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AN ECONOMIC STUDY OF POTATO PRODUCTION IN SELECTED AREAS OF SYLHET DISTRICT

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Abstract

The study assesses the profitability of potato cultivation in some selected areas of Sylhet district in Bangladesh. A total of 50 farmers were selected from different villages of Fenchugong upazila in Sylhet district. Both tabular and descriptive techniques were used to analyze the collected data. Average family size was 6.24 which was found to be higher in large farm followed by small and medium farms. On an average the dependency ratio was 3.22. The literacy in the study area was higher than that of national average of Bangladesh. Agriculture was found to be dominating occupation among the inhabitants. On an average 50% of the total income obtained from potato production. The annual savings of the sampled farmers was found to be higher in large farm followed by medium and small farm. On an average hectare^{-1} cost of production of potato was Tk. 1, 94,114. The average hectare^{-1} yield of potato was 17194 Kg. The highest yield was obtained by large farms (18291 kg ha^{-1}) while it was the lowest in small farms (16804 kg ha^{-1}). When all costs were taken into account the average net return was observed to be Tk. 81336. On an average BCR was the highest in large farms (1.68) appearing lowest in small farms (1.34). The study identified some major problems like non-availability of quality seeds and high price, low market price, shortage of human labor, lack of storage facilities etc. The farmers opined that potato production would be economically viable if quality seeds with affordable price, marketing facilities with standard price, storage facilities, fertilizer and insecticides with reasonable price are ensured.

Keywords: Potato production, profitability, constraints.

Introduction

Bangladesh is an agrobased country and agriculture is the principal source of income and employment. This sector directly contributes 15.50% of total GDP (BBS, 2016). Potato is an important food crop in tropical and subtropical countries. It is the fourth most important crop in Bangladesh. It is important and popular crop because of its quick economic return and multiple uses. It has a greater scope and potentiality for food security and poverty alleviation occupying a dominant position in both area and production among the vegetable growers in Bangladesh. Almost every family in Bangladesh consumes potato as a vegetable throughout the year. As a cheapest source of carbohydrates it is used, though not so extensively, as a supplement of the diet rice. Potato can play an important role as an alternative and a multipurpose food crop of Bangladesh. It has the desirable characteristics of high yield, nutritious or delicious food and palatable in taste. It is one of the most important sources of carbohydrates and contains an appreciable amount of vitamin B and C and some other materials. In Bangladesh soil and climatic condition has offer high potential of potato production. Bangladesh produces potato in about 9.47 million hectares of land with an average yield of 19.93 ton ha^{-1} (BBS, 2016).

Production of potato has been increasing rapidly compared to cereal crops like rice and wheat (Azimuddin *et al.*, 2009). Potato cultivation under the institutional loan was a profitable business (Majid, 2004). Potato tuber follows only rice and wheat in world as an important food crop for human consumption. It is used as a popular vegetable by both the poor and rich people in Bangladesh. It has high nutritive value as per 100 gm of edible potato contains 97 k. calories, 1.6 gm protein, little amount of fat, 10.07 gm minerals and little amount of iron. It contains 74.7% moisture

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and 22.6% carbohydrate in combination with many other items of food (Hossain and Bose, 2000). People consume potatoes in various forms such as curry cooked food, fries, potato crackers and flour to make breads, biscuits, chips, etc. in both home and abroad. From the viewpoint of nutritional requirement Bangladesh has deficit in producing nutritional crops specially the tubers and vegetables. To solve the malnutrition problem, emphasis should be given on producing more non-cereal crops like potato.

Realizing the above situations, the government of Bangladesh has been maintaining a crop diversification strategy to reduce the dependency on rice by increasing the consumption and production of potato. In Bangladesh, the amount of cultivable land is gradually decreasing because of infrastructural and industrial development activities. For that reason, production strategies require to be formulated according to the demand of the situation and time so that farmers can increase food production. The cultivation of potato was a profitable business and the medium farm was more profitable than the small and marginal farms (Sarkar and Yesmin, 2014).

