Asian Fisheries Science
The Journal of the Asian Fisheries Society

GENDER IN AQUACULTURE AND FISHERIES:

NAVIGATING CHANGE

SPECIAL ISSUE

Gender in Aquaculture and Fisheries: Navigating Change

Papers from the 4th Global Symposium on
Gender in Aquaculture and Fisheries
1-3 May 2013
10th Asian Fisheries and Aquaculture Forum
Yeosu, Korea

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Asian Fisheries Science

Guest Editors

Nikita Gopal
Meryl J Williams
Marilyn Porter
Kyoko Kusakabe
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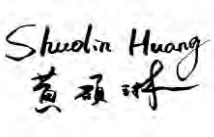
The 10th Asian Fisheries and Aquaculture Forum held May 1-5, 2013 at Yeosu, Republic of Korea, was also the host to the 4th Global Symposium on Gender in Aquaculture and Fisheries (GAF4). This event continued the women/gender and fisheries Symposia held by the Asian Fisheries Society (AFS) in the previous five triennial Forums, starting in 1998 with the 5th Forum. AFS has again provided a venue for researchers, development specialists and advocates to share their knowledge and network on gender in fisheries. Every triennial event draws new participants, including young students, and a key cadre of committed experts who regularly participate. GAF4 sessions attracted very enthusiastic presenters and audiences and generated lively discussions.

For the second time the Asian Fisheries Science journal is publishing a Special Issue on Gender in Aquaculture and Fisheries, featuring papers presented during GAF4. In 2012 we published a Special Issue containing papers from GAF3. The articles in the first GAF Special Issue have been popular with readers of the journal and we expect the articles in the present Special Issue also to be well read and cited. The themes captured in present Special Issue cover the gendered impacts of fishery sector and personal change, the diversity of gender assets and roles, and challenges, institutions and tools to meet future needs.

We congratulate the Co-editors for their diligence in seeing this volume through to publication. A special note of thanks to Nikita Gopal, the chief editor and the head of the Programme Sub-Committee for GAF4 for providing the leadership to produce this Special Issue on gender in aquaculture and fisheries, which we are pleased to commend to you.

Derek J. Staples
Past–President (2011-13)
Asian Fisheries Society



Shuolin Huang
President (2013-16)
Asian Fisheries Society

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This Special Issue of Asian Fisheries Science, *Gender in aquaculture and fisheries: Navigating Change,* is a collaborative effort of many people and organisations. We first acknowledge its genesis in the 4th Global Symposium on Gender and Fisheries (GAF4) held 1-3 May 2013 in Yeosu, Republic of Korea at the 10th Asian Fisheries and Aquaculture Forum (10AFAF). 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 Local Organising Committee in Korea, especially Prof. Jeong Yeol Lee (Chair) and Dr Yi Soon-Kil (Vice-Chair).

We gratefully acknowledge the financial support to GAF4 and to this publication from the AquaFish Cooperative Support Research Program (CRSP) of the United States of America[1], and from NORAD, the Norwegian Agency for Development Cooperation. The latter grant was made through the Network of Aquaculture Centers in Asia-Pacific (NACA) who we also thank for their support. In recognising these important supporters, we thank personally Dr Hillary Egna (Director of AquaFish-CRSP), Bodil Maal (Senior Adviser NORAD) and Dr Ambekar E. Eknath (then Director-General NACA), all of whom attended and took an active part in GAF4.

In addition, we thank the Indian Council for Agricultural Research (ICAR) which provided organisational and website support to GAF4.

GAF4 attracted 31 oral and poster presentations and three mini-workshops (Appendix II). The event was conducted by nine session chairs. GAF4 attracted a highly engaged audience, many of whom stayed throughout all presentations and contributed to lively questions and discussion. The support from the 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 20 published papers.

We are also very grateful to our reviewers who have delivered great service to this Special Issue. We thank the 37 expert reviewers (Appendix I) from countries in Africa, Asia, Caribbean, Europe, North America and the Pacific and from international organisations.

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.

[1] Now the AquaFish Innovation Lab, http://aquafishcrsp.oregonstate.edu/

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Guest Editorial: Gender in Aquaculture and Fisheries – Navigating Change

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This Special Issue of Asian Fisheries Science journal includes 20 papers and a report based on the presentations and posters of the 4th Global Symposium on Gender in Aquaculture and Fisheries (GAF4) held during the 10th Asian Fisheries and Aquaculture Forum, May 2013. GAF4 was the sixth women/gender Symposium organised by the Asian Fisheries Society. For each event, the proceedings or selected papers have been published (Williams et al. 2001; Williams et al. 2002; Choo et al. 2006; Development 2008; Williams et al. 2012a) and in the current Special Issue. Worldwide, this is the longest continuous series documenting women and gender issues by a professional fisheries society.

In this Guest Editorial, we build on our reflections in the Guest Editorial of our last Special Issue (Williams et al. 2012b). In that Editorial, we identified that gender: (1) was not usually on fisheries and aquaculture policy agendas and action plans and therefore minimal resources were committed; (2); was not amenable to a single epistemology, little conceptual thinking about gender had developed and diverse and sometimes conflictual ideas are held about its role and importance; and (3) required that stronger conceptual foundations be developed, disseminated and applied in the fish sector.

Where are we now?

In our previous Guest Editorial, we expressed both optimism and pessimism as to how much progress was being made in efforts to achieve greater gender equity in fisheries and aquaculture. In our present overview, we will continue our discourse on the three issues above, but using a slightly different structure. In the current Editorial, first we explore the progress that gender is making on the fisheries/aquaculture policy and action agenda; second we reflect on the quality

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of work and level of engagement of the Asian Fisheries Society GAF events; and third we express some views on the development of methods for gender research.

Our first element concerns trends in attention to gender in aquaculture/fisheries. If we start by looking at the broader issue of attention to gender in society, then we note that recent media attention has been given to pronouncements by high profile leaders and news headlines on the importance of gender equality to world and national economic and cultural progress. The topics typically covered have been women in the workplace, safety on the streets, in education, on the sports field, in health, in the home and women's basic human rights. Specific news items have focused on stories about the education of girls, domestic violence, how women's equality will be addressed in the post-2015 development agenda and in the Beijing plus 20 process, the low political representation of women and the plight of women in wars and disease crises such as the Ebola outbreak. While many of these issues resonate with gender and women's issues within fish value chains, most discussions and policy issues take place on more general scales such as those of the community, society or the nation. Thus, they fail to take account of the specific conditions that shape gender relations in fishing and aquaculture sectors.

The more universal gender issues, however, do influence and penetrate sectoral processes. For example, women's greater uptake of tertiary education in general is also happening in professional courses in fisheries and aquaculture (Williams et al. 2012c), which, in turn, questions why more women are not now entering senior professional positions (Egna et al. 2012).

We have seen some signs that development agencies are showing interest in women/gender issues in the fish value chains. For example, Norad conducted a study in Mozambique with a view to identifying entry points for assistance in two value chains and creating greater opportunities for women (Brugere and Maal 2014). Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) (2012) released a succinct statement called "Gender and Fisheries & Aquaculture," expressing the basic premises for the benefits of giving women opportunities, the approaches and constraints to successfully promoting gender equality in German development assistance. USAID aims to "improve the role of women as economic actors and leaders in communities" (R. Bertram quoted in NRC 2014:44), through such projects as the COMFISH project in Senegal which works to improve the businesses and organisation of women fish processors in Senegal (McCarthy 2014).

In the main, the development assistance donors seem to be linking their gender work closely into existing programs or in carefully chosen priority countries. This carries with it the chance for long term commitments and capacity building, but it may also mean that special steps will be needed to ensure that cross-project and cross-site learning takes place.

In 2012, we were starting to see some signs that more fisheries and aquaculture organisations were paying attention to gender and women's roles and putting gender into their programmes. We continue to see some steady progress, but still not enough resources and attention committed. As some of the following examples show, however, this slow and steady progress may be a good approach if it leads to deeper institutionalisation in women and gender programs than would fast and less considered growth. For example, in 2012, the Network of Aquaculture Centres

in Asia-Pacific (NACA) committed to add gender as a cross-cutting theme in their work plan. At GAF4, the Norad-NACA workshop (see "Gender and change in the spotlight," this issue) paved the way for new project at NACA, funded by the USAID-MARKET project, namely "Thematic Studies on Gender in Aquaculture in Cambodia, Lao PDR, Thailand and Vietnam." In due course, similar studies are expected to be conducted in more of NACA's 18 member countries.

In 2012, the Fisheries and Aquaculture Department of the United Nations Food and Agriculture Organisation (FAO) undertook a gender stocktake (Reantaso 2012). The exercise was based on the question: "To what extent are gender equality and women's empowerment principles taken into account in fisheries and aquaculture development research, projects and policy support?" The results identified a lack of common understanding among professionals, a lack of information and lack of human and financial resources.

FAO led the development, consultation and adoption in 2014 of the Voluntary International Guidelines on Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication [SSF Guidelines]. Among the guiding principles, the fourth principle states: "Gender equality and equity is fundamental to any development. Recognising the vital role of women in small-scale fisheries, equal rights and opportunities should be promoted." The sixth addresses equity and equality, including between genders, but also acknowledges differences. Women are mentioned in many parts of the SSF Guidelines, such as in relation to access to resources, management voice, decent work, support services, women's roles in the post-harvest sector, and their exposure to violence. How these provisions will be taken up in national policies and programmes is a critical next step. In another normative exercise, FAO developed new emergency guidance which contains specific recommendations on gender as a key requirement, e.g. Cattermoul et al. 2014. FAO also has ongoing project in the Philippines targeting gender and fisheries.

One major regional FAO project (the Regional Fisheries Livelihoods Project for South and South-East Asia; see Lentisco and Lee, this volume) that included a gender component ceased in 2014, but in several other regional activities, FAO has included gender. In Asia, the FAO Bay of Bengal Large Marine Ecosystem project undertook a gender audit and aims to follow up with action (Brugere 2014)

In Africa, it prepared "The Pan African Fisheries and Aquaculture Policy Framework and Reform Strategy: Gender and youth in fisheries and aquaculture" which was presented at the Conference of African Ministers of Fisheries & Aquaculture (CAMFA) meeting in May 2014 for integration into the policy framework and reform strategy. This gender policy was developed with inputs from the 2012 Nepad-FAO Fisheries Programme (NFFP) Gender Strategy after FAO and Nepad agreed that a gender strategy to guide Programme implementation was required. The elaboration of the Strategy itself was found to be a useful exercise, creating and reinforcing networks and the Nepad Planning and Coordinating Agency Gender Team.

The FAO project called "Strengthening the Knowledge Base for and Implementing an Ecosystem Approach to Marine Fisheries in Developing Countries", generally referred to as the "EAF-Nansen Project," is currently undertaking a gender audit led by Cecile Brugere.

Another UN report, that by the High Level Panel of Experts on Food Security and Nutrition, "Sustainable fisheries and aquaculture for food security and nutrition," also contained a substantive section on gender. The report recommended to the UN Committee on Food Security (CFS) that (paraphrased):

- States should ensure policies do not create negative impacts on women, enshrine gender equity in all fisheries rights systems;
- the FAO Committee on Fisheries (COFI) should develop policy guidance on gender equality and economic contributions;
- the CFS should urge international and national fish sector organisations to fully address the gender dimension of the fishery and aquaculture sectors; and
- development assistance programmes should be gender-aware and give priority to gendered projects.

Other UN agencies have also engaged in the fisheries/aquaculture sector, such as the UN Industrial Development Organisation (UNIDO) that has projects on compliance with labour laws in fish processing factories (see Nuruzzaman, this volume).

Among prominent fisheries and aquaculture professional associations, several are beginning to programme special sessions on women and gender. In 2012, the International Institute for Fisheries Economics and Trade (IIFET) held gender sessions in its 2012 biennial conference (Anon 2012). Similar sessions were held in the IIFET 2014 conference. In 2014, the World Aquaculture Society's conference, World Aquaculture 2014 also held a session on women in aquaculture. This session included a panel discussion that urged the Society to pay greater attention to gender equity in all their activities including fellows, plenary speakers and awards. Panel members are also leading efforts through the non-government charity, Aquaculture without Frontiers, to create an effective and active Women's and Gender Network.

More broadly in international agricultural research, including fisheries/aquaculture, the CGIAR Consortium has developed a Consortium Gender Strategy, set up a Gender and Agriculture Research Network and requires all CGIAR Research Programs (CRPs) to have gender strategies. Part of the CGIAR approach includes building the Consortium's capacity to address gender in research and development. Part of the outputs from the CGIAR gender work has been methods development, largely targeted to crop agriculture and livestock sectors.

Aquatic Agricultural Systems (AAS) CRP takes a "Research in Development" approach, which embeds research into on-going development processes and through participatory processes identifies research topics that would respond most to the needs of the farmers with a complex set of livelihood systems. AAS CRP takes gender equality as one of the research themes, and integrates gender perspectives in all its themes. The Gender Strategy of the AAS CRP takes

Kabeer's social relations approach (Kabeer 1994), and emphasises investigation on rules (gender norms), activities, people, resources, and power. Control of assets, inputs, decision making and benefits by women and other marginalised groups in aquatic agricultural systems is its intermediate development outcomes.

Our second issue to update is that of the quality of work presented on gender in aquaculture and fisheries, especially at the AFS GAF events, and the level of engagement. Gender and fisheries/aquaculture research of the Gender and Fisheries Symposium has shown development over the years. Initially, the work was more focused on gender roles and access to technology. For example, in GAF3, the technical papers focused more on gender roles. Many studies looked at what women do and what men do. These have been an important series of research papers recognising and describing the differences between women and men in how they are engaged in fisheries/aquaculture. However, although a focus on roles is interesting, it does not lead us to understanding social structures and power relations and the implication of gendered differences.

On the other hand, there has been research that has highlighted the nutrition and food security effect of aquaculture, for example, Goswami (2007), as well as how aquaculture has led to women having improved access to ponds and independent incomes (IFAD 2009). With a growing concern among both scientists and the general public about the issue of climate change, important research is needed to examine the effect of climate change on women and men in fishing communities, building on the work of Nowak (2008) and Bagsit et al. (this volume).

Gender analysis can be done in the spheres of economy, politics, health/nutrition, society, culture and many others. GAF literature has so far focused more on economic and health/nutrition issues. Analysis can also be done at micro/meso/macro level. There have been more studies at the level of households and community, including issues of female headed households, compared to the other two levels. Meso level studies include the impact of privatisation at the organisation and factory level (for example, Gopal et al. 2007), and also the importance of value chains, for example, Kusakabe et al. 2008; Hapke 2012; Sumagaysay in this volume. These studies of value chains are important in providing a useful tool to connect the micro to macro level in its analysis. The macro level includes changes in environment including climate change, as well as macro-economic changes such as economic crisis.

Although we have had many small scale case studies from various locations, we have less understanding on how these all link together. We still have little understanding of how women's work in fisheries and aquaculture are inter-related with other livelihood activities in the growing economies of many developing countries. How are macro level environment changes such as climate change experienced differently by women and men in different contexts? How are fisheries affected by global economic changes and how do these changes shape women's involvement in fisheries? For example, migration is changing the circumstances and opportunities of fishing communities, but how has that influenced women's engagement? We also have little understanding on how fishing is linked to various markets where the link is predominantly provided by women through trade and fish processing. Linkages to technological changes in aquaculture, as distinct from fishing, have not been studied much – how have the expansion or

changes in aquaculture technologies shaped gender roles and women's access to technology and market?

Researchers and others interested in gender in aquaculture and fisheries are connected by various social media such as Facebook, Twitter and e-mail lists, and materials from the Asian Fisheries Society and other events and news are posted on the website Genderaquafish.org (http://genderaquafish.org). The number of subscribers to these media continues to mount slowly, but most users see the media as sources of information and news, rather than active platforms for discourse. In many cases, this lack of strong engagement is due to the secondary nature of the users' engagement with gender/women. Their primary jobs are often in technical fields, and gender is a side interest.

Perhaps surprisingly, our third issue focuses on the issues of methods and methodology. Many biotechnical scientists took for granted that the methods they had developed and used in their fisheries research would serve them equally well when they undertook gender research. But significant differences arise both of theory and practice between investigating fish, seaweed and other creatures and plants, that do not 'talk back' or think subjectively about how they act and cooperate with one another, and human subjects. While aspects of human behaviour can be counted, the nature of people's experience and particularly their subjective interpretation of their actions and reactions do not respond as well to quantitative methods. Thus the community of gender and fishery researchers has had to turn to qualitative methodology and methods to find appropriate tools for this new research. Feminist research has contributed theoretical and conceptual discussions about why to select particular methods and careful examinations of what happens in the research context. Feminists have also been strong advocates of developing careful ethical procedures so as to ensure the protection of the participants in the research, who are often economically disadvantaged and with fewer educational skills than the researcher. The interaction between the researcher and the participant in a research interview is a complex social construction. It needs to be carefully and thoughtfully set up, as well as analysed using theoretical as well as the more conventional analytical tools. All this was new to many of the gender and fisheries researchers and GAF has considered how best to develop appropriate methods to investigate the issues of fishers, both men and women, and their fishing communities. The discussions in the Symposia have been lively and have been carried forward in items posted on the GAF webpage.

As more researchers, many of them trained in the biophysical sciences, enter gender research, practical guidance on the basics is being produced, such as the CGIAR standards for collecting sex-disaggregated information in agriculture value chain research (Doss and Kieran 2014). Mutua et al. (2014) is useful review and summary of development and evaluation tools for gender and value chains, including workshop materials, manuals, guidebooks, handbooks, reports, toolkits and working papers.

The special issue

As GAF4, the event, consisted of contributed papers, this Special Issue also is diverse in its content, ranging from reflections and reviews on development lessons, papers that dealt with

the gendered impact of change, the details of women's and men's roles, methods and methodology and papers that asked "where to next?" The papers are also diverse in their form, and are classified 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 communication (on development work, surveys or projects).

Development lessons

Two papers focused on development issues and examined ways to enhance women's empowerment through the various projects funded by development agencies. In their paper, Lentisco and Lee argued that it is necessary to better understand women's access to fisheries resources, to identify their roles and relationships with others, and to acknowledge the benefits of directly involving them in decision-making. Women's access to fisheries were divided into primary, secondary and tertiary access categories and recommendations to enhance women's participation in each of these categories were made.

Using Longwe's empowerment framework (Longwe 2002), Choo and Williams reviewed 20 papers from the AFS women/gender symposia and examined how these development projects have contributed to the process of women's empowerment. They concluded that most projects only achieved empowerment at the lowest levels of welfare and access and sometimes even these gains were fragile. Women are still far from being able to define their own needs and priorities and to control resources which may help them to challenge their subordinate positions. Feminist concepts of empowerment which should have a place at the core of women's empowerment efforts have been avoided in the fisheries sector. Unless women are able to construct a collective self to define and defend their gender needs, the control (highest) level of empowerment will remain far beyond their reach.

Changes

Seven papers analysed how the macro-environment changes have affected women and men's engagement in fisheries/ aquaculture. Soejima analysed the aging oyster farming community in Japan. Oyster shucking was carried out by women and elderly. But with workers aging, their work speed did not make the industry commercially viable. Some farmers started to hire Chinese migrant workers, and with their help, were able to expand their production. On the other hand, those who could not afford to hire Chinese workers had to shrink their production, leading to polarisation of production. Women and elderly workers who used to work in oyster shucking were also affected. The paper showed how the demographic changes impact women's involvement in aquaculture.

In fishing communities in the Philippines, Bagsit et al. analysed how women and men adapt to floods. Climate change has increased the frequency and severity of floods. Bagsit et al. identified that although women and men have different preferences for adaptation and coping responses, when they actually take action, there is no gender difference. This might suggest that women or

men face structural obstacles in pursuing their preferred adaptation strategies, and invites further studies in identifying these obstacles.

Kusakabe analysed the business trajectories of women fish traders at the border between Cambodia and Thailand. Unlike what is normally discussed for women entrepreneurs, different women fish traders faced different obstacles and opportunities that made it difficult to make any generalisation on women's business. Kusakabe described the changes in border trade regulations and how that has affected and shaped women's fish businesses over the years. She emphasised the importance of context-informed analysis as well as how the fish as a commodity shaped how the business developed.

Gopal et al. studied three different fisheries in the central part of the state of Kerala, India and analysed how women have been marginalised in these fisheries. In the ring seine and clam fisheries, women used to play a role but have been excluded through further commercialisation and changes in technology such as motorised boats. In the stake net fishery, women have never played a large role and were involved only at the shore.

DebRoy et al. conducted a study at a village near the Pichavaram mangroves in the Cuddalore district of the state of Tamil Nadu in India, and found that women are equally willing to pay for mangrove conservation and development as men, highlighting women's important role and awareness in mangrove conservation.

Defiesta and Badayos-Jover described how women and men were affected after the 2006 M/T Solar I oil spill in the coasts off Guimaras Island in the Philippines. They described how women were already economically marginalised even before the oil spill, but the oil spill exacerbated their marginalisation as external aid was more directed towards men.

Analysing the same oil spill from another angle, Badayos-Jover and Defiesta described that after the destructive oil spill, women and men had to make a decision on whether to move out or to change their livelihoods. The study showed that women were marginalised both in the household and in the community in the decision on actions to be taken after the spill.

Methodology

Because this is a relatively new area for GAF symposia there is only one paper in this section. In it, Marilyn Porter tries to lay the groundwork for the process of enabling biotechnical scientists who are interested in integrating gender concerns into their work to understand the background and potential of feminist methodology and methods. She outlines the way in which feminist research has developed, especially over the last 40 years, and looks at the problems feminist researchers encountered when they began to examine the implications of their roles as both women and as researchers. The category of "experience" became key in increasingly theoretical understandings of both the process and the outcome of research by women on women. Apart from sophisticated theoretical considerations, feminist research has brought two key issues to the foreground: that of a sensitive and informed approach to ethical issues in research, and the

responsibility to engage with and act on the issues that arise from the participants' experience. The paper suggests the possibilities of applying feminist approaches to the particular problems of gender in aquaculture and fisheries and the need to both create a knowledge base of the best and most fruitful of the feminist methods.

Contributions and roles of women (and men)

In some depth and detail, seven papers addressed the contributions of women and men, or just those of women alone, drawing out role differentiation, progress and challenges.

Sun-ae Ii studied two closely located fishing villages in Miyazaki Prefecture, Kyushu Island, Japan – Meitsu and Odoutsu. She found that the modern fisheries division of labour among women and men could be traced back to different pathways of fisheries development over the past century. Meitsu has a long association with offshore fishing and as resources have declined and become harder and less profitable to access, fishermen have taken to value-adding to local fishery products, with assistance from women in parts of the work. Odoutsu has always relied more on coastal fishing and although the members of its Fisheries Cooperative and the Women's Division are engaged in similar activities to those of Meitsu, women are much more integrated and active in all the post-harvest and value adding activities because of they were always part of the coastal fishing activity that was close to home.

In the Philippines, Alice Ferrer and her colleagues conducted qualitative studies on women and men's roles at eight sites, five in the Visayas and three in Mindanao, as a pre-scoping study for the CGIAR Aquatic Agricultural Systems (AAS) Project. They found that productive, reproductive and community roles were changing under declining productivity in the marginal aquatic systems, exacerbated by changing climate. Women and men were each expanding all their roles in fishing and farming to take advantage, at the household and family level, of any opportunity. In so doing, the people seemed to be gaining greater resilience through diversified livelihoods. As the AAS project develops, this will be tested by research.

Marieta Bañez Sumagaysay studied women's roles throughout the green mussel (*Perna viridis* (Linnaeus 1758)) value chain in Jiabong, Samar, Philippines. She found that women worked in several parts of the value chain but the chain was very male-dominated. Women's work was often unpaid, or poorly paid, acting as an extension of their reproductive work and considered menial and done only in the women's "spare time." This included cleaning, sorting, and cooking mussels. Based on her analysis of the value chain, Sumagaysay presented actions that would help the women of Jiabong meet their practical gender needs, such a providing clean, safe market stalls, and strategic gender needs such as entrepreneurial skills training and capital raising for their businesses.

Sunila Rai and her colleagues built on their earlier paper in the last Special Issue (Rai et al. 2012) of the introduction of polyculture of carp and small indigeneous fish in Terai, Nepal and its uptake by women of the Tharu ethnic group, an underprivileged community. The fish farming not only provided income and protein for the families, raising their fish consumption to twice the

national level, but also brought the women economic opportunities. Women's fish farmers groups were formed to share technical knowledge and learn new approaches. Women leaders developed from among the ranks of the network members. Two women were included in the team, along with 6 men, who visited Bangladesh to learn and broaden their knowledge of fish farming.

Most West Asian countries are definitely considered to have low women's participation in fisheries and therefore the paper by Khalfan Rashidi and E. McLean about the women invertebrate fishers of Al Wusta Governorate, Oman, exposed a little known but important women's fishery. They interviewed a quarter of the 400 fisherwomen of Oman, and described the methods and products that the women produce, especially molluscs, holothurians and crustaceans, including the snail or "rahas" fishery from which the dried operculums are used in producing frankincense. Despite the obvious value of the women's harvest, they face many challenges and are given little assistance from the government and its services. The authors outline how the women could be helped.

In Bangladesh, where fish exports are the second largest earner after garment exports, Md. Nuruzzaman and his colleagues have been working through a UNIDO project to train fish and shrimp processing factory managers and supervisors to understand and comply with labour laws. They examine all aspects of the labour conditions and treatment of women workers, who, although not well-paid, are saved from the worst of factory safety hazards by the structural upgrades that were made in the late 1990s to meet the HACCP (Hazard Analysis Critical Control Point) requirements for export food standards. Managers often display strong patriarchal views. They believe they are aiding women merely by giving them employment, and give little regard to the conditions of work. The women's conditions can be difficult, with problems from cases of physical abuse through to less opportunity for advancement compared to men. Surveillance of compliance with labour laws is predicated on export market requirements and still faces many challenges in improving women's rights.

Zuzy Anna reported the results of an economic study on women fish sellers from the north coast of Java. She noted that subsidies and credit to fishermen for fishing vessels and gear have been criticised for having a negative impact on resource sustainability, and credit facilities for women have been studied in terms of loan repayment performance, and income and empowerment. Her study examined the impact on efficiency of the women's fish selling businesses, with loans coming from a public bank, cooperatives and middlemen. A control group of non-recipients was also studied. Loans from cooperatives were found to be most productive to the businesses, due to their efficiency of dispersal, the lower interest rates and the technical and social support also provided.

Feemena Hassan and colleagues studies the uptake by women's Self Help Groups of oyster farming (*Crassostrea madrasensis* (Preston)) and value addition in Vadakkekkara Panchayath, Kerala. They found that the enterprises could be profitable, but that they still faced a number of gender and other challenges, such as health problems from the farming work, to social issues such as poaching as harvest time approached.

Where to next?

From looking back and looking forward, two papers examined how the GAF events had developed in the Asian Fisheries Society, and surveyed views of future steps needed.

Looking back in a memorial essay, Meryl Williams examined how Dr M.C. Nandeesha (1957-2012), through his professional interest, vision and ability to get a wide range of experts motivated, stimulated the Asian Fisheries Society to commence and sustain gender in aquaculture and fisheries efforts. One particular focus of his attention was to understand and improve the institutional environment to better support gender equity.

Meryl Williams and Poh Sze Choo surveyed 41 of those engaged in gender in aquaculture and fisheries activities, including academics, students, researchers, non-government organisation staff and development professionals. Whereas most felt that gender inequality issues were better understood now, better communication of strategic messages is needed. Most respondents were not devoted full-time to gender activities, and research is not well connected to grassroots needs. Much more effort is needed to create more champions, leaders and actors so as to have a critical mass for mobilisation. Targeted, dedicated resources, including full time people, institutional support and projects, and are required. The authors concluded that a more revolutionary rather than an evolutionary approach is now needed.

Conclusions

It is evident from all the previous gender events as well as from the GAF4 (that this volume is dedicated to) that awareness, interest and concern are increasing in this area of research and inquiry. As the body of work on gender in aquaculture and fisheries grows, certain issues have been observed that needs to be put in perspective so that the way forward is clearer.

One of the positive aspects has been that there is a trend to much greater attention to GAF in institutions – both academic and research and development. Also increasingly donors are looking for gender integration or at least insisting that projects look at the gender dimension particularly with regard to the impacts. Specific gender studies are also finding funds. The gender discourse in the policy arena is yet to strengthen, but as international events have shown, gender is now making it onto the centre stage. The next stage will be implementation of the policy aspirations.

As the papers being presented in the GAF events has shown, the number of practitioners in the field is increasing in quality and scope. However actual research work still largely tends to concern micro level studies, with great focus on household and community. This is very important for developing an understanding of the "what is" situation and will be a pointer for the "what should be" as far as specific issues are concerned. However as experts have pointed out, little conceptual thinking about gender has yet been carried out by the practitioners and diverse and sometimes conflicting ideas still prevail about its role and importance, with a focus on the practical, industry-specific gender roles. A great many gaps exist that need to be filled in order to join up

existing areas of work. A relatively recent approach through Value Chain Analysis (VCA) is a helpful way to link across micro/meso/macro scales, but there is need for more work on how meso and macro level factors such as privatisation (meso) and climate change (macro) affect women (and men) in the sector.

The lack of or little engagement in development of conceptual frameworks and analyses may be due to the background of the researchers themselves. The experts tend to be scattered, based in many disciplines and often not working full time in the field. This sometimes constrains the development of suitable methods which is very essential to ensure rigour and also ensure replication of studies effectively. On the other hand, it also allows a great diversity of fields from which to choose suitable concepts and methodologies, and prevents single and rigid approaches that would not suit the gender issues that are the focus.

When we wrote the Guest Editorial for the GAF3 event (Williams et al. 2012b), we were tending towards pessimism tinged with hope that gender in aquaculture and fisheries was making some progress. In this Guest Editorial, we paint a more optimistic picture of progress. Gender is now more firmly on the policy agenda, is embedded in major normative international documents, such as the Small Scale Fisheries Guidelines, and is receiving early institutional, policy and donor support. Attention is also being given to methodological and methods development as more practitioners engage in gender work. The full institutionalisation of gender into programs and institutions will face implementation challenges such as lack of leadership and resources, and will need to prove its worth to the fish sector. This a much better position in which to find ourselves, however, than still struggling to get gender on the agenda.

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Research Paper

Avoiding Pitfalls in Development Projects that Aspire to Empower Women: A Review of the Asian Fisheries Society Gender and Fisheries Symposium Papers

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Abstract

Many papers from the five Asian Fisheries Society (AFS) women/gender symposia reported on efforts to empower women but not on the underlying empowerment premises. To better understand women's empowerment, we chose to define the root word "power" based on feminist development literature. We then used the Longwe Women's Empowerment Framework to assess how each project from the 20 papers selected from the AFS women/gender symposia, has contributed to the process of women's empowerment. This framework proposes five levels of empowerment - welfare, access, conscientisation, mobilisation and control. Our results showed that most of the projects described in the selected papers achieved empowerment at the welfare or welfare to access levels, and in some cases the achievement at a fragile access level had reverted back to the welfare level. Our findings thus showed that women are still far from being able to define their own needs and priorities and to control resources which may help them to challenge their subordinate positions. In the fishery sector, feminist concepts of empowerment, which should have a place at the core of women's empowerment efforts, have been avoided. Unless women in the fisheries sector are able to construct a collective self to define and defend their gender needs, the control level of empowerment will remain far beyond their reach.

Introduction

After World War II, early initiatives in development were directed at addressing inequalities between developed and developing nations. These initiatives, however, focused on men and failed to narrow the economic gap between developed and developing nations. Boserup (1970) in her study highlighted the failure of including women in development projects even though, they played critical roles in sustaining local and national economies, especially in agricultural production. The report also observed that women professionals all over the world started to pressure their

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governments for change and that government and non-governmental agencies subsequently made visible efforts to integrate women into development projects.

Development projects which are predominantly based on the objective of economic growth may not truly benefit women. A review of the evidence of connections between economic growth and gender equality (Kabeer and Natali 2013) found that equality contributes to economic growth but, the reverse, that economic growth led to greater equality, was not necessarily the case. Providing services to women and increasing their income do not necessarily improve their well-being. This is especially the case if the new income generating activities increase their already heavy work burden and may adversely impact their physical and mental health. In addition to the economic criteria for measuring women's empowerment, several other criteria should also be used.

Starting in the late 1980s, researchers focused more on gender to develop better understanding of women's roles in the various economic sectors and to aid development efforts to address gender inequality. Although late in starting, the fishery sector (which includes aquaculture and fisheries activities) and its institutions, such as professional societies, also began to give attention to gender.

Through its Indian Branch, the Asian Fisheries Society (AFS) was first involved with the theme of women in fisheries in 1990 when it conducted the Workshop on Women in Indian Fisheries (Sudhindra 1992). Dr M.C. Nandeesha, who initiated the Indian event, subsequently helped the non-governmental organisation, Partnership for Development in Kampuchea (PADEK) to hold workshops (1994; 1996) on women in Cambodian fisheries (Nandeesha and Heng 1994) and women in Indo-China fisheries (Nandeesha and Hanglomong 1997). He also persuaded the then President of AFS, Prof. Dr. M. Shariff, to have AFS organise a women in fisheries photographic competition (1995), and later (1998) to hold the First Women in Fisheries in Asia Symposium in conjunction with the Fifth Asian Fisheries Forum organised by the AFS (Shariff 2002). Since then, a symposium on women/gender in the fisheries sector has been organised in conjunction with the Asian Fisheries Forum (later the Asian Fisheries and Aquaculture Forum).

From the papers presented in the AFS women/gender in fisheries symposia series, research on women/gender studies made only slow progress. The lack of strong progress seemed to be partly because many of the researchers in the sector are not familiar with gender research methods and basic concepts (Williams et al. 2012). Many of the gender researchers also are newcomers to gender research, having been educated in disciplines such as biology and economics (the current authors included), and only a few have a grounding in feminist scholarship.

The AFS symposia have attracted papers that were predominantly concerned with women/gender in a development context. Power and empowerment are explicit or implicit among the development issues addressed. However, most studies did not indicate clearly whether the intended empowerment outcomes have been achieved in their projects.

The current paper reviews how selected papers published in the proceedings/papers of the first five AFS symposia (1998; 2001; 2004; 2007; 2011) addressed women's empowerment. We

first briefly examined the gender and development discourse on women's empowerment, and from this chose a frame for analysing the selected papers.

Materials and Methods

In order to find a conceptual frame for analysing the content of papers from the AFS gender and fisheries symposia, we undertook a literature study of feminist and development interpretations of the concepts of power and empowerment.

To provide the material for analysis using the conceptual frame, we then selected papers from the four AFS proceedings (Williams et al. 2001; Williams et al. 2002; Choo et al. 2006; Williams et al. 2012) and those from the gender and fisheries special issue of the journal *Development {51(2)}*. As the AFS symposia are special sessions within mainstream AFS Fisheries and Aquaculture Forums, the papers they attract are mainly independently contributed, i.e. not invited papers or multiple papers resulting from gender research programmes. Thus, they reflect the general stream of research and development projects funded by research institutes and development agencies, and are not the result of theme research planned and funded by the symposium organisers.

For the present study, papers were selected as relevant if they examined empowerment of women, paying due attention to the context within which women were situated. Thus, most of the chosen studies were of individual, or group experience at household or community level. In all, 20 papers were deemed relevant.

Results

A short review of the concepts of power and empowerment

Due to its now widespread use, the word "empowerment" carries different meanings when used by different people within different contexts. Very often, its use by applied researchers and development workers is never explicitly defined. The failure to define and explore the practical details of how empowerment can be achieved weakens its use as a tool for planning strategic change (Rowlands 1997). Diverse views exist on the meaning of empowerment and the ways to measure it (Okali 2013). It has also been accused of being "downsized" and constricted (Batliwala 2010).

The term "empowerment" can be understood better by going back to its root word "power" which is often described in association with another descriptive word (such as over, to, with and within). One definition of "power over" is the ability of the powerful to affect the actions and thoughts of the powerless (Gaventa 2006). Such power could be described as "zero sum"- the more power one person has, the less the other has. This kind of power can be seen at many levels from household to national or international policy making (Rowlands 1977). Further, Rowlands (1997) suggested that, in the development context, empowerment has often been constructed on a "power over" definition, and that women should somehow be empowered to participate within the economic and political structures of society. However, Gaventa (2006) noted that more and more

development workers are becoming aware of the need to analyse and understand the changing configurations of power, and to seek out other approaches that will result in a change of power relations. Power can also be conceptualised as a process when power is linked to "power to", "power with" and "power from within" (Rowlands 1997; Table 1).

Table 1. Implications of different dimensions of power (Luttrell et al. 2009, adopted from Rowlands 1997).

Type of power relation	Implications for an understanding of empowerment
Power over: ability to influence and coerce	Changes in underlying resources and power to challenge constraints
Power to: organise and change existing hierarchies	Increased individual capacity and opportunities for access
Power with: increased power from collective action	Increased solidarity to challenge underlying assumptions
Power within: increased individual consciousness	Increased awareness and desire to change

If power is used in the sense of "power over", a gender analysis shows that power is wielded predominantly by men over other men, and by men over women (Rowlands 1997). Rowlands added that this form of power can be witnessed in dominant social, political, economic or cultural groups over those who are marginalised. Power, in this sense, is in finite supply and, if one group gains power, the other group will have less. From a feminist perspective, interpreting "power over" entails understanding the dynamics of oppression and internalised oppression; empowerment thus is more than participation in decision-making, and must include the processes that lead people to perceive themselves as able and entitled to make decisions (Rowlands 1997).

Definitions of empowerment based on the interpretations "power to", "power with" and "power within" are associated with processes by which people become aware of their own interests and how these relate to the interests of others (Rowlands 1997). Further, the "power within" approach to empower women will help build women's confidence, self-esteem and undo the effects of internalised oppression. From the feminist's point of view, achieving empowerment must involve undoing negative social constructions so that people come to see themselves as having the capacity and the right to influence decisions. The feminist model includes not only the more tangible expressions of power but also an understanding of how internalised oppression creates barriers of inequality between men and women (Rowlands 1997). People who are systematically excluded from power and influence in society internalise the messages they receive about what they are supposed to be like, and believe the messages to be true, thus resulting in internalised oppression (Rowlands 1997).

One major constraint to achieve gender equality in the coastal and rural communities in Asia is that many women have accepted their subordinate position or perceived this as natural. Siason et al. (2001) in her overview on women in fisheries in the Philippines described them as "self-sacrificing, viewing themselves more as supporters than leaders". Many women from the fisheries community in Malaysia considered that it is their duty to help their husbands and perceived that work as based more on home needs, rather than as for pay (Choo 2005). In their work in addressing gender mainstreaming in the fisheries sector, Arenas and Lentisco (2011) noted that many women

have low self-esteem, possibly because of the social values that hold men superior. Women can only be empowered if they shed this internalised oppression.

To empower women to critically and creatively reshape their worlds, women's own concept of themselves has to be de-coded and re-inscribed (Wieringa 1994). Wieringa (1994) further added that decoding and reinscription are painful processes, since women are often fearful of change; the old may be painful and uncomfortable but it still provides the security of tradition and the consent of one's social surrounding.

Criteria other than economic criteria are needed when considering and measuring women's empowerment. In this respect, the United Nations Population Information Network (POPIN, undated) guidelines for women's empowerment comprises five components: women's sense of self-worth; their right to have and to determine choices; their right to have access to opportunities and resources; their right to have the power to control their own lives, both within and outside their home; and their ability to influence the direction of social change to create a more just social and economic order, nationally and internationally. Using these five components as indicators to women's empowerment can help focus on the well-being and status of the women and not only on the objects or money that they possess. The well-being approach therefore involves not only the external objective indicators (like income, nutrition and life expectancy) but also the subjective dimension of how individuals feel about their health or economic status (White 2009).

However, despite the global aspirations for a more holistic approach to empowerment, development efforts tend to focus mainly on women in isolation and on economic interventions for them. Okali (2011) warned that "*it cannot be assumed that by focusing on women, agricultural and rural development interventions will result in desired outcomes for them. Everything we know about the organisation of society, and including gender relations, should lead us to question this assumption*". She stressed that gender interventions must be well targeted in order to meet specific and practical needs, i.e. more than narrow economic interventions, to improve the lives of women and their families.

In Longwe's (2002) framework of women's empowerment, the women-only focused economic approach occupies the welfare level, where women are passive beneficiaries of a development project. Longwe (2002) suggested five levels of a women's empowerment framework (Table 2) which are not really a linear progression but can become a self re-inforcing loop. A final point, and one that will be borne out in several of the papers reviewed below, is that women's empowerment is not a fixed and immutable state. In terms of attempting to develop definitive measures of women's empowerment, Okali (2013:2) recommends that even individual and household income decisions have to be examined within the whole of economic and social lives.

"This would then shift the analysis towards the inter-dependency and linked lives of men and women, and towards a life course analysis that highlights shifts that have implications for the changing ways men and women engage in agriculture, rather than assuming that 'one size fits all

at all times'. It would also force us to agree that empowerment does not look the same for everyone, nor is it a fixed state."

Table 2. Five levels of women's empowerment framework (summary from Longwe 2002).

Welfare	"Welfare" is the lowest level of intervention where women are given benefits to improve their socio-economic status rather than producing or acquiring such benefits for themselves. This is the zero level of empowerment where women are the passive recipients of benefits.
Access	This is the first level of empowerment since women improve their own status by their own work arising from increased access to resources. This level is the beginning of the conscientisation process.
Conscientisation	This level involves the realisation that women's relative lack of access to resources actually arises from discriminatory practices and rules that give priority access and control to men. Conscientisation refers to a collective urge to action to remove one or more of the discriminatory practices that impede women's access to resources. "Where many women accept patriarchal norms, the leadership of more liberated and activist women is essential at this critical phase of fomenting dissatisfaction with the established patriarchal order."
Mobilisation	Mobilisation is the action level that complements conscientisation and involves women coming together for the recognition and analysis of problems, the identification of strategies to overcome discriminatory practices, and collective action to remove these practices.
Control	This level is reached when women have taken action so that there is gender equality in decision making, and women have taken direct control over access to resources.

Analysis of selected AFS symposia papers on women's empowerment

Based on analysis of the content of each paper and using categories based on the empowerment levels proposed by Longwe (2002), the papers were grouped as follows: (1) general examination of women's empowerment, (2) welfare, (3) welfare to access (and in some cases may revert back to welfare from access), and (4) access to conscientisation. We had no papers that studied women's empowerment at the levels of mobilisation and control, although we know that small pockets do exist. Table 3 provides a summary of the papers examined, their scope of study and how they fitted into the various levels of empowerment in Longwe's framework.

(1) General examination of women's empowerment

Only one paper contained a broad examination of women's empowerment. In a comprehensive, probing viewpoint paper, Nozawa (2001) made the case for why women's empowerment was important. She explained the inner and outer nature of empowerment, and how deep personal, social and institutional changes are needed for its achievement. She suggested that women in Asian fisheries should be organised into three levels: the researcher/development worker level; the community level; and the institutional level.

She also emphasised the importance of establishing an organisation in Asian fisheries that can focus on: gender sensitive and fair institutions; information exchange; gender balanced fishery policies at various levels; and promotion of more women into decision-making positions. Her rhetorical questions covered all levels of the Framework.

Table 3. Symposium papers selected and the level of empowerment demonstrated, according to Longwe's (2002) Women's Empowerment Framework, with five levels: welfare, access, conscientisation, mobilisation, control.

Paper	Subject, Scope	Approximate level of Longwe Women's empowerment framework
	General examination of women's empowerment (1 paper)	
Nozawa 2001	General: general exploration of empowerment	All
	Welfare (3 papers)	
Kibria and Mowla 2006; Mowla and Kibria 2006; Halim and Ahmed 2006	Women in development projects in Bangladesh and Vietnam	Welfare, women burdened by the project activities
	Welfare to access (and possibly back) (14 papers)	
Debashish et al. 2001; Shelley and D'Costa 2002	How large development delivery institutes in Bangladesh (CARE, Caritas) approach empowerment in their strategies and activities	Welfare, access
Sultana et al. 2002	Fisheries management by women in Bangladesh inland fisheries not yet fully legitimised	Access not achieved
Kripa and Surendranathan 2008; Ramchandran 2012	S. India coastal aquaculture: Mussel culture, Kerala; mussel, seaweed and fish culture, southern India	Site rights: from welfare to fragile access and back
Lim et al. 2012; Ii 2012; Frangoudes and O'Doherty 2006	Women's rights in developed country fisheries; Women divers rights in Japan, Korea; women's rights in EU countries	Fisheries rights access is maintained by informal rights; formal access has to be won by struggle
Sullivan 2006; Lim and Laowapong 2012	Thailand rural women in aquaculture, fisheries	From welfare, struggling for access, held back by culture, despite modernisation
Nowak 2008; Porter et al. 2008	Women in coastal fishing communities: a traditional society and Tanzanian women in Islamic communities	Fragile nature of access, conscientisation and some control that can be destroyed with resource, economic and cultural change; access being removed by modernisation
Kusakabe 2006; Tindall and Holvoet 2008	Women and power in supply chains	Fragility of access
	Access to conscientisation (2 papers)	
Chao et al. 2002; Chao et al. 2006	Taiwan women: Taiwan women academics and scientists; women fishery sector entrepreneurs	Entrepreneurs can have control; academics have access but not conscientisation

(2) Welfare

Three studies described donor-sponsored projects where economic empowerment is the main concern, and which unwittingly led to women being burdened with more work, Kibria and Mowla (2006) in Vietnam; Mowla and Kibria (2006) and Halim and Ahmed (2006) in Bangladesh.

The first project, "Aquaculture Development in Northern Uplands, Vietnam (VIE/98/009/01/NEX)," was implemented by UNDP from 1999 to 2002.The objective of the

project was to alleviate poverty and malnutrition in three provinces by diversifying rural development to include aquaculture. Although this project succeeded in creating suitable opportunities for ethnic women and enhanced their status, it also increased their work burden (Kibria and Mowla 2006). Apart from household work, women spent as much time as men in the various aquaculture and on-farm activities. The total work hours of women were greater than men's and women had fewer decision-making roles than men. Kibria and Mowla (2006) also noted that although women were usually responsible for managing money in the family, they, however, did not have the right to spend the money freely on whatever they liked. Women were allowed to make individual decisions on expenses for daily meals, clothes and part of the children's education; decisions on other family expenses were decided by the husband or by both husband and wife.

The second project, "Patuakhali Barguna Aquaculture Extension Project, Bangladesh," aimed to involve women in fish farming projects and was implemented from 1997 to 2004 with funding from DANIDA. The project was found to have increased the decision-making roles in certain family matters (such as production decision processes and schooling of children) of participating women, but did not increase women's part in making decisions concerning medical care for the family (DANIDA 2008). Although women participated more actively in decision-making processes in certain family matters, the final decisions were still made by men. As a result of economic development, domestic violence against women had decreased, and some participating women became role models in their communities (DANIDA 2008). This project, however, placed additional work burden on women who were already stretched to the limits (Mowla and Kibria 2006). Women had to work longer hours and had little time to attend training and were confused on how to organise their time between domestic chores and work on the aquaculture projects. Women interviewed revealed that they usually had to do everything related to fish farming within the households; they were also likely to be responsible for maintaining their vegetable plots and raising poultry along with fishing and fish farming.

The third activity reported in a paper in this category, "Women's involvement in Support of the University Fisheries Education and Research Project (SUFER) Bangladesh," was funded by the United Kingdom Department for International Development (DFID). A project entitled "Women in Fisheries in Bangladesh - Level of Involvement and Scope of Enhancement" funded under SUFER found that involving women in fisheries projects has led to a net increase in the work burden of women. About 10% of women reported spending more than 7 h a day in project activities; the increasing shortage of drinking water and fuel wood had also added to their workload (Halim and Ahmed 2006). Even today DFID has goals of job creation and higher income for women to achieve their empowerment. DFID considers that a paid job gives rise to greater empowerment and choice - particularly in matters of when to marry and to have children (DFID 2012).

(3) Welfare to access (and back)

This was the largest group in our selection (14 papers), revealing examples of progress in women's empowerment and also of regression from access to welfare, when supply chains changed.

Two Bangladesh papers revealed the evolving strategies of large national development assistance non-government organisations (NGOs) that aim, among other priorities, to empower women through aquaculture. Both organisations started their rural interventions from a welfare level and, through self-learning, moved towards access and into conscientisation efforts. The women empowerment approaches were explored for the Agriculture and Natural Resources (ANR) sector of CARE Bangladesh (Debashish et al. 2001) and for Caritas Bangladesh (Shelly and D'Costa 2002). Both papers described the long learning curve (decades) of the NGOs themselves in their efforts to upgrade the conditions of their beneficiaries. The learning began in other rural projects in the 1980s, and led to the realisation that men were tending to benefit from the activities, despite having many women's groups involved. As aquaculture entered the portfolio of new technology interventions in the 1990s, major shifts were occurring in the NGOs' approaches, with efforts to make extension services, training, capacity building and financing much more accessible to women. The NGOs used family approaches and addressed women's status in efforts to overcome the cultural and structural obstacles to women empowerment. The NGOs also recognised the importance of transforming their own organisations to support women's empowerment work. ANR changed its own staff composition to include more women and to develop all staff to create a more appropriate workforce and workplace (Debashish et al. 2001). Caritas Bangladesh reoriented its micro-credit programmes and tackled changing the attitudes of men towards women. Caritas concluded that ownership of assets was the single most critical factor and began working towards equality of ownership of rights such as land – important access level issues in the Women's Empowerment Framework.

Also in Bangladesh, Sultana et al. (2002) studied the early stages of creation of a Goakhola-Hatiara women's *beel* (pond with static water) management committee with the support of the NGO Banchte Shekha and the WorldFish Center Community Based Fisheries Management project. The mainly Hindu women actively capture fish, snails and collect water plants. Although the project (by the late 1990s) had improved collective decision-making by the participants, the NGO had not yet succeeded in securing access to the land on which the project ran, and the women's role in the management committee was not well defined or fully legitimised. The assessment of empowerment, therefore, would be that only a fragile access level was achieved by the time of reporting.

In southern India, coastal aquaculture has become the platform for some women empowerment attempts. Kripa and Surendranathan (2008) reported the successes of women self-help groups (SHGs) in adopting mussel farming. The women found the group activity amenable. In these SHGs, a community of women (involving both illiterate and women with some education) were involved in the whole process of mussel farming-from planning to utilisation of profit. Using the framework of Longwe (2002), the level of empowerment in these SHGs will meet the "access level" where women improve their own status by their own efforts. However, Ramchandran (2012) reported that the fragile "access" situation attained by women had recently faced some challenges where men had also organised themselves to form SHGs with funding provided by banks, and women are beginning to fear losing to the male "muscle power" in mussel farming. Ramchandran (2012) suggested that the Indian government should reserve the shallow waters for women mariculture farmers. In our opinion, this could be resorting to the "welfare" approach and for

women to move forward they also need to have more confidence in themselves, be more innovative and entrepreneurial to compete with men.

In Korea and Japan, although women who dive for abalone, sea cucumbers and other high value marine species are economically well compensated, they have a low social status (Ii 2012; Lim et al. 2012). The voice of women divers in Korea is very weak- they have no rights to their fishing grounds, and even when their fishing grounds are destroyed they will not be compensated (Ii 2012). To protect their interests, Korean women divers formed mutual aid societies (akin to SHGs) to pressure local and national administrations, but in areas with only a few women engaging in diving, divers were utterly helpless (Ii 2012). In Japan, women divers (ama) can become members of the Ama Cooperative General Assembly which looks after their interests (Lim et al. 2012). In a culture steeped in patriarchy, although ama are economically empowered, these women possess few of the characteristics attributed to empowered women. Their occupation has been perceived as a job for the poor and uneducated and their contributions remain unacknowledged and hidden. However, the treatment of ama in Japan is generally no different from that of other women in the Japanese fishing community, where women are highly marginalised and their quest for social justice elusive (Lim et al. 2012).

By contrast, in the European Union, fisherwomen can be considered as having progressed the most in the empowerment process. They are supported by several laws to recognise their contributions in the fishing community. Frangoudes and O'Doherty (2006) described how the rights of the fishers' collaborating spouses are protected by laws, especially in relation to social security, health care, old-age pension and maternity benefits.

Providing Thai women with skills and livelihood training can offer good leadership opportunities to women (Lim and Laowapong 2012). However, cultural roles of women in the reproductive sphere have often held them back from the highest level of empowerment. The Thai government had targeted women in aquaculture projects because of livelihood benefits (Sullivan 2006). Although women had benefited economically like their male counterparts in these projects, unlike the latter their mobility is still limited and is confined only to the community thus hampering them from experiencing the full gains from the government initiatives to empower women (Sullivan 2006).

Nowak (2008) reported that the egalitarian culture of the Btsisi, an indigenous community in Peninsular Malaysia was gradually being broken down as they mingled with other patriarchal cultures in the country and adopted their lifestyle when forced into other economic pursuits. The once hunting-gathering livelihood, in which women enjoyed a high level of empowerment along with men, is no longer feasible as forests had been largely replaced by oil palm plantations and fish were scarce due to overexploitation. In Tanzania, Porter et al. (2008) reported that the supposed benefits of modernisation and globalisation are not reaching poor coastal communities but have actually impoverished coastal communities, degraded resources and taken access to lucrative export resources such as octopus away from women.

The subservient nature of small scale Cambodian women fish traders in the Thai-Cambodian border made them more successful than male traders (Kusakabe 2006). These women traders at the border had learned "to beg others for the trade" and men were probably unable to stoop that low and would more likely start a fight over trade (Kusakabe 2006).

In the fish supply chain from Lake Sélingué (Mali) to markets in the capital, Bamako, both women and men participate, in different proportions, in each part of the supply chain (Tindall and Holvoet 2008). In the fresh fish chain, however, the power relations between traders and wholesalers particularly are gendered. Traders are much weaker than wholesalers in the capital, Bamako, and forced to bear the handling losses. Over the previous decade, the number of traders has declined and women traders exited disproportionately, leaving only those with better access to credit. The traders' association was dominated by the men, even though half the remaining traders were women. This case demonstrates how the women traders' empowerment regressed, and also how the lack of access to decision-making power in the association contributed to post-harvest losses and loss of value in the supply chain. Women traders often have greater difficulty to access ice than their male counterparts and this often resulted in post-harvest losses and lower value for the fish they marketed.

(4) From access to conscientisation

The study by Chao et al. (2002) described how professional women in the fisheries industry in Chinese Taipei were able to respond positively to globalisation. They enjoyed easy access to information on global trends through the mass media, access to education and training courses and were highly responsive to the impact of globalisation. Women were willing to improve their language ability, to learn new knowledge, and to adapt to advanced technologies like e-science and e-commerce. Some had strong ambitions to expand into foreign markets. Chao et al. (2006) further described how these groups of professional women have created many pioneering ideas in the processing of aquatic products (such as microwavable milkfish, raw tuna belly fillets and processed shrimp) which were popular not only in the Taiwanese market but also in international markets.

Discussion

The 20 papers we examined for their approaches to empowerment covered a wide range. One paper (Nozawa 2001) provided a comprehensive treatment of women's empowerment. The others provided insights into empowerment of women in projects and into the institutions of development. Their main findings can be grouped into three main themes. First, development agencies need to consider their own organisation. Second, women's empowerment must always be considered within the context of development action. Third, women's empowerment is not fixed and can regress as well as progress.

On the first theme, two large development agencies in Bangladesh found from experience that, to help empower women, their own organisations (CARE Bangladesh and Caritas Bangladesh) had to acquire a deeper understanding and undergo profound institutional change,

including in its human resources (Debashish et al. 2001; Shelly and D'Costa 2002). We believe that this is also a requirement for any organisation attempting to support work in women's empowerment.

On the second theme, the papers revealed the importance for development agencies working on women's empowerment to take into account the impact on women and families of their interventions and of sectoral change. Donor-sponsored projects that focused narrowly on women's economic empowerment may unwittingly lead to overloading the women with work (Kibria and Mowla 2006; Mowla and Kibria 2006; Halim and Ahmed 2006).The focus on involving women to improve the family's economic position, may only manage to increase the women's work burden. Moreover, increased family income may not give women an increased say over how to spend the money. Kibria and Mowla (2006) found that, apart from household expenses, money for other uses is still predominantly controlled by men.

Women need security of formal access to aquaculture space (Ramachandran 2012) and fisheries resources (Sultana et al. 2002) to move up the empowerment ladder. Further, women are often not formally recognised as fishery professionals. They are often barred from registering as professionals for fishery benefits. In fisheries for high value invertebrates in Japan and Korea, women practitioners are debarred from registering as professionals (Lim et al. 2012; Ii 2012). For the collaborative spouses in European fisheries, women's access to recognition and benefits had to be won through first fighting for enabling legislation (Frangoudes and O' Doherty 2006).

Social and cultural norms are other important contextual elements. For women in Thailand, Sullivan (2006) and Lim and Laowapong (2012) showed how the expectations of women's roles could circumscribe but not prevent empowerment. In Taiwan, Chao et al. (2002) and Chao et al. (2006) found many women entrepreneurs were empowered by good education and access to national and global infrastructure. These private sector actors could also be considered conscientised. In an earlier paper, however, Chao and Liao (2001) had found that women fishery academics saw themselves as competitive in academic and research fields but lacking the management skills and capacity to contribute to policy making.

In the two fish supply chain studies (Kusakabe 2006; Tindall and Holvoet 2008), women's empowerment was complex, and supply chain change strongly gendered.

Several papers illustrated the third theme, namely that women can slide backwards as well as progress in empowerment. Economic development was a common cause of loss of empowerment. For example, women's positions in the supply chain were weakened as a result of the globalisation of the octopus fishery in coastal Tanzania (Porter et al. 2008), modernisation impacts in traditional Btsisi' households of Malaysia (Nowak 2008), and the contraction of numbers of traders in Mali (Tindall and Holvoet 2008).

Only a few of the authors of the gender symposium papers had grounding in feminist scholarship. Most researchers who participated in the AFS women/gender in fisheries symposia have little contact with feminist research or movements, probably thinking that feminists represent too extreme a view in their demands and challenge for change. They are more influenced by

mainstream development views where empowerment is seen as an individual rather than collective process emphasising entrepreneurship, self-reliance and co-operation to challenge power structures. Similarly, among fisherwomen from Chile, Tavares de Azevedo and Pierri (2013) found outright rejection of feminism because the women saw it as negative and failed to recognise the importance of feminist ideas in their own fight for equality.

Wieringa (1994) pointed out that feminism is a discursive process- a process of producing meaning, of subverting representations of gender, of womenhood, of identity and collective self. She contended that feminist activities should be at the core of the empowerment process where the construction of a collective self will enable women to see themselves as vocal objects, able to define and defend their gender interests. We consider that this view has relevance to the aquaculture and fisheries sector where women are on the lower fringes of empowerment in the face of changes that are often disempowering.

Scientists, especially those in the physical and biological sciences, tend to simplify the gender inequity problem and focus on a narrow scope of an enormously complex issue. Donors also very often choose to emphasise the economic dimension of women's empowerment, concentrating on short-term goals of three to five years. A more holistic approach to empowerment should be targeted and relevant indicators developed to determine whether the output from development projects have indeed met the intended outcome of empowerment.

Conclusion

In the fishery sector, feminist concepts have been avoided, yet should have a place at the core of women's empowerment efforts. Longwe's (2002) Framework for Women's Empowerment, based on Rowlands (1997) power concepts, enabled us to examine the approximate levels of women's empowerment being reported in the AFS gender papers. Although based on only 20 studies, the results produced important lessons for development agencies wishing to aid women's empowerment. For a start, empowerment does not occur overnight. To position themselves, agencies must develop their own comprehension of women's empowerment and how they, as development institutions, may need to develop their own internal capacity in order to support the empowerment of beneficiary women. Programmes and projects should avoid focusing simply on welfare level economic activities for women as this, in isolation, may just overburden women with more work. That said, we stress the importance of opening up and supporting women's economic empowerment, but in a more complete way. Women need formal access to and ownership of space and resources. Ambient cultures, in the household and outside, must be taken into account because they can support and/or circumscribe women's empowerment and certainly hold women back from achieving conscientisation, mobilisation and control levels. For their work in fisheries, society must accord women professional recognition. Finally, fish supply chains do not stand still and changes are usually gendered and can work for or, more likely, against women's empowerment. Thus, empowerment is not guaranteed to be a linear progression through the levels from welfare to control and gender equality. We need to bear in mind that regression is possible.

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Technical Paper

Beyond Fish Processors and Caregivers: Women as Primary, Secondary and Tertiary Fish Users

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Abstract

Women's contributions to fisheries are seldom recognised, and when they are, they are often understood from the roles they play in fish processing, marketing, and caregivers of fishing households. This characterisation has influenced the manner in which gender issues have been taken into account in fisheries development projects: women are targeted through post-harvest and household support activities, "low-conflict" interventions that allow them to remain in socially acceptable female domains, without challenging power relations or improving their participation in decision-making. In this paper, we argue that it is necessary to move beyond the perception of women as fish processors and caregivers, by better understanding their access to fisheries resources, identifying their roles and relationships with others, and by acknowledging the benefits of directly involving them in decision-making. Based on a synthesis of relevant literature we develop three categories to illustrate the different ways women access fisheries resources. Women directly involved in fish-harvesting are categorised as primary users, while those that access fish through kinship or other relationships are categorised as secondary users. Finally, women who buy fish directly from fishers or traders are categorised as tertiary users. Drawing on these categories we are able to make a number of recommendations to enhance women's participation in the fisheries sector.

Introduction

The theme of gender equality in fisheries has been in academic literature for over 30 years, with much of the literature directed towards making women's roles visible. The gender division of labour in fishing communities takes diverse forms and has been described in the literature particularly from the light of the importance of women's involvement in fisheries processing, marketing and trade (Williams 2002; Choo et al. 2006; Williams 2008; Weeratunge and Snyder 2009; Williams et al. 2012). The Food and Agriculture Organization of the United Nations (FAO) has estimated that, overall, 30% of the people employed in fisheries (harvest and post-harvest) are women (FAO 2012), although this differs very much by country and by sector. Women account

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for half of the workforce in inland fisheries, while in Asia and West Africa, 60% of the seafood is marketed by women. If we take into consideration that much of women's contributions to fisheries go unrecognised, global figures could actually be higher than expected, surpassing 50% of the total workforce involved in fisheries (Weeratunge and Snyder 2009).

Women play very important roles in fish processing plants in developed and developing countries, constituting a major work force in the fisheries sector. Although some women do work on offshore industrial fishing vessels, particularly in the processing floors onboard factory trawlers (Lee, personal observation), they are more active in processing plants on land. In the small-scale fisheries sector, women's roles are also dominant in the post-harvest sector. They process fish by drying, salting, smoking, making fish/shrimp sauce, etc. which they either sell to generate the main or supplementary incomes for their families, and/or use directly for household consumption (Aslin et al. 2000; Tindall and Holvoet 2008; de Pryck 2012). They are also the main caregivers of the fishing households, responsible for food and nutrition security and in many cases, responsible for family finances (Williams 2010). These roles cannot be underestimated as they represent a large burden on women, not only as processors and traders but also as mothers and caregivers of the fishing households, particularly during poor fishing seasons (Kalikoski and Vasconcellos 2012). Furthermore, some women can also be quite active in river and inland, near-shore and subsistence fisheries (Williams et al. 2002; Choo et al. 2006; Williams et al. 2012). Despite the large scale contribution of women in the sector, predominantly in fish processing and marketing, their contribution has been undervalued and they have been largely excluded from decision-making processes and mechanisms, particularly in fisheries governance and management (Tindall and Holvoet 2008).

Moreover, the widespread characterisation of women as fish processors and caregivers has also influenced the manner in which "gender issues*"* have been taken into account up to now, and has resulted often in women being targeted through post-harvest and household support activities and interventions, such as training in processing and marketing, and through grants and credit schemes to acquire processing equipment such as smoking ovens, small implements, cookers etc., or capital funds to buy fish and pay for transport and marketing, and sometimes through livelihood diversification support options such as rearing livestock and handicraft. Such activities can be considered as low-conflict, in the sense that they allow women to remain in the socially acceptable female domain of the household and in their perceived traditional role as processors and marketers. The intention of these activities, therefore, has been to improve women's income, in the hope that (besides having the boxes of "women" and "gender" ticked in the project management checklists), women would benefit from them. However, interventions of such type have rarely been organised to understand and/or question the power distribution and gender power relations within households and communities, which could be considered as going beyond the limits of what a fisheries related project is meant to achieve (Lentisco 2012). Very often, women's lack of power over their own lives inside and outside the household is ignored. Even when gender considerations are included in policy and interventions, all too often the approach used is superficial, and is carried out without a real understanding of women's needs. As a result, little has been achieved to increase women's voices in the sector in general, and their participation in fisheries governance remains limited.

This is not to say that women do not need this kind of technical support. However, failing to recognise the relative absence of women in resource management continues to be an impediment in improving their participation in decision-making, increasing their contribution to policy dialogues and having a direct say over the exploitation of the resources they depend on. These areas are most relevant for their empowerment and without them, any other gains are liable to be lost quickly if external support is withdrawn. But policies and interventions for the development of fisheries seem inefficient to deal with the complexity of gender issues (Harrison 1995), and they often remain, even if unintentionally, gender blind (Brugere 2013). Additionally, it is difficult to find real case studies on women achieving full participation in decision-making in fisheries, as well as in-depth analysis on how gender equality considerations could shape fisheries governance.

In this paper, we will argue that it is necessary to move beyond the perception of women as fish processors and caregivers, by identifying their roles and relationships with others and by better understanding their access and intended use of resources, particularly access to fisheries supplies.

Results

We found it was difficult to identify concrete documented examples where women have been more actively involved in fisheries management. Recent examples are two large projects implemented by the FAO that have aimed at integrating and promoting the role of women, through finding better ways to involve them more directly in fisheries management. These projects, the Sustainable Fisheries Livelihoods Programme in Africa (SFLP) and the Regional Fisheries Livelihoods Progamme in Asia (RFLP), have carried out numerous studies, workshops and projects where the important roles of women in the fish-value chain have been highlighted and improved, while trying to look beyond women's roles as fish processors (Holvoet 2008; Lentisco and Alonso 2012).

Some authors have highlighted the benefits of women's inclusion in decision-making, which include amongst others: better and increased awareness regarding domestic violence, increased attendance in schools among children, and women's participation in local politics (Gatke 2008; de Pryck 2012). Women are also prompt to organise themselves with the purpose of improving local conditions in their communities (Da Cal Seixas Barbosa and Begossi 2004). It has also been argued that increasing women's control over resources would improve women's bargaining power within the household, increasing not only their welfare but also their children's nutrition and health (Duflo 2011). When women participate in fisheries management, their needs and priorities are better represented, and they tend to pay more attention to livelihood needs such as equitable distribution of resources and other matters related to poverty reduction (Gatke 2008). There are also potential gains for the resource user groups themselves. Westermann et al. (2005) indicated, through their study of 33 rural programs in 20 countries of Latin America, America, Africa and Asia, that having women represented in resource management groups improves collaboration, solidarity and conflict resolution within the groups, and this could also be the case if applied to fisheries. For example, in Cambodia, Gatke found that women were better advocates for transparency and more inclusive participation in fishing communities, and communication and conflict management (Gatke 2008). Better communication, conflict resolution, equitable access,

etc., are drivers that may ultimately translate into better resource management, even if their initial concern was centered more on community cohesion and not so much on reducing their impact over the environment (Funge-Smith, pers. comm.). When considering why it is important to take into account women's involvement in resource management, fisheries managers should certainly contemplate other less evident aspects, such as the work that women do in the household, other subsistence activities (such as shellfish gleaning) or other diversified income activities outside fisheries (WorldFish 2010), as these could also be subsidising men's fishing activities, thereby keeping men fishing for an otherwise unprofitable resource, due to declining stocks or high fuel costs, continuing unsustainable and financially unprofitable practices (Harper et al. 2012). If women were better informed about the impact of such subsidies, then they could also be involved in the search for solutions. There is also a lack of information on the impact of the post-harvest sector, where women's roles predominate, in aquatic resources (Walker 2001). With the limited attention that fisheries organisations and some government agencies give to women's roles in fisheries management, it is no surprise that most of the activities targeting women in fisheries development projects, when present, will focus only on improving post-harvest activities and providing other type of supplementary livelihood support. These activities are certainly important, especially for those women who do not harvest fish, but are involved in fish processing, or are secluded in the household domain away from any type of income generating activities. However, these interventions do little to increase women's voices within the fisheries sector or improve their involvement in resource management.

