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PARTICIPATION OF RURAL WOMEN IN SELECTED AQUACULTURE ACTIVITIES

M.R. AMIN¹, M.H. RAHMAN², M.A. SAYEM³, A.N.M. SAIFUDDIN⁴ AND M.F. HASAN^{5*}

¹Assistant Director (TC), BADC; ²Professor, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh; ³Agriculture Information and Communication Specialist, Agriculture Information Service (AIS), Rangpur Region;

⁴UAO, Feni Sadar Upazila, Feni and ⁵Associate Professor, Department of Agricultural Extension, Hajeer Mohammad Danesh Science and Technology University, Dinajpur.

*Corresponding author & address: Md. Faruq Hasan, E-mail: faruqhasan@yahoo.co.uk

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ABSTRACT

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The main objective of this research was to assess the extent of participation of rural women in ten selected aquaculture activities. Besides, attempt was made to explore the relationships between some of the selected characteristics of the rural women and their extent of participation in selected aquaculture activities and also to determine the extent of constraints faced by the rural women in participating aquaculture activities. The study was conducted in Sherpur district where Foundation for Human Development (FHD) had been involved in aquaculture as a partner NGO of Development of Sustainable Aquaculture Project (DSAP) since 2000. Data were collected from a sample of randomly selected 100 rural women from a total of 184. A pretested interview schedule was used to collect data from the sample women from 1 September 2004 to 30 September 2004. Participation of rural women in selected aquaculture activities was the dependent variable which was measured by considering two dimensions of participation. (i) extent of participation (i.e., how frequently a respondent participated in a particular practice) and (ii) nature of participation (i.e., share of participation for a practice). The majority (67 percent) of the respondents had very low participation in aquaculture activities, while 19 percent, 3 percent, and 11 percent had low, medium and no participation, respectively. Out of ten selected aquaculture activities, the activity 'feeding' had highest Participation Index (PI=187) and ranked first. The activity removing weeds from ponds occupied second position in order of ranking with PI of 72 and 'disease checking' was in third position with PI of 56 while 'selling of fry/ fish' was in last position with PI of 3. Karl Pearson's correlation coefficient was estimated and showed that rural women's knowledge in aquaculture and decision making ability had positive relationships with their participation in aquaculture, while personal education, average family education and family farm size had negative relationships. The rest of characteristics viz. age, family size, area under fish production, annual family income, cosmopolitaness, extension media contact, training exposure and social participation of the rural women did not show any significant relationship with their extent of participation in aquaculture activities. Out of 13 selected constraints in participation in aquaculture, three in order of importance were lack of technical knowledge, social and religious restriction, and excessive aquatic weeds. It was also found that highest proportion (62 percent) of the rural women in the study area faced low constraint in participating aquaculture activities, followed by 21 percent and 17 percent had medium and very low constraint, respectively.

Key words: participation, aquaculture, rural women

INTRODUCTION

Bangladesh has both the world's largest delta system and the greatest flow of river to the sea. It also has vast and enriched water bodies such as ponds, *dighi*, *beel*, *baor*, lakes, rivers, estuaries etc. One third of Bangladesh's physical space of 144,000 sq km is comprised of water in the dry season, while in the rainy season up to 70 percent is submerged. All though Bangladesh has great opportunity to fish cultivation but it is limited, compare to her population.

Women are naturally dependent on male, because social structure and social relationship encourage it. But the question arises why they are dependent or what are they dependent for? The answer is not so easy in every case. The social system enables to control property rights, source of income, and women's labor and enforces (Begum 1987).

In most rural communities, there are essential differences between the economic, social and political roles of men and women. Involvement of women in all development initiatives including agriculture is seen as a priority in the national development paradigm. Traditionally, women play a major role in agriculture. However, studies on various development endeavors have also endorsed the fact that while female members of farm-based households are playing a significant role in agricultural farm and household activities, their workloads have been consistently higher than that of the male members. Research studies show that besides their regular household work, 43 percent of women are involved in activities related to agriculture, and almost 15 percent undertake agriculture as their second occupation. While aquaculture too is perceived to be a man dominated occupation, the involvement of women is just as significant (Shelly and Costa, nd.).

