



Farmers Attitude towards Safe Food Production in Bangladesh: A Study in Bogra District

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Authors' contributions

This work was carried out in collaboration between both authors. Author RS designed the study, wrote the protocol, conduct field survey and wrote the first draft of the manuscript. Author NM managed the literature searches, performed the statistical analysis, edited the manuscript and did all steps for publication. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/ARJA/2018/40213

Editor(s):

(1) Tancredo Souza, Centre for Functional Ecology, Department of Life Sciences, University of Coimbra, Portugal.

Reviewers:

(1) Adijah M. Olubandwa, Egerton University, Kenya.

(2) Haggai Onyango Ndukhu, Chuka University, Kenya.

Complete Peer review History: <http://www.sciedomains.org/review-history/24304>

Original Research Article

Received 7th January 2018

Accepted 16th March 2018

Published 24th April 2018

ABSTRACT

Safe food production is a holistic way of agriculture, which tries to bridge the widening gap between man and nature. The present study was to determine the attitude of farmers towards safe food production, to explore the relationship between selected characteristics of the farmers and their attitude towards safe food production, to investigate farmer's awareness on safe food production and to find out the constraints of safe food production in Bangladesh. Data were collected using interview schedule from a sample of 100 farmers of two upazilas of Bogra District. The duration of the study spanned a period of 6 months from October 2016 to March 2017. Descriptive statistical parameters and Pearson's Product Moment Correlation Coefficient (r) was used in this study as data analyzing tool. SPSS (Statistical Package for Social Sciences) software was used for data management and analysis. Nearly all the respondents (92.4%) have a favourable and highly favourable attitude towards safe food production. Only 4.6% farmers have an unfavourable attitude toward safe food production. The level of awareness about safe food production is low, and did reveal that both farmers and consumers are aware of the toxic effect of chemical fertilizers and pesticides. Lack of knowledge and understanding of the principles of safe food production was the highest constraints faced by the farmers. The proper ways should be taken to overcome the

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problems. Farmer's level of education, farm size, extension media contact, agricultural training received and farming experience of the respondent showed significant positive and Constrains faced producing safe food showed significant negative relationships with their attitude towards safe food production. So these characteristics should be taken into consideration. Due to increasing amount of using pesticides safe food production should be increased and it might be possible by the favorable attitude of the farmers towards safe food.

Keywords: Attitude; safe food.

1. INTRODUCTION

1.1 General Background

Agriculture is the most significant employment sector in Bangladesh. The performance of this sector has an overwhelming impact on primary macroeconomic objectives like employment generation, poverty alleviation, human resources development and food security [1]. Safe foods, as commonly understood are those edible items that do not cause or bear any threat of any health hazards for the consumers. Food safety in food production may be achieved by natural or organic farming and even in agriculture by using chemicals with a recommended dose and practices with recommended inputs.

The main consideration is that the total process in the food chain should not involve any practice or material that directly or indirectly results in hazards to consumer health. Unsafe foods are defined as (1) foods that contain microbes in sufficient quantities to lead to short term illness or death, (2) foods that contain substances that are believed to pose potential long term health problems such as pesticide residues or bovine spongiform encephalopathy, (3) foods that have unknown, but suspected, health consequences such as foods that have been genetically modified or irradiated, and (4) foods that contain ingredients that when consumed in excess quantities lead to chronic diseases such as diabetes, cancer and cardiovascular disease [2].

Vegetable and fruit are a very important group of crops and they constitute a significant part of the diet contributing nutrients and vitamins. Most of the vegetables and fruits are grown in Bangladesh are vulnerable to be attacked by insect pests. The role of insecticide use has become critically important with modernization of agriculture in Bangladesh. Modernization of agriculture implies the increased use of modern inputs such as chemical fertilizers, irrigation, quality modern seeds etc. But these provide a favourable climate for rapid growth of insects.

