



Cost and return analysis of banana cultivation under institutional loan in Bogra, Bangladesh

Md. Shah Kamal^{1*}, Md. Arshad Ali², Md. Ferdous Alam³

¹Department of Agricultural Finance, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

²Department of Entomology, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

³Department of Agricultural Finance, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

ABSTRACT

The present study was aimed at assessing the loan use, repayment and profitability of banana cultivation under bank loan. For this purpose, 60 loanee farmers were selected from four villages of Shibgong upazila in Bogra district. The empirical magnitudes of the variables were mean, percentage and ratio, cost and return of banana cultivation was made. Apart from this, some tabular analysis was also done to achieve the objectives of the study. The major findings of this study revealed that banana cultivation under the institutional loan was a profitable business. It was estimated that average annual total cost of production of banana was Tk. 34553.33, while gross return and net returns per farm were Tk. 127533.33 and Tk. 92980.00 respectively. The overall benefit cost ratio of banana farming came out to 3.69 indicating that one Taka investment resulted in a net benefit of Tk. 2.69. The findings also show that scientific uses of inputs have increased the production of bananas. The credit aspects of the study indicate that Rajshahi Krishi Unnayan Bank (RAKUB) has greater contribution as financing agency to banana production than other institutional sources of credit. But it is clear that the banana producers got credit as a part of operating capital which was not sufficient to them. Most of the credit amount (78.22%) was utilized for farming purposes. Rate of repayment was fully satisfactory (100%). RAKUB credit programme benefited the credit receivers in respect of increasing income, spending capacity decision making power and social status.

Key words: Credit, loan, banana cultivation, cost-benefit analysis, Bangladesh.

*Corresponding author. Tel.: +8801755593724

E-mail address: pannabogra@yahoo.com (MS Kamal)

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INTRODUCTION

Banana, one of the most important commercial and oldest fruits of the tropical area of the world, belongs to the family Musaceae. The actual place where it had originated cannot be precisely circumscribed but generally agreed that all the edible bananas and plantains are indigenous to the warm, moist region of tropical Asia, probably in the mountainous regions where Assam, Myanmar, Thailand and Indo-China meet (Singh 1990). Banana is also grown in many other countries of the world, namely, Bangladesh, the Caribbean Islands, Egypt, Israel, Ghana, Congo, Sri Lanka etc. the highest acreage of banana is in Africa, where greater importance is given to banana as starch food. It is a staple food of some people in Uganda (Hossain 2000). Now-a-days it is found in every tropical country among which Brazil, India,

Philippines, Ecuador, Thailand, Indonesia, Mexico, Honduras, Columbia and Panama are the major banana producing country.

Banana is the most important fruit in Bangladesh comprising 42% of the total fruit production in Bangladesh (BBS 2004). It occupies an important position among the fruits of the country not only for its wide cultivation all over Bangladesh but also from the standpoint of food value and availability throughout the year. Banana is grown in well drained high land which is also suitable for growing other important cash crops. There are some important varieties of commercial bananas, namely, Amristsagar, Mehersagar, Chinichampa, Dudhsarar, Sabri, Kathali, Singapuri, Gerasundari, Kabri, Basri and Green Bananas (used as vegetables) grown much in Bangladesh. Among these Amristsagar, Sabri and Chinichampa are the

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leading commercial varieties of banana in this country. Again, of these three varieties, Amritsagar occupies the top position in respect of area, production and trade. The optimum time of planting of this variety is September-October (Haque 1983). The low temperature prevailing during December to February retards its vegetative growth to a minimum. Usually bananas are harvested after 9-12 month of plantation. The space between the young plants especially during the first few months of crop growth, provides a scope for temporal and spatial complementarity by growing short duration, early maturing winter cash crops (Shil and Mondal 1990).

Although the area and production of banana in the country has slightly increased during the last decade, the one of the major constrain of increasing banana production as per demand and exporting is some extent is lack of financial resources by the rural poor (Aktar, 1997). It is possible to fill up this gap by expanding credit facilities to the farmers. Credit can provide them with much needed financial assistance and thereby, create new opportunities to invest in quick income earning activities and scope of self employment generation in the country especially in rural areas. Presently Bangladesh Krishi Bank (BKB), Rajshahi Krishi Unnayan Bank (RAKUB), Government commercial Banks (Sonali Bank, Janata Bank) and some NGOs such as BRAC, PROSHIKA, Grameen Bank, ASA, RDRS provide loan for banana cultivation. Banana is a highly productive crop than other crops. To enable farmers to continue banana cultivation, requirement of external fund is necessary, where farmers in the study area received from RAKUB.

