

Reprint

ISSN 1997-2571 (Web Version)

# Journal of Innovation & Development Strategy (JIDS)

(*J. Innov. Dev. Strategy*)

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Volume: 5

Issue: 3

December 2011

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*J. Innov. Dev. Strategy 5(3):144-153(December 2011)*

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JIDS\*\* issn 1997-2571, HQ: 19-10 central place, saskatoon, saskatchewan, s7n 2s2, Canada

## CONSTRAINTS FACED BY THE BADC CONTRACT GROWERS IN QUALITY SEED POTATO PRODUCTION

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Accepted for publication on 2 December 2011

### ABSTRACT

Rahman MM, Bhuiyan MH, Huqe MAS, Wazed MA, Rahman MM (2011) Constraints faced by the BADC contract growers in quality seed potato production. *J. Innov. Dev. Strategy*. 5(3), 144-153.

A study was conducted to determine the constraints faced by the Bangladesh Agricultural Development Corporation (BADC) contract growers in quality seed potato production and to explore the relationships between the selected characteristics of the contract growers and their constraints faced in quality seed potato production. The study was conducted in four selected villages namely, Shobsar and Dadpur of Bargachi union in Paba upazila and Kalaipara and Gondogwari of Geopara union in Puthia upazila under Rajshahi district respectively. Data were collected from 100 BADC contract growers by using a pre-tested interview schedule during April 20 to May 20, 2008. A three point rating scale was developed to measure the dependent variables of the study. Pearson Product Moment Correlation Coefficient (r) test was used to ascertain the relationships between the concerned independent and dependent variables of the study. Correlation analysis indicates that age, farm size and annual income of the BADC contract growers had no significant relationship with their constraints faced in quality seed potato production. On the other hand, education, knowledge on potato cultivation, extension communication and social participation of the BADC contract growers had significant negative relationship with their constraints faced in quality seed potato production. The study revealed that 66 percent of the respondents faced medium constraints in quality seed potato production. On the other hand 33 percent faced low constraints and only 1 percent faced high constraints. In this study, 6 (six) aspects of constraints were selected to measure the extent of constraints faced by the BADC contract growers in quality seed potato production. According to the descending order of Constraints Facing Index (CFI) the selected constraints were (i) constraints faced related to manures and fertilizers, (ii) constraints faced related to preservation and marketing of potatoes, (iii) constraints faced related to quality seed potatoes, (iv) constraints faced related to diseases and insects (v) constraints faced related to irrigation and (vi) constraints faced related to capital.

**Key words:** BADC contract growers, seed potato production, knowledge on potato production, extension communication, social participation

### INTRODUCTION

Bangladesh is predominantly an agricultural country, and about 80 percent of her populations live, directly or indirectly, on income derived from agriculture. It has a very rich alluvial soil and moderate climate congenial to the growth of various agricultural crops throughout the year. Economy of this country is almost entirely dependent on agriculture that supplies raw materials for industrial production and food-stuff for human and animal consumption. Two reasons are mainly responsible for the unfavorable food situation in Bangladesh. Firstly, the population is growing at an alarming rate and secondly, the rate of agricultural production per hectare is deplorably low. In fact, Bangladesh is one of the densely populated regions in the world. Rice is the staple food crop in Bangladesh. But increase in the production of rice has not been able to keep pace with the increase in population. In spite of dominance of agriculture in the national economy, Bangladesh is facing chronic food shortage due to rapid growth of population and has to import on an average 1.5 million tons of food grains in each year (BBS 2002). Potato is produced in 132 countries out of 193 independent countries of the world. At present, at least 40 countries eat potatoes as a staple food (Islam 1987). The importance of potato in the economy of Bangladesh can hardly be over emphasized. Besides, potato is the main source of important nutrients, but the production of potato has not been able to keep pace with the increased demand with the population growth. In spite of greater potentiality of potato production, the farmers of Bangladesh are not free from constraints in the field of cultivating potato. Their cultivation technique is almost traditional; they use mainly local varieties and to some extent of modern varieties of seed. As there is little scope for increasing cultivating area but there is a great scope for increasing per unit production. The area and production of potato in Bangladesh during 2007-08 were 0.5 million hectares and 8 million metric tons respectively (BBS 2006). The trend in the production of potato and gradual increase in the per hectare yield of potato crop remained static at around 5.95 metric tons up to 1960. The increase of yields to 15.25 metric tons per hectare in the recent years is mainly due to use of quality seeds of modern variety and appropriate production technologies. Presently the supply of quality seed potatoes both private and public sector is about 5 percent of the national demands (BBS 2006). To raise the average per hectare yield of potato from 15.25 to 20.00 metric tons, it is necessary to increase the production and supply of quality seed potatoes.

