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ASSESSMENT OF TRAINING NEEDS ON CROP PRODUCTION FOR FARMERS IN SOME SELECTED AREAS OF BANGLADESH

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Abstract

The study attempts to determine the training needs of the farmers emphasizing nine selected major thematic areas. Under each major component, specific and relevant training needs item were collected and systematically incorporated into an interview schedule and administered in terms of frequency of training imparted. Four districts were purposively selected for the study and a total of eighty farmers were randomly selected from four districts. Primary data were analyzed using descriptive statistics. The study revealed that more male was involved in farming and 45% farmers were middle age category (30-39 years). Majority of the farmers completed primary level of education compared to other categories and family size of more than half (60 %) of the respondents was three. Majority number of respondents (57%) had more than 10 years farming experience. A small number of farmers (8.75%) had owned agricultural land and 45% had land between 0.50- 1 hectare. More than 75% of annual gross income of 57.50% farmers came from agricultural activities. More than half (55%) of the respondents collected information on crop and its varieties by own attempt while about 34% was informed from seed seller or dealer. Farmers in Chattogram district had first priority to get training on integrated pest and diseases management, production of bio control agents and bio pesticides, marketing and transportation. Water management, integrated pest and disease management, vermi-compost production, marketing and transportation ranked first in Khagrachori district. The areas of priority for training in Rajshahi district were production and management technology, processing and value addition, marketing and transportation, integrated pest and disease management, water management and vermi-compost production. Training on integrated pest and disease management, bio-control of pests and diseases, production of bio control agents and bio pesticides, production of off-season vegetables, vermi-compost production, marketing and transportation were most emphasized by the respondents in Rangpur district. Respondents defined identification of adulterated fertilizer, insecticide and pesticide application, disease and insects of mango varieties and fruit bagging system of mango as very good type of training. The study concluded that there is an urgent need to design regular training programs in identified thematic areas to fulfill the knowledge gap among the farmers of Bangladesh.

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Introduction

Training is a process of acquisition of new skills, attitude and knowledge in the context of preparing for entry into a vocation or improving one's productivity in an organization or enterprise. Effective training requires a clear picture of how the trainees will need to use information after training in place of local practices what they have adopted before in their situation. Training does not mean knowing more but behaving differently. Again training is acquisition of the best way of utilizing knowledge and skill (Sajeev and Singha, 2010; Ajayi, 1995). Training of farmers essentially contributes to human resource development in agriculture. The basic needs of farmers are crop wise information *viz*., improved seed, inter cultural operation, fertilizers, soil testing, irrigation, new implements, plant protection measures, mushroom cultivation, poultry, animal husbandry and credit information (Babu and Singh, 1986). Majority of the farmers had low extension contact, poor credit orientation and medium farming knowledge. The farmers had high need for training in agronomical practices for 2 to 4 days just before the Kharif and *rabi* season (Chauhan and Kokate, 1986).

Bangladesh is an agro-based developing country and sustainability of agricultural production is prerequisite for attaining the rate of overall growth of the economy. Now, the question is how to increase the production. There can be two possible approaches to enhance the production either by increasing the area under the crop and by increasing the productivity per unit area per unit time. Since the crop area expansion is not feasible anymore the only alternative is to adopt the better management practices and use certain modern agricultural technologies which include better seed technology, better fertilizer application, better pest control measure and irrigation management through imparting need based training. Training is an integral part of any development activity (Pandey *et al.,* 2015). Knowledge and skills of the farmers in agricultural technologies are important factors for increased agricultural production. The factors like hard working, dignity of labour and affection for the land are genetically prevailing among them which are considered to be the fundamental assets of farmer. However, in spite of high social values prevailing in these communities, they have remained backward, underdeveloped or neglected due to the factor like lack of ambition, lack of initiative, inadequate land holding, limited needs and orthodox behavior (Barman *et al.,* 2013). Most of the farmers do not possess adequate knowledge about the methods of modern agriculture. They often become frustrated with new practices in agriculture due to lack of proper understanding of the relevant factors. As a result, they are often skeptical towards new ideas and practices in agriculture.

National Agriculture Policy -2013 has asserted on the necessity of trained and efficient farmer in order to assure crop production and food security issues of Bangladesh. It also gave forces to facilitate training of farmers on modern crop production techniques. It identified the paucities of farmers training as a strong weakness of agriculture sector in Bangladesh. One of the mandates of Bangladesh Agricultural Research Institute is to provide farmers with information necessary for carrying out their farming business efficiently and profitably. In this respect farmers training has no alternative. Different divisions of BARI are providing a lot of training to farmers in each year in order to disseminate new varieties and technologies at field level. The Department of Agriculture Extension (DAE) has been working with a view to providing agricultural knowledge and skills to the farmers in Bangladesh.

