

Guest Editorial: Engendering Security in Fisheries and Aquaculture

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This Special Issue of Asian Fisheries Science journal comprises 25 papers and a report based on the presentations and posters of the 6th Global Symposium on Gender in Aquaculture and Fisheries (GAF6) held during the 11th Asian Fisheries and Aquaculture Forum, August 2016, Bangkok,

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Thailand. GAF6 was the eighth women/gender Symposium organised by the Asian Fisheries Society (AFS). For each previous event, the proceedings or selected papers have been published (Williams et al. 2001; Williams et al. 2002; Choo et al. 2006; Choo et al. 2008, Williams et al. 2012; Gopal et al. 2014; Gopal et al. 2016).

The present Guest Editorial introduces the collection of papers and reports from GAF6 and considers its outcomes. We take the theme of GAF6 - “Engendering Security in Fisheries and Aquaculture” – literally, meaning that “engender” is to cause to exist or to develop. In terms of engendering security, we have a primary focus on the many facets of security for women: as individuals, as members of households, communities, and operating at the political level, nationally and internationally. However, we do not neglect totally the issues facing men and communities in fish value chains. Also, we ask ourselves, what gender issues are being overlooked in the current studies? As recent gender-related work of the Food and Agriculture Organization of the United Nations (FAO) and topics in GAF6 presentations and sessions resonated with each other, we briefly cover FAO gender and fisheries/aquaculture work in our Guest Editorial. Finally, we provide an overview of the Special Issue papers.

Throughout, most of the emphasis is on women’s conditions and lack of gender focus in research and policies in countries outside the Organisation for Economic Co-operation and Development (OECD), although we acknowledge the need to better integrate the longer legacy of gender and fisheries research in OECD countries, such as Neis et al. (2013).

But first, we discuss the steps taken by the Asian Fisheries Society to formally establish its Gender in Aquaculture and Fisheries Section.

Gender in Aquaculture and Fisheries Section of the Asian Fisheries Section

In the Guest Editorial to our previous GAF Symposium, we reported how the informal group that had established and developed the Asian Fisheries Society’s activities on women/gender in aquaculture and fisheries decided to continue the “long journey” towards gender equality and equity by creating a formal Section of the Society (Gopal et al. 2016). We are

delighted to report that the formalisation process is now well advanced. The Gender in Aquaculture and Fisheries Section (GAFS) was formally launched in January 2017 and began enrolling members. In April 2017, a set of self-nominated Inaugural Officers began establishing the basics of GAFS, leading to the election of the first full Executive Committee in September. The Inaugural Officers and the Executive Committee have led the ratification process for the Section By-Laws, developed a policy and priorities for partnerships and the Section's activities, and canvassed for revitalising the membership arrangements within the parent body, the Asian Fisheries Society. We hope that this institutionalization will visualize and make gender issues important in everyday life, research and politics so that women's and men's conditions not only in Asia, but also worldwide, will be improved.

GAFS helped sponsor two events in 2017, namely the panel session on Gender Issues in Giant Freshwater Prawn at Giant Prawn 2017 in Bangkok in March, and the GAF-India event held during the 11th Indian Fisheries and Aquaculture Forum of the Indian Branch of AFS (November 2017). GAFS also partnered with the new International Association for Women in the Seafood Industry (WSI) during its launch in August in Iceland at the World Seafood Congress 2017.

GAF6: Engendering Security in Fisheries and Aquaculture

Security (and insecurity) may arise from many different circumstances. In fisheries and aquaculture, GAF6 was most concerned with food security and nutrition, legal rights and politics, access to resources and industry opportunities, fair livelihoods, dignified work, safety within the household, and resilience in the face of natural and climate change related disasters. In engendering security, policies, practices, beliefs and norms interact.

Are current policies and practices engendering security?

Security for all parties with a stake in fisheries and aquaculture puts the spotlight on the small-scale sector and on people who labour in large operations such as fish processing factories and on fishing vessels. Human rights, including women's rights and equality politics within the fisheries and aquaculture sectors, are at the heart of security concerns. If we look at fisheries and aquaculture policies that may address the rights of people in

small-scale operations and labourers in large industrial operations, we find a patchy record.

Supporters of gender equality in fisheries laud the fact that gender equality is included in the 2014 Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines). Although this is welcome policy attention, implementing the Guidelines is the current challenge. The GAF6 session presentations on the SSF Guidelines and the case studies in Kleiber et al. (2017) showed that the legacy of history means that women are not presently active in fisheries decision-making, they are often invisible in most fisheries statistics, statistics on gender barely exist or are less developed and women's interests are excluded from national policies in countries all over the world, no matter the national record on gender equality in society. Many of the current national fisheries policies are based on early global fisheries instruments, such as the Code of Conduct for Responsible Fisheries, which were silent on gender equality (FAO 2012). Non-government organisations and women's groups advocating for inclusion, nevertheless, has resulted in women being recognised in some national fisheries policies. Yet even in these cases, financial resources may not be allocated, and/or expertise not available to address the needs, for example in Lao PDR fisheries and aquaculture (GAF6 report, this volume)

In the case of engendering security for labourers in larger fisheries operations, policy action tends to come from international bodies such as the United Nations International Labour Organization (ILO) and the United Nations Industrial Development Organization (UNIDO) which have taken actions on labour laws. Although relevant, fish sector companies rarely heed the requirements of other international policy instruments such as CEDAW (the 1979 Convention on the Elimination of all Forms of Discrimination Against Women), unless they are specifically implemented in national laws made explicit for industry.

