province is another example. In recent years fisheries tourism has relied mainly on women's labour. The island opened 20 new fishermen's leisure inns, almost all managed and staffed by women. The island's seafood processing for tourist consumption is also predominantly based on women's labour and management. The share of family income coming from women's labour has increased gradually from about 10% to about 35% in the last five years. Therefore, the economic status of women has strengthened, and the women have gradually become the underwriters of a better life in the New Fishing Villages.

Women become the New Fishing Village promoters. Fishing villages are distinguished from other types of rural villages in that men are more involved in fish production activities offshore, often for months at a time, or on lakes and rivers. Thus, the burden of upholding local customs, culture and the construction of civilisation has fallen on the women.

This social building work could include moulding civilised families, discarding feudal and foolish customs, boycotting gambling activities, promoting family virtues and social morality, and advocating a healthy and civilised scientific way of life. From our interviews, the women reported a strong sense of responsibility; they participated strongly in social and public affairs, public welfare undertakings, maintained social stability, helped disadvantaged groups and undertook social services. They actively participated in local civic morality education and juvenile moral education activities, made optimal use of education and demonstrated care for teenagers' growth. Their tasks also included consciously resisting social evils, actively building unity and friendships and ensuring harmonious progress in carrying forward the spirit of the era to build a good social environment, and maintain social stability.

For example, Dai Shan town, Zhejiang Province has 7 townships, 39 communities and 86 villages. It established more than 70 teams of amateur art and health groups, more than 95% of whose members were women. They were very active and carried "culture into the community". In China in recent years, village cultural construction has actively mobilised and organised broad women's participation in community cultural and social activities. Annually, community-based

amateur art teams participate in county-wide mass theatrical performances. Literacy teams participate in provincial and municipal level stylistic events and guide women in mutual exchanges. Women gain skills, enjoy the events and make common progress towards a better spiritual and cultural life.

Women as the New Village environmental and neatness pioneers. Throughout China, women's groups have taken up the cause of creating "clean and green" local living spaces. For example, in the August 2009 survey conducted in Xiang Shan town, Ningbo, Zhejiang, the county Party committee and the Women's Federation in Shi Pu town hosted a symposium in East Village on "Constructing neat and beautiful courtyards inside homes"; more than 20 East village women's representatives attended. The FuDaiHui East village county Party committee and the Women's Federation joined with the county Party committee and the Women's Federation of Shi Pu town women's federation to establish several teams, led by the team for "neat courtyard inside and outside, to build a better homeland". Other teams included: "propaganda education team", "cleaning protection green team", "supervision and evaluation team", and three teams of female volunteers. The women's teams worked out of East village to create a "beautiful courtyard" and "clean courtyard" approach for Zhejiang's fishing industry.

Women managers become the New Village "management democracy" practitioners. "Democratic administration" is an important New Village construction standard. Women are participating in greater numbers in New Village democracy management and their management is seen as more democratic than that of the men.

In recent years, women's efforts have been appreciated as they are noted for earnestly studying the new policies of the State and local laws and regulations, enhancing their political consciousness, and enthusiastically taking a larger part in grass-roots democracy. In their host villages, the women's active participation in building socialist democracy, raising democratic consciousness and participating more actively in politics is important to constructing a harmonious society and the New Fishing Villages,

In a survey of 98 women in the village of ZhiWei, one of the 86 administrative villages of Dai Shan town, Zhou Shan, Zhejiang, women accounted for 24% of the officials and in another village with 103 officials, women accounted for 28%, including eight Seat directors and three village party secretaries. In the survey, women were asked if they would stand for election as cadres when the chance arose. Most answered that they were willing. When asked what they considered the public affairs issues of greatest concern in the village, more than ten selected medical and health as their first concern, followed by villagers' electoral problems, then collective welfare. In fishing village rural elections, women's turnout reached 95%.

A batch of able women leaders has begun to emerge to represent and safeguard women's interests and serve as the women's "spokesperson".

Women in New Villages play important roles in finding the problems and solutions

Although the New Village construction should benefit women and increase their rate of participation, during our surveys we still noted that women's achievements were lower than expected and that women's development still faced many problems. Therefore, further efforts are needed to fully utilise woman's contributions in the service of New Village construction. Three areas were identified, namely: strengthening women's grassroots organisations, improving women's career and economic development opportunities, promoting the role and opportunities for women in New Village construction.

Strengthening women's grassroots organisations. "Women hold up half of the sky" and women's grassroots-level organisations are the cornerstone of the New Village construction work because, if given full effect, they can help guide fishing village women towards greater workforce participation, greater income and participation in grass-roots democratic management. The New Village construction process still has some women's organisational issues, such as inadequate women's organisations, lack of organisations in some areas, and the limited ability of women in New Village construction approaches. To overcome these problems, the Party organisation can assist by helping improve grassroots women's organisations and their understanding of issues and solutions, thus expanding the outreach to women. To adapt to the needs for constructing New Socialist Fishing Villages, grassroots women's organisations need to be promoted as a basic building block of all the New Village standards.

Improve women's employment and career development support. Fishing village industrial structures are changing constantly, potentially giving more employment opportunities to women and strengthening their contributions to New Village construction. But the study found that many women in fishing villages still are not employed and have not mastered the skills required for jobs, do not have sufficient training and are not sufficiently aware of employment opportunities.

Active measures are needed to maximise women's entrepreneurship. One measure could be to construct a fishing village women's employment information network platform. This could provide in-depth information on labour availability such as unemployed personnel, laid-off workers and family members seeking work, employment information, such as unemployed women's ages, educational levels, special skills, and details of jobs available, employment, social security and other service assistance available.

A second measure could be to improve women's job skills through relevant and effective training aimed at different ages and cultures, technical skills and at training for different periods. A third measure could be to improve women's entrepreneurship. As the State encourages the development of the private sector, it assists start-ups through helping match technologies, career development, seminars, etc.

Outstanding entrepreneurial women could be publicised to promote opportunities to New Fishing Villages to create more self-employed women.

Promote roles and opportunities for women in New Village construction. The atmosphere of New Village construction can influence women. Propaganda can be used to create a good social environment. The women's federation could publicise the roles of women in construction of New Fishing Villages, find out women's concerns in the reforms, support women to participate in the construction of New Fishing Villages, and enhance public perceptions of New Village construction. Grassroots women's organisations can be strengthened to assist the construction. Fishing village grassroots women's organisations are directly connected to the fishing village women and their public works. They are the key to mobilising fishing village women to participate in the construction of New Fishing Villages.

Conclusion

China is undergoing an historic rural transformation in which the construction of New Fishing Villages is a challenging long-term historical task. Given women's increasing dominance of the rural labour force, their greater social and economic roles, skills and education levels, along with related organisations, fishing village women have the opportunity to lead the construction. Guided by the scientific development concept, they can change the path of development, be innovative and actively develop the working mechanisms for urban and rural harmonious development inherent in building New Socialist Fishing Villages.

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Processing of Frigate Mackerel *Auxis thazard*: Post-harvest Gender Roles

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Abstract

In Danao City, Philippines, processing of tinap-anan, or hot smoked frigate mackerel (*Auxis thazard*), is the main livelihood of about 30 fish port vendors. This is a tasty foodstuff with a shelf life of three days at ambient temperature and five days if refrigerated. In 2005, research on histamine levels in tinap-anan found that the product, when processed using traditional methods, would be safe for human consumption if properly handled. In June to December 2010, the roles of women and men in the different stages of producing a safe product were studied. The processors were the offspring of the traditional processors. Eighty-two percent of the present processors were female and 18% were male. Women marketed the product through retail stores and direct selling. The men caught the fish, were responsible for assuring quality at sea, and purchased raw materials from fish ports. Men delivered the processed tinap-anan to restaurants outside the fish port while women delivered it to restaurants inside the port.

Introduction

The Philippines is one of the top fish producing countries in the world. Over 1.5 million people depend on the fishing industry for their livelihood. The Philippines is also considered a major tuna producer in the Western and Central Pacific Ocean (WCPO). Tuna is one of the top export fishery commodities and its products are exported fresh/chilled/frozen, smoked/dried and canned. Most of the Philippine municipal tuna catch (110,295 tonnes of oceanic tunas in 2008) is landed as wet fish at thousands of landing sites all over the Philippines. Much of the municipal catch is processed by drying, salting and smoking (Barut and Garvilles, 2009).

The commercial fisheries catch in 2003 comprised: small pelagics (59.6%), tunas (36.2%) and demersal fishes (4.2%) (BFAR, 2005). Post-harvest support facilities that provide access to salt, ice and cold storage are lacking in strategic locations in many areas. Espejo-Hermes (2004) noted that around 70% of the total catch was consumed fresh or chilled, while 30% was processed into cured, canned or frozen products. The bulk of cured fish and fishery products are consumed locally, and processing into traditional products, such as salted, dried, smoked and fermented fish is still widely practiced. These products are mainly produced where there is a guaranteed supply of raw material.

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The processors are generally small-scale, family establishments that have limited capital and do not receive assistance from government agencies and financing institutions. The processing methods they employ vary considerably, resulting in inconsistent quality and limited shelf-life of finished products.

