

Participation of Women in Aquaculture in Three Coastal Districts of Bangladesh: Approaches Toward Sustainable Livelihood

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Abstract: Women's contribution to small-scale aquaculture is often unrecognized and the real benefits from their involvement in activity are not objectively assessed. The present study focused on the women's participation in Danish International Development Assistance (DANIDA) assisted small scale aquaculture projects in three coastal Districts of Bangladesh. The findings reveal that in most projects women's role is significant. Women have more knowledge in terms of the management of the production for example, scheduling, harvesting, feeding frequency, removal of unused feeds, etc. Women also have been found directly involved in preparation of cage and maintenance, identification of male and female prawn, procuring of good quality seed and stocking of fish. Women in some programs are also found to be selling fish on their own. Most of the women sell by the farm-gate, local bazaar and to the middlemen. The most important positive aspect of change is that now women participants' family income has increased which is mostly used for food, health and education. Women's participation in project, according to the findings, ensures certain extent of social and economic empowerment in the rural societies. The present fisheries project fails to take into account how the women participants are going to continue when projects are withdrawn. Women would like to be engaged in aquaculture after the project support is withdrawn though there is not much scope for savings which could be used as investment to continue their involvement. However, they expressed that they would like to sustain through NGO loan, local moneylender and petty personal savings.

Key words: Women • Aquaculture • Livelihood • Sustainable Development

INTRODUCTION

Bangladesh is fortunate enough having an extensive and huge water resources scattered all over the country in the form of small ponds, beels, lakes, canals, rivers and estuaries covering an area of about 4.34 million ha [1]. Inland aquaculture together with coastal shrimp culture accounted for 40% and the inland open water capture fisheries contributed 40% of the total production [1]. Development of these two sectors is vital in the context of making a major impact on production and economic well being of the rural people of the country. Fisheries are the second sub-sector of Agriculture in Bangladesh. The export of fisheries is also the second of export earnings and fish provide 60% of animal protein. Fisheries have a greater promise and maintaining a steady rise in

contribution to GDP. Presently 1.4 million people are engaged full time and 12 million as part-time in fisheries sector for livelihood and trade. Another little over 3 million fish and shrimp farmers are cultivating fish both at subsistence and commercial level [1].

In Bangladesh, about half of the population is female. Traditionally women have been playing a major role in agriculture. They have always been intimately involved in the agricultural production process. But a broad division of labour exists wherein women are mostly engaged in home based agricultural work while men perform agricultural activities in the field. It is revealed from many researches that besides regular household work 43% of women are involved in activities related to agriculture and 15% had taken agriculture as their second line occupation. It can therefore be assumed that about 58% of women are

directly or indirectly engaged in agriculture related activities [2]. Fishing could be a full time occupation of men; however, the involvement of women is also significant. Nevertheless, full time engagement of women in fisheries is no longer a rare scenario. They are directly or indirectly engaged in activities like making fishing nets, gears, repair and maintenance of the gears, sorting of fingerlings (especially in coastal areas), fish processing, transportation, marketing etc. Yet, most women in fisheries lack access to physical and capital resources, to decision-making and leadership positions, to training and formal education. Access to these critical resources and services would improve the efficiency, profitability and sustainability of their activities. Although large-scale fisheries development projects, mechanization and improved technology may increase productive capacities in fisheries but at the same time they can also increase the post-harvest workload of women. This extra burden is often undertaken without a rise in pay or at the expense of other possible income-generating activities. If a fisheries activity is enlarged or mechanized, it often becomes the domain of men. Women should be equal partners and productive participants in fisheries activities that will improve their own and their family's nutritional and living standards. They should be given the opportunity to acquire appropriate technologies that will enable them to contribute effectively to sustained fisheries development and growth [3]. It is therefore essential to increase women's participation and decision-making in fisheries development policies. Women and gender programs in fisheries cannot be left to mainstream gender and social welfare agencies as these seldom give priority to fisheries. Fish sectors must develop their own gender approaches. In addition, within the fish sectors, family and community-based approaches rather than women's activities are more likely to succeed and last [4]. Sultana *et al.* [5] describe the development of a women-led beel (seasonal water body) management committee in Goakhola-Hatiara, Bangladesh, from its inception as a women-only group formed by a women's NGO, Banchte Shekha, in 1997 to a more inclusive and women-led management committee in 1999. This project showed the impact of the program and possibilities, scope and constraint of such program on women.

In the coastal areas many women are engaged in collecting seed, transportation, marketing of the fingerlings [6-8]. It has created self-employment opportunity for women [9]. Dry fishes can be marketed during the lean season to make good return of their

investment. Besides, they can also buy fish from the trawler and deep-sea fishing boats directly and undergo the fish drying process. Marketing of the products can also be an important area for the involvement of women in greater number [10]. In most regions, the large boats used to fish off-shore and deep-sea waters have male crews, while women manage smaller boats. Many more women engage in fishing with small implements, wading and gleaning the shores for shellfish and collecting seaweed. In artisanal fishing communities, in addition, women are mainly responsible for performing the skilled and time-consuming jobs that take place on-shore, such as net making and mending, processing the catch and marketing it. The lack of women access to livelihood, assets and empowerment opportunities represent a further barrier in the livelihood systems of coastal fishing communities of Bangladesh. It seems important to identify key constraints hindering poor fishermen particularly women participation in relation to relevant institution and policy decision making processes in the marine fish distribution and marketing system [11].

Women play a crucial role in aquaculture production in many Asian countries. For example, in Cambodia, higher yields are obtained from fish ponds managed mainly by women. In Thailand and China, they often bear the sole responsibility of farm and aquaculture production because of male migration to cities. Small-scale aquaculture development is increasingly considered as a means by which the livelihoods of the poor, including women, could be improved. Improvement of livelihood through land-based production system seems quite feeble. The understanding of the poor's assets, in terms of human, natural, physical, financial and social capitals and strategies to cope with external factors such as shocks, trends and seasonality (i.e., vulnerability context) and institutional, commercial and cultural structures and processes, can provide avenues to target development strategies more adequately to the poor and support them to achieve new livelihood outcomes [12, 13]. Women's participation in aquaculture was recognized by many researchers largely from an instrumental perspective. In rural Asia, women are excluded from participation in community-level management of natural and other resources, from relations with external agencies and from political representation. Exclusion of women from management functions refrain from the strengthening of a community's capabilities. Also it ignores an important portion of social knowledge which leads to inefficiency in

resource use and retards the overall development of the community's social capital. The role of women in fisheries encompasses social and economic tasks both within and outside the family [5]. Women spend a major part of the day doing household chores. Some women are simultaneously involved in fisheries-related work, along with other income-generating activities. Women's involvement in income-generating activities to supplement the family income enables their male counterparts to work elsewhere [14].