In many non-OECD countries, women are the majority of workers in fish processing factories and will benefit if the ILO and UNIDO (and CEDAW) policies are adopted in national labour laws, for example, see Nuruzzaman and Uddin (this volume) for occupational safety and health

issues in Bangladesh shrimp processing. Often, progress is slow, for example when the companies give priority to other imperatives such as reducing costs and meeting export standards. Even where the basic instruments for worker safety are specified, such as the ILO C188 Work in Fishing Convention, 2007 (ratified in 2016), workers may not be covered if they are working in insecure jobs at piece rates or on short contracts.

Formal recognition of women in fisheries policy has been a long time coming. Despite 40-50 years of research and development work on women and gender in fisheries covering many countries, the FAO Small-Scale Fisheries Guidelines (2104) have become the first global fisheries instrument to make women's situations and challenges more visible and also given the opportunity for new tools to improve their conditions. In other policy arenas, such as climate change adaptation (Williams et al. in press), fish product certification, and aquaculture, much more is needed to achieve even this level of visibility. For example, virtually all aquaculture policies lack gender equality provisions, so a necessary first step should be advocacy to persuade the best practice, product certification bodies, and NGOs to include gender equality provisions. Beyond advocacy, early trials indicate that suitable tools are needed to address gender. In shrimp aquaculture, Peters et al. (2016), examined the still weak progress in considering gender in shrimp aquaculture enterprises. Oxfam's Gender Transformative and Responsible Agribusiness Investments in South East Asia (GRAISEA) program tested gender transformative approaches in Indonesia and Vietnam using participatory social impact assessment. In the tests, this assessment tool, already used in Aquaculture Stewardship Council (ASC) certification, was considered underdeveloped with respect to gender and gender action learning was added to augment the tool.

The 15-year global policy framework of the Sustainable Development Goals (SDGs), agreed in 2015, was designed to end poverty, protect the environment, and ensure prosperity for all. It was designed for use in government, the private sector and civil society agencies and in communities. In a recent issue of *Yemaya*, Kusakabe (2017) and Williams (2017) argued that the SDGs should receive greater attention in fisheries and aquaculture, especially SDG 5 - "*achieve gender equality and empower all women and girls.*" Is this an early sign that SDG 5 is not penetrating

fisheries policy and that progress will be difficult? At present, most of the attention from agencies concerned with fisheries and aquaculture is on SDG 14 – “*conserve and sustainably use the oceans, seas and marine resources for sustainable development.*”

Recent evaluations of gender in major research, development and environment funding institutions revealed the long and hard road for gender and gender equity. Each evaluation concluded that, while some progress had been made in mainstreaming gender, progress was slow and major challenges remained (Independent Evaluation Office of the Global Environment Facility 2017; Independent Evaluation Department Asian Development Bank 2017; CGIAR-Independent Evaluation Arrangement 2017).

Securing fair livelihoods in fish value chains

Definitions are powerful in that they can include or exclude women as legitimate participants and stakeholders in the fish sectors. Policy within aquaculture and fisheries tends to focus exclusively or predominantly on production, rather than the entire value chain. Hence, since women are more concentrated in post-harvest and service activities, they are often excluded from consideration. Not counted in official statistics, women’s contributions to food security, nutrition, livelihoods, and foreign exchange are not recognized. Using a fish value chain approach has started revealing women’s dependence on the fish sectors from harvesting/farming through to post-harvest processing and marketing. More studies use the fish value chain approach, and these studies are showing that although women are able to make a living from the fish sector, they lack access to social security, health, decent work, and official recognition, and they have lower incomes than men, or their labour is considered as part of family labour, and is not compensated. In a few instances, such as the women traders in General Santos tuna markets, Philippines (Raymundo Pavo, this volume) and the women mollusc collectors in Costa Rica (GAF6 report, this volume), women have successfully challenged existing taboos, established their own spaces and rights.

Lack of sex-disaggregated and reliable statistics in most countries is a big challenge for the realization of women’s empowerment and gender

equality in the fish sectors. Without knowing how many and where women are in the fish value chain, and the conditions they face, women's contribution will continue to be unrecognized, and, as well, monitoring and evaluating the impact of actions and interventions will be difficult. This is slowly changing with the inclusion of sex-disaggregated statistics for a few countries in The State of the World Fisheries and Aquaculture 2016 report (FAO, 2016a). However, even beyond the challenges of statistics, much more needs to be done to secure fair livelihoods for women in fish value chains. We need to understand where and why in the fish value chain inequalities exist. This also means challenging the pervasive notion that women are best suited for low-paid processing and other low-paid postharvest work because they have nimble fingers and engage naturally in such work as an extension of their household responsibilities.

Climate change and the forces of change in coastal communities

Guidance on gender equality is given in the United Nations Framework Convention on Climate Change. "Gender equality" is Guiding Element (e) in the "Guidelines for the preparation of national adaptation programmes of action" (UNFCCC 2001) but it is weakly developed (Williams et al. in press). In climate change adaptation in fisheries and aquaculture, gender is almost always ignored, e.g., in fisheries vulnerability assessments, while the discourse focuses on technical and biophysical aspects that appear to necessitate technical solutions. Based on evidence from papers on gender and climate change and/or in natural disasters in AFS GAF publications, Williams et al. (in press) found that social and fisheries sector norms frustrate gender-sensitive climate change responses. Further, action is constrained by poor data and the low level of knowledge of gender divides in the economy and society. Often, women are assumed to be vulnerable and their agency is ignored; alternatively, women are portrayed as virtuous and expected to shoulder additional adaptation responsibilities. Neither version of women's roles leads to appropriate actions. Instead, using a gender lens in vulnerability and other assessments will expose issues that were otherwise ignored, permitting better targeted actions and highlighting new options. Williams et al. (in press) found that gender-blind adaptation risked intensifying existing gender inequalities. Gender-sensitive research also demonstrated, again, the importance of looking at the whole fish value

chain, and diversifying livelihoods as a strategy to help communities cope with disasters and declining resources.

