

Full Length Research Paper

Homestead vegetable gardening as a source of calorie supplement at Ishurdi Upazila, Bangladesh

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Received 16 December, 2020; Accepted 15 February, 2021

The present study was conducted at Ishurdi Upazila under Pabna district, Bangladesh during 2018 to investigate the homestead vegetable production and its impact on calorie supplement as rural farm family nutrition. A total of 90 farm household heads were randomly selected as respondent for the present study from randomly selected three villages of the Upazila. Data were collected through pre-tested interview schedule. More than half of household heads were middle aged group having moderate extension contact and medium annual income categories. More than two-third of them had primary to secondary level of education. Female household heads spent 6.3% time for homestead vegetable cultivation in case of small farm family followed by medium farm family (5.0%) and large farm family (2.1%). Medium farm family intake was about 3.2%, calorie from homestead vegetable garden whereas the small farm family intake was 2.2% and large farm family intake was 1.7% of the same. Marginal and large farm families spent minimum time for homestead vegetable gardening and consume flesher calories from their homestead garden. Lack of quality seeds and capital with high input cost were the most vibrant problems faced by the farm households.

Key words: Calorie, food security, homestead, nutrition, production, vegetable gardening.

INTRODUCTION

Bangladesh is regarded as one of the most densely populated area of the world and all these cultivable land decreasing day by day for increasing of population. The development of Bangladesh depends largely on the development of agriculture sector which contributes 19.1% of the GDP (Bangladesh Bureau of Statistics, 2015). About 70.0% of the total population lives in rural

areas and their livelihood directly or indirectly depends on agriculture. So, agriculture is the backbones of the economy of Bangladesh. Vegetables are rich sources of essential vitamins such as A, C, niacin, riboflavin, thiamine and minerals such as calcium and iron. They contribute to the intake of essentials nutrients from other foods by making them more palatable. Vegetables

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provide dietary fiber necessary for digestion and also essential for maintaining health curing nutritional disorders (Terry, 2011). According to the World Health Organization (WHO), a healthy individual should take 220 g of vegetable daily. In Bangladesh, the average per capita daily vegetable intake is 166.1 g, whereas the recommended intake is 250 g/day rather than China (292 g/day), Japan (432 g/day), Thailand (257 g/day) and also lowest among the countries of South Asia (Food and Agriculture Organization and World Health Organization, 2014). Vegetables not only minimize the malnutrition but also maximize the financial returns. Vegetable generate cash to the growers. It helps to reduce dependence on rice. According to modern science, eating excess rice, which we do in general, is not good from the health point of view. Thus, to fulfill farmers economic demand they are getting more involved in vegetable cultivation along with rice cultivation (Ali and Hauk, 2012). Only a small proportion of total cropped areas of Bangladesh are under vegetables production. Most of the agricultural production in Bangladesh is strenuous in rice, occupying about 75.0% of total cropped areas, whereas only 7.0% of the total cropped land is used for horticultural crops, including root and tuber crops (Bangladesh Agricultural Research Institute, 2017). In Bangladesh vegetables are grown in 2.63% of cultivable land (Bangladesh Bureau of Statistics, 2015). From this small proportion of the cultivable land area, the country produces about 0.176 million metric tons of vegetables annually, of which about 65% are produced in winter and the rest in summer. Therefore, production is not well distributed throughout the year and produce for domestic use is relatively scarce in the off-season (Department of Agricultural Extension, 2016). Vegetable production in Bangladesh has increased five times in the past 40 years and Bangladesh has scored 3rd in global vegetable production, next to China and India (Food and Agriculture Organization, 2017). A lot of vegetables are grown round the year in Bangladesh. Due to increase in the population of the country, there is a great demand of vegetables production. To meet the existing demand of the population, per unit area must be increased. This is possible by converting single cropped area into double, and double and triple cropped area into triple/fourth cropped area by using improved agricultural technologies, especially in vegetable cultivation. Farmers used to grow vegetables around the homestead area, but now-a-days a large number of farmers grow vegetables on commercial scale because vegetables cultivation is more profitable than that of cereal crops.