Potato growing is one of the promising farming businesses to the farmers due to its higher yield, diversified use, low risk involvement and high profitability. But it is most difficult for the farmers to maintain the production cost (Awal, 2013). In Bangladesh, potato occupies a dominant position in both area and production among the vegetables growers. However, compared to other crops, cost of production of potato is relatively high (Ahmed, 2001). Keeping this view in mind the present study is a modest attempt to analysis the socio-economic condition and cost and return of potato production in some selected areas of Sylhet district. The specific objectives of the study are to assess the socio-economic characteristics of the potato growers, to estimate profitability of potato production and to evaluate the constraints for potato production and to suggest some measures for Improvements.

Materials and Methods

The present study was based on field level primary data which were collected from randomly selected potato growers in some selected villages of Fenchugang upazila of Sylhet district. The survey method was used in the present study. Total sample size was 50. The information was collected during the month of March, 2016. After collection of data a list of tables, figures were prepared on the basis of the study. The collected data were thereafter analyzed and condensed by using tabular statistical techniques to obtain the result. To calculate the economic performance of potato, the simple statistical model such as the average, percentage, total cost, total return, gross margin and benefit cost ratio etc. were used.

Gross Return

$GR_i = \sum_{i=1}^{n} QiPi$

Where, GR_i= Gross Return from i^{th} product (Tk. ha^{-1})
Q_i= Quantity of the ith product (kg)
P_i= Average price of the ith product (Tk.)
I= 1, 2, 3……., n.

Gross margin

Gross margin was calculated among the difference between gross return and total variable costs. That is, GM= GR-TVC

Where, GM= Gross margin, GR= Gross Return, TVC= Total variable cost

Net return
Net return was calculated by deducting all costs (variable and fixed) from gross return. The following equation will be used to determine the return of potato production.

$\prod = P_yY - \sum_{i=1}^{n}(Pxi\ Xi)$ – TFC

$\prod$ = Net return (Tk. ha^{-1})

P_y = Per unit price of the product (Tk. kg^{-1})

Y= Quantity of the production ha^{-} (kg.)
P_{xi} = Per unit price of tht i^{th} product (Tk.)
X_i= Quantity of the ith inputs ha^{-} (kg)
i= 1, 2, 3……., n (number of variable).

Benefit Cost Ratio (BCR)

The BCR is a relative measure, which is used to compare benefit per unit of cost. The BCR was estimated as a ratio of gross returns and gross costs. The formula calculating BCR (undiscounted) was as such: Benefit Cost Ratio = Gross benefit / Gross cost.

Results and Discussion

Size and composition of family

The average size of family was found to be 6.24 persons (Table 1). The family size was observed to be higher for the large farm followed by small and medium farms. The dependency ratio in general was found to be 3.22. Members aged from 18 to 60 years were dominant in case of both male and female showing more active family members in the study area.

Table 1. Composition of family according to farm category

Age group (years)	Farm category			
	Small	Medium	Large	All
Male				
Below-18	47	2	3	52
	(1.04)	(0.67)	(1.50)	(1.04)
18-60	73	6	7	86
	(1.62)	(2.00)	(3.50)	(1.72)
60 above	12	1	1	14
	(0.27)	(0.33)	(0.50)	(0.28)
Total	132	9	11	152
	(2.93)	(3.00)	(5.50)	(3.04)
Female				
Below-18	56	3	5	64
	(1.24)	(1.00)	(2.50)	(1.28)
18-60	74	6	5	85
	(1.64)	(2.00)	(2.50)	(1.70)
60 above	11	-	-	11
	(0.24)			(0.22)
Total	141	9	10	160
	(3.13)	(3.00)	(5.00)	(3.20)
Average family size	6.067	6.00	10.50	6.24
Average earning members	1.87	2.33	3.00	1.94
Dependency ratio	3.24	2.58	3.50	3.22

Figures within parentheses indicate averages

Educational level of the respondents

Education makes a man more capable of efficiently managing scarce resources with a view to earning maximum profit. Education has its own merit and it contributes positively to economic and social development of any country. The study revealed that only 10.62% of the family members were illiterate. Members having primary, secondary and

SSC and HSC and above education were found to be 27.84%, 35.53% and 26.01%, respectively. Among the illiterate family members small farm holders were the highest and they also constituted the highest among those who have up to HSC and above level of education during the year of investigation (Table 2).

