ASIA PACIFIC ECONOMIC COOPERATION

PROJECT FWG 03/99

2001

Women in Aquaculture

Researchers

Cecile Brugere
Malene Felsing
Institute of Aquaculture
University of Stirling
Stirling
FK9 4LA, UK.
Tel. +44 (0) 1786 467878
Fax. +44 (0) 1786 472133
Email c.d.brugere@ncl.ac.uk
mfelsing@fish.wa.gov.au

Dr. Kyoko Kusakabe
Dr. Govind Kelkar
Gender and Development Programme
Asian Institute of Technology
PO Box 4, Klong Luang
Pathumthani 12120, Thailand.
Tel. +66 2 524 5668
Fax. +66 2 524 6166
Email kyokok@ait.ac.th
kelkargs@ait.ac.th

Project Overseers

Prof. James Muir
Dr. Harvey Demaine

ACKNOWLEDGEMENTS

Researchers on Women in Aquaculture project FWG 03/99 would like to express their gratitude to APEC Fisheries Working Group for supporting the study, to Prof. James Muir (Institute of Aquaculture) and Dr. Harvey Demaine (Aquaculture & Aquatic Resources Management Programme, AIT) for overseeing the project, and to all the people and organisations who provided information and support during the fieldwork and data collection. The women who spared time to share their experience of aquaculture with us are greatly acknowledged.

CHINA
Gun Ruyun, Deputy Director-General of Yunnan Agricultural Department, Kunming.
He Zhonghua, Yu Xiaogang, Xi Yuhua.

Xiao Yan, Chief, Fisheries Station of Lijiang County, Yunnan Province.
Zhu Songquan, Wang Qinghua.

Mr. Yuan Derun, Research Associate, AIT Aqua Outreach Program.

INDONESIA
Proyek Pesisir - Coastal Resources Management Project, Jakarka HQ, Bandar Lampung Sumatra.
Mr. Ian M. Dutton, project leader.
Mrs. Ethy S. Jonathan, Dr. Ir. Budy Wiryawan, Hermawati, P., Miss Emma Poespitasari, Mrs. Ari Darmastuti.

Center for Women's Study, Padjadjaran University, Bandung, Java.
Mrs. Komaria, Mrs. Andiana, Mrs. Tri Setiono, Ms. Ir. Ayi Yustiati.

Wetland International, Indonesia Programme, Bogor, Java.
Ms. Laksmi Adriani Savitri, Mr. Herry Noveriawan, Mr. Adri Amiruddin.

MALAYSIA
Institute for Development Studies, Kota Kinabalu, Sabah.
Dr. Mohd. Yaakub HJ.Johari., Ms. Shirley Fung.

Ministry of Agriculture and Fisheries, Kota Kinabalu, Sabah.
Mr. Sairin Samin, Mr. Ernest Jinuat (Inland Aquaculture Division).

Southeast Asian Fisheries Development Center (SEAFDEC), Kuala Terengganu.
Mr. Raja Bidin B. Raja Hassan.

PHILIPPINES
ICLARM (international Center for Living Aquatic Resources), Manila.
Dr. Mark Prein, Program Leader.
Dr. Mary Ann Bimbao, Brenda Katon, M.V.Gupta, Roberto Oficialis.

Project Seahorse, Cebu.
Amanda Vincent, Debbie Cowper.

Southeast Asian Fisheries Development Center (SEAFDEC), Iloilo.
Jurgenne Primavera.

Bureau of Fisheries and Aquatic Resources, Manilla.

Marine Biology Station, University of San Carlos, community-managed corral farming project in Cebu.
Dr. Thomas Heeger, Dr. Filippina B. Sotto, Red Tide, Coastal Resource management.

University Philippines Visayas, Iloilo.
Dr. Ma. Luisa (Meloy) Mabunay.

Marine Science Institute, U.P. Diliman, Quezon City.
Dr. Annette J. Menez, Dr. Suzanne Licuanan.

Asian Fisheries Society, Quezon City.
Ms. Elsie Tech, Executive Officer.

VIETNAM
Research Institute for Aquaculture No. 1, Dinh Bang-Tien, Son-Bac Ninh.
Dr. Le Thang Luu, Vice Director.
Ms. Tran Thi Anh Thu, Mr. Tran Van Nhuong.

Dr. Tran Thi Dzung, Senior Coordinator of National Network for Women in Fisheries, Ministry of Fisheries.

Vietnam Women's Union of Lai Chau Province, Hai Duong Province and Nghe An Province.

THAILAND
AIT Aquaculture Outreach, Udornthani.
Mr. Danai Turongruang, Country Program Manager.
Mr. Phairat Phromthong.

Network of Aquaculture Centers of Asia-Pacific (NACA), Bangkok
Mr. Pedro Bueno.

Asian Institute of Technology, Bangkok.
Dr Amararatne Yakupitiyage, Benoy Kumar Barman

Dr. Nandeesha.

CONTENTS

I INTRODUCTION

In parts of Asia, fish provides 50 to 75% of animal protein. Aquaculture is recognised as the way forward to address problems of protein supply to growing populations in countries that are not self-sufficient for fish production (Nandeesha 1996). By 1995, aquaculture production reached 27.8 million t, valued at US$ 42.3 billion, supplying over a quarter of total world supply of food fish (Muir and Young 1997). Fisheries policies in many countries in Asia are now emphasising aquaculture to meet goals of fish production and domestic food security.

Women play a crucial role in aquaculture production. Nandeesha (1994) found that in Cambodia, ponds in which women carried out 50% or more of the tasks associated with the culture of fish showed higher yields than other ponds. Because of male migration to cities, women often bear the sole responsibility of farm and aquaculture production (Chaisri 1997 with reference to Thailand, Suwanrangsi 1998, Song 1999 with reference to China).

In view of its potential in food supply and economic output, there have been studies on aquaculture as a strategy for livelihood diversification and poverty alleviation (Townsley 1998), in particular when considered an economic means for the rural poor to spread risk (Ruddle 1993). There has been also a recent interest on the role of women in aquaculture, and several studies looked into the ways in which women are involved in aquaculture (Bueno 1997; Locicero 1997; Hossain 1998). However, little has gone into the question of how aquaculture affects the status of women and gender relations in the household and community, and how in turn these relationships might influence the effectiveness of aquaculture in improving livelihoods and addressing poverty.

However, within the wider field of gender studies, the concept of participation of women in development has been examined over the past few decades (Young 1993). Asymmetrical participation and gain for women compared to men have been recurring issues. There has also been a growing recognition that providing services to women or even increasing their income does not necessarily improve their situation, as women's lives can still be under the control of male members of the family even when their income is increased. Consequently, the means and processes of empowerment of women are becoming increasingly central in strategies for overcoming their subordination. Many studies in the agriculture sector have pointed out the importance of gender issues, such as lack of women's access to, and control over, productive resources as well as personal resources such as individual income, skills and knowledge. In development processes, women's workload and time constraints have come under greater scrutiny because many projects have involuntarily increased women's workload without distributing benefits equally between men and women. The ways in which development projects are able to challenge existing gender relations are attracting the interest of researchers and concerned planners and implementers, but such concerns are still not fully included in gender mainstreaming discussions. Though lessons may be available from other sectors, such gender issues in the field of aquaculture have been much less studied.

The "Women in Aquaculture" project FWG 03/99 linked two important fields in rural development: small-scale or artisanal aquaculture, and gender studies. The project has focused on gender issues in aquaculture and has aimed to

develop strategies to improve the interrelated potentials of achieving gender and livelihood goals through aquaculture development. The aims and objectives of the study defined in the project proposal were:

(1) To identify key issues relating to the role of women in aquaculture in developing economies and identify methods to develop education, training and extension strategies.

(2) To propose a strategy that will allow the APEC Fisheries Working Group and economies to decide how best to promote and contribute to the involvement of women in aquaculture.

The study has concentrated on six APEC economies in Asia, namely, China, Indonesia, Malaysia, Philippines, Thailand and Vietnam.

Two main methods of integrating gender concerns in development projects have been developed over the past decade, these being the gender analysis framework and techniques (Moser 1989) and the gender-responsive planning framework (Rao *et al* 1991, Overholt *et al* 1995), both of which include checklists of gender concerns to be considered at each stage of project cycles. One of the application problems of these methods is that it takes much time to conduct this kind of analysis, and that the list that practitioners have to consider may be too long for them to remember. It requires considerable commitment from practitioners to conduct a thorough gender analysis and to implement their findings at the ground level. Although efforts to sensitise practitioners and increase their commitment for gender equality clearly need to be continued, a more systematic analysis of the gender context needs to be developed, in order to highlight the most important issues to be considered. . For this reason, increasing attempts have been made, especially in recent years, to develop a concise set of indicators to gauge the advancement and empowerment of women.

With this recognition, the project has aimed to highlight the major gender issues in aquaculture, to design a method to identify avenues for change, to put forward a concise package of strategies for women's empowerment through aquaculture, and to consider the related implications for development policy and its impacts

To take these issues further, the gender question within a sector such as aquaculture can be envisaged from an instrumental or an empowerment perspective. The instrumental perspective sees women as a vital force in aquaculture development, and focuses on the need to assist them to be more involved and more effective in aquaculture activities. From this viewpoint, women's consolidation of primary capabilities such as physical well-being, skills, mobility and access to credit, training and extension services is important, so that they are able to improve their skills and knowledge whilst increasing their yields.

The empowerment perspective focuses on gender relations. ESCAP report (2000:6) stated that:

> "In its most basic sense, empowerment is about changing the balance of power. Power can be defined as control over resources and control over ideology […]. The challenge of women's empowerment comes not so much from reversing existing power hierarchies, but rather from empowering women and/or women groups to make their

own choices, to increase their own sense of self-reliance and to identify with their own inner creativity and set of values."

It is increasingly recognised that improving the situation of women cannot be achieved without their empowerment, that is, with a change in gender power relations in the household and in the society. The goal of the empowerment perspective is therefore to challenge and change existing gender relations. This can be achieved through development projects, including activities such as aquaculture, which in many cases are not established within existing social structures and role definitions. It is clear that an instrumental content is relevant to the potential for empowerment, in that aquaculture could not be an effective mechanism for change unless women have the opportunity and capability for carrying it out, but it becomes a means rather than an end in itself. From this perspective, the focus of the present study is to examine whether, through aquaculture, more equal relationships between genders have been, or could be achieved, whether women's choices have, or could be increased, and whether women's self-esteem and confidence have, or could be improved to allow them to be in charge of their own lives. Women's access to knowledge and information, their opportunity to apply this in practice, their ability to make decisions on the household investment and expenditure, as well as their decision making power in the community are some indicators to judge advances in their empowerment.

The empowerment perspective and the instrumental perspective do not exclude each other. On the contrary, they may be complementary. Women enabled to participate in aquaculture activities will be in a better position to take part in the decision making process. Women who can make decisions can be in a better position to be *in charge of* aquaculture activities, and thus be more effective in managing aquaculture activities. However, if women are enabled to work more on aquaculture activities and consequently increase their income, but if no questioning, nor challenging of existing gender relations takes place, their empowerment process will be hampered. In this instance, aquaculture could present the risk of burdening women with additional cheap and unrecognised labour, without providing them with a fair distribution of benefits.

In the course of project FWG 03/99, it was found that women's participation in aquaculture was recognised by many researchers and practitioners, though largely from an instrumental perspective. The objective of the study was therefore to examine women's participation more closely from the empowerment perspective. Women are seen as important actors for the development of aquaculture. However, has/can aquaculture development played/play a role in women's empowerment and social advancement, and if so, how?

The report is structured as follows:

- Section II presents the methodology followed to complete the project and its required outputs.
- The situation of women and their contribution to aquaculture in the six target countries is synthesised in Section III, along with a summary of the constraints and opportunities for their participation in aquaculture identified during the literature review. Full details of each constraints are provided in Appendix A.
- Section IV presents findings from case study analyses carried out during project fieldwork.
- Development, aims and guidelines of use for the capability improvement framework for women in aquaculture, along with the framework itself, are presented in Section V.

- Finally, Section VI details the recommendations and strategies developed during the final phase of the project, to promote women's involvement in aquaculture and secure full benefits from it. .

All references used throughout the report are provided in Appendix B.

II METHODOLOGY

The main output of "Women in Aquaculture" FWG 03/99" has been the production of a capability improvement tree for women in aquaculture, to aid the formulation of strategies to enable better gender targeting in aquaculture at the policy and project planning levels.

It was decided from the outset that "aquaculture activities" would be understood and limited to:

- all aquatic production activities, whether marine, coastal or inland, encompassing all the tasks involved in the farming of aquatic organisms,
- pre-harvest activities such as hatchery production and fry collection,
- post-harvest activities such as marketing of products and home processing and other value-adding operations.

Activities falling beyond the moment the aquatic organism had left the producer's hands would not be covered by the project, though it is widely recognised that women have important roles in fishery sector post-harvest and market activities. In particular, given the current importance of fish processing in factories as an employment source for women in Southeast Asia, the subject was covered in the assessment of the situation of women in aquaculture in the target economies through the initial literature review.

The initial concept of the project was to structure its findings around a decision tree, which could be used by practitioners and policy makers. Decision trees have been developed as a guiding tool for business managers to make rational (profit maximising) decisions in complex business environments. In the study proposal, the decision tree was aimed at explain women's participation in aquaculture through the identification of their constraints and opportunities in doing so. However, to set out a decision tree in other situations, such as that of women in developing countries, whose everyday decisions are guided by a complex of factors in which the long-term wellbeing of their children, their family, and their long-term security in the family and the community may be more important than yield and financial output. It is difficult for decision trees to capture simultaneously these different contexts as their linear structure reduces their flexibility. The totality of women's decisions, which comprise conflicting needs and interests they are constantly facing, can therefore only be partially apprehended, and decision trees may have limited use in analysing such interconnected realities which involve not only material situations but also perceptions and emotions.

For these reasons, the name of "decision tree" was changed to "capability improvement framework" to satisfy both gender thought and practices and project requirements. Guidelines of use and objectives of the capability improvement framework for women in aquaculture are fully detailed in section V of this report

The methodology to reach the project's objectives was developed as a sequence of activities which included desk-based and fieldwork research.

Literature review

A desk-based literature review on the present state of knowledge and work carried out on the situation of women in aquaculture was undertaken at the outset of the project. Its main aim was to provide a preliminary insight into factors identified as preventing or restricting women's involvement in aquaculture activities. Secondary aims were to assist in listing constraints, that would be used at a later stage in the elaboration of the capability improvement tree as well as being a tool for reference and information cross-checking throughout the project life. Published materials as well as grey literature were collected on the six target economies. The contribution of women to, and involvement in small-scale fisheries has been quite well studied. However, this is in striking contrast with the paucity of accessible materials on women's participation in aquaculture activities. Likewise, he possible role of aquaculture in increasing women's status and capacity proved to be largely unexplored.

Fieldwork

Data collection was carried out in the six target economies through:

- Site visits and interviews with stakeholders (researchers, government officials, NGO/extension staff, women involved directly and indirectly in aquaculture activities) in the Philippines, Malaysia, Indonesia and Thailand. Interviews followed a checklist of themes indexed in the capability improvement tree.
- Workshops gathering participants involved in various levels of aquaculture (Thailand and Vietnam) as well as researchers and policy-makers in China. As with the interviews, groups of participants discussed themes addressed in the framework.

The first phase of fieldwork aimed at complementing and confirming information gathered through the literature review on women's constraints to aquaculture participation, to enable the conception of a first draft for the capability improvement tree. A second phase of fieldwork was aimed at testing the tree in the field, simultaneously with researchers, extension workers and women to develop it further through case study analyses.

A final workshop, co-funded by the UK Department of International Development and APEC, gathering policy-makers members from partner economy Departments of Fisheries, was held to discuss project findings and ways forward to promote women's involvement in, and benefits from, aquaculture, whilst ensuring the inclusion of gender-sensitive policies in future aquaculture development.

