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Full Length Research Paper

Constraints of floating farming in Haor area of Bangladesh

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In Bangladesh, Haor type ecosystem is found about 80,000 square kilometers in north eastern Bangladesh where floating farming is gradually becoming popular in order to minimize the adverse impact of climate change related hazards on crop production. But due to some socio-economic situational drawbacks, this farming could not get proper priority to the farming community at a large scale. So, the main focus of the study was to determine and describe constraints faced by the farmers in practicing floating farming. Data were collected from the sampled respondents of three villages of Lakkansree union under Sunamganj district using pre-tested interview schedule during September to December, 2017. A total of 30 constraints covering knowledge, skill to socio-economic aspects of the Haor farmer were recognized as the extreme obstacles regarding floating farming. Out of these, lack of adequate knowledge about floating farming; input related constraints like scarcity of water hyacinth for bed preparation; complexity in bed preparation; and leech biting during intercultural operations impacted significantly in refraining farmers from this potential farming.

Key words: Farmer, Haor, water, constraints, floating farming.

INTRODUCTION

Floating farming is a long forgotten traditional agricultural practice in some rural areas of Bangladesh, locally referred to as “vasoman chas” is similar to hydroponics, which is a scientific method whereby the plants are grown in the water and uptake their nutrients from the water instead of soil. Floating farming platforms are prepared with the biomass using water-hyacinth, aquatic algae, water-wart and the other water born creepers, straws and herbs or plant residues locating platforms are prepared with the biomass using water-hyacinth, aquatic algae, water-wart and the other water born creepers, straws and herbs or plant residues. The size and shape of the farm vary according to the farmers’ choice, demand and economic capacity but small platform or bed is easier to manage for better crop production. Floating farming has many advantages like: environmental friendly because no additional fertilizers and manures are required unlike conventional agricultural system practices in plain lands; the area under floating bed is more fertile compared to the traditional land, and crops and fish can be cultivated simultaneously. Floating farming is very popular in southern parts of Bangladesh as a traditional practice (Awal, 2014). It has become an alternate farming for vegetable production in some southern districts like Barishal, Gopalganj and Pirojpur of Bangladesh where cost benefit ratio of vegetable cultivation ranges from 1:1.6 to 1: 2.6 (Islam et al., 2015). The productivity coming from floating vegetables cultivation is estimated ten times higher than that of previous years because of adaptation of floating farming at a large scale. It is a sustainable

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agricultural practice in the wetlands of Bangladesh (Islam & Atkins, 2007). Besides these, Hoque et al. (2016) identified the effectiveness of floating agriculture for adapting climate change in Southern Bangladesh. Although having an immense prosperity of floating farming, the practice is hardly found in the north-eastern Haor areas where all physical requirements for floating farming are available. Islam et al. (2015) in this regard revealed that Haor farmers have considerable favored perception about floating agriculture. The wetland region (Haor) of northeastern (NE) Bangladesh often severely affected by flash floods (Kamal et al. 2018) Floating Gardening is a means to rebuild lives after devastating flood (Irfanullah et al, 2011). In spite of having favorable perception, there are some constraints which create obstacles in the increment of diffusion rate of floating farming adaptation in Haor areas. This study was conducted to find out these constraints which hinder farmers from the adoption of floating farming.

MATERIALS AND METHODS

The study was carried out in three villages namely Junigaon, Bahadurpur and Nilgaon of Lakkansree union of Sunamganj district where small scale, scattered floating farming was practiced in the water bodies surrounded by local dikes in such way that those could not expose to serious wave action from Haor side. Through focus group discussion, a total of 30 constraint items were identified as the major problems for floating gardening in Haor area. Data were collected from the sampled respondents of three villages using pre-tested well-structured interview schedule during September to December, 2017. Farmers were asked to mention the problems they encountered in practicing cultivation of vegetable in floating beds. To quantify the extent of these problems encountered by the farmers a 4 point scale ranging from 3 to 0 was employed. In this ranking, most severe, severe, less severe and not at all problem were identified by the rank of order 3, 2, 1, and 0 respectively. Constraint Index (CI) was also determined for each of the 30 constraints in order to rank them.

RESULTS

Floating farming is very famous in southern parts of Bangladesh as they are getting benefits from it. But having all the physical facilities like southern parts, it is not famous in north-eastern parts of Bangladesh. Because in north-eastern belt, there are some input, knowledge & skill, intercultural operational, social, situational and financial constraints which create obstacle regarding adoption of floating farming by the Haor farmers.