Traditionally, women have been involved in small-scale aquaculture in different stages of operation. They are active "caretakers" of fish in homestead ponds, nurseries, cages, and even in rice fields. It is only now that there is a growing recognition of the ability and potential of women to contribute in the fisheries sector. Fish is an essential part of Bangladesh culture. The Bangladeshis depend mostly on fish as principal source of animal protein. Fish and rice are the main diet in Bangladesh. Indeed, fish is an important component of total human food consumption (DoF 2002). Fish supplies about 73 percent of the animal protein intake and 7 percent of the total protein supply in Bangladesh (Anonymous 1997).

Fishery, as one of the major sub-sectors of agriculture, plays a very significant role in nutrition, employment, foreign exchange earning, food supply and more importantly socio-economic stability in the rural areas. Agriculture contributed to 32.24 percent to the Gross Domestic Product (GDP) and fishery sub-sector contributed to 3.10 percent to GDP (BBS 2001). About 12.05 percent of the nation's population directly or indirectly depends on fishing and ancillary occupations. This sector provides full time employment to over 1.2 million people, which are about 3 percent of the total population. About 73 percent of the rural households are involved in fish culture in ponds (DoF 2002).

Bangladesh comprises a large quantity of water bodies *i.e.* about 230,000 ha of ponds, 114,161 ha of *beels*, 68,800 ha of Kaptai lake, 5,488 ha baors and 1,031,563 ha of rivers including estuaries except the Sundarban area. The total catch of the country is estimated at 1.78 million tons in 2000-2001 of which 79.91 percent came from inland fishery and 20.09 percent from marine fishery. Out of this 79.91 percent catch of inland fishery, the shares of inland capture and culture fishery were 40.36 percent and 39.55 percent, respectively (BBS 2001).

DSAP has eight regional liaison offices to ensure effective and quality support to the partner NGOs to attain sustainability at both beneficiaries and partner NGO level. For the sake of providing quality services, beneficiaries are being served by the staff of eight liaison offices. The partners NGOs are receiving technical and financial support. The outreach activities of the project are being implemented through 35 partner NGOs in 37 districts of Bangladesh (Anonymous 2003).

Due to lack of employment opportunities in this male dominated society woman generally have no specific source of income and often suffer from malnutrition. Women have proven to be competent in adopting aquaculture technologies, despite the fact that their role in aquaculture growth has not been sufficiently recognized. By undertaking aquaculture activities, women can contribute to the family income considerably; ensure constant supply of much needed family nutrition; generate an opportunity for self-employment; uplift their overall socio-economic condition; and become more skilled.

Involvement of women in aquaculture is increased day by day. Both the public and private sectors are emphasizing on wide involvement of women in this sector. Actually a good number of women are practicing aquaculture mainly through the initiative of NGOs and different government projects in order to keep women in the streamline of national development. It is of utmost important to document different aspect of their participation in Income Generating Activities, particularly in aquaculture. In order to fulfil the present information gap, the proposed study aims at determining the nature and extent of women's participation in aquaculture.

Objectives of the Study

In view of the foregoing discussion, the following specific objectives were formulated for giving proper direction of the study

1. To determine the extent of participation of rural women in different aquaculture activities.
2. To determine and describe some selected characteristics of rural women namely age, personal education, average family education, family size, family farm size, area under fish production, annual family income, cosmopolitaness, extension media contact, training exposure, knowledge in aquaculture, social participation and decision making ability.
3. To explore the relationship between the selected characteristics of the rural women and their participation in selected aquaculture activities.
4. To determine the extent of constraints faced by the rural women in participating aquaculture activities.

MATERIALS AND METHODS

The present study was conducted in Sherpur district where Foundation for Human Development (FHD) had been involved in aquaculture as a partner NGO of DSAP (Development of Sustainable Aquaculture Project) since 2000. The study was conducted in two upazilas, namely Sherpur sadar and Nakla, which consist of seven and nine unions, respectively. Out of these sixteen unions, six unions were selected for the study locale, two from Sherpur sadar and four from Nakla upazila.

