Research Article

Credit's use performance and its determinants on farm household: A case of Chitwan district of Nepal

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ABSTRACT

Credit has been considered to play a pivotal role in the agricultural development of Nepal. A large number of institutions are involved in the disbursement of credit to agriculture. In this backdrop, the present study has examined the performance of agricultural credit and has identified the determinants of increased use of credit at the farm household level in Nepal. The study was based on survey data consisting of 107 samples collected randomly from the Chitwan district. The study has revealed that the quantum of credit availed by the farming households is affected by several socio-demographic factors which include caste, economically active population, food sufficiency, and membership in an organization. The research revealed that if the household is Brahmin/ Chettri, the probability of borrowing loans decreased by 32% as compared to other castes. Similarly, if the household's economically active population increased by one unit, the probability of taking a loan increased by 16%. The results also show that, if household food sufficiency increased by one month the probability of taking loans decreased by 4 % but if the household head is a member of an organization, the probability of taking a loan increased by 28%. The congenial environment to increase the involvement of the household head to an organization like cooperative and farmers group, increasing the food self-sufficiency through productivity enhancement program, and creating awareness on credit utilization helps to increase credit use performance in Agriculture.

Keywords: Agricultural Credit, Commercial Bank, Probit

INTRODUCTION

Agricultural credit is a key driver for the commercialization of agriculture as it allows the farmers to start a new business, expansion of existing business, improve production efficiency, meet the capital need of farms (Jaen, 1964), adopt improved technologies (Schumpeter, 1911), and cope with shocks in the external economic environment (Musembi, 2019). It also helps

the farmers to acquire agricultural inputs like seed, fertilizer, cattle and, implements in time (Saboor et al., 2009) and attracts those who are inhibited due to a lack of funds to start agriculture business. It, therefore, enhances farm productivity and thus boosting income and bettering living standards (Jan & Khan, 2012) of the farmers. The lack of credit cause dependency on less efficient traditional methods of production, rely on monsoon due to no sufficient irrigation, face a shortage of fertilizers and improved seeds during the plantation time. This has led to the agricultural sector as a subsistence sector only. In countries like Nepal where the agriculture sector contributes to one third (33%) of the Gross Domestic Product and provides employment opportunities to three-fourth (67.8%) people (MoALD, 2017), financing in this sector cannot be ignored during the policy formulation process (Nepal Rastra Bank, 2014). Rimal (2014) pointed out that low credit availability was the main factor for lower labor productivity in this sector along with associated factor-like traditional methods of farming, poor irrigation facilities, and low use of modern farm technology.

In Nepal, the credit source is both formal and, informal. Formal sources include bank and financial institution whereas informal source includes friends, relatives and, local traders. In the rural area of Nepal, 80% of loan needs come from informal sources whereas only 20% form the formal sources (Besley, et al., 2001). In Nepal agricultural credit has grown at a sluggish rate of 47 fold as compared to a total credit of commercial bank 184 fold from FY 1982/83 to FY 2012/13 (Shrestha, 2014). Realizing the need to invest in the agriculture sector, the central bank of Nepal adopted the Priority Sector Lending Program (PSLP) in 2017. This program mandates formal institutions like banks and finance to allocate 10% of their loan portfolio to the agricultural sector at a subsidized interest rate of 5%. Credit is not easily accessible to the smallholder farmers due to several factors like lack of adequate business plans, complex loan acquisition process, collateral issues, and large eligibility criteria (Pradhan et al., 2019). Similarly, the terms and conditions for loan repayment stipulated by banks do not synchronize with the agricultural crop calendar and farm cash flows. Similarly, it's also influenced by the internal factors of farmers like types of agricultural commodities produced, purchases of operating inputs such as seeds and fertilizers, and fixed inputs such as machinery and equipment; the interest rate, and the repayment schedule (Gupta et al., 2016). As no more literature are available regarding the impact of agricultural credit flow on aggregate agricultural production in Nepal, the current study attempts to analyze the impact of agricultural credit flow of commercial banks on agricultural production in Nepal. The selection of variables has been made in previous studies in other countries. In this paper, we have determined which source is the most popular among the farmers of Nepal and explain why that particular source is a choice for farmers. The result of this study will explain the factors affecting the choice of credit and the most popular credit sources in Nepal which ultimately helps in policy recommendations.The government of Nepal has tried to mobilize the financial resources to the productive sectors like agriculture and the deprived sector like marginalized farmers. Therefore this study provides policymakers relevant information regarding issues, obstacle of credit flow, farmers choices on financial sources which will increase their allocative and technical efficiency.