Constraints faced by the farmers may vary from one farmer to another depending on the influence of various factors. Behavior of an individual is greatly influenced by his characteristics. It is, therefore, likely that the constraints faced by the farmers in quality seed potato production might be influenced by their personal,

economic, social and psychological characteristics. An understanding of the constraints in quality seed potato production by the BADC contract growers and its relationship with their various characteristics will be greatly helpful for planning and execution of programs by Bangladesh Agricultural Development Corporation (BADC). But little effort has been made to undertake systematic investigation in this respect. These facts indicate the need for conducting a research study entitled “Constraints Faced by the BADC Contract Growers in Quality Seed Potato Production”.

Following specific objectives were formulated to give proper direction to the study:

1. To identify and describe the extent of constraints faced by the BADC contract growers in relation to quality seed potato production.
2. To determine and describe some selected characteristics of the BADC contract growers, the selected characteristics included: age, education, farm size, and annual income, knowledge on potato cultivation, extension communication, and social participation.
3. To explore the relationship between selected characteristics of the BADC contract growers and their constraints faced in relation to seed potato production activities.
4. To find out the rank order of constraints faced by the BADC contract growers.

## **MATERIALS AND METHODS**

The study was conducted in four villages namely Shobsar and Dadpur of Bargachi union in Paba upazilla and Kalaipara and Gondogwali of Geopara union in Puthia upazilla under Rajshahi district where most of the BADC contract growers lived. Agriculture was the major occupation in the study area and the area had well accessibility through road and water ways. Only those farmers were selected who were directly involved in potato seed production under the contract grower system with BADC. The total number of farmers was 280. These contract growers constituted the population for this study. However, data were collected from a sample rather than the whole population. Out of those farmers, 36 percent of them were selected at random from each village by using random selection method. One hundred farmers were selected as the sample for this study. However, a reserve list of 10 farmers was prepared. The farmers included in the reserve list were supposed to be used in case of any absence of farmers included in the original sample during collection of data. An interview schedule was used as the data gathering instrument for this study. The researcher prepared an interview schedule keeping the objectives of the study in view. The interview schedule contained both open and closed form of questions. Simple and direct questions and some scales were included in the schedule to get information regarding the problem conformation of the respondent farmers and their selected characteristics. The interview schedule was prepared in Bangla for easy understanding on the part of respondents. The draft interview schedule was pre-tested in field situation before using the same for final data collection. Necessary corrections, additions, alternations and adjustment were made in the interview schedule on basis of the experience gained during pre-test in the study area. The interview schedule was then cyclostyled in its final form for collection of data.

### ***Collection of Data***

Data were collected personally by the researcher himself through face to face interview. Data collection began on April 15, 2008 and continued until May 15, 2008.

### ***Statistical analysis***

Statistical measures such as number, percentage, range, rank order, mean and standard deviation were used in describing the independent and dependent variables of the study. For clarity of understanding tables were also used for presenting the data. Pearson's Product Moment Correlation Co-efficient ( $r$ ) was used to explore the relationships between selected characteristics of the respondents and their constraints faced in quality seed potato production.

## **RESULTS AND DISCUSSION**

### ***Selected Characteristics of the BADC contract growers***

In the present study, 7 characteristics of the farmers were selected for investigation. The characteristics included: age, education, farm size, annual income, knowledge on potato cultivation, extension communication, and social participation. The salient features of the different characteristics have been presented in Table 1.

Table 1. Salient Features of the Selected Characteristics of the BADC contract growers

Sl. No.	Characteristics	Measuring units	Range		Mean value	Standard deviation
			Possible scores	Observed scores		
1	Age	Years	Unknown	20-58	38.38	8.09
2.	Education	Year of schooling	Unknown	0-15	5.39	4.29
3.	Farm size	Hectare	Unknown	0.04-6.46	0.86	.99
4.	Annual income	Taka ('000)	Unknown	36-2714	253.34	350.92
5.	Knowledge on potato cultivation	Assigned scores	0-40	10-30	21.28	4.15
6.	Extension communication	Assigned scores	0-36	10-28	17.48	3.47
7.	Social participation	Assigned scores	Unknown	0-4	0.79	0.98

**Age of the farmers**

Age of the respondent farmers ranged from, 20-58 years and the average was 38.38 with a standard deviation of 8.09. This indicates that the study group was moderately heterogeneous in terms of age level. On the basis of their age, the farmers were classified into three categories that have been presented in Table 2.