Moreover, the unfavourable weather (such as low temperature, dew drops stored on the leaf, continuous fog etc.) prevailing in this season causes various types of diseases of vegetables. Pests, including insects, mites, pathogens (disease-causing organisms), weeds, nematodes, rodents and others significantly contribute to high farm production costs and reduce quality and yields [3]. The use of insecticides, however, carries several dangers. The yield loss varies in different environmental conditions but can exceed 65% in Bangladesh [4]. Non-optimal and non-judicious use of insecticides may result in severe problems related to crop production and certain externalities like pollution and health hazards. Modern seeds are more susceptible to insect pests and diseases. Both overuse and misuse of insecticides may lead to the loss of effectiveness of insecticides due to the development of resistance [5] and could cause human health hazards and environmental pollution [6]. Paul (2003) [7] reported that intensified use of insecticides can cause a severe public health hazard primarily in the form of residues in food. Inappropriate selection of insecticides and doses, improper spray scheduling and inadequate spray coverage [8] may lead to the failure in controlling insect pests. For vegetables in general, Sabur and Mollah [9] observed an increase in the use of pesticides by farmers in combating pests throughout Bangladesh.

1.2 Statement of the Problem

Before the introduction of chemicals, Bangladesh agriculture was fully dependent on the organic sources for fertilizers (animal manure, crop residues and domestic wastes) to fertile the land and pesticides for safe the crop. In the 1960s, with the introduction of a green revolution, to follow former agricultural policy -to meet the demand of food for increasing population, some farmers started to use chemical fertilizers for increasing production and chemical pesticides for crop protection. Some of them used both chemical and organic fertilizers and some of them didn't adopt chemicals fertilizers due to

conservativeness or lack of infrastructural facility [10]. Hence the food produces by applying imbalanced fertilizer and pesticide become more unsafe for a nation. In general, the foods in the habitual Bangladeshi dishes cannot be claimed as free from adulteration and health hazards. There has been a lot of evidence from the media that the foods are adulterated and processed with various harmful chemicals and additives. Food poisoning starts from the production field with the massive and unethical use of chemicals. There is an urgent need to formulate and implement good practices of using pesticides including other Good Agricultural Practices (GAP) for the country which could probably help reducing food toxicity to a great extent. To ensure safe food for farmers, they have to be motivated and their attitude will play a vital role in cultivation of safe food. So to know the farmers' attitude towards safe food is very much important to increase their practice on safe food production. The objectives of the safe farming are mainly to protect natural and agricultural resource bases from further degradation and to ensure long-term sustainability in agricultural system. Therefore, understanding the farmer's attitude on safe food production in Bangladesh is necessary and also necessary to identify constraints of safe food production in Bangladesh for visualizing the overall status of safe food production in our country.

1.3 Objectives of the Study

The objectives of this research are mainly to protect natural and agricultural resource bases from further degradation and to ensure long term sustainability in an agricultural system. Based on the above mentioned situation, the specific objectives of the study are:

1. To determine the attitude of farmers towards safe food production
2. To explore the relationship between selected characteristics of the farmers and their attitude towards safe food production.
3. To investigate farmers awareness on safe food production
4. To find out the constraints of safe food production in Bangladesh

2. MATERIALS AND METHODS

2.1 Locale of the Study

Shajahanpur and Sherpur Upazila of Bogra districts of Bangladesh were selected as the location of the study.

2.2 Population and Sample

These two upazilas consists of safe food producing farmers. Radhanagor and Chupinagor village in Shajahanpur Upazila and Shibpur and Kanupur village in Sherpur Upazila of Bogra districts were selected by simple random sampling method. 100 participants were selected as a sample for eliciting responses to a set of questions on different aspects of safe foods taking 25 from each village that had experience of practicing IPM (Integrated Pest Management). IPM farmers engaged for different durations of short and long time in producing pesticide-free vegetables. Care was taken to select the respondents of different categories who could contribute ideas relevant to the theme of the study. To provide a focus, the study concentrated only on fresh agricultural foods vegetables and fruits coming directly from the crop fields. The respondents were briefed on the background, objectives and expected outcomes of the study.

2.3 Data Collection

Data were collected from safe food producer villages (practicing IPM) Radhanagor and Chupinagor in Shajahanpur Upazila and Shibpur and Kanupur in Sherpur Upazila of Bogra districts selected using the stratified random selection process where the IPM villages were considered as strata. Combination of methods including review of literature, face to face interview using structured questionnaire and focus group discussion (FGD) was used. SPSS (Statistical Package for Social Sciences) software was used for data management and analysis. The duration of the study spanned a period of 6 months from October 2016 to March 2017.

2.4 Measurement of Selected Characteristics of Farmers

Age, level of education, family size, farm size, organizational participation, annual income, extension media contact, agricultural training received, land under fruits and vegetable cultivation, farming experience and constraints faced for producing safe food were selected as the independent variables of the study.