Training needs assessment is one of the crucial steps towards identifying the area of farmers' interest, design and development of curriculum that can best suit to the existing real conditions of farmers. Pholonngoe and Richard (1995) underscored the necessity of need assessment while stating that if non-formal education trainers hope to foster meaningful development, they should bear in mind that the needs of adults constantly change. Thus, training assessment has to be carried out to design relevant and need based training programs that can accommodate changes over time. Barbazett (2006) noted that before any actual training is conducted, the training institution must determine who, what, when, where, why and how of training. Training needs assessment process helps determine the priority of changes in knowledge, skill, attitude and behavior that will provide the greatest impact on achieving organizational or individual goals. Caffarela (2002) noted that a systematic process of farmers' training must include needs assessment, goal and objectives setting, organizing instructional methods and techniques, monitoring and evaluation. Meenambigai and Seetharaman (2003) asserted that training is the most singular factor affecting individuals' attitude, productivity, improvement, minimization of risks. So, adequate training is essential for farmers to acquire necessary knowledge and skills in different aspects of farming.

But very little research has been conducted regarding training need assessment of farmers in Bangladesh. In view of the above discussion, the study attempted to achieve the following specific objectives-

i. To examine the socio-demographic characteristics of farmers and
ii. To determine the extent of training needs of farmers' in relation to agriculture

Methodology

Description of the study area

The study had covered 4 districts of Bangladesh namely Rangpur, Rajshahi, Chattogram and Khagrachori. These were purposively selected based on the

agro-ecological zones, and production potentials in diversified farming. Rangpur is known as major vegetable growing district situated in northern part of Bangladesh. The district is renowned in crop production for a number of reasons viz., high cropping intensity (251%), acceptance of hybrid crop variety, skilled farmer and availability of modern crop production techniques. Rajshahi is located within Barind Tract, 23 m (75 ft) above sea level and has been built on the alluvial planes of the Padma River. Apart from the usual agricultural products of Bangladesh, such as rice, wheat, potatoes and lentils, Rajshahi is specially suited for various crops such as mangoes, litchis, sugarcane, tomatoes and watermelons. It's cropping intensity is 190%. Chattogram is a major coastal city and financial center in southeastern Bangladesh. It is situated on the banks of the Karnaphuli River between the Chittagong Hill Tracts and the Bay of Bengal. Though the economy of Chittagong district is predominantly non-agricultural but it is also enriched with a number of crops such as paddy, betel leaf, potato, corn, turmeric, tea, peanut, mustard, pointed gourd, brinjal, ginger, cucumber and vegetables. Khagrachori is a hilly area and includes a number of ethnic communities such as Tripura, Chakma, Marma and Tanchangya. Most of the people live on Jhum cultivation and 59.92% income come from agriculture (Wikipedia).

Sampling procedure

A multi stage stratified random sampling technique was followed to collect farm level data. From each district one upazila and from each selected upazila one village based on production potential of the different farming system was drawn up purposively for inclusion in the present study. Farmers were selected based on their intimacy with the DAE and BARI to ensure the farmers of this area well exposed about various agricultural development and latest technologies. On consultation with DAE and BARI personnel, a list of farmers representing different categories was prepared for each village. From the individual list of farmers from selected village, five farmers were randomly selected which made twenty farmers from each district. They were different in farming activities, land holding size and also in different socioeconomic attributes. Thus a total of 80 farmers were finally selected for data collection from 4 districts. The identified districts were coming from six agro-climatic zones of Bangladesh (Table 1).

Table 1. Agro-ecological zone wise coverage of the selected districts

Agro-ecological zone (AEZ)	AEZ No.	Districts
Active Tista Floodplain	AEZ 2	Rangpur
North Eastern Barind Tract	AEZ 27	
Lower Atrai Basin	AEZ 5	Rajshahi
High Barind Tract	AEZ 26	
Chittagong Coastal Plains	AEZ 23	Chattogram
Northern and Eastern Hill	AEZ 29	Khagrachori

Source: BBS, 2017

Analytical procedure

Data collection from randomly selected respondents was done by using pre-tested structured schedule through personal interview method. The duration of data collection was February to March 2016. For analyzing the data, descriptive statistics such as percentages, rank order and scoring techniques were used to achieve the objectives and to get meaningful results. In most cases, tabular method of analysis supported with appropriate statistical parameters was used to present the results of the study. A list of thematic areas and specific and relevant training need items under each area was prepared and collected through different review of literature, discussion with DAE and BARI staff as well as own field experiences

In this study, the farmer's responses were collected in a 3– point continuum scale as Very Important (VI), Important (I) and Not Important (NI) by assigning scores 3, 2 and 1 respectively. The results were calculated as weighted score for each of the thrust area identified for the training.

$$\text{Weighted score (WS)} = \frac{(\text{No. of VI} \times 3) + (\text{No. of I} \times 2) + (\text{No. of NI} \times 1)}{\text{Total No. of VI + I + NI}}$$

Where,

VI = Very Important, I = Important and NI = Not Important

Weighted Score ranged from 1 to 6.