Table 2. Classification of the farmers according to their age

Categories according to age (years)	Farmers		Mean	Standard deviation
	Number	Percent		
Young (up to 35)	34	34	38.38	8.09
Middle aged (36-50)	62	62		
Old (above 50)	4	4		
Total	100	100		

**Education of the farmers**

Education score of the respondent farmers ranged from 0 to 15 years of schooling having an average 5.39 with a standard deviation of 4.29. On the basis of their education the respondents were classified into five categories that have been presented in Table 3.

Table 3. Classification of the farmers according to their education

Categories according to education (schooling years)	Farmers		Mean	Standard deviation
	Number	Percent		
Illiterate (0)	10	10	5.39	4.29
Can sign only (0.5)	20	20		
Primary level (1-5)	21	21		
Secondary level (6-10)	40	40		
Above secondary (above 10)	9	9		
Total	100	100		

**Farm size of the farmers**

Farm size score of the respondents ranged from 0.04-6.46 hectares with a mean of 0.86 ha and a standard deviation of 0.99. The farmers were classified into four categories, according to the DAE classification as presented in Table 4.

Table 4. Classification of the farmers according to their farm size

Categories according to farm size (hectare)	Farmers		Mean	Standard deviation
	Number	Percent		
Marginal (up to 0.20)	7	7	0.86	0.99
Small (0.21-1.00)	67	67		
Medium (1.01-3.00)	22	22		
Large (above 3.00)	4	4		
Total	100	100		

**Annual income of the farmers**

Annual income score of the respondent farmers ranged from 36 to 2714 with a mean of 253.34 and a standard deviation of 350.92. The farmers were classified into three categories on the basis of their annual income that have been presented in Table 5.

Table 5. Classification of the farmers according to their annual income

Categories according to family income (taka '000)	Farmers		Mean	Standard deviation
	Number	Percent		
Low income (up to 150)	51	51	253.34	350.92
Medium income (151-300)	25	25		
High income (above 300)	24	24		
Total	100	100		

**Knowledge on potato cultivation**

Knowledge on potato cultivation scores of the farmers ranged from 10-30 against the possible range of 0-40. The average score and standard deviation were 21.28 and 4.15 respectively. Based on the knowledge on potato cultivation scores, the farmers were classified into three categories, namely poor knowledge, moderate knowledge and good knowledge that have been presented in Table 6.

Table 6. Classification of the farmers according to their knowledge on potato cultivation

Categories according to agricultural knowledge (score)	Farmers		Mean	Standard deviation
	Number	Percent		
Poor knowledge (up to 15)	7	7	21.28	4.15
Moderate knowledge (16-25)	74	74		
Good knowledge (above 25)	19	19		
Total	100	100		

**Extension communication of the farmers**

The scores of the farmers regarding extension communication ranged from 10-28 against possible range 0 to 36 with an average of 17.48 and a standard deviation of 3.47. On the basis of their extension communication scores, the farmers were classified into three categories that have been presented in Table 7.

Table 7. Classification of the farmers according to their extension communication

Categories according to extension communication (score)	Farmers		Mean	Standard deviation
	Number	Percent		
Low communication (up to 15)	24	24	17.48	3.47
Medium communication (16-22)	66	66		
High communication (above 22)	10	10		
Total	112	100		

**Social participation of the farmers**

The social participation scores of the farmers ranged from 0 to 4 against possible ranged 0 to 21 with an average of 0.79 and a standard deviation of 0.98. On the basis of social participation scores, the farmers were classified into four categories namely, no participation, low participation, medium participation and high participation as shown in Table 8.

Table 8. Classification of the farmers according to their social participation

Categories according to social participation (score)	Farmers		Mean	Standard deviation
	Number	Percent		
No participation (0)	50	50	0.79	0.98
Very low participation (1-2)	48	48		
Low participation (4)	2	2		
Total	100	100		

**Constraints faced related to quality seed potatoes**

The observed scores of constraints faced related to quality seed potatoes ranged from 0-12 against the possible scores being 0-20. The average score was 4.65 with a standard deviation of 2.36. On the basis of constraints faced related to quality seed potatoes, the farmers were classified into four categories as presented in Table 9.