We argue that a more integrated and equitable approach to fisheries governance and management should give more weight to these considerations by involving women more actively, not only in finding solutions for fisheries resource management, but also empowering women through improved participation in decision-making. On the basis of our research, we consider that it may not only be a more fair and equitable approach, but it may also be the most sustainable avenue for long term use of aquatic resources and their accrued societal benefits.

How do women access fish?

In this section, we will look at the different ways that women access fish. We have classified their access to the fisheries resources when they are directly harvesting themselves as **primary users**, when obtaining fish from members of their kin or others or owning and managing productive tools as **secondary users**, and/or when they buy the fish directly from fishers or traders as **tertiary users**.

Women as primary users

In some small-scale fishing communities around the world, there are women who fish. There is a lack of reliable statistical data to give us a consistent picture of the types of fishing, the gears used, and fishing grounds where women actually fish, and this makes it virtually impossible to quantify and to better understand the type of direct access that women have to fisheries resources. Information about comparative profit margins in the value chain as well as reliable gender disaggregated data on boat ownership or on rights distribution to use fishing grounds remains

largely absent (Weeratunge and Snyder 2009; de Pryck 2012). Noting that only a few women are in fact active harvesters, a number of case studies have looked specifically at fisherwomen (e.g. Lambeth et al. 2001; Branch et al. 2002; Sriputinibondh et al. 2005; Porter et al. 2008; Sopanha et al. 2008) describing the contextual and differential gender division of labour in fishing communities. The aim of most of these studies has largely been a contribution to the "women also fish" discourse, bringing women's roles out of their invisibility. However, they have done little to understand better gender relations and power structures, which would require a comparative analysis of women's roles against those of men, and other women (Weeratunge and Synder 2009). The literature reviewed also suggests that women's participation in the fishing is usually considered as an informal/subsistence activity, with very low profit margins. Indeed, where the fishery activity carried out by women have gained economic significance, in many cases men have come in and displaced the women out of fishing (Porter et al. 2008). There is also a need for more comparative cases that sheds light on different types of women's access to fish (primary, secondary and tertiary), and understanding these differences requires more comprehensive research. In a recent study carried out in Nigeria, by Taiwo Mafimisebi and colleagues, they found that, despite the lower education levels of the women fishers (primary education) compared to the level of education of the marketers (secondary education), the women fishers achieved greater profits than the women marketers (Mafimisebi, Ikuemonisan and Mafimisebi, pers. comm.). The study however did not examine these differences, or compare them with similar data for men. Future comparative analysis should try to explain the factors behind these disparities, particularly between primary, secondary and tertiary users. Other case studies reviewed imply that, despite some women being primary users and having direct access to the resources, there are existing perceptions (including women's own perceptions of their activity) and social taboos that prevent women's participation (Lambeth et al. 2001; Sriputinibondh 2005). The absence of a sense of recognition of their efforts as a professional activity (Pintos 2010), the lack of representation in fisheries organisations, lack of participation in decision-making mechanisms and lack of access to credit, technology, information and capacity building (de Pryck 2012), all are factors that limit women's direct use of fisheries resources and their active participation in decision-making processes in fisheries governance.

Women as secondary users

Acknowledging that there may be some overlap among our categorisation of primary, secondary and tertiary users, our intent here has been mainly to understand better women's access to fish, including the importance of social capital and kinship relationships. In this vein, we have defined women secondary users as those women who use social capital (including, but not limited to kinship relationships) instead of financial capital, to access fish. It could also include women who have direct control over fishing operations, even though they do not fish themselves, either by owning boats or lending money for fishing trips, thus guaranteeing their access to fish. For example, in the Nigerian case study above, the authors indicate that wealthy women owned motorised fishing boats and hired men to fish for them, sharing the catch in an agreed ratio. A similar example was encountered in Ghana, where female entrepreneurs, the fish mammies, emerged and remained in relatively powerful positions in the fisheries sector, by owning canoes and employing men to fish for them and other women to carry out the smoking and trading (Overa

1993). Thus there are possibilities to improve women's participation in the fisheries value chain by taking better control of fishing operations, even if they are not primary users. Women secondary users could be described as those obtaining the raw material from their fisher-husbands or other fishers of their kin, who will provide them with fish or shrimp directly from their share, or their individual catch (Williams et al. 2002), without the necessity of financial capital. These fisher-wives or fisher women will then be in charge of selling the fish fresh or undertaking some type of processing technique before selling it. A part of the catch may be consumed within the household, contributing to food and nutrition security. Women who are single or widowed may face more problems obtaining fish, although in some cases, specific laws may exist to ensure that the fishermen's widows have access to fish (Walker 2001). For example, some Territorial User Rights for Fisheries (TURF) systems in Chile allow widows to get about 75 % of the deceased husband's income for the rest of their lives, while their children are also taken care of until they can support themselves (Gallardo et al. 2011). There are other ways in which women may have access to fish in the absence of financial capital. In some countries in Sub-Saharan Africa, poor female fish-traders lacking capital, have access to fish products through transactional sex, putting themselves at risk of HIV/AIDS, other STDs and social exclusion (Merten and Haller 2007; Bene and Merten 2008; Holvoet and Chiambeng 2011).

Women as tertiary users

Finally, we consider tertiary users as those women who use money to buy fish. These women have access to financial capital and buy fish and fish products from traders, the market, or landing sites, taking the catch home for processing, and/or selling it in other areas. Where they will sell their fish will then depend on their own mobility, their access to ice, and to processing techniques for making the product last longer without perishing (Lentisco 2013). There is great scope for improving and supporting women involved in processing and marketing, through capacity building, provision of tools, awareness-raising campaigns, and by facilitating the access to credit. In all these cases, it is necessary to better understand women's practical and strategic needs. For example, the SFLP in Benin found that just by targeting women for microfinance activities, without considering gender relationships, did not in itself have an intrinsic ability to automatically change power relations between women and men (Djoi et al. 2004). Additionally, by being tertiary users of the resources, they may remain dependent of what happens in earlier links of the value chain, particularly the capture/production aspects.

Discussion

Our main finding is that women's participation and access to harvesting activities and assets (primary users) does not directly translate into recognition or access and control over the fisheries resources and to fisheries governance. There are many other considerations to be taken into account, which only emerge by carrying out adequate gender and livelihoods analysis, describing not only the roles of men and women in economic activities, but also other aspects of gender based decision-making, power and power relationships. This also requires a deeper understanding of the cultural and social contexts. For example, women's own perceptions of their work often plays a key factor in improving their roles and participation in fisheries-management - the realisation that

they are able to demand support seems to be a strong step towards their empowerment (Pintos 2010). This stresses the importance of raising awareness about gender equality considerations, not only among fisheries managers, but also among women themselves. Some of the case studies reviewed clearly indicated that, through appropriate support to women's organisations and the recognition of their activities as a professional activity, women's own perceptions about their work can quickly change to a feeling of pride and belonging, to a sense of collective self-worth, which in turn could improve their own wellbeing as well as the management of the resources (Pintos 2010, FAO Project documents in de Pryck 2012). A better understanding and response about how women access fish and fisheries resources may also improve their effective participation in fisheries governance and sustainable resource management. To fully enhance women's roles in resource management (e.g. by being owners of boats and gears, by participating in fisheries organisations and by having a more active role in decision-making at all levels), it is necessary to identify the factors and processes that need to be promoted to start tapping women's potential in fisheries governance. Such approach would not only encourage their empowerment, but can benefit from their experience and expertise to find innovative ways to attain integrated equitable fisheries governance; in addition to targeting the sustainability of fisheries resources, it will aim at the wellbeing of fishing households and communities. Women can and must help in finding and defining these processes and solutions.

There are existing management arrangements, such as co-management, that can actively increase the participation of women in decision-making (Nunan 2006). Focusing on issues of empowerment, accountability, rule making, facilitating access to resources, managing conflicts, increasing organisational capacity and understanding better the role of social capital would all improve the participation of women (Nunan 2006). These processes can be enhanced by the already existing mechanisms that deal with aspects of behavior change, rights, power distribution and gender equality. There is a need to facilitate women's direct access, and direct control over fish as a resource. It is also necessary to discuss new ways of improving their roles as primary users: as fishers (where they fish directly), secondary users: as fisher-wives and fisher-operators (where they access fish through their kinship or other relationships, or are involved in financing fisheries operations), and/or tertiary users; having a better say on the final price of the catch and improving their role in the value chain and enhancing their participation in fisheries governance. For this to happen, the use of resources needs to be understood not only in the context of sustainability, but also of power and power relations, within households and fishing communities (De Pryck 2012).

Conclusions

There is not just one way for attaining women's empowerment and achieving gender equality in the fisheries sector. Unsurprisingly, the academic literature describing women's active participation in resource/fisheries management is quite scarce, making it difficult to draw robust conclusions based on quantitative and qualitative evidence. It is important to note that support for women's post-harvest activities, microfinance, and access to markets, should continue and improve but must be expanded to include other social and cultural aspects, understanding the diverse ways in which women access fish. New interventions in the fisheries sector can facilitate

women's access to productive resources (assets, such as gear, technology, and services, such as technical skills, microfinance, etc.) and not just post-harvest tools, as a way to guarantee their rights of access and control, and enhancing their full participation in decision-making. This could be reinforced by an enabling policy and legislative environment, which mandates the inclusion of women in determining fishing gear and methods and licensing processes, thereby benefiting from a gender perspective. In addition, the relationships of power and influence, between boat owners and boat crew, fisheries officers and fishers, and between them and fish processors and fish-mongers, should be studied more carefully (Nunan 2006). The policy dialogue in the fisheries development discourse also needs to realise that gender mainstreaming is just a mechanism, used to engage in a complex discussion regarding what gender equality means for sustainable fisheries management and governance. The sector is in great need of a better understanding of women's different access to resources, gender relations, power structures and socio-economic distributions (including social exclusion and migration patterns). It is necessary to obtain and document more specific examples describing the processes by which women have been empowered in the fisheries sector and have increased their voice in resource management, learning from these examples and including them in the dialogues aimed at attaining equitable and sustainable fisheries. Fisheries projects and programs should actively seek to include these dimensions in development and not just pay lip service by ticking the gender box.

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Research Paper

Women Fish Border Traders in Cambodia: What Shapes Women's Business Trajectories?

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Abstract

This paper revisits the study of fish border traders at the Thai-Cambodian border in 2006. The political and economic development at the border influenced Cambodian women fish traders' business trajectories in different ways. The diversity of business development of the traders shows that women's businesses do not necessarily suffer from the same challenges but are influenced by various factors at micro/meso/macro level environment and relations. The paper classified traders' business trajectories into four, and showed that their relation with their husbands related to their business is not only of control over the business but also of a more subtle negotiation in their level of involvement. The particularity of fish as a commodity of trade also shapes how the trade is imagined as women's business that can keep the business under women's control. The analysis indicates the importance of context-informed analysis and a nuanced understanding of their business and life trajectories in order to understand the challenges and opportunities that women traders face in this market.

Introduction

Women play an important role in fisheries. Contrary to the image that fisheries is a male dominated occupation, around 60% of fishers and fish workers are women. If we take only Cambodia, around 57% of workers are women (de Pryck 2013). Women are especially concentrated in trade and processing activities. Kusakabe et al. (2008)'s study on fish traders at the border of Cambodia and Thailand showed how women small-scale traders were getting further marginalised following the official opening of the border. The open border signified a closure of opportunity for women small-scale traders. By officially opening the border, larger traders were able to enjoy better opportunities while smaller traders were pushed out by larger traders. Since this study was conducted in 2006, fish availability in Tonle Sap has changed and border-crossing administration has become more organised.

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We have found that business options expanded for some of the fish cross-border traders, while for others, it diminished. Contrary to our expectations, women traders do not necessarily share the same disadvantages and challenges often described in literature on women's small and micro scale enterprises (Dignard and Havet 1995; Liedholm and Mead 1999; Seligmann 2001). Therefore we start our paper by problematising the general assumptions of women's disadvantage and question why different women traders experienced fish trade differently and how this has happened by focusing on the macro economic and environmental changes, government policy changes as well as the particular nature in which the fish trade is operating. Women's small-scale fish trade is often considered as a survivalist business where women earn their secondary income to support their household. This paper challenges this notion and argues that different factors develop and define women's fish trade in different ways. The factors that influence the business is gendered, but these do not necessarily keep the business small. We will begin with a short review of women in micro and small-scale businesses. After describing the historical changes in the study area and our methodology for the study, we introduce four types of traders according to their business trajectory and analyse the factors that might have led to these changes especially taking into consideration the particular nature of fish as the commodity of trade.

Women in micro and small-scale business

There has been much focus on micro and small-scale enterprise development for poverty alleviation. However, researchers point out that studies from gender perspectives have been relatively few (Dignard and Havet 1995; Seligmann 2001; Della-Giusta and Phillips 2006; Strier 2010; Rijkers and Costa 2012) although significant research has been done in women's work in the informal economy (Chen et al. 2004; Floro and Swain 2013; Kabeer 2012). Women's small enterprises are said to demonstrate certain characteristics. Liedholm and Mead (1999) show that women-owned enterprises tend to be smaller and have lower annual growth than men-owned enterprises, women are more risk averse, and they tend to diversify into other areas rather than expand their existing business. Della-Giusta and Phillips (2006) identify three areas where common characteristics are found among women's enterprises: (1) lack of access to physical/ human/ social capital as well as technical know-how and lack of time and mobility; (2) domestic work responsibility and relatively negative image on making money; (3) gender segregation in type of business. Others have identified how women entrepreneurs give priority to family well-being (Babbs 1989) as well as how, when their businesses become successful, men can take over (Overå 2003; Strier 2010). Value chain analyses show how women's small businesses are often cornered into lower value markets and have weaker negotiation power than men's businesses (Barrientos 2001; Williams 2012). However, there is still no agreement on the importance and relevance of each of these particular gender differences and disadvantages. For example, Foss (2010) argues through her review of empirical research articles from 1980 to 2008, that there is no difference in the extent of connections that women and men entrepreneurs have.

Despite that, there is a general agreement that there are gender differences in the condition around women and men-owned businesses. Brush et al. (2009), in order to capture women's specific disadvantage, advocate for an analytical framework for women's business by adding to

the 3Ms of business (money, market, management), the 2Ms (motherhood, meso/macro environment).

On the other hand, studies showed that how women's small businesses develop as well as how they influence intra-household relations is context specific, and not all women's enterprises face the same problems as listed above, or develop in a certain way. Mutopo (2010)'s study of border traders at the Zimbabwe-South Africa border shows a specific situation of these border traders and how they overcame gender stereotypes in their effort to ensure household survival. Strier (2010) also notes how the linkage between women's business ownership, poverty reduction and gender empowerment depends on the social context. The differences may be caused not only by the societal context but also by the women's individual lives and the micro contexts that they are in. Hapke and Ayyankeril (2004), in their analysis of fish trade, maintain that women's business trajectories are determined by their personal life history including the particular economic necessity of the household, their age, and number of children. Overå (2003) in her analysis of fish trade in Ghana, flags the concept of maneuvering space of women - a space where kinship, as an ideology, defines women's and men's affairs. She argues that in matrilineal communities, women were able to invest in fishing equipment and become owners and managers, while in patrilineal communities, women are confined to mobilising only other women for their business.

Not only are the macro and micro contexts important, but also the nature of the commodity itself is important in defining women's business. Floro and Swain (2013) question why it is that women are dominating small food trade and conclude that it is because food trade contributes to household food security more than other goods, by being able to convert their wares to household consumption. Overå (2003)'s study in Ghana notes that women's business activities depend on how men see women's business. When men feel threatened, they will try to confine women's business, while when men feel that they are supported by women's business, women can expand their business even to men's realm. This is because particular types of fish trade carry certain status and an image of masculinity and femininity.

Based on these discussions, in analysing fish border trade between Thailand and Cambodia, we will take a contextual approach to analyse how the changes of women traders' businesses are influenced by the macro and micro environment as well as the particular nature of fish as a commodity of trade. We will follow Brush et al. (2009) in putting importance on motherhood (concretely speaking, women's reproductive and caring roles) and the meso and macro environment (specifically the fish market of Tonle Sap and traders' relations with fishers, officers and with their fellow traders) when analysing the women's business development. Although social norms in Cambodia generally approve of women doing independent businesses, as Walby (2009) maintains, women are not a monolith, and it is not only gender differences that influence women's lives but other factors such as age, religion, education level, class, location, etc. We need a nuanced and subtle analysis of women's business. Changes and development of women's business is not the same, and different women face different challenges in their lives and in their businesses. A woman can be influenced by her personal life events as well as by a wider socio-economic and political situation at that particular moment. This paper reviews and compares different women traders' lives and businesses. Some traders face typical problems that are depicted in women in

small-scale enterprise literature mentioned above, while some seem to have overcome these challenges and have developed their own niche. The analysis will situate women's lives in the light of fisheries policies and border trade policies and analyse how these macro-environments affected and shaped women's businesses. Below, we will first describe the methodology of this study, then, go through the historical changes of fish trade in Cambodia. We have identified four different types of business changes among women fish traders. We will introduce them and discuss three aspects that we find are of particular importance in defining business development of border fish traders at the Cambodia-Thai border.

Methodology

This study is based on 46 in-depth interviews with women and men border fish traders (32 women, 10 men, 4 couples). We have interviewed traders at Poipet (border town in Cambodia adjacent to Thailand), Rong Kluer Market (border market at the Thai side of the border with Cambodia), Banteay Meanchey Province, Battambang province and Pursat Province. Most of the respondents are from Poipet. The data collection was carried out from June 2012 to May 2013. Since fish trade is seasonal, and traders scattered, we started by interviewing some traders at Poipet market, and then conducted snowball sampling by asking traders to recommend us to other traders. We attempted to maintain some balance in the number of large, medium and small traders, as well as by gender. Although around half of large traders are men, small traders are almost all women. The study emphasised women's experience, so we have interviewed more women than men. We tried to interview traders who have quit the trade, but we could find only a few, since it was not known where they had moved to. All the names of respondents are pseudonyms.

Historical change of fisheries and fish trade in Tonle Sap

Until the late 1990s, the border between Thailand and Cambodia was still a war zone. At that time, women had an edge over men in cross-border fish trade, since they were not seen as combatants and thus it was easy for women to move around the area. During this time, fish was abundant and the price was good, so traders at that time were able to accumulate much wealth. However, in the late 1990s, when the civil war subsided, government agencies and police/soldiers started controlling the trade. A branch of a state export company was established in Poipet, and started collecting fees from exporting traders (Kusakabe et al. 2008). Chea and McKenney (2003) reported that along the street from Tonle Sap to the border, there were 27 checkpoints that collected money from traders. Cars were not allowed to cross the border, so all traders needed to reload their fish to push carts, where they needed to pay transporters to move the fish across the border.

In the 1990s and early 2000s, although there were many people who were collecting fees, there was still much fish available for small fishers to sell. Women traders had an edge over men traders since they were able to negotiate with officers better than men traders (Kusakabe et al. 2008). However, since around 2006, the amount of fish available for export has decreased (Fig. 1 for fish export figures, although Rab et al. (2006) noted that this is gravely under reported), although the fish catch in Tonle Sap has not decreased (Fig. 2). The decrease in available fish for trade has forced many downstream traders in the commodity chain to contact fishers and collectors

directly to ensure fish supply. The decrease in the amount of fish available for export has led to a shorter commodity chain. In Cambodia, no incidences have been reported of sex for fish, like in Africa (de Pryck 2013), but those who were not able to establish links with fishers had more difficulty in securing fish.

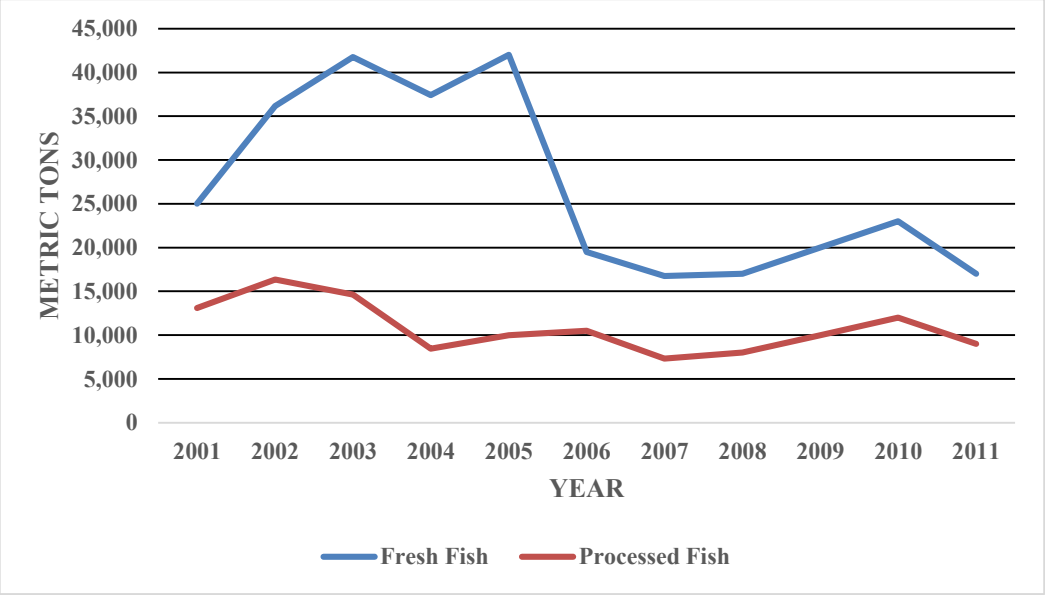

Fig. 1. Inland fish export in metric tons.

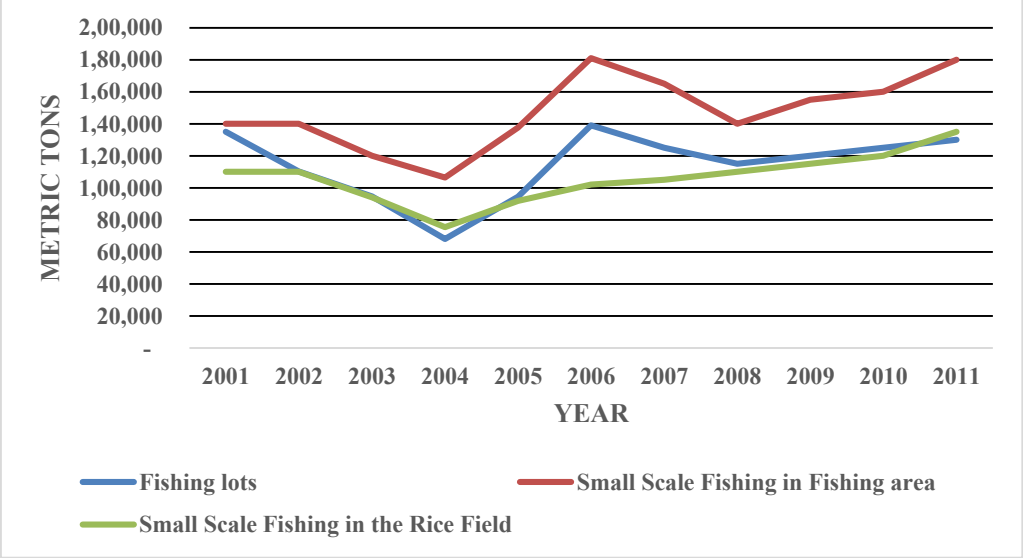

Fig. 2: Fish production in Tonle Sap.

Source: Fig.1 and Fig.2

1. The Five Year Achievement Report of the Department of Fisheries (2001-2005) including the action plan for 2006
2. The Annual Achievement of the Department of Fisheries in 2006 and the Action Plan for 2007
3. The Annual Achievement of the Department of Fisheries in 2007 and the Action Plan for 2008
4. The Annual Achievement of the Department of Fisheries in 2008 and the Action Plan for 2009
5. The Annual Achievement of the Department of Fisheries in 2009 and the Action Plan for 2010
6. The Annual Achievement of the Department of Fisheries in 2010 and the Action Plan for 2011
7. The Annual Achievement of the Department of Fisheries in 2011 and the Action Plan for 2012

At the same time, since the 2000s, increasingly more Cambodian people living in the Thai-Cambodian border started going to Thailand as migrant laborers. Traders complained that there are fewer fishers in Tonle Sap, since they find it more lucrative to work in Thailand. This might also have contributed to the decrease in fish availability. Added to this, in the 2000s, there have been several instances of border closures with Thailand, because of the Thai-Cambodian bilateral conflict. When the border is closed, traders have to bear the cost of not being able to sell the fish.

In 2010, the Cambodian Prime Minister declared that there would be no fee collections for fish transported across provinces, and private fishing lots were to be abolished allowing small fishers access to all areas of the Lake. Large traders were affected by the abolishment of fishing lots, since it has now become difficult for them to source fish in bulk. Whether such measures have improved fish production is still not clear, although the Fisheries Administration stated that the fish availability for the domestic market increased while export has suffered due to the closure of private fishing lots.

Women fish traders

We have identified four types of fish traders at the border of Thailand and Cambodia. The first are large traders who started small, but at the highest fish production period, were able to trade more than 5 tonnes per transaction. They normally have their own vehicles/trucks. They have been trading for a long time, usually since the 1990s. The second type is former large traders who have quit the fish business.

These people also started small, and could expand their business, but in the last few years, because of lack of fish supply, they did not find the business attractive and quit fish exports. The third group is mid-sized traders. They have also started small, and expanded, but only to a few tons per transaction at the highest fish production period. The fourth group is the small fish traders, who trade a few hundred kilograms per transaction. The number of respondents under each category by the business owner/operator is summarised in Table 1. The number of respondents in each group does not reflect the proportion of each in the total population of traders in each group. We have covered more than half of the large traders that operate in the area, while the proportion of small traders that we covered is low, since there are many small traders in the study area. So, we do not claim that our sample is a representation of fish traders in the study area. However, as far as the size of the trader goes, we have been able to cover almost all types. We used mainly qualitative information since our focus is to clarify the interconnectedness of various factors that shape the development of women's fish businesses. Below, we will describe the characteristics of these groups of traders.

Large traders

All women large traders started their fish business in the early 1990s, and either they themselves or their parents were doing business before the early 1990s. Trading fish during that time gave them an edge over latecomers, since the trade was lucrative at that time, and it was easy to accumulate capital.

Table 1. Profile of respondents.

Size/ Type	Operators of respondent's businesses			
	Women	**Men**	**Couple**	**Total**
Large traders (Those who, at highest fish production period, could trade up to more than 4.5 tonnes.transaction^{-1}.time^{-1})*	6	2	9	17
Large traders who quit	2	0	1	3
Mid-sized traders (trade around few tonnes.transaction^{-1}.time^{-1})	3	5	4	12
Small traders (trade few hundred kg.transaction^{-1}.time^{-1})	8	0	6	14
Total	**19**	**7**	**20**	**46**

* This includes four fish processors.
Source: In-depth interviews.

On the other hand, men traders interviewed started their trade late, but they had certain connections or exposure before starting trade: one used to work with the Department of Fisheries before starting the business, one used to be in the refugee camp, and one had a relative already in the trade. Men started to join when border trade was officially opened and when it was possible to do large trade. Women large traders normally started small, which is not attractive or socially considered appropriate for men. Women large traders have never stopped their businesses since they started. Even during pregnancies and lactating periods, after resting for two weeks to two months, they were back in business. One trader said that she tried to schedule the birth so that she could deliver her child during the low season of fish. By having a growing business, they were able to mobilise their relatives or hire other people to help look after their children. Many also operate as couples, so they can cover for each other. In some cases, the husband delivers the fish to the market, while the wife negotiates with the buyers by phone from home, so that she does not have to go to the market. There was one exception to this pattern. One woman trader started the trade in the early 1990s and expanded her business very rapidly, but then, her husband contracted HIV/AIDS and she spent all her money for treatment. However, because of her network of buyers and sellers and her reputation in the market, she was able to come back quickly to the trade, and later became a shareholder of an export company.

Unlike other studies (see Overå 2003), we found that all the women large traders we met were able to keep control over their business fully, and their businesses were not taken over by husbands when they grew large. On the contrary, as their businesses grew, the women tried to keep their husbands out of the business. Some feel that their husbands are an obstacle for business and try to keep them at bay. Sophany (woman large processor) said:

"When I married him, I thought I married a man with a stable job [and I could depend on his income]. After he lost his job, he became alcoholic and he does not seem to be interested in getting a job. He has once helped bring fish to Poipet, but he drank there [and could not do anything]. When he gets out of hand, I pay the police 50-100 dollars to put him in a drug rehabilitation center. I put him there for 3 months or until he shows remorse. He has been there three times already. He gets an injection once a month to keep him sober, but once he drinks he is out of control..... I told him that I will give him 5,000 dollars so that he can look for a new woman. But he said no – 5,000 dollars will be used up in no time. It is difficult to be a woman".

Theary (woman large trader) said that she does not let her husband come to the market since she does not want her husband, who is an officer at the government radio station, to see her and her fellow traders speak rough words in the market.

"I do not discuss my business with my husband. When I make a loss, I do not tell him. I do not want him to be involved in the business. He is not used to hearing harsh words (because he is a news reporter in a radio station so he is used to sweet sounds and voice) that market vendors use. He would be disappointed to hear his wife use such harsh words in the market, so I do not want to have him around".

They are able to manage both their businesses and their husbands and define how the business should run. This group of people was affected by the closure of fishing lots, since they have been buying fish in bulk from lot owners. Now they have to gather fish from scattered markets, and that is making it more difficult for them. However, they still have quite a large network to buy fish, so they are still in a good position to continue their trade.

Former large traders who have quit business

It was difficult to find those who quit business, since if they are in another business, existing fish traders do not know where they are, so it was difficult to contact them. Daline, who was a large woman fish trader, started running a resort and guest house, saying that the income from fish trade is now too small, and those people who know the good days feel lazy to continue with the trade when it gives so little returns. Sopheap and her husband used to be well- known exporters. However, she got drugs planted in her wares, and was arrested by Thai police for drug trafficking. She suspected that it was done by other traders who were jealous of her success. Her husband had to use up all the money that they saved to get her back home, and that was the end of their fish business.

Sopheap was an exceptional case, but other women large traders who have quit the trade all had other options. It should be noted that fish trade does not provide high social status. As Daline says, fish trade is very tiring because most of the work is done in the middle of the night, and it is smelly. So, those who have options will try to move out, and that is why men get involved only when the business is considered sufficiently large.

Mid-sized trader

This group of traders has a mixed profile. Some started late in the 2000s, but could expand to become middle-sized trader, and some started early in the 1990s, but could not grow to become large traders. Many of them are working as couples. One couple was trading independently before getting married. The other two started the trade together, one early in the 1990s and one in the 2000s. All women mid-size traders have parents who were into retail trade. Mid-sized men traders did not have the type of exposure and connections that the large men traders had, and many started off as hired workers in the fish market. Mid-sized traders are professional traders, but at the same time, they often have other income sources to supplement the volatile fish trade income. They are good at diversifying their income sources, so although they are affected by the lack of supply of

fish, and suffer from severe competition to procure fish, they are able to sustain themselves. Some traders import groceries from Thailand and sell these in Cambodia, some have rice fields, and some work as drivers and some also sell in domestic markets.

Small traders

All but three respondents in this group started their business in the 2000s. They joined the trade after the most lucrative period ended, and it became increasingly difficult to secure fish to sell. Two of the respondents who started in the 1990s had no relatives in trade and were from farming household. This might have affected their orientation and exposure to business. Chanda, who started business in the 1990s, is a widow who lost her husband to HIV/AIDS. She used to be a domestic market seller in Cambodia, but she got into conflict with the market committee who wanted to evict her to give her selling place to another trader. She is also looking after her grandson, since her daughter went to Thailand to work as a migrant worker. So, even though she has started the trade early, she has had difficulty in concentrating on her business. There are also many respondents who are doing business as couples. However, in contrast with mid-sized traders, this group of respondents does not have other sources of income. Among those who are working as couples, only one of them has another source of income: the husband works as a construction worker aside from fish trade. There is no male small trader who is doing business alone. One of the couple respondents said that when the wife is pregnant and could not work on fish trade, he will work as a motorbike taxi driver rather than do fish trade alone. Small-scale fish trade is solely a women's occupation, and men are only engaged as an individual when the business size is not so small. For women small-scale traders, all of them have been introduced to fish border trade by others – aunts, cousins, neighbors, sisters – or have been working in Thailand as migrant workers and became familiar with Thailand, but they have not worked with those who introduced them after they started their own business. Not only are they disadvantaged since they started the trade late, but their trade was interrupted often because of child delivery and rearing. Nary started her fish border trade in 2000, following her husband's aunt, and was able to expand the business. However, in 2003, she got pregnant, and quit trade for two years. She resumed her trade in 2005, but her business remains small since she had to work from scratch again. Sophorn has had continuous difficulty in concentrating on her business because of her reproductive burden.

"When my child was three months old, I had to go to buy fish together with the baby at 3 a.m. I had to tie the baby in the front. My mother-in-law was not living with us at that time, so there was no one who could look after the baby. Now, my mother-in-law is living with us, but she is sick and I have to look after her and the children. So, I cannot go far away from my house. My mother-in-law used to live with her own daughter and looked after her children. When she got old and sick, she wanted to come back to her own village, and that is how we ended up with her".

Discussion

There has been a decline in fish resources from Cambodia available for export to Thailand and that has seriously affected the border traders. Border trade was lucrative in the 1990s, but competition became more and more severe with fewer fish available for export, and when

formal/informal payments for export did not reduce. The period in which the traders joined the fish trade is crucial in determining their present business performance. However, such a macro environment change cannot by itself explain the diversity in border trade business development. Our study shows that large women traders were able to manage their reproductive work as well as their relationships with their husbands better than women in other groups. Mid-size traders were able to balance the volatile fish market with other income sources. The most vulnerable were the small-size traders, who had intermittent business experience because of their difficulty in juggling their reproductive responsibilities with their business, and because they had few other income sources.

Based on our analysis, we identified three issues that are of particular interest to understand the development of women's fish border trade: (i) effect of reproductive responsibilities of women; (ii) organising women traders' trust and networks; and (iii) women traders' relations with their husbands.

Reproductive responsibilities of women

How women traders are able to manage or mobilise support for reproductive responsibilities is one of the main reasons why some women are able to make their business grow. Small traders not only started their businesses late, but they also were not able to get support for their care responsibilities, which forced them to discontinue their business from time to time. Such discontinuity makes it difficult for them to expand their businesses. For example, Chanda lost her husband to HIV/AIDS. Her daughter was deserted by her husband and left with a son. To support the son, the daughter decided to go to Thailand to work, leaving her small son with Chanda. She also has to take care of her ailing mother, and had no one else to support her with the care work.

"Nowadays, difficulty in fish trade is that there is no one to help me take care of my mother and grandson. I have to bring my grandson to the market [since my mother is too sick to look after him]".

Some decades earlier, Chanda had stopped her trade when she delivered her own baby, since her mother was not available to look after the baby at that time. Therefore, even though she has started her business in 1995, she remains a small trader.

Sophaphin (woman mid-size trader) said that after she had children, she could not go to market herself but had to sell to her mother-in-law, and hence could only indirectly be engaged in trade. Sophorn (woman small trader) said that since she has a baby, she could not go to places far from home. Larger traders were able to hire others or depend on other relatives to look after children. The smaller traders face more difficulties in juggling their caring responsibilities.

Socheat (large trader) decided to send her children to her relatives in Phnom Penh, since

"I am too busy to care for my children. I will not be able to even check whether they have gone to school or not. My mother-in-law is also the same. She does not have time to take care of

grandchildren. If the children are here [in Poipet], they will not listen to elders. So, it is better if they are in Phnom Penh".

Organising women traders' trust and networks

Overå (2003) said that trust and social networks are very important for fish traders, since this is the "only security" they have. Women entrepreneurs have difficulty in accessing resources, and organising is considered to be effective in allowing access. Although we also find that trust and networks are important for border traders in the Thai-Cambodian border, many of our respondents were not keen to operate joint businesses with other traders. Some said that cooperation between traders itself is problematic. The competition among traders on the Cambodian side of the market is very fierce. Hak (man large trader) said:

"There is no fish traders' association. It is difficult for traders to work together especially now that there is less fish. It is difficult to help each other".

Even among relatives, it is difficult to cooperate. Pisey (woman mid-size trader) said:

"Relatives who do fish trade always get upset with each other because, to do fish trade, we need to have regular suppliers but they always fight over suppliers".

Here, when they refer to "company", actually, it is more of a cooperative. The Department of Fisheries encouraged traders to come together to form a "company" so that they could have better negotiation power with Thai traders, and be able to manage fisheries resources better. Some of our large trader respondents were shareholders of such "companies", but the general sentiment of middle and small traders were that they are not keen to do business with others, and they put more importance on their relationship with Thai customers than cooperating with fellow Cambodian traders.

Cambodian traders are not keen to work with their fellow Cambodian traders, but they are keen to strengthen their ties with Thai traders. As Sochivy (woman large processor) and Daline (former woman large trader) said, one of the main reasons why traders do not want to work in company is because they will have conflicts about which Thai customer the company will serve first. Sochivy said: *"It is easier to do business alone. The Thai customers become confused, since they cannot order directly to us personally like before. In theory, it is good to work as a company, but in reality, it does not work like that".*

Daline said: "*The most important part about trade is regular customers. The whole trade solely depends on this... In order to keep the relationship with regular customers, sometimes, I will make a loss, but I can cover it up later... It is not possible to have a fresh fish company, since there will be conflicts about which customer's demand we should fulfill first. Everyone wants to keep good relations with their own customers, and everyone wants priority for their own customers".*

Cambodian traders face increased competition with other Cambodian traders to secure fish. In the volatile fish trade, Thai traders are the only stable element, since once they establish good

relation with Thai traders, they will buy all the fish Cambodian traders bring. So, they find it most important to keep good relations with Thai traders, and that is the only way that they are able to maintain their business through price swings and fluctuating fish availability. As seen from Figures 1 and 2, fish catch in Tonle Sap is not decreasing while fish available for export drastically decreased since around 2006. Therefore, traders need to fight over fish to secure themselves fish to sell, so they find it more important to secure their upstream and downstream linkages rather than be organised as traders horizontally. Therefore, traders find it important to keep the linkages not only with Thai traders but also with fishers. Sunnary (woman small trader) said:

"Sometimes I have to buy knowing that I will incur a loss, because I have to keep the relationship with the suppliers. Now, since there are a lot of traders, people try to take away other traders' suppliers".

However, maintaining relations with fishers is difficult because there are many fishers and fishers often do not show loyalty to traders even when traders extend credit to them. It is also noted that the relationship with Thai traders is not one of equals. Thai traders have an upper hand in the trade, since they have more direct access to market, and hence the Cambodian traders are unable to set prices but have to accept the price that Thai traders offer them. However, despite such relationships, Cambodian traders still prefer to strengthen their linkages with Thai traders rather than their linkages with Cambodian traders. At the same time, it is noted that women traders, especially small traders, depend on senior traders to be introduced to the trade. They also depend on support from relatives and neighbors to manage their childcare activities that will allow them to focus on trade. Therefore, while trust and networks are the only security that fish traders have (Overå 2003), many factors push Cambodian traders to depend fully on Thai customers, putting them into a one-way cycle of dependence.

These factors include the increasingly tight nature of the fish export market as well as women's lack of time to go beyond the day-to-day operation of their business and household matters due to their heavy work burden in both their business and household, and lack of institutional support on any aspect of their operations.

Relations with their husbands

Fish trade, especially small fish trade, does not carry high social status, and few men are into the business when the business is small. At the same time, like in the matrilineal communities in Overå's (2003) study, Cambodian women enjoy considerable freedom in business operation, and because fish business itself is not of high status, even when women's fish trade becomes larger, women are often able to maintain their independence of their businesses. However, although most women traders seem to be operating quite independently from their husbands, it seems that their relationships with their husbands still influence their business operations in various ways. Some women traders are doing business with their husbands – some on equal footing, and some led by women. The wife will manage the sales and price, and husband will take care of the transportation of fish. Other women run businesses alone. We find all of these patterns of business operations in

all sizes of businesses, and whether a business is run only by a woman or by a couple does not seem to affect the business performance.

The difference between large women-run business and the small women-run business is that for the larger business, women are able to "manage" their husbands and gender relations in the household. For example, Sophany, who runs one of the largest fish processing businesses in Cambodia, was not happy to have her husband involved in the fish business, since he gets drunk while at work. So, whenever he gets out of hand, she will call the police to get her husband into the drug rehabilitation center. Nary (small trader) also did not want her husband to be involved, and she is happy that her husband is not interested in getting involved either. He will stay at home and look after the house and the children while she works in the market.

"If I waited for my husband to find work and just stay at home for my husband to deliver money to me, I would not have enough money to support my family because his work is not regular. I think my husband can help me more by looking after the children and the household. If I did not have him, it would be more difficult for me to be involved in the fish trade. [Playing such a breadwinner role] has become a habit."

Some studies note that husbands' support is important for women's business, and when women's businesses grow, then husbands will take over (Overå 2003). The study of fish border traders shows that the ways in which women's relations with their husbands influence their businesses are more nuanced. In our study we have not seen any business that has been taken over by a husband. Like Daline said, running a business as a couple will make it easier especially when managing growth, since they can have certain divisions of labor between husband and wife. But some large exporters are able to manage single-handedly their household work and business by assigning reproductive work to other women and managing to keep their husbands out of their business. Small traders have more difficulty in doing this, because they have fewer resources with which to manage their workloads. A few traders, like Nary, were able to depend on their husbands to do the household chores. Others were not able to mobilise their husband's help for either business or household work. All Cambodian women traders seem to be in charge of their business, but a close look at their intra-household division of labor and the reasons why such arrangements are being made gives us a better understanding of the burden that women are forced to carry.

Conclusion

What the cases of women fish traders show us is that many fish traders do not fit the stereotypes of women entrepreneurs. Their business development is an outcome of a combination of external factors and personal family factors. As Brush et al. (2009) noted, motherhood and meso/micro environment factors play a large role in how women's businesses perform. Although all women traders suffer from heavy reproductive responsibility (see also Hapke and Ayyankeril 2004), how such responsibility affects their trade depend on their resources that they can mobilise, both financial and human. The relationships with their husbands are more complicated than just checking on who has control over the business. Some want more support, while others want less interference from their husbands. Noting that fish trade is not of high social status, a takeover by

husbands does not seem to be an issue in this trade. Among small traders, no man would like to be involved in the first place. As such, the commodity that is traded has a great influence on how women perform in the business. The particularity of fish trade creates a certain condition under which traders are put into a certain position in the commodity chain. The harsh competition without any external support pushes traders not to cooperate with each other but to depend on the very exploitative relations with Thai traders and Cambodian officials, transporters and fishers, putting them into a more disadvantaged position in the commodity chain. The study emphasised the importance of context-informed analysis (Strier 2010) of fish traders as well as the work-life course analysis (Hapke and Ayyankeril 2004). Fish trade has a particular characteristic which differs from other trade and as such, there is a need to develop a separate analytical framework to capture the particularity of trade and its impact on the actors involved.

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Technical Paper

Changes in the Roles of Women and Elderly Persons within Oyster Aquaculture in Japan

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Abstract

Women and elderly persons play an important role in the oyster aquaculture industry of Japan. Oysters are largely sold in shucked form in Japan and both women and elderly persons are involved in this process of shucking. They represent one reason for the survival of this small-scale aquaculture industry. But as workers age, the speed at which they can shuck the shells decreases and they are more likely to damage the oyster meat. Of late, owners of these businesses have been observed to generally employ young Chinese workers. This paper presents the changes in the roles of women and elderly persons within the oyster aquaculture sector in Japan caused by the entry of Chinese workers.

Introduction

Japanese fisheries and aquaculture are now at a crucial juncture and the role of women and elderly persons in fisheries and aquaculture has become a priority issue for Japan. The generation born between the late 1920's and the early 1930's played a pivotal role in the Japanese fisheries and aquaculture sector. This generation is now at an age of retiring from active work at sea (Soejima 2009). Hence, it is to be expected that the number of fishers will decline rapidly and the Japanese fishery and aquaculture sector will face issues of labour shortage in the coming decade. Given these circumstances, we need to consider how to achieve a stable fish supply and a sustainable fishing community. For effective fisheries policy development, it is necessary to understand the current situation of women and elderly persons engaged in the sector against the background of the labour crisis. The Japanese Society of Fisheries Economics, which plays a central role in Japanese fisheries economics, held a conference in 2013, the main theme of which, was 'The Real Image of Elderly Fishers and Fishing Communities in Ten Years' Time'. In 2014, their conference is on 'Women in Japanese Fishing and Communities' and one of the themes is 'Changes and Effects of Women's Roles on Work on Land in Fisheries and Aquaculture'. Fisheries related shore-based or land-based work, performed by women, has become a topic of

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great significance in Japanese academic circles and investigating the roles of women and elderly persons in the fisheries and aquaculture sector is an important topic of interest.

However, there has been very little academic investigation of women and elderly persons in this sector. Most studies are focused on young males working at sea rather than the major role played by women and elderly persons working in land based activities (Imagawa 2011; Ohtani 2011). An increase in the volume of catches is not anticipated in Japan in the near future; thus, land-based work such as careful sorting of catches or improving sales strategies etc. will become increasingly important in fishery management and for fishing communities. Securing labour for land-based work in fisheries is likely to become a crucial issue (National Federation of Fisheries Co-operative Associations 1997; Hasegawa and Chang 2002).

This paper seeks to contribute to the understanding of the present situation in Japanese fisheries by exploring the roles played by women and elderly persons in land-based activities within the aquaculture sector. For the purpose of this study, "elderly persons" refers to elderly fishermen aged over 65 who have retired from active work at sea. The paper tries in particular to draw out the roles of women and elderly persons engaged in land-based work in the oyster aquaculture industry. The oyster aquaculture industry was considered for this study because the industry employs a large number of women and elderly persons when compared to other kinds of fishery or aquaculture. This is because oysters are largely sold as shucked shellfish in Japan, and women have been found to be more efficient at shucking oysters. The study was carried out in the town of Oku, Okayama prefecture. This town is an important oyster-producing area of the Prefecture. The study attempted to draw conclusions about the changes occurring within the oyster aquaculture sector and within local communities with respect to the changing roles of women and elderly persons.

Method

The study was carried out through personal interviews as well as discussions with members of the Fishery Co-operative Association (FCA) during November 2005, September 2008 and July 2012. The interviews were conducted through the Oku FCA, which at the time comprised 43 fishery households. Interviews were carried out in 11 households. The questions pertained to family structure, household management, number and trends of employees engaged in land-based activities, and number and trends of rafts used for oyster aquaculture. The interviews were carried out on a case-by-case basis with the help of Oku FCA as well as a local resource person. Except in the case of two households, all respondents were women. Respondents were interviewed either at their homes or their work places. Telephone interviews were also carried out.

Results

Context

The potential of the town of Oku as an oyster aquaculture production area is examined here. In 2010, the total production of shelled oysters across Japan was about 32,000 tonnes from

approximately 6,420,000 m^2 of farming area, with about 4,200 households engaged in production. Japan's top oyster production areas in 2010 were Hiroshima Prefecture (which produced around 51%), Miyagi Prefecture (producing around 7%) and Okayama Prefecture (producing 6%).

The town of Oku is a major oyster-producing area in Okayama Prefecture. Oku's production of shucked oysters was about 1,500 tonnes in 2011. In 2008, about 95% of Oku's households were involved in oyster production (see Table1).

Table 1. The number of fishery households and sampled households in Oku (by sales amount per year).

Sales amount (million Yen)	No. of households	Number of samples
None	0	
Under 1	7	
1 ~ under 3	7	1
3 ~ under 5	8	3
5 ~ under 8	29	10
8 ~ under 10	20	11
10 ~ under 15	17	11
15 ~ under 20	6	6
20 ~ under 50	1	
50 ~ under 100	0	
Unclear		1
Total	**95**	**43**

Source: Fishery census 2008. Number of samples represent personal and FCA interviews.

History of oyster aquaculture in Oku

Oyster aquaculture was started in Oku in 1952. Fishermen at this time were mainly involved in fishing with trawl nets. But in order to earn income during winter, they opted instead for oyster aquaculture. Thus, the Mokagemura FCA (currently the Oku FCA) brought seed oysters from Hiroshima Prefecture and Miyagi Prefecture and initially 30 trawl-net fishermen commenced oyster aquaculture using the simple hanging method. Total production in the beginning was about eight tonnes.

The scale of production gradually expanded, and raft-type cultivation was introduced in 1963. This new method of aquaculture was seen as a distinct opportunity and the number of oyster farmers increased to 75. By the late 1960s, the farmers no longer used the simple hanging aquaculture method and had completely shifted to raft-type cultivation, which was more effective. By the 1970s, more households had switched from fishing to oyster aquaculture due to dwindling marine catches. Oyster production through aquaculture increased dramatically because of the wide acceptance of raft-type cultivation. The production of oysters was 2,270 tonnes in 1980, with the town of Oku accounting for about 55% of total production in Okayama Prefecture.

On the one hand, there was an increase in the quantity of oysters produced; but on the other, their quality was deteriorating. This led to a marked debasement of market value and sales were hit badly. An urgent need arose to switch emphasis from quantity to quality. Consequently, in 1988 the Oku FCA decided to restrict the number of rafts operated by each fisherman. Fishermen were allowed to own a maximum of 18 rafts each. With this, the focus of the fishermen being engaged in oyster aquaculture alone shifted to instead devising better methods to shuck oysters and improve their methods of sales. Of late, the number of oyster farmers making direct sales (in addition to their sales to the FCA) has been increasing. In such cases the oyster farmers receive orders directly from consumers through internet, telephone or fax, and based on the orders placed, they deliver oysters through home delivery services. Catering to individual customers means added office work for the oyster farmers; however, to develop their sales channels, many oyster farmers are opting for this.

Oyster farmers in Oku have started to employ Chinese workers to perform the land-based work. These Chinese workers come to Japan under the industrial training and technical internship programs of the Japan International Training Cooperation Organisation (JITCO). The purpose of this program is to offer youth in developing countries the opportunity to acquire the skills, techniques and knowledge of advanced nations, thus building the human resource capacities needed for economic growth in those countries. The interns work as employees under this program for a maximum of three years. The number of foreign interns using this program is increasing annually not only in Oku, but also widely across the Japanese fishing and fish processing sectors. All the "Chinese workers" referred to in this paper came to Japan under this program. Most of these Chinese workers in Oku were women aged around 20 years.

Roles of locally hired women and elderly persons retired from work at sea

Women and elderly persons largely take on the responsibility of land-based work in the oyster aquaculture sector. In particular, the wives of raft owners, female relatives and locally hired female workers are predominantly engaged in the removal of oyster shells. The oyster aquaculture sector in Oku ranges from businesses employing as few as two workers (often a married couple) to about ten workers. The number of employees engaged in land-based activities was 65 men and 161 women, according to the 2008 Fishery Census. Since the Fishery Census does not classify workers based on nationality, it was difficult to determine the exact numbers of foreign workers.

The locally hired female workers were employed in the local agriculture sector throughout the summer and in the aquaculture sector throughout winter. Previously they formed the major workforce and this was an opportunity for them to gain additional income. They were able to earn between 80 thousand yen (approx. USD 820) and 150 thousand yen (approx. USD 1542) per month.

Also, in the case of oyster aquaculture, elderly persons retired from work at sea are often engaged in the work of removing shells. Most of them are fathers of the current owners and they often work without salary, mainly to stay engaged with some activity. They offer crucial support

for the aquaculture family businesses through this temporary labour, because their time is flexible. In fact, this voluntary labour is a major factor keeping the oyster farmers viable.

However, of late a lot of foreigners, particularly Chinese, have entered the land-based work of oyster aquaculture.

Increase of Chinese interns

Although reports state that the number of Chinese workers is increasing, there are no genuine statistical data regarding the total numbers of Chinese workers. As Chinese workers tend to be employed by individual households, these work places had to be examined individually. Of the 43 fishery households, information was obtained from 16 households whose annual production was valued at 10 million yen (approx. USD 103,000 at August 2013 exchange rates) or greater. Out of these 16 households, six fishery households (38%) had hired Chinese interns in 2008, with five more fishery households starting to hire Chinese interns in 2013. From this, it is clear that large-scale household businesses are increasingly employing Chinese workers. On the other hand, out of the 38 fishery households with production of less than 10 million yen per year, only two households (8%) had employed Chinese interns in 2008, although this number had increased to six fishery households (23%) by 2013. Furthermore, two households among the six major households had replaced Japanese workers with Chinese workers. In 2008, the households with small annual landings tended not to employ non-Japanese workers, even when their Japanese employees were viewed as elderly. However now, even the smaller households have started employing Chinese workers.

Fewer women and elderly persons engaged in land-based work

Women and elderly persons play a crucial role in supporting family businesses in oyster aquaculture. But as these women and elderly persons get aged, they lose their speed at shucking the oyster shells, which eventually damages the oyster meat. This has been observed through personal observation and confirmed by responses received from business owners. Shucking work is a battle against time. For example, the FCA limits shucking work hours from 5 am to 3 pm. It is important that workers remove the maximum number of shells in this limited time. Elderly persons often damage the oyster meat when they remove shells. The commercial value of damaged oysters is low, so owners become unhappy with these elderly persons. Young Japanese workers are also unwilling to become involved in this process, as this industry offers only seasonal work, with a peak season from October to April. Hence, the owners are forced to look for foreign labour.

On the other hand, Chinese workers tend to be younger, so their working speed is faster and they don't damage the oyster meat. They are also paid less compared to the Japanese workers. Local Japanese workers are paid an hourly wage of about 850 yen (approx. USD 8.70) while Chinese workers are paid only about 700 yen.h^{-1} (approx. USD 7.20), despite the fact that older local women are capable of removing only one-third the quantity of oyster shells that the Chinese workers can. Therefore, the households' sales tended to increase after the arrival of the Chinese workers, since payroll expenses for the Chinese interns were lower. Thus, business owners who

wished to expand the scale of their business increasingly replaced locally hired women and elderly workers with young Chinese interns. This has also resulted in the local Japanese women and elderly persons moving out of the industry.

New development patterns

In the case of one household, only four family members (the two owners, their son and his wife) were engaged in land-based work in 2008. Their annual production was around 5.5 million yen (approx. USD 57,000). However, they hired three Chinese workers in 2009, which had further increased to four Chinese workers by 2012. By 2012, their annual production had increased to 20 million yen (approx. USD 206,000). This was due to the fact that Chinese workers could shuck oysters faster, enabling the owners to expand their production.

Furthermore, sales channels are also changing. In addition to FCA sales, direct sales channels are becoming increasingly important. Furthermore, households have undergone another big change by commencing processing work. One owner's wife stopped shucking oysters, since Chinese workers could be employed for this work at a cheaper rate. Subsequently, she became engaged in processing for example, oysters in olive oil, smoked oyster products, and so on, thus diversifying the household's sales. This work was carried out with the help of locally hired women, basically due to limitations on hiring Chinese workers for this, as the number of Chinese workers is restricted to those attending the industrial training and technical internship programs. Chinese interns already hired by that particular household also sometimes worked in the processing department. The owner's wife has also begun developing new products and travelling to Tokyo for sales and business talks. She has received coverage in local media like TV and newspapers, in addition to getting verbal requests. Though this was a unique case, it has attracted the interest of many women in oyster aquaculture households who have visited her processing plant to learn about how to manage these activities. Others may follow her example.

Changes in the community

One significant change in the local community has been that the number of rafts for oyster aquaculture is increasing. In other words, this means that each household's culture activity is becoming larger in scale. Previously the FCA allocated 15 rafts (each 25 meters by 8 meters) to each oyster farmer, while also permitting oyster farmers who cultivate two-year-old oysters to operate three additional rafts (oyster famers in Oku normally cultivate and sell one-year-old oysters). So at the most, each household could have 18 rafts. However, in 2011 the FCA permitted more rafts because the participation of Chinese workers enabled faster shucking of shells, making a strong case for increasing production. Now, each household has a maximum of up to 20 rafts. Additionally, the FCA has also extended the operating season by one more month.

Another change is the increasing polarisation of businesses. This polarisation has been observed between the households that increased their sales channels and started processing activities after hiring Chinese workers (as illustrated in the case studies above) and the households that cannot do this. In other words the discrepancy between households capable of growing

expanding culture activities and surviving and households that will collapse has become clearer. This can be attributed mainly to the entry of Chinese workers.

Discussion and Conclusion

This study has contributed to the understanding of the present situation and the changing roles of Japanese women and elderly persons employed in oyster aquaculture. In conclusion, three points based on this study will be discussed.

Firstly, oyster shell shucking was a source of income for Japanese women and a post-retirement activity for elderly persons. But they are slowly being displaced from their jobs due to the entry of Chinese workers who can shuck shells faster and are also paid less than local Japanese workers. Deprived of their roles in the oyster aquaculture industry, elderly persons are losing working opportunities as well as a sense of purpose in their lives.

Secondly, and conversely, we have as an example a case study where the owner's wife acquired new business skills and exploited new opportunities. She was able to leverage her unique talents in developing new products and in expanding her business. This demonstrates how women can acquire new roles and continue to contribute in oyster aquaculture management.

Thirdly, we find that polarisation of the industry is underway. Larger-scale household businesses are employing Chinese workers, increasing their number of rafts and gradually increasing their scale of operations. On the other hand, many smaller-scale household businesses cannot afford to employ Chinese workers. In many cases, they believe that they will have to give up aquaculture sometime during their lifetime. Despite the limitations of the sample data, this study offers some insights into how the oyster aquaculture industry is evolving. If this situation of dependence on foreign labour keeps growing, there is a possibility that this will lead to serious economic and social issues for locally hired women and elderly persons. Significant issues of poverty may arise, triggered by loss of job opportunities. This is a major challenge not only to fisheries policy but also to community and welfare policy.

Future studies could explore and analyse some of the issues identified in this study using a larger and more representative sample of land-based workers in fisheries and aquaculture. The impact on women and elderly persons after they are displaced from their jobs needs to be investigated. It is also necessary to understand why the Chinese interns come to Japan and why they choose this type of employment.

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Technical Paper

Transformation in Gender Roles with Changes in Traditional Fisheries in Kerala, India

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Abstract

In most food production systems technological changes, such as mechanisation, have often resulted in the displacement of women from their traditional roles. This paper looks at three different fisheries in the traditional sector in the central part of the state of Kerala, India and attempts to analyse the changes in gender roles. The ring seine fishery which was initially small scale, has now transformed into a capital intensive, high powered, labour intensive fishery with landings shifting from the beaches to the harbours. With the landings shifting to the harbours and becoming linked to the price incentives of the market, women have slowly been marginalised from marketing activity. The stake net fishery is generally practiced by the *Dheevara* community. Women are completely excluded from fishing operations and come into the picture only after the catch is landed. In the localised clam fishery, women were once actively involved in handpicking for the clams. But motorised canoes gave more scope for men and hence women were displaced. These changes, need fishery-specific interventions to give women greater access to the benefits of the fisheries.

Introduction

The impact of change can be positive, neutral or negative. In food production systems, changes can be induced by factors which could be technological, policy related, socio-cultural, political, legal and environmental. In most food production systems, technological changes such as mechanisation have often resulted in the displacement of women from their traditional roles in those systems (Subrahmanyam 1999). For instance mechanisation in agriculture resulted in improving food production by bringing in more area under cultivation, which was a positive effect of the change. However, the negative effect of the change with mechanisation was that the small farmers and women farmers could not take advantage of mechanisation, were deprived of the

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benefits of mechanisation and, as a result, had a diminished role in the sector. Mechanisation thus had a negative impact on the role of women in agriculture.

In the fisheries sector, fishermen have benefitted from the mechanisation of fishing craft by being able to go further and deeper into the seas and exploiting either unexploited areas or species of fish. The negative impact has been the over-exploitation of many common species of fish and many oceanic regions according to FAO (FAO 2012a). Another impact is the re-allocation of the roles of certain sections of the population traditionally dependent on the sector. A significant negative impact of deep sea fishing is that women traditionally participating in on-shore fishing were unable to explore the deeper areas of the seas and the oceans, unlike their male counterparts, due to physical limitations, safety concerns, lack of adequate knowledge of seamanship and navigation, and limited capacity to invest in financial resources required for deep-sea exploration. This has also resulted in another impact in the post-harvest activities in fisheries in that, with fishing activity shifting to harbours or becoming harbour-centric, the traditional beach-based post-harvest activity of women has decreased. However, the negative impacts spilling over from the changes may not be intentional. Many fishermen and fisherwomen may not have had coping strategies to meet the changes which had occurred to serve the burgeoning needs of the society.

Bearing in mind the lessons from agricultural mechanisation and our observations on the gendered consequences of the advent of deep sea fishing, this paper looks at three different fisheries in the traditional sector in the central part of the state of Kerala in India. We analyse the resultant changes in the gender roles.

The state of Kerala on the south-west coast of India has 10% of the country's coastline, and contributes 20% of India's marine fish production (Das et al. 2012). The state also contributes 40% to the seafood exports of the country. The state has a continental shelf of about 40,000 km^2, and has among the most productive waters in the Exclusive Economic Zone of India. There are 223 fishing villages with one million people depending on the marine resources and inland fishery resources for their livelihood. The number of fisherwomen in the state is 0.36 million (http://spb.kerala.gov.in/).

Materials and Methods

The framework

This study uses an indicative framework (Fig.1), which tracks, defines, and explains the transformations in the fisheries and aquaculture sector, and uses the components; technology development, policy formulation, environmental changes and development issues to explain the changes observed in three types of fisheries, namely the ring seine pelagic fishery, stake net fishery, and clam fishery. The framework was presented in the FAO Workshop on Future Directions for Gender in Aquaculture and Fisheries Action, Research and Development during the 3rd Global Symposium of Gender in Aquaculture and Fisheries in Shanghai, China during 23 to 24 April, 2011 (FAO 2012b). In the field of technology development, the components which would be used for examining the aspects of the direct and indirect impacts resulting from the changes in

the fisheries were: activity profile; resources – access and control; and institutional constraints and opportunities (Moser 1993). The activity profile includes questions such as who does what activity, and when and where the activity is performed. The access to resources and control of resources include questions such as what resources are available; who has access to which resources; and who has the over-all control of the resources. The institutional constraints and opportunities deal with policy and law.

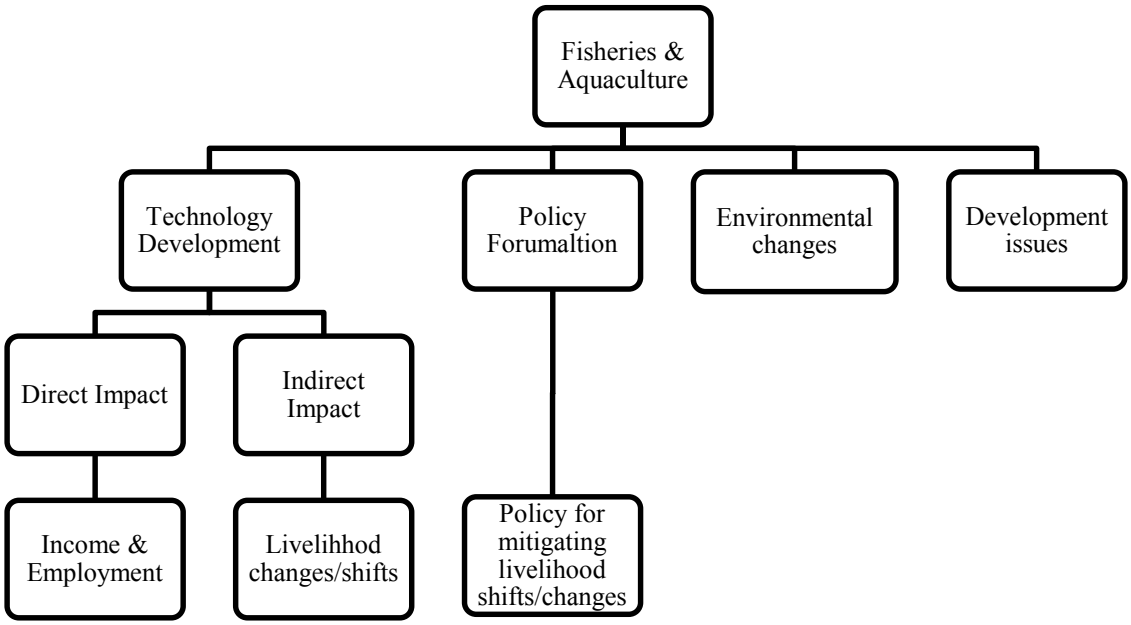

Fig. 1. Indicative Framework of transformation in gender roles with changes in the fisheries sector.

Source: FAO Fisheries and Aquaculture Report No. 998 FIRA/R998 (En) - Report of the FAO Workshop on Future Directions for Gender in Aquaculture and Fisheries: Action, Research and Development, Shanghai, China, 23–24 April 2011.

The indicative framework was used on the above mentioned fisheries described. The pelagic ring-seine fishery is coastal and the clam and stake net fisheries are inshore. All three fisheries studies are based in Ernakulum district of state Kerala. The ring seine pelagic fishery and the clam fishery changes deal with the direct impacts that resulted from changes with technology development, and the stake net fishery deals with the indirect impacts that resulted from changes with policy formulation and development issues in the sphere of livelihood changes and shifts.

Focus group discussions were used to study the scenario in ring seine sectors, while individual case studies were utilised in the clam and stake net sectors. In addition, relevant literature was reviewed to understand the developments in the concerned fields.

Results

The study indicates that there was and continues to be participation of women, in various degrees, in all the three fisheries. The results are presented separately for each fishery.

Ring-seine fishery

The ring seine fishery plays a significant role in the marine landings in the state with a contribution of 51.6% (CMFRI 2011) and operates along the entire coast of Kerala, except for the southern tip of the state. The ring seine is an encircling net, which was first designed and introduced by the Central Institute of Fisheries Technology, Cochin, in the mid-eighties for the traditional fishery as a new gear through the motorisation programme of traditional craft (Panicker et al. 1985). The adoption and popularisation of ring-seines (Balan and Sathianandan 2007) in the mid-eighties was the single most significant development in the post-motorisation of Kerala fisheries. The crafts using ring seines have grown enormously in size and their propulsion has changed from out board motors (OBMs) to in board motors (IBMs). The fishery has transformed into a capital intensive, high-powered, labour intensive fishery with landings shifting from the beaches to the harbours. The special feature of this fishery in Kerala is that the fleets are entirely operated by local fishermen, who mostly belong to the Latin Catholic community, with a unique traditional system of managing their fishing activity. This system regulates the work and wage sharing arrangements (Das et al. 2012).

There are two types of ownership of the fishing units, individual and collective. Individual ownership is for smaller crafts up to 12 m Length Over All (LOA), which are generally non-motorised or fitted with OBM. The average cost of the unit including vessel and engine ranges from INR. 50 lakh (USD 90,000) to INR. 60 lakh (USD 100,000). We also treat the ownership of a unit by a family as individual ownership. In larger units with the sizes of the craft and gear being bigger, the ownership is collective, with the unit being owned by a group of fishermen who are shareholders.