Dias and Joseph [15] analyses the Bay of Bengal Project (BOBP) experience and found that the potential of women has often been overlooked and he urges for a greater involvement of NGOs to stimulate and catalyze women's activities. Mosse [16] describe about the women issue as half of the world is women. Bhaumik *et al.* [17, 18] identified the socio-economic problems as perceived by rural women-folk which impeded their participation in various inland fisheries activities in West Bengal, India. Chapman [19] describes the role of women in fisheries research and development in Lao PDR. Felsing *et al.* [20] analyses the role of women in the aquaculture sector in Southeast Asia. Aquaculture is becoming very important in the region but the role of women has often been adversely affected. Gopalakrishnan [21] describes women in India are involved in various facets of shrimp farming, including pond construction, seed collection, collection of feed materials and preparation of feeds, pond maintenance and post-harvest handling. Women in Cantho City are profitably involved in fish nursing activities [22]. It was observed that all 33 families who were nursing fish in 1995 hired women and that women contributed about 38% to total labour use. None of the women had vocational training in aquaculture. Nam *et al.*, [23] studied women's involvement in small-scale aquaculture development in Cambodia. Sultan [24] examines the role played by women in fisheries in rural environments in India. Areas in which women may be encouraged to participate include: capture fisheries; transportation, processing and marketing; nets and gears; and, ornamental fisheries. It is concluded that there is a need for a plan for the induction of women in the fisheries sector under various appropriate schemes. Yen [25] studied women in aquaculture research and development in Vietnam. Women have been deprived of good education, improved status and active participation in development due to the cultural barrier that existed in the traditional Cambodian society. However, the situation is rapidly changing and in recent years emphasis has been laid on providing opportunities for women participation in all sectors of fisheries [26].

Very little research has been conducted in Bangladesh to examine the nature and extent of the involvement of women in the fisheries sector and the impact of such involvement on women's status and gender relations in the household and in the community except [4, 5, 14, 27-32]. Little research has gone into the question of how fisheries affects the status of women and gender relations in the household and the community and how in turn these relationships influence the effectiveness of aquaculture in improving livelihoods and addressing poverty. This study makes an attempt to assess the situation of women in fisheries-related activities against the context of women's participation in DANIDA's (Danish International Development Assistance) four different projects. The general objective of this particular study is to assess the strengths, weakness, challenges and constraints women encounter while participating in various fisheries activities. The study will identify the existing social and cultural practices that create hindrances to women's participation in programme/project implementation and examine whether female-headed households are vulnerable to shocks and risks. Present study will focus on gender issues in fisheries and aimed to develop strategies to improve gender and livelihood goals through aquaculture development. It also will answer whether aquaculture development play a role in women's empowerment and social advancement.

MATERIALS AND METHODS

Study Area: Greater Noakhali district is located in the southeastern coastal belt of Bangladesh. Due to polderization and river erosion processes it has a diversified ecological context, especially in the estuary area of the Meghna which been subject to a dynamic process of land development over the last 50 years. River erosion has forced thousands of people to migrate from their original homelands to the char area to seek new livelihood opportunities. But development pressures and a complex land tenure situation has resulted in the marginalization of the rural poor and made them vulnerable to natural and economic perturbation [33].

The majority of the households living in the Noakhali chars belong to the extreme poor and have few livelihood options. Day laboring and rickshaw pulling or inshore fishing are the common, but limited occupations for male members of the households. It has been found that at least 16% of households in the char area settlement villages in Noakhali district are headed by women [34].

This situation is mainly due to their husbands' death caused by cyclone during deep-sea fishing or due to their migration to other places, leading them to abandon and divorce their wives. These households are extremely poor and struggle to make a living through a wide variety of livelihood strategies. Typically the occupations of women-headed households' are homestead gardening; duck, chicken and goat rearing; and making nets and fishing gears. Due to the absence of their male household partner and social restrictions to outside work many of these women are even compelled to resort to begging (around 20% of women-headed households based on a survey report of GNAEP). Children and some women in some cases are also engaged in prawn or shrimp fry catching from the rivers during the spawning season, but many are socially excluded and harassed. Support services from different government agencies for such women-headed household are largely absent. Their household resource status also discourages local-NGOs to consider them for micro-credit support. The most serious livelihood issue is human rights abuses committed against women-headed households in the char area including land or other resources grabbing by neighboring households.

Typically each household in the char areas has received 0.8 hectare of lands from government under a 99-year lease agreement. It was expected that those households would be able to improve their livelihood condition through the use of this land. However, in most cases households have lost at least a part of this land, which has either been sold in response to household crisis or has been handed over (sometimes forcibly) to local money lenders after the household failed to repay loans. Most households only retain a small piece of land around the homestead area with an area of about 20 decimal (800 sq.ft.), including a ditch. Typically all the women-headed households owned a small pond or ditch constructed like other households in the char area for raising the level of their homestead. These small ponds retain water only about 6 to 7 (June-January) months in the year. Such ditches are not suitable to cultivate carp or other species in grow-out systems due to low water retaining capacity, but they are suitable for nursery systems. The homestead area is also used for chicken rearing and vegetable cultivation following traditional methods. However, efforts to bring any improvements in livelihood of these poor people have been largely unsuccessful. Neither savings nor saleable household assets have been observed during the survey among any of these women-headed households.

The women are introduced to aquaculture through learning events which take place through a group approach (typically 15 households in a group) that allows them to learn from each other based on their hands-on experience gained from their own practice. During the learning sessions the Field Trainer creates different learning opportunities for the group related to the respective learning agenda and tries to increase participants' observation and learning skills. Besides the learning events all households receive intensive follow-up support from the Field Trainers, especially during the critical period of the crop cultivation or the household livelihood system. Moreover the project provides cross visits between the women-headed households to enrich their learning and confidence. The project also educates participants about source of services and how to seek out services based on their needs.