Table 9. Classification of the farmers according to their constraints faced related to quality seed potatoes

Categories according to constraints faced related to quality seed potatoes	Farmers		Mean	Standard deviation
	Number	Percent		
No constraints (0)	2	2	4.65	2.36
Low constraints (1-4)	42	42		
Medium constraints (5-8)	52	52		
High constraints (above 8)	4	4		
Total	100	100		

**Constraints faced related to manures and fertilizers**

The observed scores of constraints faced related to manures and fertilizers ranged from 0-17 against the possible scores being 0-20. The average score was 12.24 with a standard deviation 2.97. On the basis of constraints faced related to manures and fertilizers, the farmers were classified into three categories as presented in Table 10.

Table 10. Classification of the farmers according to their constraints faced related to manures and fertilizers

Categories according to constraints faced related to manures and fertilizers	Farmers		Mean	Standard deviation
	Number	Percent		
Low constraints (up to 7)	3	3	12.24	2.97
Medium constraints (8-13)	75	75		
High constraints (above 13)	22	22		
Total	100	100		

**Constraints faced related to irrigation**

The observed scores of constraints faced related to irrigation ranged from 2-15 against the possible scores of 0-20. The average score was 6.95 with a standard deviation 2.82. On the basis of constraints faced related to irrigation the farmers were classified into three categories as presented in Table 11.

Table 11. Classification of the farmers according to their constraints faced related to irrigation

Categories according to constraints faced related to irrigation	Farmers		Mean	Standard deviation
	Number	Percent		
Low constraints (up to 7)	62	62	6.95	2.82
Medium constraints (8-13)	36	36		
High constraints (above 13)	2	2		
Total	100	100		

**Constraints faced related to insects and diseases**

The observed scores of constraints faced related to insects and diseases ranged from 2-20 against the possible scores being 0-20 having an average of 7.10 with a standard deviation 3.17. On the basis of constraints faced related to insects and diseases, the farmers were classified into three categories as presented in Table 12.

Table 12. Classification of the farmers according to their constraints faced related to insects and diseases

Categories according to constraints faced related to insects and diseases	Farmers		Mean	Standard deviation
	Number	Percent		
Low constraints (up to 7)	61	61	7.10	3.17
Medium constraints (8-13)	35	35		
High constraints (above 13)	4	4		
Total	100	100		

**Constraints faced related to preservation and marketing of seed potatoes**

The observed scores of constraints faced related to preservation and marketing of seed potatoes ranged from 5-16 against the possible scores of 0-20 having an average of 9.67 with a standard deviation 2.01. On the basis of constraints faced related to preservation and marketing of potatoes, the farmers were classified into three categories as presented in Table 13.

Table 13. Classification of the farmers according to their constraints faced related to preservation and marketing of seed potatoes

Categories according to constraints faced related to preservation and marketing of seed potatoes	Farmers		Mean	Standard deviation
	Number	Percent		
Low constraints (up to 7)	15	15	9.67	2.01
Medium constraints (8-13)	82	82		
High constraints (above 13)	3	3		
Total	100	100		

**Constraints faced related to capital**

The observed scores of constraints faced related to capital ranged from 0-11 against the possible scores of 0-20 having an average of 3.63 with a standard deviation of 2.73. On the basis of constraints faced related to capital, the farmers were classified into three categories as presented in Table 14.

Table 14. Classification of the farmers according to their constraints faced related to capital

Categories according to constraints faced related to capital	Farmers		Mean	Standard deviation
	Number	Percent		
No constraints (0)	14	14	3.63	2.73
Low constraints (1-7)	76	76		
Medium constraints (8-11)	10	10		
Total	100	100		

Data presented in the Table 14 indicate that the highest proportion (76 percent) of the farmers had faced low constraints related to capital as compared to 10 percent having faced medium constraints. On the other hand, 14 percent of the farmers had faced no constraints related to capital at all. Analyzing the obtained score it was found that respondents farmers had no so much capital problem. The concerned organizations should come forward to solve this problem.

**Overall constraints faced by the farmers in quality seed potato production**

Computed overall constraints faced by the BADC contract growers ranged from 23-85 against the possible range of 0-120. The average score was 44.89 with a standard deviation of 9.77 as presented in Fig. 1.