One fishing port for landing tunas is Danao City, Cebu, Philippines. In the 2007 census, it had a population of 109,534 people. Approximately 30 households in Danao City depend on smoke-curing tunas as their chief means of livelihood. Bahian (2005) studied the processing of frigate mackerel (*Auxis thazard*), a member of the Family Scombridae that includes tuna, and determined the histamine level of smoked frigate mackerel. This study found that if fresh frigate mackerel is processed immediately, the hot-smoked product is safe. If frigate mackerel is kept at ambient temperature for one hour before smoking, eating the product leads to detectable itchy sensations. The histamine level of frigate mackerel smoked after one hour at ambient temperature was 11.12 $mg \cdot 100\ g^{-1}$ sample or 111 ppm, higher than the recommended safe level of 10 $mg \cdot 100\ g^{-1}$ sample or 100 ppm (Huss et al. 2003).

The present study was conducted in 2010 to investigate the roles of women and men in the processing of smoked frigate mackerel in Danao City.

Methods and Findings

A gender role questionnaire was prepared, based on one developed by Lolita V. Villareal and Jeremy M. Turner (Villareal and Turner, 2004). It was administered by Cebu Technological University (CTU) researchers to 30 smoked frigate mackerel processors engaged in processing in Danao City. Of the processors interviewed, 25 (83%) were women and 5 (17%) were men.

Respondents Backgrounds

Of the female respondents, 22% were aged 50-59 years, 17% were 40-49 years, 22% 30-39 years, 13% were 20-29 years, and one was below 20. Eighty-four percent (84%) of the respondents were married, 96% were literate, and 96% practiced the Roman Catholic religion. All were Cebuanos. Sixty percent of the female respondents were married, with children from ages one to nine and 25% were nursing mothers. With respect to family planning, 83% were aware of the methods and practiced family planning; 75% of the nursing respondents currently used family planning methods.

Eighty percent of the fathers of respondents were *tinap-anan* producers. The technology of *tinap-anan* processing was therefore largely acquired from their parents.

Work/Occupation

All female respondents processed frigate mackerel as their main occupation. Marketing and part-time utility work in the fish port were subsidiary occupations for the women (Table 1). The male respondents were fishers, for whom processing fish and marketing the processed fish were subsidiary occupations. Fifty percent of the respondents had processed frigate mackerel as their means of livelihood for the past 25 years and, as mentioned above, most had transferred the craft/technology to their children.

Table 1. The main and subsidiary work/occupation of the respondents.

Work/Occupation	Main		Subsidiary	
	No. Women	No. Men	No. Women	No. Men
Fishing in the open sea	0	5	0	0
Fish Marketing	0	0	25	1
Fish Processing	25	0	0	2
Service sector employee	0	0	0	2
Total	**25**	**5**	**25**	**5**

Survey respondents typically worked 40-48 hr wk^{-1} on their main occupations, as fishermen or fish processors, and 8-15 hrs wk^{-1} on their subsidiary activity, mostly marketing *tinap-anan*. The women who processed *tinap-anan* as their main occupation and marketed fish as their subsidiary work, performed both tasks within the same week. The CTU researchers found that women processors processed *tinap-anan* immediately after obtaining it from the fishing boats near the fish port.

Gender Roles

Table 2 summarizes the roles of women and men in the *tinap-anan* industry of Danao City fish ports. The male respondents were the fishers who caught the frigate mackerel and supplied the fish to the Danao fish port. The men cleaned and sanitized the paraphernalia used for fishing and storing their catch. They also equipped their boats with sufficient ice to hold their catch at the appropriate temperature. Men's roles also included purchasing fish for smoking, smoking fish, and transporting processed *tinap-anan* to restaurants outside the fishing port.

The female respondents who processed fish also performed two additional roles. They were port fish samplers, selecting individual fish for processing, and also fish handlers, transporting the fish from the fish port to their workplaces. Typically, the female processors marketed their product through retail stores and by direct selling inside the fishing port area.

Table 2. The roles of women and men in the *tinap-anan* industry of the Danao City Fish Ports.

Men	Women
Fishing	
➢ Fish as crew on local vessels ➢ Boat cleaning, sanitizing, repairs and maintenance ➢ Fishing gear maintenance and construction ➢ Proper fish handling and delivery to shore	
Processing	
➢ Purchasing and icing fresh frigate mackerel ➢ Hot-smoking cleaned frigate mackerel into *tinap-anan*	➢ Port samplers ➢ Observe proper icing of fish ➢ Preparing fish for processing and proper application of chilled brine to fish ➢ Hot-smoking cleaned frigate mackerel into *tinap-anan*
Marketing	
➢ Delivering processed *tinap-anan* to restaurants	➢ Marketing processed *tinap-anan* on a retail or wholesale basis to restaurants situated on the 2nd floor of the fish port

Women dominated post-harvest processing of *tinap-anan*, marketing the product in the fish port, and ensuring product safety for human consumption. Men dominated fishing, fish handling, and ensuring fish quality. They also transported fish to restaurants outside the fish port. The women's and men's roles were complementary and important to product quality at different stages from capture to consumption.

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A Study on the Availability and Utilisation of Microcredit in the Traditional Fisheries Sector of Kerala, India

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Abstract

Microcredit from microfinance institutions is increasingly common in India and is used for activities from simple thrift to credit support for income generating activities. In coastal fishing communities, a large number of microfinance initiatives are active. Two major sources are Government schemes through fishermen's cooperative societies and others through non-government organisations. These have made credit accessible to people in fishing communities, especially fisherwomen. Many microfinance schemes provide credit to develop microenterprises but the funds instead have been used for household needs and only minimal tangible productive assets were created. Through household surveys, the present paper examines how microcredit is used by fisherwomen and fishermen in Kerala, India. It explores if the availability of microcredit has brought about any changes in livelihood options, household income and expenditure, social status and decision making among the fisher population, especially fisherwomen.

Introduction

Institutions and instruments of microfinance are increasingly common and are providing access to credit for vulnerable and disadvantaged groups such as resource poor fisher households in the traditional fisheries sector of countries like India (Tietze and Villareal, 2003). The ADB (2000) defines microfinance as "the provision of a broad range of financial services such as deposits, loans, payment services, money transfers and insurance to poor and low-income households and their micro-enterprises". While credit remains the main service available to the rural population through microfinance schemes, the schemes are slowly diversifying their services into savings and other products. Credit continues to be popular as this is the most deficient resource in rural areas. According to the Reserve Bank of India (RBI, 2011), microfinance is a tool for economic development with the objective to reduce poverty.

The ownership and governance structures have been used to classify microfinance institutions (MFIs) (Mahajan and Nagasri, 1999; Haq et al. 2008). In India, formal financial institutions such as banks or State cooperatives operate microfinance through various schemes, either through specialised subsidiaries or through cooperatives or other agencies. A second common type of institution is the non-government organisation (NGO) run MFI, in which NGOs operate and manage the operations of microfinance regulated by guidelines of the Reserve Bank

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of India (RBI, 2011). In both types of MFI schemes, credit is largely channeled through Self Help Groups (SHGs).

Materials and Methods

The present study was carried out from August 2010 to January 2011 in Ernakulam and Tiruvananthapuram districts of the state of Kerala, India. Ernakulam is in central Kerala while Tiruvananthapuram is the southern-most district of the state. Fishing is important in both districts. In 2005, 14,399 fishermen were active in the marine sector of Ernakulam district; and in Tiruvananthapuram the number was 47,428. The fisher populations (all persons in the fishing communities) were 0.077 million and 0.18 million respectively (http://www.fisheries.kerala.gov.in/prof-dist.pdf).

For the study, MFI's were selected taking into account their operational mechanisms and governance structures, and selecting Government and non-government MFIs. The respondents then selected broadly also fell into two groups depending on the MFI they took credit from, i.e., microcredit from Government MFIs (Govt_MF) operated by fishermen's cooperative societies and microcredit from NGO-operated schemes (NGO_MF). Respondents from each of the two types of MFIs were selected to examine whether there were differences in the terms of microcredit and its utilisation.

The tools for data collection included focus group discussions with beneficiaries followed by collection of information from 130 respondents, 105 fisherwomen and 25 fishermen through a structured questionnaire (NABARD, 2002; ADB, 2007, Gopal et al. 2010). All the respondents were from the traditional fisheries sector. The sample comprised more fisherwomen than fishermen because we observed that 85% of the beneficiaries who took credit from the various microfinance schemes in the coastal areas were fisherwomen.

Results

Socio-demographic profile

The average age of respondents in both the Govt_MF and the NGO_MF was around 40 years (Table 1). Among the beneficiaries, 33% of respondents completed middle school, 21% completed primary school and 16% achieved secondary education; 10% were illiterate.

The average family size of the respondents' households was 4.7 and 78% of the respondents lived in nuclear families. This high rate of nuclear families indicates that families are becoming smaller and the joint family system is breaking down. All the respondents were married.

Table 1. Socio-economic particulars of respondents.

