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IMPACT OF CROP VARIETIES ON HOUSEHOLD FOOD SECURITY IN *HAOR* AREAS OF BANGLADESH

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Abstract

The purpose of the study was to identify the crop varieties in the Haor area of Netrokona district to minimize the food vulnerability situation during food crisis. The study was conducted in four selected villages of Madan and Khaliajuri Upazilas under the Netrokona district. Data were collected from randomly selected 400 farmers from the study area in the year 2011. The findings of the study revealed that farmers usually cultivate only three HYV *boro* rice varieties (BR 19, BRRI dhan 28 and BRRI dhan 29) in the Haor area under study. In *aman* season farmers mostly cultivate local varieties and they get minimum yield. Only few vegetables found to cultivate by the farmers in Haor area. The vegetables are: onion, garlic, chilli, bottle gourd, sweet gourd, lady's finger and tomato. Among these onion, garlic and chilli are mostly cultivated. Many farmers reported that during the flood they had to face serious problems in respect of communication, diseases, increased price of different commodities, and lack of adequate government safety net programs/relief. Farmers' lack of flood preparedness has been observed while some farmers remained uncared about the occurrence of flood and consequently they did not take any preparedness for flood.

Keywords: Crop Variety, Food Security, Sustainable, Haor, Flood

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Introduction

The Haor region is the most vulnerable area of Bangladesh. It is situated at the north-eastern part of the country. There are as many as 423 small or large Haors in Bangladesh. Every two or three years, this region has to face the curse of either flash flood or over flood. For example, in 2010 the Haor region has experienced flash flood that broke the backbone of the farming community. Flood causes severe economic loss and social disruption as well as food insecurity to many people, particularly living in the Haor area. To address this situation of farmers, the primary innovator and the researchers invented so many technologies to escape the affects of flash flood or over flood. Farmers might have particular cropping scheme to combat the consequences of flood that need to be identified. Exploring and organizing of the flood resistant or short duration varieties of crop technologies may have impact in minimizing the effects of flood if they are displayed at the farmer's fields through demonstration and training. Crop production practices, economic activities and over all livelihoods of the farmers of Haor areas are quite different from those of the other parts of the country. The cropping practices particularly Boro rice crop mainly depends on nature (Alam *et al.,* 2011).

The available statistics indicate that, the total cultivated area in those Haor districts is about 1.26 million hectares of which 0.68 million ha (nearly 66%) is under Haor. Almost 80 percent of this area (i.e. 0.68 million ha) is covered by Boro rice, while only about 10% area is covered by T. Aman production (Huda, 2004). In the Haor areas, hybrid rice is also grown (Das, 2004). This area is gradually increasing in different locations of Haor districts (Husain *et al.,* 2001). So, there is a great possibility of growing MV rice as well as other rice and non-rice crops in the Haor areas (Alam *et al.,* 2011).

Haor area is most vulnerable area of our country. It has indeed become imperative to exploit the crop production potentiality of the large Haor areas; it is because those areas usually remain under-utilized with quite low cropping intensity (Jabber and Alam, 1996). In every year, crop is damaged by flash flood or over flood. As a result, food security towards sustainable livelihood of Haor people is threatened. The technologies for that situation are very needed to identify and organize for ensuring household food security towards sustainable livelihood. Keeping these facts in mind, the present study has been undertaken to fulfill the following specific objectives:

1) Identify the flood tolerant crop varieties in the Haor areas of Netrokona district;
2) Ascertain the problems faced by the rural poor households in food security during floods in Haor area;
3) Identify measures normally taken by the farmers to minimize the food vulnerability situation in Haor area;
4) Gather farmers' opinion to overcome the sudden food crisis caused by flood and other natural disasters in Haor areas.