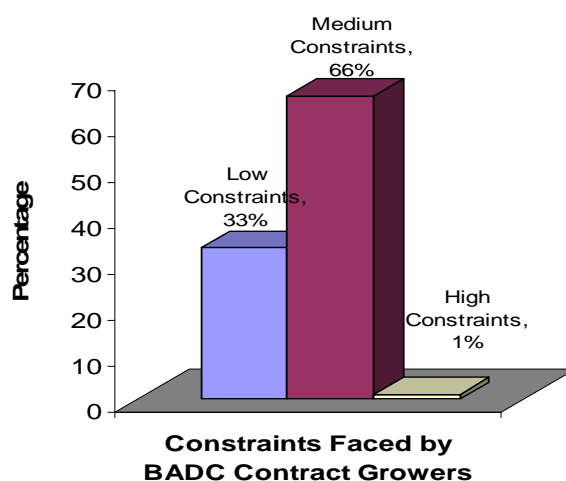


Fig. 1. Constraints faced by BADC contract growers

**Relationship between the selected characteristics of the BADC contract growers and their constraints faced in quality seed potato production**

The purpose of this section is to examine the relationships of seven selected characteristics of the BADC contract growers with their constraints faced in quality seed potato production. The seven characteristics of the farmers included: age, education, farm size, annual income, knowledge on potato cultivation, extension communication and social participation. Each of the characteristics constituted the independent variables, while constraints faced by the BADC contract growers in quality seed potato production were the dependent variable of the study. To explore the relationships between the selected individual characteristics of the farmers and their constraints faced in quality seed potato production, Pearson's product moment co-efficient of correlation ( $r$ ) has been used. Five percent and one percent level of probability were used as the basis for rejection of null hypotheses. The computed values of ' $r$ ' were compared with relevant tabulated values for 98 degrees of freedom at the designated level of probability in order to determine whether the relationships between the concerned variables were significant or not. The summary of the results of the correlation analysis has been presented in Table 15.

Table 15. Co-efficient of correlation showing relationship between the selected characteristics of the farmers and their constraints faced in quality seed potato production (N = 100)

Dependent variable	Independent variables (selected characteristics of BADC contract growers)	Observed correlation co-efficient (r) value with 98 degrees of freedom
Constraints faced by the BADC contract growers in quality seed potato production	• Age	-0.081 <sup>NS</sup>
	• Education	-0.237*
	• Farm size	-0.016 <sup>NS</sup>
	• Annual income	-0.123 <sup>NS</sup>
	• Knowledge on potato cultivation	-0.433**
	• Extension communication	-0.263**
	• Social participation	-0.255*

<sup>NS</sup> = Not significant

\* = Significant at 0.05 level of probability

\*\* = Significant at 0.01 level of probability

Tabulated value,

0.196 at 0.05 level of probability

0.256 at 0.01 level of probability

***Relationship between age of the farmers and their constraints faced in quality seed potato production***

Relationship between age of the farmers and their constraints faced in quality seed potato production was determined by testing the following null hypothesis: “There is no relationship between age of the farmers and their constraints faced in quality seed potato production”. The calculated value of the co-efficient of correlation between the concerned variables was found to be -0.081 as shown in Table 15. The following observations were made regarding the relationship between the two variables under consideration.

- The computed value of ‘r’ ( $r = -0.081$ ) was found to be smaller than the tabulated value ( $r = 0.196$ ) with 98 degrees of freedom at 0.05 level of probability.
- The null hypothesis could not be rejected.
- The relationship between the concerned variables was not significant.
- The relationship showed a negative trend between the concerned variables.

Based on the above findings, it was concluded that age of the farmers had no significant relationship with their constraints faced in quality seed potato production. This meant that age of the farmers was not an important factor in facing constraints in quality seed potato production. However, comparatively younger farmers could face constraints in quality seed potato cultivation.

***Relationship between education of the farmers and their constraints faced in quality seed potato production***

Relationship between education of the farmers and their constraints faced in quality seed potato production was determined by testing the following null hypothesis: “There is no relationship between education of the farmers and their constraints faced in quality seed potato production”. The calculated value of the co-efficient of correlation between the concerned variables was found to be -0.237 as shown in Table 15. The following observations were made regarding the relationship between the two variables under consideration.

- The computed value of ‘r’ ( $r = -0.237$ ) was found to be larger than the tabulated value ( $r = 0.196$ ) with 98 degrees of freedom at 0.05 level of probability.
- The null hypothesis was rejected.
- The relationship between the concerned variables was significant.
- The relationship showed a negative trend between the concerned variables.