Banana is of considerable significance in the economy of Bangladesh. But until recently little efforts have been made to study the economics of banana production, particularly with intercropping. A few systematic economic investigations on fruit crops were undertaken either by private or government, organizational and their data are insufficient to satisfy the demand of extension workers, policy makers, research personnel and the farmers. In this regards, cost of production and profitability study of banana would provide valuable information to the individual farmers for effective operation and management of their farms

through pinpointing the drawbacks. The research workers will also be benefited in doing further studies of similar nature. The study is expected to also assist planners in making effective and judicious plan in respect of production and consumption and in formulation of macro and micro policies for agricultural development.

METHODOLOGY

Study area and sampling

To achieve the objectives of the present study, a preliminary survey was conducted in two unions under Shibganj upazila of Bogra district. On the basis of preliminary information four villages namely Rahabal, Voria, Dauli and Goneshpur were selected for the study. The selection of the study area was based on the considerations a) the RAKUB branch of Dauli union provided credit to the farmer living in the selected villages. b) availability of a large number of banana loanee framers in the study area. The major occupation of the loanees is agriculture. An up to date list of banana growers receiving loans in 2005 was collected from the RAKUB branch office for the purpose of selecting the samples. There were altogether 200 loanees, out of it 60 loanees were selected randomly for the present study. The survey for this study was conducted in the year 2006. Repeated visits were made for collecting necessary information.

Preparation of survey schedule and pre-test

A draft survey schedule was prepared in the light of the objectives set for the study. The draft survey schedule was pre-tested in the study area by interviewing a few banana loanee farmers. The final survey schedule was developed after making necessary corrections, modification and improvements according to field experience. The final schedule contained the information on identification of the loanee, family characteristics, land holdings, occupation of the loanee, income and expenditure of the loanee families both from farm and non-farm sources accrued during the investigation and incurred in farm production, family expenditure and non-farm business expenditure if any respectively during the same period, amount for credit applied for and received

from bank during the study year, utilization of loan, repayment of loan amount by the farmers, nature of security offered for receiving loan. Formal rate of interest and other loan costs incurred obtaining credit from the bank some qualitative information were also sought.

Collection of data

Data were collected by the author himself through personal interviews with the 60 selected banana growers. A survey schedule was used for collecting information. Before going to make an actual interview, the academic purpose of the study was clearly explained to the sample farmers. Initially the farmers hesitated to answer the questions. But when they were assured that the study was purely an academic one and was not likely to have any adverse effect on them, they provided cooperation to the researcher. At the time of interview the researcher asked the questions systematically and explained wherever it was felt necessary. In order to make the information reliable and to minimize error, data were collected in local units. The local units were later converted into international standard units.

In the study area, farmers used both purchased and home supplied inputs for cultivating banana. Both inputs and outputs were valued at the farm gate price during the survey period. It was easier for a farmer to determine the cost of the purchased inputs such as: suckers/seeds, fertilizers, insecticides etc. but it was not so easy to determine the cost of home supplied inputs such as: family labour, animal labour etc., for which no payment was actually made. For solving this problem of such home supplied inputs the principle of opportunity cost was employed in this study. For the purpose of estimation, the cost items were discussed as cost of human labour, cost of animal and mechanical power, sucker/seeds, fertilizer, insecticides, irrigation, bamboo, land use cost and interest on operating capital. All the input costs mentioned here were taken into account in calculating the per acre cost of banana cultivation. In estimating total costs, both variable and fixed input costs were considered. Infact, all the above

mentioned costs are variable costs except land use cost and interest on operating capital.

Analysis of data

Data were analyzed with a view to achieving the objectives of the study. For this study, tabular analysis was applied to classify data in order to derive meaningful findings by using simple statistical measures like means, percentage and ratios.

