



Challenges of Using of Farm Machineries by Rural Women in a Coastal Region of Bangladesh

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ABSTRACT

The main purpose of the study was to determine the challenges faced by the rural women of a coastal region in using farm machinery and involving in service provision. The study also aimed at exploring the relationship between rural women's selected characteristics and the extent of their faced challenges in using farm machinery. The study was conducted in two upazilas (sub-district) of the coastal region of Bangladesh: Dumuria upazila of Khulna district and Wazirpur upazila of Barishal district. Data were collected from 110 selected rural women in the study areas during 13th October to 05th November, 2018 by using a pre-tested structured interview schedule. Rural women's challenges in using farm machinery were measured by asking their extent of challenges in 15 challenge items across a 4-point rated scale. Ten characteristics of the rural women were considered for relationship study. Correlation test was used to ascertain the relationships between the concerned variables. The study revealed that 56.36 percent of the rural women faced medium level challenges, while 42.73 percent faced high level challenges in using farm machineries. Only 0.91 percent faced low level challenges. Four characteristics of the rural women such as level of education, farm size, involvement in farming activities and willingness to use farm machineries showed significant and negative relationship with their faced challenges of using farm machineries. On the other hand, the respondents' age, household size, own land possession, training exposure, decision making ability, and contact to information sources did not show any significant relationship with their faced challenges in using farm machineries.

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Introduction

The women of Bangladesh constitute half of the total population of which 76% live in rural areas. Among the rural women, about 43 per cent are involved in the agricultural sector, and 70% work at household level (BBS, 2017). Women play an important role in agricultural growth in almost all developing countries, but also face persistent obstacles and societal and economic constraints that limit their further inclusion in means of livelihoods. They comprise the largest percentage of the workforce in the agricultural sector, but do not have enough access and control over all land and productive resources. Increasing women's access to land, livestock, education, financial services, extension, technology and rural employment would boost their productivity and generate gains in terms of agricultural production, food security, economic growth and social welfare" of the rural folk (FAO, 2011).

Women as the backbone of the rural economy significantly contributing to the economy especially in the developing countries of the world in as much as they do not own or receive as much land, financial access, farm inputs, agricultural training and other necessary information as compared to men. Empowering womenfolk and investing in them especially the rural women will significantly increase productivity by improving their working conditions as well as reducing the time that they will take working in the farm. It is unfortunate that agricultural mechanization is "still far from women and bypassing them" though "it is now well established that mechanization serves to reduce women's workload and facilitate some hard operations" (Abdelali-Martini, 2011). The Food and Agriculture Organization of the United Nations (FAO, 2011) "estimates that equalizing access to productive resources for female and male farmers could increase agricultural output in developing countries by as much as 2.5 to 4 per cent. Eliminating barriers preventing women from entering certain sectors or occupations would have similar positive effects, increasing output per worker by 13 to 25 per cent".

There are many types of agricultural machineries, from hand tools and power tools to tractors and the countless kinds of farm implements that they operate. Diverse arrays of equipment are used in both conventional and organic farming. Especially since the advent of mechanized agriculture, agricultural machinery is an indispensable part of how the world is fed (Prasad and Chathura, 2018). Mechanization has a crucial role to play at all levels along the entire value chain towards modernizing and intensifying agriculture in Bangladesh; it boosts productivity in rural areas- a core element of rural development- and ultimately leads to food security.

The women in Bangladesh lack far behind from using the agricultural machineries used for farming in here. They face a lot of problems in using those machineries. The male dominant society hinders them from using those machineries. So that they cannot use those machineries and do not get to know about those things. Again most of the rural women of Bangladesh are illiterate. So they cannot use those agricultural machineries. However, due to time demand in agriculture as well as supporting government policy, use of farm machinery is being increased in last decade (Mandal *et al.*, 2017). As women workforce nowadays is very common in agriculture and because of the fact that in general women don't use the farm machineries, the study was undertaken to investigate the challenges faced by the rural women

in using farm machinery and involving in service provision. The specific objectives of the study were (i) to assess the challenges as faced by the rural women in using farm machinery and involving in service provision, (ii) to determine selected characteristics of rural women in the study area, and (iii) to explore relationship between rural women's challenges of using farm machineries and their selected characteristics.