	Govt_MF Men	Govt_MF Women	NGO_MF Men	NGO_MF Women	Total All
Age (years)	41.9	43.8	46.7	44.7	44.3
Education (%)					
Illiterate	9	12	7	6	10
Can read and write	9	8	29	16	12
Primary	9	25	7	22	21
Middle	73	33	29	22	33
Secondary	0.00	15	7	28	16
Collegiate	0.00	7	21	6	8
Family type (%)					
Nuclear	82	88	57	66	78
Joint	18	12	43	34	22

Potable water and toilets are major problems in coastal areas (Kurien and Antonyto, 2000) but in this study we found that 92% of the respondents had access to these.

Almost half the respondent households had a television set (Table 2). Educational institutions and health facilities were also accessible. The average monthly household income of the respondents was around US$213. Respondents gathered information from newspapers, radio and television. Among men, 4% of respondents did not read newspapers and 12% did not watch TV; among women, 61% did not read newspapers. About 73% of women and 56% of men watched TV regularly.

Table 2. Household possessions, access to education and health facilities and income of respondent households.

Household possessions	
Television	51%
Refrigerator	15%
Either Bicycle or Motorcycle	25%
Radio	9%
Distance to education institutions	
Primary school	1 km
Secondary school	2 km
College	10 km
Access to health facilities	
Primary health centres (PHCs)	1.26 km
Hospitals	4.64 km
Average monthly income	
Govt_MF (Men)	US$469
NGO_MF (Men)	US$224
Govt_MF(Women)	US$195
NGO_MF (Women)	US$161

Reasons for taking Microfinance Credit

Out of the total respondents in the study, 54% in the Govt_MF group and 59% in the NGO_MF group took credit to start up micro-enterprises. Depending on the activity for which credit was taken, the amounts ranged from US$100-200 (approx.). Other respondents used credit to meet household consumption expenditure, including carrying out household repair work. While 58% of fishermen availed of credit only for starting an enterprise, only 40% of fisherwomen used it for that purpose. Credit from Govt_MF schemes was usually linked to micro-enterprise development but the NGO_MF schemes were more flexible, with the stress being more on prompt repayment rather than on whether it was used for income generating activities

Knowledge about loan and repayment

The respondents' knowledge of the schemes from which they were taking credit was assessed to find out whether they understood the terms of the loan and their associated liabilities. Out of the respondents, only 20% of Govt_MF respondents and 48% of NGO_MF respondents had sufficient knowledge of the schemes, even though such information was provided by the agencies operating the scheme, i.e. the cooperative society or the NGO.

Repayment schedule

One of the advantages of microfinance credit is that repayment options are flexible. The repayment options were daily, weekly or monthly. The average monthly repayment was Rupees 2,559.65 (approximately US$51). Only 23% of the respondents were regular with their repayments, out of which 66% were women. Men had higher rates of default. Most (85%) of the respondents repaid different amounts for each installment, suggesting that they were making repayments according to their means. Monthly repayments were made by 79% of the respondents and 20% of them repaid weekly. Very few repaid on a daily basis.

Impact on household income and expenditure

The perceived impact of the microcredit on household income was assessed. Of fishermen and fisherwomen, 64% and 39%, respectively, felt that their family income levels had increased as a result of the microfinance supported enterprises. More fisherwomen respondents using Govt_MF schemes (63%) perceived that incomes had increased as a result of employment generated from the small investments made. Only 38% of NGO_MF respondents stated that their incomes had risen. The average monthly earnings from the enterprises were Rupees 3,099.85 (approx. US$62).

Major household expenditure had increased. Of the respondents, 39% had made some changes such as adding a room, changing the roof or building a toilet. About 83% of the respondents had also added some household items such as a refrigerator and furniture. The increased expenditure at household levels may not have reflected the increase in incomes from enterprises as 42% to 47% of respondents used the credit taken to meet household requirements

including household repairs. Thus, some of the credit may have gone directly to household expenditure.

Change in social status

Of the respondents, 83% felt that their social status had increased as a result of the credit. The majority of the fisherwomen who had started enterprises felt that their status in their community had increased. Another factor that could be linked to social status was the extent of physical mobility. In the present study, 61% of fisherwomen respondents felt that their mobility had increased as they now travelled more outside their villages, while 39% felt that there was no change, or that restrictions had increased (Fig. 1).

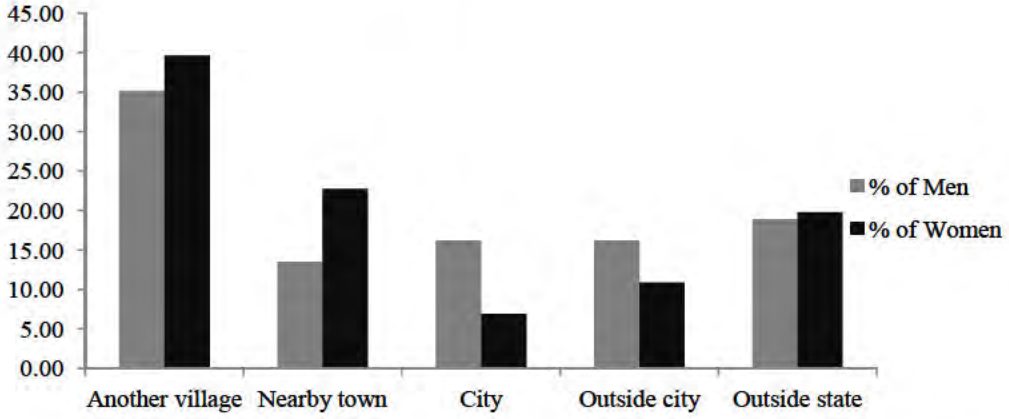

Fig 1. Changes in physical mobility of men and women respondents, as measured by movements outside their native villages.

Impacts on decision making

In this study we examined respondents' impressions of economic decision making with respect to the way the micro-finance credit is used and the decisions regarding its use. Social status is often related to economic independence and the inability to handle finances and make financial decisions are often the reasons for low or secondary social status within the family. In the present study, 33% of Govt_MF respondents and 47% of NGO_MF respondents indicated that the decision to take credit was a joint decision. Similar results were reported for decisions on household purchases such as food, clothing, health, education and marriages of children.

Discussion

This study showed that microcredit, through Government and NGO microfinance schemes, was a good option for meeting the general credit needs of the rural poor. The expansion of microfinance schemes has brought rural households greater access to credit for a number of purposes. In many cases the credit taken has been used to meet household consumption needs rather than invested in income generating activities. The sizes of microfinance loans were small and their use helped smooth household consumption and reduced expenditure uncertainties

(Tietze and Villareal, 2003; ADB, 2007) and thus helped families by "relieving seasonal liquidity crises that visit poor families" (RBI, 2011). Meyers (2002) observed that the poor actually needed access to long term credit rather than one time support and Navajas et al. (2000) pointed out that short term credit worsened the welfare of the poor.

The results of the present study tended to support the view that the availability of microcredit may not result in tangible asset creation to sustain employment and income in rural communities. As observed in the ADB (2007) study in five operational regions in Bangladesh, Philippines and Uzbekistan, the poorest households did not generate enough profit to significantly increase household incomes.

The link between the change in household income and the availability of and accessibility to microcredit may not be direct or simple. Karmakar et al. (2009) observed that in Bangladesh, the income of beneficiaries had actually risen by 2.8% to 12.2%, but other dimensions like training, timeliness of the credit and participation in decision making were important for ensuring long term livelihood security.

In the present study it was observed that the knowledge about credit and repayment provisions among NGO_MF respondents was higher because the NGO_MFIs stressed repayment. Field staff made house visits and collected dues. The repayments by the Govt_MF respondents were largely voluntary and facilitated through a group coordinator of the fishermen's cooperative society who ensured that regular group meetings of beneficiaries were conducted and appraisal of the repayments and dues was carried out. Lending to SHGs has been effective in enhancing repayment behaviour (Karlan, 2006). The frequency of repayments also tends to be higher for microfinance credit (RBI, 2011) when compared to traditional loans from traditional financial institutions. The flexible options for repayment could be one of the reasons for higher repayment percentages.

Karmakar et al. (2009) found that fisherwomen beneficiaries acquired assets of their own and exercised power in household decision making, thanks to microcredit. This study also revealed that fisherwomen felt that their social status and decision making role within the family had increased. However, other studies showed different results, namely that men tended to decide on resource allocations, and the microfinance initiatives were not always achieving the desired results of women's empowerment (Kabeer 2001; NABARD, 2002; Swain and Wallentin, 2007).

A possible limitation in the present study was selection bias as all respondents had taken microfinance credit and the study lacked a control group. Also, the recall method was used to elicit information and this can be subjective and the study may have failed to fully isolate the precise impacts of microfinance. Duvendack et al. (2011) in a systematic review of microfinance studies has also pointed this out as a major drawback in most studies.

Credit needs of the rural population tend to be overlapping and credit requirements for employment generation cannot strictly be separated from credit needs for household consumption. Whether credit taken for one purpose is diverted for other requirements can be studied by taking up micro-level studies. Lack of generic tools to measure the impacts, especially to quantify the role microfinance plays in the empowerment of women, is a major constraint. Further studies are required in small scale and traditional fishing communities.