2.5 Measurement of Focus Issue

Farmer's attitude towards safe food production was the focus variable of the study. For measuring the attitude of the respondents, a 5

point Likert scale [11] was used. There were 15 statements including both positive and negative to avoid the biasness of the respondents. Each respondent was asked to indicate his extent of agreement or disagreement against each statement along with a 5 point scale: strongly agree, agree undecided, disagree and strongly disagree [12]. Weights assigned to these responses were 5, 4, 3, 2, and 1 respectively. The total score of a respondent was determined by summing up the weights for responses against all 15 statements.

$$\text{Attitude score} = 5 \times SA + 4 \times A + 3 \times U + 2 \times DA + 1 \times SDA$$

Where,

SA= Number of respondents expressing their attitude 'strongly agree' for the statement

A= Number of respondents expressing their attitude 'agree' for the statement

U= Number of respondents expressing their attitude 'undecided' for the statement

DA= Number of respondents expressing their attitude 'disagree' for the statement

SDA= Number of respondents expressing their attitude 'strongly disagree' for the statement

This formula was considered for positive statements; on the other hand scoring was reverse for negative statements. In case of negative statements strongly agree, agree, undecided, disagree and strongly disagree were assigned weight as 1, 2, 3, 4 and 5 respectively. Attitude score of a respondent would range from 15 to 75.

2.6 Measurement of Constraints

Constraints Facing Index (CFI) was computed taking ten selected constraints by using following formula [13].

$$\text{Constraints facing index (CFI)} = Ch \times 3 + Cm \times 2 + Cl \times 1 + Cn \times 0;$$

Where,

Ch= Number of respondents indicating high constraint facing;

Cm= Number of respondents indicating medium constraint facing;

Cl= Number of respondents indicating low constraint facing and

Cn= Number of respondents indicating no constraint facing.

Constraint Facing Index (CFI) for any one of the selected constraint could range from 0 to 153, where 0 indicate no constraints facing and 153 indicating highest constraint facing.

3. RESULTS AND DISCUSSION

3.1 Selected Characteristics of the Farmers

Followings are the findings of each of the selected characteristics of the respondents in Table 1 along with the interpretations.

The analyzed results on the characteristics of the respondents and the data presented in the Table 1 indicate that the respondents of the study area were relatively middle aged and had primary to secondary level of education (28.7% primary and 32% having secondary level education). The average family size (5.97) was higher than that of the national average of 4.48 [14]. The average farm size of the respondents was 0.79 ha which was higher than that of national average of 0.51 ha [15]. Majority of the respondents had little organizational participation.

Most of the respondents (57.4%) of the farm households had medium high family income, while 23.6% and 17.8% had medium and high annual family income respectively. It was found that all the respondents had low to medium extension media contact. It was an indication of good extension service to that areas provided by DAE (Department of Agricultural Extension) and other NGOs.

3.2 Attitude towards Safe Food Production

The combined calculated attitude score of the respondents range from 30 to 63 and the possible attitude score of the farmers ranged from 15 to 75 with an average score of 52.34 and standard deviation 6.53.

Table 1. Salient features of the selected characteristics of the farmers in the study area

Characteristics	Measuring unit	Observed range	Categories	Respondents percent	Mean	SD
Age	Year	19-63	Young (18-35)	28.7	38.87	8.45
			Middle aged (36-50)	48.3		
			Old (above 50)	23.0		
Level of Education	Year of schooling	0-14	Illiterate (0-0.5)	23.3	7.85	6.73
			Primary (1-5)	28.7		
			Secondary (6-10)	32.0		
			Higher secondary (10-12)	11.6		
			Above (>12)	4.4		
Family size	Number	4-10	Small (up to 4)	15.4	5.97	1.60
			Medium (5-6)	48.3		
			Large (above 6)	36.3		
Farm size	Hectare	0.2-3.56	Small (up to 1 ha)	70.2	0.79	0.56
			Medium (1.01-3.0 ha)	26.7		
			Large (>3 ha)	3.1		
Organizational participation	score	0-23	No participation (0)	33.6	8.67	7.56
			Low (1-9)	41.2		
			Medium (10-17)	18.6		
			High (Above 17)	6.6		
Annual income	'000' Tk	58-860	Low (up to 60)	1.2	187.89	168.23
			Medium (61-150)	23.6		
			Medium high (151-250)	57.4		
			High (> 250)	17.8		
Extension media contact	Scale score	5-25	Low (up to 11)	37.9	14.29	5.43
			Medium (11.1-22)	54.7		
			High (>22)	7.4		
Agricultural training received	Day(s)	0-5	No training exposure (0)	26.2	1.55	1.23
			Low training exposure (1- 2)	25.6		
			Medium training exposure (3-4)	39.5		
			High training exposure (Above 4)	8.7		
Land under Fruits and vegetable cultivation	Hectare	0.1-2.37	Small (up to 0 .5 ha)	65.6	1.13	0.98
			Medium (0.51-1.5 ha)	30.2		
			Large (>1.5 ha)	4.2		
Farming experience	Years	3-34	Low (Below 10)	33.6	19.43	6.42
			Medium (10-20)	52.4		
			High (Above 20)	14.0		