III WOMEN IN AQUACULTURE: CONSTRAINTS AND OPPORTUNITIES

The literature review carried out at the outset of the project enabled a number of constraints and opportunities in women's involvement in aquaculture activities to be identified in the target economies. This exercise showed the limited array of literature and studies available strictly on the subject of women in *aquaculture*. By extension, the literature on women in fisheries, more widely available, was reviewed to provide a broader understanding of the involvement of women in water-based activities throughout Asia.

Table 1 summarises the condition of women in the target economies whilst the status of aquaculture and women's participation in the activity are presented in Table 2.

Of all economies, China leads the world in aquaculture production; it and the other target economies have vast aquaculture resources, both marine and freshwater. Production systems are similar in many cases. Freshwater fish culture dominates aquaculture production in China, while in Indonesia, Philippines, Malaysia, Thailand and Vietnam, both freshwater and brackish water-based systems are important. These economies have been facing various negative impacts of over-exploitation of natural resources for intensive shrimp farming, but have diverse and developing production sectors. In China, the intensification of traditional freshwater aquaculture practices has increased output, but may become resource limited. However, development in coastal areas is also increasing. The conservation and improvement of inland and coastal ecosystems towards economical and environmental sustainability is a significant challenge for all the target economies, and the development of low-impact integrated small-scale aquaculture is becoming an increasing priority for rural and peri-urban development

Women's involvement in aquaculture activities, especially in rural households, is important in the six target economies for two reasons: to increase national production and to uplift their social and economic condition. Family nutrition is also a critical issue because of reduced capture fisheries supply and increased populations. As those primarily responsible for family nutrition, the increased involvement of women in aquaculture has the potential to improve family nutrition, provided they have sufficient scope to manage benefits from the activity. At present, in the six economies, apart from China and Thailand, the participation of women in aquaculture is low when compared with that of men'. In most cases, their low level of participation in different sectoral activities is not due to problems related to the immediate place of entry, but to age-old social, cultural and ideological barriers imposed on them.

A review of the literature review on socio-cultural and economic conditions of women in the target economies revealed a range of economy-specific situations. Within the same country, differences can be found with respect to location, ethnicity, culture and economic status. In addition, large numbers of women are involved in non-economic household-based activities. As such, their work is not accounted for in national statistics, nor duly recognised. Where women's involvement is observed, it is mostly found in low-skilled low-paid jobs. Social and cultural barriers prevent girls from reaching higher

education and developing required skills. Similarly, the burden of household chores restricts them from engaging in professional careers.

Women in China are presently recorded to face fewer problems in terms of social, cultural and economic barriers. They are involved in large numbers in productive activities in different economic sectors and most importantly in agriculture, because of the large volume of male migration to urban areas. In terms of land rights, Chinese women are in a better position compared to women from some other economies. However, in Thailand, except from problems related to polygamy and divorce, women were seen to play larger roles in managing agricultural resources and have greater decision-making powers. In Vietnam, women are largely involved in production activities, though market liberalisation has increased their workload and they now work longer hours than men. Problems confronting women in the Philippines are typically of an inter-linked social, cultural and religious nature, resulting in discrimination and violence against them. Added to these are problems of traditional male dominance and of alcoholism which increase their vulnerability. In Indonesia and Malaysia, rural women had been observed to be trapped in stereotyped roles and responsibilities related primarily to child rearing and household chores. Fewer women than men are employed and they receive lower wages. Social and religious norms also constrain women's participation in economic activities.

Whilst these constitute broad descriptions of the current status of women in the target economies at a specific point in time, the situation of women is constantly evolving and changes can be expected to occur with economic development and women's improved access to resources and control over aquaculture activities.

Table 1: Social, economic and cultural aspects of women in the target economies: China, Indonesia, Malaysia, Thailand, Philippines and Vietnam

CHINA	INDONESIA	MALAYSIA	PHILIPPINES	THAILAND	VIETNAM
Chinese women have equal land rights. Women do not exclusively perform roles of mothers and wives but are also involved in all kinds of economically productive work. Large number of women now work in various professions such as teaching, medicine, department stores and light industries. Because of the migration of men for work, agricultural labour now falls in the domain of women. Women in many areas (case studies showed) have less access to aquaculture technology and marketing control. Women are mainly responsible for domestic household labour.	Women manage the family finances in most households. The economic crisis of 1997 has increased women's problems. Women's wellbeing and socio-economic condition suffers from gender stereotypes. Higher female adult illiteracy rate – 22 percent (1995). Women also form 40 percent of the total workforce, 49 percent in agriculture, 36 percent in service sector and 14 percent in industry (1990). Women work longer hours than men (11.1 hours compared to 8.7 hours). Women are mainly involved in traditional technology based work.	Women face religious, social and cultural barriers. Higher female adult illiteracy rate – 20 percent – while 11 percent of the men are illiterate. More women are in the fields of medicine and education. Women are however more dominant in the field of arts than science. In the private sector, on average women are paid 50% of men's pay. Women's participation in the paid labour force is nearly half that of men (1994). Women's employment varies with ethnicity – more Malay women involved in agricultural sector. Most women are involved in household-based unpaid work.	Cultural stereotypes of gender roles remain strong in society and women are still at a disadvantage compared to men. Gender gap and gender discrimination are high in rural areas and women-headed households face more problems. Rural female earnings are only 47 percent of the male earnings (1996). Emphasis on women's reproductive roles. They need to find supplementary income sources, in addition to their household labour. Girls work with their mothers even when they are young. Male alcohol abuse and domestic violence common in rural areas. The Catholic church does not allow divorce and the use of birth control measures. Women participate in agricultural activities especially planting, weeding, harvest. Women have the same property inheritance rights as men.	Women are less educated than men (the number of illiterate women is twice as many as men). Due to the migration of men to cities, either seasonally or permanently, women manage complete farm operations. Polygamy remains a social value among men affecting women. They need to earn for themselves. In the Northeast Thailand, land is distributed equally to all siblings. Generally, the youngest daughter inherits more land. In the Southern part of Thailand, four provinces are predominantly Muslims. Sons have a greater share of their fathers' inheritance.	Women work twice as many hours as men. Market liberalisation has resulted in increased labour for both women and men, but it is higher for women. Women have relatively high decision-making power in the households. Decision-making power varies with ethnicity. Large number of women-headed households, 40 percent of them are related to divorce, poverty and male migration. No clear land rights for women and land is usually in men's name. Women have problems getting financial supports from banks. Land allocation is made by family unit. Young couples receive a plot of land when they separate from their parents. Discrimination against unmarried women in access to land.

Table 2: History, resource base, production, future plan for development and women's involvement in aquaculture in the target economies: China, Indonesia, Malaysia, Thailand, Philippines and Vietnam.

	HISTORY	RESOURCES	PRODUCTION	FUTURE PLANS	WOMEN'S INVOLVEMENT
CHINA	Fish culture has a long history in China. Fresh water aquaculture started in 1142 BC, rice-fish culture started about 2,000 years back.	Inland water – 17.5 million ha, mainly in the Yangtze river and Pearl river delta region, 32,000km long coastal line. Marine aquaculture mainly in the provinces of Mainland (Guagdong, Fujian, Liaoning).	Leading aquaculture producer in the world, >12.5 million metric tons produced in 1995. Pond-based culture contributed the most at 74 percent. Cage culture in reservoir, lakes and rice fish production was second. Chinese carps, common carp, bream and tilapia are cultured in fresh water. Finfish, shrimp, seaweed, molluscs are cultured in marine and brackish water.	Plan to develop integrated coastal zone, improve shrimp production and integrated fish culture.	Women's role in aquaculture production is relatively high. More than one third of total workforce in rural aquaculture are women. In fisheries extension, scientific research and education units 21 percent, 27.4 percent and 37.9 percent were women, respectively.
INDONESIA	Both freshwater and brackish water aquaculture are ancient practices. Mariculture started in 1980s, and rice fish culture is almost a century old. Brackish water pond (*tambak*) fish culture started in the late 14th century.	Rice fish culture is practiced in 17 of the 27 provinces. Cage culture is commonly practiced in rivers, irrigation canals and open waters (most advances in West Java, Sumatra and Kalimantan).	Total aquaculture production was 0.761 million tons in 1997, the annual increase rate was 7.4 percent. Brackish water is the major production resource in which milk fish and tiger shrimp are cultured. Freshwater covered 39 percent of the production. Common carp, Java carp, tilapia, gourami and prawn are the important species. Small-scale production from homestead pond (0.05 ha). Pearl oysters are cultured in marine areas.	Small-scale aquaculture is at present low-input based. Plan to increase export commodities and aquaculture production of high value products.	In freshwater and brackish water pond culture, women are involved in less than 10 percent of the households. In mariculture, it is 16 percent. In seaweed culture and processing, both women and men are equally involved.
MALAYSIA	Aquaculture started almost 100 years back, expanded in 1950s with the development of cockle and Chinese major carps culture. Rice- fish culture is the oldest practised in the country.	Vast resources, both fresh water and marine. Inland fresh water ponds cover almost 80 percent of the total pond area of the country.	Aquaculture production in 1997 was 107984 tons, 8.4 percent of the total fish production. Inland freshwater ponds, mainly for prawn production, contributed to 47 percent of the value. Freshwater sector covered more than 25 percent of total aquaculture production in 1997. Species cultured were Chinese carps, Indian carps, ornamental fish and prawn. Cage culture, which covered 18 percent of the overall freshwater production, included red tilapia, Java carp, grass carp and riverine catfish. Cockle culture covered 70 percent of the production by weight, 7 percent by value. Marine cage culture is growing rapidly.	Plan to develop freshwater and brackish water fish farming for small-scale farmers, especially women, to improve their livelihoods.	Rural women participate in integrated aquaculture activities. But women's involvement is reduced because of constraints related to gender stereotyping: less capability in decision-making and overburdening as women still shoulder the full responsibility for household chores.

	HISTORY	NATURAL RESOURCES	PRODUCTION	FUTURE PLANS	WOMEN'S INVOLVEMENT
PHILIPPINES	Aquaculture development is quite recent. Aquaculture the most important source of fish production since 1996.	Total of 225,000 ha of freshwater, brackish water and marine resources to support aquaculture.	In 1998-99, aquaculture contributed more than 34 percent of total fish production and 41 percent in value. Freshwater pond culture, cage culture, pen culture (in Laguna de Bay) of carps, tilapia, mudfish, gourami, catfish covered 12 percent, brackish water production of milkfish and shrimp 20 percent and seaweed (mainly *Euchema*) 66 percent of total production (by weight).	Plan to develop fry fingerling production and distribution to increase production of milkfish, tilapia, and prawn; develop sea cage culture and increase seaweed production.	Women less involved compared to men. Effective involvement observed in tilapia cage culture.
THAILAND	Inland pond fish culture has a long history in Thailand. Catfish culture using integrated poultry, ducks and the use of by-products has rapidly grown. Intensive farming of shrimp is a recent development.	Large resources available for aquaculture development. Large number of ponds, reservoirs, coastal areas as well as rice-fields. Aquaculture less developed in the Northeast compared to the South because of the topography, environment.	Aquaculture production increased from total 128,400 tons in 1986 to 554,770 tons in 1996, with an annual growth rate of 15.8 percent. Coastal aquaculture covered 59 percent total production and 86.1 percent of total value. Freshwater aquaculture dominates in the Northeast (carps, sex-reversed tilapia, hybrid catfish) in ponds, paddy fields and reservoirs. Coastal aquaculture includes cage farming of shrimp, sea bass, grouper, grey mullet and red snapper, mollusc culture and crab fattening.	Intensive shrimp farming caused environmental pollution, destruction of mangrove areas (55 percent of original mangrove area has been destroyed). Plans to improve the situation.	Women involved in fish hatchery, nursery, grow out, harvesting (occasionally) and marketing of fry/fingerlings. Marketing of food fish in market is the domain of women. Amongst professionals, women are more employed in post-harvest (85.7 percent) activities than in aquaculture production.
VIETNAM	Aquaculture production does not have a long history though is developing fast (annual 4-5 percent increase between 1995 and 1998). Fish and shrimp culture in rice fields promoted in the last decade in Northern Vietnam.	Vietnam has a 3260km coastline, 112 estuaries, 12 large lagoons, bays, lagoon pools, river systems, ponds, reservoirs, inland hydroelectric reservoirs. Mekong river delta region is the main area of aquaculture production, followed by Red River delta region.	Thirty percent of the total fish production and 50 percent of the total export from fisheries came from aquaculture (1999). In 1998, 537.870 tons produced with aquaculture, amongst which freshwater production covered 359,000 tons. Major species: grass carp, common carp and *Rohu* (Indian major carp). Integrated aquaculture and animal husbandry traditionally found on small-scale farms, with two thirds of production used for household consumption. Coastal aquaculture production includes farming of shrimp farming, crabs, seaweed culture, molluscs (including oyster) and marine cage culture.	Plan to improve aquaculture production with improved management of integrated aquaculture/animal husbandry systems. Improvement of coastal environment now subjected to severe pollution problems.	Mostly women manage ponds. Clear sexual division of labour is however observed. Women are involved in nursing fish. They are in charge of daily decisions regarding pond management whilst men make important decisions. Women have less access to training and credit facilities.

Full details of constraints and opportunities faced by women in the six target economies are provided in Appendix A, with corresponding references in Appendix B. Generic issues are summarised below (Box 1), grouped according to the extent to which gender relations are critical in their resolution.

Table 3: Identified constraints and opportunties for women's participation in aquaculture in the six target economies

Issues which may be addressed with little or no challenge of gender relations	*Issues requiring gender relations to be challenged*
- Technology	- Female-headed households and household income
- Production intensity	- Ethnicity and religion
- Type of aquaculture system	- Mobility
- Training and education	- Decision making powers
- Marketing	- Access to credit
- Time	- Ownership of, and access to resources
- Organisations and informal support networks	- Culture
- Environmental degradation	- Institutions
	- Gender sensitive policies and discrimination

Considerable e variations exist amongst the target economies with respect to the situation of women, in terms of their current participation in the economy and in aquaculture activities, and in the socio-cultural constraints they face. It would therefore be a challenging task to produce an effective generalised strategy to improve women's role in aquaculture and in turn to build on this to achieve gender-balanced objectives. Specific national level policy formulation, based on specific needs and constraints within the political, cultural and religious context of the country concerned may be more useful and prove more effective. The following factors or objectives may be useful in doing so:

- Recognising that greater participation and empowerment of women in the rural and peri-urban aquaculture context has the potential to deliver important gains in economic output, livelihood potential and social welfare.
- Women should be involved in all spheres of aquaculture production, including the development and use of technology, and involvement in research, extension, with equality in terms of wages, benefits and other facilities.
- To ensure women's access and increase employment potential as skilled workers, they should have facilities for training, education and financial support in all of the key areas relevant to the country's aquaculture sector
- Gender-sensitive strategies in national planning are important to develop equity-based approaches to extension and development in aquaculture
- To the same extent as in large-scale commercial and export-oriented aquaculture, importance should be given to small-scale household-based aquaculture with a strategy of securing and promoting the participation of women already involved in aquaculture, whilst effectively targeting and increasing the participation of women not yet involved in aquaculture.

IV FIELD SURVEYS

China

China has vast inland water resources, which have been estimated at 17.5 million ha, mainly in the Yangtze River and Pearl River delta region. This is in addition to a 32,000-km long coastline. Women's involvement in aquaculture and related activities is high in comparison to other target economies. More than one third of total workforce in rural aquaculture are women. In fisheries extension, scientific research and education units 21 percent, 27.4 percent and 37.9 percent were women, respectively.

Yunnan Province, where the project was based and the studies carried out, has a water surface area of 285,000 hectares of which 178,000 hectares are suitable for fish culture. In addition, 319,000 hectares of paddy fields can be used for rice-fish culture. Aquaculture products formed 86.5 percent of the total aquatic production in 1999.

In Yunnan, 1.2 million women are involved in aquaculture and they have benefited from the activity in many ways. For example, Ms Su Meishun, of Simao Prefecture of Yunnan, contracted a one-hectare pond in 1990 to raise fish. With a combination of various fish species, good fertilisation, good feeding practice and overall management, she now produces more than 10 tons of fish every year. This brings approximately US$ 11,000 gross income to her household, of which over US$ 2,000 profit. She has used this money to build a house and provide her family with better nutrition.