Results and Discussions

Socio-demographic characteristics of the respondents

Table 2 shows that majority of respondents (97.50%) were male. The age distribution of respondents was fairly evenly spread over the various age groups, with the highest (45%) representation found in the 30 to 39 categories. Table 2 also shows that only 8.75% were above 50 years. It revealed that most of the farmers belonged to active age group.

About 16.25% of the respondents had no formal education, 36.25% had not completed primary school, 45% had completed primary school and 2.50% had completed secondary school. No respondents reported having tertiary education. These findings suggest that many farmers in the target groups were illiterate or have low literacy levels, which will impact on their ability to access different types of crop production training and information. This should be important to consider when developing training modules for farmers. The Table 2 also revealed that 60% of the farmers had three family members which is lower than average size of households (4.06) in Bangladesh (HIES, 2016). The reduction in the household size indicates that respondents prefer smaller families.

Table 2. Profile of the respondent farmers in the survey areas

Characteristics	Frequency	% of respondents
Sex		
Male	78	97.50
Female	2	2.50
Age (years)		
Less than 30	11	13.75
30-39	36	45.00
40-49	26	32.50
Above 50	07	8.75
Education		
No formal education	13	16.25
Not finished primary school	29	36.25
Completed primary school	36	45.00
Completed secondary school	2	2.50
Household size (No. of members)		
2	17	21.25
3	48	60.00
4 or more	15	18.75

Source: Field survey 2016

Farming experience varied among the sample respondents. About 40% had been farming for 10-20 years and 31.25% had more than 20 years farming experience (Table 3).Majority of the respondents (45%) had 0.5 to 1 hectares of agricultural land while 36.25% of the respondents were having less than half hectares' agricultural land in the survey area. In terms of ownership status, 8.75% of respondents owned their agricultural land, while 71.25% part own and part lease basis (Table 3). This clearly shows that a large proportion of respondents are smallholders and lease farmers, thus they would not be likely to invest in training and technology if other conditions are right.

The survey revealed a significant difference in the percentage of annual income gained from agricultural activities by the respondents. About 3.75% of respondents obtained less than 25% of their income from agriculture, 12.50 % obtained between 25 to 50 %, 26.25 % acquired between 51 to 75 %, and 57.50 % gained more than 75 % of their annual income from agriculture (Table 3).

Sources of other means of income were not explored in the survey, but during focus group discussions participants shared that the other source of income in the survey areas was mainly business. The proportion of income coming from other off-farm sources remains limited. Households diversified their income and were less reliant on agriculture day by day for economic development. While this is perhaps positive, it also means that farmers whose total household income is less reliant on agriculture may be less likely to invest time and money in training and technology. Most of the respondents (55%) gathered information by their own attempts and 27 % got information from seed dealer and only 3% from officials of BARI. Department of Agricultural Extension is working relentlessly for the overall agricultural development of Bangladesh. It is also an important source to get a wide variety of knowledge by farmers while the figure for the present study was only 7.5%.

Training needs of the sample households

The major training needs components identified for the study were field crop production, crop protection, soil health and fertility management, vegetable production, plantation crops, tuber crops, on farm production of inputs, agricultural engineering, marketing and transportation etc. The district-wise training needs of the farmers are presented in the form of weighted scores in the Tables 4-7. Weighted Scores in the range of 1 – 3 were ranked within each discipline and the first six rankings were identified as training needs of the farmers of the area. The areas which got 1, 2 and 3 rank orders were considered as main important areas of training. The following are the thematic areas where there are high training needs among the farmers of Chattogram, Khagrachori, Rajshahi and Rangpur district of Bangladesh.

Field Crop Production: It refers to acquire knowledge and skill about principals and practice of crop production, protecting from weeds and field management. Training on seed production was the most sought after by farmers in Chattogram district followed by water management of the field crops and training on crop diversification (Table 4). Training on weed management in field crops, nursery management practice, integrated farming and cropping systems also closely followed. In Khagrachori district water management and integrated farming were the most important need in crop production area (Table 5) which was also burning issue in Rajshahi district (Table 6). Integrated farming was regarded as the most important training area under crop production in Rangpur district (Table7). Development of quality training on integrated farming system is, therefore, a prerequisite for profitable farming in these regions.