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Gender Roles in the Seaweed Industry Cluster of Southern Philippines: The DICCEP Experience

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Abstract

Recognising the long value chain of seaweed production, a seaweed industry cluster was developed to enhance seaweed production in Davao, southern Philippines. The seaweed industry cluster was an inter-agency, multi-sectoral initiative to develop a road map for the seaweed industry and its stakeholders in Davao Region. This was designed to increase the income of fisherfolk, improve the regional contribution of the industry and to sustain productivity and competitiveness. Based on the industry cluster approach, a capability building project was implemented through the Davao Industry Cluster Capacity Enhancement Project (DICCEP). After training on the industry cluster approach, three pilot projects were implemented. DICCEP: (1) established seaweed farms for the benefit of farmers, (2) created a directory of seaweed farmers and traders, and (3) developed a database on seaweed production. It also trained 95 farmers and housewives on seaweed value adding and entrepreneurship. The project helped farmers to generate income, and processors to develop new value-added seaweed products**.** Throughout, DICCEP was sensitive to the gender breakdown among participants in the Cluster. Although men took the main leadership roles, women were active in production and, particularly, post-harvest processing. Men were also active in post-harvest processing and their skills should not be overlooked.

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Introduction

The seaweed industry is an important aquaculture industry in the Philippines and, in 2008, accounted for nearly 70% by volume of aquaculture production. More than half of the production came from Mindanao regions but, within Mindanao, the Davao Region contributed only 0.12% to the total Mindanao production in 2003. From this low base, however, the production volume has been increasing rapidly: the 2004 production was 80% higher than that for 2003, and the 2005 production was 53% higher than the 2004 production.

By province, within the Davao Region, Davao del Sur accounts for 67% of the total regional output followed by Davao Oriental at 33%. In 2005, the prospect of establishing a processing plant in Davao City encouraged the industry to continue improving its production performance.

Compared to other Mindanao regions, the Davao region has the lowest utilisation of its total potential seaweed production area. The existing area planted with seaweed is 447 ha with Davao del Sur accounting for about 50%. Between 2005 and 2010, the utilised area was expected to expand by about 188 to 252 ha. Yield was also expected to increase to between 2,511 and 2,762 tonnes, based on the current rates of 3.93 tonnes$\cdot$ ha^{-1}. Davao Oriental was also expected to improve its yield as it had the largest potential area for expansion (BFAR/DTI, 2005).

Seaweed production in the Davao region is dominated by small-scale farmers who still suffer from problems of low productivity due to unfavourable farm locations, diseases and vulnerability to markets that they access through rural traders, wholesalers, retailers and processors. The produce of the more progressive farmers usually passes more directly to markets compared to the longer routes used by small-scale farmers. The progressive farmers have better access to transport and so can sell directly to the big exporters and/or processors. The produce of the small-scale farmers, on the other hand, has to pass through a series of middlemen before it reaches the exporters and/or the processors. Because exporters or processors determined the buying price, the small-scale farmers who are the majority of the producers receive only a small part of the value and profit. A large share goes to the middlemen, assemblers and wholesalers. The large-scale exporters/processors may be subsidiaries of foreign processors, independent exporters or processors/exporters. Growers have limited market information about the buying prices, and they have limited control over the pricing of products. As a result, they are poorly rewarded for their efforts and risks. Post-harvest inefficiencies also cause wastage and reduce both product quality and the incomes of farmers.

The seaweed industry cluster approach

To support the various actors in the industry, the seaweed industry cluster approach was implemented to enhance seaweed production in the region. The Manual of Operations of the DICCEP described the industry cluster concept and its approaches (DTI-JICA, 2010).

An industry cluster is a geographic concentration of a specific industry together with its supporting and peripheral industries and service providers. It has potential to address four important factors for economic development: (1) demand conditions, (2) input factor conditions, (3) firm structure, strategy and rivalry, and (4) related and supporting industries. A cluster approach is an organised effort to increase the growth and competitiveness of a cluster within a region, involving cluster firms, government and/or the research community, and leveraging the potential of the industry cluster.

The Davao Industry Cluster, established in June 2009, is led by a Cluster Team that is the core organisation of the cluster approach. The Cluster Team's role is to maximise the advantage of industry clustering by networking with relevant stakeholders and support agencies, planning the actions of initiatives of the Cluster, and carrying out activities to improve competitiveness and growth of the industry.

Gender roles in the Davao industry cluster for seaweed

Under the Cluster Team for the seaweed industry cluster, Project Implementation Teams (PIT) (or Technical Working Groups (TWG)) are organised to implement the project efficiently. The activities of the TWG/PITs enable proactive collaboration, particularly securing the participation of those who have expertise in the diverse and relevant fields. A gender analysis of participants in the teams showed that project management is not totally dominated by men but also includes women, e.g., two of the six members of the Cluster Team are women. However, the team leaders are usually male.

The Cluster aims to promote a globally competitive seaweed industry to improve the socio-economic conditions of the stakeholders. To achieve this, the Cluster collaborates with the private sector, government agencies, academe, fisherfolks and other stakeholders for a well-coordinated approach and unified direction. It includes several different associations of seaweed farmers, local buyers and traders, processors, academics and concerned government agencies.

After production, harvesting and early stage processing, dried seaweed from the Davao region is sold to local traders/buyers in Davao del Sur, Davao Oriental and Davao City. Once the required volume is aggregated, the traders sell their stocks either to Martsons Inc., the sole seaweed processor in the region, or to seaweed processors in Cebu. Three projects carried out by participants in the Davao Industry Cluster illustrate the characteristics of the industry cluster approach and the gender roles in the Davao seaweed industry.

Project 1 – Establishment of Model Cooperative Farms. In 2010, recognising the large potential of the seaweed industry, the Davao Seaweeds Industry Cluster Team, which is a core team composed of representatives from different organisations, identified two potential municipalities for the establishment of Seaweeds Model Farms. These were farms at Tambo, Island Garden City of Samal in Davao del Norte (initially with one model farm) and Punta Biao, Digos City in Davao del Sur

(also with one model farm). The model farms were established in order to address the issue of low productivity due to such causes as unfavourable weather and vulnerability to diseases. The project was also designed to assist farmers address financing and marketing concerns.

To ensure seaweed quality and to reduce post harvest losses, technicians from the Philippine Bureau of Fisheries and Aquatic Resources (BFAR) and local consultants provided the 13 Punta Biao and 21 Samal farmers who operate as a group on the two model farms with hands-on development training. The training courses conducted were: (1) comprehensive basic and upgrading skills on seaweed farming incorporating good mariculture practices and proper harvesting and drying; (2) basic entrepreneurial skills and knowledge; (3) organisational development and value formation; and (4) an orientation seminar on financial record keeping and credit raising. The training strengthened cooperation and provided farmers with the competence to manage the seaweed farms professionally.

The gender participation was balanced at Punta Biao in Digos City (total of 13 farmers) but women dominated (71% of the 21 farmers) at Tambo in Samal.

Project 2 Profiling of Seaweed Production in Model Farms. In 2009, academic institutions were included in the Project. Schools, universities and colleges, and the Philippine Council for Aquatic and Marine Research and Development (PCAMRD) Zonal Center V, which is mandated to undertake research and development functions, participated. A database of seaweed farms in Davao Gulf was created, so the farms could be monitored to establish trends in production and identify industry gaps and potential areas for intervention. Academics also conducted a value chain analysis of the seaweed industry in major production centres in Davao region and on the model farms. The aim was to establish baseline information to help producers improve the efficiency of the marketing system and increase their incomes.

In total, 99 seaweed farmers and traders were surveyed in Punta Biao and 25 in Samal. Males carry out about 60% of the seaweed farming in each area. Of the two traders in Punta Biao, one was female and the other male. Trading in Punta Biao was dominated by females (six of seven traders).

In 2009, 21 producers in Tambo, Samal, were surveyed to determine their full range of activities. For all of the seaweed producers who responded from Tambo, seaweed farming was their primary source of income and fishing was their secondary income source. All of the seaweed farmers operated their seaweed farms on a household scale, with members of the family as helpers, and not through a cooperative or organisation. Thus, the Project's efforts to create the industry cluster and help the farmers cooperate in grading, packing and storing was a contribution to more efficient marketing. The seaweed farms of the respondents were 1-3.2 ha.

Of all the respondents, including seaweed farmers and others, most fished as their primary occupation (56%), with seaweed farming as a secondary source of income. The remainder, 44% of respondents, farmed seaweed as their sole source of livelihood. Other secondary sources of income included fishing (39%), sea cucumber collecting (29%), fish vending (14%), managing a *sari-sari* (small goods) store (5%), working in a rice mill (4%) or as a security guard (3%), while 1% each gained income from mat making, working as a barangay health labourer, laundry worker, construction labourer and driver. All respondents who were seaweed growers were members of a seaweed association and they operated their own seaweed farms. From among the respondents who engaged in seaweed farming as a secondary source of income, most of them (80%) owned a seaweed farm of 0.25 ha, 18% of them have 0.5 ha, and 1% own 1-1.5 ha farms.