METHODOLOGY

The survey was conducted in Chitwan District. This district is situated between 27°35′N 84°30′E which is 415 m above the sea level. It covers an area of 2,238.39 km^2. This district is the major hub for Mustard cultivation, floriculture, mushroom cultivation, beekeeping, poultry business and, maize production. Out of 978 households listed in the sampling frame, only 107 households were surveyed by simple random sampling techniques. Data was collected with the help of a structured questionnaire and analysis was done using descriptive statistics and probit regression model with the help of STATA. Frequencies, percentages (descriptive statistics), was used to explain the results.

Probit Model

The various regression tools and techniques were reviewed to analyze factors affecting borrowing decisions. For instance, dichotomous variable models such as Probit and Logit are commonly used, when the dependent variable is binary (Lion, 1994). Both logit and probit are equally useful in the binary response variable. However probit is easy to explain in terms of marginal effect also it contains the estimated probabilities to be between 0 and 1 and relaxes the constraint that the effect of the independent variable is constant across different predicted values of the dependent variables (Nagler, 2002). This is normally experienced with the Linear Probability Model. The advantage of the probit model is that it includes believable error term distribution as well as realistic probabilities (Nagler, 2002). Probit analysis is based on the cumulative normal probability distribution. The binary dependent variable, y, takes on the values of zero and one (Aldrich & Nelson, 1984). The probit analysis provides statistically significant findings of which demographics increase or decrease the probability of borrowing. In the binary probit model, the decision to loan borrow was taken as 1, while the decision to not borrow is taken as 0. In this study, we assumed that farmers are risk-neutral and that decision to borrow a loan and not to borrow is based on the comparison of their expected profit with and without borrowing. The probability pi of choosing any alternative over not choosing it can be expressed as in (Eq 1), where φ represents the cumulative distribution of a standard normal random variable (Eq 2):

$$P_i = \text{prob}[Y_i = 1 \mid X] = \int_{-\infty}^{x_i\beta} 2\pi^{-1/2} \exp\left(-\frac{t^2}{2}\right) dt \qquad \text{Eq. (1)}$$

$$= \varphi(x_{i'}' \beta)$$

The relationship between a specific variable and the outcome of the probability is interpreted using the marginal effect, which accounts for the partial change in the probability. The marginal effect associated with continuous explanatory variables Xk on the probability P(Yi = 1 |X), holding the other variables constant, can be derived as follows

$$\frac{\partial pi}{\partial x_{ik}} = \varphi(x_{i'}' \beta)\beta_k, \qquad \text{Eq. (2)}$$

where φ represents the probability density function of a standard normal variable

The marginal effect on dummy variables should be estimated differently from continuous variables. Discrete changes in the predicted probabilities constitute an alternative to the marginal effect when evaluating the influence of a dummy variable. Such an effect can be derived from the following

$$\Delta = \Phi(\overline{X}\beta, d = 1) - \Phi(\overline{X}\beta, d = 0) \qquad \text{Eq. (3)}$$

The marginal effects provide insights into how the explanatory variables shift the probability of the frequency of borrowing.

In this paper, we assume that the socioeconomic and demographic characteristics of the consumers affected the decision to borrow the loan. These characteristics are gender, age, caste, economically active population, household size, membership in an organization, food sufficiency, training, extension, and migration. Therefore, we handled the variables assumed statistically significant in the model. Table 1 shows the definition of variables and their mean values.

RESULTS AND DISCUSSION

Socio-economic profile of sample farmers
The survey results showed that the mean age of farmers was 52.56 years, suggesting that most farmers were in the active age group. The household size affects productivity as the possibility of more family labor availability for the timely operation of farm activities. The research area appears to be mildly populated since the average size of the family was 5.74 peoples per household.