Aquaculture has especially benefited women from indigenous groups such as the Hani and the Naxi. It has also helped to improve the status of indigenous groups who were traditionally marginalised. For the past six years, rice-fish culture has spread all over the Yunnan Province through its promotion by the provincial government. About 400,000 women are now involved in this activity as they were encouraged to take up aquaculture through equal opportunities for education, training and low interest loans.

As male migration to urban areas increases, women’s role in providing for the family is more crucial for survival. This forces women to look for alternative sources of income which is then controlled by them. In addition, men's absence elevates women to decision-making positions, from earlier positions as participants and unpaid family labour. This independence and decision-making power have in turn increased women’s self-esteem and self-confidence. It has also raised their status in their family and in society, changing traditional concepts of gender roles, gender relations and gender division of labour. Thus this form of aquaculture has improved both the economic and social status of women.

However, much remains to be done, in particular more in-depth research into women's involvement in aquaculture, relationships between women's involvement in aquaculture and their socio-economic status, and change in gender relations following women's involvement in aquaculture. There is also a lack of detailed gender-disaggregated data in the field of aquaculture.

In order to have a better understanding of women's role in aquaculture in Yunnan province, six case studies were conducted in Lijiang county. Listed below are the researchers and their research topics:

- He Zhonghua – Women and Pond-fish farming: An investigation on the fish farming in Zhaihouxia Village.
- Xi Yuhua – Fostering fish in Paddy Fields of the Qihe Township, Lijiang, Yunnan.
- Yu Xiaogang – Indigenous women and fishery resources management: A case study in Lashi Watershed, Lijiang County.
- Xiao Yan – A Research on the Exploitation and Development of the Aquatic Resources of Lijiang County.
- Zhu Songquan – The Status of National Aquaculture and Existing Problems.
- Wang Qinghua – Fishing in the Terraced Fields of the Hani Women in the Ailao Mountain Area.

After case studies were conducted, researchers discussed recommendations for women's improved participation in aquaculture. The importance of training and extension was highlighted, especially through informal information exchange. Such information exchange can occur during labour exchange in paddy-fish culture, in individual houses, or when people gather for informal credit system, and while selling fish in the market. Appropriate technology for paddy-fish culture was considered important to improve women's income through aquaculture.

Indonesia

Semi-intensive coastal shrimp farming, intensive freshwater cage culture and backyard fish processing and shrimp hatchery production were covered during the fieldwork carried out in Indonesia. Interviews with key stakeholders showed a clear divide between women's participation in, and benefits from (including capability improvement) extensive to semi-intensive activities (see Box 2.1 for case study of backyard shrimp farming), and intensive commercial aquaculture operations, from which women were totally excluded.

Women's contribution to aquaculture is important throughout the country but lacks acknowledgement due to the weight of traditions and the Indonesian patriarchal society. Financial matters, in particular business related, are under the control of the male head of the household, while women are in charge of running family matters. If some women successful develop small aquaculture enterprises, problems and constraints to their involvement in the activity remain difficult to overcome. As shown in the following case studies, institutional and familial support, in particular from husbands, along with charisma and personal determination and, to some extent, initial wealth (e.g. personal savings) were found to be key factors in women's capability improvement through aquaculture.

Backyard fish processing: Ciganitri, Cipagalo, Bojonsoang, Bandung province, West Java.

A larger number of women are involved in this activity. Women met had started this activity on their own initiative some years ago to help their family as their husband's income had become insufficient to

Figure 1: Backyard processing of locally purchased farmed freshwater or marine fish species, Bandung province, West Java,

support the family. They learnt simple processing techniques through their own observations and discussions with neighbours and relatives already engaged in the activity. This highlights the importance of women's informal networks in generating ideas and basic knowledge for new livelihood

strategies. It also indicates that, in the case of Indonesia, as a result of the current economic crisis, women have no other choice than to be active, while remaining within the constraints imposed upon them by the socio-cultural and traditional values of their society (e.g. restricted mobility).

As this progressively results in a growing number of women becoming the managers of the income they have generated themselves, this underlying trend could lead, in the long run, to deeper transformations in the perception and role of women in their own household and in the Indonesian society, in spite of the initial sacrifice of their time and energy for their family.

Extensive to semi-intensive coastal shrimp culture: Pamajang Pazir, Lampung province, South Sumatra.

Although women were found to contribute to a large extent to the shrimp production, they are acting as unpaid helping hand for their husband's enterprise. Consequently, decisions over the use of the family income are not directly under women's control though their husbands consulted them prior family decisions. As encountered in other economies, benefits are thought of as common assets shared equally between all family members and are not disaggregated amongst household individuals. Women rarely attend training as they tend to leave their husband to do so and relate the information they need back to them. They are nevertheless allowed to travel some distance on their own, to go to the local market for example, whereas longer trips to larger cities are the husband's responsibility. This turns to be an advantage for women as, in spite of the commercial nature of shrimp farming, they will catch and sell at the local market shrimps left over from the main harvest. Distance of ponds from the house was also an important constraint and women interviewed thought that activities based around their homestead would increase their participation. Some families mitigated this constraint by establishing simple houses near their shrimp ponds. This practice however, was limited by lack of freshwater supplies and access to village facilities.

Intensive cage aquaculture: Saguling Lake, Bongas, bandung province, West Java.

Women were not involved in this activity, nor any related aquaculture activity. Men questioned the appropriateness of cage aquaculture to women given problems related to distant siting of the cages from the house and the shore and the safety of guarding shifts at night.

Figure 1: Dangers of loneliness of guarding shifts as night falls... an activity for men. Freshwater cage aquaculture on Saguling Laka, bandung province, West Java.

The absence of a local market in the proximity of the site, combined with the commercial scale of the operation, meant that the production was directly sold to wholesalers, restricting women's potential intervention in post-harvest activities, including marketing of fish, as it is commonly found around the country. Credit availability was limited because of the risky nature of the activity. Household budgets were controlled by the male head of the household, also main breadwinner. These combined factors restricted women's exposure not only to the activity, but also to the outside 'world' and gave men in these communities the alibis for remaining in control of all household domains, including their wife's movements and activities. There were nevertheless instances when women find themselves temporary managers of cages, when their husband had to leave the village to go and sell the fish production. Although women found that they could cope easily with the responsibility, they underlined their lack of knowledge and the necessity for them to be given more training to be able to run this kind of aquaculture operation more often and gain recognition for their capability to do so by their husband.

The Indonesian government has attempted to provide women with alternative livelihood activities such as fish pesto making. These have failed because of the lack of niche markets for this product. Development programmes were considered inefficient at the ground level to target women's needs. Whilst the lady minister of Ministry of Women's Affairs is still lobbying to have her own budget, little action is taken in communities. Challenging the traditional perception that men are stronger than women, both physically and psychologically, emerged from some women themselves who, now in managerial positions, have had to fight their way to get their activity and results acknowledged by the male members of the community: "women have no fear about physical work" (with particular reference to digging shrimp ponds).

Box 1 Backyard shrimp hatchery: Ketang, Kalianda, Lampung Selatan, South Sumatra.

The hatchery visited had been set up and was run entirely by a woman, Mrs. Sri, since 1992. Mrs. Sri used to be a low-paid civil servant. Her success story began the day she read an article in a newspaper about backyard shrimp hatcheries. She was already familiar with shrimp farming through her ownership of a small shrimp pond ('*tambak*') on the East coast of the province, from which she drew no benefits. The capital required to start a backyard hatchery was not too important and she could afford to invest.

Figure 2: Displaying her shrimp larvae production. Backyard shrimp hatchery, Lampung province, South Sumatra, Indonesia

Training was crucial as she had no background in fisheries. She paid herself for a training course provided by the Research Centre for Aquaculture in Japara and left her family behind to attend it. Although the course was planned for three months, she managed to reduce it to one month because of her family commitments. No other women were attending the course, other trainees being younger men who eventually chose her as group leader because of her maturity.

Back home from her course, the second difficulty lied in the construction of shrimp tanks, as no expertise was available locally. She regularly kept in touch with the Department of Fisheries for advice, invested 60 millions Rupiah gathered from her own family and personal savings and started the construction of 6 tanks. Because of the lack of trust for native entrepreneurs on the behalf of banks, the requirement of a 'land certificate' and the risky nature of the activity, no loan was obtained to assist Mrs. Sri in gathering the necessary capital.

When she faced technical problems, she overcame them on her own, finding information through the literature, reliable information was not always available. Now that she has the technical expertise, new difficulties have appeared with the marketing of her production since the dramatic increase in the number of shrimp hatcheries over the last 5 years. Competition between large companies and small hatcheries has also become tougher. Getting involved in hatcheries associations has been a way for her to maintain her business. Though she started her activity with only 3 employees, she now employs 11 technicians who she progressively trained to supervise operations and manage disease outbreaks.

The benefits she's gained from her backyard hatchery? First, she's been able to create jobs. She has also increased her household's income, and was able to afford a pilgrimage to Mecca. Second, she feels free and has no boss to deal with. She has increased her number of friends, her knowledge, her experience, all by herself. She has gained respect within the community and has acquired an important role in mediating conflicts when they occur in the village.

So why are so few women following her example? For a number of reasons, according to Mrs. Sri: the complexity of the business and its requirements, for example harvesting at night and close monitoring of tanks. Also because men are typically the breadwinners. They need to support their wives throughout the whole process, from capital investment to marketing of production. She employed some women as bookkeepers, but they had to leave to get married and their husbands would not allow them to go back to work… There tends to be more examples nowadays of women setting up backyard shrimp hatcheries. They need capital and a strong willingness to overcome financial and cultural constraints. Accessing general information on shrimp farming is still difficult due to the lack of farmers' information centres. Her advantages to succeed? She had the initial capital required. But more importantly, her husband provided her with the moral support she needed to follow her own choices and decisions. She also had time: her children were grown up when she started her business. It would have been more difficult if they had been younger.

Malaysia

Interviews with key stakeholders, including women at the grass-root level, government advisers and researchers, pointed out a number of recurrent constraints to women's involvement in and benefit from aquaculture. Officials interviewed were mostly males and revealed underlying pre-conceptions on gender roles and stereotypes in the Malay society.

Malaysia's aquaculture development policies are geared towards increasing commercial production and exports of aquatic products. Large-scale intensive aquaculture operations such as shrimp farming and open sea cage culture are being promoted. Women's involvement in aquaculture activities, whether small or large scale, is limited. If women are involved in land-based related aquaculture activities such as processing, it is only as labourers and their capacity as decision-makers and managers in these operations is very restricted.

Cultural stereotypes on the role of women are dominant in this patriarchal society. According to male officials or practitioners, aquaculture is a difficult and strenuous activity, and as such, not considered as appropriate to women's needs. Assumption is made that there are easier jobs available for women, in particular in the service sector, and because women are thought to have the choice of their activity, they prefer to tend themselves towards less physically strenuous income generating activities. Reality at the grass-root level however, shows that most household wives help their husbands to provide feed to the fish, land the production when it is farmed off-shore, sell the fish when there is a local market or engage in basic on-site processing. These activities and the income generated by the sale of fish remain out of the control of women. Financial benefits are invariably for the whole family and never disaggregated between household members, resulting in women only acting as unpaid labourers within their own household. Distance of the water body from the house, along with safety concerns, were often mentioned as restricting women's access to aquaculture sites and activities.

In addition to socio-cultural constraints, women's restricted participation in aquaculture activities is due to factors inherent to the nature of the activity. The type of operation, e.g. oyster farming, which requires diving and some 'expertise'; the degree of intensity of production, e.g. intensive shrimp or finfish farming on the east coast of Malaysia; and the increasing body of knowledge and training required to successfully run these operations, were found to be the most common reasons for women's marginal involvement in aquaculture. Widows are however more commonly seen as having less constraints to engage in aquaculture than younger women (see Box 3.1).

Although women's lack of awareness about aquaculture techniques and expertise was often cited as an impeding factor, training remains inadequate for women, usually taking place over a large number of days and far from their community, without provision of compensatory services such as childminders, and is overwhelmingly attended by men. The government's top-down approach and short-term assistance have proved inefficient to provide durable

benefits to the communities involved in aquaculture. In particular, little effort has been made to integrate gender issues in aquaculture development policies. Emphasis remains on the provision of health and primary facilities for women, the "reproductive" role of women.

The need to place emphasis on self-help community groups and target women themselves instead of the household, or worse, the community as a whole as is currently practised, was suggested. A gap was evident between government officials' view over the easiness of access to a subsidy available for pond construction and the difficulties faced by women to actually obtain it. Co-operative networks are weak and dominated by men. However, the reinforcement of women's attendance to informal groups could be a way to strengthen their participation in community matters, including aquaculture, while simultaneously assisting them in gaining control over these and their household's.

Box 2: Semi-intensive farming of groupers and snappers: Setiu, Kuala Terengganu region, Peninsular Malaysia.

Mrs. Maksu, who was widowed some years ago, owns brackish fish ponds and runs four growth cycles of groupers and snappers per year. In 1999, she made RM30,000 profit. Before she started aquaculture, she used to be involved in fish processing. After she visited aquaculture areas, she decided to start her own enterprise and requested permission from the government to use public land as she did not own any. The application process was relatively easy though many government bodies had to be visited for assistance (Dept. of Fisheries, Integrated Agriculture Development Programme, Drainage and Irrigation Dept.) and a small fee had to be paid at each stage of the process. Borrowing money from the bank was a comparatively easier procedure because she was willing to start on a small scale first and it was easy to convince the bank for a loan. The Drainage and Irrigation Dept. dug ponds whilst the Dept. of Fisheries provided fingerlings to be stocked. She drew plans and the contractor built ponds accordingly. She had the idea of making floating hapas and her sons assisted her in building them.

Figure 3: Mrs. Maksu at ther aquaculture site. Grouper and snapper farming, Kuala Terrenganu region, NE Peninsular Malaysia.

All the way through, she invested a lot of her time and energy to ensure the success of her enterprise. Obtaining training on fish farming was not a problem as she was involved in fisheries and the sale of fish before.

Tasks she performs include selecting fingerlings, monitoring fish growth, purchasing and preparing feed, managing workers at feeding times. All tasks have become part of her daily routine. She employs an assistant and four family members are involved full-time on the activity.

She is still facing occasionally facing problems, such as the loss of her fish following high tides, but the most difficult and disheartening in the overall process was the government's disapproval and her struggle to obtain land, as well as lack of faith and support the wider community showed in her venture.

Why did she persevere and what did she gained? She perseveredbecause, above all, she was interesting in the activity. She felt confident about its economic potential given that the local demand for fish was high and supply low. Her assertiveness had been enhanced by some previous experience of village politics and involvement in local women's groups. So she decided to go ahead, regardless of people's disapproval. In addition, her children were already grown ups, she was a widow and could locate ponds close to her house. Now, following good yields, her influence is stronger and she has gained more recognition in the village. She feels that she has full control over the benefits brought by aquaculture and the activity has become a priority for her. Her next plan is to start prawn farming.

Why do not more women follow her example? According to her, interest is the main problem. One needs to be concerned for, and care about the activity. Cost and land come only second. People are aware of the potential benefits of aquaculture but perseverance is required to obtain land and capital. Lack of experience can also be a deterrent.

Philippines

In the Philippines, large landlords own most land and most aquaculture operations are resource and labour intensive. A large proportion of the Philippine population is landless as a result of inefficient land reforms. Among landowners, men commonly inherit land from their fathers, and even if women inherit land, ownership is transferred to their husbands when they marry. Men control most business activities.

Women have little involvement in aquaculture production, but dominate post-harvest activities such as fish processing and often sales. Because women have limited decision-making powers with regards to finances in most households, they often do not control the money brought in by their activities. As men are major resource-owners, fish are considered to belong to the male head of the household. Because women generally do not own collateral, it is very difficult for them to obtain loans.