Study Programme: The Greater Noakhali Aquaculture Extension Project (GNAEP) is a project of the Government of Bangladesh (GOB) funded by the Danish International Development Assistance (DANIDA), under the overall responsibility of the Ministry of Fisheries and Livestock (MoFL) and implemented by Department of Fisheries (DoF). GNAEP covers the three districts of greater Noakhali itself, Feni and Lakshmipur which covers 14 mainland Upazilas and Hatiya Island. The GNAEP project document set a target of 25,000 farm households to be covered in a massive extension campaign through an intensive training effort and the provision of micro-credit. Almost 2000 fish farming groups have already formed throughout the greater Noakhali region covering almost 25,000 farm households with ponds. 42% of the primary pond operators are women. GNAEP has become increasingly concerned that carp poly culture alone will not have major impact on livelihood and that the households with ponds are not usually poorest in their communities. GNAEP has been trying to offer alternative livelihood opportunities to poorer households through aquaculture. Specific programs have been developed, such as the introduction of rice-fish especially rice-prawn farming, for particularly disadvantaged group such as women-headed households in the char lands of the southern Noakhali [35-38]. The estimated number of fishponds in the region, according to survey is about 172,015 ponds owned by 141,725 households, There are also around 40,000 hectares water logged paddy field (water retention 6-9 months). The overall goal of the project is to improve the lives of the poor fish farmers by raising income from their available water resources through promotion of improved aquaculture practices.

Since 2003 the Greater Noakhali Aquaculture Extension Project (GNAEP) has started to switch its attention more towards the hardcore poor, leading to a major concentration on the charlands. Besides addressing the poverty issues for poor char dwellers in general, GNAEP also recognized the specific needs of women-headed households. Women-headed households and has been initiated on a pilot basis under a special programme called MOWHILA (Making Opportunities for Women-headed Households for Improving their Livelihood through Aquaculture). Specific attention has given to women-headed households not only because they are the most vulnerable among the char dweller households but also because their development would serve as an example to other women to give them confidence in the household decision making process [39].

GNAEP's targeted interventions in aquaculture have allowed disadvantaged groups like women-headed households, residents of settlement village and inshore fishers to solve 'rights' problems such as access to land and water resources and obtaining a fair price for their products. Local government in particular, under GNAEP's experimental SETUP (Sustainable aquaculture through Union Parishad) program, has provided resources support to some of the poorest groups through local Community Based Organizations (CBOs) and has thus become more accountable to its constituents [40].

A component of GNAEP's new initiatives to improve the livelihoods of the hard-core poor in Greater Noakhali through aquaculture and aquatic resource based initiatives, in Cluster Resettlement Villages in the charlands. It is estimated that there are around 200 such villages, established through projects such as the Netherlands Funded Charlands Development and Settlement Project (CDSP) or directly by the agencies of the Government of Bangladesh. Many of this Cluster Villages (CV) has community ponds, which offer a valuable resource for livelihood. In 2003, GNEAP launched an intervention to add value to the fishery in the community pond. The project offered technical assistance and in some cases "Credit in Kind" for stocking of post larvae of prawn.

Since 2002, GNAEP has been attempting to diversify its activities to try to offer alternative livelihoods to poorer households through aquaculture. In this respect piloting trials were started with rice prawn culture in 2002 and a number of other alternatives are being tested out with small farmers. Cage culture is one of the alternative aquaculture systems seen as suitable for disadvantaged women within the project area.

Methods: The study covered the south east region of coastal Bangladesh. This study focuses on women's involvement in fish production and has assessed the involvement of women by reviewing four projects sponsored by DANIDA. All of the above-mentioned projects' goals are aimed to address the issue of sustainable livelihood for the poor. Both primary and secondary data were collected by using case studies, Focus Group Discussion (FGD) and semi-structured Interviews. The study was conducted in 14 Upazila of 3 Districts i.e., Greater Noakhali, Laxmipur and Feni. A total number of 8 FGD sessions have been conducted to have in-depth information on economic and social issues and women's involvement in projects. A total 176 semi structured interviews (MOWHILA-60, CBO-57, Cluster Village Programme-36, Cage Culture-23) have been conducted in four projects area.

RESULTS AND DISCUSSION

Bangladeshi women who are the subject of this study are the poor, illiterate, malnourished and disadvantaged rural women who constitute about 85% of all women in Bangladesh. The majority belong to small cultivator or tenant households. Many work as wage labourers on a part time or seasonal basis, usually employed by large landowners and generally receive payment in less than their male counterparts and some times in kind. Poor nutrition takes a disadvantage toll in children and women through hunger, sickness and loss of life; the mortality rates are 57, 90 and 3.5 respectively, per 1000 live births [41]. Against this health situation rural women work up to 14 hours a day on domestic chores. Usually it is women who do all post-harvest processing and look after livestock, poultry and kitchen gardening. Men generally own and manage family land and income and therefore, the women's contributions remain overlooked. In rural society women are classified as "dependent" of her husband's family rather than as an active and equal partner in the process of production. Women tend to be evaluated in terms of their reproductive, rather than their productive, capacities. Thus women's work is confined to the household and their role in household production is taken for granted and unremunerated. Despite being the de facto managers of the household, women have no say in the decision-making.

Women's dependence on men within the family and on the extended family is reinforced by asymmetrical rules of inheritance. Hindu women do not inherit property absolutely, but only receive a life interest in property and

cannot easily dispose of their share. Muslim women are entitled to an inheritance both as daughters and as wives but it is not equal to their men folk. However, if a married woman takes her share, a male guardian always controls it. For women, the absence of access to property, especially land, is a major problem in terms of participation in economic activities. It could be pointed out that policy makers do not take rural women's absence of right to land into consideration. Policy makers assume that male members in the family would allow their womenfolk to use the land. The research findings, however show that many women are handicapped in agricultural and forestry programs where land is required to become participants [42, 43].