Table 2. Educational status of the respondent's family members

Farm category	Illiterate	Primary	Secondary & SSC	HSC & above	Total
Small	28	65	84	64	241
	(11.62)	(26.97)	(34.85)	(26.56)	(100)
Medium	1	6	6	3	16
	(6.25)	(37.50)	(37.5)	(18.75)	(100)
Large	_	5	7	4	16
		(31.25)	(43.75)	(25.00)	(100)
All	29	76	97	71	273
	(10.62)	(27.84)	(35.53)	(26.01)	(100)

Figures within parentheses indicate percentages

Occupation of the respondents

Agriculture was found to be the main occupation for majority of the respondents during the study period. A bulk of the total labor force was engaged in agriculture besides business, service and other occupations in the study area. It shows that 30% of the total loanees had agriculture as the single main occupation. Other important occupations were business and service besides with agriculture constituting 44.00% and 24.00% respectively. The dominance of agriculture as an occupation is evident in the study area (Table 3).

Average land holding according to farm category

[On an average, the size of land holding for small, medium and large farmers was observed to be 0.37, 1.13 and 2.13 hectares respectively. The study revealed that the small farmers were found to increase their cultivated land through various tenurial arrangements while other two size groups lacked behind in this aspect during the same period (Table 4). Both owned and cultivated lands were significantly higher for the large farm compared to those of small and medium farms.

Table 3. Occupation of the respondents according to farm category

Farm category	Agriculture	Agriculture cum Service	Agriculture cum business	Agriculture cum others
Small	10	12	22	1
	(22.22)	(26.66)	(48.88)	(2.22)
Medium	3	-	-	-
	(100)			
Large	2	-	-	-
	(100)			
All	15	12	22	1
	(30.00)	(24.00)	(44.00)	(2.00)

Figures within parentheses indicate percentages

Table 4. Average size of land holding according to farm category

Heads	Farm category (in hectare)			
	Small	Medium	Large	All
Homestead	0.03	0.02	0.03	0.03
Pond	0.02	0.03	0.03	0.02
Garden	0.03	0.04	0.04	0.03
Fallow	-	-	-	-
Owned cultivable	0.30	1.04	2.03	0.41
Rented in	0.01	-	-	0.01
Rented out	-	-	-	-
Average owned	0.37	1.13	2.13	0.48
Average cultivated	0.31	1.04	2.03	0.42

Annual income of the respondents

Average annual income of a family in the present study was estimated by adding up the earnings of all active members of the family from all income generating activities during the year under investigation. The overall average annual income considering all farms was Tk 2, 34, 292 of which 39.88% was earned from non-farm sources. Potato cultivation contributed 50.67% to the total annual income and other farming operations contributed 9.45% (Table 5).

Table 5. Average annual household income of the respondents

Farm category	Average annual income (Tk)			
	Potato production	Other farm income	Non-farm income	Total
Small	85972	19488	100000	205460
	(41.84)	(9.49)	(48.67)	(100)
Medium	292752	26666	13000	332418
	(88.07)	(8.02)	(3.91)	(100)
Large	594384	75000	66400	735784
	(80.78)	(10.19)	(9.02)	(100)
All	118715	22140	93437	234292
	(50.67)	(9.45)	(39.88)	(100)

Figure within parentheses indicate percentages

Average annual expenditure of the respondents

Average annual expenditure includes farm expenses, expenditure on food item and expenditure on non-food item. Farm expenses were 55510, 166966 and 201245 for small, medium and large farms respectively. It also indicates that the average overall expense of all farms was Tk 102359. Farm and food expenditure accounted for 66.46% and 22.94% respectively while that of non-food items shared only 10.6% (Table 6).