Women do not have any share in the ownership of the craft and gear in this sector. Women's traditional roles were in post-harvest activities, including sorting, marketing and processing the catch. During the early phase of development, the ring seiners were small scale beach landing crafts, possible because of the OBM engines fitted to them. This facilitated the active participation of women, who took over the post-harvest activities on the beaches and were actively engaged in sorting the catches and further marketing or processing. Since the crafts are now berthed in harbours, fishermen themselves have to travel from the fishing villages, leaving in the early hours of the day to reach the harbor from where the fishing trips begin. Women, who have to also manage household responsibilities, find it difficult to go to the landing centres and be there during the hours the landings take place, and thus, have been excluded from the marketing channel. The number of women engaged in marketing from this community has dwindled considerably (John 2009).

Stake net fishery

The stake net, known as *Oonnivala* in the Malayalam language, is very common in the backwaters of Kerala (Kurup et al.1993). It works using the fishing principle of filtering, and it can be effectively used where a strong current runs. The fishery is based on daily tidal conditions. The net is tied between stakes at the beginning of the tidal cycle, and is hauled just before the cycle

ends. The stake net is a non-selective gear. The stake net fishery is generally operated by people of the *Dheevara* community. The Government of Kerala, India brought different sub-castes of Hindu fishing communities under one section called *Dheevara* in 1984. It includes five sub-castes which are *Arayar, Mukkuva, Mogayira, Vala* and *Padanna* (Beegum 2007). *Dheevara* community has traditional rights over designated stake net fishing areas or regions in the backwaters, locally called *padus.* This type of fishing system is also seen in Tamil Nadu (Mathew 1991) and Sri Lanka (Amarasinghe 1997). The *padu* fishing is a traditional system of allocating rights to the fishing grounds to eligible fishermen in a fishing site (Rajagopalan 2012). The system defines the group of rights holders and resource boundaries and fishing sites. The *padu* system involves fishing site rotation which provides equal opportunity to prime fishing locations for all the eligible fishermen based on a lottery system. This system emerged as a response to change in markets and legislation in the 1970s. The average investment in the gear is about INR. 10,000 (USD 180), with each stake costing around INR. 5,000 (USD 90).

Each family may own one or more pairs of stakes between which they tie the net and conduct fishing operations. The *padu* system of fishing allows spatio-temporal regulation where fishermen are allowed access to specific fishing grounds by rotation, and all the eligible fishers can eventually access all fishing grounds. The work associated with the stake net fishery generally streches from the night to the early hours of the morning and is often back-breaking. In Kerala, inheritance of the *padus* has been through the male line, which is the same as in Tamil Nadu (Lobe and Berkes 2004), and it generally passes from the father to the son when the son attains 18 years of age. The membership rights are bestowed by the elderly persons of the village.

Women are completely excluded from fishing operations and come into the picture only after the catch is landed, when they are engaged in sorting the catch and later marketing them or drying the catch before marketing. There are religious rituals associated with setting up of the stake net and women are also not allowed to participate in these. Traditionally, if there were no male children in a family, the *padu* rights automatically reverted back to the system after the death of the fisherman in the family, and the widow or the female children were not entitled to such rights. Women-headed households could not even hire a labourer on wages to use fishing gear and craft – most often the fishing gear and craft had to be sold. On an average, women spent 4 to 5 h in sorting the catch before marketing is carried out. The marketing is still carried out by both men and women depending on the trading arrangements.

The one significant change that has taken place in the *Dheevara* community is that the traditional inheritance of the *padus* by women as dowry has slowly disappeared owing mainly to economic considerations over the last 25-30 years. With the fragmentation of families, there has been fragmentation of ownership of the *padus*. Almost around the same time, widows started taking over the stake nets of their husbands and leasing them out, in the absence of any other means of livelihood for the upkeep of the family. Ritualistic customs, however, still prevent women from handling the *padus* and touching them during certain times.

State legal issues have cropped up, with the fishery being classified as destructive. Stake nets, a non-selective gear, are mainly used to catch high valued prawns and hence the mesh size is

reduced to increase the catch which results in harvest of juvenile organisms. The operation of stake netting is mainly concentrated in and around bar mouths and this environment is also drawing the attention of conservationists (Vijayan et al. 2002). The estuarine fisheries of Kerala are regulated and managed by the Department of Fisheries according to the Travancore Fisheries Act, 1950. Further regulations were also promulgated for regulating and managing the use of stake nets (Mohamed et al. 2013) and this triggered a decline in the catch from stake nets. State interventions are also in place to phase out the fishery (http://www.newindianexpress.com/cities/kochi/Regulate-Use-of-Fishing-Gears-Stakenets-Says-Expert-Panel/2014/08/05/article2365220.ece). This is, however, being resisted by the fishermen for whom this has been a source of livelihood for generations. The stake net fishery is facing increasing competition from other fisheries as well as commercial and environmental interests. The increasing populations of new fishers seeking access to fishing rights in the region are putting a strain on the *padu* system (Rajagopalan 2012).

Clam fishery

The clam fishery of the state of Kerala is carried out in the backwaters, which the state is abundantly blessed with (Loveson and Sivalingam 2013). The backwaters have a unique ecosystem in which freshwater from the rivers meets the seawater from the Arabian Sea. The major species of clams found in these backwaters are *Meretrix casta* (Gmelin, 1791), *Paphia malabarica* (Chemnitz, 1782) and *Villorita cyprinoides* (Gray, 1825). The clam fishery is a localised fishery, which evolved basically to cater to the lime industry because the shells were more sought after than the clam meat. The fishermen are again from the *Dheevara* caste.

Harvesting of *Villorita cyprinoides* (black clams) continues throughout the year, and each fisherman harvests black clams about 20 days a month. A scoop net is used from a small canoe for the harvesting operation. The canoes are now mostly motorised, fitted with a small engine. They carry out the fishing standing on the canoe. Generally a single person is able to carry out the operation. Fishermen harvest in a different site almost every day. However, there is no harvest during stormy days in June and July.

Women do not actually harvest clams from canoes, but may use canoes to reach the harvest sites. Clam fishing is carried out by women by hand-picking, by standing in the waters about half-a-metre deep during the tides, and performing the time-consuming and prolonged labour-intensive work to identify regions of clam abundance in the water by using their feet. By hand picking, they can usually collect about two baskets of clam during the process. They remove the clay on the clams by rubbing them with their feet and then pick them with their hands and collect them in baskets made of aluminum or bamboo. A woman can harvest up to 6 $kg.day^{-1}$. They generally start the clam-picking process as early as 3.00 am by visiting the backwaters in their own canoes, and return with the harvest at 2.00 pm.

Clam processing is usually done in the fishermen's yards at home on the same afternoon as the harvest. Processing is carried out by the fisherwomen (Photo 1). The clams are put in large aluminium tubs with water obtained from the edge of the shore. The clams are boiled for about an

hour. When boiling causes the bivalve shells to open, the women pick out the meat, after lifting the boiled clams onto hand-held sieves or sieves hung between trees. The sieving activity is carried out by the women or by both the men and women. All of the clams are sieved by the afternoon and the clam meat is then washed in another sieve, and poured into aluminum tubs.

Photo 1. Women processing clam in homesteads.

The fisherwomen or fishermen either supply the meat to the traders or take it themselves to a local market to sell. In some instances fisherwomen also sell the clam meat within their local villages and save some for family consumption. If the processing is done during the afternoon, the marketing is carried out early in the evening. The wives of some fishermen begin the processing of clams by 3 am, and go to the market by 7 am, carrying the clams on their heads. Agents are also involved in sales of clam meats to retail food markets and large restaurants. The shells are sold through organised fishermen's societies to various industries because of their utility in manufacturing lime, poultry feed and other products. The harvest activity has almost become completely male-centric, with women now being restricted to processing and shucking of the clam meat and further marketing of the clam meat in wholesale and retail activities. The time analysis of fisher persons involved in the clam picking and processing activity has been presented in Table 1 (Gopal et al. 2011).

Clam fishermen are organised into professional societies. The fishing rights and licenses for harvesting are issued by the State Department of Mining and Geology to society members. Licenses are generally not issued to the wives of fishermen. The State government provides authority to male fishermen to gather juvenile clams from deeper waters and transplant them to shallow zones along the shores, where the women can wade at low tide and harvest them by hand. Lack of motorised canoes due to lack of credit, displaces women from the roles of harvesting

clams, hence, they harvest only low volumes when compared to male counterparts. There are no government regulations for the fishery except that juvenile clams should not be harvested.

Table 1. Time analysis in clam harvesting, processing and marketing.

Market	Timing/ Gender	4.00 to 6.00 am	6.00 to 8.00 am	8.00 to 10.00 am	10.00 am to 12.00 pm	12.00 to 2.00 pm	2.00 to 4.00 pm	4.00 to 6.00 pm	2.00 to 4.00 am
Morning Market	Men	Clam Picking							
	Women	Clam Processing	Clam Marketing						Clam Processing
Evening Market	Men	Clam Picking							
	Women			Clam Processing			Clam Marketing		

Source: Gopal et al. 2011.

However, there are on-going tensions between industrial and fisher groups with regards to clam shell mining. The excessive mining authority of the industries has resulted in damage to calm beds, damaging the ecology of clam habitat and thus affecting clam fisheries and the people dependent on them for their livelihood (Thomson 2009).

Discussion

During the 1960s, the beach landings from the ring seine fishery facilitated the active participation of women, who took over the post-harvest activities such as sorting the catches and further marketing and processing the fish. However, during the 1990's and after the advent of mechanised crafts, women became marginalised with little role to play. The landings were shifted to the harbours and became linked to price incentives of the market; women slowly became sidelined. Women who are still engaged in marketing frequent the harbours to purchase fish, but they have to face various types of hardships such as jostling for limited space, waiting for long hours for the crafts to land their catch and the auctioning process to complete, unless they are able to compete with bigger traders during auction. In many cases women do not participate in the auctioning process and buy fish from other wholesale traders. The other beach-based post-harvest activities such as handling the catch have been taken over by organised male labour.

Since the stake net fishery involves intense physical labour, women are not involved in harvesting operations. The catches in general have been declining and there is increasing pressure to abandon what had been a way of life for centuries. In this changing scenario, the need to protect *padus* from passing on to another family and in the process getting lost, is pre-empted by discontinuing the practice of women inheriting the *padus*. The fact that ownership transfer has not taken place for the past two generations may lead to social unrest if not resolved amicably. The *padu* system discriminates against women even on non-fishing rights such as drinking water and distribution of welfare schemes in natural disasters (Rajagopalan 2012).

Table 2. Indicative framework.

Factors and gendered impacts	**Ring-seine fishery**	**Stake net fishery**	**Clam fishery**
Technology Development	Increase in investment, size and power of fishing units.	Not much change in technology, still continues to be traditional methods of harvest.	Canoes for reaching collection grounds, canoes motorised with engines.
Direct Impact (income, employment)	Labour intensive; entirely male; landings shifted from beaches to harbours, women displaced from the postharvest activities on beaches like sorting and further marketing, women marginalised from the organised harbor based marketing channel.		Women restricted to processing and shucking of meat, marketing.
Indirect Impact(livelihood changes)	No share in the ownership of craft and gear for women; women marginalised in marketing and thus livelihoods impacted.		
Policy formulation		Changes in *padu* system-disappearance of traditional inheritance of *padus* by women, uncertainty regarding state policy, no tax collection, no records of ownership of stake nets.	State department of mining and geology issues fishing rights and harvesting licenses to males, state government provides authority to male fishermen to gather juveniles.
Impact of change		Women lose formal rights to inherit *padus,* uncertainty regarding state policies posing livelihood threat to dependents of the fishery.	Women not issued licenses and denied fishing rights.
Environmental change	-	Depleted resources, juvenile fishing, tying net at the beginning of high tide which is banned.	Clam beds destroyed by excessive mining industry, damage of ecology.
Impacts of change		State interventions to phase out fishery.	Tension between fisher and industrial groups, damage of clam beds affect the fisheries and dependents.
Development issues		Traditional ownership transfer has not taken place for past two generations, uncertainty regarding fishery as far as state policy is concerned.	
Impacts of change	-	The fishery has not shown any growth and is at a standstill.	

Harvesting of black clam continues throughout the year (Kripa et al. 2004). However, the fisherwomen involved in clam fisheries are still very poor and caught in a low income trap in spite of their long working hours and tedious, manual low technology efforts of collection, processing and sales of clams. Most women work single-handedly. The fishing which was done by diving and hand-picking was an activity women in the coastal areas had been actively engaged in. This affected the health of women in the fishery and many had problems such as backache, headache, myalgia, anaemia and difficulties in sight and hearing. In the clam fishery of Anjilikkad, Alappuzha district, Kerala, 52% of women are involved in carrying out all operations in capture, clam picking, processing and marketing (Sathiadas et al. 2004). Women also engage in clam harvesting in Ashtamudi Lake, Kollam district, Kerala, when they do not have work in nearby cashew factories (http://spo.nmfs.noaa.gov/mfr723/mfr7233.pdf). Although there is good export potential, they still depend on local markets for disposal of clam meat. Lack of credit coupled with low investment and low technology compels them to do this as a small scale family enterprise for their survival and sustenance. Market expansion and export promotion through value addition and product diversification may enhance the price, and thereby the income earning potential of these fisherwomen. Through suitable capacity building programmes in value-addition the livelihood options for the clam fisherwomen can be diversified (Sathiadas et al. 2004) and this can be backed by suitable institution support to improve their socio-economic conditions.

Conclusions

Women in the three fisheries sectors have been displaced out of several activities where they have been involved. In the ring seine sector, traditional post-harvest practices are no longer exclusive to women. The drudgery of life has increased for the women as they have to travel longer distances to reach harbours, wait for the catch to be landed, jostle to get a share, and in general spend longer hours than before in procuring and marketing the catch. In a similar way, the fishermen have to travel long distances to begin the fishing trips. With the social, economic and legal issues affecting the stake net fishery, women are still active in the post-harvest sorting activity, though again with high drudgery and their access to informal *padu* rights are precarious due to the stagnation in formal/traditional rights processes. In the clam fishery, women are marginalised in the harvesting sector due to their continued use of traditional methods of collecting clams rather than using motorised canoes for harvesting. They however, continue to process the harvested clam and are also involved in marketing.

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Technical Paper

Importance of Mangrove Conservation and Valuation to Women and Men – A Case Study of Pichavaram Mangroves in India

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Abstract

The study was carried out in MGR Thittu village in the vicinity of the Pichavaram mangroves in the Cuddalore district of the state of Tamil Nadu in India. The objective of the study was the economic valuation of the Pichavaram mangroves for the villagers of MGR Thittu, using the Contingent Valuation Method (CVM) for estimating the indirect use values of the mangroves. In estimating the Willingness To Pay (WTP) for conservation and management of the mangroves within the CVM framework, about 73% of the respondents from MGR Thittu were willing to pay for the conservation and management of the Pichavaram mangroves. Seventy five per cent of the female respondents interviewed were willing to pay, in comparison to 71% of the male respondents who were willing to pay. This brings into focus the fact that women along with men can be very dynamic conservationists and managers of natural resources in the community-based management process.

Introduction

"Women's uses of the environment prove to be sufficiently different from those of men to represent a distinct habitat, in the ecological sense."

Brown and Switzer (1991)

Women have special knowledge of natural resource systems, and are also the ones hit hardest by environmental degradation (Resurreccion 2013). Despite this, and for many reasons, women have not been well incorporated into natural resource management activities, particularly coastal resource management (OXFAM 2003), and these limitations have been primarily because of traditional division of labour along gender lines (Montebon et al. 2004).

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In spite of women having to bear the brunt of the impacts of deterioration of the environment, their ability to participate in natural resource management is limited (D'Agnes et al. 2005).

The Cultural Consensus Model assumes cultural homogeneity which states that no subcultures exist within the society being studied (Romney et al. 1986). This emphasises that a handful of the oldest, most well recognised members and senior individuals possess the majority of knowledge held within the community. Thus, the maximum of the researcher's time is spent interviewing them where in indigenous societies, cultural norms grant men greater public access and recognition than women. It is in this context that the Cultural Consensus Model was rejected by Hess and Ferree (1987) who stated that male and female roles in the field of ethno-biological research studies are differentiated enough to represent subcultures in both spatially and temporally distinct zones (Reichel 1999). Even the effect of resource-degradation is said to be gender-biased (Siar and Caneba 1998).

Mangroves are plant communities of trees and shrubs growing in saline and brackish coastal habitats. They are considered to be unique forest ecosystems owing to the fact that they are found at the interface of land and brackish water environments, thereby acting as important shelter grounds for feeding and breeding for fisheries resources and other forms of wild life. They are now also considered to be potential weapons to combat global warming and climate change. However, in spite of their ecological importance, mangrove ecosystems are increasingly under threat owing to anthropogenic activities including clearing and pollution and adverse climatic impacts. When mangroves are converted for business purposes such as shrimp farms, women are the main losers because they lose access to a communal source of food and cash income (Agarwal 1992). In a study of perception of dependency on mangroves at Nijhum Dwip in Bangladesh, Iftekhar and Takama (2008) found that female-headed households have higher dependence on mangroves than those led by males. These gender differences mean that women's participation should be taken into consideration while developing mangrove management plans (IUCN 2007).

For the last two decades in India, the M. S. Swaminathan Research Foundation (MSSRF) has been instrumental in addressing gender concerns, including in the Pichavaram mangroves (Fistrek 2010). Therefore, the area chosen for the present research study was in the Pichavaram mangroves in the state of Tamil Nadu in the south-eastern coast of India bordering the Bay of Bengal (Fig. 1). In this mangrove system, 51 small and large islets are interspersed in a vast expanse of the water along with forests. The Pichavaram mangroves are well known worldwide both on the research front and for eco-tourism.

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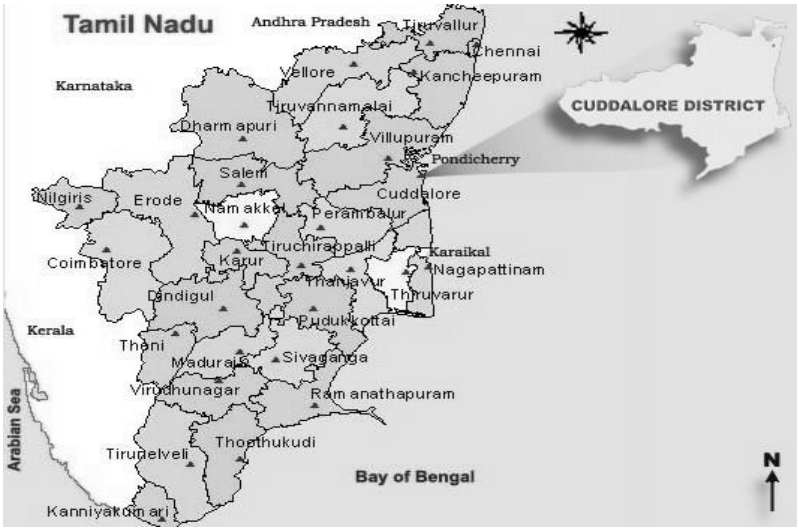

Fig. 1. Locale of the study area - Pichavaram mangroves in the Cuddalore district of Tamil Nadu state in the south-eastern coast of India.

The back waters in the mangroves are inter-connected by two river systems, viz. the Vellar and the Coleroon river systems (Fig. 2) which offer abundant scope for water sports, rowing, kayak and canoeing.

Fig. 2. Google map image of the Pichavaram mangroves.

The fishery of the Pichavaram mangroves is dominated by prawns constituting the bulk (81.1%), followed by finfish (7.1%) and crabs (4.1%) (Rajendran 2004) (Table 1). This fishery supports the livelihoods of numerous fishing and farming communities of seventeen hamlets of the Cuddalore district which utilise the mangrove resources. According to MSSRF, the villages T. S. Pettai, Vadakku Pichavaram, Killai Fisher Colony, MGR Nagar and Kalaingar Nagar, which are under direct physical coverage of the mangrove wetlands, were protected from the fury of the 2004 Indian Ocean tsunami. These hamlets are located about 500 m to 2.5 km away from the sea and 50 to 500 m away from the mangroves. The villages around the

Pichavaram mangroves affected by the tsunami were Chinnurpettai, Madavamedu, MGR Thittu, Mulukuthurai, Chinnavaikal, Kannaginagar and Pillumedu. Among the seventeen fishing hamlets, there are nine fishing hamlets and eight agricultural farming hamlets. People from eight hamlets intensively use the mangrove resources, and the people belonging to a few of the hamlets such as C. Manambadi, Killai, Pichavaram, T. S. Pettai and Thillaividangan utilise the wood, non-wood and fishery resources. In the fishing hamlets, the majority of the people have been traditional fishers. In a few of these fishing hamlets, people belonging to the *Irular* tribe live and they fish only in the mangrove waters. They fish not from boats and with nets but by groping and searching in knee-deep water for prawn, and by building bunds that confine fish during high tides and allows the fish to be captured during low tide. Bunding, however, adversely affects the mangroves by changing water circulation.

Table 1. Fishery resources of Pichavaram mangroves.

Fishery resources	Distribution	Source
Prawns (81.1%)	20 species, prominent are *Penaeus indicus* (H. Milne Edwards, 1837) , *Penaeus monodon* (Fabricius, 1798) , *Penaeus semisulcatus* (De Haan, 1844) , *Metapenaeus dobsoni* (Miers, 1878), and *Metapenaeus monoceros* (Fabricius, 1798) Also a breeding ground of *Macrobrachium sp.*	Rajendran (2004)
Finfish (7.1%)	180 species, commercially important ones belong to Mugilildae, Chanidae, Clupidae, Pomodasyidae and Gerridae	Rajendran (2004), Prince-Jeyaseelan (1981), and Prince-Jeyaseelan, (1998)
Crabs (4.1%)	30 species, important commercial ones are mud crabs	Rajendran (2004)
Others (7.7%)	birds (200 species), mollusks (20 species), plants (86 species), bacteria (52 species), fungi (23 species), seaweeds (22 species), phytoplankton (82 species), zooplankton (95 species), meiobenthos (40 species) and macrobenthos (52 species)	Rajendran (2004)

More specifically, the study area concerned is the New MGR Thittu, which was recreated only after the 2004 Tsunami caused human casualties, and washed away the livestock and much of the household property of the villagers of old MGR Thittu Island. However, more importantly, throughout the tsunami and its aftermath, the villagers were grateful to the Pichavaram mangroves which, according to them, saved the villagers who survived. However, the villagers of MGR Thittu are not allowed by the Government to visit the nearby mangrove patches in the island where they lived before the December 2004 Tsunami. The lightly wooded mangrove patches in the old island were reported as a place where the women folk travelled and spent their leisure time.

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Materials and Methods

Secondary data were used to provide the general profile of the village of MGR Thittu, its population and the district within which it lies, fish landings and the harvest of mangrove products in the village. For the collection of primary data, purposive sampling (a non-probability sampling technique) was used to interview the villagers of MGR Thittu. Purposive sampling is used in ethno botanical studies to make comparisons of specific knowledge and cultural practices (Neupane et al. 2002; Tongco 2007), and in case studies (Dolisca et al. 2007; Parlee and Berkes 2006), and also for sampling informants with a specific type of knowledge or skill (Li et al. 2006). Among the different methods of purposive sampling, the theory-based or operational construct method was used. Theory-based sampling is a qualitative research process that involves finding manifestations of a theoretical construct of interest to elaborate, e.g. expressed willingness to pay, and then examining the construct. The sampling framework can be used to study the interaction between a person and the environment (Patton 1990). Sampling decisions are made throughout the entire research process. Participants are selected based on their knowledge of the topic and based on emerging study findings (Ploeg 1999). The sample size was not determined prior to the study, but rather in the sample of villagers of MGR Thittu where the willingness to pay for the mangroves was found to exist, it was used to examine the phenomenon of the expressed willingness to pay from the sample. It was attempted to interview all the villagers of the MGR Thittu who were available during the interview time and were interested to participate in the interviewing process.

The frame-work of the economic valuation of mangroves was organised on the basis of provisioning, regulating, cultural and supporting services of the Millennium Ecosystem Assessment (2005) classification framework of the UNEP (Fig. 3).

The data were collected from 120 villagers of MGR Thittu village. An attempt was made to interview the representative of each household in the village who was present in the house during the interview. This was done through in-person survey methods after conducting a pilot study. Frequency and percentage analysis were used to analyse the general characteristics of the respondents such as age, sex, family size, and education. The respondents' opinion on the utility of products and services obtained from the mangroves, and concerns about the Pichavaram mangroves were ranked on pre-determined scales. Opinions about the villagers' participation in the management of mangroves were also considered. The Contingent Valuation Method (CVM) was used to analyse the respondents' willingness to pay (WTP) for the protection of mangroves, and the amount the respondent would be willing to pay for this purpose. The open-ended elicitation format of the CVM was used. In the CVM, the stated aim was to improve the status of the surrounding Pichavaram mangroves so that the villagers would be able to continue to receive the same level of goods and services that they obtained from the mangroves in the past. The objective of the study was to find out if the respondents would be willing to pay a sum of money every year for achieving the stated aim. If they were willing to

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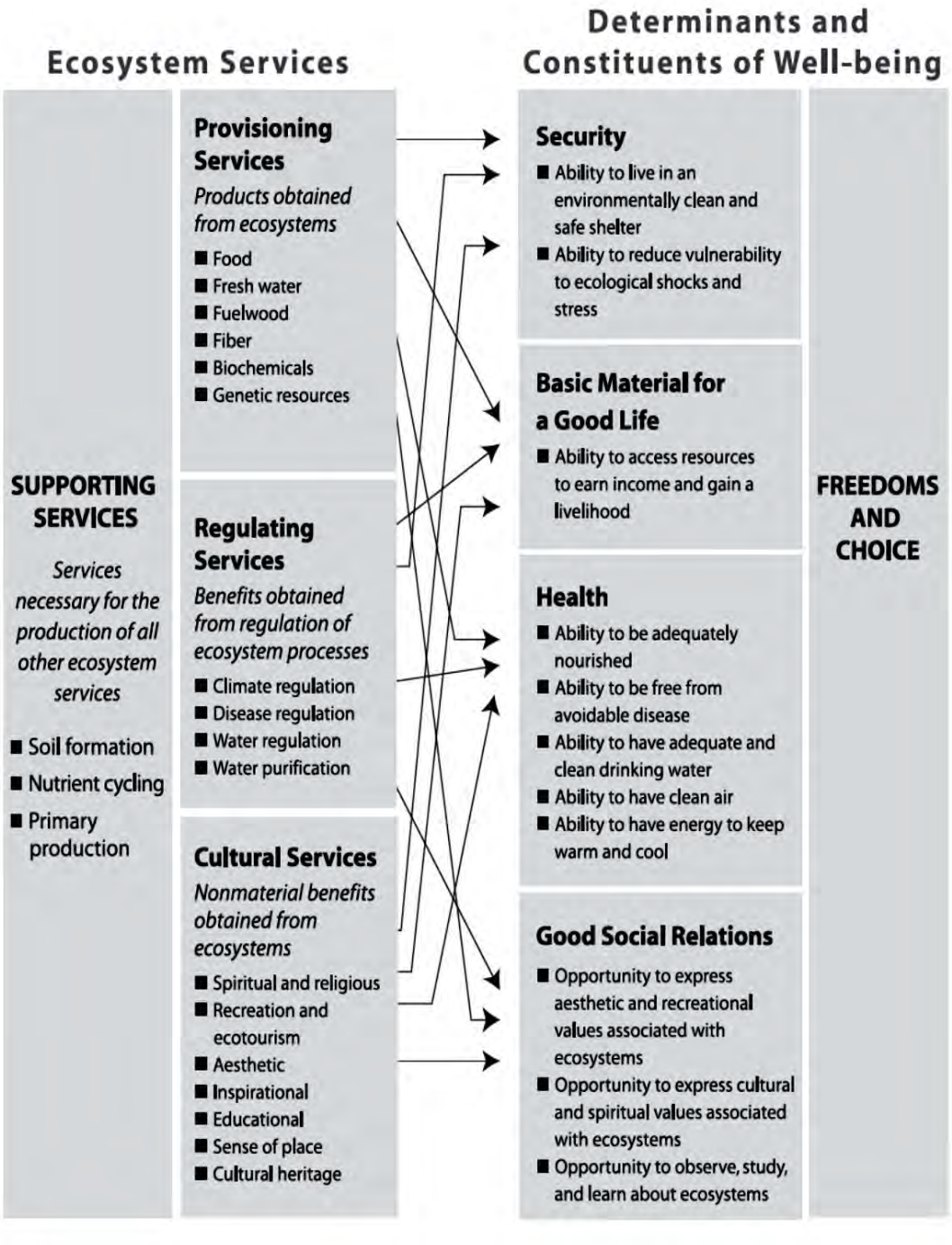

Fig. 3. Millennium ecosystem assessment framework for the valuation of ecosystem services. Source: http://www.unep.org/maweb/documents/document.300.aspx.pdf

pay a sum of money for the purpose, they were asked how much money they would be willing to pay for it. The payment vehicle chosen for the study was a hypothetical donor organisation. The WTP of the non-respondents was estimated so as to obtain a figure for the total population of the village with the mean of the WTP of the male and female respondents in separate

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categories. The WTP of the whole population of the village was summed to denote the existence value of the Pichavaram mangroves for the villagers of MGR Thittu.

Particulars of Contingent Valuation Method in the economic valuation of mangroves

The components of the values of the mangrove ecosystem which were estimated through CVM are the values obtained from fish and other aquatic animals as food, firewood, fodder, roofing materials, timber, smoke as mosquito repellant, traditional medicine, honey and black tea (provisioning services); recreation, eco-tourism, spiritual, religious, and aesthetic (cultural services); prevention of soil erosion, primary production, carbon sequestration, waste assimilation and biomass export (supporting services); and protection against storm, tsunami, floods and heavy winds and water purification (regulating services).

Results

Socio-economic profile of the respondents

Among 120 respondents, 72 (60%) respondents were female and 48 (40%) were male (Table 2). The age of the female respondents ranged from nearly 15 to 50 years with a mean of 30 years, whereas that of the male respondents ranged from 20 to 75 years with a mean of 40 years. Most of the female respondents as well as the male respondents were educated up to high school level. The majority of the female respondents (52.7%) had small families with the number of family members ranging from one to four, compared to the male respondents, for which the majority (58.3%) had large families with the number of family members ranging from five to eight.

Table 2. Summary statistics of the male and female respondents.

Socio-economic information	**Male (n = 48)**	**Female (n = 72)**
Age (years)	20 to 75 (mean = 40)	15 to 50 (mean = 30)
Education (% literate)	High School literate = 52 College graduates = 25 Illiterate = 20 Other categories (primary literate, vocational training etc= 3)	High School literate = 42 College graduates = 28 Illiterate = 28 Other categories (primary literate, vocational training etc. = 2)
Family size (number of family members 1 to 4 = small family, more than 5 = large family) (Percentage of respondents)	Small family = 41.7 Large family = 58.3	Small family = 52.7 Large family = 47.3

Opinion of the villagers about uses of the Pichavaram mangroves and concerns

The most important uses of mangroves, as ranked according to the opinions of the respondents, in order of priority, are ecological functions of the mangroves, mangroves being

a site of natural fish breeding, mangroves being a source of fish catch, firewood, timber, medicine, fodder, roofing materials, smoke for functioning as mosquito repellent, and mangroves as a source of eco-tourism. The most important concerns of the villagers about Pichavaram mangroves are strengthening coastline against tsunami, biodiversity conservation, sustainability of fish production, improving awareness of the surrounding villagers about the importance of Pichavaram mangroves, arranging alternative livelihood for the villagers, and potential impact of pollution from eco-tourism in the Pichavaram mangroves. According to the present government regulations, the only authority for the management of the Pichvaram mangrove forest is the State Forest Department. The villagers, therefore, are not allowed to utilise the mangrove resources for firewood and timber. It is for this reason that the villagers sometimes resort to entering the forests for collecting firewood and timber for their subsistence illegally.

It was unique to observe that the women of MGR Thittu were involved with the mangroves in their daily lives in diverse ways. The women, and not the men, are mostly involved in collecting firewood from the mangrove patches, and the women have the habit of spending their leisure time by visiting the mangroves. The women, again mostly, and not the men, collect timber for hut construction, if required, especially in the case of financially poor people who cannot afford to have a well-built house on their own. The women, as well as men, have survived the devastating effects of Tsunami, and have the opinion that the mangroves helped in reducing the speed of the high water waves which entered the village during the Tsunami.

Willingness to pay

Among the 72 female respondents, 75% of respondents were willing to pay for the sake of Pichavaram mangrove conservation and development. Among the 48 male respondents, 71% respondents were willing to pay for the Pichavaram mangroves. Since the samples of the respondents were randomly selected from their populations, the differences in the percentage of the WTP for the female and male categories were not statistically significant. The mean of the amount the female respondents were WTP was around INR. 686 per year (USD 15, as per the approximate currency exchange rate during the year 2010: 1 USD = INR. 45), and ranged from INR. 50 (USD 1.11) to INR. 6,000 (USD 133) per year (Table 3). There were five female respondents who were treated as outliers and stated that they would pay more than INR. 1,000 per year. The mean of the WTP of the male respondents was INR. 916 (USD 20) per year with range from INR. 100 (USD 2) to INR. 6,000 (USD 133) per year. The number of outliers in the sample for WTP for the male respondents was only one who was willing to pay INR. 6,000 per year. The WTP of the females for the entire population of the village with a population of 166 females during the research period, as extrapolated from the total WTP of the sample, was found to be nearly INR. 85,064 (USD 1,890) annually, and that of the male respondents, with a total population of 177 males in the village, was extrapolated from the sample, to be nearly INR. 1, 14,500 (USD 2,545) annually. Therefore, the total WTP of the population of the village of MGR Thittu summed up to around INR. 199,564 (USD 4,435) annually.

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Table 3. Descriptive statistics of the female and male WTP values.

Particulars	Results	
	Female	**Male**
Sample size	56	32
Range (INR per year)	50 to 6000	100 to 6000
Mean	685.98	916.25
Median	500	500
Standard Deviation	1042.21	1424.46

When the respondents who were not willing to pay any money were asked to cite their reasons for their unwillingness to pay, the most important reason given was that the government and not the villagers should pay for the stated purpose. Some of the villagers could not afford to pay; and some of the villagers were not interested in the matter (Table 4).

Table 4. Reasons for not unwillingness to pay (n=32).

Reasons	Percentage
Government should pay	34.37
Cannot afford to pay	31.25
Not interested in this matter	21.87
Money would be wasted	12.5

Management of Pichavaram mangroves

There is strict monitoring by the State Forest Department against unauthorised access to the mangroves near the village of MGR Thittu. When the villagers were asked about their satisfaction with the current management regime, they reported that they were not totally satisfied. They provided two alternatives as their choices of management, viz; either they should be provided total authority to manage the mangroves, or there should be co-management of the adjacent Pichavaram mangroves involving the State Forest Department and the villagers.

Discussion

The total existence value of the Pichavaram mangroves with the MGR Thittu villagers shows how importantly the villagers, despite being from financially disadvantaged backgrounds (as revealed during interviews and from observations during the interviews), value their mangrove resources and are willing to pay a large sum of about INR. 200,000 per year. As seen in forestry management regimes in different regions across the world (Dolisca et al. 2007), the villagers had expressed a strong desire for a co-management system along with the government in the conservation and utilisation of mangroves.

In the context of co-management of the Pichavaram mangroves with the State Forest Department, the women of MGR Thittu can play an important role in the management of the mangroves. In a similar study, it was found that indigenous Australian women expressed a strong desire to be involved in decision-making in relation to climate-change adaptation policies (Petheram et al. 2013). Women can play an important role in supporting their families by supplementing their household income when the income from fishing is not sufficient (D'Agnes et al. 2005). There are potential roles of women in the sustainable utilisation of the resources of Pichavaram mangroves, which could help them in gaining employment to support their families financially. Maintenance of a nursery of different mangrove plant species which can be used for the purpose of plantation for restoration efforts has already been taken up by pioneering institutions such as M. S. Swaminathan Research Foundation, Chennai. There are similar institutions also in Sri Lanka that involve women to manage household mangrove nurseries through workshops, which provide livelihood to women who lost their livelihood because of the destruction caused by the December 2004 Tsunami (GNF 2007). The women can take up crab fattening as a commercial venture at larger scales. This has already been initiated by NGOs such as Balamurugan Foundation, Angalaman Foundation and MSSRF in MGR Thittu, as narrated by the respondents during interviews.

Conclusion

There should be greater awareness in general about the economic value of the Pichavaram mangrove conservation for fisheries sustainability and production. The awareness of women about the importance of mangroves as a fishery resource habitat should be raised more widely to help generate support for sustaining the mangroves and also for preventing adverse effects (Villamor et al. 2013). The results are specific to the MGR Thittu village regarding the conservation and management of Pichavaram mangroves as a fishery resource during the research study period. Women's, as well as men's, importance in valuing fisheries resources such as the Pichavaram mangroves needs to be recognised and documented as demonstrated by the result that the Total Economic Value of the Pichavaram mangroves is influenced by women's, as well as men's, perceptions of the utility of mangroves.

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Short Communication

Gendered Concerns in Coastal Disasters: An Analysis of Women's Political Subordination and Prospects for Empowerment

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Abstract

Coastal areas are currently deemed highly vulnerable to a host of disasters, more so in the context of global environmental change. However, studies show that gender issues are often ignored during disasters despite the fact that women have different needs and capabilities than men at these times. Women's vulnerability during and after disasters is attributed to their political, economic and cultural conditions, underscoring multiple responsibilities and widely perceived inferior status vis-à-vis men. The main arguments in this paper are supported by the results of interdisciplinary, mixed methods research on women's standpoints or experiences of gender bias, following the 2006 M/T Solar I oil spill in the coasts off Guimaras Island in the Philippines. It was observed that women's political subordination was evident because their role in fishing was very minimally recognised. Women were often uninformed and rarely represented in decision-making following the oil spill disaster. This under-representation exacerbated the coastal women's disadvantaged conditions as institutional interventions seldom addressed their needs and concerns.

Introduction

Natural and man-made disasters have increased in recent years, particularly at the start of the new millennium. Disasters are usually classified into natural disasters and man-made or technological disasters. The former allude to environmental events that are not directly man-made, and the latter are primarily caused by hardware failure and human error, such as the case of oil spills. Generally, disasters and their aftermath cause a double burden among those considered to be the weaker, dependent and subordinate groups in communities, because they are likely to suffer more from both the direct and indirect ramifications of the said events (Acar and Ege 2001; Morrow 1999; Enarson and Morrow 1998). During disasters, women are usually the ones who are less informed, less prepared and less protected. Women's disadvantaged positions emanating from

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societal gender norms contributes to their vulnerability, more so when a disaster's consequences are compounded by economic, social, political, and family relationships (Morrow 1999).

This paper focuses on certain challenges faced by women in disaster contexts, drawing from available literature and data from interdisciplinary, mixed methods research conducted on community women's experiences of gender bias following a catastrophic oil spill in the coasts off Guimaras Island in the Philippines. Since scholarly work on societal gender dynamics point to political subordination as one of the gender discriminations women experience, the main objective of this paper is to present research evidence on the extent to which coastal community women's articulated needs were ignored and how women were underrepresented in decision-making processes following the oil spill disaster. This paper thus highlights women's political subordination in disaster response and management practices, as well as generates lessons for use in gender-sensitive coastal disaster planning and management.

The interdisciplinary study (Badayos-Jover et al. 2014; Defiesta and Badayos-Jover 2014) that served as data source for this paper was informed by feminist standpoint theory (Harding 2004) and made use of qualitative and quantitative methods that specifically looked into each manifestation of gender bias, namely, stereotyping, political subordination, economic marginalisation, multiple burden and violence against women (VAW). The research instruments used in the study were divided into sub-sections corresponding to each gender bias, in order to provide evidence on women's experiences of exclusion and subordination in disaster contexts. The study locale was the town of Nueva Valencia in the island province of Guimaras, Philippines, where the majority of oil spill affected households were located. A series of focus group interviews were held among women living in eight oil spill affected *barangays* (villages) of Nueva Valencia. Key informant interviews were likewise carried out with representative *barangay*/village leaders, government agency personnel and other local elected or political officials. Finally, an interview survey was conducted with 175 randomly selected mothers, young women or adolescents and elderly women, who live in La Paz and Tando, the two *barangays* in Nueva Valencia that were identified as most affected by the oil spill.

Results and Discussion

Various news reports account that around midnight, on August 11, 2006, the tanker M/T Solar I sank during a storm, about 20.5 km off the southern coast of Guimaras in the Philippines. The oil tanker was carrying more than two million litres of bunker fuel when it sank. The M/T Solar I oil spill, considered by far to be the largest in Philippine history, adversely affected marine sanctuaries and mangrove reserves in three out of five municipalities or towns of Guimaras and had a direct devastating effect on the coastal and fishing communities.

After the M/T Solar I Oil Spill disaster numerous community meetings were held covering concerns such as distribution of relief goods, compensation, alternative livelihood, cash-for-work schemes, coastal clean-up, health hazards and others. Most of the women respondents attended one to ten of these community meetings, with a few who claimed to have attended 16 to 28 meetings. The majority (75%) of the women respondents likewise claimed that women gave or

expressed their opinions during the meetings. However, when asked whether they think women's opinions were seriously taken into consideration, most of the responses were either *"Don't know"* (21%) or turn idealistic (48%), with phrases like *"Women's opinions are also important"* or *"Women are also respected"*. Interestingly, there were some respondents who said, *"only the opinions of those who are close to the elected barangay captain (village head) were considered"* or *"only the opinions of men"* were considered, since men's fishing livelihoods were most affected by the oil spill. More importantly, only 15% of the women respondents shared that there were consultations held specifically targeting women. The majority (70%) of the respondents said there were no such consultations for women while the remaining 15% said they "didn't know" or simply did not provide an answer.

Of the few consultations held specifically for community women, a glaring gender stereotype is the fact that most of the respondents (58%) shared that the topics were on activities deemed fit for women, such as gardening and clean up. Meanwhile, 17% of the respondents shared that the meetings held for women covered alternative livelihood concerns. Thirteen per cent of the respondents shared there were meetings held to cover health-related apprehensions while four percent said there were consultations to gather household information. Another four percent of the respondents replied that there were women consultations regarding programs for children and finally, four percent of the respondents shared there was a community meeting held in an attempt to impose a curfew for teenage girls. The topics of the meetings or consultations held for women in the oil spill affected villages highlight stereotypical discriminations against women since most of these were associated with culturally assigned women's reproductive or household maintenance concerns. Disaster situations thus exacerbate the gender divide as access to social and economic resources are re-channelled away from women and towards men (Enarson and Morrow 1998).

Relocation after disasters also increase women's workload and decreases their control over food and income and disrupts support networks on which they depend for practical and psychological support (Pincha 2008). In the aftermath of the M/T Solar I oil spill, some adolescent girls shared that they had to stop schooling to take care of their younger siblings or manage the household in lieu of their mothers who had to look for alternative income sources. Some of the elderly respondents likewise shared that they had to help augment the family income by working again, sometimes far from home. Mothers articulated concerns over nutritional deficiencies due to prolonged intake of the same types of food (mostly canned) distributed during relief operations. Moreover, as is usually the case in post-disaster responses, women's sanitary needs were overlooked since most or all care packages do not include sanitary pads for women's use during their monthly periods. These lapses in addressing women's needs are consequences of the fact that institutional disaster response and recovery efforts often assume that woman's needs are already addressed through general community interventions. Furthermore, the structure and processes of disaster response and mitigation in the Philippines follows a top-down, militaristic tradition. Gender concerns are thus systematically disregarded even though some of these concerns, like violence against women, are classified as crimes under Philippine law.

The M/T Solar I oil spill upset the daily lives of the people in the two most affected villages in Guimaras Island. Hence, some households had to adjust by making important changes and

sacrifices for the sake of family welfare. Table 1 shows the major decisions that affected households had to make following the oil spill.

Table 1. Major household decisions made after the oil spill disaster.

Decisions	Yes	No
To relocate	50	125
To seek other employment / income source	30	145
To stop schooling	5	170
To sell assets	14	161

Source: Household survey.

Table 1 illustrates that the majority of the respondents coming from the most-affected households chose not to make drastic decisions such as relocating; seeking other means of employment, having the children stop schooling or selling assets. However, the households that did decide for one or more of these more disruptive options illustrated how household decision making is reflective of gender norms and expectations. Women are usually not part of crucial decision-making during disasters. Men make the choices on behalf of women and everyone else, in the course of delegating access to facilities and limited resources in a disaster crisis (Weist et al. 1994). This scenario is evident in the aftermath of the M/T Solar I oil spill in Guimaras Island, Philippines, since major decisions were mostly done by males, as presented in figure 1.

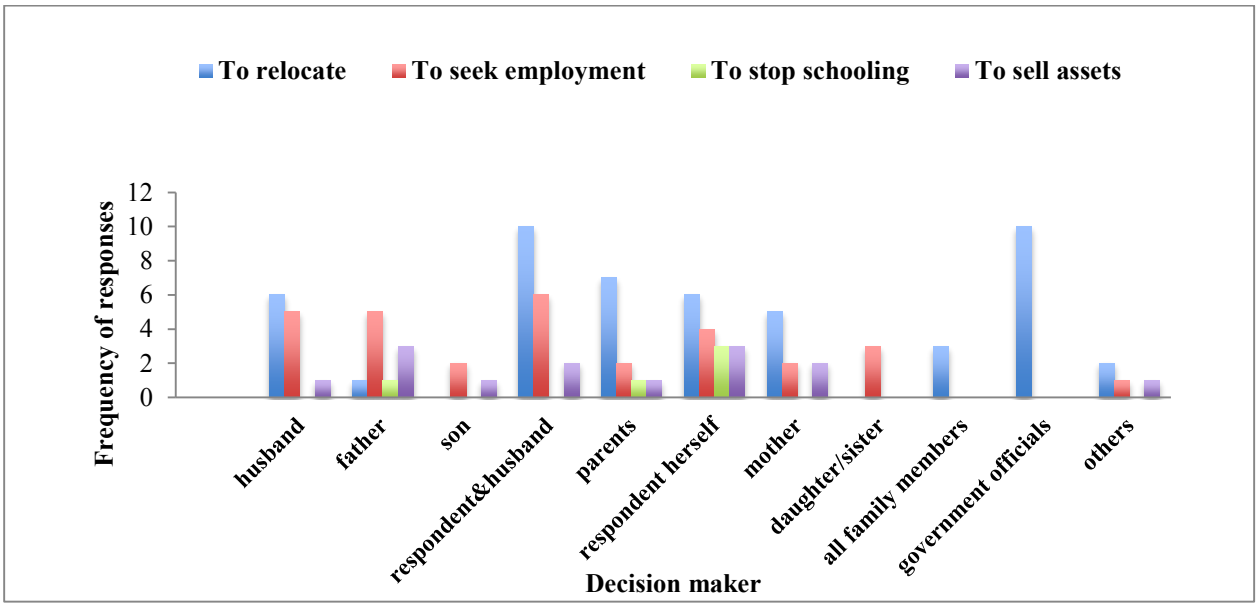

Fig. 1. Bar chart showing who made major household decisions after the oil spill disaster.
Source: Household survey.

The foregoing chart shows that apart from decisions made solely by the women respondents, the other decision points were attributed to males — husbands, fathers and a few sons. The decisions made by Local Government Unit (LGU) officials can also be considered as decisions taken by men, since within the villages included in the study, political or elective officials were mostly men. According to the respondents, only about three to four women held elective posts in the study locales at the time. Even the decisions said to be made by both the respondent and her

husband or by both parents of adolescent respondents may have been subject to gender dynamics between spouses. Male preferences thus usually emerge dominant, given Philippine society's patriarchal family set-up. In the Philippines, men dominate in household decision-making, as well as assume productive or public roles and responsibilities. Consequently, women are considered subordinate in the political sphere, where they have limited time and opportunity to participate in decision-making, from the household level up to public policy concerns (Enarson and Morrow 1998). One clear manifestation of such political subordination occurring in oil spill affected villages was the fact that women were not officially considered as fishers even though women do fishing activities. Only the men were viewed as fishers and were even formally organised into associations prior to the oil spill.

One distinct issue that compounds the stereotyped gender biases generally confronted by women in difficult circumstances is their experience of violence. Women are actual and potential victims of specific kinds of violence that are borne out of the subordinate status in society (Enarson 1999). Due to their low status in society, many women experience all types of abuses in the private and public spheres. During disasters, women become susceptible to domestic violence and other forms of abuses. Disasters disrupt the physical and social environments that shape health and health problems, including violence (WHO 2005). The community displacement after M/T Solar I oil spill paved the way for incidences of sexual harassment and violence against women (VAW). Echoing Pincha's (2008) findings, study respondents expressed concern over heightened alcohol intake of husbands following the oil spill, which in turn led to domestic quarrels, verbal abuse and even instances of wife battering. Meanwhile, adolescent girls shared that they experienced sexual harassment in the relocation sites.

Conclusions and Recommendations

Women's aggravated experiences in times of adversity are oftentimes overlooked, prompting the UN to encourage research on how gender relations operate in households and communities during disasters, as well as the processes and factors that increase vulnerabilities across different social groups (WHO 2005). Disaster situations have been shown to exacerbate or compound women's experiences of gender biases in society and remain largely unaddressed by institutional efforts. This is evident from the situations in the communities affected by the M/T Solar I Oil spill, as well as other disaster situations worldwide. Hence, gender mainstreaming in disaster response and mitigation, as well as community rehabilitation, has become an imperative (Enarson 2008).Consistent empirical evidence on the need for gender awareness and sensitivity during and after disasters is deemed to redound to more impartial and efficient disaster response and mitigation. The challenge then is for institutions to incorporate a "gender lens" when they respond to disasters.

Gender-sensitive disaster mitigation implies that women should be involved in all levels of action in disaster contexts. Consistent training and evaluation within disaster organisations will likewise make their response teams, researchers and community organisers sensitive to women's peculiar vulnerabilities in disasters. This will eventually lead to harnessing women's potentials in disaster situations. After all, it has been established that the aftermath of disasters bring about a lot

of women-headed households (Weist et al. 1994). As the results of the study and foregoing discussions show, there is an obvious need for disaster response and recovery efforts to consider the intersections of vulnerabilities, including those pertaining to gender biases. There is a glaring need for women to be represented in crucial decision-making during disasters. However, the institutionalisation of active women's participation in disaster planning and response processes implies that women in communities be organised. Such organising efforts have to take into consideration the masculinist institutional structures that characterise the societal contexts of women and consequently impedes on women's political empowerment in times of emergencies.

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Technical Paper

Do Catastrophes Exacerbate Gender Bias? An Analysis of Coastal Women's Experiences of Economic Marginalisation in a Disaster Context

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Abstract

Women are highly vulnerable because of poverty, gender division of labour and multiple burdens. These gender inequalities and biases are reinforced when disasters strike. Thus women tend to suffer more than men in disaster situations. For a disaster-prone country like the Philippines, the understanding of the differences in the impacts of catastrophes on men and women is crucial for effective disaster risk reduction and rehabilitation strategies. This research addresses this issue by examining how a destructive oil spill in Guimaras, Philippines affected the economic wellbeing of women by focusing on their experiences of economic marginalisation. Primary data were collected using key informant interviews, survey and focus group discussions.

Results show that the oil spill disrupted women's fishing activities. The data also reveal that they were already experiencing economic marginalisation even before the disaster. This was exacerbated after the disaster because their needs were considered less important leading to unequal institutional interventions. The study affirms that disasters reinforce economic marginalisation of women. It also highlights that gender perspective is crucial in analysing disaster impacts. It is recommended that post-disaster relief and rehabilitation efforts be guided by gender needs assessments and gender sensitive targeting of beneficiaries.

Introduction

Disasters result in serious social disruptions accompanied by considerable human, material and environmental losses (Ginige et al. 2009). Impacts of disasters on social groups vary depending on vulnerabilities which in turn are influenced by social structures shaped by differences in age, physical ability, sex and gender (Enarson and Morrow 1998).

The social and economic impacts of disasters are dictated by the structures and contexts in which they occur (Jones 2005). Thus men and women are affected differently by disasters because

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of variations in their physical characteristics, social norms and behaviour (Neumayer and Plumper 2008). Women's economic status is an important aspect of their vulnerability during disasters because they are generally poorer than men, have lesser access to resources, fewer employment opportunities, lower income earning capacity and minimal control over decision-making processes (Enarson and Morrow 1998; Nowak and Caulfield 2008; Laska et al. 2008). Thus, economic marginalisation and other discriminations against women are worsened in disaster situations (Weist et al. 1994).

The disproportionate effects of disasters on men and women are an important consideration in developing countries with a high incidence of disasters, such as the Philippines because it hampers development. The Philippines is one of the most highly exposed countries to disasters in the world due to its geographical location that makes it prone to earthquakes, volcanic eruptions and typhoons. Aside from these natural calamities, environmental disasters are also prevalent in the country. Oil spills in particular have increased in frequency recently, with major incidents in 2005, 2006, 2008, and three incidents in 2013, in various parts of the nation because of its archipelagic nature and the heavy reliance of its people on water transportation.

The August 2006 oil spill near Guimaras Island was one of the most devastating disasters in the Philippines and it resulted in huge economic and environmental losses. About 2.4 million litres of crude oil contaminated approximately 24 km^2 of the shores and mangrove areas of the Island when a tanker sank in its vicinity due to bad weather. As the biggest oil spill ever in Philippine history, the disaster adversely affected three out of five municipalities and 20,000 coastal residents. Valuation studies show that direct losses alone, arising from disruption of livelihoods and recreational activities, reached USD 23-24 million (Lizada et al. 2009).

Objectives

An environmental catastrophe as major as the Guimaras oil spill contained gender concerns. Little was known about these issues, however, because most of the studies on the oil spill did not tackle them nor employed gender analysis. This study is part of a bigger research project that filled the knowledge gap by focusing on the manifestations of gender bias specifically economic marginalisation of coastal women affected by the oil spill. The objective was to answer the basic question of whether the disaster has exacerbated the economic marginalisation of women.

The information provided by this research will lead to a better understanding of the different impacts of the disaster on men and women. This information is valuable in guiding relief and rehabilitation planning for future disaster events.

Materials and Methods

The locale of the study is the oil spill affected island of Guimaras, Western Visayas, Philippines. The island has a total land area of 60,465 km^2 and a coastline of 239 km. It consists of five municipalities and a population of 162,943 as of the 2010 census. This study was part of a bigger research that tackled coastal women's experiences of gender bias, namely, economic marginalisation, political subordination, stereotyping, multiple burden and violence against

women following the oil spill (Badayos-Jover et al. 2014; Jover and Defiesta 2014). This was conducted in Tando and Lapaz, the two coastal villages in Taklong Marine Sanctuary that were severely affected by the disaster. Primary data, including those specific to economic marginalisation and multiple burden, were gathered through survey, focus group discussions (FGD) and key informant interviews (KII). The survey included 175 female respondents and their households. The sample size was calculated assuming 95% confidence interval and 7% sampling error. The sample size for each barangay was determined using the proportional allocation method based on population size. The instruments used in the bigger research were questionnaires and FGD and KII guides designed to capture data pertaining to each gender bias. This study utilised those that pertain only to economic marginalisation and multiple burden.

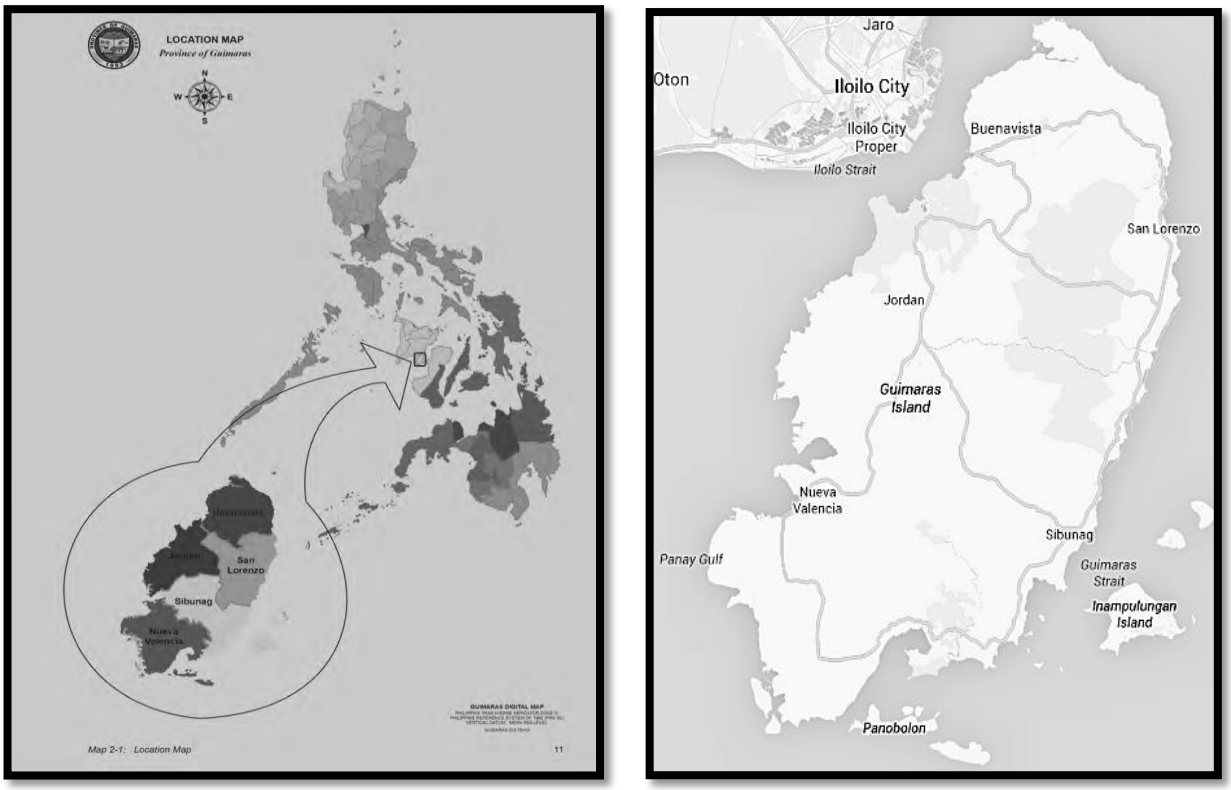

Fig. 1. Location Map of Guimaras Island.
Source: Province of Guimaras, Google Maps.

Three FGDs were conducted with nine to twelve female participants each. To capture variations in experiences of gender bias, the participants were chosen according to age groups namely adolescent girls (15-25 years), mothers (26-59 years) and elderly women (60 years and above). Key informant interviews were done among local leaders, government employees and NGO personnel involved in the oil spill relief and rehabilitation. The KIIs provided data on the process and conduct of relief and rehabilitation efforts in the oil spill affected communities. The research is descriptive in nature, using gender tools of analysis such as narratives, gendered resource mapping, 24-hour activity profiles and gender disaggregation of data.

Results and Discussion

Profile of respondents

The survey participants were mothers between 26 to 59 years of age, youth between 15 to 25 years and elderly women 60 years and above. The respondents were generally literate except for one elderly woman who never went to school. The majority of respondents (62.2%) reached secondary school and their average educational attainment was second year high school, which is equivalent to eight years of formal schooling. Among all the study participants, the elderly were the least educated with only five years of formal education on the average.

Many of the respondents come from large households, typically extended families with six members that included immediate or close relatives. Males, usually the father, play a dominant role in the majority (81%) of the families as household head and the primary income earners. This role also designates them as the major decision maker of the family. Few households (34 or 19%) were female headed, of those, most heads were elderly women (42%) or mothers (23%).

Fishing was the most prevalent livelihood of almost all (92%) of the respondent households. Each family, on the average, had two members engaged in fishing and related activities such as gleaning and fish vending. There were more male (56%) than female (44%) fishers, which made fishing a male dominated occupation in the study site.

Economic marginalisation prior to the oil spill

Economic marginalisation is the segmentation and exclusion of individuals or groups from the economy, its markets and benefits, resulting from economic and non-economic origins (Kanbur 2007). The economic marginalisation of women is a form of gender bias that results from socially constructed roles.

Despite the reduction in many difficulties confronted by women over the last two decades, gender disparities still persist, particularly the unequal access to economic opportunities (World Bank 2012). These differences are also pervasive in fishing communities where women are generally economically marginalised, having less control over fisheries value chains, being engaged in less profitable activities, and having limited participation in lucrative markets and businesses.

The women in this study were experiencing economic marginalisation even prior to the oil spill. This resulted from their multiple burdens and limited access and control over fishery resources.

The mothers and elderly respondents were over burdened by the number of tasks that they performed at home and in the community. The 24 h activity profiles showed how they allocated time to various activities within the 24 h period. Women fishers normally started their day at 4 am in the morning and ended it at 9 pm in the evening. For the whole duration of their 17.5 average waking hours they performed about 13-17 different tasks. Two of these were productive in nature

(gleaning or weaving), providing additional income and food on the family table. Generally, they spent more than half (9.7 h or 55%) of their day doing reproductive work such as child rearing, cooking and laundry. Productive activities (4.3 h) and leisure (3.7 h) on the other hand, took up only 24% and 21% of their day respectively.

Table 1. Coastal women's activities by type and number of hours spent on each activity.

Activity	Number of activities	Specific activities	Average hours	%
Productive work	2	Gleaning, weaving, fish vending, shallow water fishing	4.3	24
Eating and leisure	3	Watching TV, napping, gambling	3.7	21
Reproductive work	11	Cooking, tending to the animals, collecting firewood, cleaning the house, taking care of the children, etc.	9.7	55
Total	16		17.7	100

Source: Focus group discussion transcripts, 24-h activity profiles.

The 24 h activity profiles further showed that while women were relegated to household work, they also performed productive work as well. Men, on the other hand did most of the productive work to earn income for the family. Their daily tasks were less varied, limited to three to four activities only. This gender division of labour or the reproductive and productive dichotomy placed women in a subordinate position in the fishery. Because fishing is considered as productive work, it is perceived as the domain of men, and not of women. Thus, even before the oil spill, women in the fishery were secondary only to men, who were viewed as the "main fishers". Women's tasks were limited to the preparation of the fishing gear and supplies, mending nets, helping in fish trap maintenance, processing and selling the catch and sometimes aiding the "main fisher" in offshore fishing when an able-bodied son or male relative was absent.

"Babayi kag lalaki pareho naga pangisda, pero ang lalaki naga bugsay. Sila ang may control sa lawod kay sila ang gapamukot kag nagapanglabay. Ang mga babayi ara sa hunasan, mamulot sang pakinhason sa higad" [Both men and women are into fishing. But men are the ones holding the paddle. They control the sea because they are the ones casting the net and hooks. The women, on the other hand stay at the shorelines, gathering shells.

- mother and FGD participant

Gender division of labour also tied women to the household and reduced their access to productive assets and opportunities, particularly access to and control of fishing grounds. The FGDs revealed that women in the study site fished in near shore/shallow waters such as mangrove forests and beaches close to their homes. Their fishing activities were limited to gleaning for shells and shellfish during low tide and fry gathering and fishing along mangrove areas.

The results of the survey affirm the findings in the FGDs. Out of the 305 persons (respondents and household members) engaged in fishing and related activities; women were found in their traditional roles as gleaners (83%) and fish vendors (67%) while men (88%)

dominated offshore fishing (Table 2). Gleaning and fish vending were perceived to be appropriate for women because these were considered lighter and less risky than offshore fishing. Moreover, women's fishing grounds are also conveniently located near their homes so they can still attend to household chores making their fishing activity an extension of their reproductive role.

Table 2. Frequency and percentage distribution of survey respondents and their household members engaged in fishing by sex and fishing activity, Guimaras, Philippines, 2008.

	Male	%	Female	%	Total	%
Fishing	143	88	19*	12	162	100
Gleaning	21	17	101	83	122	100
Fish vending	7	33	14	67	21	100
Total	171	56	134	44	305	100

*Women assisting husband when the young male family member (usually the son) is absent.

Because women could not leave their homes, they had to contend with marginal fishing grounds that produced limited and less valuable fish species. The shells that they gathered from the shorelines commanded a much lower price in the market compared to the species in the men's fish catch. This translated to lower average daily fishing income for women at PhP 67.2 (USD 1.60 at exchange rate: USD 1 = PhP 42.00) compared to the PhP 185 (USD 4.41) daily earnings of men.

The income gap created a perception in the community, including among female fishers, that women's fishing activities were inferior to the "main" fishing activities of men. Most women fishers did not even place monetary value on their catch believing that it was too small, only of subsistence value and does not generate any monetary contribution to the household. They did not to take into account however, that a big part of their family's food intake came from their fish catch.

The difference in men's and women's daily fishing incomes can be attributed to the latter's multiple burdened situations. Women perform numerous and varied tasks everyday by doing both reproductive (household maintenance) and productive (income-earning) work. Women generally have lesser time to fish and therefore earn a much smaller daily income.

The male-female fishing income-gap worsened women's marginalised position in the fishery as it gave the impression that male fishers were better income earners than their female counterparts. The gap however was based on daily income accounting and therefore was not reflective of the actual value of time spent on fishing. Women's daily fishing income was much lower compared to that of men but the disparity becomes insignificant when earnings are expressed hourly. Men spent an average 5.86 fishing hours every day while women's mean fishing time was only 2.18 h. Expressing fishing income on an hourly basis, the male-female income the gap was negligible at USD 0.75 for men and USD 0.73 for women.

Despite the dominance of women fishers in shallow waters, access and control was not exclusive to them. Hence, men had access to these fishing grounds as they were also found fishing alongside women and children in these areas. The men on the other hand, had full dominance over

the more productive fishing grounds offshore. Unlike the shallow waters, offshore fishing grounds are more difficult to reach hence access and control goes only to those with fishing vessels. Since women typically do not own boats, they are unable to enter offshore fishing, leaving these grounds exclusive to male fishers.

Table 3. Average hourly and daily fishing income of respondents and their family members engaged in fishing by sex, Guimaras, Philippines, 2008.

	Men	**Women**
Average daily fishing income (in USD)	4.41	1.6
Average daily fishing hours (h)	5.86	2.18
Average hourly fishing income (in USD)	0.75	0.73

Source: Survey data.

It is not only in the fishery that coastal women in Guimaras were marginalised. They also experienced the same discrimination when it came to alternative livelihoods, especially those that utilised natural resources such as agricultural lands and forests. Agriculture and agricultural labour were the most common alternative income sources of the fishing households included in the study. Like in the fishery, women were also marginalised in the agricultural sector. Men were engaged in farming activities as hired labourers during planting and harvesting season. Their tasks, e.g. ploughing, were considered as major work as these are more arduous compared to the ones delegated to women. The latter were only hired for minor and lighter jobs such as weeding or harvesting. Hence, there were more male than female agricultural labourers. Another source of livelihood in the area was charcoal making. This livelihood was dependent on the forest for raw materials and was considered a strenuous task. Hence, just like fishing and agricultural labour, it was also predominantly a male activity.

Effect of the oil spill

The oil spill heavily affected the fishery sector more than any livelihood in Guimaras. Fishing activities were disrupted and households were left without their main source of income. Within the fishery however, the impact of the oil spill was much severe on women than on men. Women fishers were more vulnerable due to the relatively higher exposure of their livelihood to the oil spill. They were also more disaster sensitive owing to their subordinate position in the fishery and they lacked adaptive capacity because, as keepers of the household, they had limited alternative livelihood options.

The oil spill severely affected the shorelines, shallow waters and mangrove areas where women conducted their fishing activities (Fig. 2). Tidal action deposited oil along the shores, which made these areas not viable for fishing. Gleaning and shallow water fishing completely stopped for several months, leaving women fishers without any income during the period. Fish vending, a female-dominated activity, was also discontinued because of the stigma that fish from the island were contaminated with harmful chemicals.