Halim and Ahmed [4] studied the involvement of women in DFID funded aquaculture projects and found that all five projects had largely ignored the gender dimensions. Although women's contribution to family income has increased, their role in decision making in the family has not increased significantly. However, the positive aspect of the change was that women had a slightly larger role in decision-making in family affairs, though very little of this ability finds expression in major decisions such as on the purchase, lease or sale of land, sharecropping, changes in occupation, marriage, children's education, etc. All fisheries projects fail to take into account women's low status with regard to access to resources, decision-making power, women's contribution within and outside the household and their legal and political status [4].

Another aspect of the economic marginalisation of women is that many women with comparable skills and experience are confronted with the wage gap, whereby they lag behind men in income and career mobility in the formal sector. Equal pay for equal work or work of equal value has not yet been fully realized. Gender discrimination in hiring and in promotion in the work place still exists. Many rural women, for example women labourers in the shrimp sector, work with low levels of income and little job and social security. A progression in the professions is still difficult for women, due to the lack of structures and measures that take into account maternity and family responsibilities. Effective implementation of gender-sensitive legislation and practical support system is still hugely inadequate. GNAEP's new initiatives to improve the livelihoods of the hard-core poor in Greater Noakhali through aquaculture and aquatic resource based initiatives brought about some changes which have affected the women positively in a number of ways are as follows:

Increased Participation of Women in Productive Economic Activities: In Bangladesh, fishing is the most important occupation in the non-farm sector, but only a small fraction of the total female population of Bangladesh is involved in fisheries as primary occupations [44]. The role of women in fisheries encompasses social and economic tasks both within and outside the family [5]. Various studies conducted in Bangladesh show that 43 percent of rural women are contributing to agriculture and fisheries-related activities as secondary and tertiary occupations, besides performing their household responsibilities. Rural women also are contributing to seasonal fish drying and occupation that is largely restricted to women. Women spend a major part of the day doing household chores. Some women are simultaneously involved in fisheries-related work, along with other income-generating activities. Women's involvement in income-generating activities to supplement the family income enables their male counterparts to work elsewhere [14].

While fishing is traditionally perceived to be a full-time occupation of men, the involvement of women is also significant, although seldom acknowledged adequately. Along with men, women are engaged in activities like making of fishing nets, repairing and maintaining other fishing equipment, sorting of fingerlings, fish processing, transportation and marketing. Women in Bangladesh are also involved in aquaculture production and have started taking cage culture/pen culture in flood plain beels (marshy lands). Women play a crucial role in aquaculture in Bangladesh and in many Southeast Asian countries. For example, in Cambodia, higher yields are obtained from fishponds managed mainly by women. In Thailand and China, women often bear the sole responsibility of fish farm and aquaculture production, because of male migration to the cities. However, women's contribution in aquaculture is often unrecognized and the actual extent of benefits from their involvement in such activities is seldom acknowledged or assessed. This is quite disheartening because small-scale aquaculture development is increasingly considered as a means by which livelihood of the poor, including women could be addressed in a substantive way.

Table 1 shows the number of years women are involved in the fisheries programs. In total 24 percent women are involved for one and a half year. In terms of the programme 52 percent women belonging in the cage culture have been working for two years, followed by 35 percent women in MOWHILA programme and 35 percent women in CBO for one and half year. Table 2 depicts that women respondents (91 percent) are mostly

aware of various programme management. However, in this regard management implies involvement in feeding, scheduling, etc. but not participation in programme design and in implementation. Good scores on seed quality, time of stocking by MOWHILA group and general management are pleasing. Probably time of stocking for cage culture not that important. Majority of the women respondents i.e., 47 percent sell fish by the farm gate. A large number of respondent (41 percent) sell their fish through middlemen. There are now a handful prawn receiving centre in each upazila (Table 3). Table 4 shows women's involvement in the project activities, 50 percent of the respondent said that they spent 1-3 hours per day in the project activity, 27 percent of the respondent reported that they work up to 5-8 hours every day. It seems that the members of cage culture group don't spend much time maintaining their cages. In some developing countries, such as Ghana and the Philippines and in parts of other countries, including India, Thailand, Sri Lanka, Cuba and most of West Africa, there are probably as many women engaged in fisheries as men [45]. In shrimp farming activities, women help empty the nets and sort the catch, they gut, clean and sell the fresh fish on the beach and they handle all the processing, which can be smoking, salting, drying, fermenting or a combination of these. For example, in Tombo, Sierra Leone, 75% of the village women are directly involved in fish processing [45].

Practically in all countries, both developing and developed, with an export oriented fishing industry, it is the women who work as low-paid labor in the processing lines to sort and pack shrimp and to dress fish for canning and freezing. Management and supervision are very much a male preserve. In some countries, fish marketing forms the greatest single source of income for women. In some places, such as Cape Verde, women are responsible for all marketing stages, from landing all the way to the consumer. In Latin America and the Caribbean, women handle most of the retailing. A look at FAO [45] report on the organization of fish marketing in Madras fishing

Table 1: Duration of Involvement in Various Programs

Duration	MOWHILA	CBO	Cluster	Cage	All
Less Than Six Months	-	5.3	11.1		3.98
Less Than One Year	-	21.1	11.1	21.7	12.50
One Year	18.3	22.8	22.2		18.18
One & Half Year	26.7	35.1	16.7		23.86
Two Year	35.0	8.8	8.3	52.2	23.30
Two & Half Year	11.7	1.8	5.6		5.68
Three Year	8.3	5.3	25.0	26.1	13.07
Total	100.0	100.0	100.0	100.0	100.00

Table 2: Women's Knowledge about Fisheries Maintenance

Knowledge	MOWHILA	CBO	Cluster	Cage	All
Preparation of Prawn	5.0	24.6	-	39.1	14.77
Cage and Maintenance					
Identification of Prawn	11.7	5.3	13.9	-	8.52
Good Quality of Seed	45.0	15.8	36.1	17.4	30.11
Time of Stocking	61.7	31.6	30.6	13.0	39.20
Stocking Density	26.7	17.5	13.9	13.0	19.32
Management	93.3	93.0	88.9	82.6	90.90
Time of Harvesting and Methods	31.7	123	19.4	17.4	21.02

Table 3: Selling Places of Fish

Selling Places	MOWHILA	CBO	Cluster	Cage	All
Bazar	26.7	19.3	5.6	26.1	19.84
Farm Gate	51.7	21.1	61.1	73.9	46.59
Middle Man	63.3	40.4	30.6	-	40.90
Cooperative Agency	1.7	5.3	-	-	2.70
Danida Agents	5.0	3.5	-	-	2.84

Table 4: Time Spent (per day) in the Project Activities

Hours	MOWHILA	CBO	Cluster	Cage	All
1-3 Hours	55.9	31.6	38.9	100.0	50.00
3-5 Hours	15.3	24.6	25.0	-	18.18
5-8 Hours	23.7	35.1	36.1	-	26.70
8-10 Hours	3.4	8.8	-	-	3.98
10+ Hours	1.7	-	-	-	0.56
Total	100.0	100.0	100.0	100.0	100.00

harbor gives a good idea of the various marketing activities performed by women in India. Women can be auctioneers, retailers, trash fish vendors and even dealers for export [46].