Table 2. Distribution of farmers according to attitude toward safe food production

Observed range	Category	Percent	Mean	SD
30-63	Highly unfavorable (<26)	1.0	52.34	6.53
	Unfavorable (26-39)	4.6		
	Neutral (39)	2.0		
	Favorable (>39-52)	72.9		
	Highly favorable(>52)	19.5		

It revealed from the Table 2 that nearly all the respondents (92.4%) have favourable and highly favourable attitude towards safe food production. Only 4.6% farmers have unfavourable attitude of safe food production. Mohan and Helen [16] showed that, majority of the organic farmers (86.67%) had a favourable attitude towards organic farming practices followed by more

favourable (10%) and less favourable (3.33%) attitude. More than 80 per cent of the conventional farmers had favourable attitude towards organic farming practices.

Above 90 per cent of conventional farmers believed that use of organic farming practices was essential for better quality of fruits and

vegetables which means safe food for nation. Now the improved techniques like integrated pest management (IPM) and integrated crop management (ICM) are introduced towards safe food production. As a result farmers are also introduced to these technologies and they are motivated to adopt safe farming in their homestead but in commercial case only small percent are producing safe food.

The research also revealed that the respondents have highly favourable attitude towards safe food production regarding reduction of production cost, chemical pesticides are hazardous for environment and organic products are good health but they faced some challenges during producing safe food.

3.3 Awareness of Farmers about the Safe Food Production

The Fig. 1 shows that 23% of the farmers have awareness about safe food production and 77%

farmers have no idea about safe food production and proposition that chemical fertilizers and pesticides have harmful effect on soil, human and environment` due to the lack of knowledge.

3.4 Constraints Faced by the Farmers Producing Safe Food

Ten constraints were identified which hindered the farmers in producing safe food. Constraints affecting safe food production farmers were ranked according to the order are presented in Table 3.

The research observed that the highest constraint was “lack of knowledge and understanding on the principle of SFP”. Farmers expressed in this section that it was very hard to understand about the principle of safe fruit and vegetable production, mostly farmers do not know the specific management is needed on soil, water, fertilizer, pesticide and pesticides residue even timely harvesting.

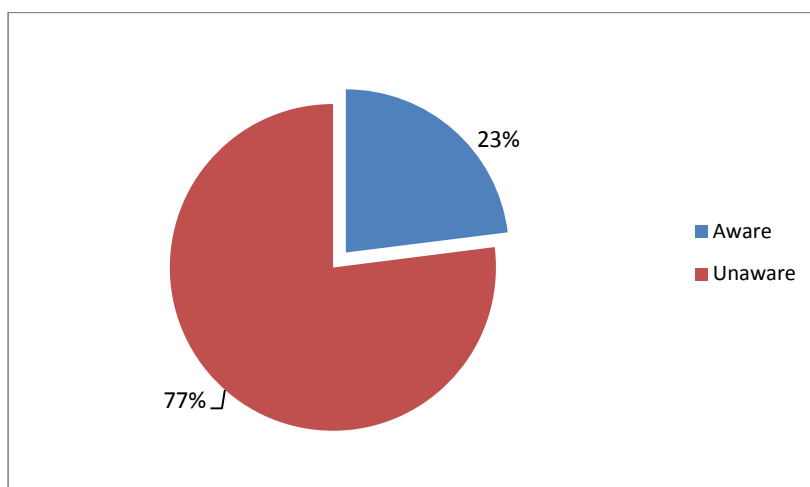


Fig. 1. Level of awareness among farmers about safe food production in Bangladesh