RESULTS AND DISCUSSION

Receipt of banana cultivation credit

Table 1 presents information about the adequacy of banana cultivation credit by the respondents. The data reveals that the average amount of banana credit received by all households was Tk. 13364.33. Small, medium and large farmers received the average amount of Tk. 6890, 12036 and 21167 respectively. On the other hand the farmers applied for credit was Tk. 15321.67. Against this, average amount received was Tk. 13364.3 which constituted 87.22%. Surprisingly, it appeared that percentage of credit received against amount applied increased as farm size increased. The small farms, medium farms and large farms received 82.11, 85.56 and 89.85% respectively. This once again provides support that large farmers get more amount from the credit institutions.

Utilization pattern of credit

Purposes for which the sample loanees spent credit money during the year under investigation have been classified as a) Expenditure on farming purposes: Sucker/seeds cost, bamboo cost, human labour cost, animal and mechanical power cost, fertilizer cost, insecticides cost, irrigation charge, non-farm business expenditure, investment in petty business, repayment of old debt, b) Family expenditure: family consumption, purchase of clothes, educational expenses, children marriage, medical treatment.

Table 1
Receipt of credit for banana cultivation

Farm type	No. of loanee farmers	% of loanee	Average amount applied (Tk.)	Average amount received (Tk.)	Received amount % of Appling
Small	23	38.33	8391	6890	82.11
Medium	28	46.67	14018	12036	85.86
Large	9	15.00	23556	21167	89.85
All farms	60	100	15321.67	13364.33	87.22

Table 2
Utilization of banana credit according to farm size (amount in Tk.)

Farm type	Expenditure on farming	Non-farm business expenditure	Family consumption expenditure	Total
Small	4340.33 (62.99)	1265.28 (18.36)	1284.39 (18.65)	6890.00 (100)
Medium	9897.14 (82.22)	1523.39 (12.65)	615.47 (5.11)	12036.00 (100)
Large	17125.23 (80.90)	3250.39 (15.35)	719.38 (3.39)	21167.00 (100)
All farms	10454.23 (78.22)	2013.02 (15.06)	873.08 (6.53)	13364.33 (100)

Table 3
Percent utilization of credit as reported by farm owners

Head of expenditure	Percent amount of credit use							
	Small		Medium		Large		All Farm	
	Tk.	%	Tk.	%	Tk.	%	Tk.	%
Sucker/seeds cost	510.00	7.40	1200.00	9.97	2325.00	10.98	1345.00	10.06
Bamboo cost	320.00	4.64	750.00	6.23	1450.00	6.85	840.00	6.28
Human labour cost	660.00	9.58	1500.00	12.46	2940.00	13.89	1700.00	12.72
Animal and mechanical power cost	300.00	4.35	850.00	7.06	1000.00	4.72	716.67	5.56
Fertilizer cost	1929.00	28.00	4550.14	37.80	7859.99	37.13	4770.82	35.76
Insecticides	250.00	3.62	317.00	2.63	425.12	2.00	330.70	2.47
Irrigation charge	371.00	5.38	730.00	6.06	1125.12	5.31	742.04	5.55
Total expenditure on farming	4340.00	62.89	9897.14	82.22	17125.23	80.90	10454.23	78.22
Investment in petty business	765.28	11.10	875.23	7.27	1675.12	7.91	1105.21	8.27
Repayment of old debt	500.00	7.25	648.16	5.38	1575.27	7.44	907.81	6.79
Total non-farm business expenditure	1265.28	18.36	1523.39	12.66	3250.39	15.35	2013.02	15.06
Family consumption	434.45	6.30	260.66	2.16	332.69	1.57	342.60	2.56
Purchase of cloths	305.23	4.43	85.64	0.71	131.52	0.62	174.13	1.30
Educational expenses	105.41	1.53	115.71	0.96	75.35	0.36	98.82	0.74
Children marriage	163.59	2.37	43.25	0.36	63.29	0.30	90.04	0.67
Medical treatment	275.71	4.00	110.21	0.92	116.53	0.55	167.48	1.25
Total family expenditure	1248.39	18.64	615.47	5.11	719.38	3.39	873.08	6.53
Grand total	6890.00	100.00	12036.00	100.00	21167.00	100.00	13364.33	100.00

It is apparent from above table 2 that average amount of credit utilized for expenditure on farming was Tk. 10454.23 as a whole. It was Tk. 2013.02 and 873.08 for non-farm business and family consumption expenses. Expenditure on farming showed a positive relationship. The small, medium and large farms spent respectively 62.99, 82.22 and 80.90 % on farming expenditure. The similar trend was observed for the non-farm business expenditure. But for family consumption expenditure, the relationship is however, opposite i.e. proportion of consumptions expenditure for family declined as the farm size increased. This analysis shows that a considerable (21%) proportion of the banana loan is diverted otherwise. Credit received from RAKUB was not utilized only for banana cultivation but also used for meeting up family needs and non-farm business expenses.