The results of vulnerability assessments are used in setting priorities for National Adaptation Plans (NAPs), including sectoral plans and adaptation projects. If they incorporate gender indicators, the results can be used to inform gender budgets for adaptation. Gender priorities, however, must not focus only on women in isolation, but also include the complexity of gender roles and relations. Fisheries and aquaculture institutions must be transformed if they are to have the capacity to integrate gender into climate adaptation. Staff will require education in basic gender equality concepts, and institutions should hire gender experts and encourage internal gender champions.

Realising security will require the transformation of sector and social norms

Social and fish sectoral norms present major constraints to secure rights and livelihoods for women in fish value chains, despite some interventions seeking to empower women. Because women's roles in fisheries and aquaculture activities are overlooked or under-appreciated, their livelihood needs are often ignored also or they are completely excluded from development assistance programs. Women-headed households are rendered particularly vulnerable to economic dislocations when markets shift, natural disasters strike and resources decline because, in addition to exclusion, they often lack access to assets such as land, credit and technologies to mitigate the impacts. Despite the important role women play in ensuring household food security and successful adaptation to ecological disruptions, gender norms and ideologies within the family, workplace and society constrain women's activities and access to economic opportunities, and thereby limit their livelihood options and security. As several studies presented at GAF6 revealed, in many societies, male family members control women's activities and restrict them from working outside the home or participating in fisheries and aquaculture projects. When women are allowed to work, they are relegated to the most marginalized positions, and they experience discrimination and harassment in the workplace with few rights and protections from the State.

Considerable debate has ensued about how to best advance women's needs and transform gender norms and relations. Can women-only organisations by themselves successfully challenge and transform prevailing dynamics? Or, must gender transformative processes engage both men and women? If the former, what kinds of support do women's organisations require? If men are to be engaged in gender transformative processes, how might this best be accomplished? While some studies suggest that women's organisations, if properly supported, can accomplish much to advance women's economic interests, others reveal that social and cultural change within the sector requires the engagement of both men and women. Although more research is needed to deepen understanding of best practices for promoting women's empowerment, it is evident that real progress in securing gender equality in fisheries and aquaculture will not be achieved unless gender norms are transformed.

FAO's gender activities

The Food and Agricultural Organization of the United Nations (FAO) continues to gradually increase its attention to women's empowerment/gender equality in fisheries and aquaculture. It is improving data on gender in fisheries and aquaculture statistics (Jennifer Gee and Kathrin Bacher, present volume), producing high quality knowledge products and undertaking, with partners, key field activities. We highlight three recent sets of products and activities: a fact sheet, the SSF Guidelines handbook, and studies on women in aquaculture supply chains in Bangladesh and Indonesia.

In the first product, FAO consolidated nearly 20 years of its own knowledge and experience on women and gender equality work in fisheries in a fact sheet "Promoting gender equality and women's empowerment in fisheries and aquaculture" (FAO 2016b). The fact sheet provided advice to policy makers on how to integrate gender into fisheries projects, gave examples of gender-sensitive indicators, and highlighted lessons FAO had learned.

Second, in order to support the implementation of the SSF Guidelines, FAO published "Towards gender-equitable small-scale fisheries governance and development. A handbook" (FAO 2017a), which was

informed by an online survey, two regional workshops and an expert workshop (Correa 2017). In leading the preparation of the handbook, FAO drew on the International Collective in Support of Fishworkers (ICSF) which had been a key partner during the consultations for the SSF Guidelines. FAO is carrying out a series of national workshops, namely in Tunisia, Ghana, Burkina Faso and Cote d'Ivoire, to raise awareness about the SSF Guidelines and empower people to use them as a tool to improve, in particular, women's social and working conditions, as well as their post-harvest, marketing and trade activities.

In the third example, FAO led the "Women's empowerment in aquaculture production systems in Asia: Comparative case studies and synthesis from Bangladesh and Indonesia," as part of the Blue Growth Regional Initiative for Asia and the Pacific. The case studies also comprised part of the CGIAR Research Program on Fish Agrifood Systems (FISH). Results from these studies were presented at GAF6 and have since been published through FAO and WorldFish (FAO and WorldFish 2017; FAO 2017b; Sari et al. 2017). In Bangladesh, the case studies were on homestead pond aquaculture production systems (in 3 districts) and shrimp processing factories in several locations (Choudhury and McDougall 2016). In Indonesia, the studies covered small-scale shrimp farming and homestead-based milkfish processing (Sari et al. 2017). Women's involvement in aquaculture suffered from the structures of prevailing societal and household norms, but brought positive outcomes such as greater financial freedom, and negative outcomes such as greater daily workload. The studies also provided insights to overcoming the barriers through connecting interventions in multifaceted approaches.

Which gender issues are not getting attention?

The most acclaimed fishery and aquaculture research often lacks a gender focus. This is also the research that is published in the most highly cited journals. Studies and projects on women/gender equality in fisheries and aquaculture are very poorly funded, and many of those presented at GAF6 and published in this Special Issue were conducted in the course of other studies and/or on small budgets. Public calls for project proposals on our theme are rare. What topics, therefore, are being overlooked or ignored

as a result of the *ad hoc* nature of the field? We propose seven topics that may be neglected but emerging. The Gender in Aquaculture and Fisheries Section of the AFS could help generate greater interest in these topics.

The first is domestic violence or violence against women (VAW) in fishing communities (e.g., Hoang et al. 2013). Domestic violence is not just an issue in stressed communities, although it may be a particular hazard in such circumstances. The issue of VAW is largely ignored throughout the sector and the mainstream focus on VAW doesn't seem to recognise the particular issues for women in fishing and fishing communities. The structural violence that leads to men controlling much of the capital and women into *status quo* or even to poverty also is important.