Homestead is the center of socio-economic activities and traditional cultural heritage of villages in Bangladesh. Homestead perhaps the most important production unit in Bangladesh, the number of which accounted about 25.36 million in the country with 21.90 million in the rural areas. These homesteads occupied about 0.54 million hectares

of total cultivable land. The average size of the rural homestead is very small (0.02 ha), which varies widely according to region and socioeconomic status of the households (Bangladesh Bureau of Statistics, 2018). Homestead gardening in Bangladesh provides an excellent opportunity for farmers to produce a wide range of horticultural crops. All micro sites of homestead from home-yard to kitchen garden, and even roofs of houses help diversify household's diet through the production and consumption of the vegetables they produce (Prodhan, 2017). Nutrition problem is key issue along with food security in Bangladesh today. A small percentage of the people have access to nutritious food, whilst the majority is forced to survive on subsistence diets that are unbalanced and devoid of essential food ingredients. Generally, landless and marginal farmers are at more risk nutritionally than those of larger households. So, from the aforementioned point of view, the specific objectives guided the present study was to (i) describe the selected socio-demographic characteristics of the rural household heads, (ii) investigate the homestead vegetables production status of the households and (iii) assess the impact of homestead vegetables production on calorie supplement as family nutrition.

METHODOLOGY

The purpose of the study was to investigate the rural homestead vegetable production and its impact on calorie supplement as family nutrition. The field study was conducted at Ishurdi Upazila under Pabna district, Bangladesh during October, 2018. The study area was purposively selected because it is one of the important commercial vegetable growing area as well as homestead vegetable production area of Bangladesh as suggested by the Upazila Agriculture Officer (UAO), NGOs workers and Upazila level officials who used to deal with homestead vegetable production as well as commercial vegetable farming. An up to date list of the homestead vegetable growers were prepared with the help of Sub Assistant Agriculture Officers (SAAO) and UAO of Ishurdi Upazila. A total of 1647 rural household heads, maintaining livelihoods from agricultural production were listed from three unions namely (Pakshi, Silimpur and Muladuli) which constituted the sampling population of the study. Among them, 90 household heads (that is, 5.5%) were selected as respondents of the study following disproportionate random sampling technique. Data were collected by face-to-face interview with the help of pre-tested interview schedule. The interview schedule contained both open and closed form questions. Both qualitative and quantitative data were collected for the study. Appropriate scales were also developed to operationalize the selected characteristics which were: age, education, family size, farm size, annual income, extension media contact and training experience. Homestead vegetable gardening was considered under four sub-heads, viz. vegetable grown in homestead; time spent in household activity and homestead vegetable garden; daily per head vegetable consumption and calorie intake from homestead gardening. The interview focused on knowledge of the respondents towards homestead vegetable production technology, percent time spent and calorie intake from homestead vegetable and constraint in homestead vegetable production. The degree of the problems faced by the respondents

Table 1. Distribution of the vegetables farmers according to their selected characteristics.

S/N	Characteristics	Categories	Respondents		Mean	SD
			No.	%		
1	Age	Young aged (up to 30 years)	22	24.4	41.75	7.10
		Middle aged (31-50 years)	49	54.4		
		Old aged (>50 years)	19	21.2		
2	Level of education	Illiterate (0)	03	3.3	7.24	2.68
		Can sign only (0.5)	16	17.8		
		Primary level (1-5 class)	29	32.2		
		Secondary level (6-10 class)	32	35.6		
		Above secondary (>10 class)	10	11.1		
3	Family size	Small sized family (up to 4)	31	34.4	6.10	1.65
		Medium sized family (5-8)	49	54.4		
		Large sized family (>8)	10	11.2		
4	Farm size	Marginal farm size (<0.02 ha)	09	10.0	1.24	1.96
		Small farm size (0.02-1.0 ha)	25	27.8		
		Medium farm size (1.01-3.0 ha)	41	45.5		
		Large farm size (>3.0 ha)	15	16.7		
5	Annual family income	Low income (up to 75 thousand BDT)	24	26.6	122.5	52.78
		Medium income (76-150 thousand BDT)	51	56.7		
		High income (>150 thousand BDT)	15	16.7		
6	Extension media contact	Low contact (up to 10)	23	25.5	15.22	4.31
		Medium contact (11 to 20)	49	54.5		
		High contact (>20)	18	20.0		
7	Training experience	No training (0)	53	58.9	0.45	0.18
		Had training (1)	37	41.1		

was measured based on the number of respondents' opinion in favor of each problem. The responses were noted as high (3), moderate (2), low (1) and no problem (0). Problem Confrontation Index (PCI) was computed as used by Hossain and Miah (2011) and Islam et al. (2019). The PCI was computed by using following formula:

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

where PCI = Problem confrontation index, P_h = No. of respondents faced high problem, P_m = No. of respondents faced moderate problem, P_l = No. of respondents faced partial problem, and P_n = No. of respondents faced no problem.

The statistical measures as range, number, percentage, mean, standard deviation and rank order were used in describing the variables.

RESULTS AND DISCUSSION

Important findings and their logical interpretations have been given subsequently in accordance with the objectives of the study.

Demographic characteristics of the respondents

Seven socio-economic characteristics of the respondents are presented in Table 1. Among the respondents 54.4% were middle aged, 24.4% were young and 21.2% were old aged. More than one-third (35.6%) of the respondents had secondary level of education next to that primary level of education (32.2%) and can sign only (17.8%), while 11.1% had higher secondary and 3.3% respondents were illiterate. It is very important to note that most of the respondents (78.9%) were educated. About 54.4% of the respondents' families were found medium sized where small and large sized were 34.4 and 1.2%, respectively. The highest portion (45.5%) of the respondents had medium farm size while 27.8% small and 16.7% had large farm size. More than half (56.7%) of the respondents had medium annual income which was followed by low (26.6%) and having high (16.7%) annual family income.

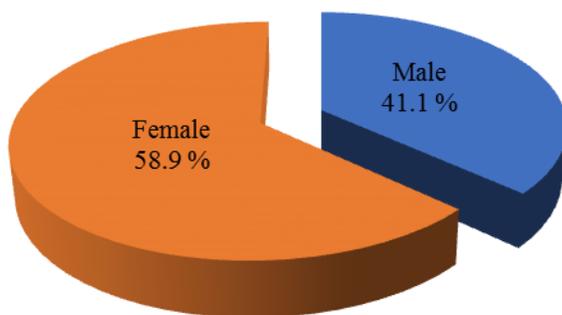


Figure 1. Distribution of the respondents according to their gender

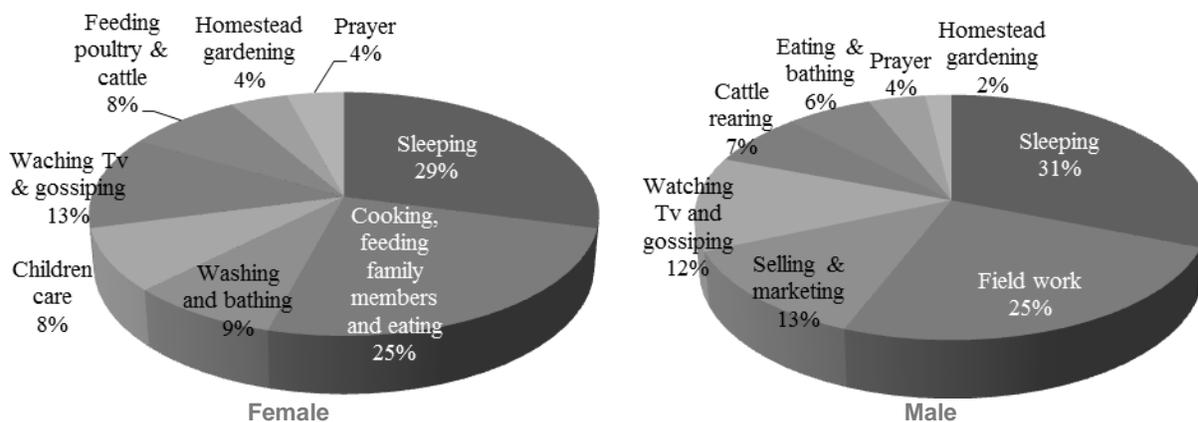


Figure 2. Daily activities and work routine of a household in the study area.