Percent use of credit for specific purposes

The utilization of credit by the respondents for different purposes was observed in this study (Table 3). It was observed that expenditure on banana farming was the highest for medium farmers (82.22%) followed by the large farmers (80.90%) and small farmers (62.89%). The overall expenditure on banana farming accounts for 78.22 % of the production expenditure. Cost of fertilizer, human labour and banana sucker were the most important heads for which credit was used. Fertilizer alone accounts for about 30% of total credit. Family expenditure constituted 6.53 % of total credit used for various household purposes. Main item of family expenditure was family consumption, which alone accounted for 2.56 % of total credit. This type of cost is quite unproductive because it has negative relationship with production purposes. Non-farm business expenses included investment in petty business and repayment of debt. The table reveals that 15.06 % of total credit money was invested in non-farm business activities in which 8.27% was for investment in petty business and 6.79% was for repayment of old debt.

Repayment of credit by the respondents

In table 4 it was observed that the average amounts repaid were Tk. 7441.20, 12998.88 and 22860.36

for the small, medium and large farms respectively. The overall average amount repaid was Tk. 14433.47. The respective average principal amounts repaid were Tk. 6890, 12036 and 21167. Percentage of loan repayment of banana farmers was 100 for all the three categories of farms.

Cost and return analysis of banana cultivation

Cost of human labour

In the study area, the wage rate for different farm operations like land preparation, weeding, pesticide application, irrigation, fertilizer application, harvesting, carrying etc varied from Tk. 50 to Tk. 70 per man -day with an average wage rate of Tk. 60 per man-day during the study period. The total average costs of labour were Tk. 4380.00, Tk. 4740.00 and Tk. 4540.00 representing 13.48%, 13.14%, 12.83% and 13.14 % of the total cost of the small, medium, large and all farms respectively. (Table 5)

Cost of animal and mechanical power use

Most of the animal labour came from the farm and only a few farmers used hired animal labour. The measuring unit of animal labour was called a pair-day. The average rate of draught animal power (DAP) was calculated at Tk 100 per pair-day. On the other hand, power tiller is a time and labour saving modern tillage technology. In the study area the total average cost of animal and mechanical power use per acre were Tk. 1350, Tk. 1500, Tk. 1750 and Tk. 1533.33 representing 4.16, 4.38, 4.74 and 4.44 % of the total cost for small, medium, large and all farms respectively. (Table 5)

Cost of sucker/seeds

There are many varieties of banana, but only one variety which is called "Mehersagar" was cultivated by the selected banana growers in the study area. They used both home supplied as well as purchased sucker. For the purchased sucker, actual prices paid by the farmers were taken into account and home supplied suckers were costed by using opportunity cost principle. The farmers had to pay cash for suckers at the rate of Tk. 3.00 per

piece as prevailed in the study area. The total average cost of sucker per acre were V 3550, Tk. 3600, Tk. 4400 and Tk. 3850 representing 10.93, 10.51, 11.91 and 11.14 % of the total cost for small, medium, large and all farms respectively. (Table 5)

Cost of fertilizer

In the study area, farmers used three types of fertilizer namely urea, triple super phosphate (TSP) and muriate of potash (MP) and cow dung (CD) for banana cultivation. Fertilizer costs were determined by the actual market prices paid by the farmers. The averages per Kg prices of those fertilizers were Tk. 6.00 for urea Tk. 21.00 for TSP, Tk. 15.00 for MP and Tk. 0.50 for CD. The total average cost of fertilizer per acre were Tk. 12850, Tk. 13650, Tk. 14250 and Tk. 13583.33 representing 39.56, 39.86, 38.88 and 39.31 % of the total cost for small, medium, large and all farms respectively. (Table 5)