Methodology

The study was conducted in Madan and Khaliajuri Upazilas under the Netrokona district in the year 2011. The physical, social and cultural heritages of the people of this area are similar in many cases with other Haor areas of the country. All the household in Madan and Khaliajuri Upazilas under Netrokona district were considered as the population of the study. The total number of households in Madan and Khaliajuri Upazilas was almost 4,000. Among them 10 per cent i.e. 400 households were randomly selected as the respondents.

The empirical data for the study were collected through pre-tested structured interview schedule from the farmers of the selected villages during 10 March to April 2011. Data were collected by the field level officers of the Women Development Organization (WDO), Netrokona under the closed monitoring and supervision of the Project Director and Principal Investigator. Quantitative data were collected through direct interviewing with farmers through interview schedules while the qualitative data were collected through FGDs (Focus Group Discussions).

Measurement of food vulnerability index (FVI)

Food vulnerability index (FVI) of the flood affected people of Haor areas were measured by the following formula:

FVI = HVFS X 2 + MVFS X 1 + NAVFS X 0

Where,
FVI = Food Vulnerability Index
HVFS = High vulnerability to food security by the respondents
MVFS = Moderate vulnerability to food security by the respondents
NAVFS= Not at all vulnerable to food security by the respondents

Thus, the computed value of Food Vulnerability Index (FVI) could range 0 to 800, 0 indicating no vulnerable situation and 800 indicated the highest vulnerable condition among the households.

Findings and Discussion

Flood tolerant crop varieties, which were cultivated by the farmers' in Haor areas

Farmers were asked to indicate flood tolerant crop varieties based on their long experience in these areas. They have identified as flood tolerant crop varieties in the Haor areas, which were quite usual to occur floods in the Haor areas. The flood tolerant crop varieties as identified by the farmers in Haor area are presented in Table 1.

Table 1. Flood tolerant crop varieties as identified by the respondents in *Haor* areas

Crops	Name of the crop variety	Respondents (n=400)	
		Number	Percentage
A. Boro Rice	BR 19	193	48.25
	BRRI dhan 28	176	44.00
	BRRI dhan 29	314	78.5
	Hira Dhan (Hybrid)	240	60.00
	Sonar Bangla (Hybrid)	157	39.25
B. Aman Rice	Local Variety	254	63.50
	Nazirshail	73	18.25
	Hashi	62	15.50
	Shahjalal	45	11.25
	Mangal	23	5.75
	BRRI dhan 52	18	4.50
	BRRI dhan 51	12	3.00
C. Jute	Deshi	129	32.25
	Tosha	124	31.00
D. Vegetables	Onion	260	65.00
	Garlic	248	62.00
	Chilli	157	57.75
	Bottle gourd	192	48.00
	Sweet gourd	168	42.00
	Lady's finger (Okra)	231	39.25
	Tomato	122	30.50

Various crop varieties in different seasons are effective in flood affected Haor areas. In case of boro rice, it was observed that about more than three-quarters (78.50%) of the respondents of the study area agreed for cultivation of BRRI dhan 29 as flood tolerant variety, followed by 48.25 percent for cultivation of BRRI dhan 19 and 44.0 percent for BRRI dhan 28. However, in case of hybrid rice varieties, 60.0 percent of the respondents agreed for Hari dhan and 39.25 percent for Sonar Bangla as flood tolerant rice varieties in the Haor area.

In respect of aman rice cultivation, it was found that most of the farmers (63.5%) cultivate only various local rice varieties as flood tolerant. However, 18.15 percent of the farmers opined for Nazirshail, and 15.5 percent for Hashi as flood tolerant aman rice varieties. Among the high yielding aman rice varieties, the BRRI dhan 51 got the lowest preference as flood tolerant variety. Some farmers also opinioned that they prefer to cultivate deshi and tosha jute to save the crops from flood.

In terms of vegetables, the findings reveal that about two-thirds (65.0%) of the farmers gave their opinion in favour of onion as flood tolerant crop followed by 62 percent of the farmers who were in favour of cultivating garlic. The next flood tolerant crop as identified by the respondents was chilli; about 58 percent farmers were in favour of the crop. The other flood tolerant crop varieties identified by the respondents was bottle gourd (identified by 48 percent farmers) followed by sweet gourd (42%), lady's finger (39.25%), and tomato (identified by (30.5 percent).