Most of them (54.5%) had medium level of extension contact while low (25.5%) and 20.0% had high extension contract. A total of 58.9% of the respondent had no training experience and about forty (41.1%) had training experience. Hence, Bangladesh Agricultural Research Institute, Department of Agricultural Extension, Non-Government Organizations and other extension service provider may give more emphasis to train farmers to improve their skills on the vegetable production. Naznin et al. (2018) also revealed that most of the vegetable growers were over 35 years old, had high literacy level, 7 or less family members, contacted various information sources, received training (64.55%), and earned low (78.2%) income annually.

Vegetables grown in homestead

Respondent of the study area nearly follow Kalikapur model of vegetables production and they cultivate different vegetables such as papaya, radish, brinjal,

amaranth, lal shak, spinach, batisak, basil, cabbage, tomato, bitter gourd, sweet gourd, wax gourd, ridge gourd, sponge gourd, snake gourd, bottle gourd, yard long bean, okra and bean. Distribution of the respondents according to their gender is as shown in Figure 1 which revealed that 58.9% were female and 41.1% were male respondents participating in data collection process as field survey about vegetables production as caloric intake in homestead gardening.

Results contained in Figure 2 indicate that about 30.0% time spent in sleeping and rest of 70.0% time was working hour both for male and female. One-fourth (25.0%) time spent by both male and female in field work and cooking, feeding family members and eating, respectively. Another major activity of a female was about 8.0 to 9.0% time spent in washing percent bathing, children care and feeding poultry and cattle. Domestic chores are the tasks performed by women at home not accorded recognition or attached economic value by society. These include rearing children, looking after the aged in the family, cooking, washing and housekeeping.

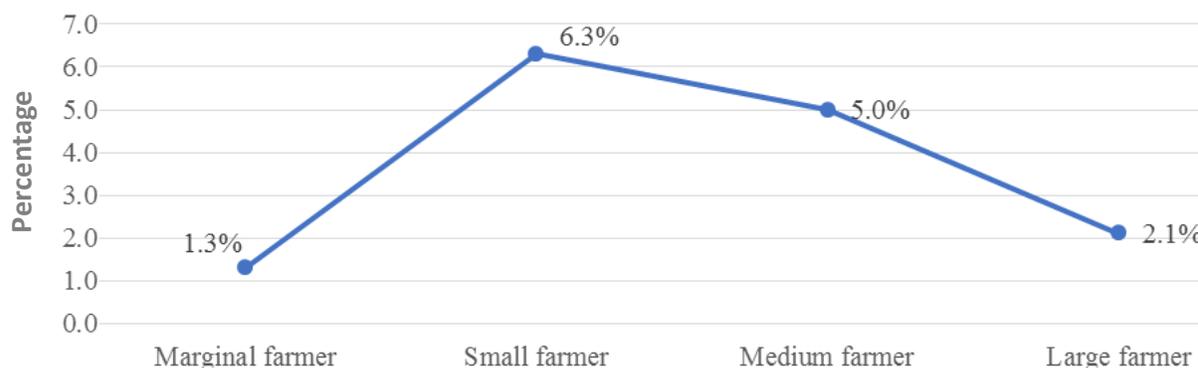


Figure 3. Distribution of the female respondents based on their percent time spend in homestead vegetable garden.

Till now, these are all considered to be the responsibility of women folk alone, and the trend is similar almost everywhere in the globe (International Labour Organization, 2011). Major activity of a male was selling products and marketing (13.0%) and about 6.0 to 7.0% time spent in cattle rearing and eating and bathing. In case of homestead vegetable gardening, woman spent just double time than that of man. Time spent in watching TV and gossiping and prayer almost similar both in male and female.