Table 6. Average annual expenditure of the respondents

Farm category	Average annual expenditure (Tk)			
	Farm expenses	Food expenditure	Non-food expenditure	Total
Small	55510 (61.98)	23291 (26.00)	10766 (12.02)	895670 (100)
Medium	166966 (81.20)	25333 (12.32)	13333 (6.48)	205632 (100)
Large	201245 (85.55)	25000 (10.63)	9000 (3.83)	235245 (100)
All	68027 (66.46)	23482 (22.94)	10850 (10.60)	1023590 (100)

Figure within parentheses indicate percentages

Average annual savings of the respondents

The study showed that on an average annual savings of the potato growers was found to be Tk 1,31,933 (Table 7). The study also revealed that annual savings increased with the increase in farm size.

Table 7. Average annual savings of the respondents

Farm category	Average annual savings (Tk)		
	Average annual income	Average annual expenditure	Average annual savings
Small	205460	89567	115893
Medium	332418	205632	126786
Large	735784	235245	500539
All	234292	102359	131933

Profitability of potato cultivation

The study showed that when all fixed and variable costs were taken into account on an average hectare^{-1} cost of production of potato amounted to be Tk 1,94,114 among which total variable cost shared 96.78% and the rest of 3.22% was contributed by the total fixed cost (Table 8). The hectare^{-1} cost of production was the highest (Tk 2, 00,373) for small farms while it was the lowest (Tk 1,74,676) at large farms. The study exhibits that human labor stood the highest cost item constituting 31.77% of total cost followed by seed, insecticides, fertilizer and irrigation having respective shares of 31.77%, 28.82%, 8.82% and 7.96%, respectively.

The average yield of potato was found to be 17,194 kg ha^{-1}. The highest yield (18191 kg ha^{-1}) was obtained by large farms and it was the lowest (16,804 kg ha^{-1}) for small farms. Total return is the value of potato in money terms. This was calculated by multiplying hectare^{-1} total quantity of products by their respective market prices. The average net return hectare^{-1} of potato was found to be Tk 81,336. The net return hectare^{-1} was the highest for large farms (Tk 1,17,980) while it was the lowest (Tk 68,832) for small farms due to higher yield obtained by the large farmers. The average undiscounted benefit cost ratio (BCR) of potato was 1.42 which indicated using Tk 1 as investment, farmers can earn Tk 1.42 (Table 9). So it can be said that profitability of potato cultivation was satisfactory in the study area.

Table 8. Per hectare cost of production of potato according to farm category

Heads	Small		Medium		Large		All	
	Tk	%	Tk	%	Tk	%	Tk	%
Variable cost								
Human labor	65996	32.94	62192	32.56	46529	26.64	61677	31.77
Power tiller	5852	2.92	5929	3.10	5932	3.40	5879	3.03
Seed	55808	27.85	56202	29.43	56231	32.19	55951	28.82
Fertilizer	15417	7.69	15527	8.13	15535	8.89	15451	7.96
Cow dung	14522	7.25	14823	7.76	14830	8.49	14708	7.58
Insecticides	17069	8.52	17194	9.00	17203	9.85	17114	8.82
Irrigation charge	14719	7.34	14823	7.76	14830	8.49	14756	7.60
Loam obtaining cost	3033	1.53	1230	0.64	763	0.44	2327	1.20
A. Total variable **cost (TVC**)	192414	96.03	187921	98.39	171853	98.38	187869	96.78
Fixed cost (FC)								
Land use	4834	2.41	-	-	-	-	3183	1.64
Interest on operating capital	3125	1.56	3080	1.61	2823	1.61	3061	1.58
B. Total fixed cost	**7959**	**3.97**	**3080**	**1.61**	**2823**	**1.61**	**6244**	**3.22**
Total cost (TC) (A+B)	**200373**	**100**	**191001**	**100**	**174676**	**100**	**194114**	**100**

Table 9. Per hectare profitability of potato production according to farm category

Heads	Farm category			
	Small	Medium	Large	All
Yield (kg ha^{-1})	16804	17543	18291	17194
Price (Tk kg^{-1})	16.00	16.00	16.00	16.00
Gross return (GR) (Tk ha^{-1})	269201	280683	292656	275450
Total variable cost (TVC) (Tk ha^{-1})	192414	187921	171853	187869
Total fixed cost (TFC) (Tk ha^{-1})	7959	3080	2823	6244
TC= TVC + TFC	200373	191001	174676	194114
Gross margin(GM) (Tk ha^{-1})	74787	92762	120853	87581
Net return (Tk ha^{-1})	68832	89682	117980	81336
BCR (undiscounted)	1.34	1.47	1.68	1.42