Overall constraints facing scores for the 30 selected constraints of the respondents could theoretically range from 0 to 90, where 0 indicating no constraint and 90 indicating most severe constraints. However, the observed constraints scores of the respondents ranged from 27 to 51 with the mean of 42.15 and standard deviation of 4.82. Based on their overall constraints scores, the respondents were classified into three categories as presented in Table 1.

The majority (66 percent) of the respondents had medium constraints while 20 percent had high constraints and only 14 percent had low constraints in farming of vegetables on floating beds. This reveals that overwhelming majority of the respondents ((86 percent) faced medium to high constraints in floating farming. To have better understanding regarding each of the constraints in production of vegetable on floating farms it is necessary to have an idea about the ranking of 30 selected constraints. For this purpose, Constraint Index (CI) was computed and depending upon CI constraints were ranked as follows:

DISCUSSION

Input constraints

Water hyacinth, bamboo, straw, water wart and crop seeds are the major inputs of floating farming. But recently availability of water hyacinth had drastically been decreased in the Haor area. Unavailability and high cost of other inputs like straw, water wart and bamboo for making raft might lead the farmers abstain from this farming. Similar finding was reported by Madon (2008) that unavailability of input as the common constraints to dissemination of agricultural technology.

Knowledge and skill constraints

Knowledge is the pre-requisite for making any farming enterprise profitable and has been considered as the base for agriculture. It also hosts formation of favorable perception and thrives for skills in the relevant field. Inadequate knowledge in this regard often lead Haor farmer's poor skill as they perceived floating bed preparation as complex and troublesome one. Enhancing skills of farmers could be gained through discussions, exposure visits and continuous practices. Learning knowledge and skill is very important for the enhancement of agricultural technology as well as improvement of rural livelihood (Robinson-Pant 2016).

Table 1. Distribution of respondents on the basis of their overall constraints scores.

Categories of constraints	Respondents		Mean	Standard deviation
	Number	Percent		
Low (up to 33.33 score)	14	14	42.15	4.82
Medium (37.34 to 46.97 score)	66	66		
High (46.98 to 51.00 score)	20	20		
Total	100	100		

Table 2. Ranking of constraints involved in floating farming.

Constraints	Degree of severity				CI	Rank order
	Most severe, 3	Severe ,2	Less severe, 1	Not at all problem ,0		
Inputs constraint						
1. Scarcity of water hyacinth	42	41	10	7	218	3
2. Scarcity of raw materials (bamboo, straw, water wart etc.)	11	25	28	6	171	10
3. High cost of quality seeds	11	55	28	6	171	10
Knowledge and skill constraints						
4. Lack of adequate knowledge	70	9	21	0	249	1
5. Lack of skill in floating farming	34	29	31	6	191	6
6. Complexity in bed preparation	4	37	20	39	106	20
Intercultural operations constraint						
7. Leech biting	38	53	5	4	225	2
8. Weeding and harvesting in deep water	22	53	25	0	197	5
9. Requirement of intensive care	19	42	39	0	180	8
10. Requiring repeated movement of floating farm	26	42	28	4	190	7
11. Skin infection	13	43	38	6	163	11
12. Heavy weed infestation	23	28	19	30	144	15
13. Deteriorated water causes health hazard	13	8	32	47	87	23
14. Multiple harvesting	2	8	21	69	43	27
Social constraint						
15. Lack of cooperation	14	30	33	23	135	17
16. Lack of relevant skilled labors	2	20	34	44	80	25
17. Ignorance	6	20	62	12	120	18
18. Social insult	10	14	22	54	80	25
Financial constraints						
19. High initial expense	5	9	8	64	41	29
20. Lack of own beds	22	28	24	26	146	14
21. Lack of own ponds	8	33	27	32	117	19
22. Sharing of produce	4	27	38	31	104	21
23. Lack of capital	0	21	52	27	94	22
Situational constraints						
24. Lack of closed water bodies	38	36	24	2	210	4
25. Rats	11	55	29	5	172	9
26. Lack of advice	25	19	34	22	147	13
27. Waves and heavy rain caused disperse floating farms	7	49	27	17	146	14
28. Floating away of farms by flash flood	11	10	29	50	82	24
29. Ducks	8	13	26	53	76	26
30. Flash flood	0	9	24	63	42	28

Intercultural operations constraint

Unlike upland agriculture, floating farming needs intensive care and repeated weeding. All these have to be done in such deteriorated water of Haor areas which has abundance of leeches. Besides, multiple harvesting in deep water and repeated movement of floating farm caused health hazard and skin infection in deteriorated water. All these constraints might lead the farmer refrain from this farming.