Project 3- Promotion and Training Programme for Seaweed Value Adding. Project 3 aimed to: (1) create greater demand for seaweed by promoting value-added products, (2) provide training on the technology for seaweed value adding, (3) help promote the nutritional value of seaweed, (4) contribute to poverty alleviation, and (5) provide training to change the attitudes of farmers.

Many issues contributed to the limited production and utilisation of seaweed, among these were: (1) lack of skills on value adding; (2) low awareness on the nutritional values of seaweed; (3) a negative attitude among farmers, and (4) lack of training and promotion programmes. To address these issues, efforts were geared towards promoting value-added seaweed products and developing skills for production to augment income of farmers as well as reforming the attitude of farmers. The seaweed farmers who took advantage of the value adding courses were gender balanced in the Punta Biao course but women dominated in Samal (15 out of 21 attendees).

Seaweed is in demand due to the variety of its uses. With its high nutritive value, local utilisation is not limited to fresh salad preparation or dried forms for phycocolloid extraction. Seaweed is also included in foods such as *Eucheuma* cupcakes and tarts and in organic fertilisers such as KD Foliar Fertiliser. In Samal, more women than men (about 70% of 21) were involved in seaweed value-adding whereas in Punta Biao the female and male numbers involved in value adding were similar. This implies that both men and women show skills for value adding.

Conclusion

The Davao Seaweed Cluster provided an integrated platform for understanding better the industry structure, engagement of women and men in different parts of the supply chain, and issues faced by the industry. The Cluster also enabled the producers to be reached and involved in planning and training, including value adding activities. It also drew in the combined skills and knowledge of the farmers, private sector, government and academe.

The Cluster in the Davao region, Philippines, was found to have both female and male participants. Even at the management level (Cluster Team), women have roles in planning, although the Cluster Team is led by a man. At the seaweed production and value adding level where farmers and housewives as family members are involved, a greater percentage of women are involved in Samal, Davao del Norte than in Punta Biao, Davao del Sur. The sample sizes on the model farms were small and few strong conclusions can be drawn on the difference. Men as well as women were found to have a significant role in value adding in both model farm locations.

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Empowerment of a HIV/AIDS Women's Group through Mangulukeni Fish Farm: A Case Study from Namibia

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Introduction

In 2001, the Government of the Republic of Namibia (GRN), through the Ministry of Fisheries and Marine Resources (MFMR) introduced Namibia's Aquaculture policy, *Towards Responsible Development of Aquaculture*. The policy called for the "promotion and development of responsible and sustainable aquaculture". The purpose was to provide a legal/institutional framework for the aquaculture industry to contribute to food security and poverty reduction through employment and to attract foreign investment. In order to stimulate interest in fish farming, the GRN spearheaded aquaculture pilot projects in different regions of the country. In the inland areas, the interest was on fresh water aquaculture where eight fish farms were established in the north and north-eastern regions, farming three spot tilapia *(Oreochromis andersonii)* and the African sharp tooth catfish *(Clarias gariepinus)*. The farms were to be under the technical supervision of the MFMR together with the community members who benefit from farm profits. An integrated aquaculture fish farming approach was adopted. For the coastal towns, the interest was mostly in commercial ventures for export, such as oysters to South Africa, Europe and Asia, abalone to Asia and seaweed to Asia.

In its mid-term and long-term planning, the GRN regarded food shortage and poverty reduction as the priorities for aquaculture. Aquaculture campaigns were targeted at the north and north-eastern regions where the majority of the population is concentrated. Aquaculture in Namibia is still in its infancy. The industry is hampered by the lack of capital, training and expertise. However the response to the GRN initiatives was encouraging and communities have started benefiting through fish as food and monetary income, even though on a small scale. Commercial farmers are also practicing aquaculture by stocking ponds and dams on their farms, also on a small scale. Feasibility study and site assessment requests are increasing as communities start their own aquaculture projects. The following case study highlights the result of the Government's initiative involving women living with HIV/AIDS in fish farming.

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Description of Project

Oshikuku Support Group (OSG) was established in January 2007 in conjunction with St. Martin's Hospital in Oshikuku. The group's purposes are to provide a supportive environment for HIV positive and affected individuals to share their experiences, and to provide counseling to people while they were participating in a group project. After the group was formed, the members decided to begin an income generating project. They chose an aquaculture project. This aquaculture project served as a means to generate income while addressing both economic and psycho-social challenges through group dynamics. They named the project "Mangulukeni Fish Farming Project", from the Oshiwambo word meaning to "be free". This project urges members of the group and the larger community to *be free* to share their experiences with each other, to *be free* of stigma associated with HIV/AIDS and to *be free* to live a healthy life.

Implementation of the aquaculture project began in 2007, with the guidance of MFMR. The members decided to start farming with three spot tilapia *(Oreochromis andersonii),* which is a delicacy among the local people. Mangulukeni Fish Farm had its first harvest in the summer of 2008. The second harvest followed in September 2009. Since inception, this project helped to raise awareness of HIV/AIDS in the Omusati region while allowing the members of the Oshikuku Support Group to benefit from the psycho-social, physical and emotional health benefits of participating in a group-based project.

Mangulukeni Fish Farming Project aims to continue as a sustainable and beneficial aquaculture project in the Omusati Region, setting an example for other aquaculture projects, other support groups, and for women in the community in general. This project has been created and run by women, with 10 out of 11 group members being female. This initiative creates a powerful example for the community at large of the strength and success of women and their ability to access the opportunities available to them. Additional direct beneficiaries from this project include the family members and households of all of the group members, totalling 92 people, 46 of whom are children.

History, Structure and Leadership

The idea for Mangulukeni Fish Farm came directly from the members of the Oshikuku Support Group. The group was working with a former Peace Corps volunteer, Julie Garon, at the time. However, the ideas for the fish farm and its motivation came directly from the group members. When the group was initially formed they discussed the need for income generation and brainstormed possible ideas and projects. In the end, they decided on a fish farm based on discussions with the MFMR. The decision was based on the prospect of a lucrative market for selling fish in the Oshikuku area and the general benefits that could be garnered through this project. They then visited an existing pond to learn from people experienced in fish farming. The Chair and Treasurer were elected from among the support group members on a rotating basis. Additionally, a

schedule is maintained each month to detail responsibility for checking the pond, feeding the fish and other tasks throughout the month. One person is deployed each month in case someone else cannot make their shift or needs assistance. These rotating structures of the support group, the leadership and fish pond maintainers, allow all group members to gain leadership and management experience. Leadership training is also planned for all group members.

Challenges

Although Mangulukeni fish farmers have successfully harvested tilapia twice, and remain highly committed, the first two years brought challenges:

- During the first year the group had to determine the best method for selling the fish (by weight in kilograms or by a standard bundle size)
- The harvest yielded small sized fish, compounding the issue as to how best to sell the fish.
- During the second year the group had to deal with a very small harvest due to catfish entering the tilapia pond during the floods of 2009. Unfortunately, the timing of the floods was such that the catfish entered when the tilapia fingerlings were quite small and the catfish ate many of those fingerlings.

The money generated from the harvest was not enough for reinvestment in the project for the coming year and could not provide substantial income to members. This was a learning process. The group remains committed to the project and has been working closely with the MFMR to ensure that the lessons learned from these experiences serve to improve planning and management of the fish pond in future years.

Impact and Successes

Participation in the Mangulukeni Fish Farming Project potentially provides group members with a wide range of opportunities and benefits. The opportunities and benefits include: opportunity for income generation; important source of protein from the fish; fostering of business, management and leadership skills; and development of a sense of belonging, ownership and accomplishment. Each project member is part of a family which also directly benefits from this project and will experience improvements in their quality of life through these benefits. These benefits include the provision of nutritious foods (fish brought home from the harvest), the benefits of additional income brought to the family and the positive experience and skills development of the group members. The project also serves as an overall source of support for group members and their families. The group meets regularly to plan and care for the pond and this allows group members additional time to talk with each other, discuss what is happening in their lives and offer support and friendship to each other. The fact that all of these economic benefits are being brought home by women cannot be

over-emphasized. This provides group members and their families with a sense of accomplishment, independence, self-worth and also encouragement for the younger generation.

In addition, Mangulukeni was awarded with an American Ambassador's Self-Help Project grant in the beginning of 2010 to assist the project with basic and operating costs. Although fish yields were low in the first two years, this project clearly demonstrates the wide array of positive impacts that income-generating group projects can have for the entire community. In addition to business management skills and psycho-social support from their peers and community, members of OSG now hope to be able to gain additional monetary income from the project in future years. The community members of Oshikuku also gain nutritious food and an awareness of HIV/ AIDS, along with a decrease in the stigma associated with the disease. This project has great potential to improve the quality of life of all the group members, their families and the wider community.

The new stage of the project is projected to produce 3-4 tonnes of product in its first year. Production is expected to increase each year, making the project self-reliant, sustainable and profitable in the long run.