The major constraints for women to become involved in aquaculture were identified to be a consequence of the dominating male role, which dictate that women should stay in the home and not be involved in 'masculine' activities such as agriculture and aquaculture. In most Philippine families, it is considered degrading for a man if his wife works outside the home, and women's contribution to the household income is therefore often limited to home-based production activities. Women have the sole responsibility for raising the children, which severely restricts their mobility, limiting activities to those that can be performed in and around the house. Furthermore, it is considered socially unacceptable for rural women to move around outside the village boundaries, and most women cannot drive cars or mopeds.

Women are generally brought up to be unassertive and few organisations actively train women in capacity building such as organising themselves, accessing and managing credit and other resources. Female practical literacy is lower than male, making it harder for women to fill out application forms for loans and assert themselves in formal situations.

Because of the intensive nature of most Philippine aquaculture production (e.g. shrimp and milkfish ponds), most farms are large, situated in remote areas, and most farm workers would live on-site. Women's limited mobility prevent them from getting involved. Their contribution to marine aquaculture is also limited by the prevailing superstition that women bring bad luck to boats.

Aquaculture extension in the Philippines is relatively rudimentary, under-developed, and because of funding restraints, extension staff and efforts are thinly spread. The main aquaculture extension agency, the Bureau for Aquatic Resources (BFAR), although required to, has yet to incorporate gender considerations into its framework. Gender analysis is never carried out as part of government projects, and no gender-disaggregated data on the

impacts of aquaculture is collected at the start or end of any projects. At present, only men are trained in aquaculture techniques, whilst women are limited to training on fish processing, preservation or cooking.

Governmental funding for aquaculture is very limited and BFAR's support to small-scale aquaculture through training or incentives is virtually non-existent. Very little research on, or documentation of, the role of women in Philippine aquaculture has been carried out, and what does exist is published only as project reports, unavailable to the general public or the scientific community.

Thailand

Fieldwork in Northeast Thailand focussed on inland freshwater small-scale pond and cage culture. Women play a major role in raising fish in ponds and cages near their houses.

Figure 5: Woman feeding fish. Pond aquaculture, Udon Thani region, Thailand.

Especially in Northeast Thailand, where many men migrate to cities to work, women are the ones left in the house and take the sole responsibility of looking after the farm and ponds.

In many cases in this area of Thailand, women own the land. In instances when men are landowners, they will be the ones to access bank credit. In spite of this, women still have a strong influence on decision making regarding household expenditure. Women usually manage household finances, and both husband and wife discuss new investments with each other.

Small-scale backyard pond aquaculture is considered by women to be suitable for them. Women stay at home more than men, and therefore, are in a better position to look after the fish regularly. At the same time, since the pond is in the backyard, they do not have to spend a lot of time looking after the fish and can easily combine this activity with other duties. This, however, does not apply to more commercialised and intensive aquaculture operations, which women as well as men have to be devoted to on a full-time basis. In these cases, women stay at home more than men and therefore are more responsible to take the duty of activities that need regular attendance, such as feeding.

There are several activities which women are not able to perform on their own. These include guarding of fish and harvesting (except for small amount of harvesting by lift net). Guarding fish, especially for cage culture in reservoirs, is difficult for women. This is because cages are situated far away from the shore, and the isolation of the place and the work make it difficult for women to guard on her own. For harvesting, even when there is no male hand in the family to help, women can always ask their customers to catch fish, or make it into a community event to drain the pond and catch all the fish.

Women easily manage pond aquaculture for their home consumption. Gender differentiation becomes evident when they gradually move into more commercial and intensive aquaculture. In order to increase yields, they need to improve their technology. However, women are disadvantaged in accessing information and knowledge compared to men. Even though they would have decision making power in the household, the perceived lower knowledge of women by their husbands as well as by themselves makes it difficult for them to have real decision making powers.

Figure 6: Preparing fish feed. Pond aquaculture, Udon Thani region, Northeast Thailand.

Usually, men are the ones who attend training sessions. Female participation can be expected in training sessions only when gender is specified or when the topic of training is on fish processing. Women are responsible for regular activities both in the house and in the farm, such as household work and feeding fishes and animals. Such duties which require constant attendance make it difficult for women to participate in occasional off-farm activities.

Men have more access to extension workers.

Women do contact fishery stations, but mainly to ask for fingerlings. When extension workers visit their houses, women can easily be distracted by other household duties, and thus men get more focussed interactions with extension workers.

Exposure to training sessions and to extension services is limited to a small amount of people who are interested in aquaculture. Women and men farmers get more information from mass media, from neighbours and other people that they meet. Women mentioned that they have less time reading newspapers and watching TV than men. Women's access these sources of information is limited by their lower literacy and education compared to men's.

Men are able to travel around more freely than women as more men than women can drive vehicles. It is more difficult for women to travel alone for security reasons. Women do go to the market and sell fish, thus have more information on the local market. However, information and knowledge on wider markets can only be accessed by travelling and through wider contacts with other areas. Farmers gained knowledge about aquaculture or sources of cheap fingerlings from travelling around. Telephone can be a partial alternative to mobility. One female aquaculturist in eastern Thailand, who did grow-out pond aquaculture as well as hatchery production, bought bread

leftovers from bread factory, and traded fingerlings to far away customers. She managed her business through her telephone.

Vietnam

Fieldwork in the North of Vietnam focussed on small-scale inland freshwater pond aquaculture. Aquaculture provides higher income than rice cultivation: four times more profits are obtained from a pond than from the same size of rice land. Women preferred this activity to paddy farming because small-scale aquaculture did not require much time and was seen as a supplementary source of cash income for them. In places where men migrate to cities to work, women are left on the farm. Men get cash income from their wage work, while women only work on subsistence farming. With aquaculture, women also earn cash income even without migrating to the city. As a woman said, “aquaculture solves the unemployment problem”.

The government has placed an emphasis on the development of brackish water shrimp culture, which does not benefit women much because of women’s lack of knowledge and capital to carry out such a type of intensive aquaculture. At the same time, the government also promoted the conversion of low yielding rice fields into ponds for aquaculture activities. This policy directly benefited women owning some unproductive paddy land and willing to start aquaculture.

Even though small-scale aquaculture seems to be suitable for, and beneficial to women, women still face difficulties because their gender. Aquaculture is seen as a man’s job, so woman’s role in aquaculture is often not well recognised. Women encounter difficulties in doing work that requires physical strength, such as transporting and harvesting fish. Women also depend on men for the guarding fish at night. They face certain taboos such as not being able to enter hatcheries or not being able to go fishing in the sea, because they are seen to bring bad luck. Because land ownership is often in the name of men, men are able to borrow large amount of money from the bank, while women can only borrow small amounts from moneylenders. Women also reported having problems cleaning themselves after entering the pond. Since proper bathing space is not available in rural areas, women are not able to wash thoroughly after being in dirty water, which can result in gynaecological infections.

Women's lack of confidence was one of the issues that came out strongly during the fieldwork. Because of this, they cannot assert themselves to access more information and knowledge and make decisions. When training sessions are provided, women normally give way to men to attend, thinking that men are better and faster at learning. This is especially true for women from ethnic minorities. Not only society places higher value on men, but also their inability to communicate in Vietnamese make it even more difficult for them to access information.

It has been pointed out that even when women are the only ones to be trained, men’s knowledge on aquaculture is higher. The amount of knowledge that women get in a three-day training is limited. On the other hand, men, with

their mobility, are able to access various information sources and with the accumulation of such exposure to the outside world, are more knowledgeable on many issues, including on aquaculture. This highlights the importance of women's mobility and access to informal information sources.

Several suggestions were made to improve women's access to information. One is to implement aquaculture extension through the Vietnam Women's Union, which has a national network, from central government to village level. Another suggestion was to organise aquaculture clubs consisting of women. Such clubs have been established under some projects, and women who participated in them thought they were useful since they discussed not only aquaculture issues, but also various problems concerning women's lives. Broadcasting on aquaculture on radio waves was also suggested as the majority of women can be reached, except those from ethnic minorities who do not speak Vietnamese.

Fieldwork, through interviews with women aquaculturists and key informants in aquaculture development, enabled to confirm the constraints and opportunities for women in aquaculture identified during the review of the literature carried out at the outset of the project. The combination of both activities lead to the construction of the capability improvement framework for women in aquaculture, which is presented in the following section with a discussion over its elaboration and some 'guidelines of use'.

CAPABILITY IMPROVEMENT FRAMEWORK FOR WOMEN IN AQUACULTURE: AIMS, DESCRIPTION AND GUIDELINES OF USE

0. Preliminary note: Users' gender awareness

The capability improvement framework for women in aquaculture (CIFWA) was elaborated from frameworks and tools currently used in gender development. It incorporates findings from the initial literature review and interviews with stakeholders. Following a second phase of fieldwork and workshops, its initial structure was developed into a broader approach integrating the assessment of women's participation in, and benefits from, different aquaculture systems throughout the range of geographical and cultural contexts represented by the project focus economies.

Awareness of, and sensitivity to, gender issues on the behalf of the user are prerequisites for an acceptable and fruitful use of the capability improvement tree for women in aquaculture. Users, whether at the policy or grass-root levels, must possess some knowledge or appreciation of the complexity of gender relations to avoid bias and to guard against over-simplified "easy fix" solutions and interpretations being developed out of context, with potential negative impacts on women.

In addition, it is imperative that the household unit be disaggregated to ensure that the specific needs of women are taken into account separately, replacing the presumption of equal benefits for all household members, which is likely to result in a gender (male) bias. Gender relations in the context of aquaculture development need to be addressed not only at the household level, but also at the wider level of the community.

Issues relating to women's access to, and control over, resources are central to the use of the framework. The following guidelines discuss these issues and provide explanatory details on the contents of the various sections of framework in order to assess, and progress towards, the improvement of women's capabilities through aquaculture and formulate recommendations where these appear necessary.

1. Development, aims and description of the framework

Progressive elaboration of the capability improvement framework for women in aquaculture

Frameworks simultaneously used to develop the present "capability improvement framework for women in aquaculture" were the gender analysis framework (Moser 1989) and the capabilities framework (Sen 1999), along with the concept of livelihood asset pentagon developed by Carney (1998) and the UK Department for International Development (DFID).

The two gender goals in development are (from Moser 1989 and Young 1997):

- *efficiency* - or meeting of practical gender needs (aquaculture benefits women though an increase in household income and improvement of nutrition levels in the family) - i.e., an instrumental-linked goal and,
- *empowerment* - or meeting of strategic gender needs (with more control over aquaculture activities and its benefits, women re-gain control over their own lives and improve their freedom and status within the household and the community).

These goals have been complemented by concepts of primary and complex capabilities. The satisfaction of primary capabilities includes health, education, skills, shelter. Higher-level, or 'complex capabilities', on the other hand, include personal fulfilment such as friendship, self confidence and meaningful work, which, in the context of this project, can be extended to women's generation and management of own income, improved assertiveness and freedom of knowledge building and decision-making at both household and community levels (after Gasper 1997, Sen 1999).

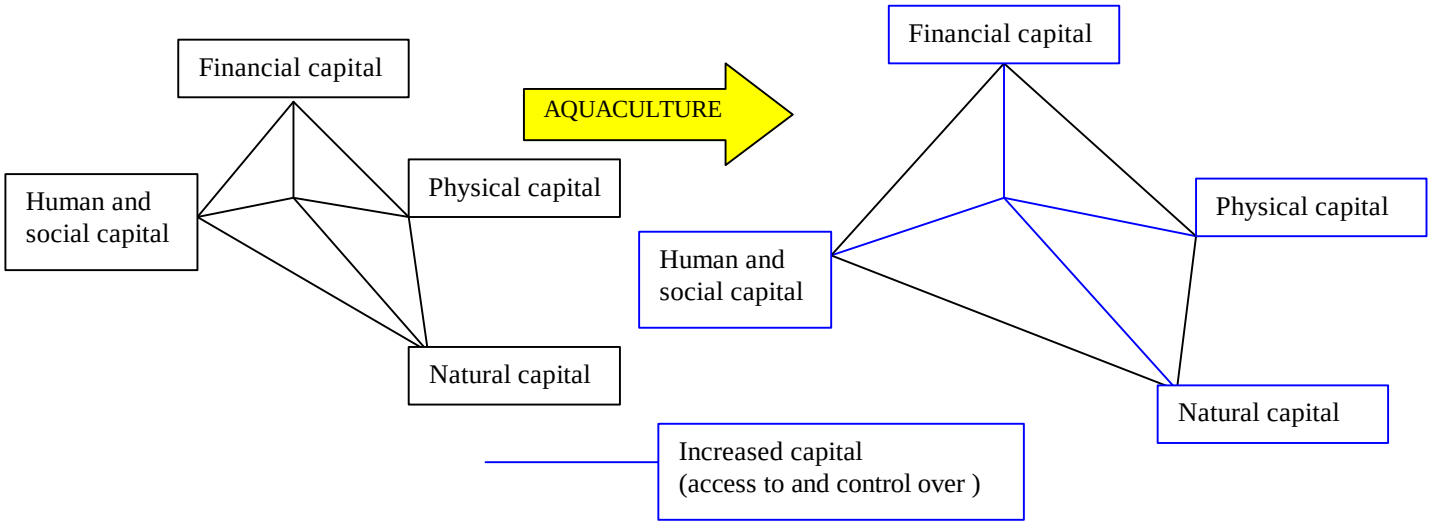
Concepts of "access to" and "control over" used in gender and development, were also incorporated into the framework. Findings from the project fieldwork provided a concrete basis for the framework and ensured its relevance at the ground level. The initial idea of "decision tree" was developed further to avoid over-simplification of reality. In its present form, the capability improvement framework for women in aquaculture captures more adequately the more complex and subtle aspects of gender relations, both within the household and the community, and enables the identification of obstacles to the strengthening of women's capabilities in the context of aquaculture activities.

The notion of "capitals", as used in DFID's Sustainable Livelihood Framework, was utilised to categorise issues encountered in both literature and fieldwork. In this context, the term "capital" should be understood as akin to a "capacity building block", since the weakening or strengthening of the components of these "blocks" will affect women's potential capabilities (the concept is developed from DFID's "livelihood building block").

These capitals are:

- Natural capital, or natural resources (products and services).
- Physical capital, or basic infrastructures and producer goods.
- Financial capital, or financial resources (flows and stocks) contributing to production and consumption.
- Human and Social capital, or personal skills, knowledge, ability to labour, good health along with social networks, "membership of more formalised groups and relationships of trust, reciprocity and exchanges" existing within communities. Because of their inter-relatedness, in particular in the context of this project, human and social capitals have been grouped together in the framework.

All capitals are needed simultaneously to provide a basis upon which women's capabilities can be built and developed through aquaculture. However, it was decided that the notion of "*access to*" these capitals had to be complemented by the dimension of "*control over*" to provide a more rigorous and specific gender focus. An "asset polygon" can be drawn to visualise the importance of each capital in comparison to others in terms of "access to" and "control over".



The schematisation of women's access to and control over the four capitals, as presented above, can assist in monitoring how these vary through time, and can point to where efforts are required to reinforce women's access to, and control over, a capital or some of its components to increase overall capabilities. Modifications to the composition of these capitals to increase gender sensitivity and reflect the specific context of women's involvement in aquaculture are detailed in the following sections.

Aims of the framework

With gender goals in development in mind, the aims of the capability improvement framework for women in aquaculture are those of the overall project, that is to:

1. Assess the extent to which women benefit from the aquaculture activities in which they are involved.
2. Identify the constraints to the participation of women in aquaculture, and to their receipt of the consequent benefits.
3. Assist in the identification and formulation of recommendations/actions where these are necessary, in order to improve the involvement of women in aquaculture, and benefits they may derive.
4. Consider how involvement, in a more rapidly evolving sector such as aquaculture, may offer specific opportunities for empowerment.