Methodology

Locale of the study

The study was conducted in the working areas under the USAID supported Appropriate Scale Mechanization Innovation Hub (ASMIH Bangladesh) project. Since 2016, the five year long project has been under implementation by the Department of Farm Power and Machinery, Bangladesh Agricultural University, Mymensingh. Aiming popularizing modern farm machineries with a service provision based entrepreneurial model, the project is being actively supported by the concerned DAE officials and its field level agents (SAAOs). ASMIH Bangladesh project covers four districts (Khulna, Barishal, Patuakhali and Noakhali) of the southern coastal belt of Bangladesh. In specific one upazila from each of these districts were the project focus locations. The upazilas are: Wazirpur of Barishal, Dumuria of Khulna, Kalapara of Patuakhali and Subarnachar of Noakhali district.

Population and sample

The women members of the households of the beneficiaries of ASMIH project were the target population of the study. There were a total of 220 intervention farmers under the ASMIH project in these upazilas. So, women members (one from each household) of these 220 households constituted the population of the study. A multi-stage random sampling method was followed to finalize the sample of the study. Firstly, two upazilas (Dumuria of Khulna and Wazirpur of Barishal) were randomly selected from the four. All 110 women members of the intervention farming households (one from each household) constituted the sample of the study. All eligible women of each of the two selected upazilas were considered because of the fact that only 55 households in each upazila were available for the study.

Variables and their measurements

The focus variable of the study was challenges in using farm machinery by rural women. At first, a total of 15 challenges were identified and verified through two focus group discussions with the respondent women and key informant interview with two concerned SAAOs and two Upazila Agriculture Officers of the concerned upazila. A four point rating scale was used for measure the extent of challenge as revealed by the respondents. A respondent woman was asked to express the extent of a specific challenge through selected one of the four options such as "high", "moderate", "low" and "not at all," while scores were assigned as 3, 2, 1 and 0, respectively. Thus, the challenge score of a respondent could range from 0 to 45, where 0 indicated 'no challenge' and 45 indicated 'highest level challenge'.

Ten characteristics of the rural women were selected for studying relationship aspect. The characteristics were age, level of education, household size, farm size, own land possession, training attended, decision making ability, contact to information sources, involvement in farming activities and willingness to use farm machineries. Conventional units were used and appropriate scales were developed to measure the characteristics (Table 4).

Data collection and analysis

Data were collected from the selected women through face to face interview during 13th October to 05th November, 2018 by using a pre-tested structured interview schedule. SPSS (Statistical Package for Social Science) software was used for data management and statistical analyses. Various descriptive statistical measures were used for categorization and describing the variables. Pearson's Correlation Coefficient (r) was used for determining the relationships between the concerned variables.

Result and Discussion

Rural women's challenges of using farm machineries

Rural women's challenges in using farm machineries were measured against 15 selected challenge items. The challenge items were further arranged under three dimensions such as (i) operation and use, (ii) being an entrepreneur or service provider, and (iii) gender related challenges.

Overall extent of perceived challenges

The observed total scores (overall challenge score) for rural women's perceived challenges in using farm machinery ranged from 15 to 38 against a possible range from 0 to 45 with a mean of 29.66 and standard deviation 3.99. On the basis of the overall challenge scores, the respondents were classified into three categories as presented in the Table 1.

Table 1 Categories of the rural women based on their overall perceived challenges of using farm machinery

Categories of rural women	Respondent (n=110)		Mean	Standard deviation
	Number	Percentage		
Low challenge facing (0-15)	1	0.91	29.66	3.99
Medium challenge facing (16-30)	62	56.36		
High challenge facing (31-45)	47	42.73		

Data presented in Table 1 indicate that almost all of the rural women faced medium to high level challenges. The mean challenge score was very close to high facing category, which means the challenges had high tendencies. It could be concluding that if the policymakers are serious on increasing women's involvement in operation of farm machinery and related

service provision based business activities, appropriate measures are necessary to mitigate the challenges. Only such steps can encourage rural women's willingness to come forward to gather knowledge about farm machinery and use in farm operation as well as involvement in service provision businesses.

Rank order of challenge items

All 15 challenge items were ranked based on their mean score in 0-3 scale, 0 indicating 'no challenge' and 3 indicating 'high challenge.' Magnitudes of all individual challenges have been presented in Table 2.