Second, fish processing in general needs more attention. Women's and men's roles are often described, but quantifying the extent of fish processing as well as how much this contributes to food security, surprisingly, is not well documented. Trends in the general industrial economy also emerge in fish value chains. For example, in OECD and some non-OECD countries, labour agencies hire migrant workers, creating different working conditions for migrant and local workers, whose union-negotiated rights may be threatened.

Third, changes in fishing communities caused by declining fish catches, coastal degradation, and river modification need attention. What can women and men in fishing communities do? What are the coping mechanisms or alternative livelihoods that they can pursue, including migration, and how does this impact the households and communities? Another dimension that has been noted and merits greater attention is the link between women and small fish. In depleted fisheries resources, small fish, juveniles of larger species and small fish species, predominate and many of these are the domain of women traders. Fisheries conservation aims to protect small and juvenile fish, advantaging the larger traders who are usually men. Conservation biologists, however, are starting to recognise the gender aspect of these strategies (McClanahan and Abunge 2017),

Fourth, the gender implications of the relations between fishing and agriculture or aquaculture are very complex, since, depending on the location, women's roles differ. Within a community, fishing and

agriculture/aquaculture may conflict over water use or sea territory use. In specialised discourse on water conflict between agriculture and fishing/aquaculture, women's roles and needs in these sectors can be ignored. For example, women might fish in paddy fields and small canals, which would benefit from water diverted to agriculture rather than being kept in large reservoirs.

Fifth, the impacts of women's success in technology adoption on intra-family conflict and household asset ownership merits greater exploration. This issue is particularly central to the development of aquaculture and women's participation. The simple assumption that women-focused projects will, if successful, naturally lead to greater women's empowerment and economic status is more complex in reality. For example, in Bangladesh, Scarborough et al. (2017) found that fish polyculture introduced through women-only groups was associated with an increase in the gender asset gap rather than a narrowing.

Sixth, and the most challenging of all, is the question posed above: how to advance women's needs and transform gender norms and relations? Recognizing that gender norms are deeply held and that even well targeted gender interventions may fail to deliver genuine gender equality and social change, many have proposed the need for "gender transformative change." The pathways to such change are far from clear.

Seventh, today's global fisheries need a focus where the conditions in the OECD and non-OECD countries may be studied in relation to each other. However, with a few exceptions such as the Too Big to Ignore project, research with a focus on such global processes and their effects on gender relations and women's and men's conditions are lacking and seem to be very difficult to organize and achieve.

We also ask what happens to well qualified women after gaining their academic degrees in fishery and aquaculture sciences. Do they get the same opportunities as their male colleagues, for example, in publishing as discussed by Morgan Chow and colleagues in this volume, and to what degree do they manage to promote gender issues and interests in their jobs?

The Special Issue

The papers in this Special Issue addressed four main themes in engendering security in fisheries and aquaculture. The first was whether current policies and practices were engendering security; second, why women were not better positioned in aquaculture; third, fair livelihoods in fish value chains; and fourth, climate change and the forces of change in coastal communities.

Current policies and practices for engendering security

A lack of gender-disaggregated data for the fisheries and aquaculture sectors has long hampered efforts to fully understand women and men's roles in these two sectors. As a result, women have often been invisible to policy makers, and the failure to consider women's roles and gender-specific constraints on improving fisheries and aquaculture productivity has resulted in massive losses in both sectors in terms of production, household food security and income (Dey de Pryck 2013). In "Engendering Statistics for Fisheries and Aquaculture," Jennifer Gee and Kathrin Bacher report that gender reporting on fisheries employment statistics is slowly improving. In 2016, FAO, for the first time, released a selection of sex-disaggregated statistics for employment in aquaculture and fisheries. These statistics revealed that women play an active and important role in the secondary sectors of aquaculture and fisheries. Women are found in all positions and roles and make up on average half - and in some cases, up to ninety percent - of the workforce in processing (FAO 2016a). Significant differences, however, characterize women and men's work in these sectors. Whereas most men are full-time employees in the fishery sector, the majority of women work part-time or on an occasional basis. Women may also be more engaged in small-scale or subsistence fishing or aquaculture, splitting their time between work and their family obligations. Understanding the implications of such differences is necessary to formulate good policy. One of the major challenges, however, is that gender reporting on employment in fisheries and aquaculture varies substantially between countries and regions. At present only 30 % of the countries reporting data to FAO collect gender-disaggregated data. Yet, as Gee and Bacher argue, informed policy making depends on high quality information. If gender-mainstreaming efforts to

foster the capacity of women in fisheries and aquaculture communities are to be successful, a strong foundation of gender-disaggregated data is required.

Resource sustainability is paramount in securing the future of fisheries and those who depend on fish value chains. As exploitation has long run ahead of resource replenishment, the race to protect resources has become urgent, often causing severe and sudden restrictions on current fishers, such as that which has happened in Thailand as a result of the European Union's yellow card issued for not taking sufficient action against illegal fishing. Khamnuan Kheuntha's paper, "When a Fisherman Can Not Fish: Impact of the 2016 Legal Reform on Male Fishermen in Phan Thai Norasing Fishing Community, Samut Sakhon Province," provides a detailed assessment of the local impacts on men and women. In Phan Thai Norasing village, the local coastal fishermen's masculinity has been built on their identification as independent, self-managed breadwinners, catching fish and krill (*Sergestid* shrimp for shrimp paste made by the women) at sea and supporting their families on the income won, despite the vagaries of the weather and catches. In 2015, the Thai government's reaction to the yellow card resulted in major, enforced legal reforms, including a strict ban on push nets traditionally used by these fishermen. With their previous fishing impeded, the way men perceived themselves changed and the restrictions caused them and the women in their households to adapt their fishing strategies. The women helped the men maintain their masculine role as fishermen, albeit operating on the margins of legality, at the expense of their own exhaustion from the extra burdens, such as maintaining a night time lookout for approaching fisheries officers.