Percent time spent in homestead vegetable garden

Percent time spend of the respondent in homestead vegetable gardening varied significantly with farm size of the respondents as shown in Figure 3. It was varied from 1.3 to 6.3% of their total working period. The highest (6.3%) time spent in case of small farmer of female respondents which was followed by medium farmer (5.0%) and large farmer (2.1%). It is well known that large and medium farmers have considerable homestead area but they spend less time in homestead vegetable gardening compared to small farmers as they are more engaged with their commercial cultivation and other activities. Marginal farmers have very minimum homestead area for vegetable gardening as they spend the lowest time (1.3%). There was a significant relationship found in gender aspect of participation. The female participants spent much more time than that of their male counterpart in homestead vegetable gardening.

Vegetables consumption by the respondents

Results contained in Figure 4 indicate that medium farmer consume the highest amount of vegetables (50 g

+ 65 g + 60 g) = 175 g head⁻¹ day⁻¹ from their homestead garden, commercial field and purchase, respectively which was followed by large farmers (30 g + 60 g + 80 g) = 170 g head⁻¹ day⁻¹ and the lowest amount of vegetables consumption by marginal farmers (20 g + 45 g + 50 g) = 115 g head⁻¹ day⁻¹. The results are almost similar to our national data where average per capita daily consumption is 166.1 g (FAO and WHO, 2014).

Percent calorie intake from homestead vegetable

Results shown in Figure 5 indicate that the dietary calorie intake of respondents varied significantly with the farm size of the respondents. Medium farmers' intake of about 3.2% of their total dietary calorie demands from homestead vegetables whereas the small farmers' intake was 2.2% and large farmer intake was 1.7%. Marginal farmers have very minimum homestead area for vegetable gardening as they fulfil 1.3% of their total dietary calorie demands from homestead vegetables. As it is known that over 80.0% of the dietary calorie demand meet up by the single source like rice. For ensuring balanced nutrition from versatile food staffs to enhance food security it needs to emphasize enormous production and consumption of homestead vegetables. Prodhan (2017) observed that total calorie uptake from different consumed vegetable was 73.0 and 111.0 kcal before and after demonstration, respectively. Ferdous et al. (2016) reported that after the intervention, the highest amount of vegetables was produced by the small farmer groups (511 kg/year) followed by marginal (499 kg/year) and landless (422 kg/year) farmers. They also mentioned in their study that the yearly vegetable requirements of farmers were largely met by the homestead garden with a supply between 55 and 79 kg/head/year compared with the bench mark level of 21 to 30 kg/head/year before the intervention.

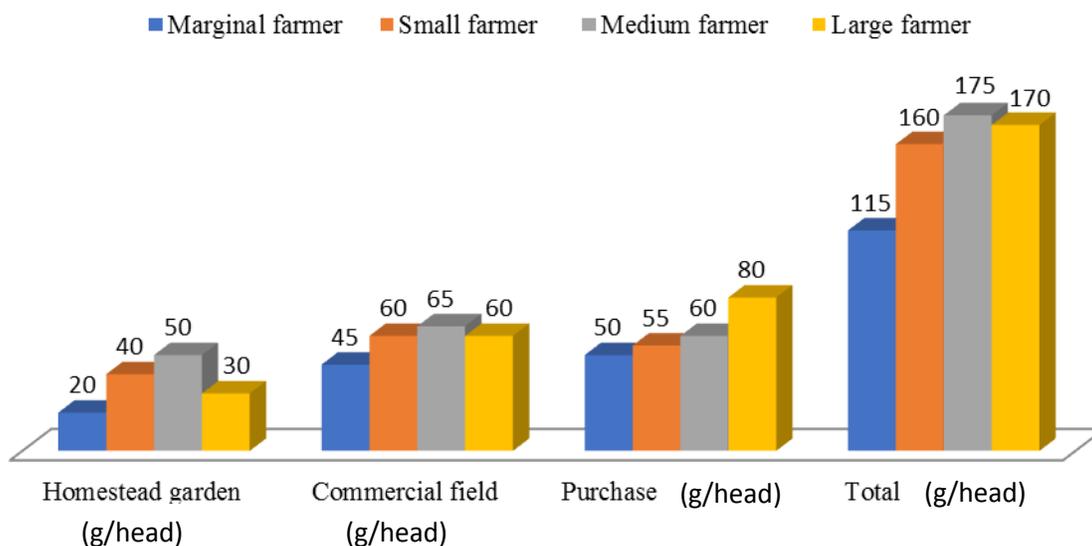


Figure 4. Per capita per day vegetable consumption by the respondents in the study area.