Table 3. Distribution of respondents according to selected farming characteristics

Characteristics	Frequency	%
Farming experience (years)		
Less than 10 years	23	28.75
10-20 years	32	40.00
Above 20 years	25	31.25
Size of agricultural land (hectares)		
No land	-	0.00
Less than half	29	36.25
0.5 to 1	36	45.00
More than 1	15	18.75
Land ownership status		
Own all	7	8.75
Lease all	16	20.00
Part own/part lease	57	71.25
Percentage of yearly income from agricultural activities		
Less than 25 per cent	3	3.75
25 to 50 per cent	10	12.50
51 to 75 per cent	21	26.25
More than 75 per cent	46	57.50
Ways of information about crops and varieties		
Own Attempts	44	55.00
Seed Seller or dealer in the area	27	33.75
DAE through SAAO	6	7.50
Officials of BARI	3	3.75

Source: Field survey 2016

Crop Protection: It refers to one's need for gaining understanding and skill about the different aspects of insect control, namely, name of insect and disease, symptoms of attack, and nature of damage and control measures against each insect and disease pest (Alam, 2006). Training on integrated pest and disease management of the crops was the most important training need in plant protection followed by control of pest and disease by use of biological agents among the respondents of four districts (Table 4, 5, 6 & 7). This is

attributed to the fact that farmers resort to over usage of fertilizers and pesticides/fungicides. Impact of excess application of those chemicals in the long run is ignored by them. But the farmers in the study area have realized the importance of integrated pest management in agriculture for sustainable production and development.

Soil Health and Fertility Management: The term refers to one's need for gaining understanding and skill about the different aspects of soil and fertilizer, namely, soil and water conservation, use of fertilizers, functions of different fertilizers, doses of fertilizers and procedure for applying fertilizers which are necessary for successful cultivation (Alam, 2006). Under Soil health and fertility management in Chattogram district, technologies for soil and water conservation and management of problematic soils were the most needed followed by technology for soil fertility management (Table 4). In Khagrachori district soil fertility management and management of problematic soils were regarded very important. On the other hand, respondents of Rajshahi and Rangpur districts select soil and water conservation as their training need in this area of interest. This isdue to continuous practice of unscientific methods of farming coupled with injudicious use of chemical fertilizers that led to soil degradation. This calls for immediate control measures and proper management practices against further degradation of soil fertility.

Vegetable Production: In vegetables sector of Chattogram and Khagrachori district, production of off-season vegetables and vegetables grading and standardization topped the list whereas in Rajshahi and Rangpur the important training need were producing off season vegetables and production of low volume and high value crops (Table 4, 5, 6 & 7). The identified training needs of farmers under vegetable sector in these areas shouldfind a place in planning and designing training programmes.

Plantation Crops: Processing and value addition was the most desired training rather production and management technology of plantation crops in Chattogram district followed by Rangpur district (Table 4&7). But this is totally ignored by the respondents of other two districts.

Tuber crops: Training on tuber crop production technology and it’s processing and value addition were regarded important among the respondents of all the districts (Table 4, 5, 6 & 7).

On farm production of agricultural inputs: Training on production of Vermi-compost, bio fertilizers and bio pesticides were still hot topics among the farmers. These reflect that farmers are so much reluctant to use chemical fertilizers, insecticides and pesticides in farming. So they demanded more and

more training on these areas as day by day they are informed about the bad effects of these chemicals.

Agricultural engineering: Training on post-harvest technology of vegetables and fruits was the most important need under agricultural engineering in Rangpur district.

Besides these, curiosities to learn how to make efficient marketing was also very high among the respondents of all the four districts (Table 4, 5,6 & 7). Every respondent wants a suitable market in which they can sell their product safely and free from the middlemen.

Table 4. Training needs of farmers in Chattogram district

Thematic Area	Chittagong district (n = 20)			
	VI	I	NI	WS
Field Crop Production				
Weed Management	0	3	17	1.15
Cropping system	4	6	10	1.70
Water management	10	6	4	2.30
Integrated farming	6	9	5	2.05
Seed production	12	5	3	2.45
Crop diversification	8	7	5	2.15
Nursery management practice	0	9	11	1.45
Crop Protection				
Integrated pest management	20	0	0	3.00
Integrated disease management	20	0	0	3.00
Bio-control of pests and diseases	19	1	0	2.95
Production of bio control agents and bio pesticides	20	0	0	3.00
Soil health and fertility management				
Soil fertility management	16	4	0	2.80
Soil and Water conservation	20	0	0	3.00
Management of problematic soils	18	2	0	2.90
Soil and water testing	2	7	11	1.55
Integrated nutrient management	6	3	11	1.75