Cost of insecticides

Most of the farmers used insecticides in cultivating banana. They used different kinds of insecticides (Bavistin, DD powder, Thiovit etc). The price of the insecticides largely varied from brand to brand. The actual cost of insecticides was used. The total average costs of insecticides per acre were Tk. 525.00, 600.00, 820.00 and 648.33 representing 1.61, 1.75, 2.22 and 1.88 % of the total cost for small, medium, large and all farms respectively. (Table 5)

Cost of irrigation

In the study area, banana growers used irrigation water. It may be noted here that the selected farmers had to buy water from the owners of shallow Tubewells (STWs) and fewer of them had their own STWs. The average costs of irrigation per acre were Tk. 1850.00, 2250.00, 2525.00 and 2208.33 representing 5.69, 6.57, 6.83 and 6.39 % of the total cost for small, medium, large and all farms respectively. (Table 5)

Cost for bamboo

The growers of all banana cropping patterns usually made three pieces of a full bamboo and each one pieces was used for one banana plant. The average costs of bamboo per acre were Tk. 900.00, 1000.00, 1200.00 and 1033.33 representing 2.77, 2.92, 3.25 and 2.99 % of the total cost for small, medium, large and all farms respectively (Table 5).

Interest on operating capital (OC)

Interest on OC was estimated actually on an average operating cost over the production period because of not all costs were incurred at the beginning of the crop season; rather they were spread over the whole production period. The interest on OC was, therefore, computed using the following formula (Miah, 1987). Interest on OC = $AIit$, Where: $AI = (\text{Total investment})/2$ or average investment; $i =$ Interest rate which was 8 % per annum; $t =$ Length of crop period in months.

Interest on OC was estimated at the prevailing bank interest rate of 8 % annum. It was assumed that if the farmers borrowed money from a bank, they had to pay interest at the same rate. The interest on OC was estimated at TK. 1016.00, 1084.00, 1187.00 and 1095.67 for small, medium, large and all farms respectively. (Table 5)

Land use cost

Depending on location, soil type, soil quality and topography per hectare cost of land use varied in the study area. For this study, the cost of land use was estimated taking into account the valuation of land at its cash rental rate. The average per acre cash rental value of cropland for the cropping period covering a year was estimated at Tk 6061.00 for the growers of banana cultivation. (Table 5)

Total cost

The total costs were worked out for small, medium, large and all farms in table 5. The total average costs of banana cultivation were estimated at TK. 32482.00 for small farm and TK. 34553.33 for all farms. (Table 5)

Table 4
Repayment status of the respondents

Farm type	Average amount to be repaid (Tk.)			Average amount of repaid (Tk.)			Total repayment (%)
	Principal	Interest	Total	Principal	Interest	Total	
Small	6890.00	551.20	7441.20	6890.00	551.20	7441.20	100
Medium	12036.00	962.88	12998.88	12036.00	962.88	12998.88	100
Large	21167.00	1693.32	22860.36	21167.00	1693.32	22860.36	100
All farm	13364.33	1069.15	14433.47	13364.33	1069.15	14433.47	100

Table 5
Item wise cost of banana production (per acre) by farm category

Particulars	Small		Medium		Large		All Farm	
	Tk.	%	Tk.	%	Tk.	%	Tk.	%
A. Variable cost								
Human labour cost	4380.00	13.48	4500.00	13.14	4740.00	12.83	4540.00	13.14
Animal and mechanical power cost	1350.00	4.16	1500.00	4.38	1750.00	4.74	1533.33	4.44
Sucker/seeds cost	3550.00	10.93	3600.00	10.51	4400.00	11.91	3850.00	11.14
Fertilizer cost	12800.00	39.56	13650.00	39.36	14250.00	38.58	13583.33	39.31
Insecticides	525.00	1.61	600.00	1.75	820.00	2.22	648.33	1.88
Irrigation charge	1850.00	5.69	2250.00	6.57	2525.00	6.83	2208.33	6.39
Bamboo cost	900.00	2.77	1000.00	2.92	1200.00	3.25	1033.33	2.99
Total variable cost	25405.00	78.21	27100.00	79.13	29685.00	80.37	27396.67	79.29
B. Fixed cost								
Land use cost	6061.00	18.66	6061.00	18.66	6061.00	18.66	6061.00	18.66
Interest on OC	1016.00	3.12	1084.00	3.16	1187.00	3.21	1095.67	3.17
Total Fixed cost	7077.00	21.78	7145.00	20.82	7248.00	21.87	7156.67	21.83
Total cost (A+B)	32482.00	100.00	34245.00	100.00	36933.00	100.00	34553.33	100.00