Social constraints

Society plays very active role regarding adoption of any kind of farming. Stone (2004) revealed in his study that farmers appear to be enmeshed in a social fabric and their decisions often seem unduly guided by social factors such as customs, obligations, and beliefs. In Haor areas, farmers did not get sufficient support from different government organizations such as DAE, NGOs etc. Relevant skilled labors were also not available. Ignorance towards any new technology was highly found and these farmers who adopted this long forgotten traditional practice they were going to face social insult and humiliation. These social superstitions and lack of having proper cooperation might lead the farmers abstain from this farming.

Financial constraints

Adequate financial ability is very essential for the dissemination of agricultural technology. In case of Haor areas, most of the farmers are very poor, they are not able to bear the high initial cost of floating farming. They do not have their own beds and own ponds. Other financial constraints like sharing of produce and lack of capital which might influence the farmers for not adopting floating farming at a large scale.

Situational constraints

Closed water bodies are very important in floating farming. But in Haor areas, closed water bodies could be hardly found. The other situational constraints like attack of rats, stormy winds that might lead the farmers abstain from this farming. Waves and heavy rain created obstacle in floating farm as it caused floated farm to disperse. In Haor areas, flash flood frequently visited. Flash flood is one of the basic situational constraints of floating farming, as the farms are floated away due to it. Duck could also do a lot of harm because of highly raised by the village people of Haor areas.

Socio-economic profile of the respondents

Age

Age is the indicator of biological maturity of an individual from birth to the time of interview. Table 3: indicates that most of the respondents were middle aged.

Level of education

Education level of the respondent was calculated on the basis of their passing of different public examinations. The average level of education was 2.40 which indicated poor education level.

Family size

Family size referred to the number of members including the respondents himself, his/her spouse, children and other family members who are permanent dependents live and eat together in the family. The average family size of the respondents was 6.73 which showed most of respondents belong to large family.

Farm size

The farm size of the respondents was measured on the basis of their total farm size area including homestead. Most of the respondents were medium farmers having average farm size 2.745 ha.

Annual family income

Annual family income of the Haor farmers was measured on the basis of their yearly income from the services, agricultural farming and other sources. It was expressed in Tk. with the mean of 71500 showing most of the farmers were poor.

Agricultural training experience

Training of technical aspects of floating cultivation may increase the adaptation of the respondents. Training was measured on the basis of the training received by the respondents on different farming activities. In this regard most of the respondents got little or no training experiences.

The socio-economic profile of the respondents showed that the Haor farmers come from very low socio-economic background. They have little access to education, income and agricultural training facilities as they live in a very remote area where all these facilities are hardly found. Moreover, they belong to extended

Table 3. Salient features of the selected socio-economic characteristics of the respondents.

S.L. No.	Characteristics	Unit of measurement	Observed range	Mean	Standard deviation
1.	Age	Year	27-65	42.20	9.685
2.	Level of education	Year of schooling	1-4	2.40	0.871
3.	Family size	No. of persons	4-10	6.73	1.694
4.	Farm size	Hectare	0.60-11.17	2.744	2.215
5.	Annual Family income	'000' Taka	45000-100000	71500	16648.71
6.	Training received	No. of days experience	0-3	2.25	1.256

family having small farm size. That's why in this research among various categories of constraints, input, knowledge& skill, intercultural operational, social, financial and situational constraints have taken into account. Constraints relevant to input, knowledge and skill, and intercultural operation impacted greatly in degradation of adoption of this farming. Among these, scarcity of water hyacinth, complexity in bed preparation, biting of leech, lack of closed water bodies, weeding and harvesting in deep water were the top constraints. Due to inadequate knowledge and skill regarding floating farming, farmers found complexity in bed preparation. As freshwater is the way of survival for leech, so it is highly found in Haor areas. Farmers got skin infection during weeding and harvesting in deep water. Scarcity of water hyacinth is increasing for using it as a cattle food by the Haor livestock farmers as they face serious fodder crisis due to flood. Both Government and non-government organizations should come forward to minimize these constraints regarding floating farming in Haor areas and make it popular among the farmers in a sustainable way.

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