In a study carried out in Central Philippines, Liberty Espectato and colleagues found women were more aware of Marine Protected Areas (MPA) than men. Women were slightly more likely than men to value the sea as a source of food and livelihood, were more knowledgeable about MPA rules and regulations, and were more likely to believe marine resources should be managed sustainably for future generations. The authors suggest that this makes women a good target for social marketing programs aimed at improving resource management; but they also warn care needs to be taken not to multiply women's burdens.

Why are women not better positioned in aquaculture?

Eleven papers are concerned with aquaculture, representing an increased interest in gender studies in aquaculture compared to our previous conferences and proceedings. As aquaculture has burgeoned, however, women have not secured equal places with men. A common assumption is that modern aquaculture does not carry the same historical gender roles as fisheries. This assumption does not withstand scrutiny. Aquaculture's gender roles and relationships mirror the same patterns of ownership, rights and power as in the general economy. Women typically function in small-scale, near-home, low technology aquaculture, or in lowly paid jobs in industrial operations. Often, these places for women are accepted by women themselves as normal. Notwithstanding the greater opportunities that women and their societies could obtain from aquaculture, through their own agency and with expert help from research institutes, NGOs and development agencies, even small-scale household aquaculture can fulfil important subsistence roles and satisfy multiple security needs, especially food security and nutrition.

Ayesha Siddiqa and colleagues' paper "Women's participation in aquaculture in southwest Bangladesh" reported on women's participation in aquaculture in rural households in the districts of Khulna, Sathkhira and Bagerhat under a USAID supported AIN (Aquaculture for Income and Nutrition) Project of WorldFish. The project surveyed 450 households, 50 % of which were assisted under the project. In 74 % of the households, women participated in aquaculture. Women's participation varied by aquaculture type: in homestead-based aquaculture, women's participation was highest (89 %); in commercial fish culture, 69 %; and in commercial shrimp culture 36 %. The survey found that increased awareness and better capacity building initiatives were important in increasing women's participation in the aquaculture activities

The direct link between the uptake of aquaculture and the food and nutritional security of farmers is usually assumed rather than examined. In southwest Bangladesh, Shahroz Mahean Haque and her colleagues studied the benefits of mud crab (*Scylla serrata*) fattening and culture ("Improving

the livelihood for marginalized women households in southwest Bangladesh through aquaculture”), where nearly 40 % of the facilities were owned and operated by women. Notwithstanding the high value of their products, a baseline survey in the Satkhira, Khulna, and Bagerhat regions revealed that most of the mud crab farmers had only 5 years average schooling and were consuming poor diets low in animal protein. An intervention that integrated tilapia into mud crab culture tested traditional mud crab fattening and mud crab and tilapia stocking and culture, using mixed sex tilapia. The intervention was also accompanied by nutritional education. Half of the tilapia farmers sold their tilapia in the market and the others used the tilapia for direct household consumption. In both test groups, small tilapia were fed to the mud crabs to reduce reliance on wild-caught trash fish as feed. The tilapia-mud crab fattening system produced greater overall production of mud crabs and increased the nutrient-rich foods for the farmer’s households. Overall, the integration of tilapia provided a more sustainable method for growing mud crab while also enhancing the livelihoods and nutrition of farmers. This study showed that simple links between aquaculture production and household benefits should not be assumed.

In many countries, ornamental fish farming is considered a suitable option for women’s fish farming. Bharat Yadav and Arpita Sharma’s paper, “Gender roles analysis of ornamental fish enterprises in Maharashtra State, India,” examined the Rainbow Revolution scheme that was launched in 2007, benefiting 305 men and women. The authors interviewed people on 30 farms in their study of gender role profiles of the ornamental fish producers to understand the differences between men and women’s access to and control over resources for ornamental fish farming in the northern coastal Maharashtra districts of Thane and Mumbai. Men spent significantly twice as much time in the ornamental unit (8 hrs.day⁻¹ average) compared to women (4 hrs.day⁻¹ average). Of the 30 farms, 22 were owned by men and 8 by women, and men had higher access to and control over resources. The prevailing social hierarchy, demographic factors, and the access to special training on ornamental fisheries were the major factors influencing who took up ornamental fish farming. The authors suggested that women’s roles could be improved by targeting women to increase their ownership and provide training programmes to make the enterprises more equitable and sustainable.

Alice Ferrer and colleagues paper, “Participation, roles, and attitude towards mariculture operation among men and women in mariculture areas in the Philippines,” is based on a survey of 785 households, 48 focus group discussions and 138 key informant interviews in seven mariculture areas – three in Luzon, two in Visayas and two in Mindanao. The study described the gender division of labour in mariculture and found that, although men take up a large chunk of mariculture work, women also take part, but women’s contribution is often unpaid and under-recognized. Even when women feed fish while men fish, women’s work is not paid while men’s is. Women find their opportunity cost of getting involved in mariculture high because it is time consuming. Mariculture requires visits to cages and pens in a boat and this demands concentrated time, which women do not have with their high workload in attending to household needs. Although women are willing to participate in mariculture many obstacles impede them in doing so.

Alita Roxas and colleagues studied the milkfish value chain in the Balingasag Mariculture Park in Misamis Oriental, Philippines, and found that few women were operating fish cages in the medium to big categories, and only men could formally become livelihood beneficiaries in the small-scale category, although their wives worked with them in the group operations. Hired workers in the medium to big fish cage operations were dominated by men, whereas in the small-scale operation, the wife and male children helped in the grow-out period. Trading and brokering was dominated by men, who sold the fish to wholesalers and retailers who were mainly women. The analysis showed that men captured most of the value addition created along the chain. To increase women’s participation in fish cage operations, the Bureau of Fisheries and Aquatic Resources built a processing plant and trained women to produce frozen and deboned milkfish for supermarkets and institutional buyers. However, because of the low volume of processing, no regular supervision was given and the women were unable to comply with food safety and other requirements.