The oil spill further exacerbated women's marginalised condition because the disruption in their fishing activities was longer. Clean up operations took time because of the large amount of

oil to be removed and the preference of authorities for the less environmentally destructive manual clean up method. Thus shallow water fishing and gleaning did not resume immediately unlike capture fishing. The men were able to return to their fishing activity and began to earn a living earlier than women.

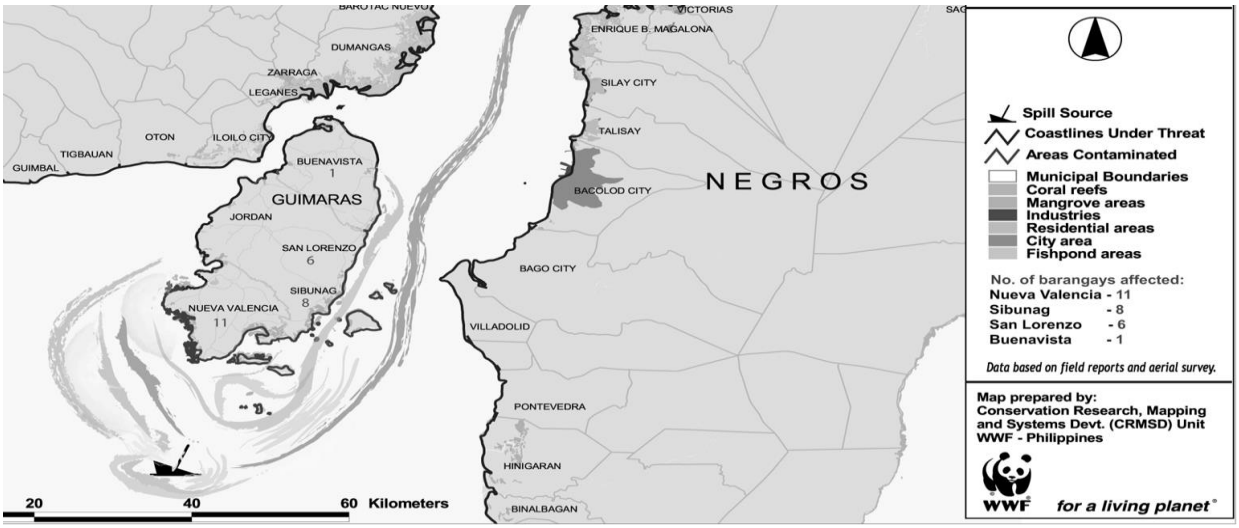

Fig. 2. Map of oil spill affected areas in Guimaras.
Source: http://www.upv.edu.ph/oilspill/images/wwf_map.jpg.

The effects of the oil spill on women fishers was not only longer and more severe, but their recovery from these impacts was also more difficult. This can be attributed to the male dominated alternative livelihoods in agriculture and forestry that left women fishers with limited options. Thus, it was harder for them to secure work in farms or exploit forest resources. Moreover, women's recovery from disasters can also be seriously hindered by their household responsibilities because these conflict with income-generating work (Enarson 2000). This was also true for the respondents of the study. While men easily migrated to other places to find employment, women's responsibility in the household prevented them from actively seeking alternative sources of income in other towns within or outside of Guimaras.

Economic marginalisation after the oil spill

In response to the disaster, the government carried out relief operations by distributing food, medicines and other basic necessities to address the immediate needs of affected families. Alternative income sources through temporary cash-for-work, including oil spill clean-up and minor construction work were provided to augment family income and prevent food insecurity. Government agencies and NGOs initiated livelihood projects such as community vegetable gardening and food processing. The oil spill affected fishers also received reparation from the International Oil Pollution Compensation Funds (IOPC Funds) for their damaged gears.

The post oil spill economic assistance from various organisations was generally perceived to have delivered benefits to affected families. These benefits however were unequally distributed, with women getting the lesser share. Similar to findings in post disaster reconstruction studies such as those after the 2004 Indian Ocean Tsunami (Akerkar 2008; Chew and Ramdas 2005) and the 2005 Hurricane Katrina (Weber and Mesias 2012), the institutional responses after the oil spill

disregarded gender specific concerns which consequently lessened women's access to economic benefits and worsened their already marginalised condition.

Relief goods for the affected households were each distributed through the head of the family. The manner of distribution is a typical "one size fits all" strategy that out rightly disregarded individual differences and specific needs of men and women.

The problem with channelling assistance intended for the whole family through the household head became more pronounced in the allocation of economic benefits. Since women were not seen as income earners and productive members of the family, their share of the economic benefits was subsumed under that of their husbands. Data from the provincial government show that the oil spill livelihood assistance projects through the traditional allocation method marginalised women. A total of 65 projects (Table 4) for the affected families were implemented at the time of the research; more than half of these (38 or 58.5%) were vegetable production, about 15 or 23% were construction work, 10 or 15.4% clean and green projects and the rest were animal dispersal (1.5%) and food processing (1.5%). Almost all (97%) of the livelihood assistance projects fall under the first three categories.

Table 4. Types and number of projects for oil spill affected families, Guimaras, Philippines, 2008.

Projects	Number	Percentage
Clean & Green	10	15.4
Vegetable Production	38	58.5
Construction	15	23.1
Animal Dispersal (chicken)	1	1.5
Food Processing	1	1.5
Total	65	100.0

Source of data: Province of Guimaras, Iloilo, Philippines.

Gender disaggregated data (Table 5) of beneficiaries from all oil-spill affected communities showed not only economic marginalisation but also gendered division of labour. Notably, there were more male beneficiaries of projects that are considered masculine, e.g. construction work; while women were the major recipients of stereotypically female projects such as food processing. Unfortunately, the male dominated type of livelihoods had the highest number of projects (63 out of 65) implemented. Consequently, more men (64%) than women (36%) benefitted from post oil spill livelihood assistance.

The respondents of the study experienced the same marginalisation particularly in the cash-for-work and compensation of damages. From the 175 households included in the survey, 239 household members were recipients of livelihood assistance, cash for work and damage compensation. The number of male beneficiaries (70%) was also higher than the female beneficiaries (30%).

Table 5. Frequency and percentage distribution of male and female beneficiaries of government assistance program by type of project, Guimaras, Philippines, 2008.

Project	No. of projects	Male	%	Female	%	Total
Clean & Green Program	7	79	75	26	25	105
Vegetable Prod	24	218	57	166	43	384
Construction	7	105	91	11	9	116
Animal Dispersal	1	2	11	16	89	18
Food Processing	1	7	32	15	68	22
Total	40	411	64	234	36	645

Source of data: Province of Guimaras, Iloilo, Philippines.

The cash-for-work program involved manual clean-up operations in the oil spill area. Only affected male fishers were allowed in the cash for work to provide them with temporary employment until fishing resumes. Women, on the other hand were initially not allowed to participate because it was assumed that they could not tackle the labour involved. Excerpts from the FGDs reveal such bias against women.

"Sang primero indi gid man kasulod ang bayi sa first batch sang clean up. Puro lang laki kay mabug-at ang ubra. Bug-at bala maghakwat sang mga dalagku nga butang….bug-at na ipahigad ang mga kahoy kag steel... ginapanulod pa na sa sako…ginapala pa ang mga baras" [In the beginning, women were not allowed in the first batch of workers (to participate in the oil spill clean-up), only men because of the heavy workload……It is heavy to lift big things…it is heavy to put steel and fallen trees on the side…they had to put them in sacks too… the oiled sand had to be removed as well.]

- Woman fisher and FGD participant

Table 6. Frequency and percentage distribution of respondent beneficiaries of selected oil spill assistance projects, by project, sex and amount, Guimaras, Philippines, 2008.

Assistance	Male	%	Average amount (USD)	Female	%	Average amount (USD)	Total beneficiaries	Total %
Livelihood	4	33	16	8	67	17	12	100
Compensation	108	75	316	36	25	195	144	100
Cash for work	55	66	136	28	34	106	83	100
Total	167			72			239	

Source: Survey data.

The women however insisted that they be permitted as clean-up workers. Some of them were allowed eventually but only for a limited number of days or as substitute for an absent male family member. Although men and women earned the same daily wage, women had lesser work days due to the discrimination. Thus when total monetary compensation was accounted for over the whole duration of the cash for work program, women received a much lesser amount compared to that received by their male counterparts.

The disparity in the economic benefits received by men and women affected by the oil spill was highest in the compensation for damages (Table 6) because these payments were based on daily fishing income and damaged fishing equipment. Since men earn more than women on a daily basis they also received higher compensation. The inequality was compounded by the difference in the value of fishing assets. Men used fishing gears (e.g. boats and nets) that were more expensive than the simple tools (containers and trowel/digging tool) utilised by women thus they were able to demand higher damage fees. On the average men received USD 316 (PhP 13,272) while women got only USD 195 (PhP 8,190). The disparity in their average compensation amounted to USD 121 (PhP 5,182), a figure that is much higher than average monthly per capita income (USD 68.6 or PhP 2,880) in the province of Guimaras. The inequality extended further to the number of beneficiaries of damage payments, as there were more men (75%) than women (25%) recipients.

Summary, Conclusion and Recommendations

The Solar I oil spill adversely affected the fishing communities of Guimaras but its economic impacts were more pronounced among women than men. Moreover, the post-oil spill institutional interventions for relief and rehabilitation did little to improve the women's situation.

The economic marginalisation suffered by women fishers after the oil spill is traceable to their already economically marginalised situation prior to the oil spill. This manifested in their lack of access and control over productive fishing grounds, lower daily income due to multiple burdens, and subordinate position in the fishery because of the gender division of labour.

The oil spill further worsened the marginalised condition of women because of their highly exposed fishing grounds. The disruption in their fishing activity was also longer due to the tedious manual clean-up operations. Household tasks also prevented them from seeking employment that would have reduced their economic burden. Moreover, the institutional interventions that predominantly preferred men pushed them even further into the margins through the unequal sharing of economic benefits from the projects that largely favoured men.

The results of the study affirm the findings in existing literature that disasters affect women more than men. The study concludes that in a highly gender biased society, the pre-existing biases against women, economic marginalisation in particular, are magnified and intensified during and after disasters due to their more vulnerable situation aggravated by post-disaster institutional interventions that are blatantly inclined towards men.

The research highlights the importance of using a gender perspective in analysing economic impacts of disasters as well as in designing relief and rehabilitation interventions. A participatory gender needs assessment may be useful in addressing the specific concerns of men, women, boys, girls and the elderly for gender fair relief operations. As for post disaster rehabilitation such as livelihood provision, institutions should have a clear understanding of community social norms specially the roles assigned to men and women to avoid the discrimination of any vulnerable group. Moreover, the allocation or distribution of economic benefits to affected communities can be carried out equitably through gender sensitive targeting of beneficiaries. This entails clear analysis

of economic and social gender vulnerabilities or the identification of areas or pathways where gender discrimination is present such as decision-making power, household and community roles, mobility issues, access and control over resources and spheres of economic activity of men and women.

Without the gender lens, the real economic impacts of the oil spill on coastal women's lives would not have been uncovered and understood. Thus valuation of impacts of disasters must incorporate a gender analytical framework to truly account for the true social loss of these disasters.

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Short Communication

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Do Adaptation and Coping Mechanisms to Extreme Climate Events Differ by Gender? The Case of Flood-Affected Households in Dumangas, Iloilo, Philippines

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Abstract

This study was conducted to identify and analyse gender-differentiated adaptation measures and coping mechanisms formulated and implemented by households during Typhoon Frank (international name *Fengshen*), in barangays Cayos and Bantud Fabrica, Municipality of Dumangas, in the Province of Iloilo, Philippines. The survey was conducted among 120 respondents who were randomly selected from the barangay local government unit. Key informant interviews, focus group discussions and secondary sources were also used to supplement information obtained from the household surveys. Results show that although women and men worked in complementary ways to secure their family assets, gender differences were observed in their preferred adaptation and coping responses. However, statistical analysis shows no significant difference in the responses of women and men relative to the flooding.

Introduction

The geographical location of the Philippines makes it one of the countries that is prone to various climatic hazards, particularly typhoons. An average of 20 typhoons enter the Philippines Area of Responsibility (PAR) annually (Casals 2013). In 2008, eight tropical cyclones affected 98 provinces in the Philippines resulting in a total damage amounting to almost PhP 20 billion (USD 1 = PhP 41) in agriculture and infrastructure (Republic of the Philippines 2009). Of the eight tropical cyclones, Typhoon Frank (international code *Fengshen)* caused the worst flooding in Western Visayas (Burgos 2010) and registered the maximum damage nationwide with more than PhP 13.5 billion (Republic of the Philippines 2009). The worst hit were the provinces of Iloilo, Aklan, Capiz and Antique (IFRCRCS 2008).

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The severity of impacts of these catastrophic events required integrated relief and rehabilitation effort across the regions. More recently, there has been an upsurge in interest and concern about adaptation linked to current climate variability and the context has been broadened to include other environmental and social stressors and changes in socio-economic conditions and sustainable development (UNFCCC 2008). Adaptation at an accelerated and more targeted pace is seen as critical for the secure development of vulnerable populations, taking into account the adaptation strategies, the differences between men's and women's vulnerabilities and resources for it to succeed (FAO 2008).

This study attempts to fill in some of the knowledge gaps that are obstacles to achieving adaptation by providing gender perspectives in the adaptation and coping strategies of coastal communities in response to Typhoon Frank and the consequent flooding that occurred in 2008 in Dumangas, Iloilo, Philippines. The objective was to identify and analyse gender-differentiated adaptation measures and coping mechanisms formulated and implemented by households to mitigate the impacts of flooding. In this study, *adaptation* is defined as the change in activities to become suitable to a certain situation, usually oriented towards the long-term while *coping* refers to short-term and immediate activities oriented towards survival.

Materials and Methods

A total of 120 households (60 per barangay) were randomly selected from the household list obtained from the barangay[†] local government unit (BLGU) in Cayos and Bantud Fabrica in Dumangas, Iloilo. The household survey instrument (adopted from Predo et al. 2009) captured information on the demographic and socio-economic characteristics of the sampled households, their awareness, perception and preparedness on climate-induced hazards and their adaptation strategies and coping mechanisms to recover and mitigate impacts of previous and future disasters. Focus group discussions (FGD) on the changes in the gender roles within and outside the households, before and after the typhoon and flooding, was also carried out. Key informant interviews (KII) and secondary sources were used to supplement information obtained from the household surveys. Statistical tools (mean, standard deviation, frequency distribution, Mann-Whitney 2-tailed test) were employed to describe, analyse and summarise the data obtained.

Results

Dumangas is a third class[‡] municipality in the south-east part of Panay Island, Philippines which is composed of 45 barangays, 17 of which are along the coast. It is basically a farming and fishing community with a significant portion of its land allocated for agriculture (48%) and aquaculture (35%) activities. Jalaur River is the major source of irrigation water for Dumangas and three other municipalities. Cayos and Bantud Fabrica (Fig. 1) are two adjacent barangays located at 7 and 8.5 km, respectively, from the town center. These areas are largely coastal and

[†]The *barangay* is the basic administrative unit in the Philippines and it serves as the primary planning and implementing unit of government policies, plans, programs, projects, and activities in the community.

[‡] Municipalities in the Philippines are classified according to the average annual income of the local units. A third class municipality like Dumangas obtains average total revenue of PhP 1 million or more but less than PhP 1.5 million per annum.

estuarine and are heavily dependent on fishing and aquaculture. However the predominant livelihood activities of the respondents were casual labour (18.3%), agriculture (17.5%) and fishing/fishing-related (11.7%).

The majority of the respondents were females (54%), married (79%) and belonged to 21-60 years old age group. Twenty-five percent of the women respondents were household heads and 48 (75%) were dependents (wives, or sister in one case). Twenty-one percent of the women were into farming while 20% of the men were engaged in casual labour. The average monthly income of the respondents was PhP 3,512 (~USD 1028 annually). The respondents have been residents of the area for an average of 36 years.

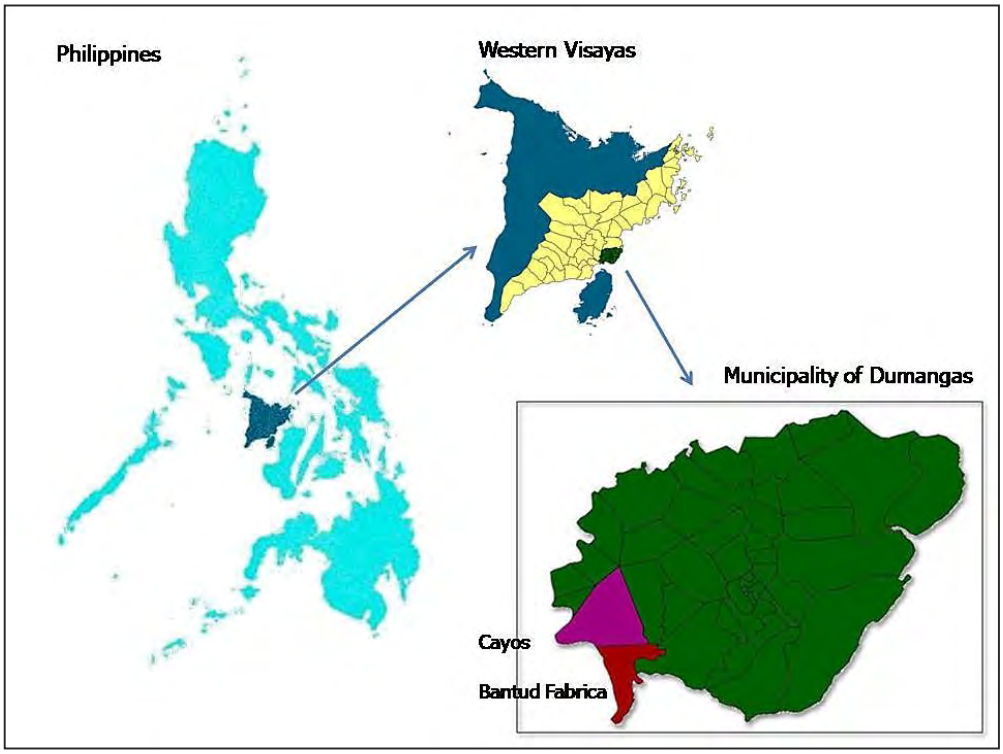

Fig.1.The study sites: Barangays Cayos and Bantud Fabrica, Dumangas, Iloilo, Philippines. Source: www.philgis.org.

Fifty nine percent of the households in Cayos and 81% in Bantud Fabrica were heavily affected by the flood brought about by Typhoon Frank (Municipality of Dumangas, unpubl. data).

As adaptation strategies, more than 20% of the women and men respondents cited strengthening of dwelling units and transfer of household members to evacuation area. On the other hand, more women than men did tree planting (19% and 11% respectively) (Table 1).

Getting a loan to meet immediate needs was the coping mechanism (Table 2) most cited by both female and male respondents (21%), and women respondents (22%) were more likely to seek financial assistance from money lenders compared to the men (13%). Other coping mechanisms cited include adjustments in meals (1-2 meals instead of 3 meals a day) and restructuring diets (respondents eat root crops, banana, etc. as alternate to rice) adjustment. Livelihood/income diversification was another notable coping mechanism identified by the respondents (Table 3).

Table 1. Adaptation measures implemented by respondents after the flooding, Dumangas, Iloilo, 2009.

Do households have any adaptation measures?	**Female**	**Male**	**All**
Yes	50 (76.9)	44 (80.0)	94 (78.3)
No	15 (23.1)	11 (20.0)	26 (21.7)
Total	65 (100.0)	55 (100.0)	120 (100.0)
Variable			n
Restructuring/strengthening dwelling units or house	18 (27.7)	11 (20.0)	29 (24.2)
Transfer household members to evacuation area	14 (21.5)	13 (23.7)	27 (22.5)
Planting more trees	12 (18.5)	6 (10.9)	18 (15.0)
Relocating to safe place permanently	4 (6.2)	7 (12.7)	11 (9.2)
Change livelihood or income sources	4 (6.2)	6 (10.9)	10 (8.3)
Praying/trusting in God	3 (4.6)	2 (3.6)	5 (4.2)
Prepare important things/belongings	3 (4.6)	1 (1.8)	4 (3.3)
Improving dike/canal system in the community	0 (0.0)	3 (5.5)	3 (2.5)
Being alert always	0 (0.0)	3 (5.5)	3 (2.5)

Almost three times more men (15%) go for fishing for income than women (5%) whereas more women (6%) than men (4%) did small businesses. Farming (41%) and backyard livestock raising (26%) are the primary income strategies adopted by both women and men respondents.

Table 2. Coping mechanisms reported by respondents, Dumangas, Iloilo, 2009.

Variable	**Female**	**Male**	**All**
Got loan from relatives or friends	11 (16.9)	14 (25.4)	25 (20.8)
Got loan from money lender	14 (21.5)	7 (12.7)	21 (17.5)
Through hard work	10 (15.4)	12 (21.8)	22 (18.3)
Resorting to other income sources	6 (9.2)	7 (12.7)	13 (9.2)
Selling livestock	6 (9.2)	3 (5.5)	9 (7.5)
Asking assistance from parents/relatives	2 (3.1)	5 (9.1)	7 (4.9)
Asking assistance from children	5 (7.7)	1 (1.8)	6 (5.0)

FGD results show that women were more engaged in the household chores compared to the men. The daily routine of both women and men respondents were disrupted by the typhoon and the resulting flood. Statistical analysis shows no significant difference in the adaptation ($p=0.090$) and coping ($p=0.635$) mechanisms employed by women and men respondents.

Table 3. Common livelihood and income strategies adopted, after the flooding, by the respondents, Dumangas, Iloilo, 2009.

Do you have other income source/s?	**Females**	**Males**	**All**
Yes	61 (93.8)	51 (92.7)	112 (93.3)
No	4 (6.2)	4 (7.3)	19 (15.8)
Total	65 (100.0)	55 (100.0)	120 (100.0)
Other income source/s			
Farming	26 (40.0)	23 (41.8)	49 (40.8)
Livestock raising	17 (26.2)	14 (25.5)	31 (25.8)
Employee	7 (10.8)	8 (14.5)	15 (12.5)
Casual labour (*pamugon*)	7 (10.8)	4 (7.3)	11 (9.2)
Fishing/fishing-related	3 (4.6)	8 (14.5)	11 (9.2)
Business-related (i.e. *sari-sari* store, food vending)	4 (6.2)	2 (3.6)	6 (5.0)
Carpentry	0 (0.0)	3 (5.5)	3 (2.5)

Discussion

Typhoon Frank that ravaged the Iloilo province in the Philippines in 2008 caused huge economic losses. The amount of damage reported by the respondents was approximately 14% of the average annual household income in the area. The Asia Disaster Preparedness Center (ADPC 2003) estimated a 75-100% financial loss in fishing and agriculture communities traversed by the Jalaur River due to the frequent occurrence of climate-induced hazards. Among these communities are Cayos and Bantud Fabrica (DENR-MGB VI 2012).

Results of this study show that there is no out-migration in the study sites, only in-migration, which is contradictory to the study by Barrameda (2010) which states that the risk of natural disaster and pressure for survival causes out-migration. It was noted however, that some respondents were engaged in *pamugon,* which means to work for a daily wage in other places, usually in nearby towns. It includes a variety of services (usually in a rice or sugarcane farm) such as planting of seedlings, broadcasting of seeds, weeding, tilling of land, fertilizer application, *pamatdan* (cutting sugarcane tops as planting material), harvesting, etc. *Pamugon* is usually associated with agriculture, rather than other livelihood activities like fishing, because those who engage in *pamugon* are contracted as labour on a per hectare of land basis hence, remuneration is more certain as compared to fishing, wherein operations are usually small-scale. But due to the temporary nature of the work, people who are engaged in *pamugon* return to their community when the work is done. This may be due to their adverse socio-economic situations, which, according to ADPC and FAO (2006) lead people to inhabit high risk areas and engage in unsustainable and dangerous livelihoods.

The respondents' average income (USD 1,030 annually) is only 68% of the average annual income of a poor Filipino household (USD 1,512 annually). This finding is not surprising as some of the respondents are either tenants of the farm they cultivate or caretaker/technician of the fish

pond they operate. Six out of the nine respondents involved in aquaculture were fish pond labourers and only 2 respondents said they operate their own fish ponds, but on a backyard scale (~0.15 ha).

Mobility is a key factor in accessing information such as weather forecasts and advisories. According to Abarquez and Murshed (2004), in many contexts, men are better connected with early warning mechanisms due to their movement in public space and access to formal and informal channels of communication. This is evident in this study also as men were more involved in coordinating with community leaders with respect to the announcements and weather forecasts. Women on the other hand, were focused in securing the household's physical and financial safety. Weather-related shocks exacerbate the seasonal and income gaps which are often bridged by loans from different sources with varying interests (ADPC 2003). This is affirmed by the respondents as lending groups served as good sources of credit for them in financing unexpected expenses such as house repairs, medical expenses, and purchase of seedlings.

Despite the occurrence of floods, economic activities in the area have not changed because the municipality largely depends on agriculture (second largest producer of rice in Iloilo) and fisheries (top producer of milkfish in Iloilo) for its revenue (Golez unpubl. data). This was also reflected in the choice of strategies with 49% falling back on agriculture and only 9.2% looking at fishing/fishing-related activities. The respondents' confidence is apparently drawn from their local leadership which intensified their disaster mitigation programs, and established the Dumangas Agro-Meteorological (Agromet) Station and Climate Field School (CFS) program, to enhance the capacity of extension workers and farmers to understand climate information and reduce risks in agriculture (Golez unpubl. data). Overall, in spite of the observed preferences of women and men respondents in their adaptation, coping and alternative livelihood choices, statistical analysis show no significant difference in their responses.

Conclusions and Recommendations

This study recognises that women and men can work in complementary ways in responding to the impacts of extreme events like typhoon and flooding. Although there is an observed preference in the adaptation, coping and alternative livelihood choices between women and men respondents in this study, statistical analysis show no significant difference in their responses.

The significant role of lending institutions in the aftermath of a calamity is particularly highlighted. The LGU of Dumangas should come up with appropriate mechanisms for providing credit to facilitate faster recovery in areas that frequently experience calamities. The local leadership also needs to revisit their recovery programs and ensure that most vulnerable groups are prioritised in the assistance allocation. Women's involvement in disaster risk reduction and management (DRRM) should be promoted through participation in training, seminars and conferences in relation to DRRM. Further, local leadership should adopt strategies that will enhance women's participation in increasing awareness and vulnerability assessment activities so that women will not be too reliant on men during disasters. On considering the future aspects of further studies in the area, adaptation strategies before the typhoon can be considered for an

effective comparison and also differences in tenure can also be incorporated. The study was, however, limited in its scope to understand the adaptation and coping mechanisms. The villagers engaged in other livelihood activities have also lead to the same biases in understanding of coping mechanism and adaptation strategies.

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Research Paper

What Does Feminist Methodology Contribute to Gender and Fisheries Science?

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Abstract

In this article I try to create a bridge between the methods and methodology of feminist approaches and those of biotechnical sciences as practised by the vast majority of researchers on gender in fisheries and aquaculture. In describing the history of feminist appropriation and development of social science methodology, I attempt to identify features of feminist approaches that would be useful to gender in fisheries and aquaculture research. I try to provide background for researchers new to qualitative research and to feminist approaches to understand the underlying issues and thus to develop research methods and methodologies that suit their particular field of work and which reflect their commitment to greater equality and recognition for gender issues in fishery and aquaculture research.

Introduction

Feminism is a difficult word; there are many definitions and it carries a heavy load of assumptions, many of them inaccurate or dated. My usage in this article is broad: it reflects an understanding that women are usually disadvantaged in relation to men, that inequality between men and women is disadvantageous to both, that gender i.e. the relations between men and women, are informed by unequal access to, and control over, power. A political dimension to feminism insists that women's rights should be protected and enhanced in the interests of a more equal world for all, and an intellectual element insists that an analysis of gender relations and women's experience should inform all social research. However feminist interest in fisheries and aquaculture is relatively recent. While feminist scholars, practitioners and activists have long been concerned with agriculture and especially with ecological issues, they have largely neglected studies of the marine environment including fisheries and aquaculture. Even feminists working in development and natural resource management have tended to ignore the sector, although some notable exceptions include Coward et al. 2000; Binkley 2002; Neis et al. 2005; Williams et al. 2005; Williams 2008; Biswas 2011. In the last few years, interest has surged, especially among researchers involved in "gender and…" research as illustrated by the growing number and types

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of papers presented at the Asian Fisheries Society Gender in Aquaculture and Fisheries (GAF) Symposia. These researchers are interested in introducing a feminist perspective into the traditional fields of marine studies. The majority of these new researchers do not come from backgrounds in feminist research or from social sciences but from backgrounds in biotechnical sciences and economics, especially in fisheries and aquaculture science. Trained in sciences such as biology and economics, they have carried out systematic and rigorous research in their particular areas of interest. When they become interested in gender, and particularly the lack of attention to gender in fisheries research, they tend to use the same methodology and methods that served them so well when they were studying fish, seaweed, aquaculture technology or peoples' incomes. The usual procedure is simply to apply the same methods that worked on the non-human species of previous studies, and to expect the same kind of precise and specific results that are available in applied scientific projects. All too often, the tools that scientific researchers have been using on fish or seaweed turn out not to work as well in social situations, and to produce results that, while accurate, are superficial in terms of understanding the social dynamics in a fishing community. Scientific researchers tend to frame their research in terms of hypotheses to test or models to apply, whereas social science researchers and especially feminist researchers begin by asking exploratory questions of the "why" kind. These two approaches lead to different methodologies and different methods. Scientific research has less of a tradition to think about the more philosophical and ethical dimensions of methodology, something that is central to understanding the claims and procedures of feminist methodology.

In recent years we have begun to understand that fisheries research is about the marine environment, including fish – but it is also about the women and men who harvest, process and consume fish, and the communities in which they live. It is this social dimension of fisheries research that feminist methodology can contribute to. Fisheries research today is going beyond its traditional focus on the science of fish and the marine environment and has begun to look at the entire chain of human activity associated with marine products and environments. We, therefore, find ourselves in an unusual situation where, in the absence of an established body of experienced feminist researchers in the field, biotechnical researchers with both knowledge and skills in the fields of research on fish and the marine environment are beginning to venture into social science research without the relevant background skills in either the theory or the methodology. As gifted researchers with a strong commitment to women's equality and gender justice, they are experiencing many of the same questions and dilemmas that faced feminist social science researchers when they began to invade the field of social sciences several decades ago. Despite the separation that currently exists between most feminist scholarship and fisheries science, a synergy does exist that is particularly relevant to the integration of gender concerns and feminist research methods into fisheries and aquaculture research projects.

This article constitutes an attempt to start the process of enabling biotechnical scientists who are interested in integrating gender concerns into their work to understand the background and potential of feminist methodology and methods. We need to begin by carefully distinguishing research 'methodology' from 'methods'. In this article I treat methodology as the theory of method. It asks questions such as: Why do we want to know? How will asking in particular ways

'create' different knowledge? How can we validate research by relying on different measures than the traditional ones? How we can rely on participants as co-creators of knowledge? In contrast, 'methods' is the nuts and bolts, how we actually carry out the research. It addresses questions such as how to carry out a qualitative interview or when to use biographical research. I will focus on feminist methodology, rather than on the specific methods feminists adopted or developed. In briefly describing the history of feminist scholarship as it developed in North America and Europe I hope to illustrate some of the dilemmas and theories that feminist scholars encountered on their way to developing theories and methodologies that were appropriate to their needs.

This discussion of the history of feminist methodology – from an "add women and stir" approach in the 1970s to the current debates about the relevance of postmodern theory will reflect some of the issues gender researchers in fisheries are encountering today and may help suggest the directions in which this research should go. One key point is the way in which feminist methodology has been seen as coterminous with qualitative methods. I suggest that this is rooted in political and ethical concerns about "women's experience" as a central and essential category of feminist research. This exploration of the core of feminist methodology will point us towards ways of making fisheries research more concerned with gender issues while avoiding the conflict between qualitative and quantitative approaches.

The origins of feminist methodology

The so-called "first wave" of feminism is generally seen as the struggle for the vote in various countries, including some in the economic South. First-wave feminists also took up other issues, such as women's access to and control over their fertility and poor working conditions in factories. A lull followed the first wave, although some campaigns and organisations continued, until the "second wave" of feminism began in the 1960s, mostly in countries of the economic north. This "wave" was both more radical than the first wave, and also much more theoretical, drawing heavily on the radical theory that was emerging to support the radical activity of those years. Thus the key texts in those early years were not focused on research on women and hardly mentioned methodology. The major texts and influences were all theoretical. Important thinkers who contributed to the new tradition of feminist theory, such as Friedan (1963), Millet (1970), Firestone (1971), Mitchell (1971), the French philosopher de Beauvoir (1949), (whose *Second Sex* pre-dated the later feminists by nearly 20 years), all tried to understand the difference between the sexes, where it had come from, why it led to inequality and oppression and whether that was inevitable. Very soon feminists wanted to examine their own data to support their arguments. They found that all the existing social science research although purportedly "gender neutral" was in fact carried out from men's perspective and was largely about men – or, worse, it was about "people" who lived male lives and had male perspectives. Studies that actually looked at women were scarce and tended to cover topics such as housework or motherhood (Luxton 1980). The generic "he" that supposedly included women took no account of the specificity of women's lives or perspectives. This situation of having virtually no useful research that could tell us how women actually lived their lives led to the first feminist methodology – the "add women and stir" approach, as it later became known (Oakley 1981). Feminist researchers simply looked at the (many) gaps in the research literature about women and went out to fill those gaps using the same methods and

approach that previous (mostly male) researchers had used. At the time, this work was very useful and certainly helped to round out the picture but it did not go nearly far enough and soon came up against feminist concerns that these methods did not provide the information we needed in the form in which we could use it. Nevertheless, there remain many areas of our knowledge about women in fisheries where this objective of simply filling the gaps is a useful starting point. We need the factual information about women's work to balance the "generic" work that supposes that all participants are male. Many of the papers at recent GAF symposia remind me of this stage in feminist research, especially those falling into the "Technical Papers" and "Short Reports" categories. These researchers, and many like them, are eager to focus on gender issues and to include women where they have been excluded. But the thinking behind their research remains caught in traditional scientific moulds and pre-conceptions. So, let us consider how feminists got from the "add women and stir" approach to more sophisticated and sensitive ways of doing research with women.

The quantitative versus qualitative methodology debate

At this point, we need to address the problem of the relative roles and value of quantitative versus qualitative research and especially the issue of the "validity" of qualitative research. This is a question that particularly bothers researchers coming from the "hard" sciences, with their predictable, well tested and straightforward processes for carrying out and validating practical research. It was an issue that challenged many feminist researchers trying to break away from standardised questionnaires, large samples and statistical data analysis in the early days of the development of feminist methodology. At first they attempted to carry out qualitative research in the same way as quantitative research. Researchers tried to ask more or less the same questions of all participants and to assemble the responses in coded categories, desperately trying to ensure that their results were "valid, reliable, verifiable and replicable" (Kirk and Miller 1986). Mostly it was not very convincing. Statistics do not work on very small samples (often fewer than 30 interviews), and other efforts to use hard scientific methods of verification seemed artificial and forced. This kind of presentation of qualitative work is still quite common but the most significant effort to create a free standing qualitative analysis with the same detail and significance as large data sets was the work of Lyn Richards and her team in developing first the NUDIST and then the NVivo computer program (Richards 1999). Richards lays emphasis on the ability of NVivo to help the researcher make connections between sets of interviews and to draw on those connections to theorise the data. While useful, the process is inevitably deductive rather than inductive, which is where the real strength of qualitative research lies.

In his admirably clear elucidation of the differences between and comparative strengths and weaknesses (and claims to validity) of quantitative and qualitative research, Bryman (1988) focused on seven characteristics of the two approaches: relationship between researcher and subject (sic), researcher's stance in relation to subject, research strategy, scope of findings, image of social reality and nature of data (Bryman 1988). In each case the two approaches are in stark contrast to each other, but Bryman argued that both were useful, both were valid and in conjunction, both could be used in social research. He also argued against seeing the two approaches as wholly different and located in different epistemological worlds, and tried to

describe a continuum of research strategies and philosophies, which uses both, as appropriate. Progress in understanding the relationship between the researcher and the people they interviewed can be measured by what they are called. At first, researchers adopted from science the dehumanising term "subject". Later they would refer to "interviewees." This term recognises that there is a relationship between "interviewer" and "interviewee" but still does not construct the "interviewee" as an active co-creator of the research interview. More recently researchers use the term "participant" in an effort to recognise the active nature of the role of the people we study in our research.

Despite Bryman's even handedness, I would argue that qualitative research is both more difficult to carry out, more demanding of a theoretical approach and less "certain" in its conclusions. Qualitative data simply does not give up its meaning as easily as the statistical results from a large data set. "Results" of qualitative research rest on the interpretation of experience as mediated through the voice of the participant. It depends on empathy and the ability to both identify with, and interpret, another's experience. It is demanding and time consuming and at the end, the researcher can only try to convince her audience that her interpretation of the data is the most likely one. After a long process of examining and analysing the data, the qualitative researcher must find ways to present the data so that the reader is convinced. Most times, this depends on the ability to find and use the most appropriate theoretical analysis of that particular data, and to present it convincingly. The quality of the theory and the way it interpenetrates the methodology have to be presented in logical but attractive ways to an often sceptical readership. Qualitative researchers are constantly searching for new and more powerful ways to present both their data and their arguments and recently have turned to a variety of visual, dramatic and audio means to convince their audiences.

How the experience of feminist researchers changed feminist methodology

As feminism took root in the economic North in the early 1970s, a generation of feminists began to insert themselves into the academic world. I was one of them, beginning my Ph.D. research in Industrial Sociology in 1970 under a male supervisor and in a department where all but one of the faculty were male. Quantitative methods ruled. What could not be counted had no scholarly validity. Like many other feminist graduate students at that time, I completed the obligatory courses in statistics and quantitative methodology but found them of no use at all when I began to design my own research, focusing on the experience and the political understanding of working class women. The chief tool of quantitative methods in Sociology was the structured interview with its carefully graded questions and the ability to insert the answers into codeable categories. Quantitative social research was built on this but also on the methods being developed in psychology, which, at the time, had a heavily positivist orientation. This orientation insisted that only "objective", codeable data was useful and that the results had to be verifiable, replicable etc. While we had not yet learned to challenge the positivist orientation on its own grounds, both the actual practice of the structured interview and the positivist theory behind it alienated feminists.

In my research, I was trying to understand the different ways in which women working in their homes developed a political understanding based on their daily experience and arguing that

it was just as valid as the ideas developed by their men folk working in factories, which led to "trade union consciousness". Thus, I had to spend time with both men and women, talk to them about their responses to issues and explore how they interpreted their own experience to mould their political views. Thus, I needed a qualitative approach. One possible choice was ethnography, which involved long term "immersion" in a particular community, was a respected approach in anthropology. There was a substantial literature of highly theoretical defences of ethnography, which argued that only such theoretically informed, long term study could reveal the underlying patterns in community life. But ethnography was less common in sociology and even rarer in related social sciences such as political science or economics. Some sociological ethnographic studies existed, especially in the form of "community studies", usually of bounded or isolated communities. But all these studies also depended on the traditional ethnographic tools of long, immersive participant observation, where two years in the field was considered the minimum. As feminists began to consider appropriate qualitative methods, many were attracted to the purity of ethnographic immersion, including a few by feminists such as Cole (1991) working in coastal communities. But few academics, and even fewer women academics, who often had children, had the freedom to live away from home for two years or more. However, feminists were arguing increasingly that qualitative approaches were key to understanding women's lives, because those lives did not fit into the boxes of male knowledge. Like many other feminist researchers I needed a methodology that fitted women's experience better. And note the appearance of the word "experience," which was to become so important in feminist debates.

During the 1970s feminist researchers turned increasingly to one method - the qualitative, semi- or unstructured interview. One of the key interventions in developing this approach as the main feminist method, was Ann Oakley's famous 1981 article "Interviewing Women: A Contradiction in Terms" (Oakley 1981). In this article, she argued that the emerging principles of feminist research were in clear contradiction with the prescribed methods of carrying out interviews which were a) one way – interviewer asks questions and interviewee answers, b) treatment of interviewee as objective "data," and c) impartial and objective stance taken by interviewer. Oakley described this as a masculine paradigm and emphasised how it is clearly not how women actually communicate with each other. Oakley raised several examples from her own research on mothering where the interviewee would ask her opinion or advice – in other words, would treat her as another woman. The text book advice for this is "if the informant asks a question, parry it,' or laugh it off with a head shaking gesture suggesting "that's a hard one". Oakley found that she could not simply refuse to answer such questions or pretend to be objective and uncaring when asked questions like – how will I breastfeed? will childbirth hurt? how will I cook for my baby, or refuse to respond when the interviewee asked for her own experiences – what was it like for you? (Oakley 1981). Many researchers into fisheries will have encountered the same problem – the closed box questions they are asking are clearly not fitting well with their participants' experience, but their methodology is not allowing them to move past the pre-ordained closed questions to explore further.

What Oakley and others were suggesting was that a feminist interviewing women is necessarily an "insider" in the exchange and ignoring that commonality is neither possible nor

ethical - nor likely to lead to good research. There was a growing realisation that something different was going on when women were researching women and especially when feminists, with a philosophy that refused to treat participants in research as "objects" researched women. This insight was also taken up in related areas of research such as biographical research. It is interesting to note that one of the pioneers of this approach, Paul Thompson, carried out his early work, focusing on gender relations, in two fishing communities in Scotland (Thompson 1983), thus pointing the way for our work today. Biographical and autobiographical research (e.g. Roberts 2002), including work by feminists (Steedman 1987) began to set the methodological bar very high in terms of sophisticated understandings of the interior nature of conversation. They insisted that what we say to each other is never simple, and is often coded in the sense of having multiple layers of meaning. These studies showed how superficial much "interview research" was.

Feminist methodology grows up

Meanwhile, feminist methodology was moving far beyond a defensive position and thinking quite differently about the nature of knowledge and especially feminist knowledge and how to use that in research. The new directions raised complex methodological, and philosophical, issues for all qualitative researchers, and early in the 1980s feminist methodology began to encounter some difficult problems, not only methodologically but also ethically. In such a brief article I cannot do justice to the full range of debates but simply indicate the parameters of some of the most important issues.

Early efforts to understand what might be different about feminist methodology drew a distinction between research *on* women and the way that replicates a male approach to research and research *for* women (Bowles and Klein 1983). One example of this new focus on research *for* women was carried out by a group of women in Germany who not only fought to get a women's shelter established but documented the experience collectively so as "to record a collective experience of women in our society which would lead to theories and strategies for change" (Bowles and Klein 1983). This research was an example of the ways in which feminist researchers were trying to break the boundaries between "researcher" and "researched", as well as that between academic research and practical activism. The commitment to research *for* women rapidly became the only legitimate criteria for feminist research; its identifying hallmark is that it leads to positive change for women. Thus the key, sometimes the only, question for feminist methodology to address was "how can feminist research be legitimate in these terms?" Feminists tended to ask not so much "how can we know?" as "how can we demonstrate that the research is legitimate?" which is not quite the same as "ethical," although that issue also became increasingly important to feminist researchers. Gender fishery researchers, most of whose research is practically and policy oriented will have no difficulty adapting their research to this requirement that it be useful for women and will lead to positive changes in their lives. But for social science researchers who had come from more highly theorised backgrounds, the demand that their research be not only theoretical but practical was often a challenge.

Another hallmark of feminist research is the involvement of feminist researchers as equals in the research process. This approach also begins to question the notion of scientific, absolute,

provable "truth" in scientific research. As Mies points out "we then realised that the truth of a person cannot be asked for, is not static but grows and develops over a lifetime" (Bowles and Klein 1983). This kind of discussion triggered the debate about the need for new methods for feminist research in order to be legitimate, not primarily in the eyes of established scientists, but in the eyes of other feminists.

Soon, such methodological thinking led to an argument about how far any qualitative feminist research could go. Liz Stanley and Sue Wise's book *Breaking Out* consisted of attacks on the ways in which feminist scholarship was developing in the late 1970s and early 1980s in North America and Europe (Stanley and Wise 1983). Their main argument was far-reaching. In *Breaking Out* and many other writings, e.g. "The knowing because experiencing subject" (Stanley 1993), they systematically demolished the legitimacy of most existing and emerging forms of feminist research. They did not do this on ethical grounds of inevitable exploitation and misrepresentation of the women being researched but because it is not possible to "know" in any real sense the experience of someone else, especially another woman. Their book, and their argument, ends, inevitably, with the "sample of one". They argue that the researcher can only truly "know" her own experience; that the particular combination of experiences that is "I" is the only one we can examine with true validity; that one cannot enter into another's experience and certainly cannot represent it to a reader or audience. In the end, they are confined to reflections, however theorised, of their own experience. There is a way in which this is instinctively "true," and any researcher, reflecting on how much she "knows" about herself, will see the contrast to the little she can ever hope to know about her research participants. But the limitations of this logical methodological approach are so great that most feminist researchers are simply not prepared to accept the consequences and abandon all research that is not confined to "the sample of one".

At the same time, feminists who were not white, European/North American and middle class were beginning to challenge the racist/classist and ethnocentric assumptions they saw in all the feminist research around them. These well-grounded critiques were first led by black Americans, such as Hooks (1990) and Collins (1990) but they were soon joined by others from the global South. The DAWN collective, led by Sen and Grown (1987) offered a summation from the perspective of Southern women, essentially arguing that the only valid research should be based on the experience of, and carried out by poor women, although the DAWN collective was, of course, composed of articulate and well educated women. Later, Indian feminists were in the fore of looking at the impact of colonialism on the way the world was understood and theorised and responded with an articulation of "post-colonial" theory (Narayan and Harding 2000). While much of this writing is highly theoretical and takes little account of actual, practical research on the ground, the central questioning of the hegemony of western thought is extremely valuable in freeing researchers in the global South from the bounds of "western" or established ways of thinking and practice. It allows feminist researchers on fisheries to develop approaches and theories that suit the data as they find it, rather than as the texts tell them they ought to find it. This insight is also applicable at more mundane levels. For example, methodology for community studies derived from Northern textbooks tend to impose particular understandings of "household" derived from dominant practices in Northern countries. But households in many cultures have very

different and fluid forms; may not have a resident, male, "head of household", marriage may mean different things, or be polygamous. Unless researchers, especially feminist researchers, are basing their work on a locally informed understanding of culture and society, their research is likely to be flawed and to reflect an imposed set of foreign norms on the study.

Dorothy Smith's core insight was that her research "proceeds by taking this experience of mine, this experience of other women...and asking how it is organised, how it is determined, what the social relations are which generate it" (Smith 1987). Her approach managed to keep the emphasis on experience and the detailed examination of it without making impossible demands of the feminist researcher. Smith's work is closely associated with a body of literature that developed "standpoint" theory (Hartsock 1998). The advantage of standpoint theory was that it justified and elaborated a position that recognised the category of "experience" without being totally limited by it. However it inherently prioritised and gave greater credibility to the standpoint of the disadvantaged. Harding (1987) began by arguing that women's standpoint was preferable to that of men because they could see both their own position and that of the dominant males – a perspective that is at the heart of standpoint theory. But as the gradations got finer and finer this theory too returned to the "sample of one" position. Standpoint theorists asserted that the researcher could legitimately speak about her own experience, about those who had more power than her in the social structure, but not those in subordinate positions. In other words standpoint theory allows the researcher to talk about oppression but not about the experience of the oppressor. Standpoint theory thus makes "studying up," i.e. studying those who hold power in society very difficult, and I would argue that this is dangerous because it removes from critical consideration the structures of power and the actions of the most powerful in society. Nevertheless, it is a valuable approach in entering into and validating the perspective of poor women in poor communities and provides these women with a legitimate "voice" in the research agenda. It also imposes on feminist researchers the obligation to seek out and truly listen to the poorest women in the communities they study.

Is it feminist methodology or simply good methodology?

By the mid-1980s, feminist methodology included highly theoretical debates that challenged all forms of existing research and, indeed, was in some danger of paralysing the actual research work of all feminist researchers. But a more practical strand also developed, and especially from those feminists committed to social change and empowering women. These feminisms trod a delicate line between trying to incorporate the kind of theoretical concerns I have outlined above and developing practical, useful and legitimate research projects. They remained suspicious about how the still prevailing quantitative research was done and kept up a constant barrage of criticism about unquestioned categories and assumptions imported into supposedly "neutral" research. However, they also accepted, as gender and fisheries researchers accept today, that large scale collection of quantitative data had its uses, provided it was used in conjunction with qualitative projects, which were based on necessarily small samples, and that the legitimacy of those small scale projects was also recognised. Meanwhile, feminist researchers were still constantly searching for qualitative methods wherever they could find them and re-shaping them according to the developing feminist principles of research.

One of the most comprehensive, and quoted, efforts to document how feminist methods should look was Shulamit Reinharz *Feminist Methods in Social Research* (Reinharz 1992). Her comprehensive account accepts both diversity and a continuity of feminist approaches – which is why she proceeds by showing how feminists have used a variety of methods, including quantitative ones, in a variety of ways but all with an identifiable feminist purpose. Feminist methodology in her view "is the sum of feminist research methods". However, despite covering in textbook fullness all the possible methods she ends by insisting that "Feminism is a perspective, not a research method; feminists use a multiplicity of research methods, feminist research involves ongoing criticism of non-feminist approaches and feminist research is guided by feminist theory" (Reinharz 1992). Indeed, towards the very end of her book she writes about the involvement of the researcher as a person – usually a woman – as a key ingredient of feminist research.

All these approaches were taken up by different researchers and during the 1990s a formidable body of feminist research existed on a wide diversity of topics and using all the methods I have mentioned, and many more. Exceptions, however, existed. Feminist concerns took much longer to penetrate traditionally male fields, and that included aquaculture and fisheries sciences. Even geographers found themselves isolated and feminist political scientists formed a small band of determined scholars, eventually forming their own scholarly journal to publish their work (*Feminist Journal of Politics*). But meanwhile, the matter of the principles and issues of feminist methodology were still not settled. I will briefly describe two of these debates although there were, and continue to be, many others.

How can we bring theory and practice together?

a. The issue of ethical accommodation

As feminist thinking about the work they were doing became more nuanced and complex they began to run into increasingly difficult issues, in particular around feminist ethics. I will describe the debate between Judith Stacey and Elizabeth Wheatley in the pages of *Women's Studies International Forum* (1988; 1994) because it illustrates some of the conundrums feminist researchers were encountering during the late 1980s and the arguments they were having. The issues that Stacey raised initially reflected common concerns at the time – that the actual practice of feminist methodology did not match the ideals and that the problems that occur are often worse than we imagined.

Like many other feminist researchers, Stacey began her research armed with a commitment to "an integrative transdisciplinary approach to knowledge which grounds theory contextually in the concrete realm of women's everyday lives". The "actual experience and language of women is the central agenda for feminist social science and scholarship" (Stacey 1988). In practice she found things were more difficult. As she developed close research relationships with her participants, that very closeness opened the way to more exploitation. She was being provided with knowledge that, if she published it, would enhance her academic reputation but could well damage her participant. This issue is often raised when feminist researchers discover details of personal experience, such as transgressive sexuality or a pattern of domestic violence, which the

participant does not want revealed. She also noted that while she worked hard to develop an equal and collaborative relationship with her participants it was she, as the academic researcher, who had control over the final product. Particularly in these difficult cases, feminist researchers need clear and careful understandings of the feminist ethical obligations to their participants – something which is often not covered in standard ethics procedures or consent forms.

As Stacey concludes her discussion of a particular case in which after many months her participant did not want her to publish certain details of her personal life. "What feminist ethical principles can I invoke to guide me here? Principles of respect for research subjects and for a collaborative, egalitarian research relationship would suggest compliance but this forces me…to consciously distort what I consider a crucial component of the ethnographic "truth" in my study. Whatever we decide, my ethnography will betray a feminist principle" (Stacey 1988). Stacey's angst resonated with many feminists grappling with trying to produce a feminist methodology, especially one focused on qualitative ethnographical practices. However, Wheatley, saw things differently. She saw Stacey's dilemma not as a rebuttal of feminist methodology but as "a potential site for engendering ethnology (or ethnography) with feminist sensibilities" (Wheatley 1994a), in other words she is not claiming ethnography as a feminist method but is claiming that feminist approaches can improve and enrich already established methods. Later in the debate, Wheatley moves into a more theoretical realm, discussing how "various versions of feminist theory or politics focus and frame our gazes in particular ways" (Wheatley 1994b) which, in turn allows us to challenge categories and oppositions that are normally taken for granted – including those that distinguish between men and women.

Stacey's and Wheatley's positions reflect the real divide between highly theoretical feminists pushing the boundaries of knowledge and more practically inclined feminist researchers trying to carry out their work in the most sensitive and ethical way possible. New and emerging research in the field of gender and fisheries will also have to engage in these issues as they move into conducting more in-depth interviews and involving their participants in both the process and the outcome of their research.

b. The issue of political engagement

The second issue also represents a disagreement between feminist methodologists. Postmodern theory emerged first in the area of literary and critical studies (in the form of post structuralism) and has been taken up with enthusiasm in the social sciences. It is a complex field but suffice for this discussion to say that it challenges many of the things we take for granted as the "meta-narratives" that depend on an essentially 18th century rational view of the world. Instead postmodern scholars challenge us to question all the seemingly obvious categories of our experience – including our understanding of gender. As an approach it has been valuable in questioning all kinds of taken-for-granted assumptions we make about our world, and especially our social world. Feminists, especially those inclined to highly theoretical and abstract work, such as Judith Butler (Butler 1993) have challenged and "complicated" much of what we thought we knew, especially about sexuality.

However, I would argue that its impact on the kind of feminist research we have been discussing is much more problematic, and, I would suggest, it is even more of a problem for the kind of engaged research on gender and aquaculture and fisheries we are aiming to encourage. Some scholars argue that postmodernism in and of itself is antipathetic to the kinds of activist, politically inspired, community based, research that had emerged as the dominant paradigm of feminist research.

Martha Nussbaum is a well-respected feminist philosopher who has concerns about the rise of fashionable postmodernism. Working with the economist Amartya Sen on issues of development and using extensive work in India, she sees the danger coming from a related angle, asserting that the basic tendency of postmodern thought is leading to a failure to engage with the real issues facing real women. In her article in *The New Republic* (Nussbaum 1999) she associates feminism at its heart with "the practical struggle to achieve justice and equality for women", a struggle with which many gender and fisheries researchers identify. Nussbaum singles out Indian feminists, in particular, as holding to this ideal. In contrast she is profoundly unhappy with a trend she sees among young feminist researchers in North America, where she claims that there is "the virtually complete turning from the material side of life toward a type of verbal and symbolic politics that makes only the flimsiest of connections with the real situation of real women". This approach is dangerous and misleading and, in Nussbaum's view, is profoundly pessimistic in its denial of the "hope for a world of real justice" (Nussbaum 1999). While the philosophical arguments she makes are complex her passion for a world with greater equality and economic justice for women is clear – and shared by most practically based feminist researchers working on issues of gender and fisheries today. In fact, practical feminist research on the ground has been making progress, much of it led by researchers in the economic South, for whom the DAWN commitment referred to earlier is still relevant.

A proliferation of strands thus work themselves out in feminist methodology. We can see feminists experimenting with new ways of making knowledge and new ways of sharing it. While many of these are fruitful, the very fact that such experimentation and debate continues points to the fact that we have not, as yet, identified a definitive feminist methodology. We have established a feminist approach to research that goes deeper than traditional qualitative interviewing. The feminist approach is deeply ethical and respectful of participants and is founded on the commitment to increasing equality and justice between men and women. While these ideals have been developed primarily by feminist researchers they are now shared by many male researchers, who also have philosophical and ethical concerns about why and how we do research.

Where does this leave feminist research on gender and fisheries and aquaculture?

The practical implications of my discussion in this article are that if we are to study women (and men) with a feminist perspective, then we have to think carefully about how we do this. Our research must be primarily faithful to feminist principles of equality and respect between women and between women and men – but – feminist methodology must also produce research that is respected by academic and other audiences. My experience of GAF over the last few years is that it has become a focal point for many researchers wanting to put women and gender relations at the

centre of their research. The field of gender and fisheries is ideally positioned to encourage genuinely and innovative research that is both feminist and significant. The field of gender and fisheries and aquaculture is still in its infancy. Researchers are searching for methods and methodologies that will suit both their existing skills and knowledge and also their new need to frame their knowledge in a feminist understanding. GAF offers a forum, and a supportive context, in which new gender researchers can try out the approaches that seem most productive to them and benefit from other researchers who are wrestling with the same issues. The GAF website increasingly offers links to articles and projects that make use of the new feminist methods and methodological thinking behind them. It is important to stress that in feminist research, there is no "right" answer, applicable to all research projects. When researchers have identified an approach that seems appropriate to their needs, they must be ready to adapt them and re-theorise them according to the particular context in which they are working, and as result of discussion with other gender researchers. It is the responsibility of researchers, especially ones working in a relatively undeveloped field such as gender and fisheries, to refine and articulate their methodology and methods so as to enrich the field as a whole.

This short account of the development of feminist methodology since the 1970s may serve to indicate both the range and depth of the debates, but also the range and depth of the possibilities of applying feminist approaches to the particular problems of gender in aquaculture and fisheries. In GAF we need to both create a knowledge base of the best and most fruitful of the feminist methods, and help our researchers to navigate through the methodological debates to find the most valid approach to their particular research problem. In future, gender researchers in fisheries will be carrying out a broader range of research and using a wider range of methods to do so. More importantly, we will be discussing why we want to know something, what the ethical implications of our proposed research might be what use it might be to our participants and their communities. Supportive colleagues in an institution such as GAF will allow us to take risks and try new methods. It will also allow us to be comfortable with the fact that our knowledge can only ever be partial. It will, at best, allow our participants to speak their needs and their knowledge to a wider world. In this respect, GAF is an exciting place to explore these new possibilities and contribute perspectives that will enrich both feminist knowledge about the world and the marine sciences. It is an agenda that will occupy GAF for some time but offers the possibility of truly new, innovative and progressive work. GAF researchers have much to offer to the fields of both gender and fisheries and feminist methodologies and the work must begin now.

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Contribution of Small-Scale Fisheries to the Livelihoods of Omani Women: A Case Study of the Al Wusta Governorate

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Abstract

Gender disaggregated data is not collected by the Ministry of Agriculture and Fisheries Wealth of Oman. Consequently, there is a deficiency of information relating to the roles of women in the national fishery. Accordingly, the present study examined the involvement of women in artisanal fisheries in the Al-Wusta Governorate. Out of the total population of approximately 400 fisherwomen, 85 (~20%) were randomly interviewed to gain greater insight into their socio-demographic status and precise function in the artisanal fishery. Field-based observations on the molluscan, holothurian and crustacean fisheries in which women were engaged were also undertaken. Interviewees (mean age of 36 years) were separated into groups based on age distribution. Over 40% of respondents were illiterate and only 20% had attained secondary level education or above. 60% of women had 4 or more children. Fishing activities involved 5-10 h a day, three times a week. Women were generally engaged in gathering (gastropods and bivalves), gleaning (sea cucumbers) and spear fishing (cephalopods and crustaceans), as well as exclusively in capture, processing and marketing of marine gastropods. Recommendations for gender-sensitive interventions, incentivisation and support are presented.

Introduction

The Sultanate of Oman is located in the south eastern corner of the Arabian Peninsula, and the Sultanate's coastline extends over 3,150 km, with three connected bodies of water within the Indian Ocean: the Arabian Gulf to the northwest, the Sea of Oman to the northeast and the Arabian Sea to the southwest (Fig. 1). The last is affected by a southwest monsoon-driven summer coastal upwelling which decreases seawater temperature and increases nutrient concentrations (Barber et al. 2001), a feature that makes the area the richest fishing ground in the Arabian Peninsula (Solanki et al. 2008). Fisheries are considered the most important non-energy source of income for Oman, with total landings of 159,000 tonnes and a value of approximately USD 319 million being reported for 2011 (MAF 2012). Nationally, the Sultanate has experienced an increased demand for

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fish and per capita consumption has been estimated as 28 kg.year $^{-1}$ (FAO 2010), one of the highest in the Middle East.

Oman's fisheries are divided into three broad categories *viz.* commercial, coastal and artisanal. Among these, the artisanal sector represents the mainstay of fisheries production, contributing 95 % of recorded landings in 2011. The sector is entirely occupied by small-scale fishermen who employ motorised fiberglass boats , 8-10 m Length Over All (LOA), wooden skiffs or "*hori*" (10-15 m LOA), traditional palm-frond "*shashas*" and a few large wooden dhows (10-25 m LOA) (Stengel and Al-Harthy 2002). Fishermen have been encouraged and subsidised technically and financially by the government, and, in recent years, significant progress has been made in improving the sector, including an increased number of landing harbours and the construction of on-site market places, processing and cold-storage facilities. Several studies have examined the structure and operation of Oman's small-scale fishery (Siddeek et al. 1999; Al-Oufi et al. 2000; Al-Subhi et al. 2013), but these have mainly emphasised institutional and personal capacity-building of fishermen, rather than fisherwomen. The general lack of interaction between fisherwomen, fisheries departments and fisherwomen's government and non-government agencies in Oman has resulted in a lack of initiatives directed towards them. This gender bias has resulted in the activities of women generally being unrecognised and their contribution has largely gone undocumented.

In contrast to the Arabian peninsula, where the activity of womenfolk in fisheries has received comparatively limited attention (Egypt: Ashworth et al. 2004; Yemen: United Nations 2007; Oman: William 1979; Al-Rashdi et al. 2007a; Bose et al. 2013), their involvement in the fisheries of Asia, Africa, Oceania, Latin and North America and Europe has been extensively reviewed (Merrikin 1987; Kyprianou 2001; Williams et al. 2002; MacAlister et al. 2002; Sharma 2004; Choo et al. 2006). Traditionally, Omani women from coastal communities have been engaged in fishing and fishing-related activities. However, economic growth, driven by the energy sector and subsequent increase in the availability of imported foodstuffs and an expatriate workforce, has outwardly resulted in coastal women being gradually pushed out of the fishery and replaced by foreign labourers. The lack of national gender disaggregated data on fisheries employment makes it difficult to gauge the precise importance of women in the sector.

Disparities in gender affect livelihoods of women, children, the household and ultimately the community. Hence, methods of improving women's income, education and ability to participate in decision-making processes will enhance the capabilities not only of the household but society in general (Weeratunge et al. 2010). In order to measure gender inequalities and thereby devise policies for change, baseline information is required. Accordingly, the present study was initiated to determine the contribution of small scale fisheries to the livelihood of Omani women. The socio-economic characteristics and associated issues, including obstacles hindering the entry of women into the fishery, competitive exclusion and others are considered, together with recommendations to enhance the future activities of female fishers in the sector. Additionally, observations were made on the general operations of specific fisheries of the Al-Wusta region.

Materials and Methods

Description of study area

Al-Wusta (Fig. 1) is one of seven coastal Governorates of the Sultanate of Oman. Approximately 400 km south of the nation's capital Muscat, Al-Wusta is the second largest Governorate in the country. With its Arabian Sea coastline, the region includes tracts of the Empty Quarter desert or Rub' al Khali, the largest sand wilderness in the world (Vincent 2008). Al-Wusta has four main fishing communities with the majority of fishers being *Bedouins,* whose livelihood activities are primarily livestock raising and fishing. The Omani population of Al-Wusta is about 19,000 (with a population density of 0.4 persons.km^{-1}) of which 55% are females (MoNE 2010). The number of traditional fishermen in the region is approximately 4,500, who contribute about 24% to national fish production (MAF 2012). The Governorate is also well recognised among other coastal regions for traditional shark salting and drying in which Bedouin women have historically been engaged. The dried shark, locally called "*awal*", is one of the traditionally favored seafoods of Oman.

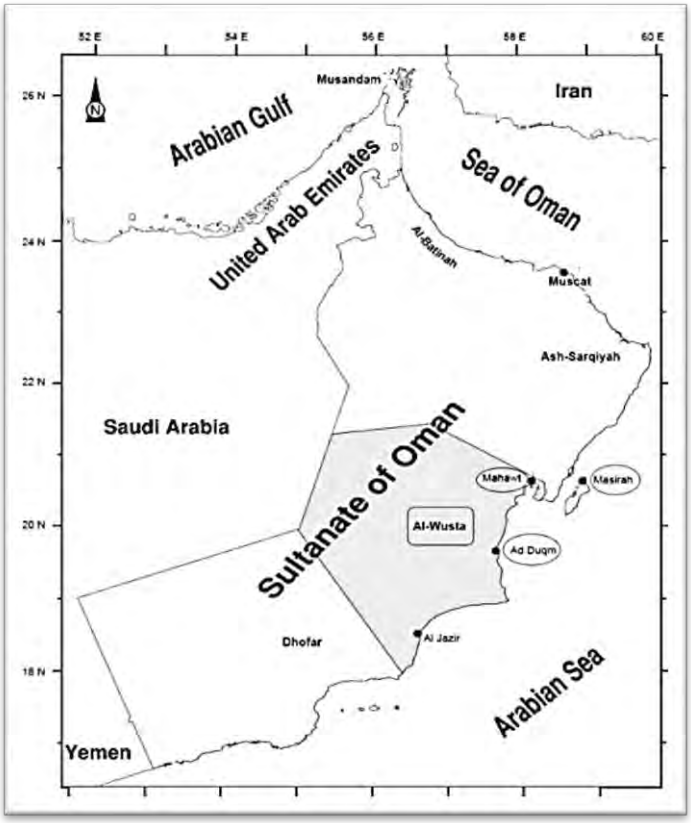

Fig. 1. Map of study area showing extent of the Al-Wusta Governorate and location of Oman.

A primary census of women involved in the fisheries was estimated by Al-Wusta Fisheries Department to be approximately 400 or around 9% of the total number of fisher folk. However, the Department recognised the need for more information on the participation of women in fishing and fishing related activities. Accordingly, three of the four fishing communities, covering the majority of fisherwomen, were surveyed: *Mahawt*, *Masira* and *Al Duqm* (Fig. 1). The activities of fisherwomen in these communities are more diversified than elsewhere nationally. Participants of the survey were randomly selected for interview.

Survey method

The survey was carried out using a questionnaire developed using FAO guidelines (FAO 1999). The questionnaire contained information on target species and their fisheries, socio-economic characteristics of the respondents and highlighted problems and requirements of the women in their fishery. Three local female residents from each of the surveyed communities, holding undergraduate or high school qualification, were hired for the purpose of conducting the interviews. Following the respondent's answers, group discussions consisting of six experienced fisherwomen, headed by a project leader and Regional Fisheries Official, were held at each surveyed community to determine problems that were faced and also to clarify some of the answers from the questionnaires. Field observations were also undertaken during the survey to ground test answers and to obtain basic information on fishing areas, species collected, and fishing and processing techniques employed.

Identification keys

Fished organisms collected during the field survey were classified using the keys and guides of Bosch and Bosch (1982); Smythe (1983); Donald and Bosch (1989); Bosch et al. (1995); Al-Abdessalaam (1995) and Shallard et al. (2009).

Results

Socio-economic observations

Eighty five individuals, representing over 20% of all fisherwomen of the Al-Wusta Governorate, responded to the questionnaire. General results showed that women are involved in marine invertebrate gathering, gleaning and spearing, all of which tended to be near-shore activities. The common, scientific, and local names of invertebrate species collected are listed in Table 1.

Table 2 summarises the socio-economic background of respondents who varied in age between 18 and 60 years, with a mean of 36 years. The largest age group (34%) was between 21-30 years, while the smallest group was made up of women of 50+ age group (6%). Over 40% of the respondents were illiterate with only 20% having attained secondary level education and above. More than 50% of the respondents were married, with 19% having been divorced. Three-quarters of the fisherwomen had children, with almost 60% of the respondents having four or more children (Table 2). The youngest age group was childless.