Rural women, particularly the housewives of the DSAP beneficiary fish farmers (demonstration farmers) who were involved with FHD in Sherpur district were the population of the study. The demonstration farmers of the project (DSAP) are generally categorized into six technology groups. Out of these six technology group members of two prominent groups' *viz.* nursery management practices in ponds and polyculture of carp in ponds were considered for the present study. The total number of rural women under the criterion were 184, who constituted the population of the study. Out of them, 100 women were selected by random sampling method. Data were collected with a pretested questionnaire contained both open and closed form questions.

Thirteen characteristics of the rural women namely age, personal education, average family education, family size, family farm size, area under fish production, annual family income, cosmopolitaness, extension media contact, training exposure, knowledge in aquaculture, social participation, and decision making ability were selected as the independent variables and participation of rural women in selected aquaculture activities as the dependent variable of the study.

Measurement of participation in aquaculture activities

Participation of women in aquaculture was actually perceived as participation in selected practices of technologies. Therefore, ten similar major activities were selected under both of the technologies which included: pond excavation, removing weeds from pond, liming, use of insecticides, application of fertilizers, management of fish stock, feeding, disease checking, catching of fry/fish and selling of fry/fish.

Participation of a respondent in each of the above-mentioned aquaculture activities was measured by considering two dimensions of participation, (i) extent of participation and (ii) nature of participation. A four point rating scale was used for computing the extent of participation score of a respondent. The weights were assigned 0 for 'no participation', 1 for 'rare participation', 2 for 'occasional participation' and 3 for 'frequent participation'. A three point scale was used for computing the nature of participation score of a respondent. The weights were assigned 1 for 'conducted by mainly men', 2 for 'shared' and 3 for 'conducted by mainly women'. Therefore, participation score of a respondent in particular practice was computed using the following formula:

Participation score = Extent of participation score × Nature of participation score

Participation score of a respondent in a particular practice could range from 0 to 9, 0 indicating no participation and 9 indicating highest level of participation. The total participation score of a rural woman was obtained by summing her scores for all the ten selected aquaculture activities. Thus, the total participation score of a rural woman could range from 0-90, zero indicating no participation and 90 the highest level of participation.

For better understanding of comparative participation of rural women in all ten activities, a Participation Index (PI) was computed using the following formula:

$$PI = (P_{np} \times 0) + (P_{op} \times 1) + (P_{rp} \times 2) + (P_{fp} \times 3)$$

Where,

- P_{np} = Number of rural women with no participation
- P_{op} = Number of rural women with occasional participation
- P_{rp} = Number of rural women with rare participation
- P_{fp} = Number of rural women with frequent participation

The range of Participation Index could be 0 to 300 for each activities, where 0 indicating no participation and 300 highest level of participation.

Measurement of constraints in participating in aquaculture activities

The women were asked to give their opinion on 13 selected constraints, which were identified during pretesting of the questionnaire. A four point scale was used for computing the constraint score of a respondent. For each constraint, score of 3, 2, 1 and 0 were assigned to indicate extent of constraints as 'high', 'medium', 'low' and 'not at all' respectively. The possible range of constraint scores thus could be 0-39. A total score of 0 indicated no constraints in respect of aquaculture participation while a score of 39 indicated highest constraint.

To ascertain the comparison among the Constraint Facing Index (CFI) was computed using the following formula:

$$CFI = P_h \times 3 + P_m \times 2 + P_l \times 1 + P_n \times 0$$

Where,

- CFI = Constraint Facing Index
- P_h = Percent of respondents having high constraint
- P_m = Percent of respondents having medium constraint
- P_l = Percent of respondents having low constraint
- P_n = Percent of respondents having no constraint at all

Thus, CFI of an item could range from 0 to 300, where 0 indicated no constraint and 300 indicated high constraint in aquaculture participation.

For describing the variables of the study, the respondents were classified in to appropriate categories. In developing categories, the investigator was guided by the nature of data and general considerations prevailing the social system. For exploring the relationship between selected characteristics of the respondents and their participation in aquaculture activities, Pearson's Product Moment Correlation Co-efficient (r) was computed.