The pilot initiative of GNAEP has widened the scope of productive activities for the whole family through increasing the women's decision-making ability in household resource mobilization. Women are involved in a greater variety of homestead-based agricultural activities, including some other IGA activities, than previously. Women have found that technologies related to carp, prawn and tree or vegetable nurseries are easy to learn and handle. These activities have become a household-based enterprise. Vegetable growing in the homestead is a traditional practice, but with improvements it has become an income-generating activity. Moreover, the introduction of integrated farming systems in local area has generated an increased demand for vegetable and tree seedlings, thus bringing more income to the women who produce them.

More than 60% of the members were found to be 25 to 40 years indicate median age group. Peoples at this age with education or training or skills, good health and commanding power on the society with their talent can affect household overall wellbeing and livelihoods. Women aged between 50 and 55 are less in number. More than 55 years old women are not a member of Cluster and Cage culture. Relatively more women aged between 30 to 39 (45 percent) are involved in fisheries project (Table 5). In total programs women respondents are mostly married i.e., 73 percent are participating in various programs. Almost 47 percent of the single (widowed, divorced and deserted) women respondents belong to MOWHILA programme, followed by 28 percent of the women respondents are involved in cluster village programs. However, it is to be noted the fact that many engaged in the MOWHILA programme are older women, which also links with their status as widows (Table 6). Table 7 shows that in comparison to CBO, Cluster and Cage culture most of the female-headed households are within the MOWHILA programme.

Age of the household members is important because of the differential growth rate of the members which strongly affects household income, expenditure and vulnerability. Sex ratio is also an important aspect to the household because it determines the demographic changes that are taking place within the population and household. Typically the higher the male members, the greater chances for higher farm income to the household. A female child typically increases the vulnerability of the household due to dowry. The initial results of this pilot intervention in livelihood development for women-headed households has indicated that such interventions centered around small-scale aquaculture can be effective in addressing the issues which confront poor women. The intervention is not only bringing benefit to the widowed women but also acts as an example for the whole women's community. The Project's experience to date is that results of the interventions are stimulating other women to undertake similar types of activities.

The sustainability of such development activities for women headed households depends on shifts in attitude and more significantly, in behavior in decision making. The strategy of GNAEP is to empower women throughout the process of experimentation and discovery. This leads to women increasing their understanding about their livelihood strategies. Once participants have accepted, evaluated and adopted techniques of how to address issues they are likely to sustain these techniques with or without the project help. Moreover this pilot initiative is

Table 5: Age group of respondent

Age	MOWHILA	CBO	Cluster	Cage	All
20-24	3.30	5.30	2.80	8.70	5.55
25-29	16.00	15.80	19.40	21.70	17.61
30-34	21.70	22.80	27.80	26.10	23.86
35-39	21.70	24.80	13.90	17.40	20.45
40-44	16.70	19.30	19.40	17.40	18.10
45-49	6.70	7.00	16.70	4.30	8.52
50-54	10.00	-	-	4.30	3.98
55+	3.30	5.30	-	-	2.84
Total	100.00	100.00	100.00	100.00	100.00
Mean Age	36.30	35.98	35.06	32.91	35.50

Table 6: Marital Status of Respondent

Marital Status	MOWHILA	CBO	Cluster	Cage	All
Single	1.7	1.8	-	-	1.14
Married	51.7	87.7	72.2	95.7	73.30
Widowed	30.0	5.3	22.2	4.3	17.05
Divorced	11.7	3.5	2.8	-	5.68
Deserted	5.0	1.8	2.8	-	2.84
Total	100.1	100.7	100.0	100.0	100.00

Table 7: House Hold Headships

Headship	MOWHILA	CBO	Cluster	Cage	All
Female	66.7	17.5	36.1	4.3	36.36
Male	33.3	82.5	63.9	95.7	64.64
Total	100.0	100.0	100.0	100.0	100.00

providing the project with broader practical and conceptual abilities which it can use for working with the hard core poor in the char lands and Island area on a larger scale.

Increased Household Income: Due to increased involvement in more productive activities household income have been raised significantly. Project monitoring indicates that the average income of the households can increase by Tk. 8000 so far only by operating a prawn nursery in a 400 sq. m. pond for three to four months. It is hoped that the income from other options like homestead gardening, tree nursery or carp nursery will also be significant in due time. This increased income is enabling households to purchase their livelihood needs and also in some cases enabling them to recover their lost productive assets. It is interesting that 78.3% of households in the cage culture groups have higher incomes and 65.2% fall in the non-poor category. The north of Noakhali is certainly better off. The issue here is whether we have caught the poorer households engaged in cage culture.

Interestingly, in the subject assessment over 50% of these cage culture households see themselves as poor or very poor, which does suggest they are less well-off in the comparative perspective of their communities. It is probably no surprise that the CBO women members may be among the better-off.

Majority of the women respondents involved in Cluster programme (88 percent) belong to the poor wealth category, followed by MOWHILA (76 percent) and Cage culture (52 percent). These respondents explained economic situation of their household in terms of the ownership of land and valuable assets. Some middle category women respondents come from CBO and Cage culture (Table 8). Table 9 and 10 explain the household wealth category of the women respondent. MOWHILA and CLUSTER is the most distressed group as they belong to the lower level wealth category (77 percent and 72 percent). Cage culture, on the contrary is in better condition as 65 percent household belong to non- poor wealth category. According to Bangladesh Economic Review 2005, the annual poverty line income for rural household is 32,371.00 taka (Tk.562 x 4.8 (number of family member) x 12) and national level of poverty line is 44.5 percent.