Problems faced by the respondents in securing food and other necessities during severe flood in Haor areas

An attempt was made to identify the constraints faced by the respondents in securing food during severe flood in the Haor areas. Respondents have indicated quite a large number of constraints. However, the major constraints have been presented in Table 2.

Table 2. Problems faced by the respondents in securing food and necessities during severe flood in *Haor* areas

Sl. No.	Problems as identified by the responents	Respondents (n=400)	
		Number	Percentage
1	Communication problem	400	100.00
2	Prevalence of diseases	400	100.00
3	Prices of all necessary commodities goes up very high	400	100.00
4	Lack of Government safety net programs/relief immediately after flood	400	100.00
5	Uneven distribution of Government relief	380	95.00
6	Miserable living conditions	370	92.5
7	Unavailability of day labour	360	90.00
8	Sheltering and feeding domestic animals and birds	310	77.50
9	Spreading of various crimes	150	37.50
10	Droping out of school children	125	31.25

During and immediately after the flood the farmers in the Haor areas have to face enormous problems in relation to food security and meet up other necessities of life. The findings revealed that the severity of problems in respect of communication, prevalence of diseases, increasing the price of different commodities, and lack of adequate government safety net programs/relief immediately after flood were the highest and the intensity of problems as cited by the respondents were also equal (100%). In order of importance, the other problems were: uneven distribution of government fund (opined by 95 percent respondents), miserable living conditions (identified by 92.5 percent), unavailability of day labour (identified by 90 percent), and sheltering and feeding domestic animals and birds (identified 75.5 percent farmers).

Measures taken by respondents in Haor areas to minimize the food vulnerability

Respondents were asked how they tackled the food vulnerability, especially when the area is affected by devastating flood. Respondents indicated various mitigation strategies depending on the nature and extent of damage due to flood. However, FVI (Food Vulnerability Index) was calculated in order to ascertain the importance of the measures taken by the respondents to minimize the food vulnerability. The findings have been furnished in Table 3.

Table 3. Measures proposed by the respondents in *Haor* areas to minimize the food vulnerability

Sl. No.	Measures taken by the respondents	High	Medium	Not at all	FVI
1	Government safety net programme	400	0	0	800
2	Meet up the family needs by storing sweet potato	260	118	22	638
3	Storing the dry fish to meet up the family needs	260	114	26	634
4	Meet up the family needs by leasing own household assets	250	128	22	628
5	Rearing calves as a wealth to overcome the problem of food deficit	250	126	24	626
6	Raising ducks for earning money to use it during food crisis	236	148	16	620
7	Selling goats to overcome the problem at the time of food shortage	248	120	32	616
8	Rearing of poultry birds as a wealth to overcome the food problem	242	130	28	614
9	Meet up the family needs by leasing own ornaments	240	128	32	608
10	By using small savings of the women to buy foods at the time of food vulnerability	243	120	37	606
11	Meet up the family needs by day labour	234	120	46	588
12	Going outside own district for searching works	230	120	50	580
13	Meet up the family needs by leasing own land	210	138	52	558
14	Taking credits from the NGO	135	180	85	450
15	Getting aids from the GOs and NGOs	87	104	209	278

The findings demonstrated that government's safety net programmes topped the list (having FVI of 800) followed by storing sweet potato (FVI=638), and storing the dry fish (FVI=634), leasing own household assets to others (FVI=628), rearing calves (FVI=626), raising ducks (FVI=620), selling goats (FVI=616), rearing poultry birds (FVI=614), leasing own ornaments (FVI=608), and using own small savings of the women (FVI=606). The FVIs, however, ranged from 278 to 800; the lowest FVI was in respect of getting aids from the GOs and NGOs.