Of all respondents, 90% indicated that the major reason for their involvement in fishing and fishing-related activities was to generate self-gain and contribute to family income while 10% indicated that their motivation was for tradition and fun. The results also revealed that 5-7 h and 8-10 h were spent for fishing by 46% and 54% of the interviewed women, respectively, 3 days a week. Answering the question, "do you own a boat", 5% responded yes, and 55% assisted their families in boat-related fishing activities.

Table 1. Taxonomic group, English, scientific and local name of species fished by women of the Al-Wusta Governorate, Sultanate of Oman.

Group	English name	Scientific/ family name	Local name
Gastropods	Top shell	*Trochus erythraeus* (Brocchi, 1821)	Hilwan
	Whelk	*Babylonia sp.*	Buwaini
	Top shell	*Trochus sp.*	Shafeil
	Chitons	*Chiton sp.*	Shanha
	Top shell	*Trochus sp.*	Sharkhali
	Turban shell	*Turbo coronatus* (Gmelin, 1791)	Toga'a
	Murex	*Murex scolopax* (Dillwyn,1821)	
Echinoderms	Sea cucumber(Sandfish)	*Holothuria scabra* (Jaeger, 1935)	FeikAlBahar
	Sea cucumber (Lollyfish)	*Holothuria atra* (Jaeger, 1833)	Abu-Areif
	Black sea cucumber	*Holothuria leucospilota* (Brandt, 1835)	Abu-areifnaqli
Cephalopods	Cuttlefish	*Sepia pharaonis* (Ehrenberg, 1831)	Ghutru
	Sand bird Octopus	*Octopus aegina* (Gray,1849)	Terbaha
Bivalves	Rocky Oyster	*Saccostrea cucullata* (Born, 1778)	Zokah
	Venus clam	*Circenita callipyga* (Born, 1778)	Doak
	Callista clam	*Callista erycina* (Linnaeus, 1758)	Doak
Crustaceans	Blue swimming crab	*Portunus pelagicus* (Linnaeus, 1758)	Hargoom

Table 2. Socio-demographic characteristics of randomly interviewed fisherwomen derived from three main fishing communities of the Al-Wusta Governorate, Sultanate of Oman (n=85).

Variables	Frequency	Percentage
Age Group		
11-20	6	7
21-30	29	34
31-40	20	24
41-50	25	29
51-60	5	6
Educational Level		
Illiterate	34	40
Primary	23	27
Preparatory	11	13
Secondary	16	19
University	1	1
Marital Status		
Married	47	55
Divorced	16	19
Single	15	18
Widow	7	8
No. of Children		
0	20	23
1 to 3	15	18
4 to 6	24	28
7 to 10	26	31

Figure 2 presents responses to questions relating to perceived limitations to sustained female participation within the invertebrate fisheries of Al-Wusta. The major issue of significance was distance from collection sites, which was cited by 97% of respondents as being restrictive. Low market price for catch was also considered an important factor, being mentioned by 82% of respondents. Lack of provision for financial and technical support (61%) represented the third most commonly cited limitation (Fig. 2) with overfishing (22%) and pollution (9.4%) being the fourth and fifth concerns respectively. Figure 3 provides a synopsis of replies to questions associated with perceived requirements for sustaining female activities within Al-Wusta's invertebrate fisheries. Mirroring perceived limitations, respondents indicated transportation (91%) and marketing (85%) as the key needs, followed by access to subsidies (72%). Establishment of fishing boat licenses and training programmes were viewed as necessary by 58% and 49% of the interview pool respectively.

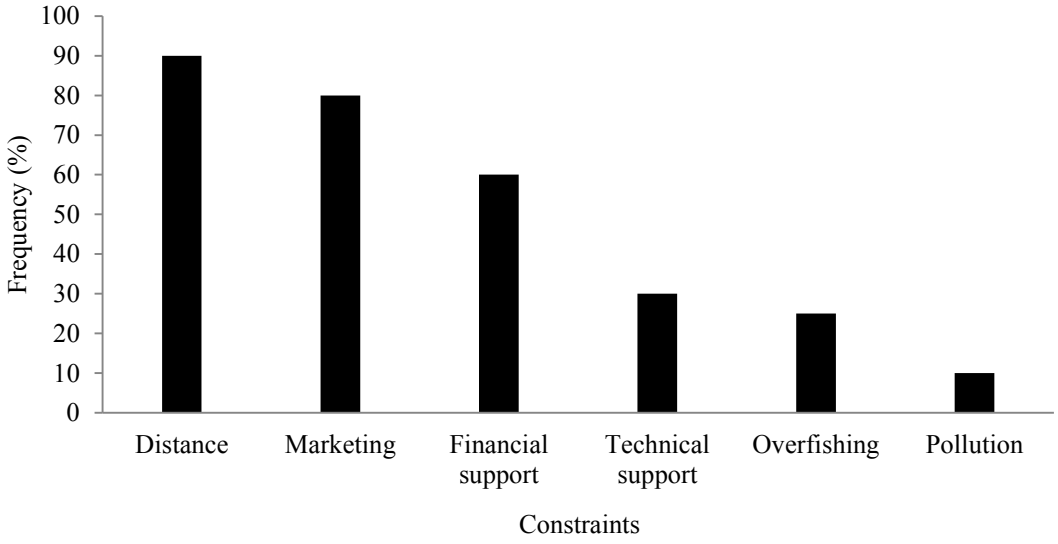

Fig. 2. Constraints perceived by fisherwomen as limiting their efficiency within, and management of the invertebrate fisheries of Al-Wusta Governorate.

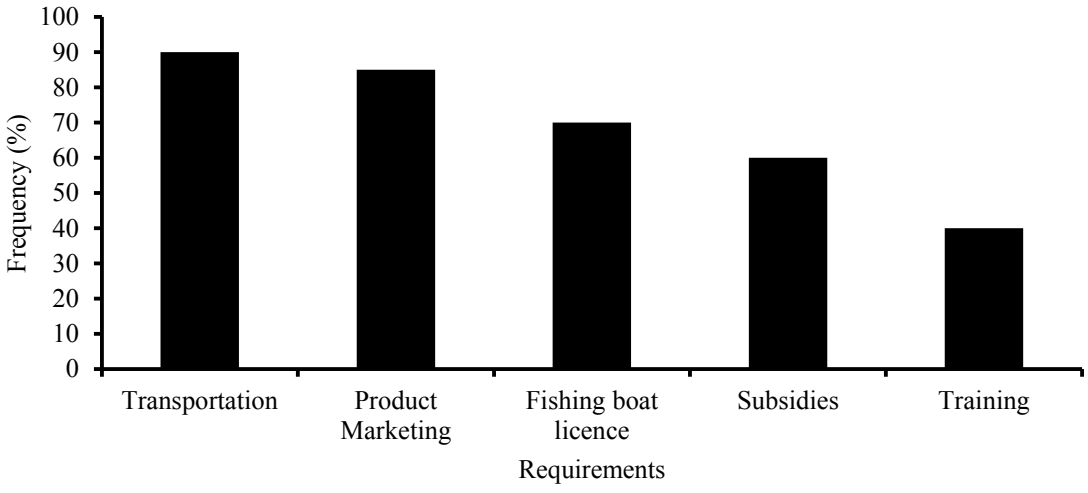

Fig. 3. Survey results summarising fisherwomen's perceived needs for enhancing their efficiency and role within the Al-Wusta Governorate invertebrate fisheries.

Molluscan fishery observations

Near-shore activities of fisherwomen concentrated on five invertebrate groups (Table 1) with fishing effort being greatest for gastropods followed by cephalopods, bivalves, echinoderms and, crustaceans respectively (Fig. 4). Eight species of gastropods or snails (Fig. 5) are fished and two products, namely the operculum and meat are derived from collected animals.

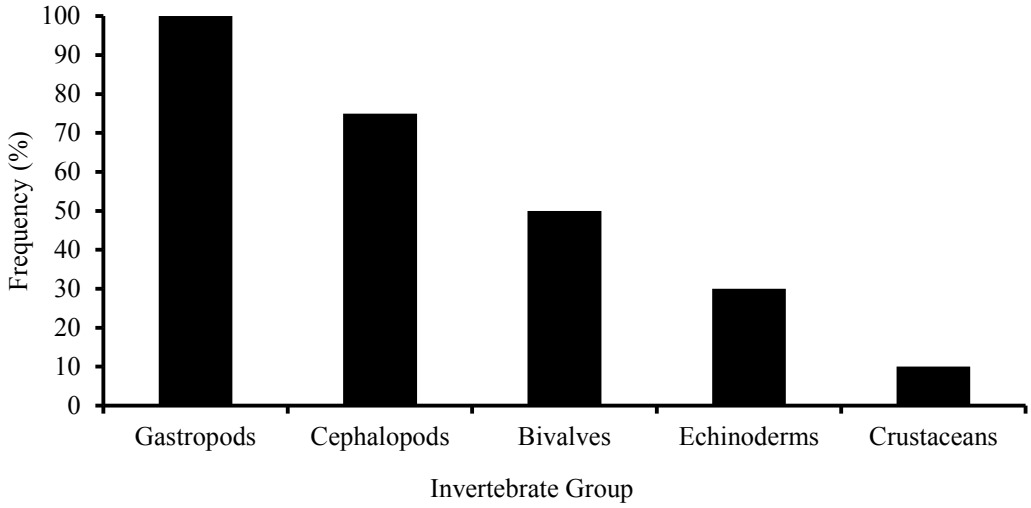

Fig. 4. Species prioritised by Al-Wusta fisherwomen by taxonomic grouping.

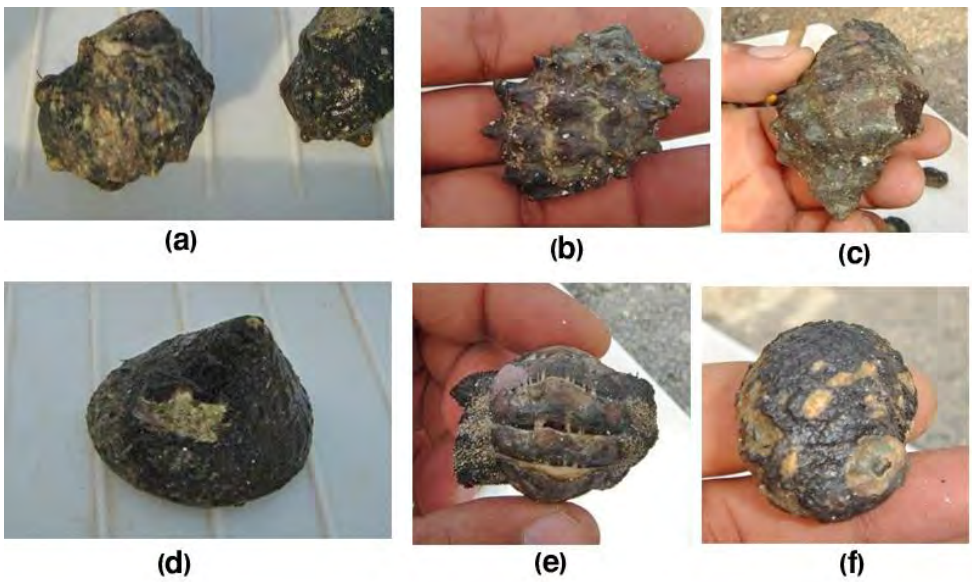

Fig. 5. Different species of snails collected by women at Al-Wusta Province: (a) *Trochus sp.,* (b)*Babylonia sp.,* (c) *Turbo coronatus,* (d) *Trochus erythraeus,* (e) *Chiton sp.*, (f) *Trochus sp.*

In Al-Wusta, the snail or "*Rahas*" fishery, which takes place on rocky shores between September and May, is exclusively carried out by women who operate three days a week during low tides. Women gather at a predetermined spot from where they either hire a vehicle and driver or take the help of family and/or friends for transportation to fishing areas, which are on an average 4 km away. Fishing gear includes a spear, knife, bag and sometimes gloves and plastic sandals or shoes (Fig. 6).

Fig. 6. Fisherwoman of Al-Wusta Governorate a) holding her main fishing tools; an iron bar used for prying open and to assist in capture of cephalopods, a knife and collection bag, and b) gathering snails from intertidal rocky shores.

The operation, inclusive of travel, takes between 5-10 h. Collected snails are boiled in seawater for one hour after which the meat and operculum are extracted. Meat is then threaded on nylon twine using a needle with a specialised, rounded eye and the resultant meat necklace hung to dry (Fig. 7). Necklaces or "*mishkak*" comprise 30-50 pieces of meat and each fisherwoman makes 3-5 necklaces per trip, equivalent to 90-150 snails per day. Each string is sold locally for USD 7.75, although double this price can be obtained when sold to tourists through middlemen. The opercula requires a further boiling step before drying after which the resultant fingernails or "*dhufarn*", may be mixed with frankincense which is burnt for scenting and perfuming (Fig. 8).

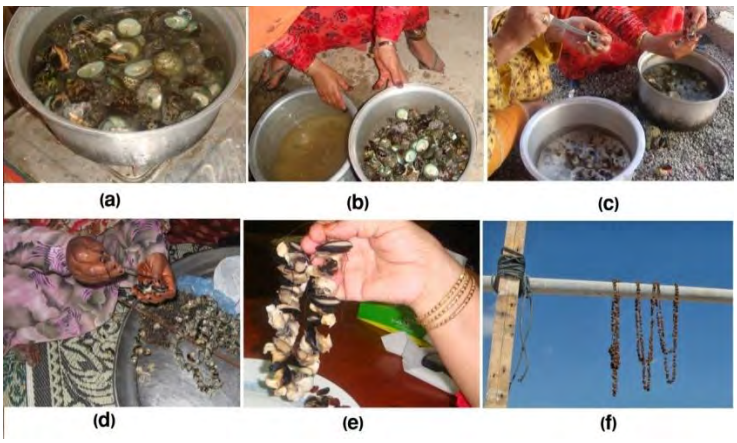

Fig. 7. The sequence of processing used during gastropod handling: (a) boiling, (b) cleaning, (c) meat extraction, (d & e) meat threading, (f) completed meat necklace and direct sun drying.

This product is widely recognised and used by Omani women and is sold for USD 2.33 by filling a tea cup which may contain 20-30 fingernails. Al-Wusta fisherwomen also spear cephalopod molluscs (cuttlefish and octopus), with the catch being sold to local restaurants or kept for family use. Bivalves, including clams, oysters and mussels, are widely collected along Oman's coasts by both women and children. Al-Wusta Governorate is no exception to this rule and several

species (Table 1) are taken, although at lower rates than elsewhere in the nation. For this reason, the fishery, which takes place during low spring tides, is considered mainly as subsistence activity.

Fig. 8. Processed snail's operculum and its utilisation: (a) extraction, (b) dried operculum, (c) admixing with frankincense (*Olibanum*) and, (d) burning the mixed product over hot charcoal for scenting.

Echinoderm and crustacean fishery observations

Sea cucumbers or sandfish are collected by both men and women, mainly in the Mahawt area of Al-Wusta (Fig. 1). Three species are fished (Table 1) with *Holothuria scabra* (Fig. 9) representing the main target animal. In the sea cucumber fishery, rather than working independently, women are contracted by specialist traders to collect animals. The trader provides transportation to and from the grounds, where women glean the near-shore area (Fig. 9). The trader also supplies boats, where necessary, and guarantees purchase of catch. In the case of crustaceans, the Mahawt area supports an important shrimp fishery (Mohan and Siddeek 1995) and is also an active region for crabbing. A small number of women are engaged in both shrimp cast-netting and crab spearing, but their catch is used for subsistence purposes only.

Discussion

Women are engaged in fishing activities along the entire coast of the Sultanate of Oman and they play a key role in the exploitation of underutilised invertebrate resources. This was found to be especially the case for gastropod molluscs where, in the Al-Wusta Governorate, womenfolk are exclusive participants in the fishery. Furthermore, they manage the preparation and sale of snail products which are traditionally consumed as a means to control and treat diabetes and hypertension (Engmann et al. 2013; Malik et al. 2011).Three fishing methods are employed by the women *viz.* gathering (gastropods and bivalves), gleaning (sea cucumbers) and spear fishing (cephalopods and crustaceans). In Al-Wusta, women are also engaged in collection of low value bivalves. Women have important, although diminishing, contributions to the more valuable holothurian fishery and participate in the subsistence gathering and capture of cephalopods and

crustaceans. Some also assist family members in artisanal fishing activities. They have active involvement in processing and marketing of products; activities that play an important role in supplementing not only family income, but also in providing a personal revenue stream and greater financial independence. A proportion of fisherwomen even possess boats. Socio-demographic data collected during this study revealed that the majority of the respondents fell in the 21-30 year age group and participation of women in fishing activities fell with increasing age. Similar findings have been reported for Nigerian fisheries (Odulate et al. 2011) where a higher percentage of female participants were also found in the 21-30 year age bracket.

Fig. 9. Women gleaning for sea cucumbers (a, b) and (c) *Holothuria scabra*.

Irrespective of the diverse activities of Al-Wusta fisherwomen and regardless of the time invested in the sector, which often exceeds eight hours a day, they receive only limited support from government agencies, NGOs, fishermen's cooperatives, or other interest groups. Similar situations are experienced on a global basis (Browne 2002; Göncüoğlu and Űnal 2011), although significant headway has been made in establishing fisherwomen's cooperatives and developing roles in fisheries co-management in some areas (see Williams et al. 2002; Choo et al. 2006). In Oman, there is an active Women's Association (OWA), a stated aim of which is to provide support services to women, which include job training (Al-Talei 2010). However, OWA meetings generally take place in towns. Fisherwomen are thus marginalised due to poor communication, their geographic dispersal and by the lack of transportation. However, Oman's Ministry of Agriculture and Fisheries Wealth (MAF) has recently initiated an innovative scheme, creating the Department of Rural Women, which will take account of the role of women in all fields of agriculture, including fishing, while providing direct assistance in terms of technical and financial help. Whether this new organisation will have the desired effect in terms of benefitting fisherwomen must be continuously monitored and evaluated.

The Government of Oman recognises that development gaps exist between Governorates (MoNE 2009) and, although Al-Wusta has ample school and classroom facilities, the level of literacy, when considered on a national basis, is generally quite poor. This situation was reflected

in the sample population, with 40% of fisherwomen being illiterate and a further 40% only attaining preparatory, or lower level schooling. Literacy rates among artisanal fisher folk in developing nations are commonly considered low (Akpaniteaku et al. 2005; FAO 2006; Maddox 2007) and this can result in reduced abilities to access and respond to available information, participate in training sessions and to become engaged in sustainable marine resource management, marketing operations, and more (World Bank/FAO/IFAD 2009). While the government recognises that literacy will empower Omani women and provide the means for them to organise independently and lobby more effectively (UNICEF/MoNE 2006; Al-Talei 2010), the situation in Al-Wusta may be complicated by the strong patriarchal culture combined with the semi-nomadic existence. Furthermore, government vocational and training centers tend only to be in larger towns, away from seasonal fishing encampments, which restrict access of fisherwomen to educational opportunities (literacy and technical training). These constraints could be overcome with the development and use of gender responsive mobile training centres that should include education on the transfer of alternative fishing technology that may enable acceleration of the development process in harvesting, processing, product quality and safety, and marketing sectors.

Lack of financial assistance was considered by respondents as being a significant constraint to enhancing their livelihoods. Associated with this were requests for subsidies, fishing boat licenses, assistance with marketing, training, and transport. Again, the educational and societal marginalisation of Al-Wusta's fisherwomen appears to work against them. The poor and needy in Oman are entitled to financial assistance through programmes administered by the Ministry of Social Development. Moreover, the Government has developed support and training platforms to assist those susceptible to poverty, especially widows and divorced women, who represented 27% of the sampled group. Specific funds for small projects and/or for family financing, are available through the Agriculture and Fisheries Development Fund (AFDF), administered by the MAF and the Sanad Project, which is administered by the Ministry of Manpower and Oman Development Bank (UNICEF/MoNE 2006). However, illiteracy, social marginalisation of the fisherwomen group and lack of gender-sensitised cooperatives and training programs, have led to overall poor communication of available opportunities. This limitation might be overcome with increased and targeted extension activities by both Ministries of Agriculture and Fisheries Wealth and Social Development, other government agencies, the OWA and NGOs.

Field observations indicate that at present the molluscan fisheries in which Al-Wusta women are engaged appear to be sustainable. Overall efficiency and perhaps product shelf life could nonetheless be enhanced with provision of basic training on more efficient gears and processing technologies. Micro financing, through the Sanad Project or AFDF for example, could be used to support training in entrepreneurial activities such as the use of shell by-products to make buttons and ornaments for the growing tourist industry. The fishery for sea cucumbers in Oman is exploited by both genders (Al-Rashdi et al. 2007a) with women being engaged in gleaning and collection and men in processing and marketing. Similar observations have been made for the sea cucumber fishery of Tamil Nadu state, India (Radhakrishnan 1994). However, unlike the situation in Oman, fisherwomen societies have been formed in every village in which holothurians are processed. In Oman, the *H. scabra* fishery has declined in the recent past and this has led fishers to target species of lesser value, including *H. atra* and *H. Luecospilota* (Al-Rashdi et al. 2007b). This situation is

not exclusive to Oman and has been recorded elsewhere globally (e.g. Hasan 2005; Conand 2008; Anderson and Mills 2011). The collapse of the Al-Wusta holothurian fishery has resulted in a significant decrease in the number of women in the sector. Thus, in 2004, more than 50% of the fishery's workforce was made up by women but this has now declined to less than 20% (Al-Rashdi and Claereboudt 2010). This has occurred due to competitive exclusion. When prices of sea cucumbers increased, this led to increased entry of men into the fishery, even though initially this was considered a "woman's job". As near-shore stocks of sea cucumber declined, fishers were forced into deeper waters which barred women due to clothing restrictions and safety considerations. This situation may be reversed in the future following the introduction of a seed production programme (Al-Rashdi 2012). Such initiatives have been successfully implemented in a number of countries with involvement of women in the grow-out process (Eckhaut et al. 2008). Clearly, it is the middleman that presently makes the largest profit from Omani holothurian fisherwomen, since it is in processing and grading that the largest margins are achieved (Ferdouse 2004). Training of women in processing and grading, together with assistance in entering the international market, would increase their revenues substantially.

There are two main needs of the Omani fisherwomen: institutional and personal capacity building. Within these needs, three programs are recommended for consideration: 1) development programs, which may include setting up gender appropriate legislation, road mapping, and policies, including subsidising and incentivising fisherwomen in a manner similar to that provided for fishermen and assistance in forming fisherwomen cooperatives and associations; 2) training and extension programs, to provide fisherwomen with appropriate technology transfer, as a means for adding value to their products, methods for improving their harvesting and post-harvesting handling and marketing and 3) research programs, including more in-depth socio-economic studies, taxonomy of the species collected and stock density, distribution, and enhancement measures for depleted species such as the sea cucumber *Holothuria scabra.*

Omani women appear to already make important contributions to fisheries, but the present study and analysis of appropriate next steps indicates that targeted interventions are needed to improve their recognition and ability to achieve their potential in the sector.

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Technical Paper

Rights, Benefits and Social Justice: Status of Women Workers Engaged in the Shrimp Processing Industries of Bangladesh

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Abstract

Labour rights and benefits and safety at work across the industrial sector in Bangladesh have been a key areas of concern and has attracted attention from various national and international labour rights organisations and also from buyers and consumers globally. After the tragic incident of a building collapse, killing more than a thousand garment workers at Dhaka in April 2013, the Generalised System of Preference (GSP) facility was suspended for Bangladesh by US markets; which also had ramifications on the labour non-compliance in the shrimp processing sector. The shrimp and seafood industry has been a very promising economic sector from which the country receives the second largest foreign exchange earnings. The inability to respond to the evolving needs of social compliance and implementation of labour rights made the United Nations Industrial Development Organisation (UNIDO) to collaborate with the Bangladesh government and the export industry in developing manuals, training of trainers on the labour laws and also aid in their implementation. In this study an attempt has been made to assess compliance with labour rights legislation, and the benefits accruing from them by interviewing workers across selected shrimp processing factories. Though the assessment revealed perceptible progress, it still leaves much to be desired. Awareness has generally been raised, but many top executives are still not convinced and carry strong patriarchal views. The government has amended the labour laws, which require adequate vigilance and inspection to achieve better compliance, to benefit millions of poor workers engaged in this sector.

Introduction

The labour standards and work place safety has emerged as a serious issue for Bangladesh due to two tragic and deadly industrial accidents; the fire at Tazreen Fashions killing 112 workers on 24 November 2012 and the collapse of Rana Plaza, a poorly constructed eight-storied building on 24 April 2013 killing more than 1130 factory workers. Although it was mainly due to non-

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compliance to safety and building laws, it also was a reflection on the poor importance given to labour laws.

Bangladesh receives its second-largest foreign exchange earnings, after garments, through export of processed seafood including shrimp. In 2011-2012, the country had earned about 600 million USD by exporting 92,489 tonnes of processed shrimp and fish. The shrimp and seafood export earnings is consistent with a steady average growth of around 8% per year over the last three decades. There are 90 shrimp processing plants in the country, of which 74 have approval to export to European Union (EU) countries. Over 80% of the shrimp and seafood are being exported to EU countries, while the US market share is only about 4%, while other countries account for the remaining 16% of exports (DOF 2013). There are over a million people involved in the entire shrimp value chain including farmers, fry producers, depot owners, transport workers and many other traders engaged in ancillary activities. It is estimated that there are over 50,000 workers employed in processing factories alone, of which more than 70% are women. Permanent employees are mainly men, while about 80% of the casual contract workers are women, who are not supported directly either by the factory or by the contractors and are kept outside the purview of labour rules.

Fair wages and labour rights in the industry have been key areas of concern for buyers, consumers and civil society organisations in the country, as well as in the main importing nations the EU and the US. Both the seafood processing and the readymade garments sector have been under constant scrutiny from foreign buyers for violation of work safety, gross labour non-compliance and deprivation of other rights and benefits. The US had suspended Bangladesh's Generalised System of Preference (GSP) temporarily after the Rana Plaza accident. The US Trade Department is reviewing the government initiatives towards restoring the labour standards and safety before restoring the trade privilege. It is worth mentioning here that the American Federation of Labour and Congress of Industrial Organisations (AFL-CIO) raised the issue of exploitation of shrimp workers and filed a petition against Bangladesh with the office of US Trade Representative in 2007 to withdraw GSP facility (SC 2012).

The issue of compliance with labour laws has long been overlooked, both by the industry and the government departments who are supposed to regulate the industry. During the mid-1980s, the contribution of the industry sector including the fisheries was between 16 to 17% of the country's GDP, which doubled to about 31% in 2012 (MOF 2013). However, the institutional framework to enhance and support this growth has not been adequate. Rather, the regulatory bodies have been weakened, exposing a political reluctance on the part of the government to regulate the industry. Some estimates are that, over 50% of posts are currently unfilled in different departments under the Ministry of Labour and Employment (MOL&E). No new recruitment or promotions have taken place for a long time and the incumbent officers, who are still young, tend to quit in search of better opportunities elsewhere with their educational & skill sets. As a result, the shrimp processing industry, seemingly not very different from the garment sector, has been trying to escape from social compliance and has been internalising their business issues through unfair labour deals across the shrimp processing sector. This is in spite of strong criticism regarding violation of work safety, non-compliance of labour laws and other deprivations.

Methodology

Both quantitative and qualitative research methods were used to carry out the study. The attempt was to assess the socio-economic conditions of workers, including their rights and benefits. The workers were interviewed during the training and awareness programmes undertaken by 'Better Work and Standards Program – Better Fisheries Quality' (BEST-BFQ), a project of United Nations Industrial Development Organisation (UNIDO) for Bangladesh, supported financially by the European Union and Norwegian Development Agency, NORAD. Personal interviews were conducted with over 1800 workers and other staff belonging to 28 selected shrimp processing factories located in five coastal districts. This was done during the factory based labour law training conducted for 59 batches of workers and other staff during the period July 2012 to November 2013 (Table 1).

Table 1. Distribution of respondents chosen for the study.

SL	Region	Number of factories	Number of batches	Workers trained		
				Women	Men	Total
1	Khulna	15	29	551	345	896
2	Chittagong	13	30	547	365	912
		28	59	1098	710	1808

During the two day training program for a group of 30 workers per batch, the participants were interviewed individually about their age, education, wage, leave and other entitlements and their problems at the work place. Structured questionnaire and open check list was used to collect information and anonymity, and secrecy were ensured for each interviewee. For better understanding, interviews with factory officers, managers, owners and industry leaders from Bangladesh Frozen Foods Exporters Association were also conducted, along with practical inspection of office records, personal file, pay roll, leave register etc. from individual factories. For policy issues, interviews with the Department of Fisheries (DOF) officials and field officials from the Ministry of Labour and Employment (MOL&E) regarding the roles of the government, frequency of inspection, amenities provided, budget allocation and availability of manpower was conducted. This was possible because of the involvement of officers (from the Fish Inspection and Quality Control (FIQC) and MOL&E), as resource persons for training programmes organised for the workers inside the premises of the processing factories.

Results and discussion

The shrimp and seafood industry has been a very promising economic sector from which Bangladesh receives its second largest foreign exchange earnings, after readymade garments. The post-harvest shrimp processing industry has been quite responsive in recent years, in terms of better social compliance and improving labour standards. This has been due to reasons like the petition lodged by the Solidarity Centre, US in 2007 against Bangladesh and demanded withdraw of the GSP facility, on the charge that there exists child labour in shrimp processing factories.

Bangladesh denied the charge and demanded further investigation. Meanwhile, the industry also became cautious about the issue of child labour in the processing industry. During the inception of the Bangladesh Quality Support Program (BQSP) Fisheries project, UNIDO 2006-2010, the processing industry did not allow any project personnel or foreign consultants to enter the processing plants. Prior written permission had to be sought through the Fish Inspection and Quality Control (FIQC), Department of Fisheries (DOF) to visit any shrimp processing factory. Subsequent years has shown that the industry has become accommodative of the BEST project, which was able to carry out about 60 factory based labour laws trainings on inside factory premises from then on, and also allowed their labour workers and other staff to receive training for two consecutive days. The training was an opportunity to give hands-on support on how to improve the labour standards through compliance of labour rules.

UNIDO objectives and interventions

UNIDO had come forward aiming to provide technical assistance to the shrimp industry to improve its compliance level in order to increase competitiveness in the international seafood market. There were interventions both in Khulna and Chittagong region, the major shrimp processing zones of Bangladesh. The interventions included Training of Trainers, follow-up training for mid-level industry officials and factory-based training in labour laws and labour rights for processing workers and staff. Through the Training of Trainers training, 78 trainers from government departments were trained in a five day course and 217 mid-level officers from 51 processing units were trained for two days. Over 1800 workers and staff from 28 selected processing factories were trained, in 59 batches, on factory-based labour laws in the training programmes held inside factory premises. Five training programmes were organised for the Trade Union (TU) leaders, of the country's shrimp processing factories (Table 2) from 13 TUs registered officially. Apart from this, a couple of awareness meetings with the top level stakeholders including owners, managers and Bangladesh Frozen Foods Exporters Association (BFFEA) leaders were organised to inform them about the progress made thus for and to develop suitable solutions for the remaining challenges. Better compliance with labour laws is related to increased expenditure in most cases, which requires the consent of the owners as well.

Socio-economic status of women workers

The workforce employed in the shrimp processing industry is predominantly made up of women, most of them uneducated. Poverty, unemployment and a discriminating job market for women workers in rural areas compelled many of them to migrate to the urban industrial areas. The trend of urban migration by the women workers started from across the rural areas of Bangladesh during the mid-1990's. They resort to industrial jobs in the urban areas to escape from hunger, deprivation and negligence prevalent at their homes. Industrial employment is seen as a good indicator for women's empowerment and social development in Bangladesh, but how far this development is just, equitable and socially inclusive is questionable, at least in the case of women workers engaged in the shrimp processing industry. There is evidence indicating widening inequality resulting in social exclusion, which are discussed in the following paragraphs.

Table 2. List of labour law training and awareness activities taken under BEST-BFQ, UNIDO.

	Activities	Participants	Location	Number of events	Number of persons
1.	Training of Trainers (TOT)	Inspectors, MOL&E Quality Control Officers FIQC, DOF; Executives from Processing Factories & NGOs	Khulna Chittagong	04	78
2.	Follow-up Training	Mid-level Officials from shrimp processing factories	Khulna Chittagong Cox's Bazar	10	217
3.	Factory Based Training	Workers and Staff from shrimp processing factories	Khulna, Jessore Bagerhat Chittagong Cox's Bazar	59	1808
4.	Trade Union Training	Trade Union Leaders from shrimp processing factories	Khulna Chittagong	05	100
5.	Compliance Officer's Training	Compliance Officers/HR Managers	Khulna Chittagong	02	36
6.	Labour Contractor/Supervisor Training	Labour Contractor, Sub-Contractor &Labour Supervisor	Khulna Chittagong	02	40
7.	Compliance Review Meeting at Deputy Chief Inspector Office, MOL&E	Compliance Officers/HR Managers	Khulna Chittagong	02	32
8.	Awareness Meeting	Owners, Managers, Compliance Officers/HR Managers	Khulna Chittagong	06	170

From the Labour Force Survey 2010, it is evident that there is gradual shift of labour away from agriculture sector, including women's labour. Women's share of the total workforce in urban areas rose from 26% in 2003 to 36% in 2010 (BBS 2012). According to a recent estimate, about 50% of industrial workforce in Bangladesh is comprised of women.

Work in urban areas has given women a little more independence than that was available in rural areas, though they are forced to live in urban slums. The unmarried girls accumulate their wages to meet the expenses of their marriage, which is a big social burden in poor communities. It was found that 45% of women workers in seafood processing plants were unmarried in Khulna and 53% in Chittagong region. This could be the strong indication of how the working girls and women are forced to work to save for their dowry. The working wife and mother spends her income for the family, for educating the children, to meet the expenditure on health and helping the family to attain a level of resilience against financial shocks and threats. The survey revealed that 54% of the women workers from Chittagong region and 31% from Khulna region have their own cell phone. Nowadays, a cell phone is not only used for communication, it is also used widely to send money quickly through a system called mobile banking. Most working girls now tend to

wait and choose eligible bachelors as husbands, compared to the previous practice of marriages arranged by parents and relatives.

Girlhood is seen as a curse in most poor families in rural Bangladesh due to the inability of women to earn a living and the burden of dowry that falls on the family at the time of marriage (UNICEF 2010). On the other hand, boys are regarded as a sign of 'family fortune' due to masculinity, meeting the responsibility for continuing the family lineage and socially acceptable earning ability from jobs of some kind. Girls have to leave the parental house and must live with the husband's family. This tradition of discrimination between boys and girls tends to make the girl children, especially in poor families, to be neglected and subordinated within the family and in the society, often compelling them to opt for urban migration. During the investigation some examples were observed where working women and girls working in the shrimp processing industry are fighting against the oppression of dowry, early marriage and patriarchy.

Demographic factors

There are three types of workers engaged in the processing factories: permanent workers directly on the rolls of the factory, permanent workers under a labour contractor and casual workers under a labour contractor. It is estimated that 70-80% of the total workforce are under labour contractors. But neither the factory nor the contractors provided accurate information on the number and type of labour because of the sensitive nature of the labour issue.

It was observed that the shrimp processing industry had been losing labour which was probably related to the unstable and intermittent labour demand, depending on seasonality of the shrimp harvest. Working in chilled conditions and with wet raw material may also be another reason for labour dropout or out migration from the shrimp processing industry. However, it was also observed that there was a gradual increase in permanent labour compared to casual labour over the years. Though there is no previous evidence or studies, the assessment was that the general tendency of factories was to keep the permanent labour to a minimum and accomplish the major work through casual contract labour, during the peak harvest of shrimps. This helps the owners to keep labour costs to a minimum, while the deprivation of labour benefits to a large section of workers continues under the pretext of intermittent supply of raw materials. It was observed that a worker who had been working for many years in the same factory as a casual worker under labour contractor, had not been entitled to the basic privileges provided in labour laws, i.e. to be promoted or recognised as a permanent worker. Moreover, in order to hide this picture of deprivation, under reporting of contract labour was observed in most of the factories.

For the purpose of the training under the project, it was decided to keep spending of scarce resources and technical assistance for the permanent workers so that the industry continues to benefit in the long run. Both the FIQC and MOL&E field officials suggested selecting more regular workers for better knowledge sharing at the end of project. Thus, the majority of the participants were permanent workers, and two-thirds of them were women workers. Based on this, over 1,800 workers and staff were trained, of which about 86% were permanent workers of the factories, while only 8% and 6% of the participants were permanent workers under contractors and casual

workers under contractors, respectively. About 61% of trainees were women and 39% men workers.

Age composition

Majority (60%) of the workers from Chittagong region were young and fell in the age group of 18-25 years, while 57 % of the workers trained from Khulna region fell in the age group of 26-40 years. There was, however, no child labour (age below 14) in Khulna region while 8 girls below 14 were found to be working in Chittagong region during this study. Further, 74 (13.5%) girls between 14-17 years of age were from Chittagong region while 4 girls and 3 boys in this age group were observed from Khulna region (Table 3). In spite of the strong campaign in recent years against the use of child labour across the shrimp processing industry, it appeared that the processing plants situated in remote areas like Sunamgonj and Cox's Bazar in Chittagong employed child labour, which may be partially related to the poverty in the region where children are forced to support families and also because of little or no vigilance from the government inspection departments. It is to be mentioned here that adolescent (14-18 years) workers are allowed to be employed under special conditions, as per the country's Labour laws.

Literacy status

In terms of education, workers from Khulna region are better educated when compared to Chittagong region. It was found that 63% of women workers and 18% of men workers from Chittagong area were illiterate, while only 27% women and 7.5% men workers from Khulna region were found to have had no schooling. The mean number of schooling years was 8.84 for the men workers against 4.78 for women at Khulna region, while for Chittagong region the mean schooling years were 7.98 and 2.75 for the men and women workers respectively (Table 4).

Table 3. Distribution of processing workers received training according to their age group.

SL	Age group	Khulna		Chittagong	
		Women	Men	Women	Men
1	< 14	0	0	8	0
2	14-17	4	3	74	0
3	18-25	217	88	332	131
4	26-35	254	158	109	140
5	36-40	52	47	17	33
6	> 40	24	49	7	61
	Total	551 (61.5%)	345 (38.5%)	547 (60%)	365 (40%)

Labour rights and benefits

Depending on the scale of operation, profitability of the business and availability of raw materials, there are variations across the processing factories in terms of labour rights and benefits. The rights and benefits affecting the socio-economic status of workers include their appointment

letters as a job security document that describes the work, gives details of the wage, hours of work, weekly holiday, number of days as paid leave and also gives some disciplinary instructions. This appointment letter is instrumental for protecting the rights of workers. A report by Solidarity Center 2012 says that 86% of workers in the Khulna region did not have any letter of appointment as of 2010. In the present study, it was observed that majority of the workers (79%) in the Khulna region had received appointment letters and 94% of them were also provided with identity cards. In the Chittagong region, only 31% of the workers received an appointment letter, although 54% of them were provided identity cards. The difference between the two studies can be explained by the fact that this study had 86% regular workers interviewed at work while the Solidarity Center study covered all workers and interviewed them outside their work place.

Table 4. Educational status of processing workers received training.

SL	Years of schooling	Khulna		Chittagong	
		Women	Men	Women	Men
1	0	148	26	343	66
2	1-5	200	41	91	40
3	6-10	167	177	98	153
4	11-12	25	55	5	53
5	>12	11	46	10	53
Total		551	345	547	365
Mean schooling year		4.78	8.84	2.75	7.98

However, the shift towards better compliance around Khulna region can be seen as the result of recent awareness and training programmes, along with pressure from the national and international labour rights organisations to enforce labour rules. The employers around Chittagong region were found to be not too willing to abide by labour rules and were reluctant to give the workers their lawfully due benefits.

Wage

The study found that the average wage paid in Khulna is BDT 3589.00 per month (46 USD) for women workers, which is 61% that of her male counterpart who is drawing BDT 5878.00 per month (76 USD). In Chittagong region, the average wage is BDT 3928.00 per month (50.6 USD) for women workers which is only 57% that of her male peers and equal to BDT 6847.00 per month (88.3 USD) (Table 5). The variation in wages among the men and women workers is partly due to the patriarchal attitude of employers and partly due to the better skill and education of men workers. The regional variations are also along expected lines due to differentials in living costs between the two regions. Chittagong being a port city and the second largest city of the country has a higher cost of living. Average labour wage levels in the shrimp processing sector, however, is higher than government declared minimum wage of BDT 2645.00 per month (34 USD). No one had reported receiving less than the minimum wage in Khulna region while 53 women (9.7%) and 3 men workers from Chittagong region reported receiving wage below the minimum wage declared by government. One reason could be the availability of cheap migrant labour in

Chittagong from neighbouring Myanmar which is ready to accept jobs in the processing factories for low wages.

Table 5. Wage disparity among the processing workers received training.

SL	Wage per month (BDT)	Khulna		Chittagong	
		Women	Men	Women	Men
1	2645<	0	0	53	3
2	2646-3500	367	22	210	34
3	3501-5000	159	152	230	110
4	5001-7500	22	104	45	120
5	>7500	3	67	9	98
Total		551	345	547	365
Mean wage per month		3589	5878	3928	6847

Note: 1 USD = 77. 5 BDT in April 2014.

Leave and allowances

The situation as far as provision of leave and allowances is concerned are better in Khulna compared to Chittagong region. Such entitlements are usually mentioned in the appointment letter issued to the workers. Since Chittagong factories lag behind in issuing appointment letters and identity cards, it is only to be expected that leave provisions and allowances are also largely ignored. As the shrimp processing activities are subject to availability of raw materials and the shrimp harvesting season is limited to 5 to 6 months in a year, leave facilities in tune with lean periods are the norm in most of the shrimp processing factories, except for a few plants working round the year. There is mutual understanding between the employee and the workers that they will work extra hours during the peak harvesting season when factories receive good amounts of raw materials, while less work and more relief period allowed during lean and off-season periods. The casual workers prefer to do more hours of work as their wage is calculated on a piece rate basis, and for more earnings more work has to be carried out. Most of the factories claim that they have provision for maternity leave, though practically there is not much evidence of providing the benefits to the women workers from Chittagong region. Deputy Chief Inspector, Factories and Establishments, Department of Inspection, Khulna Division disclosed that total amount of maternity leave benefit paid was BDT 52,000 in 2010 and BDT 462,000 in 2011 from the shrimp processing factories around Khulna region. This sharp increase in payment of maternity benefit by the processing factories can be attributed fully to the BEST-BFQ Project activities along with the monitoring from Department of Inspection, MOL&E.

Since most of the factories are short of raw materials, the management claims that there is no need for overtime work and usually no overtime allowances are offered. If a worker works for two hours more than normal working hours during the peak harvest days, the wages she or he earns for those extra hours can easily be recovered by the factory during the lean season when there is less raw material and less work. It was observed that lumpsum overtime allowance had been paid in case of few factories during peak season. Similarly, a lumpsum festival bonus is also allowed

in most factories during *Eid* and *Korbani*; two major festivals for the Muslims in Bangladesh, though a provision for such bonus is not mentioned in the labour laws.

Compensation for accidents

Social security and compensation for accidents is very crucial for workers. In a country where industrial deaths and injuries are high, the labour laws provides for only BDT 100,000.00 (1282 USD) as compensation for accidental death of a worker and BDT 125,000.00 (1600 USD) for those disabled for life. The actual compensation, however, often stood at two to three times more than the prescribed amount, when industrial deaths have occurred by accident in the past. Higher compensation provisions have been demanded strongly by various activists and sections of the civil society, including the Trade Union leaders. However, there was no response regarding compensation amount received by the participants during this study.

Working conditions

The physical environment and work safety across the shrimp processing industries are better compared to other industries in Bangladesh. The structural developments in the shrimp processing sector in Bangladesh happened after 1997, as a result of the European Union (EU) ban on shrimp and seafood import from Bangladesh. The industry had to undergo serious overhauling by upgrading the infrastructure and machinery, including modernisation of internal layouts of the factories as per EU and Hazard Analysis Critical Control Point (HACCP) requirements. The shrimp processing industries in Bangladesh were then approved by the EU and it qualified for the withdrawal of the ban in 1997. The structural up-gradation and maintenance of the processing environment are prerequisites for handling of perishable raw materials like seafood. This also gave the workers comfortable, clean, healthy working conditions.

Safety and labour standards

Most of the shrimp processing factories are two storied buildings where the production work is done on the ground floor while the office and administrative blocks are situated on the first floor. Apart from illnesses due to working in chilled condition and wounds and scars on the hands from continuously working in peeling and de-heading, the shrimp processing industry is considered safe from risks related to building and fire safety, the two main threats generally levelled against the garment industry. Due to the forced infrastructural upgradation as a result of the EU ban in 1997, the shrimp processing industry had to follow the stipulated regulations and upgrade infrastructure including design and structure of the plants to return into the business.

Trade union

Trade Unions (TU) are officially allowed in the shrimp processing industries and there are 13 registered TUs as of 2012. Most of the TUs are new and only few TUs have actually shown some promise in redressing issues of the workers in workplaces. There are complaints that the TUs are domesticated by the industry owners to make them benign or harmless. Intimidation and risk

of dismissal was a major observation during this study, and in few cases TU leaders have been sacked in Khulna region (SC 2012). It is true that there has been no labour unrest across the shrimp processing industry, while widespread unrests have often been recorded across the garment industries in the recent past. The TU experience in Bangladesh industrial sector has not been very favorable. During the early 1980s, the Jute industry and nationalised banking sector have had TUs and Collective Bargaining Agency (CBA) in all the units of these industries. Strong politicisation of TUs and irresponsible actions by CBA leaders caused massive losses and destruction of the industry, while the TU and CBA leaders reportedly made illegal earnings. The fear of evolution of similar TU and CBA across the growing industry in Bangladesh can prove to be counterproductive.

Child labour and forced labour

The issue of child labour has been raised against the shrimp processing industry of Bangladesh. Verite (2012) attempted to explore existence of child labour and forced labour across the entire shrimp value chain and observed that there existed forced labour in the form of long working hours in processing and child labour, generally accompanying working mothers under a labour contractor. The current survey, however, did not find child labour across the factories in Khulna Region, while a small percentage of women workers were girls below 14 years in Chittagong region. Issuing appointment letters and identity cards have helped in reducing child labour. The introduction of compulsory birth registration programme by the Government has also been instrumental in controlling child labour as no manipulation is possible in date of birth to falsify age claims. Forced labour was also not observed in the factories surveyed. The workers enjoyed full liberty to quit their job at any time, if they could earn better wages in any other works. Labour drop-out is very common in Chittagong area, where alternative job options are available.

Gendered discrimination

The issues of labour rights and their benefits have usually not been looked at from gendered point of view by the entrepreneurs in Bangladesh. Creation of employment has always been considered a laudable accomplishment as perceived from an economic point of view. Labour rights and benefits and social discrimination that occur in the course of its implementation have not been looked at seriously because of the patriarchal notion that the creation of job is sufficient as far as an unemployed person is concerned. So, entrepreneurship has usually been patronised by the public sector government departments for the growth and development of the country.

During this study, many factories were identified where there were either no or few women workers employed under permanent pay roll. The permanent men workers are entitled to paid leave, use free canteen services and enjoy other privileges constituted by the management. On the other hand, hundreds of women workers are engaged through labour contractor as casual workers, but have never been promoted to permanent workers. The argument of by the management is that *"jobs are created for women workers. They should feel lucky because thousands of people including women are still unemployed"* or *"There is no hard and fast rule that we have to employ equal number of men and women under my factory"*. In one statement during factory inspection, one General Manager stated *"we have 2500 women workers in this factory, all are childless and*

hence we do not need any child care room". In another case, all of 155 permanent workers under a shrimp processing factory were men, with over 300 women casual workers under a labour contractor and the owner claimed his factory had better compliance. Deliberate gender discrimination is thus common in the shrimp processing factories.

Violence against women

This study also explored if there were cases of violence against women, especially common in the case of casual women workers under labour contractors. At least 70 women workers reported verbal abuse and harassment by their male counterpart, supervisor or by bosses. Thirty women respondents reported physical harassment, while nine young women workers reported sexual abuse at their work place. In majority of the cases, the victims are young and unmarried. It is true that women earn a monthly wage and are treated better in their families. They can spend their own income and take part in decision making within her family. Yet she has to face negligence, deprivations and violence at her work place when compared to her male counterpart. There are NGOs and individuals who came forward to assist victims lodging cases as per laws. Such actions are expected to be a deterrent to potential violators. However, the victims often do not want to come out in public fearing social stigma that may follow the disclosure of the incidence of violence and harassment.

Changes towards better compliance

There has been a change in terms of compliance of labour laws as observed from the factories during this study. A number of factories have appointed 'Compliance Officers' to look after labour laws and human resource management. Record keeping in precise formats in tune with compliance requirements for inspection is also being followed. Similarly, there are examples of processing factories that have started planning their own training programmes on labour laws. Training manuals developed by UNIDO are being used to impart in-house training for their workers and staff with the help of trained trainers. Some of the factories, both in Khulna and Chittagong, were seen using display boards announcing their labour policy along with photographs and news clips on the labour laws training, to demonstrate their changed attitude.

Challenges

There are no dearth of laws to govern the industry sector in Bangladesh. The issues arise when the industry units tend to bypass official rules. It is important to bring changes through political commitment and increased vigilance and inspection by the Government agencies to ensure labour rights and consequent benefits and social justice in the society, particularly for the women employed in the sector. The top management should also understand the value of better compliance and recognise that their reputation in the international market is linked to this. Among the most immediate needs to be addressed are wage revision, parity of wages between men and women, profit sharing and extending other employment benefits to the workforce engaged in the shrimp processing sector. Both the Government and the industry should work towards increasing the supply of raw material round the year, to ensure continuous employment. Research and

development is needed on new value added products so that the industry can diversify and also keep production going throughout the year and workers can have sustained livelihoods. Finally, an industry with better compliance should be able to fetch premium prices from the markets.

Conclusion

Labour standards and work place safety have emerged as serious issues for Bangladesh due to the recent industrial accidents and subsequent GSP suspension by the US government. The final withdrawal of GSP facilities in US and EU export market has been a driver in securing favourable work environment as per acceptable global standards. This has also been a reason for fixing the weakness in terms of complying with the building codes, and fire safety in the industry.

There have also been efforts by the Government to make necessary amendments to existing labour laws and it has been comprehensively revised and came into effect in July 2013. The shrimp and seafood industry falls under the purview of being monitored for labour compliance, as long as they want to export. It is, therefore, imperative to continue support to the shrimp and seafood industry to keep them up-to-date on matters related to better compliance in respect of amendments made in the labour laws. However, vigilance is needed, as the export sector will continue to have compulsions to keep costs low to ensure profits. There is also need for strong policy frame work and political commitment to enforce the rules, to see that the labour are not deprived of their rights.

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Technical Paper

Carp-SIS Polyculture: A New Intervention to Improve Women's Livelihoods, Income and Nutrition in Terai, Nepal

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Abstract

Based on lessons learned from field trials, carp-small indigenous fish species (SIS)-prawn polyculture technology was improved to a "carp-SIS polyculture" technology suitable for small scale farmers in Terai, Nepal. In December 2008, the project was initiated to improve income and nutrition of Tharu women in Chitwan (100 farmers) and Kailali (26 farmers) districts. SIS dedhuwa, *Esomus danricus* (Hamilton, 1822) and pothi, *Puntius sophore* (Hamilton, 1822) were intended to improve household nutrition through increased consumption due to their high micro-nutrient content whereas large carps rohu, *Labeo rohita* (Hamilton, 1822); mrigal, *Cirrhinus mrigala* (Hamilton, 1822); silver carp, *Hypopthalmichthys molitrix* (Valenciennes, 1844); bighead carp, *Aristichthys nobilis* (Richardson, 1845); common carp, *Cyprinus carpio* (Linnaeus, 1758) and grass carp, *Ctenopharyngodon idella* (Valenciennes, 1844) were grown mainly for sale. The farmers consumed 48.7% of the production and raised their fish consumption to twice the national average of 1.85 kg.caput^{-1}.year^{-1}. Farmers earned NPR 3,025 **(**USD 34.23**)** per household in 270 days which helped them economically. A women fish farmers' co-operative was established. Altogether 156 women directly benefited from the project. The training and project experiences improved their self-confidence. Micro-nutrient analysis of common SIS showed that vitamin A was higher in mara, *Amblypharyngodon mola* (Hamilton, 1822) whereas iron and zinc were higher in dedhuwa. The approach was found to be a more economic and sustainable, and is being replicated in other districts.

Introduction

The Nepalese people have a plant-based diet. In addition to staple plant foods such as rice and roti (flat bread made of wheat flour) vegetables such as green beans, cauliflowers, cabbage, brinjal, mustard, spinach, lady's finger, potatoes, radish, squash, tomatoes etc. grown in home vegetable gardens play a vital role in the supply of nutrients to the resource poor. However, quality and bio-

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availability of essential amino acids are higher in animal protein compared to plant protein (Pulami and Poudel 2004). Therefore, there are advantages to include animal protein in the diet. Fish are an important source of nutrients and micro-nutrients because fish are rich in protein, fatty acids, essential vitamins and minerals which are important for the cognitive and physical development of humans (Roos et al. 2006). Realising this fact, a pilot project entitled "Improvement of women's livelihoods, income and nutrition through carp-small indigenous fish species (SIS) - prawn polyculture in Terai, Nepal" was initiated in Chitwan (central region) and Kailali (far western region) districts of Nepal to help directly address malnutrition among poor women and children. The project ran for three years, commencing in December 2008. The approach included farming by the women, of carp rohu, *Labeo rohita* (Hamilton, 1822); mrigal, *Cirrhinus mrigala* (Hamilton, 1822); silver carp *Hypopthalmichthys molitrix* (Valenciennes, 1844); bighead carp *Aristichthys nobilis* (Richardson, 1845); freshwater prawn, *Macrobrachium rosenbergii* (De Man 1879); and small indigenous fish species (SIS) such as dedhuwa, *Esomus danricus* (Hamilton 1822); mara, *Amblypharyngodon mola* (Hamilton 1822); and pothi, *Puntius sophore* (Hamilton 1822) in household ponds. Farmers sell carp and prawn for household income, whereas the SIS are consumed by the family, through regular partial harvesting, to improve the nutritional status of family members as these fish are rich in vitamins and minerals (Thompson et al. 2002; Roos et al. 2003; Akpaniteaku et al. 2005; Roos et al. 2006, 2007a, 2007b). Moreover, as SIS are eaten whole, there is no loss of nutrients from cleaning or as plate waste, and the contribution to micronutrient intake is higher.

Average fish consumption rate and income of farmers increased after the interventions that brought new farming technology and provided training programmes (Rai et al. 2012). Despite this, farmers could not continue using the technology due to the unavailability of prawn seed as prawn seed production is not well developed in Nepal. These were sourced from Bangladesh and stocked in farmers' ponds during the first two years of the project. Transportation of prawn seed from Bangladesh was expensive and also suffered more than 50% mortality during transportation. Similarly, mara was unavailable in Chitwan and its transportation from other districts caused high mortality (Rai et al. 2012). Due to these bottlenecks, prawn and mara were excluded and only carp, dedhuwa and pothi were included in the stocking combination in third year. Based on this experience, the project introduced carp-SIS polyculture as an improved technology to the selected women farmers in Chitwan and Kailali in 2011. The findings from the first year of the project implementation (carp-SIS-prawn polyculture technology) were presented in Rai et al. (2012). The present paper presents the final results of the project. The paper describes findings of improved carp-SIS polyculture technology in relation to household fish production and consumption, the socio-economic conditions of women farmers and outcomes beyond the immediate project.

Materials and Methods

Farmers' selection

A total of 126 women farmers were selected, 100 from Chitwan (central region) and 26 from Kailali (far western region) based on their available resources, water source and enthusiasm for fish farming. The farmers were trained in pond fish farming. They were taken on an exposure trip

to a fish farming area, and assistance was provided to get them involved in income generating activities to improve their socio-economic status.

Training in pond polyculture

Female farmers received training on carp-SIS polyculture techniques for two days. Trainers from the Rural Integrated Development Society (RIDS) and the Rural Empowerment Society (REST) trained the farmers on carp-SIS farming (Rai et al. 2012). During the training, farmers were supplied a carp-SIS polyculture manual and a record book to record the numbers and weights of fish that were harvested, consumed and sold. The number and weight of dead fish and the amounts of feed and fertilizer applied to the ponds were also recorded. The record books were regularly monitored by the project staff. The farmers also visited Shankarnagar, one of the biggest fish producing area at Chitwan, to observe commercial carp farming.

Pond fish farming

Each farmer carried out farming in a small household pond of average size ~100 m^2 (sizes varied between 35 m^2 to 236 m^2). Ponds were dug in 2008 and the entire construction was supported by the project. All the ponds were fed with water channelised from nearby rivers and rivulets. Farmers stocked fingerlings of rohu, mrigal, silver carp, bighead carp, common carp *Cyprinus carpio* (Linnaeus, 1758), grass carp *Ctenopharyngodon idella* (Valenciennes, 1844), dedhuwa and pothi in March 2011. The stocking densities used by farmers were: carp 10,000 ha^{-1} and SIS (dedhuwa and pothi) 30,000 ha^{-1} (Table 1). Farmers fed fish and fertilised their ponds following Rai et al. (2010) and Knud-Hansen et al. (1993), respectively, except grass carp feeding. Farmers fed banana leaves, wastes of green vegetables and grasses grown on the dike to grass carp daily. Though feeding was done mostly by women, the transportation of feed and fingerlings and harvesting were done by both men and women.

Table 1. Stocking density (No. ha^{-1}) of carp and SIS.

Species	**Stocking density** (No. ha^{-1})
Rohu	2,000
Mrigal	500
Silver carp	3,000
Bighead carp	1,000
Common carp	2,000
Grass carp	1,500
SIS (Dedhuwa/Pothi)	30,000
Total	40,000

Record keeping and estimates

Fish production was estimated by deducting initial (stocking) total weight of fish from final total weight of fish. Final total weight was determined by summing total final harvest weight of fish, weight of fish consumed by family and weight of fish sold.

Fish production (Kg. $pond^{-1}$) = Final total wt. (harvest wt. + wt. of fish consumed + wt. of fish sold) – Stocking total wt.

The amount of fish consumed and sold by the family was determined from the records of weight, number and type of fish consumed and sold by the farmer. Income generated by each farmer from fish sale during and at the end of the culture period after final harvest was summed up to calculate total income earned from pond fish sale.

Results

The project participants

A total of 126 women farmers adopted carp-SIS polyculture, 100 in Chitwan and 26 in Kailali districts. The average family size was 6.4. Most families (96%) were headed by men (husband, father or father-in-law). Both men and women in the family were involved in agriculture. However, only women were selected for the project to meet the objective of the project. The majority of the farmers (95%) were Tharu, the least privileged ethnic group of Nepal. Involvement of Tharu women in income generation activity through carp-SIS farming helped to empower them economically and socially. Moreover, their involvement in group activities provided them the opportunity to come out of their house and improve their self-confidence and play significant roles in the society. Some emerged as leaders while others increased their participation in social activities. Moreover, their roles in household decision making also improved while earlier their responses would be "I have to take permission from my husband or father-in-law", if they were asked to participate in training, field trips etc. Later they began to demand to go for training and on field trips.

Women fish farmers' groups

Six women fish farmers' groups have been formed, five in Chitwan and one in Kailali (Table 2). The number of members in each group ranged from 15 (Piple) to 26 (Hasuliya). 95% of the women were Tharu, and other castes included Sarki, Pariyar and Brahmin. Women's groups of Phulloria, Mudovar and Piple have mixed communities whereas those of Majhui, Phaphini and Hasulia have only women from the Tharu community. The majority of women (58%) were young (20-39 years) followed by middle aged (40-59 years, 39%) and old (60-70 years, 3%). Elder women members could read and write with difficulty but they were found to be very sincere in performing their duties such as pond management, feeding fish and keeping fish production records. In aggregate, 87% of the women members had a primary level of education (Grade 1-5), 9% had secondary education (Grade 6-10) and 2% had higher levels of education (Intermediate).

Each group held monthly meetings. During the meetings, problems such as fish diseases, poisoning of water sources, water supply, advocacy with the District Agriculture Development Office (DADO) and their solutions; as well as future activities such as "where" and "how" to procure fingerlings were discussed. A monthly deposit of NPR 10-25 per member was made in the groups' account. This corpus was used for providing loans of NPR 500–5000 per person (USD 5.32-53.2) to group members who were in need of financial support, at an interest rate of 1% per month as well as for repairs of equipment, e.g. purchase of pump set and fishing net. The number of members were found to have increased since the establishment of the women's groups of Piple (15 to 17 members), Majhui (21 to 25 member) and Phaphini (25 to 39 member). New members constructed fish ponds on their own in Piple and Majhui whereas in Phaphini ten members received support from the project (supported by Danida, Denmark) and DADO in 2011 and 14 members received support from Twinning project-phase I in 2012 for pond construction.

Table 2. Women fish farmers' groups formed in Chitwan and Kailali districts.

S. N.	Women fish farmers' groups	Village	No. of members per group	Ethnic composition	
1	Namuna Bikash Mahila Machapalan Krishak Samuha	Phulloria, Chitwan	23	19 Tharu	4 Sarki
2	Janmukhi Mahila Machapalan Krishak Samuha	Mudovar, Chitwan	16	15 Tharu	1 Pariyar
3	Rai Mahila Machapalan Krishak Samuha	Piple, Chitwan	15	14 Tharu	1 Brahmin
4	Laligurans Mahila Machapalan Samuha	Majhui, Chitwan	21	21 Tharu	-
5	Saypatri Mahila Machapalan Samuha	Phaphini, Chitwan	25	25 Tharu	-
6	Lalpur-Bhadari Mahila Machapalan Samuha	Hasulia, Kailali	26	26 Tharu	-
	Total		**126**	**120**	**6**

Capacity building

Altogether 156 women benefited directly through capacity building and empowerment through their roles as farmers (136), trainers (18), field supervisor (1) and coordinator (1). Eighteen women farmers from RIDS and REST were selected by their respective executive bodies based on their experience and literacy (Rai et al. 2012) and they in turn trained 136 project farmers on carp-SIS polyculture. In addition, eight women lead farmers and eight project staff (2 women and 6 men) visited Bangladesh to observe and study advanced aquaculture technologies. Visiting lead farmers included chairpersons from each of the six women's groups (6) and the two highest fish producing farmers, one each from the first and second project years.

The Bangladesh visit had been a turning point for some farmers and project staff, providing the visitors from Nepal with the confidence that "we can also do". Having observed and learnt the integrated pond dike farming system utilising dikes for growing vegetables in Mymensingh, Bangladesh, some farmers adopted the same technology in the ponds back home with technical support from project staff. Two farmers also increased their pond size after the visit. One of the

farmers assisted her fellow farmers to establish a woman's fish farmers co-operative in the village a year ago. The co-operative will be a collaborating partner in a Twinning project–phase II (funded by Ministry of Foreign Affairs, Finland). Another farmer approached a donor (Danida Nepal) and DADO for financial support to construct ponds for her fellow farmers in the village. With support received from the donor and DADO, she succeeded in helping ten women in adopting fish farming and also increased the number of members in the group from 25 to 35.

Outcomes beyond the immediate project

Two significant impacts were observed as a result of the implementation of the project. These were the establishment of women fish farmers' co-operatives and the use of the project approach, materials and outputs as the basis of new projects. Women farmers from Majhui, Khaireni-3 and Chitwan established a women fish farmers' co-operative in December 2012. The co-operative consists of 25 members, with an elected executive board of 11 members for managing co-operative activities. The co-operative collects savings from members which they utilise to disburse loans to needy members at low interest. In Nepal, bank loans have a high interest rate and securing a loan is a cumbersome process. Therefore, the low interest loans from co-operative are attractive to farmers. The cooperative aims to improve the economic and social status of members through their participation in income generating activities such as fish farming, integrated fish farming and marketing.

Two new projects: "Twinning support for development of women fish farmers' organisations in Nepal," funded by the Government of Finland and "Agriculture and Nutrition Extension Project" funded by the European Union (EU) have been replicating carp-SIS polyculture in Chitwan, Nawalparasi and Rupendehi districts. In addition, the project's training materials, strategies; outputs and manpower have been used as the basis for these new projects. The Finnish project has appointed, Ms. Usha Chawdhary, a farmer of Majhui, as a Field Supervisor and also five lead farmers as Trainers. Similarly, the EU project has also recruited Mr. Bishwa Chandra Pokhrel, Field Supervisor of the project as an Aquaculture Officer.

Fish production

Fish were harvested after 270 days of stocking in December 2011. Farmers obtained an average production of carp (86%) and SIS (Dedhuwa/Pothi) (14%) of 4.4 tonnes.ha^{-1}.year^{-1} which was higher than the national average fish production of 3.5 tonnes.ha^{-1}.year^{-1} from carp polyculture (Ministry of Agriculture and Co-operatives 2009). The total production was higher in Chitwan (4.7 tonnes.ha^{-1}.year^{-1}) than in Kailali (3.0 tonnes.ha^{-1}.year^{-1}).

Fish consumption

48.7% of the total carp produced was consumed by the households. The average fish consumption rate increased to 3.7 kg.caput^{-1}.year^{-1}, whereas the average national fish consumption rate in Nepal is 1.85kg.caput^{-1}.year^{-1} (Directorate of Fisheries Development 2013). SIS consumption ranged from 0.5 to 6.4 kg.household^{-1} in 270 days. Fish consumption was higher in Chitwan compared to Kailali due to relatively higher fish production (Fig. 1).

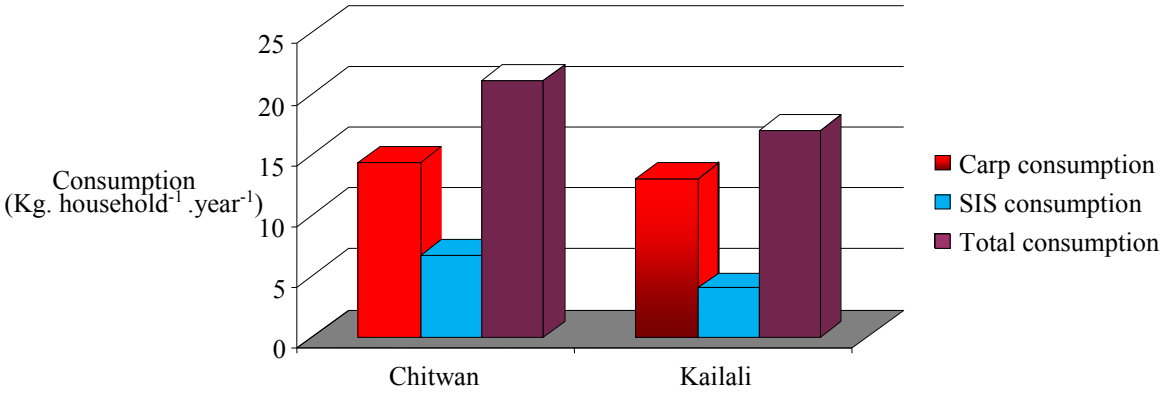

Fig. 1. Household fish consumption in Chitwan and Kailali.

Income

Farmers sold fish to locals in the neighbourhood and customers generally came to farmers' houses to buy the fish. Both men and women were involved in the fish sales. A few farmers sold fish to local vendors who in turn carried out their trade in the local markets. Carp was sold at the rate of NPR 200 (USD 2.1) per kg and the average income generated by the farmers per household in 270 days was NPR 3, 025 (USD 34.11).