Capital: Of the sample only few have limited access to credit. Most had access to the local money lenders (dadon) but no access to the Bank and NGO's. Regular liquid flow of capital to household was much lower than the per capita income. Small savings indicates less capability for achieving expected outcomes for example, in capability of coping with short term adversity. It also denotes less availability of available assets to convert into other type of assets. Indeed, small savings in all forms by few household denotes their less capability to save from surplus income as most household spend their maximum income to meet their basic needs. The dependency for credit to local money lender indicates less access to and poor performance of public money for poverty alleviation of the rural poor. Borrowing money from the local moneylender involves tremendous risks as lender can get hold of the land if payment is not made within time. However, it seems that after GNAEP came into the scenario of helping MOWHILA group, some of the MOWHILA members are capable of getting back the hold of the land previously grabbed by the money lender as their income is increased substantially after getting involved with prawn farming.

Table 8: Socio- Economic Category of Respondent

Wealth Category	MOWHILA	CBO	Cluster	Cage	All
Middle	1.7	24.6	2.8	13.0	10.80
Lower Middle	21.7	29.8	8.3	34.8	23.30
Poor	41.7	36.8	55.6	30.4	41.48
Extreme					
Poor	35.0	8.8	33.3	21.7	24.43
Total	100.0	100.0	100.0	100.0	100.00

Table 9: Economic Profile of the Respondent

Income (Tk.)	MOWHILA	CBO	Cluster	Cage	All
Up to 12000	23.3	7.0	30.6	21.7	19.32
12001-24000	38.3	28.1	25.0	-	27.27
24001-36000	18.3	21.1	13.9	-	15.90
36001-48000	5.0	22.8	5.6	-	10.23
48001 tk.+	15.0	21.1	25.0	78.3	27.27
Total	100.0	100.0	100.0	100.0	100.0
Average	35,503	48,485	35,395	13,6674	

Table 10: Wealth Categories of Respondents

Wealth Category	MOWHILA	CBO	Cluster	Cage	All
Poor	77.3	49.3	72.2	34.8	58.52
Up To 32371 Tk.					
Non Poor Category	26.7	56.1	27.8	65.2	41.48
32371 Tk.+					
Total	100.0	100.0	100.0	100.0	100.00

Table 11: Initial Investment to Continue Programme

	MOWHILA	CBO	Cluster	Cage	All
Personal Savings	96.7	93.0	97.2	100.0	96.02
Bank Loan	3.3	21.1	-	-	7.95
Ngo Loan	66.7	36.8	41.7	17.4	45.45
Money Lender	36.7	21.1	16.7	4.3	23.30
Other Sources	3.3	-	-	-	1.14

Table 12: Credit Sources

	MOWHILA	CBO	Cluster	Cage	All
Bank Credit	16.7	47.4	11.1	-	23.30
Ngo Credit	58.3	73.7	50.0	34.8	58.52
Cbo Credit	23.3	57.9	5.6	-	27.84
Money Lender	33.3	31.6	22.2	13.0	27.84
Other Places	1.7	5.3	-	4.3	2.84

Ownership of non-productive physical assets such as jewelaries, denotes improved trend of livelihoods, ability to buy and off-course the existence of dowry. Interesting that ownership was found mostly among the poor household. Household having these substitute physical assets are in a better position in order to encounter sudden shocks resulting from any damage, drought or accident. Table 11 shows the investment sources of the respondents, 96 percent respondent will invest from their personal savings, 23 percent will take loan from money

lenders. It seems that most women think that they can finance their operations through personal savings. Table 12 shows the credit sources of the respondent, 59 percent reported will take credit from NGO, 28 percent informed they will take loan from money lenders, followed by 28 percent from the CBO. NGOs work in the area, but tend to neglect the poorest as not creditworthy. GNAEP has therefore helped the women to get interest-free credit in kind from the private sector.

Social capital captures community and wider social claims on which individuals and household can draw by virtue of their belonging to social groups of varying degrees of inclusiveness in society at large. It facilitates and substitutes diverse income portfolios [47]. Social capital was measured in terms of membership in different organizations and kinship among the members. Few members are also a member of CBO. Few members are also members of local club and also few have good relationship with the local elites for example, UP chairman.

Land Ownership: Members of MOWHILA and CV owned land. No household owned a land bigger than 2 acre. This small land holding indicates that they have very limited chance for producing food and on-farm income. Ownership of cultivable land by only very few people means remaining household rely on purchased food for living. This also implies large dependency of most household on non-crop or non-rice income for making means of living and less chance of making means for producing food and shelter and reducing risks. This kind of land ownership off-course affects household income pattern and food security. Increase of rural non-farm and /or non-crop income is an agreement with the findings of Reardon *et al.* [48]. BCAS found no land occupancy by a large group of household among shrimp fry collectors and poor peoples living in the shrimp producing areas in Khulna district [32].

The floor of the most members was earthen as expected. Household is on the khas land. They got the land ownership or on the verge of getting lease (locally known as BONDOBOSTO) for 99 years from the GoB. CDSP I and II has this kind of programs and off-course ASROYAON project of Govt. of Bangladesh. Nijera Kori (an NGO) has been working on this in the southern most area of Noakhali. They tried to make rural poor/landless people to be motivated and protect those lands from the so called land grabber (BHUMI DOSHSHU). Ownership of trees particularly timber might be useful for coping

seasonal or sudden shocks for example capital loss resulting from the fish mortality or loss due to floods. Trees can also be sold to encounter emergency or to face sudden shocks such as health care and medicine, poor harvest and natural disasters.

Livelihood Strategy and Income: Household members were found to engage in diverse portfolios of income generating activities, for example, farming, vegetable gardening, fish seed trading and off farm activities. In addition, traders were also found to pursue a diverse means of income generating activities for constructing the building blocks of living such as crop farming, fish farming, vegetable gardening, labor selling, petty business during off season. These diverse occupations could be in response to the paucity of on-farm employment opportunity which has driven them towards non-farm to non-crop strategies due to poor human capital for getting alternative or off-farm options. However, the large dependency on fish/prawn farming indicates the trend of self employment on traditional crop sector. Fish/prawn farming as a single category of occupation stood on the top of the list indicating fish/prawn farming is the main income source of these MOWHILA and cluster village (CV) members. As a result, improvement of the livelihoods can be achieved by improving the sustainable income from fish farming through improved culture technique.