Based on the above findings, it was found that education of the farmers had a significant and negative relationship with their constraints faced in quality seed potato production. This meant that the farmers having more education were likely to face less constraints. Educated persons are supposed to have more extension contact and training and as a result they can combat the constraint scientifically and effectively.

***Relationship between farm size of the farmers and their constraints faced in quality seed potato production***

Relationship between farm size of the farmers and their constraints faced in quality seed potato production was determined by testing the following null hypothesis: “There is no relationship between farm size of the farmers and their constraints faced in quality seed potato production”. The calculated value of the co-efficient of correlation between the concerned variable was found to be -0.016 as shown in Table 15. The following observations were made regarding the relationship between the two variables under consideration.

- The computed value of ‘r’ ( $r = -0.016$ ) was found to be smaller than the tabulated value ( $r = 0.196$ ) with 98 degrees of freedom at 0.05 level of probability.
- The null hypothesis was accepted.
- The relationship between the concerned variables was not significant.
- The relationship showed a negative trend between the concerned variables.



Based on the above findings, the researcher concluded that farm size of the farmers had no significant relationship with their constraints faced in quality seed potato production. This implies that farm size of the farmers does not have much influence on their constraints faced in quality seed potato production.

***Relationship between annual income of the farmers and their constraints faced in quality seed potato production***

Relationship between annual income of the farmers and their constraints faced in quality seed potato production was determined by testing the following null hypothesis: "There is no relationship between annual income of the farmers and their constraints faced in quality seed potato production". The calculated value of the co-efficient of correlation between the concerned variables was found to be -0.123 as shown in Table 15. The following observations were made regarding the relationship between the two variables under consideration.

- a) The computed value of 'r' ( $r = -0.123$ ) was found to be smaller than the tabulated value ( $r = 0.196$ ) with 98 degrees of freedom at 0.05 level of probability.
- b) The null hypothesis was accepted.
- c) The relationship between the concerned variables was not significant.
- d) The relationship showed a negative trend between the concerned variables.

Based on the above findings, the researcher concluded that annual income of the farmers had no significant relationship with their constraints faced in quality seed potato production. This implies that annual income of the farmers does not have any influence on their constraints faced in quality seed potato production.

***Relationship between knowledge on potato cultivation of the farmers and their constraints faced in quality seed potato production***

Relationship between cosmopolitaness of the farmers and their constraints faced in quality seed potato production was determined by testing the following null hypothesis: "There is no relationship between knowledge on potato cultivation of the farmers and their constraints faced in quality seed potato production". The calculated value of the co-efficient of correlation between the concerned variables was found to be -0.433 as shown in Table 15. The following observations were made regarding the relationship between the two variables under consideration.

- a) The computed value of 'r' ( $r = -0.433$ ) was found to be larger than the tabulated value ( $r = 0.256$ ) with 98 degrees of freedom at 0.01 level of probability.
- b) The null hypothesis was rejected.
- c) The relationship between the concerned variables was significant.
- d) The relationship showed a negative trend between the concerned variables.

Based on the above findings, the researcher concluded that knowledge on potato cultivation of the farmers had a negatively significant relationship with their constraints faced in quality seed potato production. This implies that farmers having higher knowledge on potato cultivation were likely to face have lower level of constraints in quality seed potato production. Seed potato growers having higher knowledge in potato cultivation are supposed to know what constraints to be faced are and how to mitigate them.

***Relationship between extension communication of the farmers and their constraints faced in quality seed potato production***

Relationship between extension communication of the farmers and their constraints faced in quality seed potato production was determined by testing the following null hypothesis: "There is no relationship between extension communication of the farmers and their constraints faced in quality seed potato production".

The calculated value of the co-efficient of correlation between the concerned variables was found to be -0.263 as shown in Table 15. The following observations were made regarding the relationship between the two variables under consideration.

- a) The computed value of 'r' ( $r = -0.263$ ) was found to be larger than the tabulated value ( $r = 0.256$ ) with 98 degrees of freedom at 0.01 level of probability.
- b) The null hypothesis was rejected.
- c) The relationship between the concerned variables was significant.
- d) The relationship showed a negative trend between the concerned variables.