The implementation of recommendations is worthwhile only when following a participatory approach, in which women concerned are the main actors and hence owners of their implementation. Using the framework in this

perspective will also allow the progression of women's towards empowerment through aquaculture to be described and monitored. This extends from identifying their exposure to, and use of, basic means of production and components of human and social capitals, to their attaining of complex capabilities such as decision-making in the household and the community. Such changes could also be described in the context of aquaculture activities gradually shifting from subsistence to market-oriented operations. The framework enables obstacles to the strengthening of women's capabilities in aquaculture to be identified, as the activity evolves from extensive and subsistence-oriented to intensive and commercialised. The distinction between subsistence and commercialised aquaculture is important, as women's control over the means of production and the benefits accrued tend to weaken when aquaculture production intensifies and becomes more market and money-oriented. For women to obtain full benefits from their participation it is therefore essential to ensure their control over resources and decision-making. The framework assists this in identifying what women do and do not control.

The framework is based around two initial descriptors:

- 1. Women ARE involved, to some extent, in aquaculture (i.e. direct aquatic production and linked pre-production and post-harvest activities) in a given household, community or region.
- 2. Women are NOT involved in aquaculture (i.e. direct aquatic production linked pre-production and post-harvest activities) in a given household, community or region.

Following these, section 1 shows the extent of the benefits gained by women from their participation in aquaculture from a gender perspective. Section 2 identifies the reasons for, and constraints to, women's non-participation in aquaculture, describes the key fields where changes are required, and leads to the suggestion of potential steps to take towards an improvement of their involvement in, and benefits from, the activity.

The main sub-division made within section 1 (when women's participation in aquaculture exists) is the 'natural' progression of aquaculture from subsistence operations to commercial-scale ventures. Fieldwork showed that, in areas where aquaculture was practised at the household level for subsistence (e.g. backyard ponds), women were often in charge of the overall running of the operation. However, when aquaculture shifted towards larger scale, commercial ventures, decision-making and related responsibilities were commonly taken over by men, with women losing the financial and social benefits which had initially been gained.

Sequences of section 1 allow the continuous assessment and monitoring of women's involvement in aquaculture through access to, and control over, a number of 'assets' which include means of production, benefits, knowledge, technology and markets. Positive feedback is likely to take place between each sequence because progress towards women's capability improvement is not a linear process. For example, an increase in women's access to, and control over, knowledge and technology will lead to both an increase in access to, and control over, markets and market information, as well as an increase in their access to, and control over, economic benefits from the activity. At each

stage, the distinction may also need to be made between access and control, the former being a prerequisite of the latter, but often an initial stage of progression.

The overall aim of section 2 is to elucidate factors hindering women's participation and to formulate targeted recommendations for a better integration of gender awareness and issues into policy and project planning. Women's involvement in aquaculture may be limited because the 'asset polygon' for aquaculture does not compare well with the "asset polygon" of other income generating activities (IGA) women are already engaged in. Comparing the aquaculture polygon with that of another IGA is beyond the scope of this project. However, policy and project planners could extend the concept of the capability improvement framework for women in aquaculture to other IGAs in assessing the benefits of these to women, and potentially considering comparative analysis for different livelihood options.

The framework can be used with women at the household level to build a picture of their involvement in, and various benefits they may draw from, aquaculture. A larger number of separate assessments with women from different households can assist in representing the situation of women in aquaculture at the village/community level.

Description of the framework and guidelines of use.

First section of the framework

Initial question: ***Are women involved in aquaculture (i.e. direct aquatic production and linked pre-production and post-harvest activities)?***

YES - to what extent?

1. Access to and control over means of production

1.1 Natural capital

In the specific context of aquaculture, natural capital refers primarily to land and water, though associated quality features such as fertility and security may be critical.

Access to these two natural resources comprises the extent to which women can use them, restrictions for using them in terms of regulations as well as knowledge/experience/skills required and cultural customs, and the ease of acquiring them.

Control over natural capital covers ownership, user rights, bargaining power of women over land and water bodies, and security of access once gained..

1.2 Physical capital

In the context of aquaculture, physical capital refers to basic infrastructures and producer goods for aquaculture production. Producer goods include equipment and tools, fingerlings and feed. Banking and transport

infrastructures are also necessary for the physical flow of aquaculture products between producers and consumers. Training centres and infrastructures also form part of the physical capital.

Access to physical capital is the extent to which women can use tools, equipment and training facilities as well as their mobility, ability to use public transport and infrastructures such as banks and markets, and the existence of physical/economic/cultural restrictions on them doing so.

Control over physical capital covers bargaining power, user rights and security in using these infrastructures.

1.3 Financial capital

Two main elements of financial capital are credit (from official and unofficial sources) and personal wealth (cash as well as flows and stocks). An intermediate category may be capital available from women's own or marital family.

Access to financial resources includes how easy it is for women to borrow money from banks, amounts they can borrow, and whether there are cultural barriers to credit. At the household level, it includes the proportion of the household wealth women can dispose of, in terms of cash as well as flows and stocks.

Control over financial resources includes ownership of credit (name under which credit is obtained), existing restrictions in use of credit to certain purposes only, ability of women to choose how to use and manage the household wealth, with the possibility of investing in aquaculture, that is to take risks.

1.4 Social and human capitals

As specified in a previous section, human and social capitals were grouped together because they overlap when applied specifically to women in aquaculture. In addition to labour and time, they were broadened to include women's training and personal situation along with informal networks of information and personal exposure, as well as the wider 'power relations' between members of a community, and the structures which result. Culture and history also form part of this capital.

Access to, and *control over*, all the factors detailed hereafter, are to a large extent determined by women's initial personal situation (e.g. single, married, abandoned, divorced, widowed, in good or bad health, personal wealth, etc.) which will influence their participation in aquaculture. A number of widows or single women were found to be more active in aquaculture activities than their married counterparts. This, in turn, was found to have increased their status and acceptance and improved their political role within the community. Status of health will also affect the ability to carry out aquaculture tasks, along with personal assertiveness and independence.

Control over personal situation refers to women's ability to judge their personal situation in relation to outer criteria, take control over it and overcome the constraints imposed by external circumstances and environment. This in turn can be closely related to self-confidence, and to the existence and strength of informal networks of friendship and support.

Because of the importance of human and social capitals and their more abstract nature, the notions of access to, and control over, applied to each of their key components are briefly detailed hereafter.

1.4.1 Labour

Access to labour includes the ease with which women can do and get assistance with aquaculture tasks, either from their family or hired labour force, as well as the physical limitations (e.g. strength) they face in performing tasks by themselves. Cultural restrictions for women to perform tasks themselves (e.g. go in or near the water, security at night during guarding shifts) can also limit their access to labour.

Control over labour encompasses the capacity of women to manage and supervise aquaculture operations and the labour force they require, and their capacity for managing by themselves the potential labour conflict (i.e. energy allocation) between household duties and aquaculture tasks. It is noteworthy that the distinction between labour and time is very subtle in this context and some overlap will be found between this and the next point.

1.4.2 Time

Access to time comprises the possible occurrence of conflicts over time allocation for household duties, livelihood strategies (including aquaculture activities) the division and allocation of time between tasks and household members, and the extent to which cultural customs and restrictions condition the time women have at their disposition.

Control over time includes women's own decisions over time management and allocation for themselves and for other members of the household, and the management of the potential time conflict between household duties and aquaculture tasks. Note that this may be subject to a range of external factors as well as those expected within the household (e.g. social and political events, seasonal/climatic factors or events, non-routine family obligations)

1.4.3 Knowledge, skills and training

Access to knowledge, skills and training refers to the basic know-how required to select, organise and operate the means of production for aquaculture, as well as access to means and places where women can obtain basic knowledge and skills and receive aquaculture training.

Control over this involves the independence of women in obtaining and managing the knowledge they deem necessary for them to carry out aquaculture operations on their own.

1.4.4 Information

Closely related to knowledge, skills and training, is *access to* information, in particular informal networks of information from women to women, can be particularly important for obtaining the knowledge and skills needed for running aquaculture operations. *Access to* informal networks refers to the existence of these in villages or close neighbourhoods and the ease with which women can approach and informally join them. Good access to

information through informal networks can compensate for hindered access to training centres (i.e. physical capital infrastructures).
Control over these refers to the voluntary extent of women's participation in these networks.

1.4.5 Personal exposure

Closely linked to information is women's personal exposure to aquaculture through their access to, and control over, knowledge, skills, training and information through informal networks. *Access to* personal exposure is the ability of women to be in contact with aquaculture either directly through extension officers providing the training required, or indirectly through informal networks of information (e.g. visit to neighbours, to the community medical centre, etc.).
Control over personal exposure refers to the degree of exposure women have chosen to have and that will allow them to decide for themselves how aquaculture ventures compare with other income generating activities.

1.4.6 Mobility

Women's mobility can be considered a cultural asset, but also an indicator of e.g. *purdha*, reflecting much deeper cultural constraints on women. For example, impaired mobility leading to reduced access to markets and market information (e.g. knowing where and when to sell the production, or having to deal with intermediaries because women have difficulties leaving their home) can result in obtaining only partial economic benefits. Furthermore, *access to* mobility includes the distance cultural norms allow women to go unaccompanied, and can grade from staying within homestead boundaries, visiting relatives, going to the market, to going outside the district and leaving the house for several days.
Control over mobility includes women's independence or freedom of movement within their own house and their community and how they can overcome, by themselves, the constraints imposed upon them by cultural norms.

1.4.6 Decision-making

All elements of the above can finally be summarised as women's access to, and control over, decision-making related to the management of aquaculture operations.

Access to decision-making over aquaculture and the management of its tasks is the extent to which women are allowed by the male head of the household to choose livelihood options and decide what is required for aquaculture to be a successful operation.

Control over aquaculture decision-making refers to women's complete independence in managing and being fully responsible for the overall aquaculture operation.

1.4.7 History of aquaculture and cultural acceptance of the activity

It is important to consider history (indigenous activity, practised only by men, or recently introduced technology not subject to cultural taboos regarding their users) and cultural acceptance (e.g. fish grown in a green pond seen as "dirty"). These are likely to affect the way aquaculture is taken up and perceived by the community and consequently govern which approach is most suitable to increase the involvement of women. There may also be related issues of access – e.g. to traditional acceptance, and control, e.g. through the ability to break boundaries, diverge from traditional practice.

2. Access to and control over economic benefits

Access to benefits from aquaculture (i.e. income) would be defined as whether women are able to keep all or part of the profits made from aquaculture for their own use, to be in charge of the aquaculture operation, and/or whether there are cultural preference or restrictions to women 'keeping the books'.

Control over benefits includes decisions regarding the use and allocation of the profits from aquaculture (e.g. for household welfare, personal use and / or re-investment in aquaculture activities). This includes whether the woman has to account for money spent or is free to decide how to allocate funds without reporting to her husband, and from what point in time women start loosing control over the benefits of aquaculture (e.g. when the enterprise becomes more intensive and commercialised).

Other direct benefits include improved nutritional status for women in particular, or for their household members more generally. When access to, and control over, benefits are assessed, it is important that the household unit be disaggregated in order to take into account the benefits women receive, compared to those the family as a whole gets. This may be difficult as family members may tend to consider that any kind of input brought in (e.g. income, food etc.) is for the equal benefit of all members. In reality, the division of benefits between household members is commonly unequal, often with women's ultimate control over these more restricted than their husbands' or fathers'. A closely related issue is the availability of benefits tochildren, and the role and relative power women may have in ensuring and protecting these.

3. Access to and control over technology and knowledge

Access to technology and knowledge refers to whether women attend training sessions, if there are any obstacles in their attendance to these, whether extension officers contact them, if they learn about technology through mass media, or have other sources of information for further details.

Control over technology and knowledge refers to whether women are well informed of the consequences of the technology (both positive and negative), whether they have the ability to look for information, and whether they can participate in the development of aquaculture technology with government officers and researchers.

4. Access to and control over market and market information

Access to market and market information comprises knowledge of where markets are for which products and at which prices.

Control over market and market information refers to bargaining power over product prices, both at selling and buying markets.

Access to and control over technology and knowledge, as well as market and market information, were mentioned previously in the section dealing with access to, and control over, means of production. However, as production gradually moves from subsistence to commercialisation, markets become more complex, in terms of technical equipment and knowledge required to develop appropriate marketing strategies.

5. Improving women's capability

The ultimate goal of any development activity is to improve the capability of men and women. In this case, emphasis has been placed t on women as they are generally at a disadvantage, and as activities such as aquaculture may offer unusually good potential in stimulating and supporting change.

Improvement in each step described previously is expected to lead to a general improvement in women's capabilities, in particular complex capabilities which are related to women's increased wellbeing, confidence, decision-making and agency in the household and the community[1].

5.1 Women's control over own income

Benefits from aquaculture cannot be disputed, especially when considering increased availability of fish for both home consumption and for extra income when sold at the market. However, women's degree of control of the income from aquaculture may decreases with the intensification of the activity and increased profits. This may create a development dilemma in that the more successful a woman’s enterprise may become, the more she learns and develops profitable skills, the greater may be the risk of encouraging the annexation of at least part of the benefits.

5.2 Decision-making within the household

Some women have considerable decision-making power in the household. However, when business becomes more market-oriented and intensive, women may often lose control over decision-making either because they have less

[1] Naila Kabeer (1999) has introduced a three-factor measurement of women's empowerment, that is: resources (defined broadly to include not only access but also future claims, both to material and human and to social resources), agency (including processes of decision-making, as well as less measurable manifestations of agency such as negotiation, deception and manipulation) and achievement (well-being outcomes).

access to knowledge or because of their restricted mobility. The cultural perception that men should take the lead in enterprises often relegates women to a supporting role in more intensive aquaculture activities.

5.3 Decision-making in the community

"Women, by engaging in the aquaculture profession, improve their self-confidence. This is because they succeed, they meet people who come to buy, meet sale agents selling materials, equipment and fish feed, and more people come to visit them at their farm… There is no problem in the relationship between those who raise a lot of fish and those who do not raise that much. This is because the former group supports the latter to raise more fish".

(Quoted from a group of women engaged in more intensive aquaculture, in the project workshop held in Northeast Thailand).

It is essential to look beyond the community and at women's position in the political spheres to comprehensively 'measure' their decision-making and power in the wider society. It was shown in the study that, by being successful aquaculturists, women's status in the community has commonly improved, along with their recognition from all community members. However, women are generally not village heads, chairpersons of village committees, or chiefs of sub-districts. On the political scene, women's presence remains limited compared to the decision-making power they can exercise at home.

Second section of the framework:

If the answer NO has been given to the initial question *Are women involved in aquaculture (i.e. direct aquatic production and related pre-production and post-harvest activities)?*, new questions need to be asked.

- First step: **Why 1**: **Questions exploring women's access to and control over elements of natural physical, financial capitals and primary capabilities.**

Refer to section 1, sequences 1 to 5, described previously.

- Second step: **Why 2**: **Questions exploring which key constraints or areas where changes are needed to ensure, in the first place, women's participation in aquaculture activities**.

The aim of this section is to explore why aquaculture is not practised by women. This includes understanding the constraints to their participation in aquaculture activities and assessing whether, if they were involved, they would benefit from it, in terms of welfare, efficiency and capability and/or empowerment. The nature of key constraints identified, and where recommendations / actions are needed, include:

- *Socio-cultural*: for example, women's *purdha* and the challenging of patriarchal stereotypes.

- *Political*: for example, reinforcement of political rules such as devolution, the challenging of the political authority of the village head etc.
- *Economic*: for example, regulation and maintenance of prices of goods affected by foreign imports, imports etc. and determining in turn opportunities for new activities (including niches for aquaculture production).
- *Institutional*: for example, provision of closer and more readily available training, actions by local non-governmental organisations in the area to promote and support aquaculture for women.
- *Legal*: for example, change or enforcement of legal tools regarding land ownership and hereditary laws.
- *Physical/natural*: for example, construction of roads to important market places, or the provision of more frequent bus services, could improve women's access to markets and disposal of their production without relying on intermediaries.

All above constraints are inter-related: a change in local policies is likely to affect the work level of institutions at the ground as well as economic links and trade between regions.

After identification of fields where interventions are needed, targeted recommendations can be formulated to improve the way gender relations are taken into account and addressed in each of the above areas of key constraints. This indicates that if gender relations are to be addressed adequately for women's capability improvement, there is a need to look at issues beyond women's sole involvement in aquaculture activities. In particular, in the case when women are not involved in any aquaculture operations, to investigate whether women are involved in other income generating activities (IGA) and how the asset polygon for these compares with the aquaculture polygon.