ANNEXES

Appendix I

GAF3: List of Reviewers

1. Dedi Supriadi Adhuri
2. Michael J. Akester
3. Ram Bhujel
4. Vina Ram Bidesi
5. Helen Binns
6. Roehlano Briones
7. Pedro Bueno
8. S.K. Choi
9. Cyr Couturier
10. Boris Fabres
11. Nandini Gunewardena
12. Charles Jeeva
13. Vijaya Khader
14. Mecki Kronen Mechthild
15. Dilip Kumar
16. Yumiko Kura
17. Kyoko Kusakabe
18. Mitusutaku Makino
19. Claire Marte
20. Kathleen Matics
21. Janet Momsen
22. Rose Mwaipopo
23. Irene Novaczek
24. Barbara S Nowak
25. Yoshiko Ogawa
26. Jharendu Pant
27. Marilyn Porter
28. Nicole Power
29. Cornelie Quist
30. Annemarie Reerink
31. Budy P. Resosudarmo
32. Arif Satria
33. Susana Siar

SHINING A LIGHT ON GENDER IN AQUACULTURE AND FISHERIES: Report on the 3rd Global Symposium on Gender in Aquaculture and Fisheries

More than 30 years after the 1979 Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), discrimination on the basis of gender and its consequences for society is still struggling for mainstream attention especially in aquaculture and fisheries. The Food and Agriculture Organization's (FAO) of the United Nations 2010/11 flagship report on the *State of Food and Agriculture* highlighted the gender gap in agriculture and estimated that raising women's farm productivity by 20-30% could lift 100-150 million people out of poverty. Held as part of the 9th Asian Fisheries and Aquaculture Forum at Shanghai Ocean University from 21 to 23 April 2011, the 3rd Global Symposium on Gender in Aquaculture and Fisheries (GAF3) of the Asian Fisheries Society shone a light on the gender gap in the fish sector. This, the Society's fifth women/gender symposium, attracted a record number of papers and stimulated lively discussions. It was followed by a FAO Special Workshop on Future Directions for Gender in Aquaculture and Fisheries Action, Research and Development which will be reported on separately.

Common themes were revealed: social context needs deeper diagnosis than gender alone in order to understand the complex "back stories"; women are still invisible and often marginal in the fish sector, trade and in natural resource management, although mainstream exceptions exist; the conundrum that women have access to micro-finance yet fail to build assets; and the struggles and successes of achieving gender equality in institutions. Messages of hope also emerged, founded on intrinsic community and personal resilience strategies and innovations such as training and inclusive governance.

Gender is not a solitary social factor

In opening GAF3, Nandini Gunewardena of FAO urged researchers and agencies to take strategic initiatives to put gender more firmly on the aquaculture and fisheries agenda, especially by building the evidence base, engaging in advocacy and networking to voice issues, focusing on those in which vulnerabilities are strongly gender biased. According to Marilyn Porter, simply adding the gender lens to fisheries research is not enough: social, culture, power and household lenses must also be added. With three examples, she illustrated why researchers need to understand complex "back stories" when helping to improve women's lives. The examples were: Tanzanian development projects that underachieved because they ignored household economies; the social consequences from the collapse of the Atlantic cod fishery which resulted in the re-structuring of coastal communities in Canada; and the power of shore dealers over boat owners and workers in West Sulawesi, Indonesia.

Making women's contributions visible

Regardless of whether the aim is to improve women's position or envision a new more gender equitable society, GAF3 agreed that women lacked profile and recognition in fisheries and aquaculture. To make women's contributions more visible, Dr B. Shanthi shone a light on 13 particularly successful women aquaculture entrepreneurs of Tamil Nadu, India, showing that women can and do work successfully at all levels. The women included one who manages a freshwater prawn (*Macrobrachium)* and crab (*Scylla serrata)* hatchery and five women's Self Help Groups from the Irrular tribal people raising ornamental fish. These successful cases also give clues as to how more opportunities can be created.

Since 1986, the International Collective in Support of Fishworkers (ICSF) has been shining a light on small scale fishers' contributions. Naina Pierri Estades summarised the 2010 outcomes of a major global ICSF initiative to revitalise the "gender agenda" in small scale fisheries. Based on national and regional studies of gender issues, "Recasting the net: defining a gender agenda for sustaining life and livelihoods in fishing communities" culminated with crystalising dreams for the future and an agenda for action. The new gender agenda puts women firmly at the center of gender analysis and stresses that small scale fisheries are those in which women are most involved.

How gender analysis adds value to fish supply chains

What theoretical base can researchers use on which to build their analyses and probe the complexity of gendered impacts in the "global fish food regime?" Using the recent decades of fisheries development in Kerala State, India as the context, and case studies of three Kerala women, Holly Hapke proposed a research framework that extends and links commodity chain approaches, such as multi-scaled gendered commodity chain analysis, with household level analysis down to the livelihood and household level. Among the complexities, the case studies revealed some common elements such as migration of husbands for work, diversification of family income sources and combining of family skills to meet the globalisation challenges that have shifted Kerala's forms and loci of fish production and processing.

Another conclusion drawn from Dr Hapke's inquiry into gender theory and analysis in fisheries is the need to understand fish supply chains, including processing and marketing. Who does and controls what in fish processing was the subject of several other GAF3 papers, helping to shine a light on the complexities of gendered divisions of labor and identify suitable entry points for interventions.

Della Grace Bacaltos described gender roles in seaweed production and marketing in Davao del Sur, Philippines based on studies by herself, N. Revilla and R. Sordilla. The studies revealed the family-based nature of the farming. Men do most of the site preparation, care, maintenance and harvesting; women and men share the tasks in procuring planting materials and in planting. In

marketing, women share the load of negotiating prices and are more likely to receive the family's money. Industry wide, women take part in all stages, even management, although men take the lead. Moreover, Della Grace Bacaltos also described a Davao region development project that established model farms and industry clusters to help with value added products and link the farmers, some of whom are former dynamite fishers, to markets.

The global supply chain for farmed giant tiger prawn, *Penaeus monodon,* is one of Asia's most important and it has been subjected to repeated trade upsets over product quality and production methods. In Bangladesh, Mohammad Nuruzzaman reported how large farms have been fragmented to small holder farms that exported over 50,000 tonnes of giant tiger and freshwater shrimp, and which rely mainly on family labor, including that of women. Farm productivity and profitability are decreasing and, more frequently, export shrimp consignments are failing quality checks. A new project included women in training programs through farmer couples training and in female farmer training. The early experiences revealed what could be improved in family capacity building efforts, such as overcoming initial household resistance to including women and minimising the dominance of men that can inhibit the women's classroom learning.

In 2004 in Bohol, the Cebu Technological University (CTU) assisted the only Philippine hazard analysis and critical control point (HACCP) shrimp export factory gain certification. Recently, CTU examined the gender side of maintaining HACCP standards. Cecilio S. Baga reported that 80% of the workers were women younger than 30 years who also undertook other work when not processing shrimp which only provided intermittent work depending on harvests. CTU helped train lowly paid, "on call" women and men workers in processing *Penaeus monodon* ("pansat" in Cebuano), opening up job opportunities for potential workers. Despite pride in working in the HACCP plant, however, half the workers wished for better work for their children.

Milkfish (*Chanos chanos* or "bangus") is the Philippine "national fish" yet little is known of the gender contributions to its production and processing. Bangus was the focus of CTU's efforts to revitalise local production and extension by using 55 hectares of its own instructional fish ponds as a test-bed. Venerando D. Cunado reported that, in production, 90% of workers were men, whereas in processing of the product, 68% of workers were women. With the exception of some of the heavier work, however, women and men engaged in the same activities. According to Rosario Segundina Gaerlan, whose participation was supported by the FAO-Spain Regional Fisheries Livelihoods Programme (RFLP), in the study done in 8 project sites in Region I (northeast Luzon Island), value can be added to bangus production by enhancing the processing and business skills of women and men in the supply chains. With good management practice, attention to sanitation procedures, plus equipment, capital and know-how backed up by government programs, surplus aquaculture production was turned into household and community profit.

Canned tuna may be the most recognised tuna export globally, but, in parts of the Philippines, hot smoked frigate mackerel (*Auxis thazard),* known as "tinap-anan", is a favorite. In 2005, Corazon. P. Macachor, a food technology researcher, developed methods for monitoring the histamine levels in tinap-anan to ensure food safety during processing, using the new facilities at Danao City fish port. Recently, she examined gender roles in frigate mackerel supply chains and found that both women and men contribute to the safety of tinap-anan. Quality control starts with men's on-board handling. Women dominate processing and need continued training on safety for tinap-anan and in how to make other value-added products of abundant tuna species.

Gender in the aquaculture and fisheries mainstream

Frequently, projects to assist women focus only on small scale and minor industries within the fish sector. The GAF3 Symposium heard three presentations on gender dimensions in mainstream sectoral industries, namely, carp culture in India, carp polyculture with small Indigenous Fish Species (SIS) and prawn in Nepal and fisheries development projects.

"India is basically a carp culture country", said M.C. Nandheesha and India's freshwater carp aquaculture was studied in 10 states in the north, east and north-east and south. Women's participation varied greatly with state, being very low in Andra Pradesh (south) and Punjab (north), both states with large production. Women's participation was considerable in Manipur, Assam and West Bengal (east and north-east), although largely in pond fertilisation, nursery rearing, feeding and harvesting. Self Help Groups (SHG) were often the vehicle for women's participation. Traditions, cultural differences and economic level of the women appeared to account for the large inter-state differences.