FINDINGS AND DISCUSSION

Selected characteristics of the rural women

A number of characteristics of the rural women such as age, personal education, average family education, family size, family farm size, area under fish production, annual family income, cosmopolitaness, extension media contact, training exposure, knowledge in aquaculture, social participation and decision-making ability. The salient features of the characteristics are presented in Table 1.

Table 1. Salient Feature of the respondents regarding their characteristics (N=100)

Sl. No.	Characteristics of the women	Scoring system	Range		Category	Respondents (Percent)	Mean	SD
			Possible	Observed				
1	Age	years	-	18-65	Young (up to 30) Middle aged (31 – 45) Old (>45)	43 40 17	34.45	10.03
2	Personal education	Level of school-ing	0-17	0-16	Illiterate (0) Primary (I-V) Secondary (VI-X) Higher Secondary (>X)	41 22 32 5	4.25	4.30
3	Average family education	Rated score	0-4	0-3.6	Illiterate (0) Primary (I-V) Secondary I (VI-VIII) Secondary II (IX-X) Higher Secondary (>X)	1 27 38 29 5	1.71	0.85
4	Family size	Numbers	-	2-18	Small (up to 4) Medium (5-6) Large (>6)	16 54 30	6.66	2.50
5	Family farm size	Hectare	-	0.23-5.82	Small (0.51-1) Medium (1.01-3) Large (>3)	40 48 12	1.58	1.19
6	Area under fish production	Hectare	-	0.04-3.49	Marginal (up to 0.2) Small (0.21-1) Medium (1.01-3) Large (>3)	60 35 4 1	0.32	0.48
7	Annual family income	Scale score	-	16.18-440.70	Low (up to 50) Medium (50.10-75) High (76-125) Very high (>125)	16 26 27 31	110.97	81.79
8	Cosmopoliteness	Scale score	0-24	0-10	No (0) Low (1-8) Medium (9-16) High (>16)	7 88 5 0	3.92	2.50
9	Extension media contact	Rated score	0-54	0-26	No (0) Very low (1-9) Low (10-18) Medium (19-26)	1 67 31 1	7.98	3.65
10	Training exposure	No. of days	-	0-30	No training (0) Very low (1-6) Low (7-12) Medium (>13)	92 6 1 1	0.53	3.14
11	Knowledge in aquaculture	Knowledge test score	0-30	12-30	Fair knowledge (0-20) Good knowledge (21-25) Very good knowledge (26 and above)	28 50 22	22.89	3.76
12	Social participation	Scale score	0-24	0-16	No (0) Low (1-8) Medium (9-16)	3 57 40	8.21	3.85
13	Decision making ability	Scale score	0-30	3-25	Low (up to 10) Medium (11-20) High (21 and above)	10 76 14	15.94	4.12

SD = Standard Deviation

Data indicates that participation in aquaculture activities were mostly in the hands of young and middle-aged individuals, about half of the respondents of the study area secured primary and secondary education, majority of the rural family had education at secondary level and highest proportion of the women comes from medium family size. The present study shows that majority of the rural women comes from small and medium farm size category, majority of the rural women in the study area used marginal category of land for fish production, majority of the respondents had very high and high income, lion portion of the rural women had low cosmopoliteness, highest proportion of the respondents had very low extension contact with their information sources, highest proportion of the respondents had no training exposure, highest proportion of the respondents had good knowledge on aquaculture, highest proportion of the respondents had low social participation and highest proportion of the respondent women had medium ability in decision- making.

Participation in aquaculture activities

Ten aquaculture activities have been selected to measure extent of women's participation. In order to have a clear picture of rural women's participation in aquaculture activities, Participation Index (PI) of all activities and overall participation score were computed which are described in the subsequent sections.

Comparative participation in ten aquaculture activities

In order to make comparison among the ten selected aquaculture activities, a participation index (PI) was calculated for each activity. The computed PIs and concerned rank order have been presented in Table 2. The computed participation indices of ten activities ranged from 3 to 187 against possible score of 0 to 300 with average of 46.6.