Reynold Tan studied consumer acceptance of aquaculture products in the Philippine marketplace (“Comparing awareness and behaviour towards food consumption trends: Gender differences among milkfish, *Chanos chanos* (Forsskål 1775) purchase decision makers in the Province of Iloilo,

Philippines”). He compared awareness and behaviour of milkfish purchasers in Iloilo with respect to consumer trends such as food safety, organic food, sustainability in production, good agricultural practices, traceability, local production, support to local farmers and food labels. Consumers in five municipalities and one highly urbanized city were surveyed. On awareness, except for food safety, no significant differences were found between male and female purchasers for the eight consumption trends. On whether purchase behaviour conformed to food consumption trend awareness, however, a statistically significant difference was found between women and men for all eight food consumption trends. Different behaviours were greatest on the issue of food safety, with males having an average of 5.9 (true of me) vis-à-vis 5.2 for females (somewhat true of me).

In Nepal, women play active roles in adopting and promoting small-scale aquaculture. As aquaculture has been effective in improving family nutrition and also generating good income, more people, especially women and their groups, are attracted towards it. But in Nepal suitable land for aquaculture is limited. Therefore, Madhav Shrestha and his colleagues made efforts to utilize unused riverbanks of the foothill areas (“Women in riverbed aquaculture for livelihoods in foothills of Nepal”). According to them, construction of stronger and higher dikes on the riverside helped farmers to control the flood. Farmers also grew fruits, pulses and vegetables on the dikes and generated attractive income. Recently, with project support, 53 families constructed 90 such ponds. The project also provided training to the marginalized ethnic women who were able to produce 82 kg.family⁻¹ of fish on an average, which is substantial in a country where per capita consumption of fish is only about 2 kg.capita⁻¹.year⁻¹. There are many rivers and unused riverbeds where construction of fishponds could create new opportunities.

In Nepal, most small-scale fish farmers including the aforementioned project farmers feed their fish rice bran mixed with mustard oilcake. As nutrients are not adequate, fish grow slowly. Manufactured feeds are neither cheap nor of good quality. Realizing this constraint, Sunila Rai and her colleagues (“Involving women in field-testing of periphyton enhanced aquaculture system for nutrition security”) have tried to explore

alternatives, such as growing periphyton on bamboo sticks in the pond itself. They conducted a participatory trial involving 37 women organized in two cooperative groups. In addition to the major carps, they also stocked small indigenous fish, often considered as unwanted weed fish. Results were encouraging: 50 % reduction in feed cost, 22 % more fish production, and 2 times higher gross margin. Fish farmers could easily apply the idea.

These two case studies from Nepal serve as examples of how women can be empowered to overcome specific problems and help promote aquaculture and make it sustainable using indigenous knowledge, e.g., growing small fish with the carps, and locally available resources.

In seaweed farming in some locations, women are major participants, even leaders, but official statistics often fail to record this, such as in Nusa Tenggara Timur Province (NTT), Indonesia, according to Ria Fitriana (“Gender’s participation in seaweed production - examples from Indonesia”). Her study in three districts (Alor, Rote, and Kupang) that are indicative of NTT seaweed, used a value chain analysis. Across socio-economic classes and different ethnic groups, her study showed that men and women contributed similar amounts of labour to most processes in seaweed production. To improve production and quality, both women and men farmers needed enhanced skills in reducing post-harvest losses.

Imelda Joseph and A. Gopalakrishnan studied the impact of cage fish culture on household livelihoods (“Cage farming headed for equal opportunity in aquaculture development in Kerala, India”), focusing on the Pizhala area of Kadamakudy Panchayat in Ernakulam district, Kerala. The Indian Council of Agricultural Research-CMFRI (Central Marine Fisheries Research Institute) and the Kerala State Fisheries Department disseminated technologies in a village which is presently dominated by capture fisheries. Before the farming intervention, women were trained in cage farming, along with men and youth of the village, through an awareness-raising programme. Cage farming has opened up a better avenue for the development of aquaculture, as well as social benefit and equal opportunity, supporting similar previous results in nearby areas.

Morgan Chow, Hillary Egna and Jevin West report on the first preliminary gendered analysis of authorship of peer reviewed aquaculture publications in the JSTOR Corpus database archive comprising approximately 2 million papers (1913-2016) (“Towards assessing gender authorship in aquaculture publications”). The aquaculture industry has grown considerably in the last 3 decades, and approximately half of the papers on aquaculture have been published since 1990. The results of the analysis show gender disparity in scholarship. As is common across fisheries and other natural and social sciences globally, women remain underrepresented as authors in the aquaculture discipline. Women represent 16 % of aquaculture paper authorship across all positions (e.g. first, middle, last author) with 11 % of women representing single authored papers since 1990. The possible reasons for this are discussed in the study, including such factors as lower levels of training and participation in active publication by women in the aquaculture discipline. Low publication numbers have flow-on effects which ultimately can impact on the ability of women to gain promotion and secure employment in academia. These figures also are not consistent with the reported number of women working in aquaculture research. The paper identifies areas for further research to calibrate the publications data to the number of women graduates and active researchers over time, and compare the aquaculture data with those in related disciplines to obtain a clearer and more complete picture on scholarship by women and men in fisheries and aquaculture.