The results may be well supported by the other researchers conducted in the similar issue. Theis (2018) indicated five major challenges for overcoming gender gaps in farm mechanization. These were: need of learning of the machines, investing in machines, advertising the clients, machine operation and support from family and community. Pini (2005) argued that physical workloads as well as male-domination in decision making were the major challenges that needed to be addressed for increasing women involvement in using tractors in farming. Studies indicated that there are numerous challenges or constraints limiting women's adoption of technologies, not least their lack of access to and control of resources, combined with cultural norms, values and assumptions (van Eerdewijk and Danielsen, 2015). Sims *et al.* (2016) also focused on social and cultural issues for women involvement in farm mechanization in the African context.

Challenges based on dimensions

Three dimensions of challenges were considered to assess the extent of rural women's challenges of using farm machineries. The computed values of all the dimensions have been shown in Table 3.

Data presented in the table 3 clearly show that the rural women in the study area faced higher level problems in the cases for direct operation and use of the machineries. This is mainly due to their physical limitation and socio-cultural barriers. On the other hand, the challenges were relatively lower in case of entrepreneurship of farm machineries. It was noted during the data collection process that women were interested in involve in business of farm machineries if appropriate measures are taken and financial supports are initiated.

A close look into the table 3 revealed that challenges were high in operation and use of the machinery as well as in gender related issues. For both dimensions, an overwhelming majority of the respondents faced medium to high level challenges. On the other hand, challenges were perceived relatively medium (mean value: 8.45 in a 0-15 scale) for being an entrepreneur. The results call an action from the policymakers and extension planners to introduce more women-friendly technologies as well as extension programmes for increasing their involvement in operating farm machinery.

Table 2 Rank order of challenges as faced by the rural women for using farm machinery

Sl. No.	Challenge items	Extent of faced challenges and weights (n=110)				Mean	Rank order
		High (3)	Medium (2)	Low (1)	Not at all (0)		
For operation and use							
1	Lack of possession of agricultural machineries in family	16	43	50	1	1.67	11
2	Lack of operating skills and knowledge	73	23	13	1	2.53	3
3	Lack of training opportunity	49	57	4	0	2.41	4
4	Physical limitations to use heavy machines	20	67	32	1	1.87	8
5	Lack of control and opportunity to use	19	49	42	0	1.79	10
For being an entrepreneur (service provider)							
6	Lack of information on business opportunity for machines	6	47	56	1	1.53	13
7	Lack of investment capital and credit opportunity	78	15	15	2	2.54	2
8	Lack of business experience with machines	11	47	51	1	1.62	12
9	Lack of information on maintenance and services	3	39	67	1	1.40	14
10	Difficulty to get money from operators	4	34	70	2	1.36	15
Gender related challenges							
11	Machinery use and entrepreneurial activities are male dominating work (social and cultural barriers that do not welcome women)	76	22	11	1	2.57	1
12	Machines are not women friendly to use	36	65	9	0	2.25	5
13	Lack of equal getting training opportunity equal to men	15	63	32	0	1.85	9
14	Increases workloads of women	30	59	21	0	2.08	6
15	Lack of support by family members (husband and others)	30	58	22	0	2.07	7

Table 3 Rural women's faced challenges in using farm machinery across dimensions

Dimensions of challenges	Possible range	Observed range	Respondents' categories	Respondent		Mean and SD*
				Number (N=110)	Percent (%)	
Challenges for operation and use	0-15	3-14	Low (0-5)	3	2.73	10.40 (2.03)
			Medium (6-10)	49	44.55	
			High (11-14)	58	52.73	
Challenges for being an entrepreneur	0-15	0-13	Low (0-5)	13	11.82	8.45 (2.13)
			Medium (6-10)	87	79.1	
			High (11-13)	10	9.1	
Gender related challenges	0-15	5-15	Low (0-5)	1	0.91	10.73 (2.34)
			Medium (6-10)	59	53.64	
			High (11-15)	50	45.45	

*SD= Standard deviation

Characteristic profile of the respondent rural women

Ten characteristics of the rural women were considered for the study. The respondents' salient features based on the characteristics have been presented in Table 4.