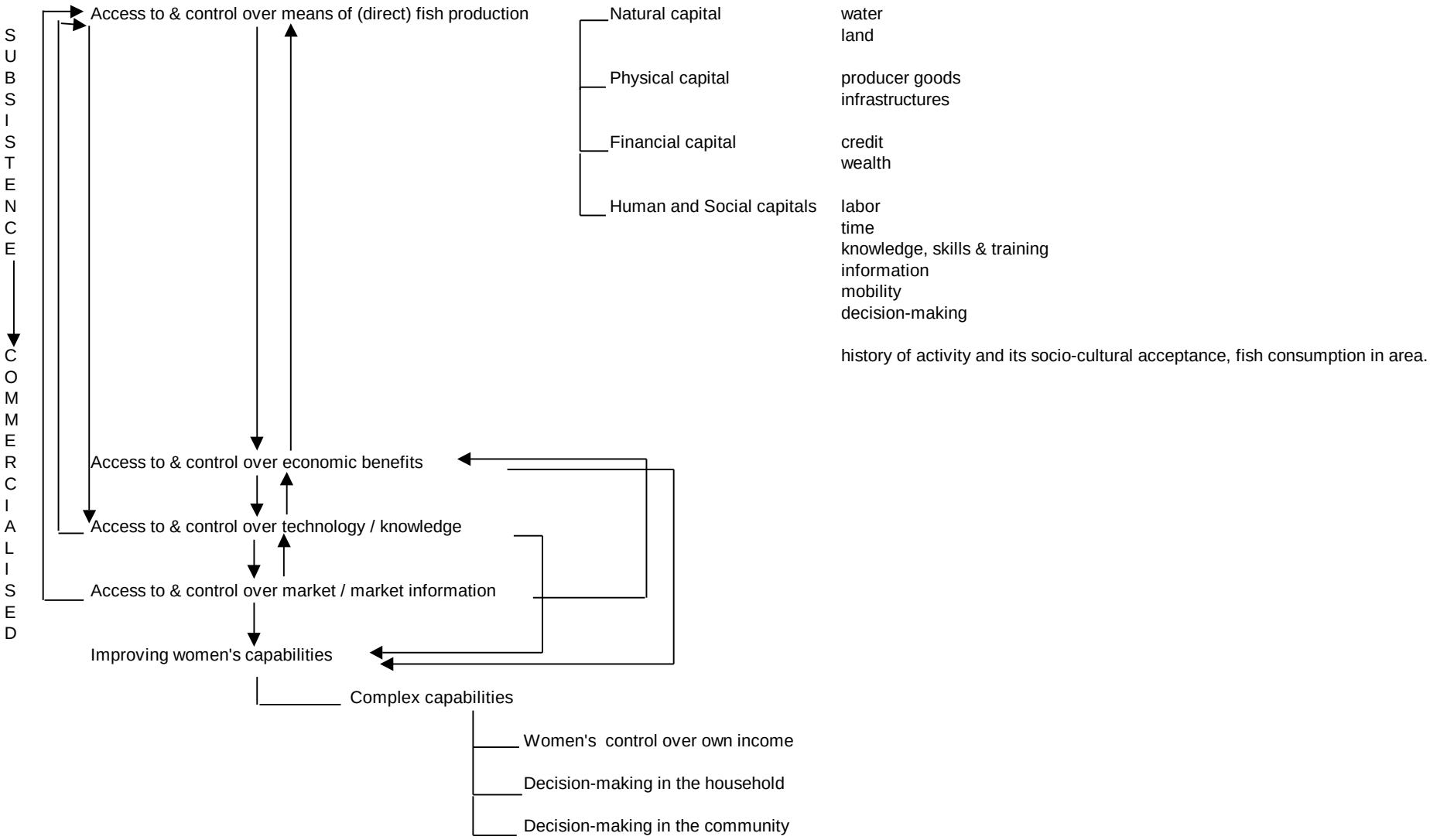
Therefore, questions around the involvement of women in other IGA need to be investigated in parallel and simultaneously to those pertaining to their non-involvement in aquaculture.

Through the exercise, as access to, and control over, capitals and capabilities are investigated, an asset polygon can be drawn to visually represent the relative importance of each asset in comparison to others, with specific reference to women's participation in aquaculture. It may be found that women are not doing aquaculture because the aquaculture asset polygon does not compare well with the asset polygon for other IGA they are involved in. In this instance, the role of project implementing agencies or policy makers is to compare women's IGA pentagon with the aquaculture polygon obtained from women in a different area, or men from the same area, although this comparison is arbitrary and should be used with great care. With the opinion and assistance of women themselves, a decision could be reached on whether aquaculture should be promoted in a designated area because of its potential to improve their capabilities.

Capability improvement framework for women in aquaculture (CIFWA)

Involvement of women in aquaculture (i.e. direct aquatic production and related pre-production and post-harvest activities)?

YES



NO

Why (1) Questions exploring women's access to and control over

Natural capital — water; land

Physical capital — producer goods; infrastructures

Financial capital — credit; wealth

Human and Social ca — labor; time; knowledge, skills & training; information; mobility; decision-making

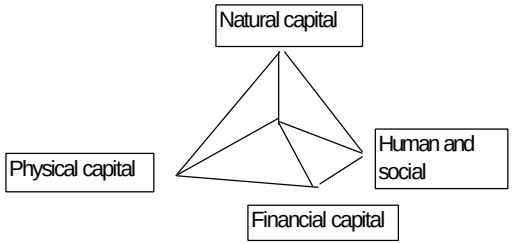
history of activity and fish consumption in area,
socio-cultural acceptance of the activity.

Why (2) Questions exploring which key contraints

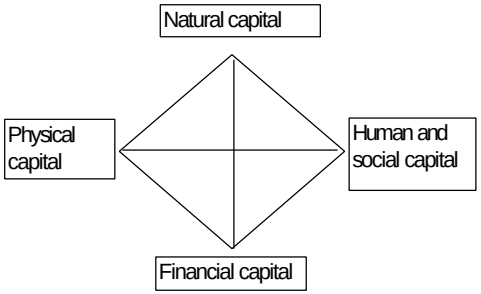
Socio-cultural (e.g. women not allowed to go
Social
Political
Economic
Institutional
Legal
Physical/natural

RECOMMENDATIONS on how to further involve and empower women within the aquaculture activity framework and constraints and opportunities identified

Simultaneous comparison of asset capital between aquaculture and another IG



Asset polygon for aquaculture



Asset polygon for another IGA performed by women

VI FUTURE STRATEGIES FOR POLICY AND ACTION

A gender-responsive aquaculture policy and its effective implementation require a two-fold approach:

- Substantial participation by women (~50 percent, which corresponds to their number in the relevant populations) in all levels of decision-making related to aquaculture; and
- A gender relations approach to assess if projects have improved women's socio-economic and political position in their homes and communities.

A gender relations approach requires a gender sharing of the work (including housework which is officially considered as non-work) and decision-making both in the household and community.

1. Policy Making

To promote an effective approach to gender awareness, empowerment and wider human resource development through a sectoral entry point such as aquaculture, it would be necessary to develop a more appropriate form of policy making and implementation. In many cases, these have been top-down and centralised, and have traditionally been male-dominated. It is unrealistic to suggest that such approaches be eliminated, as considerable degrees of institutional power are vested in such structures. However, they could be changed from without and within through various policy influencing processes, and could also be complemented by bottom-up development approaches involving partnerships between development agents, local community organisations, communities and households. Such approaches could incorporate practical techniques and methodologies such as gender-sensitive Participatory Rural Appraisal (PRA) or Rapid Rural Appraisal (RRA) and a gender analysis in the field. These processes and mechanisms can be used both to support local level development, and to feed evidence and provide a social and political counterpoint to more centralised policy processes. In particular, policies, concerning aquaculture should ensure that women's involvement in aquaculture goes beyond an increase in their workload and raises their socio-economic status both within the household and the community.

Capability Equality through Public Policy

The central goal of public policy and planning is capability equality, that is to achieve basic individual capabilities – particularly in its application to the assessment of women's quality of life and through integrated programmes for women's skill development, management skills, knowledge and technological development, social mobility, and decision-making. A number of women in agriculture and aquaculture at the grassroots level may typically voice a demand for their own economic and social independence, their wish to seek knowledge, information and formal education. Such action or expression indicates that they aspire to capabilities and personal freedom from the patriarchal, male family authorities as guardians of village communities This may also provide the basis from which change can be sought.

Addressing cultural sensitivity in gender inequality

Addressing the complexity of gender subordination in various socio-cultural systems means challenging 'cultural sensitivity' in terms of gender inequality. The lack of intervention in gender matters within development processes is often justified in terms of 'cultural sensitivity'. Patriarchal approaches to development, and patriarchy in general, may legitimate the subordination of women as culturally given and thereby seek to escape all criticism of domination. There is a legitimate concern for cultural sensitivity where the agenda is too obviously driven by external constructs of equality, but this needs to be balanced against situations where elemental human rights are at stake and a supposedly 'traditional' approach represents nothing more than a relatively recent process of gender disempowerment.

2. Training and Extension

- Paradigm shift attributing more prestige and funds to extension workers.
- Sensitisation of policy makers to gender issues in aquaculture.
- Gender needs assessment to be conducted in current aquaculture extension practices.
- Implementation of new gender sensitive extension practices to be conducted by aquaculture extension staff.

Strengthening gender-sensitive extension processes at the grass-roots level is crucial in the successful implementation of more gender-sensitive approaches in aquaculture. A paradigm shift may be necessary (as it is for effective field-level interventions in other aspects of aquaculture or aquatic resource management) whereby the extension worker is viewed as a researcher, participating in action learning processes with the communities they serve However, such a change would often require budget and resource allocations and may also require incentives for extension staff. Such a change, together with improved conditions and assurances of personal security can have the added benefit of attracting more women into extension. It is widely acknowledged that women are under-represented in extension and training in most countries and that there is commonly a perception that research is more prestigious than extension work. Adding prestige to training and extension is an avenue to encourage the participation of women in this field. There is good evidence, e.g. with larger NGOs that this approach is effective, and women are increasingly being attracted to posts which require good levels of knowledge, enquiry and confidence. For both men and women, specific training in gender issues and development techniques would be essential.

The sensitisation of policy makers to gender issues will be instrumental to the success of gender sensitive approaches to training and extension, since they would involve policy modification or formation at some juncture in the future. This could be achieved by raising the profile of gender issues within policy-making bodies by encouraging policy makers to attend training courses and conferences.

In order to meet the needs of women, a gender needs assessment should be carried out from the outset of all projects. This requires a critical analysis of the extension system to assess whether women's needs are met by current extension practices. A multi-disciplinary research body which includes extension workers should be established to conduct this assessment, deriving funds from either national or international sources. A combination of technical, socio-economic

and institutional backgrounds would be best suited for this study, with specific gender skills an important requirement. Outputs of this assessment would be submitted to policy makers. The extent to which women's needs are being met or ignored under current extension procedures would be highlighted. Implementation, monitoring and evaluation of gender sensitive approaches in aquaculture should be conducted by this multi-disciplinary body and data collected should be gender disaggregated.

3. Technology Development and Research

- Gender needs assessment to precede aquaculture research interventions.
- Policy formulation to support these methods.
- Evaluation of gender sensitivity of technology in relation to 1. Women's mobility, 2. Safety, 3. User-friendliness of the technology.

Technology and research projects should be gender-sensitive in their inception, implementation, monitoring and evaluation. These should be preceded by a gender needs assessment and stakeholder analysis to determine the social impacts and beneficiaries of any intervention.

In order to effectively implement and institutionalise these measures, research and technology policy should be drafted as appropriate by a donor institutions, NGOs and government agencies, ideally working in partnership and open and responsive to demands of potential end users.

Impacts of new technologies to be transferred at the grass-root level should be assessed with respect to women's usage, and data collected to monitor the uptake of the technology should be gender- disaggregated to reflect this. Appropriate technologies should be generated or selected e.g. using participatory approaches, in particular with reference to the capabilities of female users: access to time and resources, mobility required for using the technology, safety of using the technology (e.g. ability to swimming) and its user-friendliness. Efforts should be made to increase the mobility of women by organising study and mutual learning visits.

4 Gender-disaggregated Database

- Need to start separate data for men and women.
- Need to increase awareness amongst women themselves on the value of their contribution to aquaculture and potential benefits they could draw from it.

Apart from specialised data within individual research or development projects, there is an almost complete absence of gender-disaggregated data with regard to aquaculture, and an urgent need to fill this gap.

Women's contribution to aquaculture is often more than that of men in their households. There is a need to increase awareness of their contribution amongst women themselves. Evidence of women's substantial involvement in the field will add weight to the efforts to bring about gender-sensitive changes in policy or in formulation of gender-sensitive

policy. Such data development could be encouraged both at the community/NGO level and at the level of national employment and income statistics, and of related household surveys. Indicators of the involvement of women, and the access and control they have over key resources or processes would also be important to identify and develop.

5. Resource Provision

- Credit to be assessed on the basis of access to collateral rather than ownership of collateral.
- Provision of group credit.
- Results of monitoring exercises to be utilised to improve attractiveness of aquaculture to banks.
- Subsidies for systems where women have a comparative advantage.
- Niche exploitation by women.
- Strengthening capabilities of women's unions and organisations through resource allocation and assisting them the role of carrying out mainstream responsibilities.

Resource provision in aquaculture, particularly of credit, often discriminates against women, who are usually not legal owners of the resources to which they have access. Subject to the means of ensuring appropriate levels of security, mechanisms should be sought for the provision of credit and other resources in aquaculture to be based on *access to*, rather than ownership of, collateral. Such measures would provide useful assistance in promoting equality in access to credit and to independent rights to resources e.g. land, ponds, lakes and other resources.

Provision of group credit, based on production plans and careful assessment of gender needs and opportunities, should be considered by financial institutions. Such mechanisms would be particularly suitable options for small-scale aquaculture such as backyard ponds and fry production, from which larger levels of credit base and access could be developed.

Results of trial-based monitoring could be utilised to improve the attractiveness of non-subsistence aquaculture systems to banks. Where appropriate, 'pump-priming' subsidies – whether in the form of capital, resources or services, could also be considered for aquaculture systems where women have a comparative advantage. Ditches and inshore areas, which are often neglected by men, can be used by women, thus avoiding conflicts over resource use. Their safety is not compromised in these areas. Community ponds also represent a water resource to which women have access, though competition for water use in these ponds may restrict the ability of women to be involved in aquaculture. Women could also be encouraged to participate in other non-land based, aquaculture related activities such as ornamental fish production, hapa sewing, seed production and the collection and processing of feed and aquatic products.

Emphasis should be placed on strengthening capacities of women's unions and organisations through resource allocation and assigning these the role of carrying out mainstream responsibilities, such as management of energy and water resources.

6 Conclusion

The incorporation of the above strategies for policy and action in current national aquaculture development policies and their implementation at various levels of society (government, community, household) should influence the build up of women's livelihood assets (capital-polygon) while improving simultaneously their livelihood outcomes and the control they have over these as well as their capabilities within the household and the community.

The social and economic implications a disadvantaged group's improved access to a technology such as aquaculture, have been demonstrated throughout the study. If the measures suggested above are implemented and monitored, aquaculture could be then considered as a suitable economic activity for improving women's capabilities. However, more developed programmes of work, linking the aquaculture context with others, determining its effectiveness as an entry point and picking examples of good practice in the region to indicate future options for women, are needed. To be fully effective and for their benefits to reach women, not only have future aquaculture programmes to be gender-sensitive, but also to bridge the gap existing between institutions operating at the policy and ground level, in ensuring that stronger collaboration and linkages are established between all sectors of development.

APPENDICES

Appendix A: Constraints and opportunities for women's participation in aquaculture. A review of the literature.