Table 2. Distribution of rural women according to their comparative participation score and ranked order

Activities	Observed range	Category	Percentage (N=100)	Participation Index	Ranked order	Level of participation
Feeding	0-9	No (0)	11	187	1	Medium
		Low (1-3)	20			
		Medium(4-6)	40			
		High(7-9)	29			
Removing weeds from pond	0-9	No (0)	45	72	2	Low
		Low (1-3)	40			
		Medium(4-6)	13			
		High(7-9)	2			
Disease checking	0-9	No (0)	59	56	3	Low
		Low (1-3)	31			
		Medium(4-6)	5			
		High(7-9)	5			
Application of fertilizers	0-6	No (0)	61	46	4	Very low
		Low (1-3)	32			
		Medium(4-6)	7			
		High(7-9)	0			
Liming	0-9	No (0)	76	30	5.5	Very low
		Low (1-3)	19			
		Medium(4-6)	4			
		High(7-9)	1			
Catching of fry/fish	0-9	No (0)	76	30	5.5	Very low
		Low (1-3)	19			
		Medium(4-6)	4			
		High(7-9)	1			
Management of fish stock	0-9	No (0)	87	19	7	Very low
		Low (1-3)	8			
		Medium(4-6)	4			
		High(7-9)	1			
Pond excavation	0-6	No (0)	86	16	8	Very low
		Low (1-3)	12			
		Medium(4-6)	2			
		High(7-9)	0			
Use of insecticides	0-6	No (0)	94	7	9	Very low
		Low (1-3)	5			
		Medium(4-6)	1			
		High(7-9)	0			
Selling of fry/fish	0-2	No (0)	97	3	10	Very low
		Low (1-3)	3			
		Medium(4-6)	0			
		High(7-9)	0			

It is evident from table 2 that the activity 'feeding' had highest Participation Index (PI=187) and ranked first. The activity removing weeds from ponds occupied second position in order of ranking with PI of 72 and

'disease checking' was in third position with PI of 56 while 'selling of fry/fish' was in last position with PI of 3.

Overall participation

The rural women's score for participation in aquaculture activities could range from 0 to 90. The computed participation score ranged from 0 to 51 with an average of 10.47 and standard deviation of 9.38. Based on their participation scores the respondents were classified into four categories as shown in Table 3.

Table 3. Distribution of rural women according to their extent of participation in aquaculture activities

Category	Percentage of Rural women (N=100)	Mean	Standard Deviation
No participation (0)	11		
Very low participation (1-15)	67	10.47	9.38
Low participation (16-30)	19		
Medium participation (31-60)	3		

Data presented in Table 3 showed that the highest proportion (67 percent) of the respondents had very low participation in aquaculture activities compared to 19 percent had low participation and 3 percent having medium participation and 11 percent had no participation.

Relationship between characteristics of the rural women and their participation in aquaculture activities

Pearson's Product Moment Co-efficient of Correlation (r) was computed in order to explore the relationship between the selected characteristics of the rural women and their extent of participation in aquaculture activities. Computed values of 'r' between the selected characteristics of the rural women and their participation in aquaculture activities has been presented in Table 4.

Table 4. Coefficients of correlation (r) between the respondents characteristics and their participation (N=100)

Dependent variable	Selected characteristics of rural women	Value of "r" with 98 df	Tabulated value of "r"	
			0.05 level	0.01 level
Participation in aquaculture activities	Age	-0.137 ^{NS}	0.197	0.257
	Personal education	-0.229*		
	Average family education	-0.273**		
	Family size	-0.128 ^{NS}		
	Family farm size	-0.355**		
	Area under fish production	-0.191 ^{NS}		
	Annual family income	-0.176 ^{NS}		
	Cosmopolitaness	-0.019 ^{NS}		
	Extension media contact	0.163 ^{NS}		
	Training exposure	0.088 ^{NS}		
	Knowledge in aquaculture	0.307**		
	Social participation	0.027 ^{NS}		
Decision making ability	0.220*			

*, ** and NS = Significant at 0.05 level, 0.01 level of probability and not significant

The correlation test showed that rural women's knowledge in aquaculture and decision making ability had positive relationships with their participation in aquaculture, while personal education, average family education and family farm size had negative relationships. The rest of characteristics *viz.* age, family size, area under fish production, annual family income, cosmopolitaness, extension media contact, training exposure and social participation of the rural women did not show any significant relationship with their extent of participation in aquaculture activities.