Date presented in Table 4 shows that the women were young in age, while had secondary level education in average. They had 4.61 sized households while had only small family farms and very small farm in their own possession. Due to involvement in the ASMIH project activities, they had considerable level involvement in training activities and contact to farm information sources. It was found that on average their involvement in farming activities was good considering low participation of women in other parts of Bangladesh. Moreover, average willingness score for using farm machineries seems low to medium.

Relationship between extents of faced challenges in using farm machinery and rural women's selected characteristics

Pearson's Product Moment Co-efficient of correlation (r) was used to test the relationships between rural women's extent of faced challenges in using farm machinery and their selected characteristics. The concerned coefficients of correlation have been shown in Table 5.

Data presented in the Table 5 shows that out of the ten selected characteristics of the rural women, four namely level of education, farm size, involvement in farming activities, and willingness to use farm machinery had significant and negative relationships with their extent of faced challenges in using farm machinery. That means, with the increase of these characteristic profile, the extent of faced challenges would be mitigated. Sraboni *et al.* (2014) indicated that education is a key factor for women involvement in all aspects of agriculture in Bangladesh.

Table 4 Salient features of the selected characteristics of the respondent rural women

Characteristics	Measuring unit/system	Possible range	Observed range	Mean	Standard Deviation
Age	Actual years	Unknown	15-60	35.26	10.70
Level of Education	Years of formal schooling/ years needed for degree obtained	Unknown	0-17	6.94	3.90
Household size	No. of members	Unknown	3-13	4.61	1.79
Farm size	Hectares	Unknown	0.1-6.89	.63	1.14
Own land possession	Hectares	Unknown	0.0-0.26	.02	0.05
Training attended	Days	Unknown	0-48	3.15	8.44
Decision making ability	Scale score (4-point rated scale, 0-3 range, 17 items)	0-51	17-51	29.36	13.07
Contact to information sources	Scale score (4-point rated scale, 0-3 range, 7 items)	0-21	0-21	5.96	4.06
Involvement in farming activities	Scale score (3-point rated scale, 0-2 range, 20 items)	0-40	0-38	16.21	7.59
Willingness to use farm machineries	Scale score (2x2 type rated scale, 0-4 range, 7 items)	0-28	0-14	9.90	5.68

Table 5 Correlations between rural women's selected characteristics and their faced challenges in using farm machinery

Focus variable	Personal characteristics	Correlation coefficient (r) with 108 d.f.
Rural women's challenges in using farm machinery	Age	.131
	Level of education	-.322**
	Household size	-.021
	Farm size	-.268**
	Own land possession	-.157
	Training attended	-.075
	Decision making ability	-.063
	Contact to information sources	-.061
	Involvement in farming activities	-.266**
	Willingness to use farm machinery	-.223**

** Correlation is significant at the 0.01 level (2-tailed)

The findings are also supported by Sisei (2016) who concluded that major factors for women's involvement in farm mechanization were access to machinery and training coupled with the access to and control over productive resources or assets such as land, capital, knowledge, information as well as financial resources. However, it could be argued that these issues should be properly emphasized for increasing women involvement in farm machinery use and involving in service provision business (owning, operating, renting etc.) as an opportunity for rural entrepreneurship. In a relatively earlier study Sirohi (1985) also emphasized on education and farm size related issues of women for participating in farming.

Conclusion

Majority of the rural women faced high to medium level challenges for using farm machineries and involving in machinery service provision. They had relatively high challenges in use and operation issues and gender issues. In specific, male domination in machinery operation, lack of money to invest in machinery by women, disapproval from society as well as lack of cooperation from family members, and lack of advisory support are the key issues to be addressed by the concerned authority. The DAE as the mainstream extension provider along with other stakeholders may come forward to solve these issues. On the other hand, they had low challenges in custom services or entrepreneurial issues if other key challenges are mitigated. It means, they are ready to involve in business if supports are provided. Appropriate supports should be given to rural women for encouraging their willingness of use and operation of farm machineries. DAE should concentrate these issues while strengthening its ongoing farm mechanization related extension events. The government should provide special supports for rural women so that they can invest in farm machinery business. More social awareness is necessary for overcoming gender related issues. While DAE cannot directly make any impact on women's education and farm size issues, it can effectively deliver services for women farmers in increasing their involvement in farming activities and increasing their willingness to use machinery by providing appropriate training programmes and gender sensitive extension events.

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