Thematic Area	Chittagong district (n = 20)			
	VI	I	NI	WS
Fertilizer Application	16	4	0	2.80
Vegetable production				
Production of low volume and high value crops	5	8	7	1.90
Production of off-season vegetables	16	4	-	2.80
Exotic vegetables production	2	6	12	1.50
Seedling raising	0	5	12	1.10
Export potential vegetables	12	5	3	2.45
Vegetables grading and standardization	16	4	0	2.80
Protective cultivation(green house, shade house)	0	7	13	1.35
Training and pruning	0	5	15	1.25
Plantation crops				
Production and management technology	4	11	5	1.95
Processing and value addition	18	2	0	2.90
Tuber crops				
Production and management technology	19	1	0	2.95
Processing and value addition	19	1	0	2.95
On farm production of inputs				
Bio-agents production	13	6	1	2.60
Bio-pesticides production	14	5	1	2.65
Bio-fertilizer production	15	5	0	2.75
Vermi-compost production	18	2	0	2.90
Agricultural Engineering				
Repair and maintenance of farm machinery and implements	0	2	18	1.10
Post-harvest technology of vegetables and fruits	0	12	8	1.60
Marketing and Transportation	20	0	0	3.00

Source: Field survey 2016

(-) indicates not under ranking

Table 5. Training Needs of farmers in Khagrachori district

Thematic Area	Khagrachori district (n =20)			
	VI	I	NI	WS
Crop Production				
Weed Management	0	0	20	1.00
Cropping system	13	5	2	2.55
Water management	20	0	0	3.00
Integrated farming	14	6	0	2.70
Seed production	1	14	5	1.80
Crop diversification	0	9	11	1.45
Nursery management practice	0	4	16	1.20
Crop Protection				
Integrated pest management	20	0	0	3.00
Integrated disease management	20	0	0	3.00
Bio-control of pests and diseases	13	7	0	2.65
Production of bio control agents and bio pesticides	16	4	0	2.80
Soil health and fertility management				
Soil fertility management	17	3	0	2.85
Soil and Water conservation	5	12	3	2.10
Management of problematic soils	20	0	0	3.00
Soil and water testing	0	0	20	1.00
Integrated nutrient management	0	13	7	1.65
Fertilizer application	19	1	0	2.95
Vegetable production				
Production of low volume and high value crops	0	5	15	1.25
Production of off-season vegetables	12	4	4	2.40
Exotic vegetables production	0	0	20	1.00
Seedling raising	0	9	11	1.45
Export potential vegetables	0	0	20	1.00
Vegetables grading and standardization	10	3	7	2.15
Protective cultivation(green house, shade house)	0	7	13	1.35
Training and pruning	0	5	15	1.25
Plantation crop				

Thematic Area	Khagrachori district (n =20)			
	VI	I	NI	WS
Production and management technology	0	0	20	1.00
Processing and value addition	0	0	20	1.00
Tuber crops				
Production and management technology	14	6	0	2.70
Processing and value addition	11	3	6	2.25
On farm production of inputs				
Bio-agents production	14	2	4	2.50
Bio-pesticides production	15	2	3	2.60
Bio-fertilizer production	15	5	0	2.75
Vermi-compost production	20	0	0	3.00
Agricultural Engineering				
Repair and maintenance of farm machinery and implements	0	6	14	1.30
Post-harvest technology of vegetables and fruits	8	0	12	1.80
Marketing and Transportation	20	0	0	3.00

Source: Field survey 2016

(-) indicates not under ranking

Table 6. Training needs of farmers in Rajshahi District

Thematic Area	Rajshahi district (n = 20)			
	VI	I	NI	WS
Crop Production				
Weed Management	0	0	20	1.00
Cropping system	0	11	9	1.55
Water management	16	4	0	2.80
Integrated farming	13	4	3	2.50
Seed production	0	8	12	1.40
Crop diversification	0	13	7	1.65
Nursery management practice	0	0	20	1.00
Crop Protection				
Integrated pest management	16	4	0	2.80
Integrated disease management	19	1	0	2.95