The lowest income groups are from the Southern Noakhali as Northern part of this district is slightly better off. In the northern part cage culture certainly brought income other sources and on-farm found to be higher in southern part that could be related to cash crop production. Household with large land holdings had higher on-farm activities indicates that ownership of land might generate more viable living by providing regular income flow to the household. Land ownership might also enhance more income and on-farm income gradually increased with increased land holdings. Most members encountered difficulties to provide adequate food for their household. Having difficulties for providing adequate food to the household members by this high percentage of members could be due to their less or no food from own production due to low land holdings and low share of income for purchasing food. February, march and April at the beginning of the year and October, November and December at the end of the year were found to be most difficult months to fed the household members. This

might be related to the unemployment as the people do not have agricultural employment in these months. This also indicates the importance of income from the prawn fish farming to the food security of household for nearly half the year.

The livelihoods of this large group of peoples are most vulnerable as any kind of sudden shocks or disruptions can damage the income source and will bring tragic consequences. Bene [49] proposed the “two pillar” paradigm of circular logic of poverty of fishers. Usually the poor choose fishing as livelihood strategies and the fishers are poor because they are fisherman. This logic indicates that poor adopt fishing as livelihood strategies since this does not require much technical knowledge or asset accumulation. They are also unable to earn from off-farm sources for making positive livelihood outcomes. As far as the seasonal hardship is concerned 60 percent respondent said that Aswin and Kartik (September-October) is the most seasonal hardship for MOWHILA, CV's and CBO's but monsoon (June~August) was bad time for cage culture (Table 13).

Less Vulnerability to Social Risks: When individual women-headed households come together into a group, the group enables them to speak out. The linkage between groups and Union Paris had brought about with the facilitation of the Project seems to be effective in terms of allowing the members to raise their voices in the disputes which affect them. The group activities have allowed a sharing of their individual social problems among the participating members and have led them to search for the solution of the problems collectively. Women-headed household groups have become more aware about their rights and more able to communicate their complaints to the local UP members individually or at times collectively. The Project has found that soon after formation of their groups, the incidence of misconduct against them has reduced dramatically, because UP members are giving attention to the groups' needs if only to gain their support in the next election. Through such process of improvement of human rights among women-headed households has been noticed. There is evidence that the local community is also helping to resolve many social issues related to women-headed households. Table 14 shows the awareness of the respondents about their rights, respondents are much aware about divorce and dowry 78 and 72 percent respectively. They have less awareness on trafficking and reproduction rights, which

is 5 and 2 percent only. 93 percent respondents attend to village doctor and midwife, respondent of the MOWHILA program are attended by Kobiraj. This table also shows high dependence on Kobiraj and spiritual healers by the MOWHILA group (Table 15). Table 16 shows the most alarming barrier for the respondent is the religious barrier 11 percent followed by socio-culture barrier 10 percent. 81% respondent did not report any form of barrier.

Gender issues in fisheries can be seen from two perspectives. One is an instrumental perspective. The other is an empowerment perspective. Instrumental perspective sees women as a vital with a change in gender power relations in the household and in the society. The goal of the empowerment perspective is to challenge the existing gender relations. This can be achieved through development projects, including aquaculture activities. Therefore, from this perspective, it is important to examine whether more equal relationships between genders have been achieved through the uptake of aquaculture by women, whether their choices regarding the management of the activity and the household have increased and whether women's self-esteem and self-confidence have improved so that they can be in charge of their own lives. Women able to access knowledge and information, to make decisions on household investment and expenditure, as well as having decision making power in the community, are some of the indicators to judge advances in their empowerment. Empowerment perspective and the instrumental perspective do not exclude each other. On the contrary, they complement each other. Women enabled to participate in aquaculture activities will be in a better position to take part in decision making processes. 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 their aquaculture activities.

Increased Food Security of Household: Women play important roles in food security especially in rural areas. Any economic strategy for agriculture and rural employment linked to poverty alleviation and food security must, therefore, consider gender equity and women's contributions as central issues in productivity and access to resources. A general view of Asian women's status reveals a scenario of diversity, characterized by disparity in women's economic achievement, political participation, educational advancement and social articulation. The gains in these areas, especially among urban women, tend to mask the

Table 13: Seasonal Dimension of Economic Hardship

Season	MOWHILA	CBO	Cluster	Cage	All
No Response On Hardship	21.7	10.5	16.7	8.7	15.34
Monsoon (June-August)	10.0	8.8	-	87.0	17.61
Aswin and Kartik (Sept.-October)	60.0	66.7	83.3	-	59.09
Winter (November- January)	3.3	14.0	-	4.3	6.25
All Year	1.7	-	-	-	.57
Not Much Hardship	3.3	-	-	-	1.14
Total	100.0	100.0	100.0	100.0	100.00

Table 14: Awareness of Rights

	MOWHILA	CBO	Cluster	Cage	All
Divorce	84.7	75.4	77.8	78.3	78.98
Dowry	78.0	66.7	69.4	82.6	72.72
Acid	49.2	15.8	33.3	8.7	29.55
Trafficking	3.4	7.0	8.3	4.3	5.68
Voting Rights	44.1	15.8	25.0	13.0	26.70
Reproduction Rights	20.3	5.3	16.7	4.3	2.27

Table 15: Health Care System

	MOWHILA	CBO	Cluster	Cage	All
Hospital\ Clinics	70.0	59.6	52.8	30.4	57.95
Village Doctor\ Midwife	93.3	91.2	86.1	91.3	90.90
Private Sector	30.0	19.3	8.3	-	18.18
Kobiraj	65.5	47.4	30.6	65.2	52.27
Spiritual Leader	25.0	3.5	19.4	17.4	15.91

Table 16: Socio-Cultural Constraints Encountered by Women

Barriers	MOWHILA	CBO	Cluster	Cage	All
Socio-Cultural	16.7	3.5	11.1	8.7	10.23
Religious	16.7	5.3	8.3	17.4	11.36
Extra Work	10.0	15.8	2.8	4.3	9.66
Non Cooperation	1.7	5.3	-	-	2.27
No Time To Look After Child	-	-	-	-	0.57
Attitudinal Problem From Society	5.0	-	-	4.3	1.70
Negative Attitude From Elder Member	-	1.8	-	-	0.57