Sunila Rai's work in Nepal presented a different angle on women in carp-SIS-prawn polyculture. In Nepal, carp polyculture is the main aquaculture industry but it does not supply household food. For family consumption, small indigenous fish offer greater nutritional value, as, for example, some have up to two orders of magnitude more vitamin A than the carps. Working with the Tharu community of Chitwan, experimental aquaculture demonstrated that, despite water quality problems, polyculture of carp, *Macrobrachium* and small indigenous fish gave overall higher production without affecting carp production. The women farmers' ponds with small indigenous species returned 50% more income than those without. The fish were partially harvested over 250 days and households consumed more than half the harvests.

Rarely is gender mainstreamed in large fisheries development projects to the extent it is now happening in the FAO-Spain Regional Fisheries Livelihoods Programme (RFLP) for South and Southeast Asia. Typical fisheries development projects tend to marginalise women and their work and focus on "more important" technical issues. Drawing on development theory and practice, Angela Lentisco reviewed tools that could be of use for gender analysis in fisheries development projects, including the gender roles framework, the triple roles framework, the gender analysis

matrix, the women's empowerment framework and the social relations framework. With the focus on small-scale fisheries projects, the RFLP has put together a set of tools for use in different phases of the project cycle from planning to evaluation. The RFLP also conducted a workshop to gain information on the gender approaches and tools that were being used by the different fisheries agencies and development organisations in the Asia Pacific Region. She presented a summary of the recommendations of this workshop, and concluded that despite the richness of materials available, "we need to make the topic of gender more accessible, palatable and punchy (without losing the real meaning)."

Vulnerable and marginal

Many women are considered marginal and vulnerable in fisheries supply chains but women and vulnerability should not be confounded. However, Ramachandran C Nair's analysis in India exposed how even success can make women vulnerable in the contested space of Indian marine aquaculture. Across five States, mussel farming and seaweed culture were largely developed as platforms of women's empowerment, whereas, from the start, open-sea cage culture is masculine in its conduct. Once women's mussel and seaweed farming became profitable through State support, banks joined and the industries seem headed towards male dominated coastal privatisation, led by the more mature mussel farming for which common property rights are becoming defined. The women-dominated industries started out without any common property rights, whereas cage culture has these from the start. The States, which earlier promoted women's development at the community and household level, are silent on the contest for capital and coastal space rights.

For poor households, microfinance has become a popular though increasingly questioned solution. It is often targeted at women even if the gender dimensions are rarely studied. Two presentations at GAF3 showed that microfinance, while well regarded by the recipients, usually does not increase their assets and productivity. In 2 districts of Kerala, India, Nikita Gopal reported that government and non-government run microfinance schemes had helped family finances and improved household financial decision-making in low-income families but, since most of the funds had gone into meeting household expenses and not into entrepreneurial opportunities, asset creation had been minimal. In Guimaras, Philippines, Alice J. G. Ferrer found similar results when she studied women and men in fishing and non-fishing households. The decision to seek credit was typically taken jointly by the wife and husband but women then sought the majority of credit, mainly from informal sources. The credit, however, fed consumption rather than production and hence failed to improve productivity or living standards. Both studies stressed the importance of examining all sources of credit and better understanding the need for credit.

Women sea divers in Japan and Korea have been long a source of wonder but the reality of their way of life has been little understood. In Japan's southwest Iki Island, Nagasaki Prefecture, most "ama" or sea people divers are women and more than half of them in the study presented by Cristina P. Lim were already at least in their 50s. While having formal rights to harvest sedentary species such as abalone and sea urchin, the ama earnings are declining, and their overall fishing rights and access to decision-making in the fisheries cooperative associations are secondary to those of the men.

In contrast to Japan where men still dive, in Korea, only women now dive. As in Japan, the divers are an aging group. Sun-Ae Ii traced the history of Korean women divers, many of whom are in the south and originated over 100 years ago from Jeju Island. Despite their ecosystem knowledge, household and community contributions, the women divers are marginalised on account of: their gender and because their fishing is inshore, targets only sedentary species, and that they come not from peninsular Korea but from Jeju Island. The needs of the women divers are not addressed in fisheries policies and assistance.

Newcomers to a community often suffer the marginalisation of being outsiders. In Taiwan, however, where the rate of marriage with foreigners is currently about 15%, Nai-Hsien Chao found in five fishing villages that foreign spouses, predominately from China and Vietnam, tended to be self-motivated, hard working and well integrated into society. Of the interviewees, 70% contributed all their earnings, much also from the aquaculture and fisheries sector, to family expenses.

Fishers and fishing communities are still vulnerable to poverty, even in fast modernising economies such as Malaysia, from which four GAF3 presentations examined poverty, aging and gender perspectives. Jariah Masud's work analysed Malaysian national poverty eradication programs which, despite their considerable achievements and the growth of the fisheries and aquaculture sector, had not changed the endemic poverty in fishing communities. As women's roles in fisheries are invisible, special fisheries programs never targeted women even where women contribute as fishers, such as on Bruit Island, Sarawak. Likewise, women-only poverty eradication programs were outside the economic mainstream, focusing mainly on the perceived social problems of poverty. Assumptions and practices with respect to gender, poverty and fisheries need to be rethought and based on better understanding of poverty among fishing households. In another presentation, Jariah Masud explored the constraints faced by fishing community women in becoming entrepreneurial and graduating from survival to high income status from fish related and other enterprises. Several rural Malaysian women have succeeded in redesigning their businesses to become more productive and profitable but further study is needed to better understand what factors contribute to success, including how to best use or even avoid credit.

Tengku Aizan Hamid's detailed analysis of the demographics of Malaysia's fishing population showed an aging trend, although in Sabah and Sarawak, foreign labor is causing "younging" of the

fishing population. On average, traditional fishers are older than commercial fishers. Statistics on women's employment may not be reliable and need improvement before reliable patterns can be identified. National fisheries development policies seek to revolutionise the sector through subsidies, injection of equipment and infrastructure but these interventions do not reflect the realities of the skills available nor address the need for human capacity development that would be needed.

To stimulate GAF3 inputs to its design, Zumilah Zainalaludin presented draft plans for a regional workshop on empowering vulnerable stakeholder groups in fish farming that is part of the European Union funded ASEM (Asia-Europe Meetings) Aquaculture Platform. The critical point will be who to target in order to stimulate changes in mindsets on gender in aquaculture.

Women in coastal cities and remote fishing communities

In two coastal cities of Central Java, Semarang (a large city) and Pekalongan (a small city), Indonesia, Zuzy Anna used rapid quantitative appraisal (rapfish) analysis on ecological, economic, social and institutional uncertainties facing two groups of women – wives of traditional fishermen and wives of non-fishermen but engaged in fishing-related activities. The areas studied have among the highest divorce rates in Indonesia. Fishers' wives near Pekalongan tended to experience the least uncertainty and those near Semarang the most. Non-fishers' wives experienced less seasonal effect than the fishers' wives. The most important drivers for the different dimensions of uncertainty were: ecological - drought, pollution and season; economic - volatility in production and income; social - family instability, unemployment and health; and institutional - dependency on credit and savings and local financiers. The women used many different strategies to cope with fishing and non-fishing uncertainties, such as reigning in spending and taking up piece-work outside the home. Personal and cultural attitudes also played their part, including a "life goes on" outlook.

Although satisfying the national criteria for classification as fishers, women in the remote Pantar islands of East Nusa Tenggara, Indonesia are less regarded than men as marine resource users. Using participatory rural appraisal and focus groups discussions, Ria Fitriana thoroughly documented the women's and men's fishing related activities, throughout the supply chain, revealing a great range of overlaps and complementarities in fisheries activities.

In coastal Sri Lanka, the poor fishing village of Naguleliya is heavily dependent on fishing, C.D.A.M.P.A.Dissanayake found increasing dependence on women's fishing by hand or helping in seasonal beach seining, especially in households supported by widows or where husbands were unemployed.

The central coastal region of Vietnam also presents challenges, especially to women, dependent on fisheries resources, according to Nguyen Dang Hao who, under the FAO-Spain RFLP studied 16 communes in the provinces of Quang Tri, Thua Thien Hue and Quang Nam. Here, on

average, women bear more children than the national average and work 12 to 14 hour days, 3-4 hours longer than the men. People in these poor provinces suffer from low education levels, combined with escalating fishing pressure on open access resources under sometimes dangerous and risky conditions, such as hurricanes. These handicaps mean that women, although having access to credit, know little about financial management and have almost no voice in managing the natural resources due to the prejudices of traditional beliefs. Women generally have fewer money earning opportunities than men except in raising livestock and trading fish. Although women and men have high participation rates in the Women's Union and Farmer's Association, respectively, these bodies offer little more than the sympathetic support and the opportunity to share experiences.

"Edging up the ladder" was how Cristina P. Lim characterised the progress of most women in Ban Thung Maha, a Thai-Buddhist village on the Andaman Sea coast of Thailand. Women undertook a wider range of complementary fisheries, coconut, rubber and palm oil plantation and household tasks than the men but held little in terms of formal fishing rights and positions in local institutions. Case studies showed five women forging their own and joint family income opportunities to survive but some did not even dare to dream of a better life.