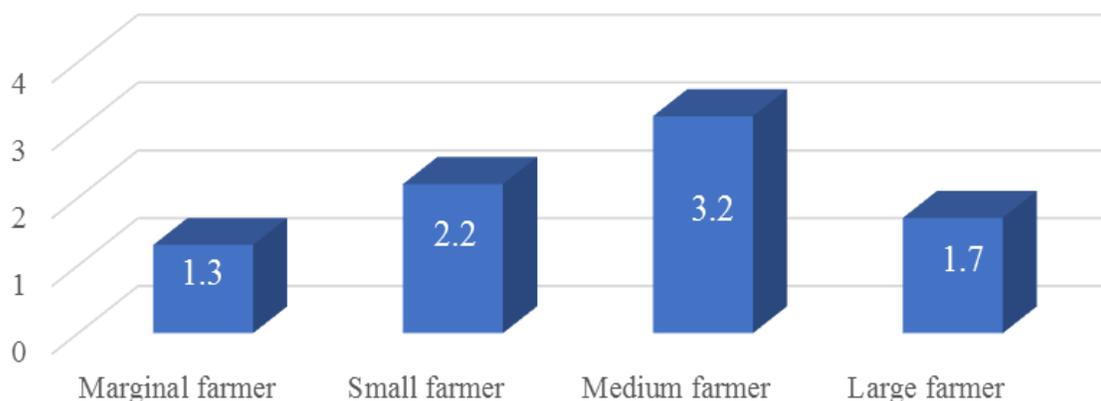


Figure 5. Calorie intake by the respondents' family from their homestead vegetable garden compared to their total dietary demand (%).

Respondents' knowledge on homestead vegetable production

For consumption of sufficient amount of vegetable per day it is very essential to have knowledge on the beneficial effect of vegetable consumption and its production technology as well. Results shown in Figure 6 indicate that 42.1% of the respondent had medium level of knowledge about homestead vegetables production technologies which was followed by low (39.5%) and high (19.4%) knowledge.

From Figure 6, it is observed that an overwhelming majority (81.6%) of respondents in the study area had low to moderate knowledge on vegetable production

technology. This might be due to their poor literacy levels. So, government may take initiative to arrange training program about modern vegetable production.

Problem confrontation index (PCI)

Eight problems faced by the respondents regarding homestead vegetable production were considered in this study. The computed PCI of the 8 problems ranged from 0 to 260 against the possible range on 0 to 270 have been arranged in rank order according to their PCI.

According to their PCIs which appear in Figure 7 indicate that 'lack of quality seed' is the most vibrant

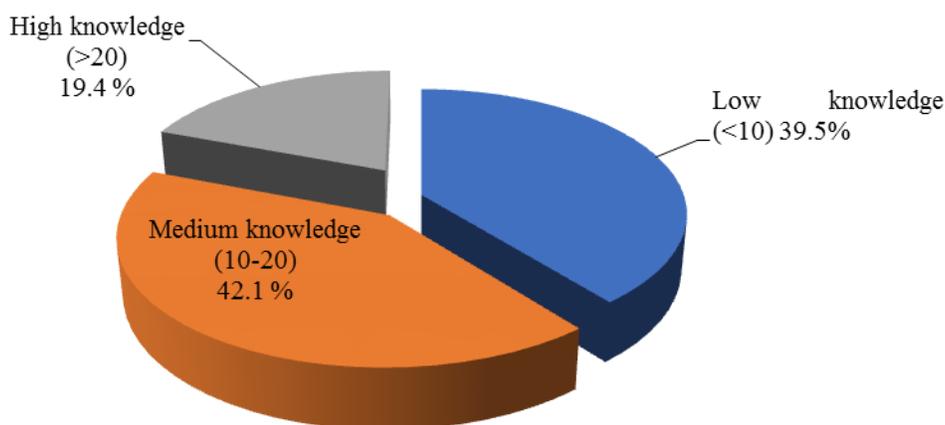


Figure 6. Respondents' knowledge on homestead vegetable production technology.

