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Profitability of banana cultivation under agricultural credit in Narsingdi district of Bangladesh

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ABSTRACT

Agricultural credit can play important role by providing the needed liquidity to farmers who do not have sufficient investable funds to exploit the opportunity. The present study analyses the adequacy, utilization patterns and repayment status of credit, the profitability and show the relationship between profitability and loan size of Banana cultivation in sadar upazila of Narsingdi district of Bangladesh. Primary data were collected from randomly selected 60 borrowers of the different NGOs who cultivate Banana in the study area. Data were collected through direct interviewing using pre-tested semi-structure interview schedule. Both tabular and econometric techniques were used to analyze the data. Average amount of loan received were Tk. 13750, 23100, 35100 for the small, medium, and large categories of borrowers, respectively. The overall average amount of loan received was 85.4% of applied amount. Most of the credit amount was utilized for farming purposes. Status shows that repayment rate was highly satisfactory. Multiple regression models indicate that amount of loan received and level of education of the respondents were significant factors affecting loan repayment. It was estimated that overall average annual total cost of production of Banana per hectare was about Tk. 557710 while gross return and net returns were about Tk. 931024 and Tk. 373313, respectively. The overall benefit-cost ratio of Banana cultivation was 1.67. The relationship between loan size and profitability of Banana cultivation indicated that medium size loan receiver farmers were more profitable compare to the small and large amount of loan receiver farmers. The findings of the study indicated that reasonable amount of credit ensures farmers to profitable farming activities. The findings of this study will be helpful for financial institutions officials and policy makers to formulate the loan disbursement policies related to agricultural credit in Bangladesh.

Keywords: Profitability, banana farming, agricultural credit, Bangladesh

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1 Introduction

Banana is the fourth most important staple crop in the world, and is critical for food security in many tropical countries (Smale et al., 2005). It is one of the economically important food crops grown in Bangladesh both in homestead and commercial farms (Ahmed, 1984). Banana has been associated with man for cen-

turies and many people consider the banana to be one of the man's finest fruit. Banana is delicious fruit crop grows widely all over Bangladesh and most important fruit in the country from the stand point of food value and availability, throughout the year (USAID, 1969). Major districts that cultivate Banana are Narsingdi, Gazipur, Rangpur, Bogra, Nator, Pabna, Noakhali, Faridpur, Khulna in Bangladesh. There are a number of banana cultivars in Bangladesh. Among them, BARI Kola-1, Amritsagar, Sabri, Champa and Kabri are the commercial cultivars. The other cultivars are Mehersagar, Dudsagar, Agniswar, Genasundari, Kanaibanshi, Basrai, Binisuta, etc. It is the second largest produced fruit after citrus with a global annual production of about 145.4 million metric tons, of which Asia contributes 69 million tons (FAO, 2011).

As people of Bangladesh largely depend on agriculture and about 65% of the total population in Bangladesh live in the rural areas (WB, 2017). There is a lack of food security for all of these people. In this regard, Banana can play an important role. The edible parts are nutritious, easily digestible, rich in carbohydrate and minerals and even rich in calorie value than potato. Banana is also a high source of Potassium and low in Salt. Banana low blood pressure and protect against heart attract and stroke. It also has several medicinal uses. Besides, banana can adapt in all farming system even a piece of homestead land of marginal farmers. Banana is also grown in the well-drained high land which is also suitable for growing other important cash crops. In addition, the financial return of the fruit crop is also high (Haque, 1983). There is a high demand for the banana in the domestic market and there is also an export possibility of banana in its bulks to the foreign. One can easily be self-employed and solvent by the cultivation of banana as it grows in large quantity round the year.

With a view to popularizing banana farming no commercial basis and to meet the increasing demand for nutrition, large number of farmers have already come forward to initial banana farming. Some farmers are using credit in their farming and some are not. Credit can play important role by providing the needed liquidity to farmers who do not have sufficient investable funds to exploit the opportunity. Adequate and timely provision of credit ensures farmers to invest more in the form of modern inputs and use inputs efficiently that can increase the production of their banana farming as well as contribute a great in the national nutritional requirements. So it is essential to perform comparative study and make an investigation in respect of performance of credit receiving and non-receiving banana farming. Till date, very little attempts have been made in this regard. So this study is designed to generate valuable information on the resource use efficiency, profitability, credit information of credit receiving banana farming in, comparison to non-receiving one and problems identification of banana farming thereof. Kamal et al. (2015) found out in his study that banana cultivation under the institutional loan was a profitable business. Kathirvel (2008) pointed out that credit inadequacy was the major problem (Rank 1) in the production of banana. High Fertilizer cost was the next important problem (Rank 2). The small size of farm holdings, the lack of technical guidance was the least important problems.