Seeking fair livelihoods in fish value chains

Gender equality is one of the bases of fair livelihoods. In her Extended Abstract, “Women in the seafood industry: Different countries, diverse level of knowledge and awareness,” Marie Christine Monfort summarized her seafood industry study (Monfort 2015) carried out in Croatia, Egypt, France, Iceland, India and Senegal. The knowledge of women’s participation, gender-based roles and power distribution, awareness of inequalities and barriers against women, and correctives measures and initiatives is incomplete and variable across countries and industry sectors. The quality of data was not linked to the countries’ levels of economic development. India and Senegal, for example, had among the better records, perhaps resulting partly from efforts supported by gender sensitive

development aid agencies. In economically more developed countries such as France, however, the knowledge of the participation of women in the seafood industry was “dramatically poor.”

Myra Iguban and Alice Ferrer from the University of the Philippines Visayas focused their attention on the different (and unequal) roles that men and women play in the important local Sergestid shrimp industry (“Roles of men and women in Sergestid shrimp (*Acetes spp.*) value chain in Oton and Tigbauan, Iloilo Province, Philippines”). The authors provide a detailed account of exactly how this fishery is conducted including all the tasks involved, rather than simply describing the capture phase. Using a variety of methods, the team explored and described how all the tasks associated with the shrimp fishery were broken down by gender, as well as other variables. While the division of labour by sex was less extreme than in other fisheries, men still dominated the capture segment, while women were predominate in processing and trading activities. The paper insists that we take a broad view of ‘fishing’ to include the other vital parts of the process and thus give women’s roles their true importance and value.

In small scale coastal fisheries, such as those in the Philippines, post-harvest processing is dominated by the work of women, and yet gendered divisions of labour and needs have received little attention. Encarnacion Emilia Yap and her colleagues proposed a comprehensive approach to technology transfer in such situations (“A model for gender-based post-harvest fisheries technology transfer initiatives in the Philippines”). They sought a new intervention model that could furnish responsible livelihoods and capacitate women. Their study started from a rapid assessment of fisheries resource and coastal community needs to create the basis for skill training modules for the women of Carles, a coastal town in northern Iloilo, Philippines. They assessed the status of the coastal resources, the roles women and men played in the community, opportunities and constraints for alternative livelihoods activities and the practicality of a gender-based post-harvest fisheries model for technology transfer projects to improve the women’s economic conditions. Early uptake and impact evaluations were positive.

Despite such innovative efforts, in the Philippines coastal barangays (villages) often have high levels of food insecurity and undernourishment, according to Feljean Cagape and his co-authors in their Extended Abstract “Food security practices of 4Ps women in urban coastal areas of Iloilo City, Philippines”. The 4Ps programme was the *Pantawid Pamilyang Pilipino Program* or Bridging Program for the Filipino Family. Noting that poor nutritional outcomes may have complex causes, the authors studied women in coastal barangays and found they were basically food consumers, buying daily food from local eateries (*carinderias*), and risking their health from less nutritious prepared meals. The women’s food security roles were limited to purchasing, budgeting, and cooking once a day. *Carinderias* were abundant and food production space, e.g., for gardening, was limited. The authors recommended enhancing the women’s fish vending and processing, such as setting up a common market for the fish vending and related activities. Further, women and men could be educated in better meal planning and advance budgeting to lessen their reliance on expensive and unhealthy food, and government agencies could provide support for gardening and financing the food and nutrition security activities.

This Special Issue has two papers, of a contrasting nature, that address the post-harvest segment of the value chain in industrial scale fisheries. Typically, gender/women receive little attention in this segment of the value chain. One paper addressed the health and safety of workers in shrimp processing in Bangladesh, and the other women in the Philippine tuna landing port of General Santos.

Mohammad Nuruzzam and Mohammed Helal Uddin’s paper, “Occupational safety and health (OSH) risks for the female workers engaged in the shrimp processing industry in Bangladesh,” is a welcome addition to this Special Issue as too few studies have been published on this topic. The authors contend that OSH risks are emergent issues for female workers in the Bangladesh shrimp processing industry. Following several serious accidents in the Bangladesh garment industry, the Bangladesh government, United Nations Industrial Development Organization (UNIDO), International Labour Organization (ILO) and the local shrimp factory owners have taken the issues seriously. The authors found that since shrimp were handled in

cold conditions on the ground floors of, usually, two-storied buildings, shrimp processing was less risky in terms of fire and building safety. But, in such cold, damp conditions without good clothing and protection equipment, workers risked health problems and diseases such as colds, coughs, asthma, backache and musculo-skeletal pains. Other OSH risks included faults in the electric lines to processing machines, high sound levels that can impair hearing, and vibrating machines. Risks of explosion and toxic gas leaks from compressors and ammonia gas cylinders were high and could cause breathing ailments or even kill. Female workers suffered more than their male counterparts from several illnesses and occupational diseases and also suffered lower wages and less leave and privileges. Since the majority of the shrimp processing workers were female, OSH risks need additional monitoring.

Raymundo Pavo and Larry Digal's ethnographic study, "Women's space in the fish Port Tumbler Complex and the value-chain nodes of the fishing industry in General Santos City, Philippines," investigated the points of convergence with and divergence from the value-chain nodes of the tuna fishing industry. The General Santos City tuna industry supports at least 42,000 jobs but women fill few of these whereas male workers dominate. Using the concept of social spaces, the study showed that women occupied spaces in the fish port complex, demonstrating their agency and capacities by earning income, as friends to fellow workers, and as allies in the fish marketing processes. Their spaces were marginal, however, compared to those of the men, and these spaces did not interface fully with the tuna value chain nodes. Nevertheless, the women did not consider themselves as marginalised. They expressed hope for better livelihood opportunities. With enhanced capacities, the women could see beyond their current spaces and situations in the fish port complex and more critically evaluate their opportunities.