Constraints accompanying with potato cultivation

The potato cultivators were interviewed to express about problems they were encountering for their enterprise. Responses thus collected are summarized in Table 10. It was detected that almost all the respondents encountered almost same nature of problems but in varied degree. It was observed that non-availability of quality seed and high price was the most important obstructing problems of potato cultivation as it was mentioned by 80% of the potato growers following the constraints shortage of human labor, high prices of fertilizer and insecticides, lack of storage facilities and low market price (52%, 50%, 42%, 30%, respectively).

Table 10. Constraints faced by the potato growers

Sl. no.	Constraints	Respondent facing the constraint		
		No.	%	Ranking
1	Non-availability of quality seed and high price	40	80	1
2	High prices of fertilizer and insecticides	25	50	3
3	Shortage of human labor	26	52	2
4	Lack of irrigation facilities	12	24	6
5	Low market price	15	30	5
6	Lack of storage facilities	21	42	4
7	Seasonal wastage	10	20	7
8	Lack of adequate transportation facilities	12	24	6
9	Loss of production due to theft	8	16	8
10	Crop damage by wild and domestic animals	5	10	9

Respondents were requested to express what they thought about the solutions of the problems faced by them. They suggested that required amount of quality seeds should be available to the potato growers in time at reasonable price. Other inputs like fertilizer, insecticides, irrigation water etc. should also be made available to the farmers. Attention needs to be paid for increasing marketing facilities so that the farmers could get fair price for their products. Storage facility needs to be confirmed so that farmers can store potatoes before time of selling.

Conclusion

The study mainly investigates the profitability and the constraints for potato production. The mean family size of the potato growers is the higher than the national average of Bangladesh and most of the farmers have secondary education. Agriculture is the main occupation for majority of the potato farmers and their earnings come from potato production. The farmers mostly expense for food items and their annual savings increase with the increase in farm size. The hectare^{-1} cost of potato production is the highest for small farms while it was the lowest for large farmers. The highest cost item was the human labor with compare to other items. The large farms receive the highest amount of yield but it was the lowest for small farms. Potato cultivation is financially profitable among the farmers in the study area. Most of potato growers face same category problems but in different ways. Non-availability of quality seed and high price is the major constraint of potato cultivations for the farmers. The quality seeds as well as other inputs need to be available to the potato growers in time at reasonable price.

References

Ahmed J U. 2001. A comparative economic study of potato and cauliflower production in a selected area of Comilla District. Unpublished MS Thesis, Submitted to the Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

Awal M A. 2013. An Economic Analysis of potato and Carrot Production in selected Areas of Mymensingh District. Unpublished MS Thesis, Submitted to the Department of Agricultural Economics (Production Economics), Bangladesh Agricultural University, Mymensingh.

Azimuddin M Alam Q M and Baset M A. 2009. Potato for Food Security in Bangladesh. Int. J. Sustain. Crop Prod. 4(1):94-99.

BBS 2016. Yearbook of Agricultural Statistics of Bangladesh, Bangladesh Bureau of Statistics, Statistics Division, Ministry of Planning, Government of peoples Republic of Bangladesh.

Hossain M and Bose M L. 2000. Growth and Structural Changes in Bangladesh Agriculture; Implication of Strategies and Policies for Sustainable Develompent in M. A. S. Mandal ed. Changing Rural Economy of Bangladesh, Bangladesh Economic Association, Dhaka, 1-20.

Majid M A. 2004. An Economic Analysis of the Availability and Utilization of Potato Credit in Some Selected Areas of Bogra District. Unpublished MS Thesis, Submitted to the Department of Agricultural Finance, Bangladesh Agricultural University, Mymensingh.

Sarkar M M A and Yesmin F. 2014. Profitability of potato cultivation in some selected areas of Rangpur district in Bangladesh. Int. J. Sustain. Crop Prod. 9 (1):11-15.