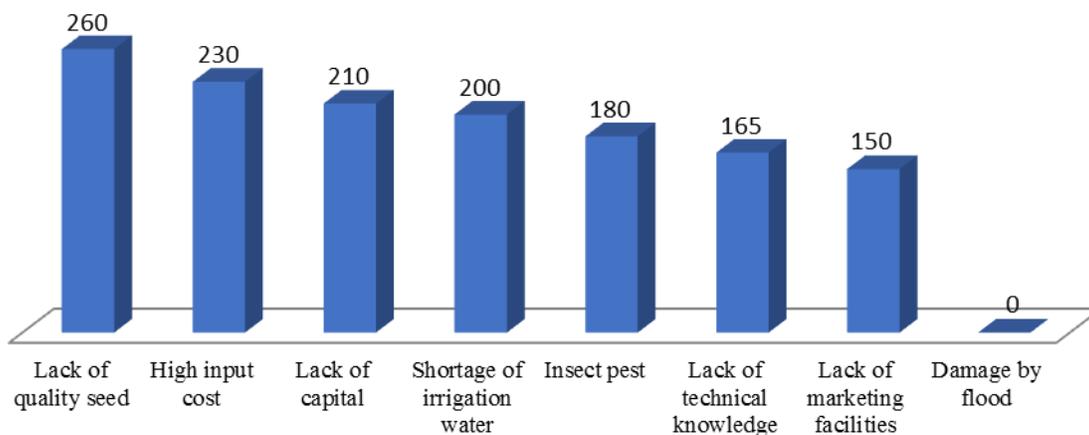


Figure 7. Rank order of the selected eight problems regarding homestead vegetable gardening based on their PCIs.

problem of the respondents in the study area, because it is very difficult for the respondents to collect good quality seeds from the market. Farmers are also cheated by losing their money and crops as well because of buying low quality seeds. So, this problem ranked first among the problems. Another major problem of the respondents regarding vegetable production in their homestead was 'high input cost'. Farmers need to purchase required inputs for their production, sometime input dealers and agencies cheat the farmers by taking high price for inputs and inputs are below quality. 'Lack of capital and shortage of irrigation water' was another major problem. It is also difficult for the respondents to manage enough capital and irrigation water in dry season for cultivation. Vegetables damaged by insect-pests, lack of technical knowledge and marketing facilities were other problems of the respondents. There was no problem about

homestead vegetables damage during flooding period in the study area. Similar problems were identified as the hinderer of homestead vegetable production by Debnath et al. (2018) and Akter et al. (2019) in their respective studies.

Conclusion

From the findings of the study, it is apprehended that the medium farm holding farmers consume the highest amount of vegetables from their homestead garden which was followed by small farm holding farmers and the lowest amount of vegetables consumption by marginal farmers. The medium farm holding farmers' intake was about 3.2% of their total dietary calorie demands from homestead vegetable, whereas the small and large

farmers' intake was 2.2 and 1.7%, respectively. Marginal farmers have very minimum homestead area for vegetable gardening as they fulfill 1.3% of their total dietary calorie demands from homestead vegetable. Marginal and large farmers spent minimum time and consume fewer calories from their homestead garden. Lack of quality seed was the most vibrant problem of the study area. Other major problems regarding vegetable production in their homestead were high input cost, lack of capital and shortage of irrigation water. Department of Agricultural Extension and Department of Health may arrange motivational campaign along with functional training for farmers emphasizing the importance of vegetable intake to maintain sound health. Low cost quality seeds may be made available to the rural farm households, especially women.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

ACKNOWLEDGEMENTS

The authors are grateful to the Bangladesh Agricultural Research Council (BARC), Farmgate, Dhaka, National Agriculture Training Academy (NATA), Gazipur, Bangladesh Sugarcrop Research Institute (BSRI), Ishurdi and Bangabandhu Sheikh Mujibur Rahman Agricultural University, Bangladesh to provide all facilities and extending co-operation in conducting the research.

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