Nutrient profile of SIS

Micro-nutrient profiling of SIS samples of dedhuwa, faketa (*Barilius* sp.), mara and pothi, collected through the project, was done at the University of Copenhagen, Denmark. Among the four SIS, vitamin A was found to be highest in mara whereas iron and zinc were found to be highest in dedhuwa followed by pothi (Table 3). In the table, the vitamin A and iron content of the four SIS is compared with that of mrigal and silver carp from Bangladesh (Roos et al. 2007b).

Table 3. Vitamin A, iron and zinc content in four common SIS of Terai, Nepal.

SIS	Vit. A (RAE.100g. rawclean parts^{-1})	Fe content (mg.100g. rawclean parts^{-1})	Zn content (mg.100g. rawclean parts^{-1})
Dedhuwa (*Esomus danricus*)	107.5	6.2	4.5
Faketa (*Barilius* sp.)	84.5	1.0	3.6
Mara (*Amblypharyngodon mola)*	685.5	2.4	4.3
Pothi (*Puntius sophore*)	56.0	3.1	4.2
Mrigal (*Cirrhinus mrigala*)	< 30	2.5	
Silver carp (*Hypopthamichyths molitrix*)	< 30	4.4	

RAE: Retinol activity equivalent

Discussion

The dietary habits of the Nepalese people is undergoing a change and fish consumption is gradually increasing. Indian and Chinese carp are the main fish cultured and eaten in Nepal but carps have lower vitamin and mineral content compared to SIS, particularly mara and dedhuwa. This fact indicates the benefit of increasing SIS production and consumption. In this regard, polyculture of carp and SIS in ponds can contribute to improved family nutrition as well as increased income in rural areas. In the past, SIS were not valued and their presence in ponds was considered undesirable (Rai et al. 2012). This project has contributed to changing the attitude towards SIS and has highlighted the nutritional value of SIS.

Among the farming families that took part in the project, total fish production was found to be higher than the national average production from carp polyculture and carp-SIS-prawn polyculture (Rai et al. 2012). Increased production can be attributed to extra production from SIS, improved management particularly in protecting fish from poisoned water, improved stocking combinations and increased stocking density. During the production period, farmers regularly harvested SIS (up to two times per month after breeding of the stocked brood SIS) for family consumption after three months of stocking, which maintained the optimum stocking density in the system and improved overall fish production. In carp-SIS-prawn polyculture, production was hindered by i) a fish kill from using a poisoned water source, ii) using low stocking density of 7,500 ha^{-1}, and iii) stocking four carp species which perhaps did not utilise all available niches (Rai et al. 2012). Fish production was comparatively lower in Kailali than Chitwan which was probably due to stocking of small size fingerlings and poor pond management.

Fish consumption among farmers was found to be double the national average per capita fish consumption and higher than from carp-SIS-prawn polyculture (Rai et al. 2012). The partial harvesting system of SIS obviously increased fish consumption. SIS contributed 28% to the total family consumption on average. A few of the farmers preserved their excess dedhuwa by drying them under sunlight for consumption later. However, fish consumption is far lower than the global average fish consumption, thus there is a potential and need to increase the fish production and consumption. Micro-nutrient analysis showed that mara and dedhuwa were more valuable in terms of nutrient content. Vitamin A was found to be comparatively lower in mara than reported by Roos et al. (2003, 2007a, 2007b) in Bangladesh. The reason might be the sample of mara contained juveniles having lower vitamin A content. Roos et al. (2002) reported that vitamin A accumulates with age in fish. Micro-nutrients in SIS were found to be much higher than in large carps in Bangladesh (Roos et al. 2003). Regular intake of such micro-nutrient dense small fish can mitigate malnutrition problems from which women and children often suffer.

Almost all farmers sold carps and increased the household income which empowered women economically. The income generated was higher than from carp-SIS-prawn polyculture (NPR 1,523 per household in 250 days) due to better production. Marketing was not difficult because production was small and demand was high. The farmers spent the income on household activities and micro-credit savings.

Realising the malnutrition problems, in 2012, Dr. Baburam Bhattarai, the former Prime Minister of Nepal gave a strong commitment to improve the nutritional status of children and women for future socio-economic growth and development of the country. To ratify the commitment, the Government of Nepal signed the Declaration of Commitment for Accelerated Improvement in Maternal and Child Nutrition, and launched the Multi-Sectoral Nutrition Plan (MSNP) on 17 September 2012 (UNICEF 2012). The new national nutrition programme may help the approach to expand to new areas and benefit larger number of women and children.

The project has been able to develop a sustainable fish culture package appropriate to small scale farmers which is now being replicated in five districts (Chitwan, Kailali, Kapilvastu, Makawanpur and Nawalparasi). Around 1,200 households have adopted this technology. The project has also played a significant role in leadership, skill and career development of women farmers involved in the project.

Conclusion

Though fish production was better in carp-SIS polyculture, it needs to be increased further by increasing production through improved technology such as using substrates for periphyton growth, integrating with vegetables and fruits and adopting multiple stocking and harvesting strategies. Upscaling of carp-SIS polyculture in other parts of Terai is essential to benefit more families. This upscaling may need collaborative efforts among rural communities, government line agencies, research institutions and donors. The approach might be a way to help implement the new Multi-Sectoral Nutrition Plan in the country (UNICEF, 2012).

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Technical Paper

Work Spaces for Women in the Mussel Industry Value Chain of Jiabong, Samar in the Philippines: Promoting Small-scale Entrepreneurship

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Abstract

Green mussel, *Perna viridis* (Linnaeus, 1758) farming in Jiabong, Samar in central Philippines is an important livelihood option, yet has remained an "infant" industry. The Industry has potential because of its employment-generation capacity, the increasing market demand for fresh and processed mussels and the social benefits that accrue to the mussel stakeholders.

The strategies for the promotion of small-scale entrepreneurship for women in the mussel industry are identified in this study by using a Value Chain Analysis (VCA). There are opportunities that exist and work spaces that women micro-entrepreneurs occupy in the various production stages of the male-dominated mussel industry. These unfold from the current state of women's productive-reproductive work and community activities, along the entire value chain from the mussel growing stage to its harvesting, processing, and trading (both fresh and processed). In this scenario, there are practical and strategic gender needs which have to be addressed to expand and improve women's work spaces that have to go beyond the traditional marketing/trading that women are engaged in. Strengthening women's skills and entrepreneurial capabilities along the value chain will increase women's income from increased employment and engagement in a more gender equitable mussel industry.

Introduction

It was in the 1970s that green mussel, *Perna viridis* (Linnaeus, 1758) farming was introduced in Samar in central Philippines. They could have come through the bilge water of the ships plying the islands via Maqueda Bay in Samar (FAO 1999). Today, mussel farming has expanded in area, employment, and in its contribution to livelihoods and incomes.

In this male-dominated industry, what are the work spaces for women? What are their roles in the different stages of mussel production and processing? What are their practical and strategic gender needs (PGNs and SGNs) such that, by addressing these needs, productivity is improved

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and gender equity along the mussel value chain is promoted? What investment opportunities and entrepreneurial initiatives are open to the women?

This paper tries to explore these questions by conducting a gendered Value Chain Analysis (VCA) in Jiabong, Samar in 2012. Jiabong is the largest of seven municipalities in Samar and is known to be one of the biggest mussel producers in the area. Key Informant Interviews (KIIs) with the Municipal Agriculturist, the persons-in-charge at the Department of Trade and Industry, at the Local Government Unit of Jiabong and at Bureau of Fisheries and Aquatic Resources (BFAR) were conducted. Secondary data was also collected from these offices.

A quick survey among the mussel operators along the value chain was also undertaken. Respondents included twelve value chain operators: six mussel farmers/producers, three traders/sellers and two mussel processors. The KII guide as well as the survey questionnaire included the following parts: steps in mussel production processing and trading/marketing, strengths and weaknesses of the local mussel industry, the PGNs and SGNs of women engaged in mussel production and the investment opportunities for women. A balance in the number of male and female respondents was considered.

A brief on the mussel industry in Jiabong

In 2005, Jiabong had the biggest mussel farm area in Eastern Visayas at 117.05 ha with the volume of mussel production being 7,937.65 tonnes, equivalent to 14,7953 sacks and an estimated value of PhP 31.09 million or USD 605,922.72 (at an exchange rate of USD 1 = PhP 51.31). Jiabong now has 160 ha of mussel farms, with an estimated value of production of PhP 32.16 million or USD 626,754.04 (Table 1). Prices of mussel (locally called *tahong*) ranged from PhP 150 (USD 2.92) to PhP 21 (USD 4.19) per sack. These years also witnessed the emergence of *tahong* processors. There were new investments in the production of *tahong* crackers and bottled *tahong*.

The success stories, however, met challenges of declining mussel production in 2008. The decline was primarily due to pollution (BFAR 2009), the deterioration in the condition of the water, the presence of pathogenic bacteria (Docdocan 2008), and harmful algal blooms (HAB) or "white tide" that killed the mussels (Docdocan 2009). It was also caused by waste from upland areas and households (Senate PSR No. 914, 2012). The traditional use of bamboo poles to attract mussel spats may have likewise contributed to increased siltation and prevented adequate water circulation within the mussel area. These resulted in a 90% decline in mussel production over the 117 ha of mussel farms. The damage affected 137 registered mussel farmers and 255 households (Labro 2011) amounting to PhP 38 million (USD 740,596) with PhP 28.62 million (USD 557,786) being the losses to the industry in Jiabong alone. Prompt response from BFAR in 2009 included massive coastal clean-up. Mussel farmers hauled 37 truckloads of garbage from 67 ha of mussel farms (Quirante 2009). BFAR consequently established techno demo farms, designated regulated zones and introduced the use of environment-friendly farming method.

Table 1. Mussel producers in Samar by farm area and the volume and value of mussel production, 2005 & 2006.

LGU	Area devoted for mussel culture (in ha)		Volume of production (in kg)		Estimated value of production (in PhP)	
	2005	2006	2005	2006	2005	2006
Jiabong	117.05	160	7,937,650	6,431,750	31,089,895	32,158,750
Villareal	42.60	48	2,088,300	2,378,650	8,353,200	11,417,520
Tarangnan	10.00	11	135,000	220,650	540,000	970,933
Catbalogan	17.23	19	630,000	529,050	1,890,000	2,433,745
Talalora	3.00	3.5	221,650	241,666	664,950	1,063,260
Zumarraga	2.40	3	80,000	104,166	288,000	458,260
Daram	1.90	2	63,300	76,666	227,800	337,260

Source: Jiabong Municipal Agriculture Office.

The product and the market

Jiabong mussels are generally sold fresh and shipped out daily. Processed mussels e.g. *tahong* crackers and bottled mussels which come in garlic and *adobo* flavour are produced and sold less frequently. Almost all produce goes to domestic markets/retailers.

The mussel value chain

The mussel Value Chain (VC) consists of a sequence of productive processes (functions) beginning with the provision of specific inputs for mussel production, to transformation or processing, marketing and up to final consumption (Fig.1). It can likewise be viewed as a series of institutional arrangements linking and coordinating producers, processors, traders and distributors of mussels and mussel products. At the micro level are the businesses that are found in each VC function. They are called the VC operators and the operational service providers; each one with specific activities. At the macro level are VC enablers which are composed of various support services to VC operators. At every VC level, value is added to the product thereby, generating more incomes, more investments and more employment.

The operators and enablers

As of 2010, there were 97 mussel farmers. Only three were women (Table 2). In mussel processing, there were only two entrepreneurs; one of whom was a woman. In processed *tahong* retailing, on the other hand, most of the fourteen entrepreneurs were women. There are also the retailers of fresh mussel who are mostly composed of the wives of the mussel growers. The relationships among these VC operators are shown in figure 2.

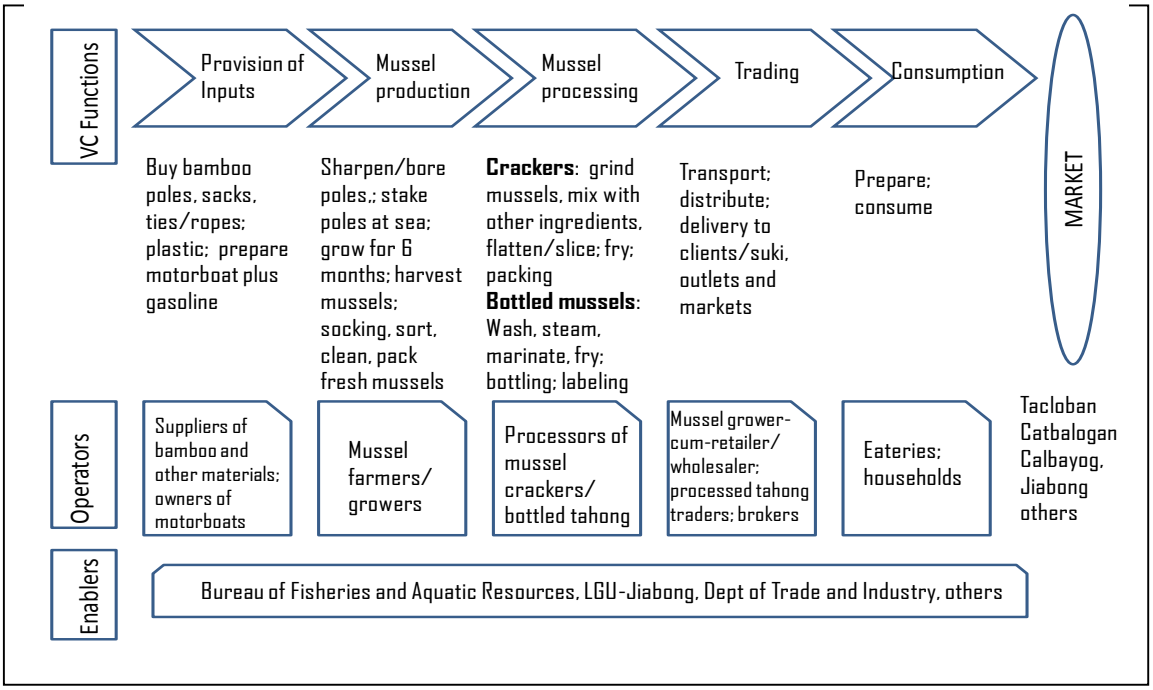


Fig. 1. The mussel value chain map, Jiabong.

Table 2. Mussel farmers in Jiabong, 2010.

Barangay	Number of mussel farmers			Method used	Number of poles
	Male	Female	Total		
Jia-an	20	-	20	Staking	One farmer with 1000 poles 19 farmers with 200 poles each
Alejandrea	33	2	35	Staking	3 farmers with 1000 poles One farmer with 500 poles 31 farmers with 200 poles each
Malobago	19	1	20	Staking	All 20 farmers have 200 poles each
Macabetas	22	-	22	Staking	All 22 farmers have 200 poles each
TOTAL	94	3	97		

Source: Jiabong Municipal Agriculture Office.

Strengths and weaknesses of the mussel VC

It is imperative for operators in all VC functions to be competitive if the VC is to become the driver of economic development by its ability to create jobs and generate incomes. Table 3 provides an overview of the strengths and weaknesses of the mussel industry and Jiabong's potential to be the mussel capital of the Philippines after the 2008 mussel kill.

The opportunities emanate from the government programs for the expansion of the mussel industry, which boasts of wide areas for farming, a large potential market for fresh and processed mussel products, as well as the presence of well-organised mussel operators associations. On the other hand, there are constraints to contend with such as the need to provide sustained supply of inputs, to improve the shelf-life and quality of processed mussels, and to undertake more aggressive marketing. All of these serve as indicators for identifying investment opportunities for women.

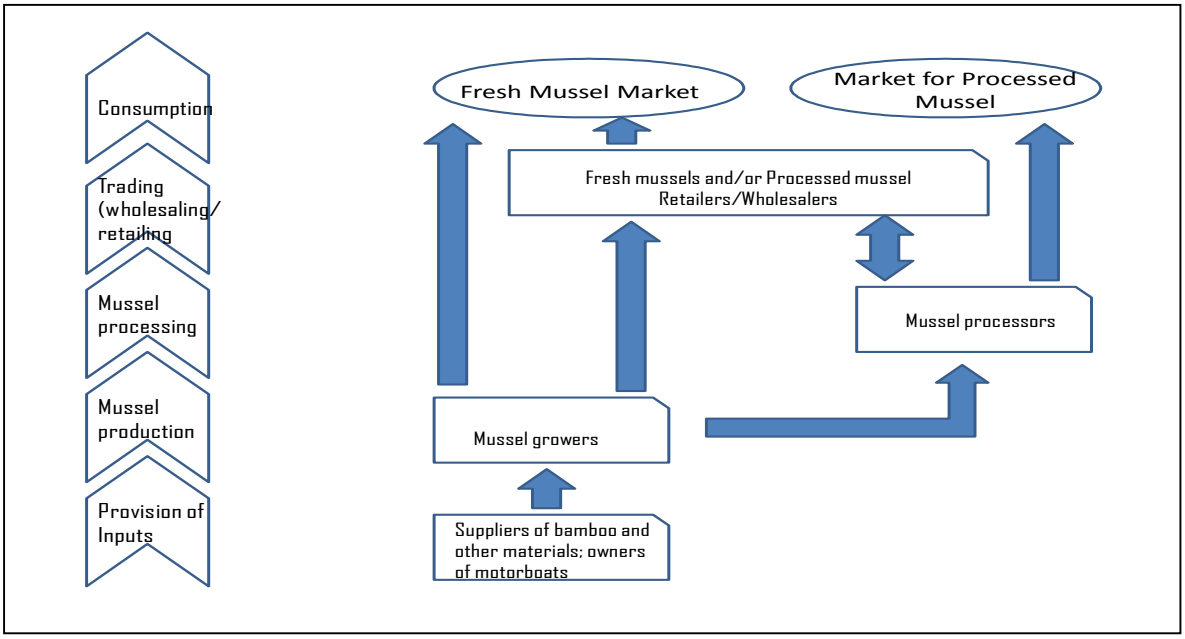


Fig. 2. The linkages between VC operators, Jiabong.

Table 3. Strengths and weaknesses of the Jiabong mussel industry, 2012.

Strengths	VC function	Constraints
• Mussel crackers is gaining market as a healthy snack item	Consumption	• Exotic food has small local market • Flavour can still be enhanced
• Large potential profit and rates of return • Employs women and girls • Possible business for transport providers	Trading	• Bottled mussels take a long time to sell • Wholesaler waits for orders • Prices are not standardised
• Longer shelf life • There are only 2 processors • Bottled mussel and other ways to process mussels has wide potential for business	Mussel processing	• Mussel crackers are easily crushed • Not regular/continuous • Poor packaging • Lack of better technology/equipment
• Less cost to growers who have own supply of bamboo • Potential for the expansion of area for mussel production. (In 2005, Jiabong still had 200 hectares) • Presence of mussel operators associations • Higher revenues for bamboo owners when mussel farming areas increase	Mussel production Provision of inputs	• Sea water is not of best quality • Mussels fall before it is ready for harvest • Non-monetised self-owned resources • Mussels do not grow to big sizes • Rotten bamboo poles pollute seawater • Low/ irregular production • No fixed supplier of bamboos • No bamboo grower/farmer

Source: FGDs and KII conducted in December 2012 and January 2013.

The women in the mussel VC: Gendered work spaces

Being a male-dominated industry, the participation of women is minimal except in mussel processing and trading. Using a Gender Activity Profile, the productive-reproductive-community work mix shows that the work spaces for women include extension of household work for which they have been best prepared for by conventions, norms, and traditional socio-economic institutions (Table 4). These are traditionally "female jobs", and works that relate to maternal roles

(e.g. caring, nurturing) and roles that are parallel to household chores (e.g. cleaning, sorting, preparing paraphernalia/ingredients, cooking, and packing).

Many times, the women are not paid because of the perception that work is: light and part of the husband's main work; menial, thus, without cost/labour value; done when the woman is not doing any other work; regarded as family labour and only the husband gets paid for the work; and done simultaneously with housework and there is no "extra/separate" time spent by the woman to merit payment. Nevertheless, woman's work is an economic activity. She could have earned had she worked for others and sold her services in the labour market.

For the unpaid female labour, it is understood that when the husband who grows/processes/trades mussel products gets paid or earns profit, the cash income goes to the coffers of the family. The value of the woman's labour services gets intertwined with the cash income that accrues to the husband. Having no pay that is separate from her husband's pay, however, does not bother her as this is seemingly dictated by society.

Table 4. Work spaces for women in the mussel value chain.

VC function	Economic activity			
	Woman	**Paid?**	**Girl**	**Paid?**
Consumption	• Prepares the mussels as viand	No	• Helps mother	No
	• Buying, selling mussel products		• Peddling/selling of mussel products	
Trading (Wholesale/ Retail)	• Brokering; and recording sales	No (but profits from sales)		
	• Looks for transportation			
	• Takes charge of deliveries and orders			
Mussel Processing	• Prepares the sacks			
	• Buys ingredients			
	• Prepares the ingredients			
	• Helps husband process the mussels		• Collects mussels left in the farms after harvest	No (but profits from sales)
	• Packaging			
Mussel Production	• Delivers processed mussels		• Cleans and sorts	
	• Can own and manage mussel farms		• Helps in packing	
	• Looks for financial resources			
Provision of Inputs	• Helps prepare the fishing gears			
	• Helps in harvesting mussels			
	• Sells bamboo to growers	No		
	• Canvass lowest price of bamboo on behalf of the husband-farmer	No		

Source: FGDs and KII conducted in December 2012 and January 2013.

PGNs and SGNs of women in the mussel industry

Gender needs arise because of the terms of work and the gender discrimination in the work place. Staking, planting and harvesting mussels at sea are reserved for the males. While women self-claim that they can go to sea (as well as their husbands do), they contradict themselves by

living a life that encourages submission. The submission seems to be a happy and welcome state that is supposed to be a matter-of-fact and, therefore, not to be challenged. The practical gender needs (PGNs) often concern the inadequacies in living conditions and, thus, meeting these needs will improve the quality of the women's lives by involving women as beneficiaries and participants (Table 5). The PGNs arise from physical fatigue, and exposure to occupational and environmental hazards. The Strategic Gender Needs (SGNs), on the other hand, are needs which women identify because of their subordinate position in the industry. In the mussel value chain, it appears that the SGNs emanate from the lack of access and control of the woman on resources and assets needed in mussel production (Table 6).

Generally, she lacks self-confidence, and she accepts male dominance in the home and work spheres which is interpreted as her withdrawal in favour of submissiveness. She does not see this as a concern in relating with her husband or other men in the mussel VC. Her disadvantaged position is not identifiable by the woman herself. She is in a comfort zone that is dictated by society. She forgets to realise that she has skills/abilities that can be tapped as complements to her husband's work, not as a substitute for hired labour or as appendages to male labour.

Table 5. Women's practical gender needs (PGNs) in the mussel value chain.

VC Function	Gender issue	Practical gender needs (PGNs)	Addressing gender needs
Consumption	• Road accidents when peddling to travellers onboard buses passing by Jiabong	Health care; Better work conditions	• Provision of a bus stop where stalls for the women mussel peddlers will be located.
Trading	• Physical fatigue from whole day's work; backache • Tired hands from the pressure exerted in rolling the dough • Tired feet from standing • Eye strain • Exposure to heat while frying	Health care and protection Better work conditions	• Provision of women-friendly equipment : electric mixer/presser, boiler/fryer • Provision of ergonomic working tables/ chairs • Rest area
Mussel Processing			
Mussel Production	• Exposure to the sun and the rain • Carrying sacks of mussels when there is no help available • Wounding hands/feet • Wounding of hands from prolonged soaking in water		• Provision of trolleys/carts to carry heavy weights • Use of safe cleaning equipment and hand gloves • Construction of a shaded work station (with good drainage)
Provision of Inputs	• Work opportunities for women (e.g. bamboo production) but there is poor access to sources of capital	More sources of income	• Access to financing • Technology transfer on bamboo production

Source: FGDs and KII conducted in December 2012 and January 2013.

Responding to PGNs and SGNs of women mussel workers

Meeting the PGNs necessarily improves the quality of life of the women in the mussel industry. That is, she gets sick less often, her work becomes safer and less physically straining, exposure to environmental/occupational hazards is reduced, and she is less tired and fatigued at the end of the day. Traditional roles and relationships at home, however, may not be altered much. The woman may still have multiple burdens and her productive contribution to the industry may still be unrecognised and muted. Yet her personal physical well-being is improved. On the other hand, addressing the SGNs necessarily alters the woman's position in society and in the industry value chain. She herself becomes an agent of change. She is an enabler of changing women's roles and the transformation of relationships in the mussel value chain (Table 6).

Table 6. Women's strategic gender needs (SGNs) in the mussel value chain.

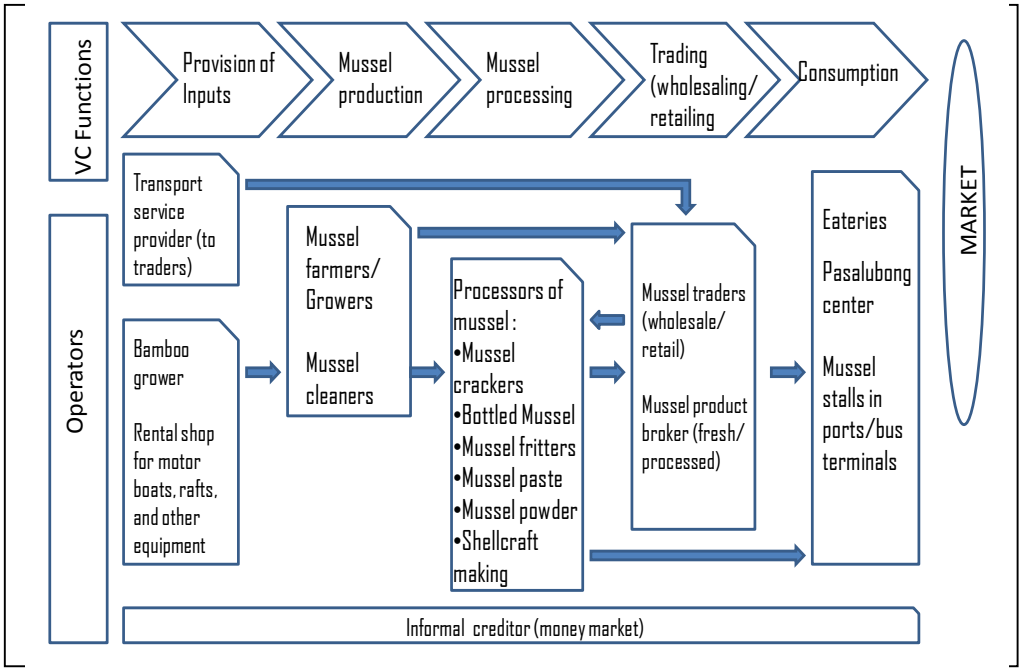
VC function	Gender issue	Strategic gender needs (SGNs)	Addressing gender needs
Consumption Trading Mussel Processing Mussel Production Provision of Inputs	When there is food shortage, husband gets to fill his plate first, then the children; what is left goes to the woman The husband rests at home while the woman tends the store and peddles in the street She is an assistant to the husband in production She is expected to be at home since husband is best person to go to sea She looks for creditor, or for cheapest inputs; these are unmanly activities	Unrecognised women's skills/abilities Unpaid women's work Roles not to be based on gender but on capacity Limited access to resources	• Consciousness raising e.g., Gender Sensitivity Training • Enhancing the woman's self-confidence through education • Formation of women's organisations • Strengthening the social capital across the VC; Women's participation in decision-making processes at home, work, and community • Entrepreneurial skills training and technology transfer

Source: FGDs and KII conducted in December 2012 and January 2013.

Promoting women entrepreneurship in the mussel VC

The widest window for addressing gender needs along the VC lies in providing opportunities for entrepreneurship and investments and in enhancing the work environment of existing micro and small mussel enterprises. In this manner, the woman's capacity and skills as an individual are recognised and optimally utilised and the value of her work effort is monetised. She can be expected to gain more confidence as she relates with the men in society, having gained access to resources and to structures/mechanisms and processes in the community. Empowering the woman means making her economically productive and earning for herself money equivalent to the value of her market time. From the provision of inputs up to the market, there are investment opportunities for her by being able to sell the value-added products at a higher price (Fig. 3). Work spaces for her could include: ownership of poles, managing mussel production, supervising mussel sorting, cleaning and packing; providing storage and similar post-harvest facilities for rent;

innovating flavours for mussel cracker production; to go for value-addition e.g. mussel fritters, mussel paste and mussel powder for seasoning; producing shell craft; and to function as brokers, retailers, or wholesalers using social networks/information technology



Enabling strategies

The business prospects for the woman-entrepreneur are promising. However, these can only succeed if the enabling environment is created and is made accessible and friendly to the woman-entrepreneur. Value chain upgrading strategies are crucial and necessary: product development and quality strategy; human resource development; horizontal and vertical business linking; market research; policy creation and enforcement; and the physical site development (Fig. 4).

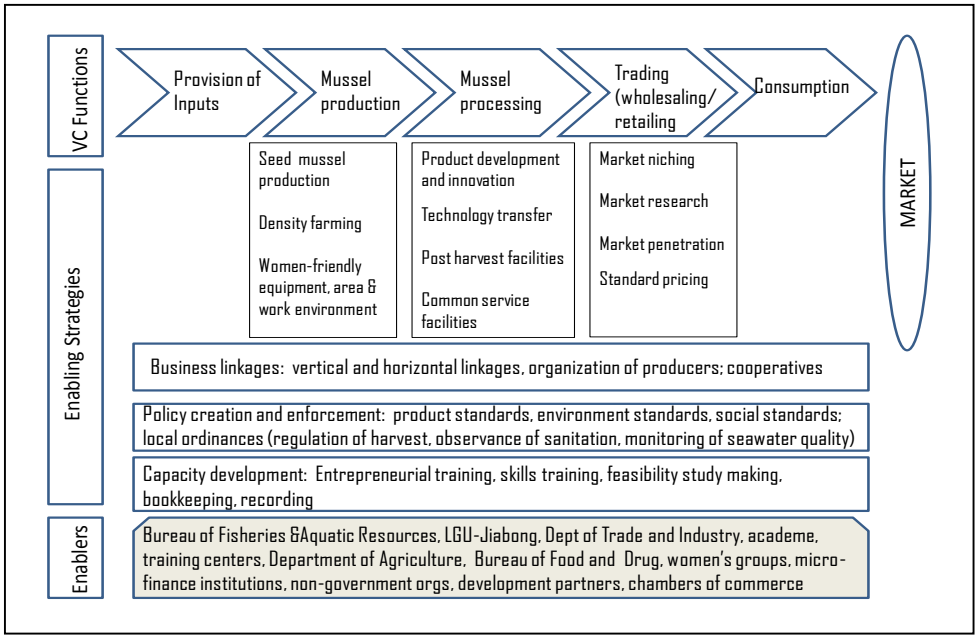


Fig. 4. Enabling strategies for the mussel value chain.

The initiatives have to be provided by both government institutions and the private sector. Business associations/organisations are likewise as important, particularly for creating business linkages. The establishment of a Mussel Enterprise Development Fund is worth considering.

Conclusion

Mussel farming is a sustainable small-scale, village level enterprise and a relatively green industry mainly dependent on local resources. In Jiabong, Samar, Philippines, it employs the unskilled women and men, the child labourers, and the out-of-school youth at various stages of the mussel VC. The product has a high market demand and promising export potential. It can also be an avenue for woman's economic empowerment in as much as she can engage in various entrepreneurial activities across all the VC functions.

Where women's participation is minimal, determining the total net value of women's work is difficult, which was a limitation of this study. This difficulty is compounded by the small sample size and the lack of studies based on large databases from where similar smaller studies can be referred. These limitations are recognised along with the non-availability of complete data of the past years.

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Technical Paper

Expanding Roles of Men and Women in Aquatic Agricultural Systems in the Philippines

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Abstract

This paper is an attempt to describe the expanding roles of women and men in eight areas, five in the Visayas and three in Mindanao, that are potential pilot areas for the CGIAR project on Aquatic Agricultural Systems (AAS) in the Philippines. Data were obtained from Focus Group Discussions conducted between August and October 2012 with fishers, farmers, and women in the potential sites during the pre-scoping study on the drivers and trends of development in Visayas and Mindanao for the CGIAR Project. Results show men and women increasingly complement each other in reproductive and productive roles, thereby forging a stronger partnership both in the home front and in income generating activities, primarily in farming and fishing, to combat poverty and improve the family well-being. The greater need to diversify livelihoods due to climate change has also been found to further require the expanding roles of men and women. Women have also become more active in community endeavors, although men have been found to maintain lead roles in the community.

Introduction

More than half of the Philippine population is found in coastal areas where the Aquatic Agriculture Systems (AAS) are located. AAS are "diverse farming systems where families cultivate a range of crops, raise livestock, farm or catch fish, gather fruits, and harness natural resources such as timber, reeds and wildlife" (WorldFish 2011). AAS are considered naturally highly productive but many of the people living in these areas are poor. Multiple constraints face the poor that limit their ability to benefit fully from the AAS. One possible constraint is gender disparities. If it is, then efforts towards gender equality need to be strengthened and rigorously pursued in these areas.

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This paper attempts to describe the roles of women and men in selected AAS sites in the Visayas and Mindanao. The purpose is to gain understanding of the present situation and how people's roles are related to their poverty situation. It is hypothesised that in situations of poverty, women move from reproductive to productive roles and the men move towards reproductive roles.

Methodology

The data used in this paper came from a bigger data set collected from 32 Focus Group Discussions (FGD) with 77 fishers, 73 farmers, and 71 women from the municipalities of Siaton (Negros Oriental Province), Maribojoc (Bohol Province), Sogod (Southern Leyte Province), Guiuan (Eastern Samar Province), Palompon (Leyte Province), the city of Dipolog (Zamboanga del Norte Province), and the municipalities of Libertad (Misamis Oriental Province), and Kauswagan (Lanao del Norte Province) (Fig.1). The sites were chosen during the pre-scoping work under the WorldFish CRP (CGIAR Research Program) in the Philippines using criteria that include their coastal location, physical accessibility, high number of poor families, and geographic orientation. Within each site, the coastal barangay considered the poorest and where farming and fishing are dominant livelihood activities was selected.

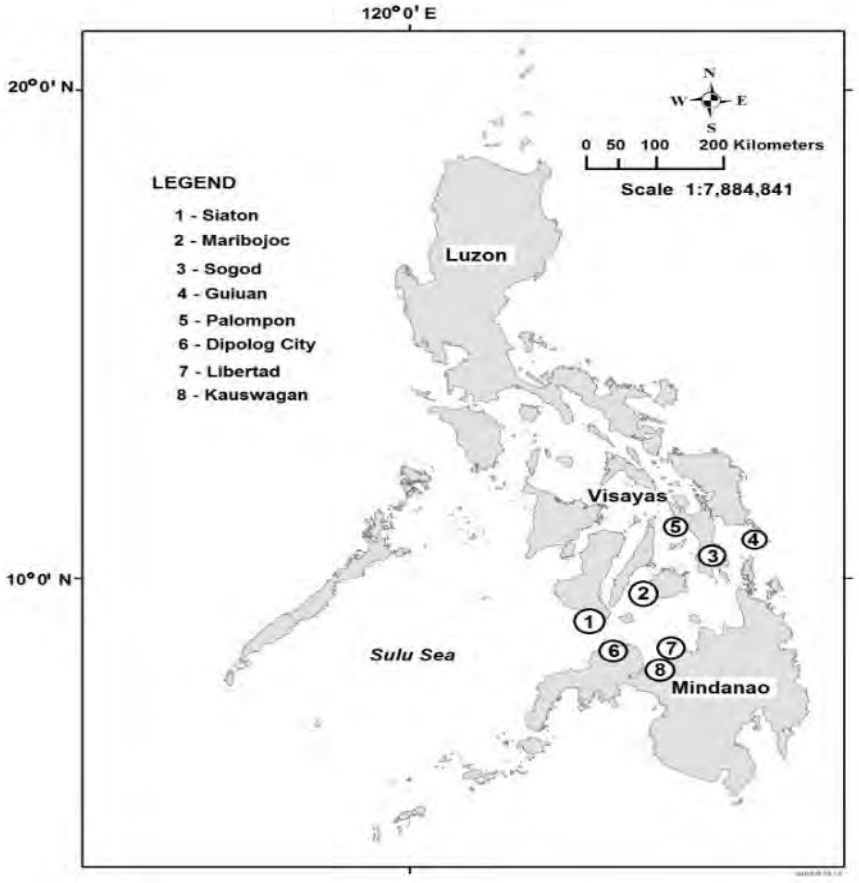

Fig.1. Map showing the AAS sites in the Visayas and Mindanao included in the study.

This paper is highly qualitative. The responses of the FGD participants were not quantified but categorised into reproductive, productive, and the community roles. The sites where these roles were observed were identified. Reproductive role involves the bearing and rearing of children and all the tasks associated with domestic work and the maintenance of all household members. Productive roles are performed to produce goods and services for consumption by the household or for income. Community roles are undertaken at the community level to ensure the provision and maintenance of scarce resources of collective consumption.

Results

The AAS communities

Poverty incidence (which ranges between 24.9% and 55.55%) in the AAS sites was higher than the national average of 22.9% in 2009 (National Statistical Coordination Board 2009). Farming and fishing were the major sources of income. Rice and coconut were the primary agricultural crops. Aquaculture is small-scale or relatively new, while ecotourism is a sunrise industry with great potential as a source of income. The manufacturing sector is small, with home and cottage industries predominating and generally using local agricultural or marine products as raw materials.

Profile of the study participants

Fishers were predominantly male (89.61%), married (90.91%), and between 21 to 72 years of age. Almost the same proportion had elementary education (44%) and had partly done or finished high school (43%); few reached college (13%). They had been fishing for two to 60 years. Their households had one to 12 members. The common gears used were hook and line, *lambat* (gill net), *pana* (spear)*, sabay* (eel catcher), fish pot, *bubo* (fish trap) and long line. Few admitted using a compressor to catch fish.

Farmers were predominantly male (75%), married (90%), and between 23 and 80 years old. More than a third (36%) have had only elementary education, but slightly more (45%) of them have reached high school. Their households had one to 12 members. Their main sources of income were rice/corn farming, coconut farming/copra making, root crops and vegetable farming, orchard, poultry, and livestock raising. They have been farming for one to 70 years.

Fishers were members of organisations such as the fisherfolk association, '*Bantay Dagat'* (sea patrol), water services association, electric cooperative, farmers' cooperative and credit cooperative in the municipality or barangay. Meanwhile, the farmers were members of organisations such as the farmers' association, irrigators' association, fisherfolks' association, water services association and multi-purpose cooperatives in the municipality or barangay.

The majority of the women were married (81.69%) and between 23 and 78 years old. Almost the same proportion finished elementary (32.39%), reached or completed high school (33.80%) and had some college education (33.80%). They came from households with two to 10 members. Their main sources of household income were rice farming, fishing, copra

making/coconut farming, vegetable gardening, livestock raising, business, fish/food vending, food processing, laundry services, salaried jobs and dressmaking. They also worked as housekeepers and labourers for which they acquired wages and they were also supported by remittances from family members. They were members of organisations such as the multi-purpose cooperative, irrigators' association, religious organisations, fishers and farmers' association, and the women's club in the municipality or barangay where they resided.

Gender roles of women and men

Reproductive roles

Men and women share household activities including cooking and looking after their children (Table 1). They aspire to provide good education for their children and adequate food for the family. Among household-beneficiaries of the Conditional Cash Transfer (CCT) Program, the husband and wife make sure their children go to school or avail of preventive health care and nutrition services to ensure continuously receiving of direct cash transfers. In some cases they leave their children with grandparents when they go to work.

Table 1. Reproductive roles of women and men in AAS sites.

Women	Men
Mother and wife: Care and maintenance of the family • cook food • take care of small children • clean house • wash clothes • make sure children go to school, receive appropriate health care (especially if CCT family)	Father and husband: Care and maintenance of the family • cook food • take care of small children (especially when the wife is out working) • wash clothes • make sure children go to school, receive appropriate health care (esp. if CCT family) • fetch water

Productive roles

Farming

In rice farms, men take care of farm preparation, men and women plant and women lead in farm maintenance (Table 2). The women prepare food for the farm workers to ensure cost efficiency and nutritional balance. Negotiations on renting of farm machines such as in Kauswagan, are women's turf. They also participate in the budgeting of fuel. In Sogod, drying of palay by the road is the domain of women; they do the job with the older children. These are the few sacks of palay left for milling and household consumption as the rest of the harvests have been used to pay for debts incurred for farm inputs.

In coconut farms in Sogod, Guiuan, Kauswagan and Libertad, postharvest activities are done by women and men. Men dominate in harvesting, but harvesting from shorter trees involves

women. Men and women help each other in the hauling and piling, dehusking, and splitting the coconut into half. Drying the coconut and **s**cooping the coconut from its shell are domains of women. Moreover, women prepare the food for the workers. Marketing of copra in Sogod and Guian is dominated by women. Aside from allowing them to practice their marketing skills, the role ensures that earnings are spent for food and other needs of the family.

Table 2. Productive roles of women and men in AAS sites.

Women	Men
Rice farming	
• Help in negotiations for acquiring farm inputs • Join contracting system to prepare the field for planting (plough field), planting (or help in bundling the seedling) • Cook food for the workers • Dominate maintenance of farm • Help in harvest and in selling produce • Dominate drying sacks of palay	• Dominate land preparation (buy inputs, prepare farm for planting) • Dominate actual planting • Dominate harvest • Dominate marketing
Copra making	
• Climb short coconut trees when ladder is available • Help in hauling and piling, removal of husk, and splitting the coconut into half • Cook food; • dominate drying the coconuts (under the sun or fire), **s**cooping the coconut • dominate marketing	• Climb coconut trees • Help in hauling and piling, removal of husk, and splitting the coconut into half, and drying
Vegetable gardening	
• Dominate planting, maintenance, harvest and selling	• Dominate land preparation
Fishing	
• Help in preparing for fishing trip • Mend nets • Help in paddling the boat to fishing ground • Help in actual fishing	• Prepares for the fishing trip • Paddles boat to fishing destination • Leads actual fishing • Mend nets
Marketing of fish and fishery products	
• Help in cleaning, drying, storing • Dominate marketing of fresh and dried fish as fish broker/trader, retailer	• Help in cleaning, drying, storing • Help in transporting the produce

Meanwhile, vegetable farming such as in Guiuan, Libertad, Palompon and Kauswagan, is a female domain. Men take charge of plot preparation but women dominate planting, farm maintenance, harvesting, and marketing.

Fishing

Fishing has evolved into a husband and wife tandem activity in Palompon, Sogod, Libertad, Dipolog City, Guian, and Kauswagan. The wives help their husbands in manually paddling the boat to the fishing area, setting gillnets, holding the torchlight and in removing the trapped fish

from the net. In sardines fishing in Dipolog City, wives are members of the four-person crew especially during the peak season for sardines from March to June. A wife does what other crew members do and earns 25% of the income from the activity, enabling the husband and the wife to take home a 50% share of income. Moreover in Guiuan, fishing for sea cucumber is a family affair so that earnings go solely to the family.

In Guiuan and Dipolog City, men and women are involved in fish deboning and drying of '*danggit'* (rabbitfish). The men clean the fish and the rest of the processing is left to the women and children. In Libertad, the women make *ginamos* (fish paste) out of the catch of anchovies of their husbands and have made a community enterprise out of it.

Marketing of fish is dominated by women in Sogod, Guiuan, Palompon and Dipolog City. The marketing skills of women are also acknowledged in other larger scale ventures such as those found in Dipolog City, four of the 12 fish brokers are women.

Other livelihood activities

In Libertad, women are also engaged in making and selling banana chips, fried bananas and other snack items. They also gleaned with their children, to allow children to add to family income. In Kauswagan, women also engaged in operating a small *sari-sari* store or eatery, direct selling of cosmetics and intimate women's apparel, cooking and selling popcorn and peanut products, engaged in shell crafts and in making small Christmas *parol* or lanterns, among others.

In Guiuan, women play a major role in the community industry known as *Paragbato* ("*tiktik ng bato*"). Men would look for coral boulders and haul their find home, leaving the women to pound these to small pieces without the benefit of wearing protective gears. Half a sack of the product is sold for PhP 15. The sacks used are the empty cement sacks obtained from construction sites. The women could sell at least 25 sacks a day of the pound coral, which are mainly used for ornamental purposes in building and construction works.

Surplus labour in fishing communities is a major reason for fishers taking up other jobs like driving '*habal-habal'* (motorcycle ferrying as many as five passengers) or '*trisikad'* (bicycles with sidecars), carpentry, and in road repair and road widening projects. Some women also rendered home services. In such circumstances it was common for men to tend to household chores.

Community roles

Barangay officials are generally men but it is common for women to be elected or appointed as secretary, treasurer and auditor (Table 3). Membership of women in community organisations is increasing. Almost an equal number of men and women constituted the 1057 members of one of the irrigator's association in Dipolog City.

Women have also risen to positions previously held only by men. In Libertad, a woman heads the farmers' organisation. In Dipolog City, a woman headed the local fisheries law

enforcement group for nine years. Her team of 35 fishers who volunteered their services included five women. In Libertad and Guian, there were also women law enforcers for the fish sanctuary.

Table 3. Community roles of women and men in AAS sites.

Women	Men
• Barangay officials (secretary, treasurer, councilor) • Members of the irrigators association. In one irrigators association with 1057 members--50% women and 50% men; member or officer • *Bantay Dagat* (Sea patrol group); in one site, the head is a woman • Member of religious groups	• Barangay officials (punong barangay, councilor) • Irrigators association – member or officer • *Bantay Dagat* (Sea patrol group) • Member of religious groups

Discussion

The results have to be understood within the context of the selected AAS areas. These are generally areas where fishing and farming are the main livelihood activities and where incidence of high poverty is a major feature. The constant confrontation with poverty increasingly pushes women and men to become partners in income-generating activities to keep the household economy afloat. Necessity as well as choice has caused a blurring of the conventional reproductive and productive dichotomy of roles women and men play. The emerging role transformation shows that people understand that a diversified livelihood is more resilient than an undiversified one. This understanding is shared by members of the AAS communities studied, lending support to what Ellis (2000) earlier said as a critical attribute of people living on the margin of survival.

This diversification is seen as a function of several factors. The returns to labour and time of men and women, which implies the factoring in of certain skills or characteristics (e.g. strength, patience) possessed by either, is one such factor. Risks associated with production efforts of the household, such as those resulting from climate change also affect the decision to broaden gender roles. Opportunities offered in the larger economic context, such as those provided by government assistance programs, similarly lead to the rational decision to expand income sources.

Evidence pointing to men assuming more of the reproductive role (taking care of small children and doing household chores) to allow women to be engaged in more productive work is significant. The opportunity cost of women's time appears to be at work in cases such as this: where women are able to earn more income from productive endeavors – and therefore contribute more to household welfare – the more they spend time for productive work.

Out-migration for varying periods of time to take advantage of better earning opportunities and send home remittances were previously only the domain of men, but in the AAS communities studied there is a rising phenomenon among women (young and married) to go to the urban areas to find employment as salesladies or caregivers. The presumably higher returns in the cities act as

the pull factor and forces the male sibling or husband to take care of the children and perform reproductive roles in addition to tending to his own productive endeavors.

On the other hand, climate change disrupts rainfall patterns and has added more risks to farming. It has also affected the number of fishing days per year. These increasing risks to sources of livelihood have thus compelled the AAS households to compensate for anticipated or actual losses by adopting contingency income sources, a strategy consistent with those done by poor households facing the same circumstance as observed by Alderman and Paxson (1992). The Focus Group Discussions revealed that the livelihood diversification scheme put in place invariably and consciously included more production efforts for women; on many occasions they are doing activities not related to the household's primary income source, mainly to spread the risk. Women therefore may run a *sari-sari* store or a small eatery, engage in direct selling and more. Meanwhile, men are also engaged in other activities not related to fishing or farming. While these endeavors form part of risk-spreading activities, they also point to the existence of surplus labour in AAS communities.

Interactions between household decisions to allow women to play a bigger productive role and trends in the larger economy are also becoming apparent. The extension of credit by government agencies to rural organisations has pushed women to organise quickly and meet credit requirements. The production of fish paste, and processed peanut and banana products by women are examples of productive endeavors by organisations of women. The women themselves recounted how credit reinforces diversification of income sources, promotes value-addition and even provides motivation for them to go further.

The Conditional Cash Transfer Program of the government seems to have enlisted the cooperation of the targeted beneficiaries in the AAS communities as husbands and wives have become partners in making sure their children go to school and receive the required preventive health care and nutrition services. As intended by the program, a circumstance is being created that will yield both immediate and long-term effects on household welfare, the former through the cash transfers and the latter through human capital enhancement. However, this is an area requiring a more focused and in-depth analysis.

Household efforts in cutting costs or maximising returns also result in men and women spending time together doing productive activities. Women's active involvement in agriculture has been noted in past studies (Lu 2010; Chiong-Javier 2009; Romero-Paris 2009). Similarly, in copra production in AAS sites, with technology producing shorter coconut tree, more women could be taking over from men in climbing the coconut trees.

In fishing, the wife helping the husband in actual fish catching is a new phenomenon to ensure that more fishing income comes to the family. This is also a reflection of limited, if not lack of employment opportunities in the area. These results are similar to the findings of past studies showing women's significant involvement in fish capture (Santiago 2008; de la Cruz 2005; Jimenez 2004) but in contrast to the findings that actual fishing is "male-dominated" or that there is little involvement of women in fish capture (Sumagaysay 2005).

Women contribute significantly in the marketing of fish catch or farm harvests. Returns to labour time, particularly when the women have certain skills, is an obvious reason for this. House-to-house peddling, which reportedly results in higher revenues, is also a forte of women and seen as an alternative to selling wholesale to compradors/traders who dictate prices.

The contribution of women, however, is still not recognised by formal institutions and knowledge generators. According to Santiago (2008), the 27.3% share of women out of 10.4 million workers in agriculture, hunting and forestry sector in 2004 was likely an underestimation because women's participation in trading of agricultural and fishery products, working in farms, and engaging in micro manufacturing enterprises were likely not considered. The same study reported that the proportion of unpaid family workers includes 54.4% females and 45.5% males.

In community work, partnerships of women and men were already noted by past studies. However, evidence shows women becoming more involved in community work that used to be dominated by men, such as in irrigation associations and in fishery law enforcement.

Conclusions

Evidence points to changing gender roles in the AAS sites covered by the study. Changes are happening in the home, in work areas, and in the community. With women now doing more productive work than before, it is common among men to take charge of household chores. These changes have to be understood in the context of the AAS where poverty is an everyday challenge. Poverty, climate change, macroeconomic trends, government assistance programs, and the recognition of complementarity of skills of women and men seem to enhance partnership among husbands and wives to improve their household economies. A more in-depth study has to be conducted to further explore this preliminary evidence.

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Short Communication

Location Specific Intervention for the Empowerment of Coastal Women: A Case Study of Oyster Culture in Kerala

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Abstract

The underlying causes of gender inequality are often related to social, cultural and economic factors. Consequently, the access of women to education, technical training and productive resources is inadequate, particularly for those women in the rural areas and employed in the informal sector. Economic empowerment is a tool to bring about greater inclusion in society. With these concepts in mind, the Department of Science and Technology (DST), Government of India, funded a project in Kerala state that introduces edible oyster culture (*Crassostrea madrasensis* Preston) and its value-addition as a livelihood option for fisherwomen. Value addition of the oyster meat was also introduced to the women SHGs in this project. Value addition generate profits of INR 37.43, INR 97.49 and INR 106.37 from per kilogram of fish cutlets made, oyster meat and prawn pickle respectively. The aim of this paper is to highlight how needs based, location specific technology interventions can contribute to women's empowerment in coastal areas in terms of personal, social, economic and community aspects.

Introduction

In fishing communities in India, women have played important roles in supplementing family income, though increasingly marginalisation is being observed as they are being displaced from their traditional fisheries related activities (Sathiadhas et al. 2005). Though employment opportunities for women in fisheries are generally more common in the post-harvest sector, there exists scope in small-scale aquaculture and allied activities, such as in the culture of edible oysters, mussels, ornamental fish, shrimp, seaweed and in the aqua feed industries. Further, production of value added products also can be a small scale venture with minimum inputs and requiring minimum technical support.

This paper discusses an initiative taken by the Central Institute of Fisheries Technology (Indian Council of Agricultural Research), Kochi, Kerala, India to mobilise women's Self Help

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Groups (SHG's) in the coastal area of the state of Kerala to take up oyster culture as an alternative livelihood and income generating activity. Culture of the edible Indian oyster *Crassostrea madrasensis* (Preston) has the potential to provide significant economic benefits to rural and semi-urban coastal communities, and can also benefit specific demographic groups such as women who suffer from low incomes and have limited economic opportunities (Szuster and Flaherty 2004). Indian oyster is particularly suitable for culture because it has a fast growth rate and tolerates a wide range of salinity. If supported by technical aid in product development, oyster farming has the potential to become an economically beneficial venture. A reasonable amount of flexibility in the activities also facilitates the involvement of women who can balance their reproductive roles along with these activities. The particular initiative in this study was supported by the Department of Science and Technology, Government of India and was implemented in Moothakunnam, Ernakulam District, Kerala, India during 2010-11.

Study area

Moothakunnam village was selected for implementing the project because of the presence of shallow water bodies in its vicinity that was suitable for oyster culture. The village is part of Vadakkekara Panchayath that covers an area of 11.25 km^2 (Fig.1). The total population of the Panchayat was around 31,000, 48% male and 52% female. Fisherwomen organised into Self Help Groups were purposively identified for implementing the interventions.

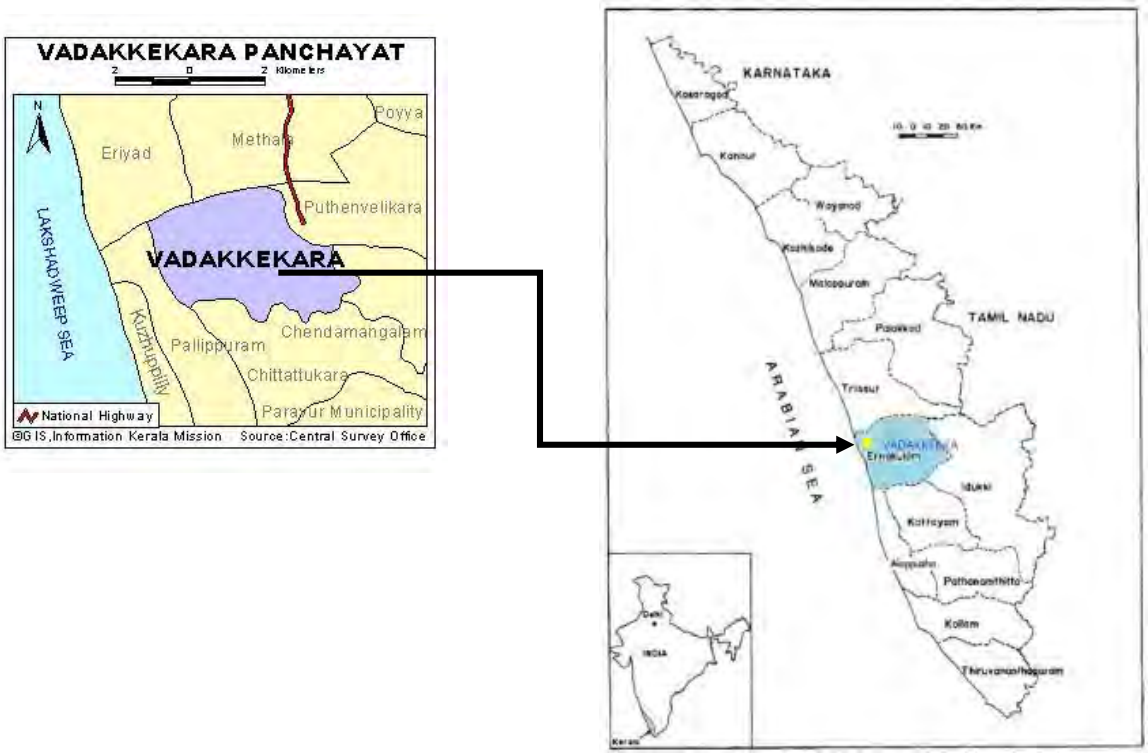

Fig.1. Vadakkekara Panchayat

A baseline survey conducted in the region revealed that even though the women were literate (literacy rate 93.25%), their participation in the work force was poor and a major proportion of the women had no gainful employment. With suitable training, women could be encouraged to take

up economically useful activities. Traditional oyster culture was also practiced in this region and so there was a familiarity, though limited involvement, with the culture of the species by the targeted group of women. The women also had some previous experience in mussel culture. Oyster culture is less labour intensive and could be carried out with minimal inputs, making its day to day management feasible for women.

The intervention and the results

The fishers in the study area often gleaned wild oysters in the creeks. Wild oyster collectors gather oyster meat from the shells using an indigenous technique of poking the shells with a sharp device. The meat so shucked was sold in the nearby markets or marketed door to door. Traditional oyster culture methods involved the placement of rocks on hard or sandy substrates to promote natural spat settlement. Although traditional culture existed in some areas such as Kasaragod in the north of Kerala state, the production of oysters in Kerala received a boost during the 1990s as a result of the introduction of hanging culture techniques from the Central Marine Fisheries Research Institute (CMFRI), Kochi, Kerala. This was an improved traditional system where oysters were suspended on strings placed below bamboo rafts and it is now one of the most popular culture method. This method is also called the rack and ren method.

Table 1. Economics of edible oyster culture, based on three 5 m x 5 m sites monitored.

Sl.No	**Material/work**	**Area in square metres**		
		50 m^2	**30 m^2**	**25 m^2**
A	Capital Investment	INR	INR	INR
1	Bamboo/casurinas poles 6m length	2500	1500	1125
2	Bamboo/casurinas poles 4m length	3500	2000	1200
3	Nylon rope 4 mm for rack construction	600	450	300
4	Cleaned oyster shells for making ren	500	300	250
	Total	**7100**	**4250**	**2875**
B	Depreciation @ 50%	3550	2125	1438
C	Labour and other charges			
5	Labour charges for Rack construction	2500	1500	1500
6	Nylon rope for ren making	900	750	600
7	Labour charges for Ren making	500	300	250
8	Canoe hire, farming, harvest	1200	1200	1200
9	Labour charges for Harvesting	1200	900	600
10	Depuration expense (shell on)	1500	1000	750
11	Charges for heat shucking			
	Total	**7800**	**5650**	**4900**
D	Production cost	11350	7775	6337.50
E	Production Kg	5900	3510	2875
F	Heat shucked meat @ 4%	236	140.4	115
G	Selling price @ INR 80 kg^{-1}	18880	11232	9200
H	Net profit	**7530**	**3457**	**2863**

Three selected SHGs were trained in the rack and ren method of oyster culture. A series of vertical bamboo poles are driven into the bottom through the water column in rows and horizontal

bars are connected on top of the poles. Oyster strings (rens with spat) are suspended from the racks. The oysters reach harvestable size (80 mm) in 7 to 8 months. The meat yield is 10% of the total weight (approximately 80-100 tonnes.ha^{-1}) (James et al. 1993). The project team also gave technical back-up by regular monitoring of hydrological parameters to identify problems, if any, and take corrective action.

The capital investment in farms was done by the SHG groups from internally mobilised funds and, later, the project supported the fabrication of rack and ren, harvest, processing and value addition etc. It was found that a profit of INR 7,530 (USD 124.04), INR 3,457 (USD 56.95) and INR 2,863 (USD 47.16) could be generated out of an area of rack and ren culture of oysters of 50 m^2, 30 m^{2}and 25 m^2 respectively, which presents ample incentive for the women's groups to engage in oyster culture. Along with the heat shucked meat, sales of shells for lime also contributed nominal revenue. Enhancing the quality of the cultured oysters and diversification through value added products can generate better earnings. Value addition increases the attractiveness of the product and also its shelf-life. Value addition generate profits of INR 37.43, INR 97.49 and INR 106.37 from per kilogram of fish cutlets made, oyster meat and prawn pickle respectively.

Issues faced by the women SHGs in oyster farming

From our observations and interviews, we noted that the major problems and constraints encountered by fisherwomen engaged in oyster culturing were long working hours for processing, lack of depuration facilities, manual shucking of shells, unpredictable seed availability, mortality of seeds during transportation, low demand and price in internal markets, poor awareness of scientific processing, low income and poor credit facilities, inadequate transportation and lack of mechanisation for harvest and post-harvest activities.

The problem of poaching when the harvest was imminent was a major issue encountered by the women. As the culture takes place in open bays and estuaries, the rafts are vulnerable to poaching. The women tried to overcome this problem by volunteering to guard the rafts at night by taking turns during the harvest period. However, this raised other concerns like their security. Women had to travel long distances to market fresh oyster and heat shucked meat.

Another problem encountered was the seasonal glut due to simultaneous harvesting of oysters in nearby locations. This caused reduced demand for raw meat in the market, eventually resulting in low prices. One method for overcoming sales under distress in an over-supplied market was use the oyster meat to prepare products such as pickles, cutlets, oyster balls and breaded and battered products. The women in the project were provided with information on value-addition.

Gender impacts

The major gender impacts of the intervention were the women's contributions to household income and their increased freedom in economic decision making at the household level, leading to a measure of economic independence. Moreover, women gained more self-confidence and self-esteem, which may have been more important than their economic gains from the project. The

experience of working in groups and shouldering collective responsibilities may enhance women's skills in interpersonal relationships as well as in microenterprise management.

Conclusion

Empowerment is making women more economically independent, self- reliant and confident as individuals. Women in traditional communities often become more visible when they become more organised. Income generating activities like edible oyster culture and value addition using oyster meat has been successfully implemented as part of this project with suitable capacity building through training on modern methods of culture and preparation of value added products. Promotion of Self Help Groups (SHGs) and provision of easy credit facilities by linking the SHGs with institutional agencies will be a driver to increase production and to look for diversified markets for raw oyster and value added products, which will in turn improve livelihoods and the socio-economic status of the fisherwomen.

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Short Communication

Anthropological Study on the Role of Gender in two Miyazaki Fishing Villages, Japan

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Abstract

Men are considered to have a monopoly in the fishery sector and women are not considered to play a significant role. But, directly or indirectly, many women are engaged in the fishery sector. Women are engaged directly in a fishery by engaging in fishing either individually or by accompanying their husbands, and by collecting seaweed. They may also get involved in a fishery indirectly by engaging in feed preparation and also marketing of processed seafood products. The present study deals with the various roles and activities of women and men in two fishing villages in southern Miyazaki Prefecture in Japan, namely Meitsu and Odoutsu. The fishing villages depend on the development of fishery technologies that have enhanced the fish catch. And recently, in the face of increasing challenges to fishing, the villagers have raised their income by opening seafood restaurants, fish stores and selling the processed products to tourists directly. The differences in the roles of women and men in the two villages are traced parallel to the decades of changes in the fisheries. In Odoutsu, with a history of coastal fishing, women are more involved in all modes of the fish value chain, whereas in Meitsu with more past emphasis on offshore fishing, women have in more restricted roles in the value chain.

Introduction

The Japanese fishery sector is facing a difficult outlook due to a decrease in marine resources, rise of fuel charges, aging of the fishermen and a lack of youth participation in the sector, and also a falling interest of Japanese youth in consuming seafood. But various strategies are being developed to rejuvenate fishing village economies. For example, besides selling fish directly, fishermen are also engaged in fish processing and marketing of these products and also running seafood restaurants, and increasingly women are coming to the forefront of these activities (Soejima 2005; Abe 2013).

Generally we tend to think that fishing in the sea is work for men, while women will sell fish on shore, according to the analysis of occupational activities and divisions of work between the two sexes based on ethnographic materials from all over the world (Murdoch 1981). In more than 50% of the Pacific region communities, however, both men and women are engaged in fishing

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(Akimichi 1995).

This paper reflects on the gender division of labor by comparative analysis of two fishing villages in southern Miyazaki, Japan and also highlights the factors causing changes within the social and environmental context. Fisheries here are taken to include activities that go beyond fishing, especially post-harvest, processing, marketing and also administration (Ii 2001; Ii 2012).

The fishery of the southern Miyazaki costal fishing villages

Miyazaki Prefecture is located in southern Kyushu in Japan and is surrounded by Oita, Kumamoto, and Kagoshima Prefectures, facing the Pacific Ocean (Fig. 1). Coastal and offshore fisheries have been carried out off Miyazaki, depending on the coastal topography and location of fishing grounds. Coastal fisheries are generally pole-and-line fishing, long line fishing, and cuttlefish fishing using small boats of 5-10 m. In off-shore fisheries, boats of 20-150 m carry out pole-and-line fishing, long line fishing, and round haul net fishing and target bonitos (*Katsuwonus pelamis* (Linnaeus, 1758)), tunas, and sharks. Pole-and-line fishing and long line fishing are also used to catch bonitos and tunas on the large boats of 200-500 m in the Exclusive Economic Zone (EEZ) up to 200-nautical-mile fishing ground.

Fig. 1. Location of Meitsu (in the south) and Odoutsu (in the north) fishing villages in southern Miyazaki.

The central part of the coast of Miyazaki comprises emerged shorelines with extended sandy beaches, whereas the north and south parts of the coast consists of submerged shores with heavily indented coastlines. The different coastal topographies affect the management and methods of fishing.

The central part of the coast mainly serves as the fishing grounds for coastal fishing. In the northern part of the coast, fishers are engaged in coastal and offshore fishing. The southern part of the coast, however, is quite different. The shores are enriched by water from rivers of various sizes flowing from the land, but when the hot and oligotrophic Japan Kuroshio Current comes close to the coast, it carries away the eutrophic water. So, fishermen generally embark upon large boats, more than 30 m, to fish for tunas and bonitos in offshore and pelagic seas (Beppu et al. 1992).

For fishing bonitos, from February to May, fishermen move to the east towards Taiwan and from May to November they follow the shoals of bonitos heading north in the direction of the Japan Kuroshio Current. They go as far as off Sanriku (northern Honshu Island), using a port in the Tohoku district as the base. Eighty-five percent of the catch of bonitos is supplied for sashimi. The catch of bonitos is increasing through the introduction of more advanced boats worth several hundred million yen each and the introduction of state-of-the-art equipment. Therefore this fishery employs many young fishermen who are skilled in operating these boats. The majority of the bonitos catch come from the southern Miyazaki coastal area and it accounts for more than 90% of the total bonitos catch from Miyazaki. The bonitos are fish that are popular among Japanese. They are also mentioned in "Kojiki" or records of ancient matters, "Nihonshoki" or chronicles of Japan and "Manyoshu" or the oldest collection of Japanese poems.

Long-line fishing is carried out in the seas off the coast of Japan and within the 200 nautical mile EEZ. Also fishermen pay charges for fishing operations in the waters near to Palau, the Federated States of Micronesia, the Marshall Islands, the Solomon Islands and Kiribati. The ships vary from 17.23 tonnes to 363 tonnes. Smaller boats deal with fresh fish and large boats are equipped with freezers to preserve fish at -55 °C.

Population scales of Meitsu and Odoutsu villages

Odoutsu and Meitsu are villages located on opposite banks of the Nango River that flows into the Sea of Hyuga (Fig.1). Both are fishing villages with the fishermen engaged mainly in pole-and-line fishing for bonitos and long line fishing for tunas.

A large proportion of the populations in the two villages were in the age group 50 and above. However, fishermen were even older and in the age group of 60 years and above. Meitsu has around 4,000 households whereas Odoutsu has about 1,500 households. The village populations reached their peak in the1960s in both the villages. The population of Meitsu plunged in the 1970s, but surged again from the 1980s. Since then, it has gradually gone down again and at present is about 10,000. In Odoutsu, the population has been decreasing since the 1960s and now stands at about 4,000 people. Meitsu has more households, which may be due to the fact that there has been less migration from there to urban areas.