Moreover, it is expected that the study would help in determining more profitable practices of banana farming and thereby improve socio-economic conditions of farm households which in turn will contribute to achieve Sustainable Development Goal (SDG) in the country. Therefore, researcher focused on profitability of banana cultivation of the beneficiaries of rural areas in Bangladesh. This research was mainly aimed to assess the availability of credit, its utilization and repayment patterns, determine the profitability of banana cultivation and identify the relationship between loan size and profitability of the banana cultivation of the respondents.

2 Materials and Methods

Sadar upazila of Narsingdi district in Bangladesh was selected purposely as Narsingdi district has a great contribution in total banana production of Bangladesh. A total of 60 farmers who received loan from NGOs like ASA and BRAC were randomly selected for this study. Out of 60 respondents, 20 small, 20 medium and 20 large loanee farmers. The study was based on primary data collected through face to face interview by using semi-structured interview schedule. Data were collected during the months of January to March, 2017. Both tabular and econometric techniques were used to analyze the collected data. To assess the effects of key variables in repayment process, multiple linear regression model was specified as follows:

$$Y_i = aX_1^{\beta_1} X_2^{\beta_2} X_3^{\beta_3} X_4^{\beta_4} X_5^{\beta_5} X_6^{\beta_6} e^{u_i} \quad (1)$$

In linear form it can be written as,

$$\begin{aligned} Y_i = \ln a + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \\ \beta_3 \ln X_3 + \beta_4 \ln X_4 + \\ \beta_5 \ln X_5 + \beta_6 \ln X_6 + u_i \end{aligned} \quad (2)$$

where, Y_i = amount of repayment (Tk.), X_1 = received amount of loan (Tk.), X_2 = respondent's income (Tk.), X_3 = respondent's savings (Tk.), X_4 = respondent's return (Tk.), X_5 = respondent's age (years), X_6 = education of the respondent (years of schooling), $\beta_1 \sim \beta_6$ are co-efficients of the respective variables, u_i = error term, a = intercept/constant, and ln = natural logarithm

For profitability analysis, activity budgets (Dillon and Hardaker, 1993) of the banana cultivation were prepared using the following algebraic equation:

$$\pi = P_y Y - \sum_{i=1}^{n} (P_{x_i} Y) - \text{TFC} \quad (3)$$

where, π = net return (Tk./ha), P_y = per unit price of the product (Tk./kg), Y = quantity of the production per hectare (kg), P_{x_i} = per unit price of ith inputs (Tk.), X_i = quantity of the ith inputs per ha (kg), TFC = total fixed cost (Tk.), and $i = 1, 2, 3 \ldots .n$ (number of inputs).

Apart from the profitability analysis, undiscounted benefit-cost ratio (BCR) was calculated dividing per hectare gross return by gross cost

3 Results and Discussion

3.1 Credit adequacy

Capital is required for investment in various Income Generating Activities (IGAs). To meet the demand of individual and the family and also the surroundings capital is so much important. To fulfill the capital requirement, credit is helpful as it creates scope for further investment. The demand for credit of a person depends to a great extent on their economic condition as well as on type and scale of activities in which they are engaged. Adequacy generally means the sufficiency of the loan to meet the need of the borrowers. On the basis of the amount of loan taken by the respondents, they were classified into the following three categories: (1) Small amount Tk. (5000–15,000); (2) Medium amount Tk. (15,001–30,000); and (3) Large amount Tk. (>30,000). Adequacy of loan, number and percentage of distribution of households according to amount of loan received are shown in the Table 1. The table reveals that the average amount applied for a loan in the small, medium and large category were Tk. 15800, Tk. 27850 and Tk. 40600, respectively while the average amount of loan received were Tk. 13750, Tk. 23100 and Tk. 35100, respectively. The overall average amount of loan received in percentage was 85.4%. So, adequacy of credit for the borrowers was reasonable.