Based on the above findings, the researcher concluded that extension communication of the farmers had a negatively significant relationship with their constraints faced in quality seed potato production. This implies that farmers with higher extension communication were likely to face lower level of constraints faced in quality seed potato production. All the respondents' farmers were contract-seed potato growers registered with BADC. So, both farmers and BADC extension agents had contact with each other at the time of need which resulted lower level of constraints faced by farmers.

### **Relationship between social participation of the farmers and their constraints faced in quality seed potato production**

Relationship between social participation of the farmers and their constraints faced in quality seed potato production was determined by testing the following null hypothesis: “There is no relationship between social participation of the farmers and their constraints faced in quality seed potato production”. The calculated value of the co-efficient of correlation between the concerned variable was found to be -0.255 as shown in Table 15. The following observations were made regarding the relationship between the two variables under consideration.

- a) The computed value of ‘r’ ( $r = -0.255$ ) was found to be larger than the tabulated value ( $r = 0.256$ ) with 98 degrees of freedom at 0.01 level of probability.
- b) The null hypothesis was rejected.
- c) The relationship between the concerned variables was significant.
- d) The relationship showed a negative trend between the concerned variables.

Based on the above findings, the researcher concluded that social participation of the farmers had a negatively significant relationship with their constraints faced in quality seed potato production. This implies that farmers having higher social participation faced lower level of constraints in quality seed potato production.

$$\text{Constraints Facing Index (CFI)} = P_n \times 0 + P_l \times 1 + P_m \times 2 + P_h \times 3$$

Where,

$P_n$  = Percentage of BADC contract growers having no constraint facing

$P_l$  = Percentage of BADC contract growers having low constraint facing

$P_m$  = Percentage of BADC contract growers having medium constraint facing

$P_h$  = Percentage of BADC contract growers having high constraint facing

Percent of the respondents facing no, low, medium and high constraints were described earlier in 4.2.1 to 4.2.6 sections. Constraint Facing Index (CFI) for any one of the selected dimensions could range from 0 to 300 where ‘0’ indicated no constraint facing and ‘300’ indicated high constraint facing. However, Constraint Facing Index for the selected six dimensions of quality seed potato production ranged from 140 to 219. Comparative rank orders of the six selected dimensions have been shown in Table 16 on the basis of the obtained Constraints Facing Index (CFI) score.

Table 16. Rank order of constraints faced by BADC contract growers with observed score according to descending order

Sl. No.	Statements	Percentage of the respondents				CFI	Rank order
		No (0)	Low (1)	Medium (2)	High (3)		
1.	Constraints faced related to manures and fertilizers	0	3	75	22	219	1st
2.	Constraints faced related to preservation and marketing of potatoes	0	15	82	3	188	2nd
3.	Constraints faced related to quality seed potatoes	2	42	52	4	158	3rd
4.	Constraints faced related to diseases and insects	0	61	35	4	143	4th
5.	Constraints faced related to irrigation	0	62	36	2	140	5th
6.	Constraints faced related to capital	14	76	10	0	96	6th

### **CONCLUSION**

Conclusions drawn on the basis of findings of this study and the interpretation of their meaning in the light of other relevant facts are presented below: It was revealed that more than fifty percent farmers were illiterate, could sign only or had primary level of education. There existed a negatively significant relationship between farmers' education and their constraints faced. Therefore, it may be concluded that illiterate farmers will continue to face constraints in quality seed potato production activities, if suitable steps are not taken to remove illiteracy among the farmers. That is only the literate farmers could face constraints in potato cultivation. It was found that an overwhelming majority (94 percent) of the farmers had social participation ranged from no social participation category to low social participation category. Farmers' social participation had negatively significant relationship with their constraints faced. One would, therefore, conclude that a very large proportion

of the farmers will continue to face constraints in quality seed potato production activities, if suitable motivational steps are not taken to raise their social participation. It was concluded that an overwhelming majority (90 percent) of the farmers had medium to low extension communication, while there was a negatively significant relationship between extension communication of the farmers and their constraints faced. Therefore, it may be concluded that a very large majority of the farmers will continue to face constraints, if suitable steps are not taken to strengthen extension communication activities among the farmers. It was identified in the study area that majority (81 percent) of the farmers had poor to moderate knowledge on potato cultivation, while there was a negatively significant relationship between knowledge on potato cultivation of the farmers and their constraints faced. One would, therefore, conclude that an effort to improve knowledge on potato cultivation of the farmers would be helpful for minimizing their constraints faced in quality seed potato production.

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