Female headed households and household income

Single women-headed households refer to households headed by women who are not living with their spouses, either because they are widowed, divorced, separated, unmarried, or because their husbands migrated to the city. These households are amongst the poorest in much of South East Asia, with women bearing all income earning responsibilities and increased workload to maintain the household, whilst restricting their available time and willingness to take risks to engage in additional income generating activities. Furthermore, in some economies such as Vietnam, female-headed households are disadvantaged in terms of land allocation and access to services (Cark Bro International 1998) which will hinder the start of aquaculture due to lack of initial inputs.

Ethnicity and religion

Different ethnic groups have different socio-cultural beliefs, which may limit the involvement of women in aquaculture. For example, from a study of the sustainability of the NOPEST project in Bangladesh, (Zaman 1998) identifies the difference between Hindu and Muslim households in rural areas. Her study indicates that Hindu areas are 'less conservative' than Muslim areas, with greater mobility of women and higher rates of successful female participation in the project. The involvement of women in fishery-related activities in Malaysia and Indonesia differs between ethnic groups (Ng 1989, Upton and Susilowati undated), and so are religious beliefs important determinants for Filipino and Thai women's participation in aquaculture activities (Israel 1991, Israel-Sobritchea 1997, Sotto *et al* 1998).

Technology

Labour saving technologies that can lighten women's work burden in fish production, preservation and processing have been given little attention (Suwanrangsi 1998, Tewari and Singh 1998). Simple, light and manageable gear can enhance women's initiative and autonomy in completing tasks that are traditionally the domain of men.

Most agricultural projects target technologies to male heads of households (SDWW undated). Because of poor prior to intervention analysis, some of these technologies actually increase the workload of the poorest most marginal women, without correspondingly bettering their income. It is important that both men and women own and are taught how to operate and manage new technologies, otherwise women do not feel entitled to use equipment.

Large-scale modernisation of operations traditionally carried out by women is threatening the role and impact they are making in post-harvest activities, and therefore the recognition they have obtained in fulfilling this role. For example, the introduction of a shrimp grader or mechanical filleting machine reduced labour needs by 55% in Thailand. Because the fish processing industry mainly employs women, these are the first victims of intensification (Israel-Sobritchea 1994, Matics 1997). However some technology, such as intensification of packing of fish for marketing, and the introduction of iced transport, may increase the participation of women (Upton and Susilowati undated). Technological improvements such as modern landing devices, fish auctions in marketing complexes may decrease the role of traders and dealers, thus considerably reducing the need for women in these activities.

One interesting case regarding working time for women can be seen in the study of Songhao State Farm in Cantho City (Ba and Hien 1996). Here, because of the new technologies in rice production, such as broadcasting and application of weedicides, women's work in the field has dropped to about 30% of the previous farm load. Now women are using their "saved" time for aquaculture, livestock raising, non-rice crop cultivation, and other services such as small trading, tailoring, and other off-farm services. Women take part of 70% of aquaculture activities, while for rice, women contribute 30%. In this area, rice contributes 60% of household income, followed by aquaculture, which now contributes 14.1%.

Production intensity

Aquaculture of different levels of intensity may show different potential for the involvement of women. A commonly held view is that women cope best with easy fish culture methods. Rice-fish culture has often been advocated as an

ideal culture method for women, as the technology is 'simple' and women are already the major workers in the rice-fields all over Asia. However the preparatory work for rice-fish requires heavy digging activity, which women may not be able to do without assistance. In areas where women are traditionally looking after livestock, extending their responsibilities to aquaculture may be easier since they already have access to the necessary inputs and are familiar with animal production.

In Cambodian finfish pond and cage culture, Nandeesha (1994a) found that women involvement in aquaculture was higher in small-scale ventures than in large-scale, capital intensive operations. In Bangladesh, Barman *et al*. (1998) found that the participation of women in fish culture activities increased with the intensification of management, though their control over benefits, especially fish for household consumption, declined. According to Upton and Susilowati (undated), intensification of shrimp and milkfish farming in Indonesia decreases women's access to, or understanding of, the technology, thus marginalising them even further. It is difficult to pinpoint the reason why women's control over aquaculture activities decrease the more profitable they become, but the problem should be addressed by effective targeted extension.

Type of aquaculture system

Women in Bangladesh successfully practice cage culture. However, the cages, to be robust enough and withstand adverse environmental conditions, use primarily exogenous materials, which are unlikely to be available locally, are costly and also heavy for women handle on their own. Women involved in freshwater cage culture in Bangladesh declared that they depended on outside sources for the supply and construction of small cages and on men to shift them within the water body (Brugere & Kaleda 1999). It is likely that South East Asian women would be subject to similar constraints.

Marine-based aquaculture may not be suitable for women in areas such as the Philippines where women traditionally do not go to sea (Israel 1991, Israel-Sobritchea 1994). In contrast, in Indonesia, women's role is well established in sea-based aquaculture activities. However the social and cultural reasons behind the higher participation of women in marine-based activities than freshwater aquaculture are not well documented, and until these are known it may be difficult to increase the involvement of women in the latter.

Oyster, mussel and seaweed farming are simple, initial investment and external inputs required being minimum (Yap 1999). With the possibility of being practised at a very small scale, these forms of aquaculture may be more suited to the needs of women.

Training and education

Lack of knowledge/skills is the largest problem for both women and men in aquaculture in most Asian countries. Often the problem is bigger for women, as they are less educated than men. Since men are considered to be the head of household, they normally represent the family to any outside meetings including training (Anh and Hung, 1997).
Samet (1997), Bueno (1997) and Matics (1997) have mentioned the need for training in fish handling, processing, transportation etc. for women in Indo-China countries, along with training in book-keeping, management and accounting if needed.
The importance of targeting the training activities specially towards women, by taking into account their special needs has been emphasised by a number of authors (e.g. Matics 1997; Nandeesha, 1994b; Zaman, 1998). Recommendations include: venue close to village, short training sessions to minimise disruption to household activities, visual aids to cater for the common lower literacy rate among women, scheduling of training during the non-busy farming season, child care provision, tools and equipment lending/sharing co-operatives to facilitate women's access to work, follow-up training etc. Special recommendations for Muslim women restricted by '*purdha*' include separate gender training groups, mobile training units to reach women who are not allowed to leave the house (Engle 1987). The accessibility of mass media should be assessed for both men and women in the target area, and education levels, literacy, dialects, local communications media and time availability taken into consideration when extension is planned and designed (Felsing *et al* forthcoming). Follow-up on training has also been shown to be important for the long-term participation of women in aquaculture development projects (Zaman 1998).

Mixed-gender meetings may put a damper on the participation of women, but on the other hand, separate training sessions obstruct support from male family members. Women interviewed in the CARE farming training project in Bangladesh project highlighted the need for joint training sessions, which could induce their husbands to be more co-operative (Zaman 1998). Men of the project also expressed a need for the farming to be a family activity, since they

needed help with the various activities. Recommendations from this and other studies (Murray *et al* 1998, Debashish *et al* 1999) included differentiated training for men, women or joint. It is generally recognised that male relatives to women participating in women-only projects need to be involved in the training as well, to improve their understanding of the project aims and activities.

Educators are considered by Conlu (undated) to be one of the most important vectors of awareness to enhance people's capabilities. Female extension workers are often best for reaching women (Tungpalan *et al* 1991, Bueno, 1997). Women constituted 43.8% of the total extension staff in Malaysia in 1989 (FAO 1993), and are actively involved in aquaculture extension in the Philippines (Engle 1987). However, shortages of female staff for government aquaculture extension programmes was recognised to form a major constraint to aquaculture in the Lao PDR, where collaboration with the country's women's union was recommended (Murray *et al*., 1998). In addition, papers presented at a workshop on women in fisheries in Indo-China countries showed that in all countries far more men than women were trained in all areas of fisheries and aquaculture, even in those sub-sectors where women are known to do all the work (e.g. marketing) (Nandeesha 1996). In the Philippines, female trainers are more numerous in the activity already dominated by women (fish processing). The training thus acts to reinforce current gender divisions (Engle 1987).

In all target economies, the level of female illiteracy is higher than that of men. This makes it more difficult for women to access traditional training courses. Young women however, are becoming as educated as young men, which heightens their chances of accessing specific training programs on the development of new technical options such as aquaculture. Training of children has been tried in the Children's Participation Initiative (CPI) in rural Bangladesh, and was found to ease the fast transfer of information by children in a form accessible to women (Zaman 1998).

The gender sensitivity of the training institution is also important to encourage women's participation in training (Bueno 1997).

Marketing

Women in many areas of South East Asia participate greatly in marketing of capture fisheries products, both as primary sellers and middle-women. Women are similarly involved in the marketing of products from small-scale aquaculture. However, their involvement in the marketing of larger-scale aquaculture products is virtually non-existent, and often women only carry out marketing activities when markets are based in or very close to the villages. In areas where the movement of women is restricted, it may be difficult to involve them in the trading of fish products. In most South East Asian countries, driving cars or trucks is commonly considered a man's job, which could limit the marketing activities of women.

Time

All societies show a degree of gender division of labour but the type of work men and women carry out differs between different cultures. Studies show that there are very few activities which are always performed by men and even fewer always performed by women (Mosse 1993). Rural women commonly have multiple tasks, and are responsible for a variety of productive, reproductive and community activities[2]. Because rural women are normally responsible for household chores, childcare and provision of fuel and water for the family, they often work longer hours than men. This means that their time to spare for aquaculture activities or attendance to meetings or training is limited (Bueno 1997, Matics 1997b, Nam *et al* 1997, Vorin *et al* 1997, Felsing 1998, Murray *et al* 1998, Siar and Caneba 1998, Suvarna *et al* 1998. There is therefore a danger that aquaculture projects increase women's already very high workload without providing them many benefits.

Unless women's "double burden" (Israel-Sobritchea 1994) of time commitments and lack of recognition of household work and duties is addressed in development projects, women are unlikely to get much involved in income-generating activities (Siason 1998). This could be done by provision of day care services, child minding centres, or pooling of cooking responsibilities (Nandeesha 1994b).

[2] **Productive work:** the production of goods and services for consumption and trade. **Reproductive work:** the care and maintenance of the household and its members, including bearing and caring for children, preparing food, collecting water and fuel, shopping, housekeeping and family healthcare. **Community work:** the collective organisation of social events and services such as ceremonies, community improvement activities,participtation in groups, and local political activities. After Veldhuizen, L. v., Waters-Bayer, A., and Zeeuw, H. d. (1997). "Developing Technology with Farmers: A Trainers' Guide for Participatory Learning," Zed Books, London, UK..

Mobility

In most Asian countries women are less mobile than men. Most women are reluctant to travel, or not allowed by their husbands to travel far (Suwanrangsi 1998). Fewer women than men know how to drive, and because women feel responsible for household work and are in many cases responsible for looking after livestock, they are less likely to leave the house than men. Because of their restricted mobility, especially in rural areas, they have little access to distant markets, and thus less exposure to information available from these. This contrasts with coastal fisheries in the Philippines (San Miguel Bay), in Indonesia (North Java) and Lao PDR where women control fish marketing activities and act as 'middle-women' (Bueno 1997, Matics 1997b, Murray *et al* 1998).

In a study of two projects from Bangladesh, Zaman (1998) quotes the need identified by women for options near to the homestead, thus enabling women to work on them. Shaleesha and Stanley (1998) highlight the socio-cultural restrictions on women getting involved in aquaculture far from their homestead, and provides examples of the success of 'backyard' rearing of ornamental fish. Murray *et al* (1998) and Brugere *et al* (in press) found that distance from the fish pond or cage site to the house had a major effect on the involvement of women in aquaculture activities. Often poorer women are subject to fewer restrictions than women from higher social strata, and Ahmed *et al*. (1998) in their study of the reservoir fisheries of Bangladesh, found a substantial involvement of tribal women, who are not subjected to restricted mobility like Bangladeshi women of higher social status.

In most South East Asian countries, extended families are the norm, granting women greater freedom to leave the house as other family members can look after the children (Lopez-Gonzages *et al* 1993). Gerardino and Gerardino (1993) report that women in some areas of the Philippines form themselves into workgroups assigning one member to watch over the children while they work in nearby fields. However the expectation that women are available to look after the home tends to hamper their involvement in marketing activities, as they have less opportunity to gain information on prices and market trends (Siason 1998).

Organisations and informal support networks

In the Bay of Bengal Program, the formation of fisher-women's co-operatives were found to successfully enable women to participate actively in profit making activities in Sri Lanka and India (Matics 1997b). Community managed projects could present an avenue for increasing the participation of women. Other studies on the constraints women face in fisheries and aquaculture in the Asia-Pacific region emphasise the lack, or weakness, of women's organisations as a major obstacle for their involvement in fisheries and aquaculture (Bueno 1997). In South East Asia, fisheries and farming organisations are often systematically composed of the heads of households, which in most cases are men (Murray *et al* 1998). Siason (1998) reports that women's involvement in community decision-making and leadership is limited, though women often attend community meetings more often than men.

However, in the Philippines, Lopez-Gonzages *et al* (1993) note that when women's participation in community management activities results in the generation of supplementary income for the household, husbands do not mind looking after children when women attend meetings. In this study, women were more active than men in community organisations. The importance of women's informal networks, through, for example, health centres or neighbourly contacts, has been highlighted as a way to obtain information and exchange knowledge when their movement is limited (Brugere et al, in press).

Decision-making powers

Although women in South East Asia often carry out the majority of the work in aquaculture, men make most important decisions. The cultural restrictions to women's decision-making powers pose a problem because they decrease their control over aquaculture activities and affect their level of knowledge and attitude to learning, with implications for their personal development.

Voeten and Ottens (1997) observed that through 'conscientisation' of gender relations, rural women realised the obstacles they faced, and moved away from being passive beneficiaries. They recognised the need to take control over the aquaculture activities, and the need for them to increase their knowledge and skills to become equal to men. After receiving training, women knew more about aquaculture, which increased husbands' confidence about their wives' management skills. Women then became "aquaculture specialists" in the household. Men recognised the benefits gained by their wives in improving their knowledge, and encouraged them to attend training, whilst agreeing to take up "female" chores such as childcare and cooking.

Studies from Indo-China countries showed that women involved in fisheries had greater financial independence and thus greater decision-making powers in the household (Nandeesha 1996).

Access to credit

The difficulties faced by women with lower literacy and more restricted by social-cultural constraints than men, in accessing credit have been highlighted by several authors (Minh *et al* 1996, Bueno 1997, Samet 1997). Minh *et al* (1996) found that capital was the largest problem for women engaged in fish nursing in Vietnam. In coastal districts, even though there is much potential for aquaculture and fish processing, few families are able to practice anything but fishing due to lack of access to capital investment (Hoa 1998). According to the law, wives own the land together with their husbands, though in practice, this is not recognised by the banking system, which leaves women at a disadvantage in accessing formal forms of credit (McDonald 1995).

In contrast, women have access to credit through the 'share' system of collective savings practised in the Philippines and Thailand (Matics 1997b). However, if such systems do not exist, high interests rates charged by financial institutions are likely to discourage women and exclude them from credit facilities. Matics (1997b) recommends flexible credit schemes, with loan administered to small groups of women from the same socio-economic background rather than to individuals. Nandeesha (1996) recommends medium-sized loans to increase the viability of the aquaculture activity.

Ownership of and access to resources

Because access to a water body is a requirement for aquaculture, women's ownership of, and access to land and water resources are prerequisites for their involvement in, and control over aquaculture activities. In a FAO / UNDP study in the Lao PDR, access to land was found to be a major constraint to aquaculture, because farmers did not think they had adequate land to devote parts of it to an aquaculture pond (Murray *et al* 1998). In the same study, seasonal water bodies were found to be a great constraint, as were user conflicts over communal water resources.

Environmental degradation

A degraded and depleted environmental resource base breeds poverty, resulting in the further over-exploitation of such resources and the marginalisation of women (Lopez-Rodriguez, 1996, DENR 1999). This is especially true in areas where women depend on natural resources for their livelihoods, such as mangrove swamps from which women gather both food, firewood and thatching materials and which are threatened in many areas of South East Asia (Israel-Sobritchea 1994, FAO 1996, Siason 1998).