Thematic Area	Rajshahi district (n = 20)			
	VI	I	NI	WS
Bio-control of pests and diseases	8	11	1	2.35
Production of bio control agents and bio pesticides	9	7	4	2.25
Soil health and fertility management				
Soil fertility management	0	10	10	1.50
Soil and Water conservation	12	4	4	2.40
Management of problematic soils	9	11	0	2.45
Soil and water testing	0	0	20	1.00
Integrated nutrient management	0	7	13	1.35
Fertilizer application	7	13	0	2.35
Vegetable production				
Production of low volume and high value crops	15	5	0	2.75
Production of off-season vegetables	11	4	5	2.30
Exotic vegetables production	0	0	20	1.00
Seedling raising	0	0	20	1.00
Export potential vegetables	0	0	20	1.00
Vegetables grading and standardization	0	7	13	1.35
Protective cultivation(green house, shade house)	0	13	7	1.65
Training and pruning	0	0	20	1.00
Plantation crop				
Production and management technology	0	0	20	1.00
Processing and value addition	0	0	20	1.00
Tuber crops				
Production and management technology	20	0	0	3.00
Processing and value addition	20	0	0	3.00
On farm production of inputs				
Bio-agents production	5	7	8	1.85
Bio-pesticides production	12	5	3	2.45
Bio-fertilizer production	3	11	6	1.85
Vermi-compost production	16	4	0	2.80
Agricultural Engineering				

Thematic Area	Rajshahi district (n = 20)			
	VI	I	NI	WS
Repair and maintenance of farm machinery and implements	0	6	14	1.30
Post-harvest technology of vegetables and fruits	4	13	3	2.05
Marketing and Transportation	20	0	0	3.00

Source: Field survey 2016

(-) indicates not under ranking

Table 7. Training needs of farmers in Rangpur district

Thematic Area	Rangpur district (n = 20)			
	VI	I	NI	WS
Crop Production				
Weed Management	0	3	17	1.15
Cropping system	12	8	0	2.60
Water management	0	14	6	1.70
Integrated farming	16	4	0	2.80
Seed production	11	9	0	2.55
Crop diversification	0	13	7	1.65
Nursery management practice	0	9	11	1.45
Crop Protection				
Integrated pest management	20	0	0	3.0
Integrated disease management	20	0	0	3.0
Bio-control of pests and diseases	20	0	0	3.0
Production of bio control agents and bio pesticides	20	0	0	3.0
Soil health and fertility management				
Soil fertility management	4	16	0	2.20
Soil and Water conservation	11	9	0	2.55
Management of problematic soils	3	14	3	2.00
Soil and water testing	0	0	20	1.00
Integrated nutrient management	0	11	9	1.55
Fertilizer Application	16	4	0	2.80
Vegetable production				
Production of low volume and high value crops	9	8	3	2.30

Thematic Area	Rangpur district (n = 20)			
	VI	I	NI	WS
Production of off-season vegetables	20	0	0	3.00
Exotic vegetables production	0	0	20	1.00
Seedling raising	0	8	12	1.40
Export potential vegetables	7	6	7	2.00
Vegetables grading and standardization	7	8	5	2.10
Protective cultivation(green house, shade house)	0	0	20	1.00
Training and pruning	0	0	20	1.00
Plantation crop				
Production and management technology	0	11	9	1.55
Processing and value addition	8	5	7	2.05
Tuber crops				
Production and management technology	13	7	0	2.65
Processing and value addition	13	7	0	2.65
On farm production of inputs				
Bio-agents production	8	8	4	2.20
Bio-pesticides production	6	5	9	1.85
Bio-fertilizer production	18	2	0	2.90
Vermi-compost production	20	0	0	3.00
Agricultural Engineering				
Repair and maintenance of farm machinery and implements	0	2	18	1.10
Post-harvest technology of vegetables and fruits	17	3	0	2.85
Marketing and Transportation	20	0	0	3.00

Source: Field survey 2016

(-) indicates not under ranking

Comparative evaluation of training needs of farmers

Training needs on integrated pest and diseases management, production of bio control agents and bio pesticides, marketing and transportation ranked top followed by bio-control of pests and diseases, production and management technology, processing and value addition, vermi-compost production while soil fertility management, fertilizer application, production of off-season vegetables, vegetables grading and standardization come last on the ranking list in

Chattogram district (Table 9).One the other hand water management, integrated pest and disease management, vermi-compost production, marketing and transportation were main training areas in Khagrachori district as it is apparent from the weighted score values likewise, the training needs areas ranked in descending order were fertilizer application, soil fertility management, production of bio control agents and bio pesticides respectively (Table 9).

Besides areas of training needs indicated by the respondents of Rajshahi district in order of preference were production and management technology, processing and value addition, marketing and transportation, integrated disease management, water management, integrated pest management, vermi-compost production and production of low volume and high value crops in descending order (Table 8). In Rangpur district, integrated pest and disease management, bio-control of pests and diseases, production of bio control agents and bio pesticides, production of off-season vegetables, vermi-compost production, marketing and transportation were topped the list while training on bio-fertilizer production was the most sought after one (Table 8). Comparing training needs of four districts, integrated pest and diseases management, vermi-compost production, marketing and transportation areas emerged as important ones. Similar finding was observed in Barman *et al.* (2013) who reported fertilizer management, seed treatment, pest and disease management, water management and marketing were the important training need area where majority farmers had high level of training need.