Expansion and diversification of fishing activities in Meitsu

The Meitsu Fisheries Cooperative has a membership of 293, out of which 60% of the members are between 20-60 years of age and take part in pole-and-line fishing for bonitos. Eighty

percent of those who engage in troll fishing and pole-and-line fishing are in their 60s. The fishing methods also include pole-and-line fishing and long-line fishing. Fishing is coastal and has long been done within 12-37 km from the coast (Nango Town Local History Compilation Committee 1980).

In 1907, about 30 boats from the village would go to the seas off the Goto Islands of Nagasaki, Ohshima Island of Kagoshima and off Okinawa and Taiwan, mainly to fish for bonitos. In 1931, about 100 tuna boats from Hoto Island of Oita used the port of Meitsu as their base for tuna fishing, and this helped in developing the port as well as tuna fishing in the village. With the advancement in means of transportation and distribution, as well as improvement in the quality of life, fish was in greater demand. In the post-war period, the fishing industry grew further. Fishing boats became larger, and fishing grounds extended to the Philippines. According to records from 1951, the majority of the boats were still small boats carrying 2-3 fishermen to carry out night fishing with fish-luring lights. However, long-line fishing for tunas was assuming greater importance (Nango Town Local History Compilation Committee 2011).

In the late 1960s, more fishermen started to own more than one boat each and by the 1970s, with advanced freezing technologies and boats of over 100 tonnes the tuna fishing industry of Japan not only operated in the East China Sea but also began to explore deep seas in the Atlantic Ocean and near the coast of Africa. The catches rapidly increased, which lead to a surge in the price of tunas in the late 1970s (Nango Town Local History Compilation Committee 1980).

But the fishing industry went in to a slump not long after due to the implementation of the 200 nautical- mile EEZs internationally in 1978. In addition, foreign purse-seiners came to fish for tunas in large numbers. Fisheries resources declined, fuel costs surged, the demand for marine products did not grow sufficiently to meet the increasing imports that caused an oversupply of fish and kept the prices of fish low. In the early 1980s, the increasing number of fishing boats and the use of larger boats of 50-100 tonnes made it possible to operate for longer periods, from three to six months, and bring back catches in both frozen and raw condition. An imbalance between supply and demand caused by an oversupply of bonitos and tunas, however, still kept prices low. From 1985, both national and prefectural governments subsidised the fleets as they strove to stabilise the prices of fish through adjusting production and at the same time reducing the numbers of bonito and tuna fishing boats (NangoTown Local History Compilation Committee 2011).

Meitsu fishermen also promoted coastal fishing in such ways as releasing fries and employing foreign workers who were trained to acquire know-how and techniques concerning fishing. They took steps to encourage the consumption of fish by selling fish and providing free fish dishes at various events, such as the *Nango Kuroshio Matsuri* (Nango Kuroshio Current Festival) in August and *Sangyo Bunka Fukushi Matsuri* or the festival for promoting industry, culture and welfare, in autumn. In 2005, to further expand the consumption of fresh marine products and create awareness about the importance of including more fish in the diet, the Fisheries Cooperative opened a restaurant to serve fish dishes and sell processed marine products. Its annual average sales is about 170 million yen.

The Fisheries Cooperative has several subordinate organisations, namely the Tuna Fishing Boat

Owners' Cooperative (with a membership of 8), Bonito Fishing Boat Owners' Cooperative (membership of 14), Small Boat Owners' Cooperative (membership of 42) and the Women's Division (membership of 130). Thus the Women's Division has a greater number of members than the total of all the other subordinate organisations.

The stagnation of fishing activities in Odoutsu

With coastal and offshore fisheries as their mainstay, Odoutsu fishermen actively engage in pole and line fishing for bonitos in fishing grounds off Okinawa and Taiwan. After the fishing season for bonitos from March to August, fishermen also operate pole-and-line fishing for mackerels.

In the early 1930's, fishing boats started becoming larger and the village attracted long-line boats from all over Japan as the base for tuna fishing. Over the stretch of coast from Odoutsu to Tanegashima and Yaku Islands, the catches were very good. After a slump during World War II, from 1946 onwards the catches increased. In 1964, coastal long-line fishing for tunas by small boats lighter than 10 tonnes and using horse mackerels as live baits was thriving, and the village installed a 100 tonnes refrigerator and an ice-making machine. Till 1969, the village flourished because the catches increased rapidly due to upgrading to larger vessels, modernising the fishing boats and improved construction of cargo boats to carry the fish. Thereafter, confronted by constraints like the oil shocks in 1973 and 1978, falling fish surging prices, fuel oil prices, and restrictions on fishing grounds by the 200-nautical-mile EEZ regulations, in 1993 the Fisheries Cooperative decided to merge with the fisheries cooperatives of two neighbouring villages (Nichinan Industry Revitalisation Council 1993). In 2013 Odoutsu village owned 33 fishing boats, varying from 0.5 tonnes to 137 tonnes. Before 1993, the Fisheries Cooperative membership was about 200, but has decreased to 78 at present, 70% of whom are aged 60 and above.

Regarding tuna fishing, two 19 m boats designed for three fishermen each, carried out fishing in the fishing grounds which stretch from the East China Sea to the Southwest Islands of Kyushu. Bonito fishing boats exploit two fishing grounds. One fishing ground is off Miyazaki to Okinawa and the Goto Islands of Nagasaki; and the second is the Nansei Islands. Eight boats of less than 5 tonnes capacity engage in long-line fishing for flying fish for about 180 days from September to March. Pole-and-line fishing for bonitos is carried out during April and May, after watching the tidal currents as well as taking into account the market prices of fish. Long-lining for dorados (*Coryphaena hippurus* Linnaeus, 1758*)* is carried out from June to August.

In contrast, neighbouring Meitsu village has combined coastal and offshore fishing, and its vessels catch full-grown bluefin tuna (*Thunnus orientalis* (Temminck and Schlegel, 1844)), young bluefin tunas and yellow porgies (*Thunnus albacares* (Bonnaterre, 1788)) to earn 50,000 yen a day or more. Despite the example of Meitsu, fishermen of Odoutsu do not want to develop new fishing methods, saying, "*You do, but we'd rather not*". As they started the job when big catches were common, fishermen of 60 years of age and over are reluctant to change their fishing methods to new ones. Fishermen in their 40s and 50s are constantly trying to develop new methods to increase production, as they became professional fishermen when fish catches were already declining. A little less than 80%

of the members who go fishing on small boats are 65 years old and over. A fisherman who is in his 50s and works on a tuna fishing boat explains the situation by saying that few young people want to join the profession, because fishing requires hard work, but unlike thirty years ago, it doesn't pay, and they cannot be free until they return to their base port.

The activities of the Women's division affiliated with the Japan Fisheries Cooperatives

The National Liaison Conference of Women's Divisions is affiliated to Japan Fisheries Cooperatives. The women's divisions are organisations comprising of women living in the area of each cooperative, who themselves belong to the cooperative or whose family members belong to the cooperative. They are unique organisations united by the power and energy of women who work on the beaches and have been making a persistent effort for the development of the cooperatives and also for improving the socio-economic conditions of their villages. The fisherwomen cooperatives initiated their activities on their beaches in the 1950s. The women also started saving their income with the help of these cooperatives to help them during financial crisis. Women are also involved in many activities, such as conservation of the environment, promotion of savings, fund-raising campaigns for children who lost parents in maritime accidents on fishing boats, and expansion of the consumption of processed marine products. Their previous projects mainly concentrated on promoting diets containing more fish and also conserving the beach environment by activities like cleaning beaches, and planting trees to create fishermen's forests. They also use and disseminate environmentally friendly soaps named *wakashio*, give cooking lessons as part of the efforts to encourage people to eat more fish, have started up a team of entrepreneurs to promote local people's consumption of local products, as well as to produce and sell processed products made from local marine resources.

Fisheries related activities of women of Meitsu village

According to Ms. M, who was born in Meitsu in 1947 and is now President of the Meitsu division, the Women's Division of the Meitsu Fisheries Cooperative was established in 1978. At the time of foundation the Women's Division of the Cooperative had 400 members which had decreased to 130 in 2012. More than 60% of the members were of age 60 and above. Less than 10% of the members belonged to the age group between 20-30 years old as women of this age group were busy taking care of their young children. Women whose husbands belonged to the Fisheries Cooperative automatically become members of the Women's Division, but today even non-fisherwomen are also permitted to join the division.

The Women's Division have encouraged savings as part of an effort to abolish customs which seemed to be merely for vanity or a waste in the community, such as return offerings by the families of the deceased to people who have made funeral offerings and monetary gifts for the Bon Festival and the first Bon Festival after the funeral. Today however, their activities comprise: (1) assistance for various events; (2) promotion of detergents which are eco-friendly; and (3) encouraging fish in the diet by giving cooking classes to show how to cut, trim and cook fish at elementary schools twice a year, at junior and senior high schools four times a year as well as to elderly people living alone. The restaurant run by the Fishermen's Cooperative employs 24 people, and two of them are the staff of the Cooperative. The others are women working part-time, and five of them are members who are

in their 70s and earn an hourly wage of 700 yen.

A member who owns bonito and tuna boats deals with accounting and management of the wages, insurance premiums and other expenses of the 24 fishermen and crew on the boat, including 6 Indonesian trainees, while her husband goes fishing off Katsu-ura of Chiba and Kesen-numa of Miyagi from January through November. After deducting the expenses from the total income, the net income is divided among the captain, chief engineer, chief fisherman and cook.

Spiny lobster fishing is carried out by one fisher couple, and in cases of trawl-line fishing and long-line fishing, one fisherwoman helps fixing baits on the hooks.

Women of Odoutsu village becoming processors and sellers of seafood

In 1952, the forerunner of the Women's Division was founded and named the Ladies' Division. As of 2012, there were 75 women belonging to the Division, and those in their 60s account for a little less than 80%. Members in their 40s and under make up a little more than 1%. The staff in charge of management and operations of the local processing center consists of twenty women, of whom two are in their 50s, eleven in their 60s, and seven in their 70s.

With allocations from the national and prefectural budgets, the Nichinan City Fisheries Cooperative established the processing center in 1994 for the purpose of processing and selling dorados, as the catches were too big to be priced properly and there was no demand for them. In 1997, however, the catches of dorados plunged, and the cooperative had to operate the center while incurring loss. In 2001, it entrusted the operation to the Women's Division. They process the catch of bonitos, dorados and flying fish and produce local products of their own brand, trying to meet the consumer demands.

Processed marine products are produced based on according to orders. The Women's Division members also participate in various events including the open-air markets held in the morning twice a month. Also, the women visit elementary schools and high schools to give cooking lessons which was started in 1975, so that young people may be encouraged to eat more fish. Their fisheries products are advertised through mass media, including national television and newspapers, word-of-mouth communication, and on the cooperative's website. The women are paid daily wages of 5,000 yen.day^{-1}.

The processing center operates for 130 days a year and its annual sales amount to 20 million yen. The income earned is used for buying/replacing equipment, development, management and administration, and new product ventures. From February to November, the women make *katsuo-shoyu-bushi* or boiled bonito meat marinated in soy sauce, and from September to March, they process *tobiuo-surimi-udon* or noodle made from flying fish mince.

Women consider these processing centers as not just a place to earn income but also as a space through which they could promote and propagate the traditional preserved fish products. Processed foods are supplied to commercial trade shows in Tokyo and Miyazaki, Michi-no-ekior rest areas along the highways, Minato-no-ekiora restaurants combined with shops that sell local products at

Meitsu Port, and local supermarkets. Also, they sell those products to people who order it for *chugen* or mid-year gifts, *seibo* or year-end gifts, souvenirs, gifts, and return gifts to people who gather at anniversary memorial services. Popular products of their own brand are *sakana-udon* or noodle made from fish mince, *katsuo-shoyu-bushi,* and *shiira-no-surimi* tempura or deep-fried mince of dorados. The Odoutsu village Women's Division has developed 13 products so far.

Difference in gender roles among the two coastal villages

With the Fisheries Cooperative having a growing membership and with the development of larger fishing vessels, Meitsu village built larger and more modernised fishing boats and they were able to carry out fishing in distinct fishing grounds and stay at sea for longer duration. Moreover, when marine resources decreased, they changed their fishing method from pelagic fishing to small coastal fishing, and also improved fishing tools and methods, which led to an increase in production.

As part of their efforts to expand consumption of marine products and encourage people to eat more fish, members who engage in small-scale fishing participate in festivals and open-air fish markets and gauge consumer preferences. Attempts are also made to create more awareness about their locally produced products in order to revive the declining marine fish industry. They are marketing locally processed marine products at the restaurant run by the Cooperative. Fishermen's wives help their husbands in management of overhead expenses and preparation for going fishing but do not engage in processing and sales or marketing the products, as is the case in Odoutsu village.

Odoutsu village has fewer members in the Cooperative and most of them are aged. They use simpler forms of fishing. Therefore, fishermen's wives support their husbands in fishing, and at the same time, they buy a large amount of local fish to process, and visit various events to advertise and sell their products. These efforts, however, are made without any assistance of the Cooperative. Based on traditional recipes, they developed various processed products of their own brand to meet the popular demand of the consumers (Table 1).

Table 1.The differences in gender roles in fishing activities in Meitsu and Odoutsu villages (• indicates participation, x indicates no participation).

Village	Direct sale by fishermen	Processing and sale by women	Processing facilities of marine products by women	Participation in events for publicity and sale of products of women
Meitsu	•	×	×	×
Odoutsu	×	•	•	•

Conclusion

The Meitsu fishermen depends mainly on the bonito and tuna fishery to cope with the changes such as decrease in marine resources, the slump in the price of fish, the rise in fuel costs and by the employment of young foreigners on fishing vessels. In addition, the fisheries cooperatives provide new opportunities not only in the capture fishery but also in processing and marketing of

fish products. Wives of fishermen also support their husbands in these ventures.

However, the Odoutsu fishermen depend mainly on the coastal fishery and harvest flying fishes, dorados and bonitoes and are engaged only in the small scale fishery. Therefore their wives depend on their traditional knowledge, and they process and market their value-added products directly.

The study elaborates how two fishing villages which have almost the same kind of fishing activity, exhibit differing roles among men and women in terms of the scale of the fishing industry and fisheries cooperatives as well as the ways of responding to the changes in social and environmental conditions. The division of roles between men and women are not as simple as "men go fishing while women sell fish," but the roles may actually take various and variable forms, even in villages that are adjacent to each other.

Further studies may be required to show differences in the processes by which the divisions of roles and occupations between men and women were formed in fishing villages with different forms of fishing as well as comparing fishing village communities with villages that have totally different forms of occupations, such as farming villages and mountain villages.

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Research Paper

The Impact of Financial Assistance on Income: The Case of Women Fish Vendors in North Coast of Java

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Abstract

Subsidising or extending credit for fishing often has negative impacts on fish stocks and does not improve the income of fishermen, but little research has been conducted on financial assistance to fishermen's wives (fisherwomen). Fisherwomen have a very important role in helping the family economy but often face problems due to the lack of financial capabilities. Most of the fisherwomen who run fisheries small scale businesses, such as selling fish in baskets in markets on the north coast of Java, obtain financial micro-credit assistance from cooperatives, rural banks or from middlemen. This paper analyses whether financial assistance in the form of micro-credit affects fisherwomen's income. By using regression analysis, the impact of different types of existing microcredit on recipients compared to non-recipients is analysed with respect to socio-economic variables on income, return on investment, and expenditure. An efficiency analysis using Data Envelopment Analysis (DEA) was carried out to determine whether fisherwomen who received financial assistance (micro-credit) would be more efficient in terms of using their inputs compared to those who did not receive credit. The units of analysis were groups of fisherwomen who received micro-credit and those who did not avail of micro-credit. The inputs were measured by cost of capital, working hours and micro-credit, while outputs were measured in total revenue. The paper also analyses the optimum amount of credit for the fisherwomen studied.

Introduction

In the social structure of Indonesian fisheries communities, women have an important role, mainly due to the characteristics of fishing as an economic activity. Under conditions where the husband's income as a fisherman typically is erratic, the main person who can help to maintain a family livelihood is a fisherman's wife (fisherwoman). Besides having obligations as wives and mothers in domestic roles, fisherwomen also have a productive economic role to meet the needs of the household. In most coastal areas in Indonesia, fisherwomen help maintain the viability of

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fishing families through domestic activities, as well as economic activities. Fisherwomen basically have social roles as "sovereigns of the land", while their husbands work at sea.

In Indonesia, the coastal communities, dominated mainly by small-scale fisheries economic activities, still have to grapple with the serious problems associated with poverty. The depletion and degradation of coastal and marine resources has also had an impact on poverty. Some coastal areas in Indonesia have experienced severe over capacity in fishing, especially the Malacca Straits, Java Sea, Makasar Sea, and Bali Strait (Squires et al. 2003; Anna 2003). Even the northern coastal area of Java has fishing capacity that is 35% in excess of the optimal capacity (Fauzi and Anna 2012). Moreover, climate change has exacerbated the economic conditions of coastal communities in Indonesia (Fauzi and Anna 2010). This has been validated by the fact that some areas in the north coast of Java such as Tegal, Pekalongan and Semarang are the most vulnerable to inundation from sea water and sea level rise, locally known as flood or *rob*. The *rob* which has become more frequent over the years (50 cm rise due to sea level rise and land subsidence over the past 12 years in Semarang), has caused a drastic decline in the ability of fishermen to go fishing, resulting in their lower productivity (Diposaptono et al. 2009). The *rob* has also caused enormous losses of coastal infrastructure, including damaging fishermen's housing. Unfavorable economic conditions have encouraged fisherwomen to contribute to meet the needs of their families by resorting to economic activity. One of the economic activities that has been found to be promising for fisherwomen on the northern coast of Java is selling fresh fish in baskets. One important variable in running such businesses, and which often becomes an obstacle for fisherwomen, is the availability of finance. The need for capital is mostly met from small credit cooperatives, rural banks and middlemen.

Studies on the impact of micro-credit assistance to fishermen's economic performance, have been widely carried out, and found to be associated with productivity (McElroy 1991; FAO 1998; Millazo 1998; Munro and Sumaila 2002; Hempel and Pauly 2002). Almost all studies have indicated that micro-credit assistance to fishermen reduced operating costs and increased profits in the short run, and there was a natural tendency to increase effort resulting in over-capacity, leading to decline in per unit fish production in the long run. Studies have also revealed that direct subsidies are not very effective in combating poverty in fisheries or increasing production (Hempel and Pauly 2002; Bailey 1988). Mc Elroy (1991), noted that subsidy programs in the form of motorisation in the Java Sea fisheries had led to decreasing the long term catch per unit effort during the period from 1980 to 1990. Mc Elroy (1991) also observed that the effort (measured in number of trips) of the pelagic fisheries in Pekalongan was escalating. Fishers had to go further for fishing and increasing costs defeated the very purpose of the subsidy. Similar findings were found in Lombok, West Nusa Tenggara, where unsustained credit assistance provided by foreign NGOs such as Hivos and the German Agency for International Co-operation (GIZ) had no long term impact on the production and income of fishermen (Koreuber 1991).

However, research on the impact of financial aid for fisherwomen has not been widely looked into. Available studies are mostly related to the performance of loan repayments and also the impact of micro-credit loans on income and empowerment. Studies of Jayaraman (2008) in India showed that contrary to the common belief, poor women were credit worthy, honest and

most importantly 'bankable'. The study showed that the Fisherwomen's Self Help Groups (SHGs), a potential tool for rural development through micro-credit, did play a positive role in helping the fisher folk in their socio-economic development, emancipation and empowerment. The study by Suman (2007) indicated that women who use microcredit tended to even repay seriously delinquent loans if the frequency of women's group meetings were increased, because they could not bear the shame of a delinquent debt. Karmakar et al. (2009) suggested that micro-credit had an impact on fisherwomen's benefits by helping them in acquiring assets of their own, increasing their social status and decision making role within the family. The study also found that the income of the fisherwomen had actually risen from 2.8% to 12.2%, and microcredit programs encouraged women to attend meetings and this helped build their confidence, allowing them to handle money and become financial managers. Gopal et al. (2012), observed that micro-credit increased the income of fishermen and fisherwomen. The study revealed that they had renovated their houses, such as building toilets, and added household items such as refrigerators and furniture. The credit may not have been used entirely for production purposes and there was a possibility of it being diverted for household expenditure. Gopal et al. (2012) also stated that micro-credit had increased the social status of fisherwomen. Furthermore, Kabeer (2001) found that every 1% increase in loans to women micro-credit recipients of the Grameen Bank increased the probability of school enrolment by 1.9% for girls and 2.4% for boys.

Kabeer (2005) however observed that though financial assistance could make vital contributions to the economic productivity and social well-being of poor women and their households, it did not automatically empower women, because it does not bring about the radical structural transformation that true empowerment entails. Although micro-credit has the potential of empowering women, the connection is not always straight forward or easy to make (Kulkarni 2011).

While micro-credit for women may be beneficial in improving their living conditions, it is useful in helping them to efficiently carry out their businesses? From some of the studies reported above, the answer is still mostly qualitative. This paper will outline a more quantitative analysis of the impact of micro-credit on earnings and business economic efficiency using regression analysis and Data Envelopment Analysis (DEA). It also incorporates the assessment of different types of financial assistance provided by local private institutions and cooperatives. This is an aspect which has not been dealt with by various studies. The study also analysed the impact of credit assistance on the expenditure patterns of the fisherwomen, as it has long been of concern that the credit received is often used for daily household expenditure. The optimal credit requirement by applying efficiency analysis is also attempted.

Methods

This study was carried out in four steps. Firstly a qualitative approach was used to assess implementation regarding types of financial assistance or micro-credit for fisherwomen in Indonesia and how it is applied. Secondly, a quantitative approach by means of regression analysis was used to assess the effect of financial assistance (the local Rural Bank, cooperatives, and middlemen) on productivity of fisherwomen in comparison with those who did not get financial

assistance. Thirdly, efficiency analysis was carried out using Data Envelopment Analysis, to analyse the impact of financial assistance on the efficiency of the businesses. In the final part, policy implications of this analysis is spelt out.

Quantitative assessment based on regression analysis was carried out as follows. It was assumed that fisherwomen's income (rent) and Return on Investment (ROI) are functions of several socio economic variables including age, education, experience, working hours and financial assistance received. The role of financial assistance was captured using a dummy variable; D=1 if fisherwomen received financial assistance from different sources like a cooperative, middleman or rural bank and D=0 otherwise. Therefore, the general form of the function of this model is as follows:

$$y = f(age, education, experience, work\ hours, dummy\_financial\ assistance) \quad \text{(eq. 1)}$$

The specific functions of this model are written in semi log regression model form, to capture the elasticity factor, i.e., unit of change in independent variable affects a percentage change in the dependent variable. The model then is written as:

$$\ln y = \alpha_0 + \alpha_1 age + \alpha_2\, education + \alpha_3 experience + \alpha_4 work\ hour + \ldots\ldots\ldots\ldots + \alpha_n D + \varepsilon \quad \text{(eq.2)}$$

Furthermore, the study also analysed the impact of socio economic variables and dummy variable of micro-credit on the performance of fisherwomen's household expenditure. The model is written as:

$$\ln E = \alpha_0 + \alpha_1 age + \alpha_2 education + \alpha_3 experience + \alpha_4 work\ hour + \alpha_5 Income + .. + \alpha_n D + \varepsilon \quad \text{(eq.3)}$$

In order to capture the effect of micro-credit and socio-economic variables, a similar regression was carried out. The level of credit is measured by the amount of money the fisherwomen received as financial assistance. This model differs with the previous one in that it uses credit as a dummy variable. Upon regressing the dependent variables such as ROI and income (y) over these quantitative and dummy dependent variables such as age, education and micro-credit, the individual elasticities were tested for their significance. The equation can be written as follows:

$$\ln y = \alpha_0 + \alpha_1(age) + \alpha_2(education) + \alpha_3(experience) + \alpha 4(work\ hour) + \alpha 5(micro\text{-}credit) \quad \text{(eq.4)}$$

Quantitative assessment was also carried out to assess the level of economic efficiencies among fisherwomen (those who received financial assistance and those who do not). In doing so, an efficiency analysis was carried out using Banxia software for estimating frontiers by DEA. DEA is a Linear Programming based technique for evaluating the relative efficiency of Decision Making Units (DMU's). DEA is based on a non-parametric mathematical programming approach to frontier estimation, and needs relatively little technical detail (Seiford & Thrall 1990; Lovell 1993; Ali & Seiford 1993; Charnes et al. 1995; Seiford 1996). The DEA approach is used to estimate the efficiency scores of the DMU, (in this case the micro-credit group) based on Charnes, Cooper, Rhodes (CCR) constant return to scale model (Charnes et al. 1978). The CCR model is

applied because it is more suitable than the Banker, Charnes, Cooper (BCC) (variable return to scale) model and most studies in finance institutions are based on the input oriented constant return to scale model (Charnes et al. 1978 in Nawaz 2010). If the DMU_j has some inputs $x_{i,j}$ and outputs y_k, a relative efficiency measure is defined by:

$$Efficiency = \frac{\sum_k u_k y_k}{\sum_i v_i x_{i,j}} \qquad \text{(Eq. 5)}$$

where *u* and *v* are weights parameter for input x and output y, respectively. The optimisation problem for the equation is:

$$\max \theta_0 = \frac{\sum_k u_k y_{k,jo}}{\sum_i v_i x_{i,jo}}$$
$$\text{subject to } \frac{\sum_k u_k y_{k,j}}{\sum_i v_i x_{i,j}} \leq 1 \forall_j$$
$$u_k, v_i \geq 0 \qquad \text{(Eq. 6)}$$

Description of studies

This study was carried out using cross-sectional data of fisherwomen who run small-scale business (selling fish in baskets), in the northern coast of central Java. Two fishing locations in the region were chosen, namely, Pekalongan and Tegal. These small scale fisherwomen are those who sell small pelagic fish like trevally, scad, tuna, mackerel, barramundi, anchovies, etc. in baskets. Financial assistance from government initiatives as well as private and individual financiers/middlemen is available to both fishermen and fisherwomen in both these coastal areas. In addition to the in-depth questionnaire, data were also obtained by focus group discussion.

Four groups of fisherwomen, who are selling fish in baskets, were selected. The first groups was the control group, namely fisherwomen who do not receive any financial assistance or in other words, fund their own business and capital investment. The second group is those fisherwomen who received financial support through micro-credit schemes channeled through the Rural Bank, the local private banking institution that channels micro-credit into small enterprises such as those in the fisheries sector. The third group was fisherwomen who received financial support from cooperatives. And the fourth group was that of the fisherwomen who received financial assistance from middlemen. The respondents were selected by purposive sampling, based on data from the local marine and fisheries office. The sample was determined using formula from Issac and Michael (1981), with 5% precision. For every group, the number of respondents are equal. In total 80 respondents were selected from the population of 257 fisherwomen fish sellers in Pekalongan city and 200 in Tegal city. The descriptive statistics of the samples from both area are provided in Table 1.

Respondents surveyed from the two study sites were aged between 23 years to 69 years, with an average education of 6 years equivalent of primary school. Their working experience was 9 years on average, and the average hours spent in fish marketing was 5.5 hours per day. Regarding the respondents' marital status, 68 were married, 3 were single and 11 were divorced. The married respondents who borrowed micro-credit revealed that the decision of borrowing micro-credit was as per their husbands' approval. The average income of respondents ranged from 630 thousand Rupiahs to 5.63 million Rupiahs per month, the cost of capital (capital to buy fish for sale per month) ranged from 0.7 million Rupiahs to 5.5 million Rupiahs, while their household expenditure ranged from 1.1 million to 6.63 million Rupiahs per month. The amount of micro-credit ranged from 1 million to 5.5 million Rupiahs for a period of one year mortgage loan. The Return on Investment (ROI) ranged from 32.4% to 95.7%.

Table1. Descriptive statistics of socio-economic variables (Pekalongan and Tegal).

Variable	Non-recipient				Rural bank				Cooperative				Middlemen			
	Mean	Min.	Max.	SD	Mean	Min.	Max.	SD	Mean	Min.	Max.	SD	Mean	Min.	Max.	SD
Age	37.61	23.00	52.00	9.61	39.29	23.00	65.00	13.15	37.85	23.00	69.00	12.35	38.08	24.00	62.00	11.33
Education	6.45	1.00	12.00	2.54	5.00	1.00	9.00	2.83	6.75	1.00	12.00	3.45	5.67	1.00	9.00	2.46
Experience	9.58	4.00	17.00	3.31	8.36	5.00	20.00	4.40	10.90	4.00	30.00	6.60	7.75	5.00	12.00	3.22
Work Hours per day	5.70	4.00	7.00	0.65	5.29	4.00	6.00	0.73	5.40	4.00	7.00	0.82	5.58	5.00	6.00	0.51
Income (Million Rupiah) per month	2.04	0.63	5.63	1.33	1.14	0.61	2.10	0.52	2.21	0.98	4.35	1.03	0.66	0.59	1.05	0.13
Cost of capital per month (Million Rupiah)	2.44	0.80	5.50	1.71	1.37	1.00	2.00	0.39	2.41	1.20	5.50	1.29	0.95	0.70	1.25	0.15
Expenditure per month (Million Rupiah)	2.71	1.38	6.63	1.25	2.06	1.11	3.10	0.60	2.97	1.73	4.75	0.95	1.66	1.35	1.93	0.20
Amount of Micro-Credit (Million Rupiah)	-	-	-	-	1.55	1.00	2.00	0.30	2.41	1.20	5.50	1.29	1.40	1.00	1.50	0.17
ROI	71.86	38.75	112.50	20.80	68.04	32.40	95.67	19.34	83.94	49.76	115.6	16.15	49.64	38.75	68.00	10.85

Results and Discussion

The regression was carried out using dependent variables which included income (economic rent), returns on investment as well as expenditure. The explanatory variables were age, years of education, experience of fisherwomen in the fish selling business, and the dummy variable (D=1 if fisherwomen receive financial assistance or micro-credit D=0 otherwise). Partial regression coefficients were tested in the log-linear form of the model. The following Table presents the general (overall) model for the purpose of model comparison. The general model for model 1 with income as an independent variable is:

$$\ln Y = 12.8 - 0.00047x_1 + 0.0815x_2 + 0.0361x_3 - 0.0313x_4 + 0.505D_1 + 0.912D_2 + 0.743D_3$$

While for model 2, the general model is:

$$\ln Y = -0.29 - 0.00105x_1 + 0.0080x_2 + 0.0034x_3 - 0.0975x_4 + 0.266D_1 + 0.490D_2 + 0.503D_3$$

And for model 3, the general model is:

$$\ln Y = 13.7 - 0.0086x_1 + 0.0569x_2 + 0.007x_3 - 0.0422x_4 + 0.00000022x_5 + 0.0847D_1 + 0.106D_2 + 0.037D_3$$

Table 2. Regression results for all models.

Variable	Model 1 (Y=ln*income*)		Model 2 (Y=ln*ROI*)		Model 3 (Y=ln*expenditure*)	
	Coef.	p-value	Coef.	p-value	Coef.	p-value
Constant	12.8	0.000	-0.29	0.422	13.7	0.000
Age (x_1)	-0.000473	0.957	0.001052	0.804	0.00863	0.010*
Education (x_2)	0.08154	0.026*	0.00795	0.643	0.0569	0.000*
Experience (x_3)	0.03611	0.029*	0.003418	0.659	0.00733	0.236
Work Hours (x_4)	-0.03130	0.737	-0.09745	0.032*	- 0.0422	0.222
Income (x_5)	-	-	-	-	0.00000022	0.000*
Rural Bank (D_1)	0.5046	0.011*	0.26553	0.005*	0.08472	0.243
Cooperative (D_2)	0.9122	0.000*	0.49087	0.000*	0.10564	0.166
Non-recipient(D_3)	0.7427	0.000*	0.50275	0.000*	0.03739	0.611
R^2	50.3 %		48.6%		79.6%	
Adj R^2	44.5 %		42.6%		76.9%	
$F_{statistic}$	8.67		8.11		28.81	
Prob ($F_{statistic}$)	0.000		0.000		0.000	
$DW_{statistic}$	1.58		1.94		1.64	

* Significant at the interval confidence 95 %.

As can be seen from Table 2, the model with expenditure as dependent variable performed better than those with income and Return of Investment (ROI). The model indicated that 77 % of the variation in revenue could be explained by the socio-economic variables, including financial assistance. On the other hand, even though the model with income as dependent variable performed seemingly well, the explanatory variables only accounted for 50% of the variation of income.

From Table 2 it can be seen that for model one, the explanatory variables that significantly affected the natural logarithm of income at the level of significance of 5% (or 95% level of confidence), were education, experience, Rural Bank, Cooperative and non-recipient dummy. Age and work hours did not significantly affect the income of fisherwomen. It can also be inferred that the increase of one year in education could increase the income by 8%, while the increase of one year in experience could increase income by 3%. For the dummy variable 'micro-credit', the coefficient of Rural Bank is 0.505 which means that the income of fisherwomen who availed of micro-credit from Rural Bank was 1.66 times higher than that of those who took micro-credit from middlemen. The income of fisherwomen who had availed of micro-credit from cooperatives was

2.49 times higher than that of those taking micro-credit from middlemen. The non-recipient fisherwomen had an income 2.10 times higher than those who had taken credit from middlemen. In the case of loans from middlemen, probably the high cost of credit effectively reduced the fisherwomen's income. Compared to cooperative borrowers and non-recipients, the Rural Bank borrowers had lower incomes, by 0.665 times and 0.788 times respectively. While compared to non-recipients, cooperative borrowers performed better with income 1.19 times that of the non-recipients. The model with ROI as the dependent variable had an R^2 of only 48.6%. The model for each type of micro-credit presented in Table 3.

From model one it can be concluded then that cooperative micro-credit for fisherwomen provides the best income. The reason for this performance is that cooperative micro-credit has more conventional mortgage interest levels compared to other micro-credit schemes. Interest for the Rural Bank, Cooperative, and middlemen were 8%, 12%, and 60% respectively. Besides, fisherwomen who borrowed finance from Cooperatives were members of the Cooperative and as such had more advantages than others, i.e. they often have the opportunity to get education and training in the field of entrepreneurship. They also had more opportunities to exchange information about their business in Traders' Cooperative meetings, so that they can run their businesses better.

Table 3. Models for micro-credit using income, ROI and expenditure as dependent variable.

Model	Micro credit	Equation
Model 1 (*y*=ln*income*)	**Rural Bank**	$\ln Y = 13.30 - 0.00047x_1 + 0.0815x_2 + 0.0361x_3 - 0.0313x_4$
	Cooperative	$\ln Y = 13.71 - 0.00047x_1 + 0.0815x_2 + 0.0361x_3 - 0.0313x_4$
	Non Recipient	$\ln Y = 13.54 - 0.00047x_1 + 0.0815x_2 + 0.0361x_3 - 0.0313x_4$
	Middlemen	$\ln Y = 12.8 - 0.00047x_1 + 0.0815x_2 + 0.0361x_3 - 0.0313x_4$
Model 2 (*y*=ln*ROI*)	**Rural Bank**	$\ln Y = 0.02 + 0.00105x_1 + 0.0080x_2 + 0.00342x_3 - 0.0975x_4$
	Cooperative	$\ln Y = 0.20 + 0.00105x_1 + 0.0080x_2 + 0.00342x_3 - 0.0975x_4$
	Non Recipient	$\ln Y = 0.21 + 0.00105x_1 + 0.0080x_2 + 0.00342x_3 - 0.0975x_4$
	Middlemen	$\ln Y = -0.29 + 0.00105x_1 + 0.0080x_2 + 0.00342x_3 - 0.0975x_4$
Model 3 (*y*=ln*Expenditure*)	**Rural Bank**	$\ln Y = 13.78 + 0.00863x_1 + 0.0569x_2 + 0.00733x_3 - 0.0422x_4 + 0.00000022x_5$
	Cooperative	$\ln Y = 13.81 + 0.00863x_1 + 0.0569x_2 + 0.00733x_3 - 0.0422x_4 + 0.00000022x_5$
	Non Recipient	$\ln Y = 13.74 + 0.00863x_1 + 0.0569x_2 + 0.00733x_3 - 0.0422x_4 + 0.00000022x_5$
	Middlemen	$\ln Y = 13.7 + 0.00863x_1 + 0.0569x_2 + 0.00733x_3 - 0.0422x_4 + 0.00000022x_5$

Age(x_1), education(x_2), experience(x_3), work hours(x_4), income (x_5)

For model two, the variables that affected ROI at 5% level of significance were working hours, and the dummy variables viz. Rural Bank, Cooperative and non-recipient. The variables age, education and experience did not affect ROI. From the coefficient for working hours, it can be seen that if the working hours increased by 1 hour, then the ROI would decrease by 9%. Compared to the other dummy variables for Cooperative, middlemen and non-recipient, the dummy variable of Rural Bank was respectively 0.798, 1.304, and 0.789 times, while the dummy

variable of Cooperative compared to middlemen and non-recipient was respectively 1.63 and 0.99 times. The dummy variable of non-recipient compared to middlemen was 1.65 times. This means that for the ROI model, the best performance was by the non-recipient group, followed by those supported by cooperatives.

From the results of the regression analysis for model three, (Table 2) only the variables of age, education and income affect expenditure and are significant at the 95% level of confidence. For every one year increase in age, expenditure will increase by 0.8%, while with every one year increase of education expenditure will increase by 5%. Moreover, an increase of income by one million Rupiahs will increase expenditure by 22%. In contrast to the results of the study conducted in Kerala, India by Gopal et al. (2012), micro-credit recipients did not divert loan funds for household expenditure. In the interviews of the present study nearly 92.3% of respondents said they did not use the loan money for daily household expenditure needs. In fact, nearly 86% said they wanted to save money for shopping needs instead of their primary needs. Even though they had extra income from their businesses, they said that the credit would not change their spending patterns. These results are in line with research in Indonesia from Suman (2007), which showed that women tended to be more disciplined and avoided the temptation to use the loans for things that did not fit the original purpose, in this case their business.

Efficiency analysis using DEA was conducted to determine whether fisherwomen who receive micro-credit would be more efficient in terms of using their inputs compared to those who did not receive credit. The first efficiency analysis model is for Decision Making Units (DMUs) in all groups of fisherwomen, with the inputs being the average cost of capital and work hours, while output was the average of total revenue. Result revealed that the highest score for efficiency (100% efficient) was achieved by fisherwomen who borrowed credit from Cooperatives, followed by non-recipients and women borrowing from the Rural Bank, while the fisherwomen who borrowed credit from middlemen tended to be the least efficient (75.76%) (Table 4). This result is in line with the results of the regression model results, which showed that fisherwomen who borrowed micro-credit from Cooperatives had better income than the fisherwomen who borrowed micro-credit from other institutions (Rural Bank and middlemen), and had a better performance than non-recipients.

Efficiency scores in Table 4 were derived from group averages data. From Table 4 it can be concluded that fisherwomen who received credit from the Rural Bank should decrease their cost of capital (reduce their credit) by 9.26% and working hours by 47.34% to achieve a fully efficient utilisation of inputs, while for the fisherwomen who borrowed credit from middlemen their costs of capital should be decreased by 24.24% and working hours by 71.10 % from the average. For non-recipient fisherwomen, to achieve full efficiency they should decrease their capital by 8.83% and work hours by 13.01% from the average. Since fish is a perishable commodity, decreasing working hours would mean conducting sale in a shorter time period, thus increasing efficiency.

Table 4. Efficiency frontier analysis and total potential improvement - results for groups of fisherwomen.

DMU	Efficiency score (%)	Total potential improvement		
		Capital (%)	Work hour (%)	Total revenue (%)
Non-recipient	91.17	-8.83	-13.01	0.00
Rural bank	90.74	-9.26	- 47.34	0.00
Cooperative	100	0.00	0.00	0.00
Middlemen	75.76	-24.24	-71.10	0.00

Further DEA analysis was conducted for all fisherwomen respondents (individual DMU's), with the inputs of work hour and cost of capital and output of total revenue. Detailed score and projection for efficiency improvement can be seen in Table 5.

Table 5. Efficiency score and input output projection for all respondents.

DMU	Score	Total revenue projection	Work hours projection	Cost of capital projection
Middle men				
Min.	0.47	-0.01	-0.48	-0.53
Max.	0.69	0.01	-0.36	-0.22
Average	0.56	0.00	-0.43	-0.43
Rural Bank				
Min.	0.38	-0.01	-0.48	-0.77
Max.	0.89	0.01	-0.44	-0.22
Average	0.66	0.00	-0.31	-0.45
Cooperative				
Min.	0.56	-9.12	-0.46	-2.40
Max.	1.00	0.00	0.00	0.00
Average	0.78	-0.48	-0.17	-0.52
Non-recipient				
Min.	0.50	0.00	-0.47	-2.48
Max.	1.00	0.01	0.00	0.00
Average	0.71	0.00	-0.27	-0.65

In line with the results of the model of average values of each group as a DMU, fisherwomen who get micro-credit from Cooperatives showed better scores (0.56 to 1), followed by non-recipients with score 0.50 to 1(Table.5). The projections for improvement for all DMUs varied with input and output. For borrowers from middlemen for example, to be efficient, working hours should be reduced in the range of 36% to 48% and the cost of capital (credit) should be reduced by 22% to 53%.

If DEA is carried out within the micro-credit recipients only, using credit as an input (Table 6), the scores are varied. Fisherwomen borrowing from middlemen are in the range 0.31 to 0.56, for credit from rural bank in the range 0.32 to 0.92, and for credit from Cooperatives they are in

the range 0.62 to 1 (efficient). From the input-output projection within micro-credit recipients, it could be inferred that reducing working hours from 8% to 80% is required to be fully efficient. This is due to the perishability of fish. The more the time spent in sale of fish, the more the risk of spoilage of fish resulting in lower prices and reduced profit.

Table 6. Efficiency score and input output projection DEA analysis within micro-credit recipients.

DMU	Score	Work hours	Micro-credit	Total revenue
Middlemen				
Min.	0.31	-0.80	-0.69	0.00
Max.	0.56	-0.65	-0.44	0.00
Average	0.38	-0.76	-0.62	0.00
Rural Bank				
Min.	0.32	-0.80	-0.68	0.00
Max.	0.92	-0.08	-0.08	0.00
Average	0.60	-0.55	-0.40	0.00
Cooperative				
Min.	0.62	-0.68	-0.38	0.00
Max.	1.00	0.00	0.00	0.00
Average	0.83	-0.27	-0.17	0.00

From the results of the DEA, it can be inferred that to be efficient, fisherwomen need to reduce their micro-credit borrowings by 62% if from middlemen, by 40% if from the Rural Bank and by 17% if from Cooperatives. In other words, the optimal microcredit for fisherwomen vending fish in baskets from the Rural Bank is around 900 thousand Rupiahs, from Cooperatives around 2 million Rupiahs, and from middlemen around 500 thousand Rupiahs.

Conclusion

On the northern coast of Java, Indonesia, fisherwomen play a major role in the household economy. One of the main problems for fisherwomen to develop their skills in business is the lack of financial capital. Access to micro-credit institutions by fisherwomen has grown in Indonesia. However pessimism about the schemes of financial assistance for fisherwomen's businesses still continues. Women are considered to have poor business skills, especially the illiterate or poorly educated fisherwomen.

This study shows that financial assistance in the form of low interest rate micro-credits or loans through different institutions such as the Rural Bank, Cooperatives and middlemen have different impacts on the economic performance of fisherwomen's economic activity, such as their income, ROI and expenditure. The study has also revealed that financial assistance in the form of micro-credit from Cooperatives has a greater impact on fisherwomen's income when compared to that of non- recipients, credit from the Rural Bank and credit from middlemen. Relative to other schemes analysed in this study, Cooperatives are also considered to be the most efficient agency

for providing financial assistance based on DEA. Fisherwomen who avail credit from Cooperatives are also members of the Cooperatives. It was also observed during this study that the fisherwomen in Cooperatives were becoming more competitive, gaining more self-confidence, had better market information and greater social bonding to help each other. Thus, the performance of their businesses was also more efficient, than were those of the other recipients (Rural Bank, middlemen and non-recipient) who were not members of cooperatives.

The study also revealed that to be efficient, the optimal amount of micro-credit for fisherwomen selling fish in baskets on the North Coast of Java differed according to the types of micro-credit institutions they used. The optimal amount of credit of Cooperatives was the highest compared with the Rural Bank and middlemen. This shows that the Cooperative sector is reliable as an institution that provides micro-credit for fisherwomen, and more credit can be distributed to the fisherwomen to make their businesses more profitable. This condition implies the need for the development of more fisherwomen cooperatives, and more credit disbursement from cooperatives, as the number of fisherwomen's cooperatives compared to fishermen's cooperatives is still very limited, limiting the opportunities for fisherwomen to access credit.

Financial assistance from middlemen was found to have less impact on fisherwomen's economic performance, including its efficiency. However, borrowing from the middleman is still an option for some fisherwomen, even though the interest is tends to be high. Women who are not members of Cooperatives and do not have collateral, as required by other institutions such as the Rural Bank, may need credit from middlemen. This implies that suitable policy changes are required such as reduction or removal of the collateral requirements insisted on by financial institutions, so that there are sufficient opportunities for more fisherwomen to get institutionalised financial assistance.

The study also shows that fisherwomen are basically disciplined in their borrowing behavior and their expenditure apparently had nothing to do with the financial assistance they received through micro-credit. Women become more thoughtful when dealing with money earned through businesses started using credit and women did not tend to spend the money earned from the micro-credit funded business for their consumptive needs. The information in this study could be used by decision-makers to develop suitable financial assistance schemes for the development of fisherwomen.

From the point of view of methodology, however, a limitation of the present study is that the regression could have been strengthened by adding other variables, for example, the husband's income, which could affect the fisherwomen's spending patterns. Also the DEA approach, which assumes only conditions of constant returns to scale, could be developed using variable returns to scale. Another deficiency of DEA is that the approach explains only the general relationship between input and output and hence is sensitive to the inputs and outputs chosen.

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Essay: Dr M.C. Nandeesha -The Man Who Brought Gender Awareness to the Asian Fisheries Society

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The death of Dr Mudnakudu C. Nandeesha in December 2012 at the age of 55 left a deep void in the hearts of many. His personal and professional gifts are very much missed, especially among those who are now active in gender in aquaculture and fisheries. Among many other impacts, Nandeesha made unique and lasting professional contributions to gender awareness and initiated a steadily growing series of gender activities by the Asian Fisheries Society. I know some of the story of what happened because I was personally drawn into these activities by Nandeesha. In this essay, I will recount the history as I saw it happen. It is a good example of what one person, with vision, drive and inter-personal skills can set in train.

A brief professional biography

After his Masters graduation Nandeesha's professional career began in teaching at the College of Fisheries, Mangalore while he undertook his Doctorate in Zoology/Fisheries from Visva-Bharati University, Shantiniketan, West Bengal, India. Armed with a new Ph.D, he then moved into international development in Cambodia, first working for 5 years (1992-1997) with Padek, the Partnership for Development in Kampuchea. After this, he worked on two major projects for CARE in Bangladesh, LIFE (Locally Intensified Farming Enterprise) Project (1998-2000) and GOLDA (Greater Options for Local Development through Aquaculture) Project (2000-01).

Equipped with a great depth of field and international experience, and connections through his active participation in professional conferences and other events, Nandeesha returned to India in 2001 as Professor and Department-in-Charge, College of Fisheries, Central Agricultural University, Tripura State, where he remained until 2008 and built its programmes and institutional culture. From 2008-2010, Nandeesha consulted to the Food and Agriculture Organization (FAO), the Network of Aquaculture Centres in Asia-Pacific (NACA), the International Fund for Agricultural Development (IFAD) and others. In 2010 until the time of his demise, he was Dean of the Fisheries College and Research Institute, Tamil Nadu, India. During this time, he worked to establish the Tamil Nadu Fisheries University, an undertaking that came to fruition in 2012 and

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which he was scheduled to lead as Vice Chancellor. Nandeesha was the Special Officer of the newly formed Tamil Nadu Fisheries University. The order appointing him as Vice Chancellor by the Government of Tamil Nadu was delivered to him on the 26th of November 2012. The Fisheries Minister, the Secretary of State and also the Vice Chancellor of the Tamil Nadu Veterinary and Animal Sciences University, of which he was a part before becoming the Special Officer, visited him in the hospital - congratulated him and wished him a speedy recovery.

He was also a board or council member of several regional and global professional bodies such as the Asian Fisheries Society, the World Aquaculture Society and the development charity Aquaculture without Frontiers.

Much could be written about the influence that Nandeesha brought to all his professional fields, but I will focus on how he motivated gender in aquaculture and fisheries as this is where I knew him best. This is a microsm of his influence in education, research and development in aquaculture and fisheries, but also has the unique feature of having generated a new network of professionals in the Asian Fisheries Society (AFS) in times when similar networks did not form in other similar professional societies.

Impact on gender awareness in AFS and beyond

In 1990, the Asian Fisheries Society Indian Branch (AFSIB), which Nandeesha had been instrumental in helping establish, held their first ever workshop on "Women in Fisheries in India." In the Foreword to the Proceedings, Dr H.P.C. Shetty, the AFSIB President at the time, wrote: "*I also wish to commend the initiative of Dr. M.C. Nandeesha, the dynamic Secretary of AFSIB, in suggesting the workshop topic and for spearheading its organisation and publication of the proceedings*" (Gadagkar 1992).

Following the success of this event, in 1994 Nandeesha again used a workshop to bring together stakeholders to discuss "Women in Cambodian Fisheries" (Nandeesha and Heng 1994). Working from Padek, he expanded the geography in 1996 for the "Women in Fisheries in Indo-China Countries" seminar (Nandeesha and Hanglomong 1997).

All this time, he was building contacts on the theme of women in fisheries. In 1995, he persuaded Padek to support the women in fisheries photo competition at the 4th Asian Fisheries Forum (AFF) of the AFS in Beijing. This was a quiet entry – a toe in the door to bigger events, and more was to come. I recall seeing the photos in Beijing, and this may be where I first met Nandeesha. In early 1996, he invited me to give welcoming remarks at the above-mentioned Indo-China seminar in Phnom Penh. As an outcome of this productive seminar, Nandeesha suggested that we should request the next Asian Fisheries Forum to include a symposium on Asian women in fisheries. The organisers agreed and this event came to fruition in Chiang Mai, Thailand in 1998 at the 5th AFF (Williams et al. 2001), along with another photo competition. AFS, WorldFish Center, Padek and several donors supported the event.

Why stop at Asia? In 2001 at the 6th AFF, the Global Women in Fisheries symposium was held in Kaohsiung, Taiwan (Williams et al. 2002a) along with a photo competition. This symposium determined a broader agenda for future events and developed into gender and aquaculture and fisheries themes (Williams et al. 2002b).

This started the regular GAF (Gender in Aquaculture and Fisheries) events, the first at 7th AFF in Penang, Malaysia in 2004 (Choo et al. 2006); GAF2 in Kochi, India at 8th AFF, 2007 (Choo et al. 2008); GAF3 in Shanghai, China in 2011 at 9th AFAF (Asian Fisheries and Aquaculture Forum) (Williams et al. 2012). Little did we know that this would be the last that Nandeesha could attend.

These events did more than raise awareness; they created a platform for researchers, including students, and development workers to meet each other, present and discuss their work at the events and in the proceedings. The events also brought in outside partners such as Padek and CARE, and drew in a number of development donors, as well as supporters in national institutes and universities. So far, the Asian Fisheries Society is the only professional aquaculture and fisheries society to hold regular and well-branded events on gender/women, although, 20 years later, some others are moving to highlight women's contributions.

An important development for the AFS movement has been publishing the written papers from the symposia. Gradually, the quality of these proceedings has improved. More rigorous peer review has done much to raise the standards.

Nandeesha's gender approach as revealed in four publications

Stimulating AFS, a major fisheries and aquaculture professional society, to incorporate women/gender events in its programme is one indicator of Nandeesha's approach. Further insights into how he approached gender equality in fisheries and aquaculture are revealed in his publications. I have chosen four publications to analyse: Debashish et al. (2001), Nandeesha (2006), Williams et al. (2012) and Williams and Nandeesha (2012). These publications all reveal a strong focus on gender equality in institutions (a development agency, university, society and the aquaculture sector) and in education.

Institutional approaches in CARE Bangladesh (Debashish et al. 2001) was based on a paper presented in 1998 at the AFS Women in Asian Fisheries symposium. It analyses the case of the Agriculture and Natural Resources (ANR) sector of the development agency CARE-Bangladesh which decided to focus on helping women in aquaculture. This decision came about from recognising that the women in rural Bangladesh often managed home vegetable gardens and livestock and, in hard times, their nutritional needs and those of their children were often not met.

The act of helping women was confronted by challenges. For one, the extension systems of the time, both CARE's and most others, did not include women. Almost all extensionists were men, with a low appreciation of women's learning styles and needs. Putting together their experience over several high profile fisheries/aquaculture projects, CARE recommended a three-

tier approach. In the first tier, logical frameworks for each project should specify goals for women's participation. In the second tier, extension methods and interventions should be chosen for their ability to increase benefits for women. The third tier, building a more gender-sensitive organisation, is internal to the institution. CARE found this one of the most difficult to achieve.

Field experience revealed further that very local social attitudes and the types of aquaculture resulted in different gender roles. Among the CARE projects, the GOLDA project had a participation rate of 43% women, whereas the cage culture project, CAGES, had only 14% women. Within ANR, although a level of 28% women staff had been achieved by 1998, women's retention was low and workplace culture contained a certain degree of resistance from the men.

The conclusion from this analysis is that making a decision to benefit women in a sector entails much more than deciding to do it. Changing the focus of an organisation to create more value for women is akin to a mission change and requires a deep internal organisational change to support and achieve it.

In two publications, Nandeesha revealed his dedication to encouraging institutions to increase opportunities for women students and staff. In his paper on gender participation in the Indian state fisheries colleges under the agricultural universities, he looked at the relatively low numbers of women among teaching, administration and support services staff (Nandeesha 2006). For students in the Master of Fisheries Science programme, the participation rates of women students varied by state and were related to female literacy and social status by state. Kerala has the highest literacy rate in India and in the Kerala Fisheries College, women comprised 70% on average of the top 10 fisheries graduates from 1995 to 2003. He recommended that greater gender equity could only be achieved by sensitising senior leaders, constructing curricula that are more gender sensitive and better support infrastructure for the women, including ensuring their physical security and comfort.

I know he put some of his own recommendations into practice in Tripura where he was instrumental in getting his then employer, the College of Fisheries, to construct suitable dormitories for women students, and gave his best paper prize money from the 2007 GAF2 symposium towards scholarships for women students.

The second paper (Williams et al. 2012), was a wide ranging review - *Sustaining aquaculture by developing human capacity and enhancing opportunities for women* - undertaken for the decadal aquaculture conference convened by the Food and Aquaculture Organization (FAO) and the Network of Aquaculture Centres in Asia-Pacific (NACA). At the intersection of human capacity development and women's opportunities, Nandeesha suggested we should report on the rates of women students in relevant university courses, and changes over time. Knowing that no ready statistical database existed, I was sceptical of the feasibility of doing this. Undaunted, Nandeesha undertook to write to his friends and colleagues around the world, which he did. Sixteen of the key institutes responded promptly, with varying collections of statistics which we were able to present in a table, and a figure (Fig. 1) that showed the overall upward trend across all continents surveyed (Asia, Africa, Europe, North America).

This showed Nandeesha's insistence to move forward and support observations with hard data, even if it had to be collected from scratch.

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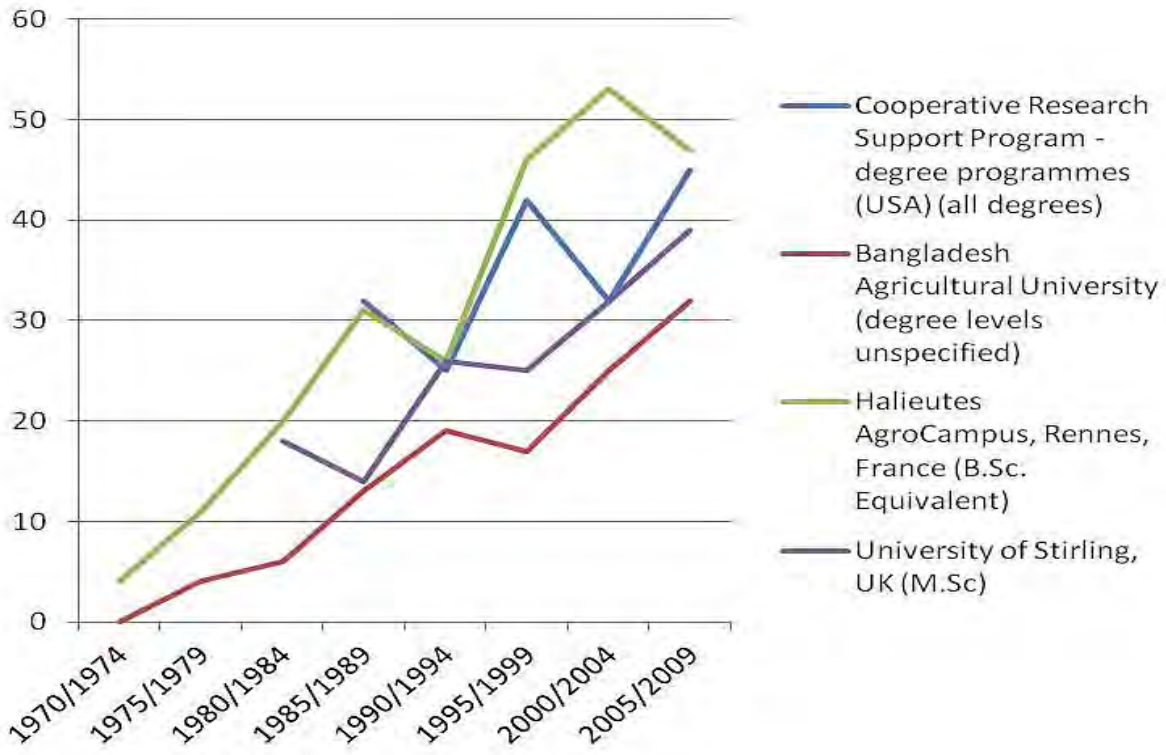

Fig. 1. Selected time series of female graduates in aquaculture programmes.
Source: Fig. 2 Williams et al. 2012.

Another sign of Nandeesha's stress on the importance of education was that he repeatedly recommended to the AFS GAF group that a "gender 101" course was desperately needed in fisheries and aquaculture education and for in-service training of fisheries officers. Although a few small courses have been run as parts of larger projects, however, major progress has not been achieved on this front, but the need persists.

The fourth paper is concerned with recording and keeping our progress on gender equality in clear and critical view. In *Now is the time to move the agenda forward* (Williams and Nandeesha 2012), at Nandeesha's urging, we covered more than an update on recent gender in aquaculture and fisheries events. He suggested we also provide a timeline of events to date, with links to outputs (proceedings, news reports) and review the performance of the Society with respect to gender equality on the Council. Nandeesha developed a table of the 11 women Councillors since the start of AFS, showing their terms. Two of them (Dr Claire Marte and Dr Ida Siason) had been presidents. He would be disappointed to note today that the number of women Councillors is not increasing, and he would be urging us that a new concerted effort is required to get more senior women to step up and nominate for the election.

Lessons learned from a visionary

Since I first interacted with Nandeesha in 1996, I observed his total commitment to social justice. Social justice mattered above all else. Always conscious of the realities on the ground, he worked hard to apply it in practice in daily life. His mission for social justice shone through in his vision of bettering the lives of women in fisheries and aquaculture. At a practical level, it showed in actions such as promoting the building of the women's dormitory at the Tripura Fisheries College and donating his 2007 GAF2 award, plus many more personal actions that are the material for another publication.

Nandeesha possessed strong self-respect but did not put himself first. His self-respect served as a solid base on which to build his strategies and tactics to fulfil his social justice mission. The donation of his 2007 award was not the first time he had done this. In other accounts of his life, we hope to document more of his generosity to people and institutions at important points in their development.

I would characterise his overall strategy as consisting of first getting a "toe in the door," and then ramping up action once an opening came. This step often required that he and his partners had to be prepared to take risks. He was a demanding collaborator, prompting his collaborators to push the boundaries, and try for more. A meeting with him frequently generated new ideas and inspirations, and more work for him and his collaborators.

He believed in the importance of going to the top influence-makers. For example, in the 1996 Women in Fisheries in Indo China conference, the formal events were presided over by Princess Norodom Marie Ranariddh, wife of the then Prime Minister of Cambodia, Prince Norodom Ranariddh. The most important part of Nandeesha's strategy, however, was working with others at all levels, and getting key people engaged in furthering the action. I would count myself among the many "others" that were started on new paths and fields of endeavour by Nandeesha's influence. Many middle level professionals proudly say "he was my teacher," and several retired senior leaders proudly say "he was my student."

All four of Nandeesha's papers discussed above show his focus on the importance of institutions and their internal cultures in achieving gender equality. He realised that unless the well-meaning institutions grasped and acted on the need to grow cultures that were fully supportive of women as professionals, co-workers and office bearers, they would be struggling to deliver benefits to women in the field.

Finally, Nandeesha did not rest on past achievements, but kept reminding us of where we had come from, what had been achieved and what more effort was needed. Also, true to his training as a biologist with a respect for hard data, he sought to assess progress with hard numbers, even if, as was the case with women students in aquaculture courses, it meant collecting this himself.

Conclusions

The Asian Fisheries Society would likely not have developed its strong track record in sponsoring women/gender in aquaculture and fisheries symposia and other awareness raising actions if not for the efforts of Dr M.C. Nandeesha. We cannot say definitively that AFS would never have started giving serious attention to gender equality, but we can say that its actions would have started much later than they did, and thus would not have progressed so far without him. And time is important in closing the gap between the benefits of women and men.

Dr Nandeesha was a visionary committed to social justice, and with an intuitive understanding of how to motivate others to act and bring about institutional change. He changed the course of my professional life and that of many others. I echo these words from Rajeswari Dayal B. his loving wife: "so though Nandeesh is not with us physically, his thoughts and deeds are there to guide us through these difficult times."

Acknowledgement

I am very grateful to Mrs Rajeswari Dayal B., wife of Dr M.C. Nandeesha who kindly reviewed the draft of this manuscript for accuracy, provided some additional detail and originally provided photos of Nandeesha for use in the oral presentation at GAF4.

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Research Paper

Call to Action? Survey Highlights the Shortcomings of Business-as-Usual in Addressing Gender Equality in the Fishery Sector

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Abstract

In the fishery sector, too little attention is paid to gender equality, and gender-blind policies and programmes render the issue as peripheral or invisible. Since 1990, the Asian Fisheries Society (AFS) has paid sustained attention to gender, although at a modest level. In order to gauge how the small cadre of gender experts perceived progress in mobilising attention and action on gender in fisheries, we conducted an online structured survey. Using Actor Network Theory as the questionnaire framework, we analysed the responses from 41 experts. The respondents perceived that the understanding of the gender inequality issues has progressed well but the strategic messages arising are not communicated strongly nor well targeted. Few workers, and even fewer full time professionals, are dedicated to the field of gender research and action, and research is not well linked to grassroots needs. Therefore, the field suffers from weak efforts to enroll more champions, leaders and actors and reach critical mass for mobilisation for gender equality. For mobilisation to happen, targeted, dedicated resources are urgently needed, including full time people, institutional support and projects. To achieve this will require strong, perhaps even confrontational, campaigns and plans, from within the fishery sector, led by a self-nominated core group of committed women and men concerned with inequality in the fishery sector.

Introduction

In the fishery sector, comprising aquaculture and capture fisheries and their supply chains, gendered divisions of labour and the invisibility of many workers, especially but not only women, can lead to policies and programmes that ignore the needs of many of the workers (Williams et al. 2012). Fishery sector policy and support tends to be androcentric in its themes and reluctant to address social issues, preferring to focus on economic, resource and environmental issues. Specifically, the fishery sector has paid little attention to the gender dimension, adopting the

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narrative that the sector is a masculine domain in which women play little role and in which economic, bio-technical and capitalist drivers and epistemologies prevail. Gender-aware policies and programmes are therefore rare in mainstream fisheries and aquaculture. Yet, in a recent report (World Bank 2012), nearly half the workers in capture fisheries are women, and similar participation is likely in aquaculture. Thus, gender must be taken more seriously.

Thanks to the initiatives of Dr. M.C. Nandeesha and other colleagues, the Asian Fisheries Society (AFS) began addressing the topic of women in fisheries/aquaculture in 1990, and progressively expanded the work to global scale symposia, albeit of still modest attendance. Up until 2001, the AFS activities had been based on a "women in fisheries" approach, but after this, events were consciously renamed as "gender and fisheries", including aquaculture, in an effort to be more inclusive of the people (women and men) and the development processes (Williams et al. 2002). In reality, most of the papers presented at the subsequent events have been on women, but more attention is being given to the development context. The AFS women/gender activities have been described elsewhere (e.g. Williams and Nandeesha 2012) and will not be enumerated here. The Society's contributions, although continuous, have been opportunistic and relied on a patch work of small resources contributed by people prepared to act as leaders and contributors, and explicit and implicit organisational support, including some small donor grants. Coupled with the modest funding and weak policy attention to gender in the fishery sector, progress has been slow but seems to be accelerating as major institutions and donors show an emerging interest in gender equality.

In 2011, our assessment following GAF3 of the slow progress concluded that women/gender studies and action: *"(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*" (Williams et al. 2012). Moreover, we identified a certain amount of research progress, at least in the more descriptive fields on women's roles and contributions and structural efforts on institutions and supply chains. Progress was more modest on complex contextual analysis of ecological, economic and cultural systems, including inter-sectionality.

We wondered, however, how a wider group of interested people viewed the progress towards achieving greater gender equity and equality in the fishery sector, the problems faced, and the options for greater progress. We therefore carried out a survey to find out more.

Methods

We conducted a qualitative survey electronically, using Survey Monkey, to gather information for analysis. The survey was entitled: "Gender networks in aquaculture and fisheries: What works and what doesn't?" The survey questionnaire consisted of two parts: basic demographic information and core, open ended interview questions. We compiled an e-mail list of 232 accessible names and addresses from previous and current network lists. The lists were: the lists previously run by one of us (Poh Sze Choo) out of the WorldFish Center, the subscribers of the Genderaquafish.org website, the present Google Group Genderaquafish and the GAF3

presenters. The call was deliberately not open to all social media groups because we wanted to focus on the views of insiders. Although overlaps among the lists were considerable, each list did have significant differences in membership. Forty-five people accepted the e-mail invitation to take part in the survey within the allotted time frame (19% of the 232 invited) and were sent the survey questionnaire; of these, 41 (91% of the acceptances) fully completed it. These responses, most providing considerable detail, formed the basis of our analysis.

The basic demographic questions included name, gender, age, nationality, country of work, field of expertise, type of work institution and details of participation in past AFS and other gender/women's networking in the fishery sector.

To structure the core questions, we used the framework of stages in network formation used in Actor Network Theory (ANT) (Callon 1986), namely Problematisation, Interresment, Enrolment and Mobilisation. The results provide more information on how each of these was used in our study. We chose this framework for several reasons. Actor Network Theory can consider networks as any scale. The different networks that each of the respondents had in mind could have been operating at scales from project and local networks to national and international networks. The networks do not require formal definition, and indeed many of the gender in fisheries and aquaculture networks are informal, e.g. the Asian Fisheries Society network, ephemeral, e.g. project networks, or weakly formal in the case of some national and regional efforts struggling to thrive.

Callon (1986) calls the process of forming a network of influence "translation". In the current study, we recognise that each of those interviewed has their own network in mind, although many of the answers also revealed that they also conceived of gender in the larger context of the fishery sector. All but nine of the respondents gave permission to be identified by name, and thus this permits some context to be revealed with respect to their comments.