Culture

Culture is an important consideration in any development planning. In areas where a long tradition for aquaculture exists, such as Indonesia, both men and women are familiar with the activity as a livelihood option. However, gender roles are likely to have been forged around the activity and its tasks from an early age and this conditioning of the gender division of labour may result in an important cultural constraint to overcome for women to get involved in aquaculture activities traditionally reserved to men. For this reason, new forms of aquaculture may present a higher potential for adoption by women as they do not hold gender preconceptions related to the distribution of tasks and activities. Similarly, if aquaculture work conditions are difficult or incentives low (for example, physical work, isolation, high risks, low pay, etc.), it is unlikely that women will want to be involved. About 5% of women involved in research and development in fisheries in a study from India reported that they faced sexual harassment, and 62% were not paid equally to men (Venkataraj 1998).

Women's own initiative to engage in new activities is also inhibited by cultural stereotypes, which result in lack of self-esteem and self-confidence. Under these circumstances, there is a need to build on women's existing skills and assets.

Institutions

In a farming project in Bangladesh, Zaman (1998) identified the need for stronger institutional linkages, facilitating contact between women carrying out farming activities in different areas, and women and vendors, seed suppliers etc. The project arranged cross-NGO visits targeting women, by complying with their time availability and commitments. Special marketing strategies are needed for women because of their restricted mobility.

Gender sensitive policies and discrimination

Bueno (1997), Sujatha and Dixitulu (1998) and Suvarna *et al* (1998) have identified lack of government mechanisms dealing with women in fisheries, as well as lack of government strategies for addressing gender issues, as the main constraints facing women in aquaculture and fisheries in Asia. The low number of projects targeting women may be due to a lack of gender disaggregated data and indices as well as few women working at levels of policy development and programme planning in governments, highlighting a need for change in legislation and policies no longer biased against women.

Appendix B: References used in the review of the literature

Ahmed, K. K., Rahman, S. and Chowdhury, M. A. K. (1998) Role of tribal women in reservoir fisheries, Bangladesh. Paper presented at the Fifth Asian Fisheries Forum: Fisheries and Food Security Beyond the Year 2000, Chiang Mai, Thailand.

Ba, V. T. N. and Hien, T. T. T. (1996) Women in a Vietnamese State farm earn nearly half of family income. *Aquaculture Asia*, Oct-Dec 1996, pp.42-43.

Barman, B. K., Little, D. C. and Edwards, P. (1998) Impacts of tilapia on poor farmers in Northwest Bangladesh. Paper presented at the Fifth Asian Fisheries Forum: Fisheries and Food Security Beyond the Year 2000, Chiang Mai, Thailand.

Brugere, C. and Kaleda, Y. (1999) Cage Aquaculture for Greater Economic Security (CAGES): Social Surveys. Research Project R7100, Institute of Aquaculture, Stirling.

Brugere, C., McAndrew, K and Bulcock, P. (in press) Does cage culture address gender goals in development? Results of a case study in Bangladesh. Submitted to *Aquaculture Economics and Management*.

Bueno, P. (1997) Gender issues on the participation of women in fisheries development. *In* M.C. Nandeesha and H. Hanglomong (eds) *Women in fisheries in Indo-China countries,* pp.21-38. PADEK, Bati Fisheries Station, Phnom Penh, Cambodia.

Cark Bro International (1998) *SPS Component Description for Support to Freshwater Aquaculture Development, Vietnam.* DANIDA.

Carney, D. (1998) (ed) *Sustainable Rural Livelihoods. What Contribution Can We Make*? Papers presented at the Department for International Development's Natural Resources Advisers' Conference, July 1998. Department for International Development, London.

Chaisri, Y. (1997) Women in fisheries in Thailand. *In*: M.C. Nandeesha and H. Hanglomong, (eds) *Women in Fisheries in Indo-China Countries*, pp. 126-128. PADEK, Bati Fisheries Station, Phnom Penh, Cambodia.

Conlu, P. V. (undated) *Development of Fisheries in the Region: the Role of Filipino Women in Fishing Communities*. FAO, Rome, Italy.

Debashish, K. S., Shirin, M., Zaman, F., Ireland, M., Chapman, G., and Nandeesha, M. C. (1999) *Strategies for Addressing Gender Issues Through Aquaculture Programmes: Approaches in CARE-Bangladesh*. CARE Bangladesh, Dhaka.

DENR (1999) *Women and The Environment*. Department of Environment and Natural Resources DENR, Manila, Philippines.

Edwards, P. and Demaine, H. (1997) *Rural aquaculture: Overview and Framework for Country Reviews*. Regional office for Asia and the Pacific, FAO, Bangkok.

Engle, C. R. (1987) Women in training and extension services in aquaculture. *In*: C. E. Nash, C. R. Engle and D. Crosetti (eds) *ADCP/NORAD Workshop on Women in Aquaculture*, Vol. 28, pp. 67-82. FAO, Rome.

ESCAP (2000) *Empowerment of Women in Poverty*. Report of ESCAP/Grameen Bank Regional Seminar, 7-9 July 1999, Dhaka, Women in Development Discussion Paper Series, No.8.

FAO (1993) *Agricultural Extension and Farm Women in the 1980s*. FAO, Rome, Italy.

FAO (1996) *A Population Project for Small-scale Fisher-women in the Philippines*, Vol. 1999. FAO/UNFPA.

Felsing, M. (1998) *A Situation Analysis of Integrated Aquaculture in Villages in Northern Karnataka, India*. M.Sc. thesis, University of Stirling, Stirling.

Felsing, M., Haylor, G., Lawrence, A. and Norrish, P. (In press). Reaching the rural poor: Developing a strategy for the promotion and dissemination of participatory aquaculture research. *Journal of Agricultural Extension*.

Gasper, D. (1997) Sen's capability approach and Nussbaum's capabilities ethic. *Journal of International Development*, **9**(2): 281-302.

Gerardino, C. E. and Gerardino, E. C. (1993) Role of women in sustainable farming in the upland - the Magdungar experience. *In:* L. B. Villacorta, E. C. Velasco and F. H. Roquia (eds) *Analysis of Gender-based Activities in Selected Agro-ecological Systems in the Philippines*, pp. 121-131. CIDA and the University of the Philippines at Los Banos (UPLB), Environment & Resource Management Project (ERMP).

Hoa, P. T. (1998) The role of women in mangrove planting and protection in Nghia Hung district, Nam Dinh province - measures for life and environmental improvement. *In:* P. N. Hong and P. T. A. Dao (eds) *National Workshop on the Socio-Economic Situation of Women in Mangroves of Coastal Area - Trend to Improve Their Life and Environment*, pp. 66-69. Centre for Natural Resources and Environmental Studies (CRES), Vietnam National University, Hanoi & Action for Mangrove Reforestation (ACTMANG), Japan, Hanoi, Vietnam.

Hossain, M.M. (1998) "Women in aquaculture: BRAC's experience". Paper presented at the Fifth Asian Fisheries Forum: Fisheries and Food Security Beyond the Year 2000, Chiang Mai, Thailand.

Israel, L.Q. (1991) Women in the fisheries sector: a review of the literature. *Lundayan* **II**: 2-3.

Israel-Sobritchea, C. (1994) Gender roles and economic change in a fishing community in Central Visayas. *In:* I. Ushijima and C. N. Zayas (eds) *Fishers of the Visayas: Visayas Maritime Anthropological Studies I: 1991-1993*, pp. 279-303. CSSP: College of Social Sciences and Philosophy, University of the Philippines, Diliman, Manila, Philippines.

Kabeer, N. (1999) Resources, agency achievement: reflections on the measurement of women's empowerment. *Development and Change*, **30**(3): 435-464.

Locicero, G. (1997) Women in fish processing and marketing in Kompong Channang Province in Cambodia. *In* M.C. Nandeesha and H. Hanglomong (eds.) *Women in fisheries in Indo-China countries*, pp. 113-114, PADEK, Bati Fisheries Station, Phnom Penh, Cambodia.

Lopez-Gonzages, V., Villacorta, L. B. and Canada, J. (1993) Barangay Punta Salong, Manapla, Negros Occidental (coastal study site). *In:* L. B. Villacorta, E. C. Velasco and F. H. Roquia (eds) *Analysis of Gender-based Activities in Selected Agro-ecological Systems in the Philippines*, pp. 13-48. CIDA and the University of the Philippines at Los Banos (UPLB), Environment & Resource Management Project (ERMP).

Lopez-Rodriguez, L. (1996) The fishers of Talangban: women's roles and gender issues in community-based coastal resources management. *In: A Collection of Case Studies On Community-based Coastal Resources Management in the Philippines*, pp. 67-81. College of Social Work and Community Development, University of the Philippines Diliman, Manila, Philippines.

Matics, K. I. (1997). Women's contribution to fisheries development in South East Asia. *In*: *Women in Fisheries in Indo-China Countries*. M. C. Nandeesha and H. Hanglomong (eds.), pp. 11-20. PADEK, Bati Fisheries Station, Phnom Penh, Cambodia.

Minh, L. T., Huong, D. T. and Tuan, N. A. (1996) Women in Cantho City are profitably involved in fish nursing activities. *Aquaculture Asia* **1**: 40-41.

Moser, C.O.N (1989) Gender Planning in the Developing World: Meeting Practical and Strategic Gender Needs. *World Development*, **17**(11): 1799-1825.

Mosse, J. C. (1993) *Half the world, half a chance. An Introduction to Gender and Development*. Oxfam, Oxford.

Murray, U., Sayasane, K., and Funge-Smith, S. (1998) *Gender and Aquaculture in Lao PDR: A Synthesis of a Socio-economic and Gender Analysis of The UNDP/FAO Aquaculture Development Project LAO/97/007*. FAO, Rome.

Nam, S., Vibol, O., Viseth, H., and Nandeesha, M. C. (1997) Women in small-scale aquaculture in Southeastern Cambodia. *In:* M. C. Nandeesha and H. Hanglomong (eds) *Women in Fisheries in Indo-China Countries*, pp. 115-125. PADEK, Bati Fisheries Station, Phnom Penh, Cambodia.

Nandeesha, M. C. (1994a) Aquaculture in Cambodia. *Infofish International* **2**: 42-48.

Nandeesha, M. C. (1994b) Women in Cambodian aquaculture. *In*: M. C. Nandeesha and N. Heng (eds) *National Workshop on Women in Cambodian Fisheries*, pp. 116-123. PADEK, Cambodia, Bati Fisheries Station.

Nandeesha, M.C. (1996) Women in fisheries in Indo-China countries. *Infofish International*, **6**: 15-21.

Ng, C. (1989). *Women in Development: Malaysia*. Asian Development Bank, Manila, Philippines.

Overholt, C., Cloud, K., Anderson, M. and Austin, J. (eds) (1995) *Gender Roles in Development Projects: A Case Book*. Kumarian Press, West Hartford, Connecticut.

Rao, A., Anderson, M. and Overholt, C. (eds) (1991) *Gender Analysis in Development Planning: A Case Book*, Kumarian Press, Connecticut.

Ruddle, K. (1993) The impacts of aquaculture development on socio-economic environments in developing countries: towards a paradigm for assessment. *In* R.S.V. Pullin, H. Rosenthal and J.L. Maclean (eds) *Environment and Aquaculture in Developing Countries. ICLARM Conference Proceedings 31*. Manila, pp. 20-41.

Samet, H. (1997) Women in Cambodia and their contribution to agriculture / fisheries. *In*: *Women in Fisheries in Indo-China Countries.* M. C. Nandeesha and H. Hanglomong (eds), pp. 44-47. PADEK, Bati Fisheries Station, Phnom Penh, Cambodia.

Sen, A. (1999) *Development as Freedom.* Alfred A. Knopf, New York.

Shaleesha, A. and Stanley, V. A. (1998) Women in Indian fisheries. Paper presented at the Fifth Asian Fisheries Forum: Fisheries and Food Security Beyond the Year 2000, Chiang Mai, Thailand.

Siar, S. V. and Caneba, L. M. (1998) Women and the question of sustainable development in a Philippine fishing village. *International Journal of Sustainable Development and World Ecology*, pp. 51-58.

Siason, I. M. (1998) Women in fisheries in the Philippines. Paper presented at the Fifth Asian Fisheries Forum: Fisheries and Food Security Beyond the Year 2000, Chiang Mai, Thailand.

SDWW (undated) *Women and The Green Revolution*. Vol. 1999. Women in Development Service.

Shang, Y.C., and Tisdell, C.A. (1997) Economic decision making in sustainable aquaculture development. *In* J.E. Bardach (ed) *Sustainable Aquaculture*, pp.127-148, John Wiley and Sons, New York.

Song, Z. (1999) *Rural Aquaculture in China*. Rep. No. RAP Publication1999/22. FAO Regional Office for Asia and the Pacific, Bangkok, Thailand.

Sotto, F. B., Laron, C., Lim, M., and Heeger, T. (1998). Women's participation in sapyaw (haul seine) fishery on the eastern coast of Barangay Sillon, Bantayan Island, Cebu, Philippines. Paper presented at the Fifth Asian Fisheries Forum: Fisheries and Food Security Beyond the Year 2000, Chiang Mai, Thailand.

Sujatha, K. and Dixitulu, J. V. H. (1998) Role of women in changing trends of fisheries industry - a case study of selected coastal villages in North coast of Andhra Pradesh, India. Paper presented at the Fifth Asian Fisheries Forum: Fisheries and Food Security Beyond the Year 2000, Chiang Mai, Thailand.

Suvarna, M., Bhatta, R., and Rao, K. A. (1998) Gender perspectives on fisheries and livelihood in coastal Karnataka, India. Paper presented at the Fifth Asian Fisheries Forum: Fisheries and Food Security Beyond the Year 2000, Chiang Mai, Thailand.

Suwanrangsi, S. (1998) Technological changes and their implications to women in fisheries. Paper presented at the Fifth Asian Fisheries Forum: Fisheries and Food Security Beyond the Year 2000, Chiang Mai, Thailand.

Tewari, R. and Singh, R. (1998) Status of fisherwomen in West Coast of India. Paper presented at the Fifth Asian Fisheries Forum: Fisheries and Food Security Beyond the Year 2000, Chiang Mai, Thailand.

Townsley, P. (1998) Aquatic resources and sustainable rural livelihoods. *In*: D. Carney (ed.). *Sustainable Rural Livelihoods, What Contribution Can We Make?* Department for International Development, London.

Tungpalan, M. T. V., Mangahas, M. F., and Palis, M. P. E. (1991) Women in fishing villages: roles and potential for coastal resources management. *In:* L. M. Chou, T.-E. Chua, H. W. Khoo, P. E. Lim, J. N. Paw, G. T. Silvestre, M. J. Valencia, A. T. White and P. K. Wong (eds) *Towards an Integrated Management of Tropical Coastal Resources: the ASEAN/US Technical Workshop on Integrated Tropical Coastal Zone Management*, pp. 237-243. ICLARM, Manila, Philippines, National University of Singapore, Singapore.

Upton, M., and Susilowati, T. (undated) The role of women in small-scale fishery development in Indonesia. pp. 125-166. Reference incomplete.

Venkataraj, J. (1998) Scenarios of Indian women in fishery science. Paper presented at the Fifth Asian Fisheries Forum: Fisheries and Food Security Beyond the Year 2000, Chiang Mai, Thailand.

Vorin, E., Sina, N., Sory, S., Sothirin, P., Veasna, K., Khutsomaly, Sipha, P., Vida, T. and Gum, W. (1997) Women in Fisheries in Battambang Province. *In:* M. C. Nandeesha and H. Hanglomong (eds) *Women in Fisheries in Indo-China Countries*, pp. 85-90. PADEK, Bati Fisheries Station, Phnom Penh, Cambodia.

Voeten, J. and Ottens, B.J. (1997) Gender training in aquaculture in Northern Vietnam: A Report. *Gender, Technology and Development* **1**, 413-432.

Young, K. (1993) *Planning Development with Women: Making a World of Difference*. Macmillan, London.

Zaman, F. (1998) *Dissemination of NOPEST Activities Study and Sustainability Study*. CARE Bangladesh, Dhaka, Bangladesh.