3.2 Utilization of credit by the respondents

Credit plays an imperative role in farm business as many people do not start a business without taking a loan. It helps people to be self-employed. Besides, it increases farm productivity and income if it is properly utilized. The pattern of credit utilization is very important in farming. Proper use of credit increases production and benefits of the borrowers. On the other hand, if it is used for unreported purposes it will result in loan default and weakens the financial viability of the concerned lending institution. Proper utilization of loan is a pre-requisite to attain the aims and targets of both loan receivers and lending institutions as well as for the economic development of the country at large. In this section, an investigation has been made to see the patterns of utilization of receivers' loan money. Here only last twelve months (January-December 2016) borrowing was taken into consideration as it was thought that the respondents perhaps, would not be able to remember the incidence beyond a period of one year. The average amount of credit spent on the three broad head namely, expenditure on farming, expenditure on family, expenditure on others. It is evident from Table 2 that utilization of credit money for expenditure on farming was higher than the expenditure on family or others categories. It is also apparent from the table that average amount of credit utilized for expenditure on farming was 80.86% as a whole. It was 86.11%, 75.25% and 80.33% for small, medium and large loanee farmers, respectively. The average amount of credit utilized for expenditure on family was 14.79% as a whole. It was 10.69%, 20%, and 13.62% for small, medium and large loanee farmers, respectively. The average amount of credit utilized for expenditure on family was 4.35% as a whole. It was 3.2%, 3.74% and 6.04% for small, medium and large farmers respectively. The important point is that (small) overall credit receiver or loanee utilized their 81% loan for banana cultivation. So, utilization patterns of credit by the banana farmers in the study area was good enough comparing other agricultural credit in Bangladesh.

3.3 Repayment of the loan by the respondents

Repayment capacity is one of the crucial aspects of credit analysis and proper utilization of credit is supposed to have a great influence on the repayment capacity of borrowers. A successful credit program always attributes by its satisfactory loan use and level of repayment. The repayment schedule is different in different NGOs. Most of the loan paid by installment basis like 46 installments in one year. Some also have the monthly basis installment. The interest rate also differs from each other. In the study area, most of the beneficiaries repaid their loan in monthly basis along with interest. The average repayment rate of small, medium and large loan size farmer was 94.71%, 98.88%, and 95.48%, respectively in the study area. The overall average repayment rate was 96.47% in the study area (Table 3). So, repayment of credit by the borrowers was satisfactory.

Table 1. Distribution of loan (in Taka) received by the NGOs credit receivers

Category	No. of loanee farmers	Av. amount applied for (Tk.)	Av. amount received (Tk.)	Amount received % of applied
Small amount (Tk. 5,000–15,000)	20	15800	13750	87%
Medium amount (Tk. 15,001–30,000)	20	27850	23100	83%
Large amount (>Tk. 30,000)	20	40600	35100	86.50%
All	60	28083	23983	85.40%

Table 2. Utilization of credit by the respondents in different purposes

Item of expenditure	Average amount of loan used (Tk.)			
	Tk. 5,000–15,000	Tk. 15,001–30,000	>Tk. 30,000	All
Expenditure on farming	86.11%	75.25%	80.33%	80.86%
Expenditure on family	10.69%	20%	13.62%	14.79%
Expenditure on others	3.20%	3.74%	6.04%	4.35%
Total	100%	100%	100%	100%

3.4 Factors contributing overall repayment by the banana loan borrowers

Results of multiple linear regression analysis furnished in Table 4 shows that only education of respondents and loan amount mount had positively significant coefficients. It means keeping other things constant, repayment would be enhanced by 0.190% and 0.943% if education of the respondents and loan amount would be increased by 1%, respectively. It has been seen that large amount of loan has a great impact on repayment otherwise they have to pay more interest. So, these farmers try to avoid large amount of repayment by repaying in time. The farmers who get higher return and saving, likely to be repaid their loan. Educated farmers are more conscious about their loan repayment and repay as soon as possible. The coefficient of multiple determinations (R^2) was 0.84 it indicates that about 84% of variations in loan repayment have been explained by explanatory variables included in the model. The value of adjusted R^2 was 0.83 indicates after taking into account the degree of freedom, about 83% of the variation in the dependent variable was explained by the explanatory variables. So fitness of the model was more or less satisfactory. Besides, F-value was 60.91 and it was significant at 1% level implying that all the explanatory variables included in the model are important for explaining the variation of the dependent variable in banana loan repayment. So, it can be said that education of the respondents and loan amount were the most important factors affecting timely repayment of banana credit extended by different NGOs in the study area.