Table 1: Socio-Economic Profiles

SN	Variable	Mean	Std. Dev.	Min	Max
1	Age (Year)	52.56	11.65	25	88
2	Gender (Male =1, Female =0)	0.79	0.41	0	1
3	Ethnicity (Brahmin/Chettri=1, Otherwise=0)	0.83	0.38	0	1
4	Education in Years	6.90	4.36	0	18
5	Household Size (Number)	5.74	2.37	1	16
6	Economically Active Population (Number)	4.10	1.52	1	13
7	Male Population (Number)	3.13	2.72	1	28
8	No of Employed in Household	0.93	0.93	0	5
9	Training	0.41	0.49	0	1
10	Migration status	0.37	0.49	0	1
11	Food Sufficiency in Month	8.40	4.53	0	12
12	Membership in an organization	0.67	0.47	0	1
13	Annual Saving	5796.26	12886.66	0	100000
14	Extension service	0.58	0.50	0	1
15	Land ownership in Kattha	13.93	14.66	0	100
16	Cultivated land in Kattha	11.68	13.07	0	95
17	Loan taking household (If yes =1 otherwise =0)	0.46	0.50	0	1
18	Annual Income from livestock	83446.26	183348.50	0	1200000

Source: Field Survey 2019

This family size is more as compared to the national average as indicated by the annual household survey 2015/16 Nepal. Nepalese farmers are mostly illiterate; education helps to build a good and confident relationship with development agents thus maximizing production.

The major caste in the survey location was brahmin/chhettri (83%), culturally household were male-headed (79%), and have some family members migrated (37%). The availability and accessibility of extension services and farmer's training help to speed up the technology adoption process. Out of 107 respondents, majority of households (58%) have access to extension services like expert advice, training and field days and 28% has got training related to commercial production, access to credit is important for smallholder since loan derived from credit institution would help smallholder to purchase inputs for farm production. Most rural smallholders were characterized by a lack of access to credit (54%).

Flow of credit and their share
Table 2 shows the flow of credit through different sources. Though the farmers prefer taking a loan from co-operatives as shown in Table 4, the loan borrowed by government bank is highest i.e. 47% followed by private bank i.e. 36.40%. Bank has adequate liquidity to borrow, they are trust worthiness, they have facilities to repay the installment according to their income and have a lower interest rate, has a lower cost of loans as compared to the cooperatives. Here a government bank refers to the agriculture development bank and, rastriya banijya bank which is located in that area followed by the private bank which is 36.40%. The cooperatives are the third-largest contributor to the credit flow i.e. 12.39%.

Table 2: Flow of Credit (n =49)

SN	Source of Loan	Total Loan Borrowed by Farmers, Rs.	Percentage share
1	Private Bank	27300000	36.40
2	Micro-Finance	1050000	1.40
3	Government Bank	35325000	47.11
4	Cooperative	9290000	12.39
5	Personal Lending/Farmers Group	2026000	2.70
	Grand Total	74991000	100

Source: Field survey 2019

Farmers choice on duration of loan
Based on the duration loans were divided into three categories as adopted by (Reddy et al., 2004). Short-term loan refers to the loan that has to be repaid within one year, medium-term loan has to be repaid 1 to 5 years, and long terms loans to be repaid in more than 5 years. According to the farmer's preference, most of the farmers prefers to borrow long term loan i.e. 42.86% followed by medium and short term loans.

Table 3: Category of the loan

SN	Terms of loan	Number	Percentage
1	Short-term (1 Year)	11	22.45
2	Medium-term (1-5 Year)	17	34.69
3	Long-term(More than 5 Year)	21	42.86
	Total	49	100

Source: Field Survey, 2019

Farmers choice of credit source

To analyze farmer's preference to credit source the index value was calculated, and on this basis, the ranking was done. The index value results show that farmers prioritize the cooperative as the first option followed by a government source, and private bank for lending the loan as shown in Table 4. The reason behind this is, in the co-operative loan is collateral-free, has an easy lending procedure, has facilities to renew loans, they are familiar with working staff, and are nearby their village. The co-operatives also provide loans in emergencies.