Table 8. Comparative evaluation of training needs of farmers in four districts

Thematic Area	Chattogram		Khagrachori		Rajshahi		Rangpur	
	WS	Rank	WS	Rank	WS	Rank	WS	Rank
Field Crop Production								
Weed Management	1.15	-	1.00	-	1.00	-	1.15	-
Cropping system	1.70	-	2.55	-	1.55	-	2.60	6
Water management	2.30	-	3.00	1	2.80	3	1.70	-
Integrated farming	2.05	-	2.70	6	2.50	5	2.80	4
Seed production	2.45	-	1.80	-	1.40	-	2.55	-
Crop diversification	2.15	-	1.45	-	1.65	-	1.65	-
Nursery management practice	1.45	-	1.20	-	1.00	-	1.45	-
Crop Protection		-						
Integrated pest management	3.00	1	3.00	1	2.80	3	3.0	1
Integrated disease management	3.00	1	3.00	1	2.95	2	3.0	1
Bio-control of pests and diseases	2.95	2	2.65	-	2.35	-	3.0	1
Production of bio control agents and bio pesticides	3.00	1	2.80	4	2.25	-	3.0	1
Soil health and fertility management								
Soil fertility management	2.80	4	2.85	3	1.50	-	2.20	-

Thematic Area	Chattogram		Khagrachori		Rajshahi		Rangpur	
	WS	Rank	WS	Rank	WS	Rank	WS	Rank
Soil and Water conservation	3.00	-	2.10	-	2.40	-	2.55	-
Management of problematic soils	2.90	3	3.00	1	2.45	6	2.00	-
Soil and water testing	1.55	-	1.00	-	1.00	-	1.00	-
Integrated nutrient management	1.75	-	1.65	-	1.35	-	1.55	-
Fertilizer Application	2.80	4	2.95	2	2.35	-	2.80	4
Vegetable production								
Production of low volume and high value crops	1.90	-	1.25	-	2.75	4	2.30	-
Production of off-season vegetables	2.80	4	2.40	-	2.30	-	3.00	1
Exotic vegetables production	1.50	-	1.00	-	1.00	-	1.00	-
Seedling raising	1.10	-	1.45	-	1.00	-	1.40	-
Export potential vegetables	2.45	-	1.00	-	1.00	-	2.00	-
Vegetables grading and standardization	2.80	4	2.15	-	1.35	-	2.10	-
Protective cultivation (green house, shade house)	1.35	-	1.35	-	1.65	-	1.00	-
Training and pruning	1.25	-	1.25	-	1.00	-	1.00	-
Plantation crops								
Production and management technology	1.95	-	1.00	-	1.00	-	1.55	-
Processing and value addition	2.90	3	1.00	-	1.00	-	2.05	-
Tuber crops								
Production and management technology	2.95	2	2.70	-	3.00	1	2.65	5
Processing and value addition	2.95	2	2.25	-	3.00	1	2.65	5
On farm production of inputs								
Bio-agents production	2.60	-	2.50	-	1.85	-	2.20	-
Bio-pesticides production	2.65	6	2.60	-	2.45	6	1.85	-
Bio-fertilizer production	2.75	5	2.75	5	1.85	-	2.90	2
Vermi-compost production	2.90	3	3.00	1	2.80	3	3.00	1
Agricultural Engineering								
Repair and maintenance of farm machinery and implements	1.10	-	1.30	-	1.30	-	1.10	-
Post-harvest technology of vegetables and fruits	1.60	-	1.80	-	2.05	-	2.85	3
Marketing and Transportation	3.00	1	3.00	1	3.00	1	3.00	1

Source: Field survey 2016. (-) indicates not under ranking

Training received by the respondents

A limited number of training was provided by the Department of Agricultural Extension and Bangladesh Agricultural Research Institute (BARI). The present study was identified randomly some of the training that was provided by the DAE and BARI among the respondents of four districts. Duration of most of the training was one day mainly. In Rangpur district, the number of respondents received training was highest. Out of 20 respondents in Rajshahi district, only 9 received training whereas it is only 4 to the other two districts out of 20 respondents (Table 9). But the current study found their deep interest on receiving training on different crops. Respondents of Rajshahi district wanted training on papaya, wheat, eggplant and chili production practices. Training on tomato, bitter gourd, cauliflower, felon, coriander was demanded by the respondents of Chittagong region. At the same time respondents of Khagrachori district demanded training on turmeric, zinger, mango cultivation following by litchi, mango, zinger, turmeric, and groundnut and potato production practices in Rangpur district (Table 9).