Climate change and the forces of change in coastal communities

Marieta Banez Sumagaysay makes a plea for a full understanding of the Water-Energy-Food nexus in coping with the effects of climate change on women's fish drying activities. She studied the coastal village of

Duljuganin in an area of particularly high vulnerability in the Philippines, a country already high on the Climate Risk Index. Here, women's fish drying was vulnerable to variations in expected sunshine and the costs of non-solar energy, as well as increasing difficulties in accessing sufficient water for cleaning and preparing the fish. More erratic drought and flood both adversely affected supplies from local wells. Human factors were also involved. Locally there was also competing pressure on the wells for domestic use. Meanwhile, from beyond the local municipality, the demand for dried fish was increasing, due to a larger population with increased purchasing power. The demand was facilitated also by improvements in packaging. The women, therefore, had opportunities to increase their incomes by increasing production and engaging with this expanding market. The fish drying process is described in useful detail, emphasizing the women's vigilance and the commitment required to cope with increasingly variable day to day fluctuations in weather conditions. Climate change is thus actively affecting the process, although the women themselves seemed to have an inadequate understanding of the intricate interrelationships involved in the Water-Energy-Food nexus. The author recommends training both for the women fish driers themselves and for the other 'players', the professional and administrative bodies concerned.

Mary Barby P. Badayos-Jover, in her paper "Security in adversity: coastal women's agency in the aftermath of Haiyan" described a case of a coastal village in Bayas, Philippines, after the 2013 typhoon Haiyan. Women in villages were disappointed because post-disaster assistance tended to target men's needs, e.g., providing boats, and neglected women's needs. Women came together and formed groups for squid processing as well as for financial support through mobilizing external assistance. Such women's agency transformed gender norms and created a space where women articulated their needs.

B. Shanthi and colleagues used the socio-economic and gender analysis approach to look at the changes experienced by men and women after the 2004 tsunami in coastal villages in Tamil Nadu, South India. Fish marketing was important for women during the pre- and post- tsunami periods. Post-tsunami, many women engaged in aquaculture activities and

participated in the National Rural Employment Guarantee Act Programme, which is a 100 days rural employment scheme. Men fished regularly prior to the tsunami; however, after the tsunami they experienced poor catches and had to travel long distances to fish. The fishing villages also experienced seawater intrusion into freshwater ponds and drinking water. The study found that women's workloads increased because of their participation in the new livelihoods activities and men's migration to cities to look for work. There were also changes in decision-making within the households, in which women had to make decisions by themselves, whereas before most decisions were made jointly with their husbands. After the tsunami, participation in women's self-help groups increased because men encouraged women's membership due to the benefits that were available to members.

Sun-Ae Li studied the impacts on fishing livelihoods of men and women fishers in J Village, Simpo Harbour, Gimje City, South Korea. The fishers' livelihoods were removed by the Saemangeum Seawall Project, a major land reclamation scheme that began construction in 1991 and is ongoing. The highest project priority was economic development, but the environmental reconstruction removed the basic fishing and shellfish livelihood rights of women and men fishers. The fishers were compensated, but not sufficiently for their future needs. Assistance was not given to help them create new livelihoods, leaving many fishers with meagre incomes. The number of people living in J village declined and those who remained became more dependent on farm labouring. Strains developed within the community, damaging the cultural cohesion in J Village. The impacts of the reclamation differed between women and men, and on people of different ages. Although public conflict and controversy accompanied the Saemangeum Project from its conception, most were concerned with environmental issues. Within organisations representing the fishers, members' views were not united and the organisations lacked the capacity to represent the fishers' concerns.

Climate risk is pervasive. In the Extended Abstract reviewing several of their recent studies, "Gender and Emotions in the Appraisal and Management of Climate-Related Risks in Inland Aquaculture," Louis Lebel and Phimphakan Lebel reported that fish cage farmers growing tilapia in

rivers in northern Thailand faced climate-related risks such as droughts and floods. As women made significant farming contributions, how they perceived risk was important. Gender differences in risk perception and management were not explained by gender differences in attitudes to risk but the studies found gendered differences in feelings around risk-taking. The appraisal of risks involved both analysis and emotions. Modest gender differences and emotions both influenced risk-taking and decision-making and thus were significant factors in how climate-related risks are managed.

Conclusions

The 6th Global Symposium on Gender in Aquaculture and Fisheries (GAF6) on which this Special Issue is based was another milestone in the progress towards engendering security in aquaculture and fisheries. We are encouraged by the number and range of papers in this volume, complemented by other papers presented at GAF6 and published elsewhere. As befits an applied field of research, most of the work published represents on-the-ground efforts to empower women and men to improve their livelihoods. These applied studies are complemented by others of a deeper theoretical and more exploratory nature addressing women's and men's personal perceptions of themselves within the fish sectors.

In the present Guest Editorial, we have examined engendering security through looking at the adequacy (and inadequacy) of policies and practices, the importance of fair livelihoods and decent, safe work in fish value chains, and the impacts of change in coastal communities. We have also reviewed recent directions of work on gender in fisheries and aquaculture by FAO and noted the cautious self-assessments of progress on gender in the programs of the Asian Development Bank, Global Environment Facility and CGIAR. We conclude that realising security will require making better use of Sustainable Development Goal 5 (gender equality), and the transformation of the fish sectors and social norms. This is a prescription that presents enormous challenges and requires much more organisation by those who hold the vision. Small steps, such as the creation of the Gender in Aquaculture and Fisheries Section of the Asian Fisheries Society and other like-minded networks can help set us on the pathway.

Seven gender issues were identified as not receiving sufficient attention: violence against women, fish processing, impacts on women of changes in resources and climate, linkages between fisheries, aquaculture and agriculture, household impacts of women's success in technology adoption, how to transform gender relationships and norms, and the effect of global processes on gender relations in the fish sectors.

In closing, we celebrate what the present Special Issue contains, including many papers that address some of the above issues. We commend the papers examining women in aquaculture including the human nutrition side, reflections on climate change and disasters and explorations of women's and men's identities in the current realities of the sectors in major market complexes and under displacements from past fisheries.

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