3.5 Profitability of banana cultivation

In the study area farmers used both purchased and home supplied inputs for cultivating banana. Both inputs were valued at prevailing market price during the study period. Usually, old banana cultivators use those suckers which are grown in their field. New farmer has to buy sucker from other banana farmer. Table 5 exhibits that the gross margin of banana cultivation per ha was estimated at Tk. 470759, Tk. 471531 Tk. 461203 for small, medium and large loan size farmers, respectively. The overall gross margin of banana production per hectare was estimated at Tk. 467831 in the study area. Per hectare net returns from banana production was calculated by deducting total costs from gross return. The average per hectare net return was estimated at Tk. 373258, Tk. 377904 Tk. 366778, respectively for small, medium and large

Table 3. Repayment of loan according to loan size

Loan size	Average amount repaid (Tk.)			Average amount due (Tk.)			Repayment (%)
	Principal	Interest	Total	Principal	Interest	Total	
Small	13050	1834.5	14884.5	700	78	788	94.71
Medium	22850	2992.5	25842.5	250	37.5	287.5	98.88
Large	33550	4033.5	37583.5	1550	148.5	1698.5	95.48
Total	23150	2953.5	26103.5	833.33	88	921.33	96.47

Table 4. Estimated values and related statistics for overall repayment

Explanatory variables	Estimated values of coefficient	Standard error	*t*-value	*p*-value
Constant (α_0)	0.063	0.742	0.085	0.933
Age of respondent (X_1)	0.157	0.254	1.025	0.31
Family Size of respondent (X_2)	-0.123	0.14	-0.875	0.042
Education of respondent (X_3)	0.190*	0.091	2.078	0.678
Savings of respondent (X_4)	-0.017	-0.017	-0.417	0
Amount Receivable(X_5)	0.943**	0.055	17.236	0
R^2	0.849			
Adjusted R^2	0.835			
F-value	60.914**			

** and * deignate significant at 1% and 5% levels of confidence, respectively.

Table 5. Per hectare average costs and returns of banana cultivation

Particulars	Cost and Returns			
	Small†	Medium†	Large†	Overall
Gross return (GR) Tk.	931195.2	935205.2	926671	931023.7
Total variable cost (TVC) Tk.	460436.1	463674	465468.5	463192.9
Total fixed cost (TFC) Tk.	97500.75	93627.36	94424.56	94517.56
Total cost/Gross cost (TC) = (TVC + TFC) Tk.	557937	557301	559893	557710.46
Gross Margin (GM) = (GR–TVC) Tk.	470759	471531	461203	467831
Net Return (NR) = (GR–TC) Tk.	373258	377904	366778	373313
NR(%) of Total Cost	66.8997	67.8096	65.5086	66.93
BCR (GR/TC)	1.67	1.68	1.65	1.67

† Size of loanee farm

loan size farmers in the study area. The overall net return of banana cultivation per hectare was estimated at Tk. 373313 in the study area. An undiscounted benefit-cost ratio (BCR) is a relative measure, which is used to compare benefits per unit cost. Benefit cost ratio for banana cultivation was determined as the ratio of gross return to gross cost. Benefit-cost ratio (undiscounted) of banana farming was came out to be 1.67, 1.68, 1.65 respectively for small, medium and large loan size farmers in the study area. The overall benefit-cost ratio (undiscounted) of banana farming was came out to be 1.67, which specifies that a one taka investment result in a net benefit of Taka 0.67. So, we can say that, production of banana was profitable. The finding justifies that gross margin, net return and benefit cost ratio was highest for medium loan size farmers, suggesting that the medium loanee group was more profitable for banana farming in the study area.

4 Conclusions

Banana cultivation is a profitable agribusiness in Bangladesh. But it is a capital demanding farming (Samadder et al., 2017). The findings of the present study indicated that if the availability of adequate banana credit can be ensured, banana farming could be more sustainable and attractive commercial enterprise which can improve farmers' socioeconomic status as well as assist in alleviating rural poverty of Bangladesh. This study also indicated that the farmers who got medium loan amount were the most profitable than small and large loan size. May be the main reason behind for that was inadequate of loan for small loanee and excess amount of loan for large loanee which they need for banana cultivation. Borrowers were found to be conscious about purposive utilization of loan money. So, repayment of credit was found to be extremely satisfactory by the borrowers. Borrower loans were mostly given in accordance with their demand. As banana is a capital demanding crop, credit shall be disbursed considering the comparative advantages of producing certain crops in certain regions (BB, 2014). Even Over time, the volume of credit provided through formal institutions and NGOs has increased manifold (Rahman et al., 2016) but it was not sufficient in the study area and. So, institutional credit facilities should, therefore, be made available for all Banana farmers on easy terms and conditions and adequate amount. The study suggests for further study of similar type in other parts of the country to represent the entire country because of the limitation of the present study.

Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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