Table 3. Ranked order of the constraints faced by the farmers' towards safe food production

Constraints	CFI	Rank order
Lack of knowledge and understanding on the principle of SFP	136	1
Insufficient training	127	2
Unavailability of (non-poisonous) technical options for all crops	123	3
Unsatisfactory price	121	4
Lack differentiation between safe and toxic food in general market place and sale in same price	116	5
Lack of co-operation of GO and NGOs agencies	96	6
Lack of community approach in safe food production	83	7
Time requirement for management for better yield	76	8
Lack of monitoring and evaluation Unsatisfactory price	74	9
Less awareness about importance of safe food at consumer level	72	10

Second ranking of constrains was insufficient training. The farmers of the study area revealed their expression on insufficient training which is obviously needed for safe food production. Farmers expressed that they need training especially, on soil management, soil test, crop cultivars, crop rotation, mix cropping, mulching, pest management system, procedure of making organic pesticides and pesticide residue and withdrawal date of pesticides . Farmers also expressed that they did not have enough idea on safe food regulations.

The third ranking of the constraint was “unavailability of (non-poisonous) technical options for all crops or lack of organic pesticide”. For this reason, farmers use only homemade organic pesticide in homestead areas but not for commercial production.

3.4.1 Overall constraints faced for producing safe food

The Overall constraints faced for producing safe food has been presented in Table 4.

The research revealed that the highest proportion 48% faced medium constraints while 35% low and 17% high constraints faced for producing safe food.

Table 4. Overall constraints faced for producing safe food

Observed range	Category	Percent	Mean	SD
10-136	Low constraints (up to 50)	35.0		
	Medium constraints (51–100)	48.0	57.43	7.92
	High constraints (Above 100)	17.0		

Table 5. Relationship between the selected characteristics of and their attitude towards safe food production

Variable	Selected characteristics of farmers	Correlation coefficient (r)
Attitude towards safe food production	Age	0.005
	Level of education	0.171*
	Family size	-0.150
	Farm size	0.129*
	Land under fruit and vegetable cultivations	0.013
	Organizational participation	0.078
	Annual income	0.077
	Extension media contact	0.384**
	Agricultural training received	0.212*
	Farming Experience	0.212*
	Constrains faced producing safe food	-0.373**

* Significant at 0.05 level of probability and ** Significant at 0.01 level of probability

3.5 Relationship between Selected Characteristics and Farmers Attitude towards Safe Food Production

Relationship between the selected characteristics of the farmers and their attitude towards safe food production was ascertained by computing Pearson’s Product moment coefficient of correlation (r) and presented in the Table 5.

Table 5 showed that level of education, farm size extension media contact, agricultural training received and farming experience of the respondent showed significant positive while constrains faced producing safe food showed significant negative relationships with their attitude towards safe food production. However, the rest of the characteristics of the farmers did not show any significant relationship.

Oluwasusi [17] found similar results regarding perception and attitude of farmers towards organic agricultural practices. Adebayo and Oladele [18] showed that farming experience, farm size, household size, organization membership and frequency of extension contacts had significantly positive relationship with attitude to organic farming practices.

4. CONCLUSION AND RECOMMENDATION

Most of the respondents have a favorable and highly favourable attitude towards organic vegetable cultivation. Safe food production is in the way of increasing its acceptability and cultivation trends. Lack of knowledge and understanding of the principles of safe food production was the highest constraints faced by the farmers. The proper ways should be taken to overcome the problems. Farmer's level of education, farm size, extension media contact, agricultural training received and farming experience of the respondent showed significant positive and Constrains faced producing safe food showed meaningful negative relationships with their attitude towards safe food production. So these characteristics should be taken into consideration.

It is therefore recommended that the extension service providers like public and private organizations should take into active consideration on providing training to the vegetable farmers and need-based advisory services for organic vegetable cultivation. Knowledge about how new technology and processes can give safe food and enhanced shelf life should be provided to the farmers. It is essential to establish a collaborative business plan to foster greater supply chain innovation between suppliers, manufacturers and retailers.

CONSENT

As per international standard or university standard, written consent has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
<http://www.sciencedomain.org/review-history/24304>