Table 6
Gross return of banana cultivation

Particulars	Small		Medium		Large		All Farm	
	Tk.	%	Tk.	%	Tk.	%	Tk.	%
Banana (Bunches)	114000.00	95.96	120000.00	95.54	132000.00	95.51	122000.00	95.66
Sucker	4800.00	4.04	5600.00	4.46	6200.00	4.49	5533.33	4.34
Total	118800.00	100.00	125600.00	100.00	138200.00	100.00	127533.33	100.00

Table 7
Net return from banana cultivation

Particulars	Farm categories			
	Small	Medium	Large	All
Gross return (Tk.)	118800.00	125600.00	138200.00	127533.33
Total cost (Tk.)	32482.00	34245.00	36933.00	34553.33
Net return (Tk.)	86318.00	91355.00	101267.00	92980.00
BCR (undiscounted)	3.66	3.67	3.74	3.69

Gross return of banana cultivation

Gross return was estimated by multiplying the per acre total quantity of product by their respective prevailing market prices. The average market price of banana was TK. 100.00 per bunch and suckers was TK. 3.00 per piece. The total average returns from selling of bunches were estimated at TK. 114000.00, 120000.00, 132000.00 and 122000.00 representing 95.96, 95.54, 95.51 and 95.66 % of the total return for the small, medium, large and all farms respectively. On the other hand, respective returns from selling of suckers were Tk. 4800.00, 5600.00, 6200.00 and 5533.33 which constituting 4.04, 4.46, 4.49 and 4.34 for small, medium, large and all farms respectively (Table 6).

Net return

Net return was calculated by deducting total costs from gross return. Table 7 showed that net returns for farm small, medium, large and all banana farms were Tk. 86318.00, 91355.00, 101267.00 and 92380.00 respectively. The net return is the highest for large farm which is followed by small and medium farms

Benefit cost ration (BCR)

An undiscounted benefit-cost ratio (BCR) is a relative measure, which is used to compare benefits per unit of cost. The BCRs of three types of banana farms were greater than one indicating that banana farming was profitable for all the three categories of farm. It was also evident from table 7 that large farms were earning more profit per taka invested in banana farming than small and medium farms. The overall benefit-cost ratio of banana farming came out to be 3.69 indicating that a one taka investment resulted in a net benefit of Tk. 2.69.

The overall average per acre variable cost of banana production stood at Tk. 27396.67. Variable cost accounts for 79.29 % of the total cost while per acre fixed cost accounts for 21.83 %. Fertilizer cost was the most important component for banana cultivation constituting 39.31 % of total cost. It constituted 39.56 % for small farms, 39.36 % for medium farms and 38.55 % for the large farms. Labour cost was the second largest cost

component in banana cultivation accounting for 13.14 % of the total cost of banana production. Average per acre gross return from selling bunches stood at Tk.114000.00, 120000.00, 132000.00 and 122000.00 for the small, medium, large and all farms respectively. Net return about total cost per farm per cycle were Tk. 86318.00, 91355.00, 101267.00 and 92980.00 for small, medium, large and all farms respectively. The benefit cost ratios (BCR) above the total cost were 3.66, 3.67, 3.74 and 3.69 for small, medium, large and all farms respectively. Average amount of banana credit was Tk. 13364 per farm. The small, medium, large and all farm received respectively Tk. 6890, 12036 and 21167. Average amount of banana credit received displayed a positive relationship with the farm sizes. Credit for banana farming was mainly used in banana cultivation. The percent of credit used in banana farming was 78.22. The remaining 21.78 % were used for non-farm business expenses and family needs. Rate of loan repayment was 100 %. However is a previous study by Kamal et al., (2014) it was observed that lack of sufficient credit supply, high interest rate, low price of output, high prices of inputs, lack of fertilizer, lack of storage facilities, problem of theft and inadequate extension services were the main problems in receiving and repaying the loan. If this problem could be solved farmers would be more interested to invest in banana farms by getting loan from RAKUB.

CONCLUSION

In respect of profitability, it can be easily concluded from the study that farms having more banana cultivation can earn relatively more profit. Credit for banana farming was mainly used in banana cultivation. Repayment of credit has been extremely satisfactory.

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