Table 17: Use of Women's Earning

Income Used	MOWHILA	CBO	Cluster	Cage	All
FOR FOOD	100.0	84.2	86.1	100.0	92.05
FOR CLOTHS	95.0	70.2	72.2	30.4	73.86
FOR EDUCATION	40.0	35.1	22.2	39.1	34.66
FOR LUXURY	43.3	12.3	19.4	4.3	23.30
FOR PETTY CASH	13.3	8.8	8.3	8.7	10.23
FOR HEALTH	65.0	15.8	52.8	21.7	40.00
FOR OTHER	1.7	1.8	5.6	-	2.27

constraints that are often confronted by rural women within the region. Rural women in Asia continue to struggle under the dual burden of production and domestic labour and are confronted by poverty, lack of access to productive resources, illiteracy, high health risks and denial of market access in profitable food sectors. The status of women in Asia could be summed up as "duality" characterized by the "coexistence of gender equity gain and gender equity gap amid economic

prosperity and abject poverty". Women are important productive workers in the world economy, making up about one-third of the labour force. Women in fishing communities too play an important role in fish production all over the world. Their role encompasses social and economic responsibilities, both within and outside the family. There are essential differences between the economic, social and political roles of men and women in most rural communities especially in fishing communities.

In general the male perception, fostered by cultural traditions and social biases, that women cannot be heads of household continues to persist and creates barriers to access to economic opportunities for these women. Despite of the fact that there are difficulties for women to be involved in fisheries, there is a vast potential for women to contribute meaningfully in the fisheries sector. Involvement of women in all development endeavors including agricultural is seen as a priority in development paradigm.

All the participants have reported that the increased income from their activities has been primarily spent for ensuring household food security as the priority. They recognize that their food security is far better than before. Increased production of vegetable and fish from household resources allows them to consume a certain portion of the production which far greater than before. The year-round vegetable production approach undertaken by women-headed households ensures a regular supply of vegetable to the households, contributing to improvement in their diets. The application of pesticides in the process of vegetable cultivation is common but the production systems followed by the households is organic. These pesticide contaminant-free vegetables are not only safer for its purchasers, but also for the households' consumers.

There is a major difference between the MOWHILA and Cluster Village groups and the CBO group. The first two are engaged only in production activities; the latter are an organization serving the industry, as well as wider community development activities. Individual members are prawn farmers, but they may overlap with the first two groups. They are thus qualitatively different and should be treated as such. This is a problem of the char lands and GNAEP is addressing it through economic empowerment, building CBOs and links to Local Government, but the wider issue of khas land ownership is beyond of GNAEP's programme. There is a Netherlands-funded project, CDSP-III which seeks to regularize ownership of already settled, empoldered areas. Table 17 shows the use of women's income for various purposes, 92 percent and 73 percent allocated their income respectively for food and cloths. About 40 percent respondent uses their income for health services. Across programs women spent most earning on food.

Ownership patterns of livestock showed relatively few household owned cattle or goats although poultry ownership was wider. Across the land classes, half the sampled household owned no cattle and goats. Non-ownership of livestock by large group of members

indicates less capability to make additional building blocks for facing emergency or sudden shocks and additional income flow to household attributed to inadequate surplus income to the household. Ownership of poultry/cattle by most household indicates the trend to accumulate easy convertible assets for future use. However, ownership of only poultry denotes less capability to generate income, as that was not enough to make a small contribution to the subsistence and better chance for making extra income to the household thus better capability to adjust seasonal shocks.

CONCLUSION AND POLICY IMPLICATIONS

It was revealed from this study that DANIDA and/or other agencies can improve and promote the participation of women in fisheries activities in a manner that is appropriate to the assessments of the different social and regional groups of women in the fisheries sub-sector. GNAEP's new initiatives to improve the livelihoods of the hard-core poor in Greater Noakhali through aquaculture and aquatic resource based initiatives brought about some changes which have affected the women positively in a number of ways e.g. increased participation of women in productive economic activities, increase household income, less vulnerability to social risks and increased food security of household.

Strength of the GNAEP's different projects are: Women as equal partners with male participants, women are given priority in fish species selection, women are found to participate in pond site fish selling, women are found to market their own products, women and men both mobilized to become member of CBO and there are few limitations of the GNAEP's different interventions which are: Many lack highly technical skills and basic understanding on ecological and biological requirements of the quasi-intensive commercial system, most of the women demand opportunities for participation in local market to sell their own products, most of the women have no access to capital, women lack market information, women need more training in fisheries management.

In Bangladesh socio-economic changes triggered by increasing rates of landlessness and an unequal access to development benefits have affected and influenced the lives of rural poor and women significantly. All the Five-year plans of the Government of Bangladesh (GoB) tried to involve women in various development activities by adopting various programs to involve women in different types of Income Generating Activities (IGAs). The Fourth Five Year Plan (1990-1995) used terms as

“gender” and adopted the objectives of women in development (WID) policy which included such concerns as increasing women’s participation in public decision-making, raising productivity and income, improving nutrition and health, reducing population growth, reducing infant and maternal mortality and the male-female literacy gap and ensuring the participation of the “poorer 50%” in development, etc. Furthermore, the Government of Bangladesh has formally stated its commitment to implement the PFA (Platform for Action) adopted in the Fourth World Conference on Women in Beijing. The PFA emphasizes the strategy of mainstreaming of women’s development into government policies and programs. Large number of rural women is participating in different forms of project-based activities and fisheries are one of them.

Gender equity participation requires changes in the project implementation procedures. In many parts of the world, women’s access to education is considerably less than that of men. In addition, women are less likely to be exposed to information because of various barriers they encounter. Even where efforts are given by the planners to integrate women in development activities, such as through participation in meetings, domestic responsibilities often prevent women from attending. If women are asked to attend mixed (men and women) meetings they generally stand at the back of the room, because they feel socially constrained to speak out. Effective consultations with women often require dialogue from house-to-house or arranging separate meetings with small groups, rather than large scale meetings.

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