HIV/AIDS, Tsunami affected communities

Aquaculture and fisheries may be especially important to households affected by natural calamities and heavy disease burdens. In Namibia, Africa, the need to find food and income producing opportunities for women affected by HIV/AIDS resulted in the Mangulukeni Fish Farm project. According to the results presented by Gosbert Hamutenya and facilitated by Kibria Ghulam, the first harvest of tilapia had been poor due to an unexpected flood that shortened the growing season but women still felt empowered by the farming experience. GAF3 participants offered suggestions for building on the early sense of empowerment experienced by the women by improving future harvests included assistance through special project funding and greater technical assistance to diagnose the productivity problems.

In the 2004 Indian Ocean tsunami, 189 people, 150 of whom were women, were killed in Thotamuna village, Sri Lanka. Yet, today, women outnumber men by more than two to one. Fish are the main source of income and yet most local fish, caught by the men, bypasses local women and goes, via wholesalers, processors and exporters to national and international markets, according to the work of Bandara Basnayake whose participation in the Symposium was made possible by the RFLP. A detailed and gendered analysis of the causes and effects of poor growth in micro-enterprises has indicated that local gender relationships offer an untapped potential for gradually building the amount of fish processed first by local women with the skills enhanced to provide products to meet different market demands. Such efforts, if they could gradually break the existing trade cycle, could lift households out of poverty and further strengthen gender relations.

Climate change and environment

Climate change

Pacific island case studies from Melanesia (Fiji, Solomon Islands), Polynesia (Niue, Samoa) and Micronesia (Federated States of Micronesia) illuminated, albeit with some variations, the dominance of women in inshore, reef and lagoon fisheries and fish marketing. Young people are also major users of the coastal zone and therefore also impacted by climate effects such as sea level rise and greater salt intrusions to coastal gardens. Although market savvy, women were not very knowledgeable on climate change and its impacts, even though the coastal locus of their work and the use of traditional fishing methods make them keen observers of the environment. While not underestimating the cultural shift required, Veikila Vuki concluded that women, young people and institutions which included them should urgently be brought into climate change decision making so that society could understand their needs and make use of their special insights.

At Barangay Bislig, Leyte, Philippines, a fishing dependent village with many migrant families, Marieta Bañez Sumagaysay found that most but not all women fish driers were aware of climate change through local signals such as prolonged rain and unpredictable weather. The impacts on fish drying, already challenged due to declining fish availability, were to increase the women's labor, the costs for additional salt and the losses from spoilage, all leading to lower income. Given limited livelihood alternatives, the women are adapting by paying more attention to weather forecasts, and adjusting their drying practices and technologies to copy with the new irregular rainfall patterns. For these women, more long term and lasting solutions will need greater technology changes and development of more livelihood options beyond fish drying.

Mangrove replanting

Mangrove destruction has been serious in most tropical countries, not least the Philippines where efforts to reforest coastal sites have met with mixed success. In two presentations, Farisal U. Bagsit and Alice Joan Ferrer delved into gender roles and responsibilities in mangrove reforestation programs in the Western Visayas, Philippines. The studies examined different types of institutions involved in reforestation, namely a 14 year old concerned citizens association (F. Bagsit) and six people's organisations formed or recently strengthened in a three year old project led by a United Kingdom Based non-government organisation, the Zoological Society of London (A. Ferrer). In both studies, women tended to remain active longer than the men in people's organisations and undertook a greater range of roles in the mangrove replanting and nursery activities. Where gender comparisons were possible, men tended to take on more leadership positions and tasks requiring greater physical strength, but women performed many different roles and substituted for husbands when they were not available. In Farisal Bagsit's study, the women earned low incomes from their other activities and valued the small additional income from sales of mangrove seedlings and

propagules. Despite the onerous work that takes people from other duties and jobs, both studies revealed an appreciation of the importance of reforestation and the shared camaraderie of the work.

Gender matters in institutions

Gender is an important dimension in human institutions. In fisheries, this dimension is often ignored or, worse, women frequently are not given access to membership or rights. Even when gender is ignored, such as in education institutions, wider social changes are altering the gender ratios in aquaculture and fisheries institutions. Rather than awaiting slow, passive, externally driven change, actors have taken to activism and advocacy.

Over the last decade, successful activism by representatives of fisher's wives, fishing women's organisations and feminist academics in Europe has yielded major steps forward in formal standing and rights of women, e.g., achieving 2010 EU Directive 2010/41 on spouse rights. Katia Frangoudes, from the frontline experience of academic research and activism in AKTEA, the European women's organisation, described how the European Union (EU) rather than national governments has demonstrated political willingness. The movement has observed that women activists have been critical to the achievements, and also that it cannot rely on women parliamentary leaders to advocate for women.

In 2006 in Cambodia, where late 20th century wars reduced cohorts of men even more than those of women, the Ministry of Agriculture, Forestry and Fisheries developed and now, through the Fisheries Administration, is implementing a gender mainstreaming policy and strategy in the fish sector. Heng Ponley, whose participation was made possible by the RFLP, stressed that, despite gender being a controversial and complex subject, and with limited resources and information on gender roles in fisheries, the policy and strategy had made encouraging progress in raising awareness and mainstreaming gender in the central Fisheries Administration. This is the vital first step to eventually achieve gender equality in the sector.

Women in research and education

As in many scientific fields, the aquaculture and fisheries career pipeline from education to research "leaks" women at a greater rate than men and women's career progress generally ends in lower salaries and less senior positions. This is despite equal opportunities, reported Hillary Egna, using data from nearly 30 years of work by the USAid funded Cooperative Research Support Programs (CRSP) for aquaculture. Women represented about half the graduates in recent years; in 1999 an upward inflection occurred after earlier lower rates. Although the CRSP's director and principal investigator is a women (Hillary herself), the numbers of women leaders and researchers are low (12-25%) and active efforts are being used to understand and break through the persistent career barriers and use the full potential of the women graduates.

Stella Williams stressed that world development had ignored women for nearly 50 years, including in the field as farmers and fishers and in science, education and research. African agricultural education and R&D statistics showed the typical "leaky pipeline" with fewer women in higher positions. Stella shared her personal experience in aquaculture education, research and development and recent lessons from the African Women in Agricultural Research and Development (AWARD) program which is now engendering the African agricultural R&D through post-bachelors, masters and doctoral fellowships, mentoring, networking and role modeling. Science and leadership skills are targeted in the fellowship holders from the 10 AWARD countries.

Women and law enforcement

Based on a survey of over 600 people in five coastal municipalities of Southern Iloilo on Panay Island, Philippines, Caridad N. Jimenez reported on views of gender in fisheries law dissemination and enforcement. Gender was not a major issue among the fishing communities, although women and men are perceived to have different strengths. Legal material was not regarded as gender biased and women were seen as better than men at disseminating the materials. Two thirds of people had no preference on the gender of extension workers, and 95% thought that the gender of an enforcement officer was not an issue. Women were well regarded as effective in fisheries intelligence and surveillance. As expected, concerns were expressed at the idea of women having to deal with troublesome fishers, travel far from home and go to sea.

Posters

The poster by XiJie Xu on women's roles in China's new fishing villages, inland and coastal, highlighted the critical roles and opportunities of women, who make up about 60% of the labor force, carry a substantial share of the work but have not yet taken full advantage of opportunities in China's new economic era.

Mundus Maris – *Sciences and Arts for Sustainability* – exhibited three outstanding posters, primarily on people in aquaculture. "A mosaic of people" presented the range of women's and men's roles in aquatic farming on the different continents; "Rapid aquaculture expansion and continued change" addressed the human capital challenges of aquaculture's rapid expansion; and "Making the rules work for people" stressed social and environmental justice.

Zumilah Zainalaludin found high levels of poverty in both able-bodied and vulnerable Malaysian fishing households but households with higher ratios of women tended to be most affected.

G. Arul Oli and colleagues' poster stressed the importance of fisheries in India, the lack of attention to gender and outlined well advanced plans for a non-credit certificate course on "Gender in Aquaculture and Fisheries" for Indian Fisheries Colleges and research institutes.

GAF3 BACKGROUND INFORMATION

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At GAF3, 48 papers were presented, 41 oral papers and 7 posters, as well as a discussion session in preparation for the FAO Special Workshop that followed GAF3. Presentations and posters covered the following geographic areas: global – 9 presentations; countries – *Asia*: Bangladesh, Cambodia, China, India, Indonesia, Japan, Korea, Malaysia, Nepal, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam; *Africa*: Namibia, Tanzania; regions; South and Southeast Asia, Pacific, Europe. Presenters came from 21 countries.

GAF3 Organising Committee. Meryl Williams (Chair), Melba Reantaso (Vice Chair), Choo Poh Sze (Vice Chair), Rosario H Asong, Katia Frangoudes, Kibria Ghulam, Mafaniso Hara, Hisashi Kurokura, Kyoko Kusakabe, M. C. Nandeesha, Marilyn Porter, Ida Siason, Katherine Snyder, Kripa Vasant, Nireka Weeratunge, Stella Williams, Sijie Xu, Veikila Vuki, Yinghua Xu

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