Constraints faced by the rural women in participating aquaculture activities

The constraints score range from 3-20 against the possible range of 0-39. The average was 10.80 and standard deviation was 3.92 as shown in Table 5.

Table 5. Distribution of rural women according to their overall constraints in participating aquaculture activities

Category	Percentage of Respondents (N=100)	Mean	Standard deviation
Very low constraint facing (1-6)	17		
Low constraint facing (7-13)	62	10.80	3.92
Medium constraint facing (14-25)	21		

Data presented in Table 5 indicate that highest proportion (62 percent) of the respondents in the study area faced low constraints, while respectively 21 percent faced medium constraints and 17 percent had very low constraint. The extent of constraints in participating aquaculture activities along with their Constraint Facing Index (CFI) are presented in Table 6.

Table 6. Rural women's extent of constraints in participating in aquaculture

Sl. No.	Constraints	Extent of constraints				CFI (Computed Score)	Ranked Order
		High	Medium	Low	Not at all		
1	Lack of technical knowledge	72	92	21	0	185	1
2	Social and religious restriction	54	56	21	0	131	2
3	Excessive aquatic weeds	12	56	56	0	124	3
4	Shortage of money	21	68	29	0	118	4
5	Risk of flooding	60	46	9	0	115	5
6	Disturbance from predatory birds	6	22	72	0	100	6
7	Incidence of diseases	0	28	58	0	84	7
8	Lack of personal interest	6	52	22	0	80	8
9	Theft of fish from pond	12	28	22	0	62	9
10	Dereliction of pond	0	14	27	0	41	10
11	In ability to use fertilizer in ponds for domestic use of water	0	8	6	0	14	11
12	Lack of fry / fingerling and other inputs in time	0	4	8	0	12	12
13	Multi-ownership of pond makes problem	0	4	3	0	7	13

Table 6 indicates that the constraint which ranked first on the basis of CFI was “lack of technical knowledge” with a CFI of 185. The constraint “social and religious restriction” occupied second position in order of ranking with CFI of 131 and “excessive aquatic weeds” was in the third position with CFI of 124 while “multi-ownership of pond makes problem” was in the last position with CFI of 7.

CONCLUSIONS AND RECOMMENDATIONS

Overall participation of the rural women in aquaculture was very low. The highest proportion (67 percent) of the rural women had very low participation in aquaculture activities, while 11 percent had no participation. This could happen possibly because of the working nature and policy of the different government and non-government organizations. Thus, it may be concluded that there is further scope to increase participation of the rural women in aquaculture activities. The rural women had relatively less participation in the remaining seven activities i.e. application of fertilizers, liming, catching of fry/fish, management of fish stock, pond excavation, use of insecticides and selling of fry/fish. Thus, it may be concluded that there is huge scope to increase participation of the rural women in aquaculture activities, if gender specific development programme and proper extension strategies are taken for the development of aquaculture.

Age, family size, area under fish production, annual family income, cosmopolitaness, extension media contact, training exposure, and social participation of rural women were not significantly related with their participation in aquaculture activities. Thus, it may be concluded that, at least for the present study these characteristics of the rural women do not play any significant role on their extent of participation in aquaculture activities. The highest proportion (62 percent) of the rural women faced low constraints. It was found that the rural women faced comparatively greater constraints in lack of technical knowledge, social and religious restriction, excessive aquatic weeds, shortage of money, risk of flooding and disturbance from predatory birds from ponds. In view of this fact it may be concluded that the effort for increasing fish production in Bangladesh will not be successful if the rural women continue to face constraints in above aspects.

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