Table 4: Farmers Choice of credit source

SN	Source of Loan	1st	2nd	3rd	4th	Weight	Index	Rank
		1	0.75	0.5	0.25			
1	Cooperative	25	13	3	1	36.5	0.74	1
2	Government	10	23	9	5	33	0.67	2
3	Private Bank	7	8	16	16	25	0.51	3
4	Personal Lending	5	1	3	14	10.75	0.22	5
5	Micro Finance	2	4	18	13	17.25	0.35	4
	Total	49	49	49	49			

Source: Field Survey 2019

Credit use in a different sector

The results indicated that most of the loans were taken for consumption (34.69%) and unproductive purposes and very little of the loans were invested for productive purposes like Agriculture (14.29%), education (12.24%). 14.29% of households use this loan to go abroad for earning and 14.29 use for the capital purchase. The majority of the borrowers were non-elite group. They mostly use this credit for household consumption.

Table 5: Credit Use in a different sector

Credit Use	Household Number	Total Household Number	Percentage
Household Consumption	17	49	34.69
Education	6	49	12.24
Health	5	49	10.20
Agriculture	7	49	14.29
Capital Purchase	7	49	14.29
Out sanding loan	2	49	4.08
Abroad	7	49	14.29

Source: Field Survey, 2019

Factors affecting borrowing loan

Table 6 shows the factor that affects the borrowing decision of the farmers. Out of the nine factors ethnicity, economically active population, food sufficiency and, membership was found to affect the household decision to borrow the loan. The results show Brahmin/Chettri has less likely to borrow loans than other castes. Similarly, if households are food insecure and if they are members of an organization there is a higher probability of borrowing. Also, a higher number of economically active members increases the chance of borrowing. The research

revealed that if the household is Brahmin/ Chettri the probability of borrowing a loan decreased by 32% as compared to other castes. Among the non-elite group of Nepal, there is higher poverty, low income, lower access to the resources, subsistence in Nature, low remuneration due to caste-based occupation as compared to the elite. Due to this reason, the non-elite group has a higher chance of taking a loan (Subedi, 2016). Similarly, if the household economically active population increased by one unit probability of taking a loan increased by 16%. According to Shah et al. (2008), households with more adults are likely to participate more in formal credit as it increases their confidence to repay the credit. The results also show that if the household food sufficiency increased by one month the probability of taking a loan decreased by 4%. In a food-insecure household, there is high seasonal variation in the incomes, which could be mitigated through the credits. Similarly, if the household head is in members of an organization the probability of taking a loan increased by 28%. Membership in an organization leads to better access to credits.

Table 6: Factor affecting borrowing loan

Variable	Coef.	Std. Err.	Z	P>z	dy/dx
Ethnicity (Brahmin/Chettri =1, Otherwise = 0)	-0.85	0.13	-2.47	0.01	-0.32***
Economically active population number	0.41	0.06	2.85	0.00	0.16***
Employed population number	-0.26	0.07	-1.47	0.14	-0.11
Training (If yes =1, Otherwise =0)	0.09	0.13	0.28	0.78	0.04
Migration (If yes = 1, Otherwise =0)	0.20	0.13	0.62	0.54	0.08
Distance to Cooperative in Meter	0.00	0.00	0.03	0.98	0.00
Food Sufficiency in Month	-0.11	0.01	-3.17	0.00	-0.04***
Membership in an organization (If yes = 1, Otherwise =0)	0.74	0.12	2.33	0.02	0.28**
Extension Service availability (If Yes =1, Otherwise =0)	0.24	0.12	0.81	0.42	0.10

Number of obs   =   107 LR chi^2(9)   =   37.53   Prob > chi^2 =   0.0000

Log-likelihood = -55.022315   Pseudo R2   =   0.2543

Farmers preferences and perception on subsidized loan and subsidized inputs
The research revealed that among 107 households, 46.72% of the household prefer subsidized loans whereas 53.27% of farmers prefer subsidized inputs like feed, milking machines, vaccines, etc.