Table 9. Training received and demand for training by the sample farmers

Name of District	Total no. of respondents	No. of respondents received training	Crops on which training should be delivered
Rajshahi	20	9	Papaya, Wheat, Eggplant, Chili, Potato
Chittagong	20	4	Tomato, Bitter gourd, Cauliflower, Felon, Coriander
Khagrachori	20	4	Turmeric, Zinger, Eggplant, Mango, Rice, Bitter gourd
Rangpur	20	13	Litchi, Mango, Zinger, Turmeric, Groundnut and Potato

Source: Field survey 2016

Respondents of the present study received a number of training from DAE and BARI. Table 10 shows a list of different training programs received by the sample farmers and their ranking as very good, good and poor. Identification of adulterated fertilizer, insecticide and pesticide, disease and insects of mango varieties, bagging system of mango, insecticide and pesticide application, vegetables production techniques as very good type of training (Table 10). Beside this, production technology of potato and pumpkin and seedlings preparation considered as poor type of training among the survey respondents.

Table 10. Training received by the sample farmer

Subject matter of Training	Organizing Agency	Duration (Days)	Grade
Seed conservation	DAE	3	Good
Modern rice cultivation	DAE	2	Good
Identification of adulterated fertilizer, insecticide and pesticide	DAE	1	Very Good
Disease and insects of mango varieties	BARI	2	Very Good
ToT on rice	DAE	3	Good
Rice cultivation technique	DAE	1	Good
Production technology of mango	BARI	1	Good
Fruit bagging system of mango	BARI	1	Very Good
Fertilizer application to mango	BARI	1	Good
Pulse crop production technology	DAE	5	Good
Insecticide and pesticide application	BARI	3	Very Good
Production technology of potato and pumpkin	DAE	1	Poor
Seed production and preservation	DAE	1	Good
Fertilizer application and weed management	DAE	1	Poor
Seed production of BRRI dhan 28	DAE	1	Good
Rice production technology	DAE	1	Good
Seedlings preparation	DAE	1	Poor
Turmeric and zinger production	DAE	1	Good
Seedlings of fruits preparation	BARI	1	Good
Insect and pest management	DAE	1	Good
Disease, insect and pest management	DAE	1	Good
Vegetables production techniques	DAE	1	Very good
Rearing mango orchard	DAE	1	Good

Source: Field survey 2016

Conclusion

All the sample respondents of the present study opined that training is very essential for making their crop production more efficient and profitable. But inadequacy of training is very common even in most crop intensive districts of Bangladesh. Farmers emphasized to get training on integrated farming systems and water management for field crop production. Integrated disease management attained the top most priority followed by integrated pest management under training on crop protection. Management of problematic soils and fertilizer

application were most needed training under soil health and fertility management while training with respect to production of off-season vegetables was the most important one under vegetable production. Training on tuber crops cultivation was also in high demand for areas of production and management technology, processing and value addition of tuber crops. Vermi-compost production secured the top most position in the list under on- farm production of inputs followed by bio-pesticides and bio-fertilizers production. Marketing and transportation accorded highest response from the farmers in four districts in the assessment of training needs. A number of training in the survey area was identified as very useful for the farmer while some were regarded as poor in quality and necessity. It indicates a gap in farmer's knowhow and actual information which needs to be addressed through designing and developing a training module. The BARI and DAE can reorient their training schedule and subject matter based on these findings to enrich farmer's knowledge on improved crop production techniques.

Recommendations

Based on the findings of the study, the following recommendations are suggested:

- An extensive research programme should be conducted covering all the intensive crop growing areas of Bangladesh to identify the appropriate crop production needs of farmers.
- DAE should arrange training progrmme based on the necessity of the farmers. Otherwise, it will not bring any positive outcome in the crop production systems of Bangladesh. Training identified as not very good should be discarded and good one should be developed with current information and knowledge.
- Much emphasis should be paid on integrated farming systems, integrated pest and disease management and technologies for soil and water conservation while planning and designing training programmes for farmers.
- Both extensive and intensive hand on-training programmes should be emphasized for farmers through proper assessment of their training needs.
- The concerned different centers and divisions of BARI should pay relatively higher emphasis and care on those specific most important needs, as identified by this study through concerted efforts while formulating different training module for the farmers in hills and plain areas as well as different agro-climatic and farming system areas of Bangladesh.
- Farmers regular contact with BARI avail themselves with latest crop production techniques and information. So, BARI should increase their farmers training and field day workshops in different agro ecological zone of Bangladesh.

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