The four core questions were:

(1) Why do you think some networking activities worked and some did not? Please provide information for a network activity that worked and why and also one that did not and why?
(2) Please briefly describe an event or incident you have experienced or observed that illustrates an interesting aspect (good or bad) of what is required to make changes in the way woman/gender issues are handled in the fishery sector.
(3) What next steps do you think are needed to ensure that gender in aquaculture and fisheries networks are sustained, grow and have influence?
(4) Who do you think still has to be persuaded that gender is important in the fishery sector and why are they important to making progress?

Results

Demographic and background information on respondents

The majority (78%) of the respondents were women, and the proportions of respondents less than 50 years old, or 50 years or greater were about equal. The attempt to gauge field of expertise using simple categories (fisheries, aquaculture, gender or all of these) was not very successful, but the discipline expertise responses were more informative of backgrounds. Disciplines named were: gender, anthropology, sociology, geography, economics, trade, policy, management, home economics, food and post-harvest technology, rural development, social and economic programme development, education, conservation, and social compliance.

The survey attracted nearly half its responses from the universities (19 respondents), and relatively few from government research institutes (7). Seven respondents were from development agencies, four were students and four were from NGOs. The majority of respondents came from Asia (24) and, by country, the Philippines (9) and India (6) provided the greatest number of respondents. Other respondents were from Africa (4), Europe (7), North America (5) and Oceania (1).

Most respondents had attended one or more of the AFS women/gender events, especially those in the last decade, or the IIFET2012 gender sessions and had used social media networks and websites for gender in aquaculture and fisheries. Two thirds of respondents had been involved in creating gender strategies, doing gender research, working for development projects incorporating gender, gender training, and formal gender networks and in institutions that were interested in gender (Annex). Some respondents were still students or interested others wanting to participate. This indicated that we had attracted responses from those active in many modes, but primarily in the research and planning modes, rather than in roles in grass-roots women's/gender networks. Although we attracted several respondents from development assistance agencies, we did not solicit formal submissions on behalf of the agencies.

Analysis of the responses

Although the four core questions were structured according to the four ANT stages, responses did not always line up with the stages. Each response from each respondent, therefore, was considered and then allocated to one or more of the four stages: Problematisation, Interresment, Enrolement, Mobilisation.

Problematisation

The Problematisation step of network formation concerns defining the problem, its causes and consequences and the relevant actors or parties to address it. Of all the translation stages, the survey responses were richest with respect to this stage, referring to current reality under three recurring themes: (1) gender is only "bycatch" in fisheries, (2) we don't have the facts yet, and (3) gender is only weakly institutionalised.

The first theme, gender is "bycatch" only, refers to the low awareness and apathetic or even negative attitudes towards gender. Mohammad Nuruzzaman (Bangladesh) said: "*the whole domain is in the hands of people who care less about gender issues"*. He noted that officials were often gender-blind in their operations and society has suffered "*as a result of persistent, deeply-rooted patriarchy"*.

Gender bias and ignorance can be fatal to women's prospects. Adelke M. Lydia (Nigeria) said that "*some fishing communities discriminate against women and restrict them to some fishing activities, lowering their incomes and restricting livelihood diversification"*. Fishing communities are not the only ones who discriminate. "*Natural scientists continue to believe that biological - rather than social - differences circumscribe men's and women's roles and benefits from the fishery sector"* (Anon., female). Another female respondent found that top administrators, mainly males, lacked sensitivity to the value contributed by women in aquaculture and fisheries. Even when women have a major fishery role they are excluded. Sun-ae Ii (Japan, Korea) pointed out that the Korean women divers, though important to their families' incomes and the maintenance of the fishing community are completely excluded from decision making in the community, local administration and government, and their knowledge and experience ignored. In Sumatra, where women control 80% of fish marketing (Dedi Adhuri, Indonesia), they are not noticed.

Jariah (Malaysia) suggested that the fishery and aquaculture curricula include the human aspects to overcome the total focus on technical issues of current professionals. *"Professionals are unable to see how (the people) are situated in the bigger picture"*.

The second theme concerned the need for more facts on women/gender in aquaculture and fisheries because we are now arguing from only a weak knowledge base. The fishery sector needs disaggregated statistics and illuminating knowledge. A female Indonesian respondent noted that national statistics exclude data on women's roles and household economic contributions. Another went beyond statistics and stressed the need for "*better (research) methods … to understand gender roles for … livelihood projects"*.

A paucity of data also means that the priority for work on women/gender also slips down the agenda. B.Shanthi (India) experienced this first hand: "*In 2001, when I wanted to work on women/gender issues in aquaculture, I was discouraged by people saying there was no women's participation, only men's. I took up this challenge and made a rigorous survey in Tamil Nadu, South India, to find out whether there was any women's participation in aquaculture. I studied 13 cases of women's participation, proving their importance and made myself visible as a gender expert in the field of aquaculture research."*

One respondent, and also K.Holvoet (Belgium, Benin and West Africa), saw progress now that a big change is happening to consider not just the fish but commodity and value chain approaches. *"This gives a lot of room to make women's roles visible"*.

The third theme, gender is only weakly institutionalised, is considered responsible for low human capacity and low priority. Gender research and projects are often only sideline fields to the

main field of work. This observation caused Ramachandran C. (India) to say: "*for most of the GAF actors, being either fishery or aqua biological/sociological researchers, gender seems to be the bycatch rather than the catch".* A female respondent said: "*network members are overloaded with day jobs".*

A serious consequence of the marginal nature of gender work is that it is the first component to be dropped in a cutback, leading to what Callon (1986) calls "depunctualisation," or the reverse of "punctualisation," the synergistic build-up of capacity in a growing network (i.e. the Mekong River Basin (MRB) fisheries programme in 2002).This phenomenon was noted by one respondent who also was critical of the shift in focus of women/gender efforts. She wrote: "*When the 'women in fisheries' concept was changed to 'gender in fisheries', suddenly the tone of regional and national networks became thoroughly 'macho' in the Mekong River Basin. Simultaneously, overworked male project officers were burdened with nurturing the networks, of which they had scant interest or background. Accumulated 'corporate memory' was lost, and regional meeting tasks were 'outsourced' to an external ... consultant with no regional experience".* Notwithstanding this downsizing experience, the network is a survivor and has been sustained by the lower Mekong countries and the Commission for more than 13 years (Williams 2012), thanks in part to a solid legal foundation based on many years of volunteer groundwork.

A final major consequence of the poor institutionalisation of gender is that networks are perceived as having a weak capacity to initiate action and reach decision-makers at the very top – "*the unconverted*" – according to Jennie Dey de Pryck (Italy). We surmise that this may be partly because the networks have not defined these as objectives to reach. A female respondent urged that the (GAF) "*networks should be more strategic and ambitious in their activities, rather than just doing the minimum of holding research and extension symposia and occasional training".* Strategy was considered important in reaching to senior policy makers. Jennie Dey de Pryck recommended using the networks to develop alliances and having a coordinated strategy at major conferences to influence the policy makers, donors, media, etc.

Interessment

In the Interessment stage, the primary actors recruit others, especially those who recognise the primary actors' authority, to the network. Survey responses concerning this stage of translation covered two themes, namely, the "who" and "how". In each theme, we could distinguish ideas and suggestions that were concerned with two different types of actors in the network, i.e. the more academic actors who we will call researchers for short, and the grassroots actors, i.e. the fish supply chain actors and their representatives.

In terms of who is or should be the actors during Interessment, several researchers felt that, from their experience, a core group was key to the success of networks. A female respondent observed that: "*a core group of members (....) needs to be developed.* A *number of dynamic, charismatic people need to be identified and encouraged".*

Continuing the thread of the core group, Lasse Lindström (Sweden) said *"an individual/individuals who 'drives' the network, and that there is funding for that person(s)"* are crucial. The importance of funding for the maintenance and survival of the groups was little acknowledged, perhaps indicating that respondents tended not to be responsible for fund raising in their day to day work. Others went into more depth on the pivotal importance of champion(s) and leaders. Cristina P. Lim felt said that we need "*a Champion (...) to encourage others,*" and (Maripaz L. Perez, Philippines) "*influence other leaders to consider gender in all policies"*. *"The champions must be ... perceived by other network members to be fair and working beyond his or her self-interest* (Susana V. Siar, Philippines). And, finally, successful past networks have been served by "*a strong, focused and enterprising leader willing to take the network to well defined goal(s) regardless of international sponsorship" (*Margaret Massette, Uganda). The respondents, however, did not make a distinction between different types of networks – research and grass-roots networks – and whether the same need for a champion held across network types.

Networks are more than leaders, however, and several respondents called for a broader buy-in, and especially including the young. K. Kuperan Viswanathan (Malaysia) suggested this could be achieved, for the researcher group, by "*documenting and disseminating the findings to a broader audience and providing leadership to young people*". Others suggested: mentoring and recognising people for their work (Susana V. Siar), –"*most women (researchers and workers) desire to be recognised and appreciated"* (Cristina P. Lim).

A fundamental tool for recruiting others to the network was recommended by Susana V. Siar, namely a directory of all those involved.

In the field, the most critical Interessment step is to become more inclusive, getting beyond researchers talking to each other and becoming involved with the fish workers and organisations that support them. A female respondent said: "*fisherfolk women should be more actively empowered to make things happen for themselves… The discourse is still at the level of women in fisheries but not gender, where men's needs are addressed as well"*. The means for actively empowering women was not addressed by respondents, although Adeleke M Lydia stressed one point, namely that "*the grassroots (should be allowed) to suggest possible solutions to their own problems"*. J. Cleofe (Philippines) urged that women/gender actor networks strive to become active in sector mainstream meetings, conferences, and policy discussions. *"We want to be treated as a regular member of a bigger network or collaborative effort. In many conferences or meetings, the voices from women in the community or the women fishers themselves are seldom heard"*. Marilyn Porter (Canada) urged the GAF (network) to reach out to the smaller NGOs and advocacy groups for women in their communities.

Many practical suggestions were given for how Interessment might be advanced in the researchers' network. In so doing, many respondents mentioned the current positive actions that should be continued as well as what more are needed. Nikita Gopal (India) found the plus points of the AFS network to be regular updates, effective use of social media, and easily downloadable, recent documents. The minus points are that the network does not elicit much discussion and clearly needs some mechanism to foster focused discussion. Further, the mailing list should be

made more active by stimulating issues for discussion (Ria, Indonesia). One respondent cautioned, however, that the network must be careful not to overload members with messages.

Maripaz L. Perez compared a successful and a not so successful network from her experience in industrial and technological research. The unsuccessful network failed to sustain activities when members become competitors and thus lapsed as a community of practice. We suggest that this could be a risk for women's entrepreneurs' networks in fisheries and aquaculture.

Regular events are considered important as mechanisms for enlisting others, increasing memberships, and creating a ripple effect. Sara stressed that "*workshops, mini-symposiums etc in conjunction with another conference could be a way to attract people who would not normally attend a "gender thing", and thus create the chance to influence a wider audience"*. Global meetings might be costly but regional ones more feasible. Nikita Gopal suggested "*interactions on focus areas which could lead to similar work being taken up simultaneously in many locations/regions/countries, linked also with national and international bodies like FAO, ICAR etc"*.

The responses also implied that network leaders need to recognise the importance of personal comfort zones and network preferences. Tesfom, M.A. (Eritrea) appreciated that the GAF informal network "*is also making use of the Fisheries Social Scientists (FSS) Facebook page and disseminates relevant information through the FSS"*.

Many respondents emphasised the necessity of gender mainstreaming at different levels and the need to make women's roles much more visible in society. Several recommended that gender needs to be considered in all situations, not just where women currently work. Gunilla Tegelskär Greig (Sweden) drew from a non-fisheries gender course she had undertaken which "*was an eye opener in terms of how you can put a gender perspective on everything, including building roads etc. We cannot just focus on the sub-sectors/initiatives which predominantly include women (most notably the post-harvest sector) but have to work much more broadly to change things, to change perceptions and structural issues"*. This will mean educating the experts. Jariah found in a training course on gender in aquaculture that "*the majority of the researchers/scientists with no gender awareness indicated that there is no need to focus on gender since they felt their work already benefited people. During the workshop, we found that … most of those never exposed to gender were "men with folded arms" but after a few interactive sessions we were able to change their perspective"*.

Enrolement

During the Enrolement stage, roles are defined and actors accept their roles. Except for examples in the Philippines and India many of the responses concerning Enrolment were about what could be done, rather than what is already in train. This stage of network development is still immature. As with the above Interessment responses, we organised the responses into the "who" and the "how."

Again, strong views were expressed that grass roots women must be involved, to be conscientised and to build solidarity. J. Cleofe said that involving women from the community/grassroots brings *"the women ... face to face with other women, (where they) share their experiences and build networks and linkages, creating solidarity among women. Network sponsored study tours are also effective in facilitating learning and solidarity. Results and discussions from high level meetings and conferences should be shared with the grassroots women"*. Further, a respondent stressed that women should be consulted on their needs and preferences.

Many respondents favoured enrolling those at the top, but several cautioned to be alert to gender complexities at the top of organisations. Mohammad Nuruzzaman warned that the rare female leaders may behave in "*a patriarchal way"* although he conceded that, in the main, "*it is men who need to be"brainwashed!"*. B. Shanthi was also in favour of involving professional women in the support of gender networks but cautioned not to take their support for granted due to their other work pressures. She also raised the dilemma that women in senior position may not be supported by women around them, even when addressing gender issues. "*Realise that many women cannot concentrate on networking activities due to other official commitments which are time bounded and priority based. Also, women may envy another woman if she gets to a top rank and can pull her down without allowing her to succeed. Women do not support another woman when she is addressing gender issues. Some women who still want to be in the good books of men can play double roles*."

Jennie Dey de Pryck listed major (UN) declarations, action programmes and guidelines in the fisheries sector, in rural and economic development, the Post-2015 Development Agenda, and others. Using these major fields as targets for gender action, she suggested inviting a small group of very distinguished persons to serve as committed "patrons" or "opinion leaders" to help carry the advocacy messages (based on good data) to the top decision- makers.

Marilyn Porter wants the GAF network "*broadened in terms of geography. I would like to see the feminists involved in North Atlantic fishery networks more engaged with researchers in the Asian region*".

Turning now to the "how" of Enrolement, respondents focused on integrating the gender dimension to strengthen the fisheries mainstream, and creating incentives for people to undertake active roles in gender networking.

K. Holvoet recommended that gender communication should be integrated into fisheries networks such as Sarnissa (aquaculture). We need "*strong gender focal points in fisheries departments for making the case that attention to gender increases contributions to the economy*," as is already being done in agriculture.

Mainstream conferences that create the space for researchers to focus on gender are appreciated, such as the day dedicated to gender at the 2012 IIFET Conference in Dar es Salaam,

Tanzania (Sara), and the regular GAF symposia as part of the Asian Fisheries Society Fisheries and Aquaculture forums.

Achieving a presence in mainstream activities often requires a locally credible presenter, according to Lena Westlund (Sweden). *"In Bangladesh, where I worked as a DFID team leader for an institutional development project on fish farming within the Grameen Bank group, we struggled to change attitudes at all levels. It takes a long time to change attitudes – often one small step at the time (and in a way that matches the needs). An example from Bangladesh was to accept that I, as a woman (and foreigner), was not always the best person to pass messages. We briefed our senior male consultants and had them talk to decision-makers. Also at the community level, it was easier to "use" local men to discuss with men on gender issues.*"

With regard to incentives for people to enroll, a woman respondent suggested researchers would be motivated by working on joint papers, joint presentations, joint proposals or joint research. Especially, internet-based discussions needed substance rather than chit-chat as the basis for working together.

Social networking among people was also seen as an important element in how to enroll people. Gunilla Tegelskär Greig gave the example of the social events accompanying the 2010 ICSF "Recasting the net" workshop (ICSF 2010).

Mobilisation

In the fourth stage of translation, namely Mobilisation, primary actors become spokespeople for the network and seek to mobilise passive actors. Many respondents contributed with passion on who should be mobilised and why. Sara, Lena Westlund and Marilyn Porter emphatically said "*everyone,*" indicating frustration with the *status quo*. "Men" were also a group that was mentioned with passion. One female respondent remarked that "*amazingly, after decades of conducting gender sensitivity workshops, it is still "men" who must become attuned to the importance of gender*". Ayanboye Oluyemi (Nigeria) stressed also the importance of conscientisation of women: "*the women themselves, especially the grassroots women should come out of their shells, know and show their importance in the community*". Respondents did not suggest how women's emergence might occur or be encouraged. In numbers of responses, overwhelmingly, the survey respondents felt that leaders and policy makers in governments, and at various levels of organisation and programme implementation, still have to be persuaded of the importance of gender in aquaculture and fisheries. Typically, respondents did not specify which leaders needed greater gender awareness, who should persuade them, and how gender should be mainstreamed in the fisheries sector.

In the views of the respondents, the lack of progress in Mobilisation can be explained by the depth of change needed. In summary, the responses considered, first, that governments, policy makers and bosses must recognise the importance of gender in fisheries and aquaculture since they set the political and development agenda. Second, managers and extension officers are important because development projects go through their office for implementation. Third, researchers need

to be convinced, especially those from the natural sciences; and fourth, donors and funders have to be convinced. The fact that donor funds are still not forthcoming means that a case has still not been made for support for gender action in the fisheries sector.

How mobilisation can proceed elicited several suggestions. For researchers, Nikita Gopal offered that "*interactions on focus areas which could probably lead to similar work being taken up simultaneously in many locations/regions/countries"*. Also, hold regular discussions on emerging gender issues. Achini (Sri Lanka) added that the network should hold dialogues and aim to produce positive outcomes or at least policy change. She stressed the need for "*positive participation of all possible stakeholders, not only elite gender specialists"*. Corazon Plete-Macachor (Philippines) stressed the benefits of linkages among women fish workers, government agencies and university technical and educational experts.

Respondents were concerned for long-term continuity and sustainability. Marilyn Porter had found that "*top down heavily funded and controlled projects work much less well than more humble efforts to work together*". K. Holvoet shared lessons from the Department for International Development (DFID, United Kingdom)-FAO-Sustainable Fisheries Livelihood Programme (SFLP) experiences. "*Gender networking persisted for a short while after the project but during that time there was much less attention for gender in fisheries to take the network to a higher level. In the past few years, attention has increased and so there is probably more funding available and so more chance that networking will last. Within FAO's fisheries department and its gender division, there was no sustainability because of the lack of focal points and lack of a mainstreaming vision."* So attention only resided with those with a personal interest. *"In the SFLP project and* (in national) *fisheries departments, a network was set up between gender experts and fisheries departments but focal points for gender in the fisheries departments didn't have clear Terms of Reference, mandates and didn't have the means (financial and technical) and so in only a few cases did the networking sustain. SFLP developed tools for gender analysis and gender mainstreaming and this was a very interesting way of starting the network as it brought together the different levels (micro, meso, and macro) and multidisciplinary teams. But maintaining the networks is expensive and asking for commitment of personnel is often not possible."*

This analysis from a major field and policy project is a sobering lesson on the immense challenges of mainstreaming gender in fisheries and aquaculture. From anecdotal evidence, we know that other projects have had similar experiences. These experiences merit a wider analysis of the cultural, institutional – international and national – and economic conditions in which this outcome is embedded so that the depressing outcomes are not continually repeated.

Constant communication and creation of active chapters in local regions were recommended by a female respondent. Amplifying the importance of on-the-ground action, Jennie Dey de Pryck pointed out that, in a project in Kenya, "*promotion of the use of mobile phones for women fish processors and traders to access up-to-date information on markets/prices, compiled daily by the Kenya Marine Fisheries Institute (in an International Labor Organisation Coop Africa programme)*" succeeded in improving profits. The success of the enterprises was an important element in Mobilisation.

Mobilisation requires building women's capacity by including women in all planning and decision-making (B. Shanthi), and creating "*equal access in education, micro-finance and credits, services and rights to new inventions and ideas*" (Tesfom, M.A).

In practice, however, experiences differ. VijayaKhader (India) observed that networking to mobilise women through the Self Help Groups (SHG) in India worked well in some contexts but not in others even in the same states as successful projects. Some women were averse to changing their activities and technologies. Also in India, Piyashi DebRoy described how women of the Koli fishing community at Versova in Mumbai completely managed and operated the seafood stalls at the Versova Koli Seafood Festival. She suggested that this revealed entrepreneurial potential that could be used in fish businesses in daily life and lead to improved socio-economic conditions. She had not observed such fishery initiatives by women in other regions of India. Shyam Salim (India) found from experience that if the "*expected benefit out of the networking activities weren't received in the time frame stipulated*," then women's interest could not be sustained. He found that the more successful networking activities were those matched to the capacities and bargaining power of the women workers.

Mobilisation also requires resources such as funding and network members' time, "*rather than assuming networking takes place by itself"* (Lena Westlund). However, clear objectives are needed and research needs to be problem and not funds driven. "*Gender activism and research should converge,*" recommended Ramachandran C. Noting that a website (Genderaquafish.org) and Facebook account were welcome, Nelson Turgo (Philippines) went further to suggest that a dedicated centre funded by international agencies could be contemplated.

Courses that teach the basics of gender in aquaculture and fisheries ("GAF 101") were identified as a priority, and have long been a constant need from the grassroots to top decision-makers. For researchers, this would mean training materials, workshops in gender analysis in fisheries research and project planning and implementation, as well as seminars and conferences. Achieving this sort of basic capacity building for a wide swathe of experts, however, remains a distant possibility because existing sector experts are unaware of their own ignorance with respect to how gender can be addressed. To this end, basic training needs to be developed and made compulsory. One of the fundamental precepts should be explaining the difference between addressing "women" and "gender". Susana V. Siar narrated one of her own experience on this in which she was assigned the task in a project of addressing the gender aspects. *"After the session, one participant from a donor country asked what was meant by addressing gender in the project. So, I started telling him that the project would have to look at the different impacts that the project will bring about on men and women, at which point, he said, Oh, increasing the role of women in the project. I tried to explain that gender is not only about women, but I don't think I succeeded. My point is that many of us are stuck with the idea that gender and women are synonymous.*"

Discussion

From the above analysis of the gender networking survey responses, we conclude that respondents perceive reasonable progress in the Problematisation of gender in aquaculture and

fisheries. This has provided a general understanding of issues but has not been matched by strategic messaging to communicate the issues to key audiences. Although more detail is needed, existing knowledge is sufficient for more proactive messaging. Coinciding with, and perhaps partly the cause of, inadequate promotion of current knowledge, the field of action and research comprises only a limited set of actors. Gender is only weakly institutionalised in the sector and is merely "bycatch" or a "night" job for the interested network members. A part of this weak institutionalisation also is that the networks to which respondents referred were mainly informal and ephemeral, e.g. project based. Thus, they lacked definition of key responsibilities and objectives, such as reaching out and influencing key policy makers.

Consequently, the Interessement stage of translation is weakly developed, but respondents had a rich set of ideas on how to do it. Paramount among these was the need for champions and leaders, and an active core group, which respondents judged are still to emerge. The Enrolement stage is more weakly developed still and will not progress until the critical actors step up, plus sectoral and cultural shifts occur. Mobilisation, which relies on Interessment and Enrolement, will continue to be slow unless major opportunities for rapid progress can be seized.

On balance, we judge that network Punctualisation is occurring slowly. For example, the AFS GAF effort has managed continuity and a slow building of interest, despite meagre resources. The total is certainly greater than the sum of parts, but we also fear that progress is still so fragile that depunctualisation is an ever-present possibility in the face of the gendered and rapid nature of change in the sector (GAF4, 2013).

Through attention to the gender dimension in the fishery sector, what are the options for achieving greater gender equality, notably in fishery settings where masculinisation continues apace, often in connection with modernisation and capitalisation, e.g. declining women's employment in Norwegian aquaculture (Maal 2013)? Researchers are mainly focused on deepening the problematisation of gender inequality, and especially its impacts on women. While important, this is a necessary but not sufficient base from which to create the translation, unless, as urged by Ramachandran C., gender activism and research converge, perhaps through the use of feminist research methodologies (Porter, 2014). Gender transformative research approaches, as being developed by the CGIAR Aquatic Agriculture Systems program (CGIAR AAS 2012), may be one way forward but they are still in a preliminary stage.

Central United Nations and national government gender/women's agencies such as UN Women, have all but abandoned sectoral work programmes in favour of more general programmes such as ending violence against women, girl's education, and reproductive health. Thus, we contend, change has to emanate from within the fishery sector. This is not likely to happen spontaneously from routine fishery policy that is gender-blind. Field projects are more likely to reveal new insights and pioneer new approaches. In fishery field projects, gender mainstreaming has been the primary strategy as most of the projects focused on development and poverty objectives, e.g. Lentisco and Alonso (2012). Also, the actor-networks peculiar to the fishery sector likely would resist attempts from outside the sector, e.g. from women, gender and feminist programmes, to intervene in core fishery conditions. As practised in projects, mainstreaming can

become shaky when the projects are ended, e.g. the cases of the SFLP and Mekong River Commission Secretariat experience. And at the present rate of uptake, centuries will be needed before all fisheries projects take up gender.

To us, the solution requires a bold activitist step, rather than business-as-usual waiting for incremental and research efforts to mature and reach out to motivate change. The sector has sufficient knowledge now to make a campaign on gender equality. "We" – those who identify with the urgency for progress on gender or women's equality in the fishery sector, need to put this knowledge to use and make the leap. If not us, then who? If us, then how?

Conclusion

We share the frustration at the slow progress expressed by many survey respondents. Indeed, if gender equality could be measured in the fishery sector, we would likely find it is declining rather than increasing. We also observe that, although more knowledge and experience are slowly accumulating from research and development projects, some of these are being rendered out-of-date by the pace of change.

Fishery policy is gender blind, creating a great obstacle to any priority being accorded to gender activities. Polite, albeit sustained, low key, unfunded, incremental progress is not enough to even hold the ground for gender equality. The time has come for the core group of women and men who care for the urgency of tackling gender inequality in the fishery sector to increase the visibility of the issue at the highest policy levels, to fashion urgent messages on the problems of gender inequality in aquaculture and fisheries, and advocate for the funding and resources to get people into "day jobs" in activism and research to do something about the inequality problems and lost opportunities. This is not a job for researchers or at least researchers alone, but for people who are prepared to take a stand and commit in order to mobilise others. However, researchers do have a vital role to play as, in parallel with the advocacy, much more research and data gathering are urgently needed.

Finally, we acknowledge that the perspectives of our respondents, largely researchers and development workers are but one part of the whole picture. We know little of the perspectives of the women and men at the grass-roots. And we need to also know the views of those at the top of agencies that are implementing fisheries programmes and projects in development agencies and fisheries departments.

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Shriver, Shyam.S.Salim, Sun-ae Ii, Susana V. Siar, Tesfom M A, Nelson Turgo, Prof.(Mrs) VijayaKhader, PhD, Lena Westlund and nine anonymous respondents. We also thank two anonymous reviewers for their constructive criticism.

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Annex: Gender in fisheries and aquaculture network activities in which respondents engaged.

1. Gender planning, strategy formulation
- 2010: International Collective in Support of Fish workers (ICSF); 2011: FAO; 2012: ICAR (India), NEPAD (Africa).
2. Gender research activities
- International: CGIAR Aquatic and Agriculture Systems, CIDA, DFID, European Union (EU), Japan, NORAD, Oxfam, SIDA, Too Big to Ignore project and regional agency funded projects, e.g. SEAFDEC/AQD, Memorial Univ. (Canada).
- National women/gender research activities: in India, Indonesia, Kenya, Malaysia, Pakistan, Philippines, Tanzania and other countries, with institutional, national and international donor funds. - Research themes included women/gender and agricultural innovation, climate change, seafood processing, food safety and HACCP, disaster management, donor dependency and social capital, fish value chains, environment, marine protected areas, pollution, HIV/AIDS, community based management for food and income, sustaining coastal fishing communities, migration, and reproductive health.
3. Development-project related gender activities
- Sustainable Fisheries Livelihood Programme (Africa) - Technology consultant, FAO and other agencies gender projects on fish processing (Kenya) - Work in FAO Gender, Equity and Rural Employment Division - UNIDO projects on labour law implementation in post-harvest sector - Training in good shrimp farming practice for women farmers and farmer couples, post larvae collectors (Bangladesh).
4. Gender training workshops
- Organising gender workshop, module development and conducting the workshop sessions on empowering vulnerable stakeholder groups (AqASEM09 (Asia-Europe Meeting Aquaculture Platform) EU (2012)).
5. Participation in formal gender network(s), including institutional networks
- AKTEA (Europe), WINFISH (Philippines), Gender and Development (GAD) national focal person, Philippine Department of Science and Technology
- Asian Fisheries Social Science Research Network (in which some women/gender studies were done)
- FAO network of gender focal points from each division and department
- Bringing together feminist and natural resource management networks;
6. Participation in other fisheries and aquaculture activities that include gender themes
- Samudra (ICSF), EU-Framework Program 7 Project ASEM Aquaculture Platform, Fisheries Social Scientist Facebook Group.

Appendix I

GAF4: List of Reviewers

1. Arathy Ashok
2. Aswathy. N
3. Barb Neis
4. Barbara S Nowak
5. Bernadette P Resurreccion
6. Charles Jeeva
7. Chuthatip Maneepong
8. Dale Squires
9. Elizabeth Liz Matthews
10. Froukje Kruijssen
11. Holly Hapke
12. Ida Siason
13. Jayasankar.J
14. Katia Frangoudes
15. Keiko Hirano
16. Krishnan.M
17. Kyoko Kusakabe
18. Marilyn Porter
19. Meryl Williams
20. Miranda Morgan
21. Mokbul Morshed Ahmad
22. Nandini Gunewardene
23. Narayana Kumar
24. Narun Naher
25. Nicole Power
26. Nikita Gopal
27. Nireka Weeratunge
28. Pedro Bueno
29. Poh Sze Choo
30. Ram Bhujel
31. Ranjitha Puskur
32. Rebecca Metzner
33. Richard Faustine
34. Roehlano Briones
35. Sahoo. P.K.
36. Sarah Harper
37. Silvia Sarapura

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Appendix II

GENDER AND CHANGE IN THE SPOTLIGHT

Report on the 4th Global Symposium on Gender in Aquaculture and Fisheries, 1-3 May 2013, Yeosu, Korea

Changes in fisheries caused by modernisation and mechanisation, globalisation and environmental disasters also have consequences for the communities that depend on them. They shift the working spaces, continually destroy and create jobs and livelihoods, and bring greater overlaps in women's and men's roles in the household, factory and market place.

"Gender and fisheries studies, therefore, are increasingly addressing these changes and how women and men were affected by them," said Dr Nikita Gopal, who led the Program Committee that organised this highly energetic and successful event. "For example, small changes such as bringing migrant labor into Japan's oyster industry and large changes such as formalising cross-border fish trade in Cambodia brought positive changes for some women and setbacks for other women and men, including the elderly. However, overall, GAF4 also continued to fill out the global picture showing that women and gender issues are still generally not on the radar of the fishery sector".

The present report puts the spotlight on key results and discussion presented over the 3 days of GAF4. In all, 28 oral presentations, one poster and four mini-workshops/panels were given. Feedback declared GAF4 the most successful and highest quality of the six women in fisheries/gender in aquaculture and fisheries events held by the Asian Fisheries Society over the last 15 years. [1]

We highlight four major threads of GAF4: (1) the gendered impacts of fishery sector change, (2) gender assets and roles, (3) challenges and tools to meet future needs, and (3) the road to mobilisation to achieve gender equality in aquaculture and fisheries. Out of these threads, researchers and grass roots representatives concluded that they need to suspend pre-conceived ideas about gender roles and relationships because many of these are in flux. Researchers need to develop further and make better use of rigorous qualitative, as well as quantitative, social science research methods. Qualitative methods are especially useful because of their participatory nature and careful ethical approaches. Such methods will bring researchers and grass roots participants closer, which is an essential step in mobilising support for gender equality.

[1] The first five events were: 1998 Asian Women in Fisheries (Chiang Mai, Thailand), 2001 Global Women in Fisheries (Kaohsiung, Taiwan), 2004 Global Gender and Fisheries (Penang, Malaysia), 2007 2nd Global Gender and Fisheries (Kochi, India), 2011 3rd Global Gender in Aquaculture and Fisheries (Shanghai, China). See Genderaquafish.org for the proceedings and other information.

The AquaFish-CRSP Best Paper prize was won by Kumi Soejima (Japan) for her paper "*Changes in the Roles of Women and Elderly Persons within Oyster Aquaculture in Japan*". The AquaFish-CRSP Best Student Paper prize was won by Piyashi Deb Roy (India) for her paper (with R. Jayaraman, M. Krishnan and K. Criddle) "Importance of Mangro*ve Conservation and Valuation to Women – A Case Study of Pichavaram Mangroves in India*".

A special part of GAF4 was the Special Session in Honour of Dr M.C. Nandeesha, sponsored by the AquaFish-CRSP and dedicated to the life and work of Dr Nandeesha who established the AFS gender in aquaculture and fisheries work.

GAF4 was supported by the Asian Fisheries Society, grants from the AquaFish Cooperative Research Support Program of the USA (AquaFish-CRSP), the Norwegian Agency for International Development (NORAD), the Indian Council for Agricultural Research, the Network for Aquaculture Centres in Asia-Pacific (NACA), the Korean local organising committee for the 10th Asian Fisheries and Aquaculture Forum and the home agencies of the many presenters and participants.

1. Nothing stands still: The gendered impacts of fishery sector and personal change

Fish production, processing and trade are all changing and interacting with women's and men's lives and their business decisions, often in surprising ways. The first presentations summarised in this section on gendered change concern the changes occurring in the 'normal' course of sector change; the second set address the impacts of changes such as acute natural disasters and climate change.

Fish trade and processing

Eight years after her earlier study, [2]**Kyoko Kusakabe** revisited the situation of women trading fish from Tonle Sap in Cambodia across the border to Thailand. The trade has changed: fish for export has declined, trade is now formal and other economic opportunities have opened up in Cambodia, leading to different outcomes for different women traders. Some savvy traders grew to become larger traders, then moved to other businesses; others grew and went bankrupt; some maintained medium sized businesses and took in Vietnam and Thai imported fish; others stayed small; and some new ones entered. The outcomes demonstrated interplay between the economic positions of the traders and influences from their own changing life stages and changing responsibilities, including reproductive responsibilities. The outcomes challenged earlier assumptions and exposed contradictions. For example, women could not have dominated trade because it was suitable "women's business," but still succeeded in what is seen as a risky, dangerous and competitive business.

[2] Kusakabe, K, P. Sereyvath, U. Suntornratana and N. Sriputinibondh. 2006. Women in fish border trade: the case of fish trade between Cambodia and Thailand. In: Choo, P.S., S.J. Hall, and M.J. Williams (eds.). *Global Symposium on Gender and Fisheries*. Seventh Asian Fisheries Forum, 1–2 December 2004. Penang, Malaysia: World Fish Center and Asian Fisheries Society. pp. 91-101.

In Japan, local young women and elderly women and men have long been employed in shucking oysters, keeping smaller family farms viable, especially in the main farming area around the Seto Inland Sea. But the industry is now undergoing many changes. **Kumi Soejima's** prize-winning case study in Oku town, Okayama Prefecture delved into how the apparently small act of bringing in young Chinese women workers had far reaching positive and negative impacts on women and men. Local women and elderly women and men lost jobs that gave them a sense of purpose in useful roles, and oyster enterprises developed along polarised paths, some stagnating in adhering to traditional practices, others scaling up and diversifying their oyster products. Some women in oyster-farming families, according to their individual means and preferences, have taken the opportunity of being freed from the shucking work to become more significant business actors in family enterprises. Among the massive changes in the Japanese oyster industry, the gender changes are significant, complex but little studied, and remedial action to assist those affected, especially the elderly, are not happening.

When GAF4 was held in Yeosu in early May, the world was still reeling at the mounting death toll (eventually 1,127 people) in the collapse of a Dhaka, Bangladesh, building that housed export garment factories. When **Mohammad Nuruzzaman** spoke about social justice and rights of 50,000 workers (80% of them women) in 90 shrimp and prawn processing factories in Bangladesh, he addressed a sensitised audience. The processing sector has been harshly criticised locally and internationally for not complying with labour laws and basic human rights. To overcome these problems and spurred by EU and US trade sanctions, the United Nations Industrial Development Organisation (UNIDO) joined with the Bangladesh government and the export industry in developing manuals, training trainers on the labour laws and their implementation, assessing compliance and interviewing workers over their conditions. Progress is perceptible but still leaves much to be desired. Awareness has been raised but many top executives are still not convinced; the intermittent nature of the processing loads means that much work is contract labor and compliance is thus harder to achieve; and men still fare better than women in the workplace. Nuruzzaman contrasted three different viewpoints on the women's labor conditions in the processing factories - the patriarchal, the feminist and the neutral views (see table). Each of these views has a degree of truth and some shortcomings. New trade unions show some promise of redressing female and male worker's injustices in the fish processing workplaces. However, vigilance is needed as the export sector is likely to still continue to develop strongly and be under pressure to keep costs low to ensure profits.

Patriarchs' view	**Feminist's view**
• Jobs have been created • Status of workers has escalated both in the family and in society • Thousands of other people are still unemployed • The workers can enjoy their spending The workers take part in decision making in their families	• Women experience strong discrimination • Women are deprived of rights & benefits • Gender opportunities are unequal • Violence is happening against women at work
	Neutral view
	• Women's practical gender needs are being met • Good work space is created • The understanding of strategic gender needs is increasing

Aquaculture and fishery production changes

Aquaculture in Norway is one of the greatest global success stories. Norway's farmed fish production overtook wild-capture fish production in 2005, thanks largely to increased efficiency in Atlantic salmon (*Salmo salar*) production. But, **Bodil Maal** (Norway) revealed, the 600% increase in salmon production since 1990 had been accompanied by a per employee production increase of 450%, resulting in nearly job-less growth. More worryingly, women's employment in the salmon industry plummeted from 20% in 1990 to just 9% in 2010. This was largely due to the concentration of farm ownership, accompanied by centralisation and heavy mechanisation of operations that decimated family farms and undermined local community ownership. More than half the production is done by just 6 stock-exchange listed companies.

In India, the state of Kerala is the most important fishing state in terms of its share of exports (40%) and the intensity of production relative to coastline. Since the 1960s, fisheries mechanisation has been among the most relentless of transformations but its positive and negative consequences on gender and other socio-cultural dimensions has not been well studied, according to **Nikita Gopal**. She and colleagues analysed the largely negative outcomes for women in the offshore ring seine fishery, stake net fishery and clam fisheries of the backwaters. Conducted by the Latin Catholic community, the capital intensive ring seine fishery has become more so. As the landings have moved from beaches into harbours, women fish processors and traders have been marginalised and fish handling has become organised and taken over by men. The stake net and clam fisheries are operated by the Hindu *Deevara* community. Stake nets rely on traditional rights to the fishing sites. Women are important in processing the landed stake net catch. Stake net site inheritance and granting of rights as women's dowry has been suspended for two generations as the government stopped formal support for the area rights. Widows and single mothers often hold and lease out area rights to survive. In clam harvesting, women once harvested clams along with the men but men have taken over and mechanised the fishery, effectively restricting the women's work to shucking and marketing the meat. In the cement industry, the shells of the black clam *(Villorita cyprinoides)* are used as lime because of their high calcium content.

Jenny Shaw and Leonie Noble (a researcher and a fisher and community leader, respectively, both from Australia), used Photovoice to investigate the community impacts of environmental and fishery change in Houtman Abroholas, low islands off Western Australia that are at the edge of severe climate change and resulting fishery impacts. Fished for 100 years, the islands entered a new phase of community fishery consultation in the 1990s under a woman state premier. Unfortunately, this consultation was discontinued under subsequent conservative governments and women's inputs to the consultation process were lost, to the detriment of community-friendly management decisions on the climate-affected western rock lobster (*Panulirus cygnus)* fishery. The investigation graphically documented the devastating collapse of a once-vibrant community and its social, cultural and physical assets.[3] Women and families have suffered loss of services, long absences and stress of reduced incomes from husbands, sometimes leading to domestic violence and loss of inter-generational connections. The study made a

[3] In May 2013, the museum exhibition based on this work won an award in its class in the Australian Museums and Galleries National Awards (MAGNAs).

compelling argument not only for including women in community leadership and consultation but also in fishery management decisions. Women postulated that a different management regime (seasonal closures rather than quotas) could have saved the islands' communities as well as the fishery.

In her poster, **Sun-Ae Ii** presented an anthropological study of two remote fishing villages in Miyazaki Prefecture, Kyushu Island, Southern Japan. She first traced nearly a century of fishery change in two villages close to each other - Meitsu and Odoutsu. The Women's Divisions of each of the local village Fisheries Cooperatives were formed in the mid 1970s. Although both villages have depended on tuna and other pelagic species, Meitsu tends to have larger vessels and the fishing and marketing is mainly done by men; although women fish with their husbands in the smaller scale fisheries. In Odoutsu village, the generally smaller and more local scale of fishing has created more space for women to work in processing and marketing. In both villages, the Women's Division members regularly give fish preparing and cooking lessons to primary and high school student, promoting continued fish eating to the young.

Angela Lentisco shared some lessons learned from the Spain-FAO Regional Fisheries Livelihoods Programme (RFLP) of South and South East Asia for which she is the gender advisor. RFLP is taking a principled approach to development and turning up pleasant surprises in traditional gender role reversals. In a number of countries, RFLP finds that men are providing support to their wives who were carrying out alternative livelihoods activities. For example, in Viet Nam, husbands are helping their wives with chicken raising, while in Sri Lanka the men are supporting their wives' handicraft group and also making home gardening a family activity. RFLP teamed up with the Vietnam Women's Union to hold workshops to raise awareness of gender issues amongst members of fishing communities. A large number of men (approximately 40%) were also involved and this helped dispel the impression that gender was 'women's business' and led to far more useful discussions on gender roles in the community. In Sri Lanka, going out to sea to fish is almost exclusively the role of men. However, by involving women in RFLP's safety at sea training for fishers, women learned about the importance of life jackets and other basic safety steps and encouraged their husbands, brothers, fathers and sons to adhere to them.

Climate change and impacts of disasters

Pata Regency in Central Java, Indonesia, is known as "milkfish town," for the milkfish (*Chanos chanos)* that is cultured there in brackish water ponds. However, as **Fitri Majid** and her colleagues Indah Fitri Purwanti and Indah Susilowati reported, farm productivity is declining already from the impacts of climate change, especially erratic rain, rising sea levels and reduced salinity. Farmers are aware of the changes and ongoing research is being targeted at involving the whole family unit in finding solutions for mitigation and adaptation, both in fish farming and in outside economic and social realms.

As three papers at GAF4 illustrated, acute disasters, e.g. oil spills and typhoons, present a specific form of change and the Philippines has been all too frequently the victim. On August 11, 2006, the oil tanker Solar I sank off Guimaras Island in the Visayas, central Philippines and the

resulting oil spill seriously affected the coastal livelihoods of nearly 20,000 people in over 3,600 households. **Mary Barby Badayos-Jover** and colleagues studied the aftermath in which militaristic top-down – and male focused - emergency responses gave relief work to men, relegating the women and girls to greater reliance on household and outside work, and exposed them to greater domestic violence at home and sexual harassment in the emergency shelters. **Gay Defiesta's** study of the same disaster found that women's inshore and mangrove-associated fishing and the onshore activities they normally undertook to help their husbands were all temporarily wiped out by the spill. The remediation work and post-emergency support programs went predominantly to the men (64%, and mainly the more lucrative projects). Women lost most of their direct coastal fishing livelihoods and the fishery support they normally gave the men, but gained less from the rehabilitation, even when projects were more typically women's work, such as vegetable growing. Both the papers stressed the importance of taking a gendered look at disasters and disaster recovery, as this disaster exacerbated women's local economic marginalisation.

In mid June 2008, Typhoon Frank (or Fengshen by its international name) cut through the Philippines, hitting hardest in and flooding 4 provinces of the Western Visayas. Fishing and farming were the main activities of those affected, according to **Farisal Bagsit** and colleagues who studied the aftermath. Unlike the Solar I oil spill, Frank affected household members equally and women and men worked in complementary ways to secure and protect the family assets, but gender differences did emerge in preferred coping and future avoidance mechanisms. Women gave priority to family physical and financial safety while men undertook more outward directed facilitation and managerial actions to protect the family.

2. A great diversity of gender assets and roles

Presentations from eight countries in Africa, Asia and West Asia (India, Indonesia, Korea, Malaysia, Philippines, Nepal, Nigeria and Oman), explored the spaces, assets and roles of women in aquaculture and fisheries.

India

The edible Indian oyster (*Crassostrea madrasensis)* seems to have good potential for culture based on natural spat fall. A project in the coastal community of Moothakunnam in Ernakulam District, Kerala, by **Femeena Hassan** and her colleagues targeted women's Self Help Groups (SHG) as a vehicle for testing socio-technical extension. The District has a high ratio of women to men but many women are not involved in the economy directly. The SHG's were trained in rack and string (ren) culture farm management, the techniques and importance of depuration and hygienic post-harvest processing, including of value added and long life products. Early results show that the enterprises can be profitable. A longer term challenge will be to keep the women in charge if, as expected, the enterprises become profitable.

Also in Kerala State, **Dinesh Kaippilly** and colleagues interviewed women in fisheries in the marine and inland sectors, and in tribal fishing and compared and contrasted their experiences. In the marine sector, most of the women were older than 60 years, had worked for more than 30 years in the fisheries, work long hours for little income and many suffer from health problems. In

inland fisheries, the women interviewed were mainly involved in the hard physical work of collecting and marketing clams (*V. cyprinoides)*.[4] Due to the difficult nature of their work, they suffered even more than the coastal women from health problems, and earned less. In accord with their culture, the tribal fishers, women and men, fished together for the endemic food fishes including Mahseer (a highly valued cyprinid), undertaking the long and physically demanding fishing trips. Compared to the former two groups the third group faces fewer health-related issues from their work front. Women from all the three populations contribute significantly to the daily income and protein security of their families.

The Pichavaram mangrove area of Tamil Nadi, southeast India, bore the brunt of the 2004 Indonesia Ocean tsunami, and one village, MGR Thittu was almost totally destroyed. **Piyashi Deb Roy** used this village as a study site to estimate the value villages now put on mangroves for coastal protection. Her presentation won the Best Student Paper Award.

Using contingent valuation methods, she investigated village people's willingness to pay for mangrove protection. Slightly more women (79%) than men (67%) were willing to pay. Men, on average were willing to pay more than women, but the spreads of hypothetical payments were large for both women and men. Women's reasons for being willing to pay were wide ranging, from ecological (e.g. protection against storms), to cultural (e.g. fisheries and firewood), for family livelihoods (e.g. crab fattening, mangrove nurseries), ethical (e.g. a place of worship) and recreational uses in their leisure time. The women made a strong case for being given management responsibility for the mangroves, given their wider use and appreciation of the many values of the mangroves. Their stewardship could be helped through training to realise their life and livelihood interests.

Indonesia

In Pekalongan and Tegalon on the north coast of Java, Indonesia, women small scale sellers of fresh fish in baskets can access several different sources of finance. **Zuzy Anna** reported on quantitative economic analyses of income and returns on investment that compared cases with finance from middlemen, cooperatives and rural banks and those who took no credit. Women with finance from cooperatives had the best income performance and cooperatives were the most efficient in delivering finance. In terms of effect on income and efficiency of delivery, middlemen were the least efficient. Overall, the women were very disciplined in their borrowing behaviour. GAF4 participants debated the strengths and weaknesses of cooperatives, as many do not survive long term. In the study reported, however, two of the cooperatives were very strong and effective.

Korea

In Gangwon Province, Korea, women are now 30% of the fishery workers, up from less than 10% in 1995, although the total number of fishery households is dropping. **Myoung Hee Yeo** found that more than 80% of the women are over 45 years old and most were in fishery support roles. Although more than half of the women actually contributed more than half the family

[4] For more details, refer to the presentation by Nikita Gopal

income, they still saw themselves in subordinate roles. Low income and hard physical work were causes of work dissatisfaction. On a more positive note, the study found that more women were now (2012) identifying as professional persons than in 2005.

Malaysia

Zumilah Zainallaluddin and her colleagues explored wives' and husbands' perceptions of their roles and responsibilities in pond and cage aquaculture enterprises in Kuala Besut, Terengganu, Malaysia. Spouses tended to carry the same views on who did what in the domestic sphere, but their views differed with respect to aquaculture roles. Up to 22% of women reported various contributions to many cage and pond culture activities but only one husband (out of 51) recognised his wife's work in the cage culture activities and none recognised the women's contributions in the case of pond culture. In another study, **T.A. Hamid** reported on a survey of brackish water and freshwater aquacutlurists from Kuala Besut, Terengganu, almost all of whom were men. Most respondents had cash savings, more than half owned land and a small number had other assets. Their poverty rates were 12% (freshwater) and 15% (brackish water) and more research is planned to investigate the impact on the fish farmers of the national poverty eradication programs.

Nepal

A successful sequence of projects introduced polyculture of carp and small indigenous species (SIS) to women farmers, predominantly of the important Tharu ethnic group from the foothills of the Himalayas, reported **Sunila Rai**. The SIS (14% of production) were intended mainly for household consumption because of their high vitamin A and iron levels, and the carp (86% of production, six species) for sale. Bio-technical problems were sorted out in the early years of the project in Chitwan and Kailali districts and impact studies showed that farmers consumed nearly half their production, giving them a fish consumption rate twice the national average. In addition to nutritional and income benefits, the training and project experiences built collective assets such as confidence and local cooperation. Individual assets also grew. Leaders emerged, such as one woman who rose to become the cooperative president and another who became a technical field supervisor.

Nigeria

Women in Nigeria dominate in artisanal fish capture and fish marketing. In Ondo State, southwest Nigeria, **Taiwo Mafimisebi** studied the financial returns of each of these groups, what affects them and how the returns might be improved. The artisanal women fishers had, at most, primary education while half the marketers had secondary education, but the fishers achieved significantly greater profits than the marketers. Both of these profitable groups contributed most of their profits to household income, and put 22% (fishers) and 31% (marketers) back into their businesses. Despite their profits, both groups face increasing challenges and would benefit from better collective organisation to access government support and bank credit to improve their enterprises.

Oman

Many official reports from Arab countries say that women do not fish due to religious and cultural reasons. But in Oman, an old saying is that "behind every boat, a woman," referring to the women's activities in all stages of fishing. Modern Oman, however, is reducing women's fishing space but, as **Khlfan Al Rashdi** found, in special niche fisheries women were still active. In Al Wusta Region, near the 'empty quarter" of the Arabian peninsula, Bedouin women harvest gastropods (locally called *rahas*), echinoderms (especially high value sea cucumbers), cephalopods and bivalves. In the marine snail fishery, women control the whole operation from collecting, processing and selling the dried meat and the operculums (which are mixed with frankincense, burned and used as perfume) to middlemen. In the case of the overfished sea cucumbers, women make up half the fishers in the Mahout area and work on contract to a trader. The women, whose work is supported by their families, are mainly literate, married and have children. The biggest constraints the women experience are the long distance to the fishing sites and the low price they obtain for their products.

Philippines

In the Philippines, green mussel (*Perna viridis)* farming first began in the 1960s and in 1975 in Samar, Leyte, where Jiabong is the main center, according to **Marieta Banez Sumagaysay**. Although the industry is male dominated, through a multi-scale value chain analysis, she found that women and girls occupied roles all along the value chain. Except in mussel processing and mussel trading, overwhelmingly the roles entailed non-paid extensions of homework which did not meet the women's practical gender needs, e.g. for income, healthy working conditions, or their strategic gender needs for self-esteem and better control over their own lives. These roles included in the selling and procuring of bamboos poles for the farms, cleaning of mussels at harvest, and preparing the mussels for market. Although the mussel industry has many laudable features such as its sustainable nature and its support of many jobs, new approaches are needed to engage women in more powerful and recognised positions to make the industry more gender equitable.

Philippines is the country with the least gender gap in Asia, and one where three-quarters of the people live in aquatic agricultural systems (AAS) – "diverse farming systems where families cultivate a range of crops, raise livestock, farm or catch fish, gather fruits, and harness natural resources such as timber, reeds and wildlife." In these areas, poverty rates are three times the rates of other areas. **Alice Ferrer** reported how, at eight AAS sites in the Visayas and Mindanao regions, preliminary scoping studies had found women's and men's roles were both expanding. Women are taking new and greater roles in the productive spheres, including in rice farming, e.g. negotiating farm inputs, copra growing and climbing coconut trees, and in actual fishing so that more money stays in the family. At the same time, men and youth are taking more responsibility for looking after children at home and getting them off to school. Women's community roles are expanding, such as helping in the *bantay dagat* (community coast guard).

3. Challenge, institutions, and tools to meet future needs

Empowerment and access to productive tools

Two GAF3 presentations looked into the problematisation[5] of gender issues in fisheries through women's empowerment concepts and the access of women to productive tools.

Poh Sze Choo (Malaysia) explored in depth the different concepts of power and empowerment used in development. She used the concepts as a frame within which to assess gaps in the women/gender and fisheries studies to date, especially as reflected by those presented in previous AFS WIF/GAF events. She noted how most studies addressed the local and household level but rarely how women's lives were impacted by broader scale or sectoral processes, with the exception of a few works on global warming and globalisation. Many project studies focused on economic empowerment of women, and ignored other important meaningful dimensions of empowerment. She presented three power frameworks, including Longwe's[6] practical schema that has a hierarchy of empowerment: welfare, access, conscientisation, mobilisation, and control. Although economic empowerment may be an important first step, it is rarely sufficient to get women beyond the lowest level (welfare), particularly through project-based help, as this is usually short lived.

Angela Lentisco explored whether improved income, nutrition and empowerment would result from women's ownership of productive tools such as access to fish directly (by fishing) or indirectly (by buying fish, getting it directly from male family members or by exchange, even in some cases for sex). Major impediments stand in the way of women's access, however, particularly because of assumptions about the subsistence level of women's work which keeps them below the radar and out of contention for formal help and representation. Women are further put down if they are displaced from supply chains by modernisation, mechanisation and globalisation, and/or lose access to new technologies (sometimes developed specifically for them, such as that described by **Femeena Hassan** in Kerala) and fisheries, when the new industries become profitable. Disparaging perceptions of women and their suitability for fisheries work, plus their own self-perceptions and feelings of inadequacy can also hold them back. Fortunately, specific cases show that these negatives can quickly be turned into positives with active interventions to build self-confidence, knowledge and organisation to create the necessary access to productive tools. To move forward, a discourse on the best forms of collective action is still needed within each fishery. Should women aim for a perspective that is integrated (with men's organisations) or independent (with women-only organisations)?

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[5] "Problematising simply means making something problematic, not taking it for granted, questioning assumptions, framings, inclusions, emphases, exclusions." Source: patthomson.wordpress.com

[6] Longwe, S.H. 2002. Spectacles for seeing gender in project evaluation. Paper presented in GEM Africa Workshop, 16 November 2002.

Steps forward in key institutions

With respect to gender, an oral presentation and two workshops gave insights into what is happening in aquaculture and fisheries research workplaces and their work programs.

According to Dr Meenakumari, India's national leader of fisheries research, (presented by **Nikita Gopal**), the number of women professionals in Indian fisheries is gradually increasing, as indicated in the workforce statistics from the Indian Council of Agricultural Research. In 2001, women were 14% of the professionals; in 2012 they comprised 20%. In classification, just over half are senior or principal scientists and more than 60% of the PhD holders have done their studies in more than one state, and a similar percentage have moved institutions for work. Women tend to have led fewer projects than men and had not taken advantage of as many training opportunities. These statistics lead to suggestions for women professionals to improve their careers by stepping up for leadership and training opportunities, although they have already shown their preparedness to move for education and work.

NORAD-NACA Workshop on Mainstreaming Gender in the Network of Aquaculture Centres in Asia-Pacific Programme

NACA took advantage of the presence of a number of gender and aquaculture experts to conduct a workshop to give it guidance on fulfilling its Governing Council commitment (March 2012) to mainstream gender into the NACA program. The workshop asked the question: how can the Network of Aquaculture Centres in Asia-Pacific (NACA) mainstream gender into its work program and what strategies can it develop to achieve this?

The workshop was co-chaired by Bodil Maal, Senior Gender Advisor of Norad and Meryl J Williams, mentor to NACA on gender. **Dr Ambekar E. Eknath**, the NACA Director General, started with an overview of the NACA work programme and referred to key opportunities for integrating gender issue. 'Gender' is one of the cross cutting areas that has been recently introduced by NACA. The main aim was how to bring gender into existing programmes, since gender is emerging as a major aquaculture issue. The presentation was followed by a lively discussion on the way forward for NACA.

The workshop will be reported in greater detail by NACA, but what follows is a short summary of outcomes.

NACA is an important inter-governmental platform for Asia-Pacific, the region that produces the vast majority of world aquaculture products and that supports most of the fish farmers. Therefore, it should take a leading role on raising the profile of gender equality opportunities and issues. Further, its excellent track record in publishing and for collaborative studies makes it an ideal platform for three priority actions.

First, NACA should develop a **thematic gender gap report** for Asia-Pacific aquaculture. The report should address what is being done in member countries, what needs more attention. The paper should lift the profile of what countries are already doing and help raise NACA's profile

as a champion on gender in aquaculture. The gender gap report should be accomplished by using experts in member countries and collaborating with other regional or international bodies.

Second, NACA should craft **clear messages**, **in simple and concrete language** on why women are important in aquaculture, what the problems are to their greater contributions, and endeavor to have women's organisations and policy makers rally to improve the situation. Do not complicate the message and avoid complex, more academic gender terms.

Third, NACA should develop a **project targeted at women entrepreneurs in aquaculture**, at the SME level. This should be designed to fit with NACA's Sustainable Farming Systems Programme.

Aquaculture Asia-Europe Meeting (AqASEM), Work Package 7 on "Empowering Vulnerable Stakeholder Groups in Aquaculture Community"

Zumilah Zainaludin, Jariah Masud and Tengku Aizan (Malaysia) introduced WP7 of the AqASEM program of the European Union's 7th Framework Programme and Asian partners. **Jariah Masud** shared their experiences in conducting the 2012 Workshop on Gender Awareness[7] to introduce the basics of gender in aquaculture issues to policy makers, extension workers and scientists from five countries (Cambodia, India, Indonesia, Malaysia, Philippines). The first hurdle was identifying and attracting appropriate attendees. A pre-test showed that levels of gender and aquaculture knowledge differed widely from country to country and among attendees. For example, the Philippine attendees were much more knowledgeable. At the start of the workshop, some attendees were very reluctant, such as the "men with folded arms" who did not feel they needed to attend, and the scientists who felt that their work was already helping people. Attendees reported major shifts in their appreciation of the issues at the end of the workshop but have not been very responsive since. One such event is clearly not sufficient to make an impact on attitudes and follow-up is needed.

The workshop discussions will be reported in more detail by its organisers, but here are some highlights.

Workshop participants shared experiences in introducing and documenting successful and not so successful women's aquaculture programs in the region and discussed the options for regional collaboration to follow up WP7.

Gender support must be connected to the larger aquaculture industry issues, such as "sea grabbing" that can affect community and small scale farming and is resulting from the strong economic growth of the industry. Women's needs also should be canvassed to ensure that policy and program priorities address them.

[7] For an early news item on this Workshop see: http://genderaquafish.org/2012/04/20/malaysian-workshop-upgrades-knowledge-develops-plans-for-gender-equity-in-asian-aquaculture/

Research methods

For many attendees, **Marilyn Porter's** (Canada) magnificent overview of what qualitative, feminist research methods could contribute to gender research in fisheries, and the workshop she led, was a highlight of GAF4. Marilyn gave an authoritative review of the rise of feminist scholarship from the 1970s and the early "add women and stir" methods, to the rise of rigorous ethnographic and qualitative approaches in which participants became partners in the research enterprise, not simply "subjects". This dimension of the research can lead to extraordinary impacts, as reported by **Jenny Shaw and Leonie Noble**. The product of the community-based research on the impacts of fisheries management and climate change on the people of the Houtman Abrolhos (see above) was an award-winning museum exhibition called "Scene Change" that had a profound emotional impact on those who saw it, particularly fishers who felt deeply and personally touched.

Applying qualitative methods does not deny that data – especially baseline and background information – are needed, but she urged the attendees to recognise that qualitative methods ask different questions, the answers for which often can't be measured. In analysing the qualitative information gathered, researchers had to "get used to not having tables and graphs!" However, the non-quantitative methods were rigorous and, properly used, capable of delivery profound insights and explanations.

In going over a comprehensive list of methods (see table), Marilyn outlined the uses for which each was particularly suited and its challenges and the compromises that may be needed.

- Interview research, especially in depth, open ended interviews
- Ethnography
- Cross cultural, comparative research
- Case studies
- Action, community based, participatory research
- Literature based research, content research
- Life story, narrative research, autobiography and oral history
- Visual, audio, dramatic and multi-media research eg photo research
- Historical research
- Diaries and journals

Some of the compromises may include the need to work through primary interviewers, e.g. due to time and language constraints, the confounding of results from research team interactions and hierarchies, and the dilemmas of what to do when negative social issues are discovered in the field, such as domestic violence and sexual exploitation of workers. The AFS GAF researchers need to take more notice of such ethical issues. Ethical questions pervade feminist (and therefore gender) research.

Marilyn concluded her presentation by saying that there are no actual "feminist methods", just feminist use of good research methods that remain true to feminist principles of gender equality and can contribute valuable perspectives to fisheries research.

As a case study, she then generated an active examination of how more detailed information on the qualitative characteristics and motivations of women in the largely quantitative economic study by Taiwo Mafimisebi (see above) may have added additional value to the economic research.

4. Gender equality is only possible through mobilisation

In her presentation opening the session in honor of Dr M.C. Nandeesha (1957-2012), **Meryl Williams** showed how the AFS gender in aquaculture and fisheries efforts resulted from the specific and visionary efforts of just one person, Dr Nandeesha. She traced his early steps of holding symposia on women in fisheries in the Indian Branch of the AFS and in Cambodia and Indo-China countries, followed by getting a "toe in the door" at the triennial Asian Fisheries and Aquaculture Forums. The first activities were non-threatening ways of introducing the topic, e.g. women in fisheries photo competition. He also brought in partners and worked to get the formal WIF/GAF symposia in AFS made academically respectable through well-published proceedings and awards. His own publications showed a concern for: (a) how institutions, such as CARE-Bangladesh, delivered on their policy promises on gender equality through changing their staff recruitment policies; (b) getting the basic facts and statistics together to track gender in education and research agencies; and (c) how the AFS was faring in electing women Councilors.

First Council (1984-1986)	12%	2 of 17
Second Council (1986-1989)	11%	2 of 18
Third Council (1989-1992)	0%	0 of 17
Fourth Council (1992-1995)	0%	0 of 17
Fifth Council (1995-1998)	18%	3 of 17
Sixth Council (1998-2001)	19%	3 of 16
Seventh Council (2001-2004)	31%	5 of 16
Eighth Council (2004-2007)	27%	4 of 15
Ninth Council (2007-2011)	20%	3 of 15
Tenth Council (2011-2013)	13%	2 of 16
Eleventh Council (2013-2016)	13%	2 of 16

He would not have been happy to have seen that, after nearly 30 years, the AFS Council had only about the same percentage of women Councilors as at the start (see table), although it had higher numbers in the 2000s.

Meryl concluded that Dr Nandeesha was a visionary committed to social justice **and** with an intuitive understanding of how to motivate others to act and bring about institutional change. His loving wife, Rajeswari Dayal B said of him: "so though Nandeesh is not with us physically, his thoughts and deeds are there to guide us through these difficult times."

In order to gather views and ideas of what works and what is still needed to strengthen networking in gender, **Meryl Williams**, Poh Sze Choo, and Dr M.C. Nandeesha before his untimely death, developed a survey of experts. The survey elicited 41 (78% from women) detailed

and thoughtful responses, addressing the four step process of forming influencing networks (based on Actor Network Theory[8]).

The first step, Problematisation, in which the problems and the "actors" are defined, received the greatest attention from respondents, revealing the considerable progress made in general understanding of the issues, even though much more specific detail is needed for most fishery situations. Out of the wealth of detail, however, only weak strategic messages have been developed, although sufficient material is available to start to craft such messages. The set of actors is still small and limited in its extent. The second step, Interessement, in which others are recruited to the network, is still weak, but survey respondents provided a rich set of ideas on how to do it. They stressed the needs for leaders and champions in the right places, but felt that an active core group of these was still to emerge. Researchers and the grass roots organisations must get together if any progress is to be made. The third step, Enrolement, in which roles for action are defined and actors formally accept their roles, is even further behind Interessement. Clearly, little progress can be made until the critical people are convinced to step up.

The final step, Mobilisation, during which the primary actors act as spokespeople and start to mobilise the passive actors, relies on achieving much more progress with Interessment and Enrolement, unless a major opportunity for rapid progress can be found.

In the ensuing discussion, participants stressed the importance of setting the agenda and getting the message out to other circles by building a common understanding with concrete examples and studies. Group members presented pros and cons and the challenges of holding standalone events on women/gender, noting the difficulties in getting sufficient attention at a mainstream conference such as 10AFAF, versus the problem that a significant number of GAF4 presenters were only able to attend because they were also presenting in other sessions.

Noting that the GAF events had been totally focused on research, many participants, including researchers, stressed that future events must consist of more than research presentations and workshops. They must include different types of sessions that engaged with the women and other workers in the sector who were working at grass-roots level.

After GAF4, a small group met to further discuss the next steps and agree an action plan, covering items from the immediate aftermath of GAF4 to what GAF5 would look like, the opportunities for other GAF events at forthcoming conferences. A small group agreed to follow-up on getting funding to develop a gender in aquaculture and fisheries "101" course. The action plan also included the need for a bolder strategy, networking with other networks of similar interests and the importance of developing and getting funded site-specific collaborative research to help improve the quality of the research.

[8] Callon, Michel (1986a). Some elements of a sociology of translation: Domestication of the scallops and the fishermen of St Brieuc Bay." In: John Law, ed. (1986). *Power, action and belief: A new sociology of knowledge.* London: Routledge & Kegan Paul.

GAF4 BACKGROUND INFORMATION

GAF4 (http://genderaquafish.org/) was supported by the Asian Fisheries Society, AquaFish-Cooperative Research Support Program (USA), the Norwegian Agency for International Development (NORAD), the Indian Council of Agricultural Research (ICAR), the Network for Aquaculture Centres in Asia-Pacific (NACA), the Korean host agencies of the 10th Asian Fisheries and Aquaculture Forum plus the personal support of presenters and their organisations. It was held as part of the 10th Asian Fisheries and Aquaculture Forum hosted by AFS and the Korean Fisheries Society, from 1-3 May 2013 in Yeosu, Korea. All supporters are gratefully acknowledged.

GAF4 was the 6th women/gender in fisheries/aquaculture symposium in the series hosted by the Asian Fisheries Society (AFS, www.asianfisheriessociety.org) over the past 15 years. Founded in 1984, AFS is a non-profit scientific society that promotes networking and co-operation between scientists, technicians and all stakeholders involved in fisheries (including aquaculture) production, research and development in Asia. Its ultimate objective is to enhance food security and income-generating opportunities for fisheries workers via sound management practices, environmentally sustainable development and efficient utilisation of the aquatic resources. At GAF4, 29 papers were presented, 28 oral papers and one poster, as well as four workshops. Presentations covered 16 countries ***Asia and Oceania***: Australia, Bangladesh, Cambodia, India, Indonesia, Japan, Korea, Malaysia, Nepal, Oman, Philippines, Sri Lanka, Thailand, Timor Leste, Vietnam; ***Africa***: Nigeria; **Europe:** Norway; **Regions**; South and Southeast Asia; Asia-Pacific, Global.

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