Suggestions to overcome the sudden food crisis caused by flood and other natural disasters in Haor areas

Respondents under the study were asked to highlight the suggestions to overcome the sudden food crisis caused by flood and other natural disasters in the Haor area. They were specifically requested to indicate what prior measures the respondents would have to take and what measures they expect from the government to tackle the situation. The findings have been presented in Table 4.

Table 4. Suggestions of the respondents to overcome the sudden food crisis caused by flood and other natural disasters in *Haor* areas

Sl. No.	Suggestions to overcome the sudden food crisis due to flood	Respondents (n=400)	
		Number	Percentage
1	Strengthening government safety net programmes	360	90.00
2	Working as a labourers	345	86.25
3	Increasing the amount of relief	340	85.00
4	Storing dry foods	310	77.5
5	By leasing or selling own wealth/ ornaments	285	71.25
6	By selling poultry birds	280	70.00
7	Dependents on NGO aids and credits	260	65.00
8	By selling goats	260	65.00
9	Meet up by preserved foods	250	62.50
10	By selling cows and calves	150	37.50

The findings in Table 4 dictates that the overwhelming majority of the farmers opined for the strengthening government safety net programmes as a measure to overcome the unforeseeable food in future due to flood and other natural disasters. This was followed by working as a labourers (86.0%), increasing the amount of relief (85.0%), storing dry foods (77.5%), leasing or selling own wealth/ ornaments (71.0%), and by selling poultry birds (70%). Slightly more than one-third farmers opined in favour of selling cows and calves as a measure to overcome food crisis in future.

Conclusion

In the Haor areas, the most important crop is boro rice. Farmers often cannot harvest boro rice due to early flash floods, hailstorms or other kind of disaster. However, there is shortage of high yielding short duration boro rice varieties. Only three HYV boro rice varieties have been reported as suitable for cultivation in the Haor. Hence, it is concluded that more short duration boro rice varieties need to be developed by the concerned research institutes.

In aman season farmers mostly cultivate local varieties and they get minimum yield. Consequently, they become food insecured. This fact leads to the conclusion that so long, the farmers would continue to cultivate local aman varieties, the chances of becoming food secured would be less. Therefore, the concerned agencies should give due cognizance of this fact and take proper steps to generate high yield potential aman rice varieties appropriate for cultivation in aman season.

Only few vegetables were found to cultivate by the farmers in Haor area. The vegetables are: onion, garlic, chilli, bottle gourd, sweet gourd, lady's finger, and tomato. Among these onion, garlic and chilli are mostly cultivated. Therefore, the concerned research institute may take necessary steps for generating more vegetables suitable for cultivation in the Haor areas.

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References

Alam, M.S., Quayum, M.A. and Islam, M.A. 2011. Crop Production in the Haor Areas of Bangladesh: Insights from Farm Level Survey. *The Agriculturist.* 8 (2): 88-97.

Das, D.C. 2004. Experiences with Modern and Hybrid Rice Varieties in Plain Land Ecosystem in the Mymensingh Region. Proc. of the 20th National Workshop on Rice Research and Extension in Bangladesh. Bangladesh Rice Research Institute, Gazipur-1701. pp. 63-65.

Huda, M.K. 2004. Experience with Modern and Hybrid Rice Varieties in Haor Ecosystem: Emerging Technologies for Sustainable Rice Production. Proc. of the 20th National Workshop on Rice Research and Extension in Bangladesh. Bangladesh Rice Research Institute, Gazipur-1701. pp. 94-97.

Husain, A.M., Hossain, M. and Janaiah, A. 2001. Hybrid Rice Adoption in Bangladesh: A Socio-economic Assessment of Farmers' Experiences, Research Report, Social Sciences Division, International Rice Research Institute (IRRI), LosBanos, Philippines. pp. 55-59.

Jabber, M.A. and Alam, M.S. 1996. Adoption of Modern Rice Varieties in Bangladesh. *J. Agri. Econ.* 16 (2): 77-95.