Table 7: Farmers preferences on subsidized loan vs subsidized inputs

SN	Description	Respondent (Percentage)
1	Soft loan at zero percent interest	50(46.72)
2	Subsidized inputs	57(53.27)
	Total	107(100)

Source: Field survey 2019

Perception on Subsidized loan
Farmers have both negative and positive perceptions of loan. Positive perception includes 1) they can rationally use it in needed area 2) subsidized loan replaces the loan borrowing at a higher interest rate 3) loan can be utilized to expand existing business i.e. they can purchase new cows, add more cattle shade. However negative perception includes: 1) loan is burden 2) loan need to be paid after some time 3) loan incur interest which has to paid even if the business incurs loss 4) loan always grows if taken once 5) loan needs to invest wisely 6) loan taking

process cumbersome. The loan, therefore, has fear of payment and it is a matter of social dignity.

Perception on Subsided inputs
Similar to a loan, n the case of subsidized inputs, farmers have also both positive negative impressions. Positive perception includes: 1) subsidized inputs are not needed to be payback 2) perception of freeness 3) subsidized input directly gives production or has a direct and immediate impact. Some negative perception includes: 1) subsidy is only for powerful person 2) to get a subsidy, needs better personal relationships 3) subsidized inputs are of inferior quality 4) subsidized inputs are based on the interest of donor rather than on the need of farmers.

Constraints in loan borrowings
Out of the 49 farmers' research revealed that 59% of farmers feel that the current prevailing rate of interest is high in their locality, 63% of farmers feel loan taking procedure is lengthy and only 30% of the farmers get a loan based on the skills. In the farming area, there is a limited loan redemption facility in case of severe farm loss due to natural calamities and insect pest attacks. 36% of the farmers reported that had to pay money to the loan lending officer to facilitate the loan. None of the farmers reported loan redemption in case of loss in their farms and 22% of the farmers get lending facilities through the nearby location as shown in the table below.

Table 8: Constraints in loan borrowing

SN	Response	Response if Yes 1 otherwise 0
1	Higher interest rate	29(59.18)
2	Lengthy paper process	31(63.27)
3	Availability of credit based on the skill	15(30.61)
4	Possibility of extension of loan repaying period in case of loss	10(20.41)
5	Pay the officer to get a loan	18(36.73)
6	Loan redemption if in the condition of the loss	0 (0)
7	Has lending facilities through nearby branches	11(22.45)
8	Aware of the subsidized loan	13(26.53)

*Source: Field survey, 2019   ** figure in parenthesis presents the percentage*

CONCLUSION

Lack of finance is one of the main constraints of Nepalese farmers due to which they have a lower capacity to invest in the agriculture sector. Co-operative is the best organization that creates financial linkage to its member; therefore, the government should financially strengthen them to facilitate the loan procedure to the farmers. Farmer involvement in an organization should be increased to increase its accessibility. Credit should be emphasized on the food insecure households in janjati and other caste and households that have higher active members. Credit use is more on the non-productive sector, so the government must regulate this by creating a credit awareness program and through conducive policies. Based on discussion with farmers following policy measure must be adopted by the government to increase the accessibility of farmers to the subsidized loan and normal loan. The Policy measure includes 1) easiness and short loan processing period 2) subsidized loan must be available to real farmers 3) lower interest rate like cooperative, farmers group 4) less paper process 5)

availability of credit based on skill for resource-poor farmers who do not have a property to keep the collateral 6) possibility of extension time to pay the loan if farmers bear loss 7) lending to farmers in the required amount in required time 8) minimized corruption during lending process 9) providing lending facilities with Branches nearby farmers cluster 10) loan redemption policy in risky conditions like bird flu and natural disaster. These policies will facilitate agribusiness and also motivate them 11) even though the government of Nepal has announced to subsidized loan actual farmers are not able to get due to lack of knowledge about it, so the government should facilitate to create awareness about its terms and conditions and carefully monitor the lending institutions whether they are lending to appropriate farmers or not.

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Authors' contributions

N. Upadhyay and S. Gairhe designed the research methodology, analyzed data, and wrote the paper in consultation with Drs Y.Ghimire., and K. Timsina. Y. Acharya and A. Acharya assisted in questionnaire design, conducting field survey, data collection, and data entry. N. Upadhyay revised the article after getting the reviewer's comments.

Conflict of Interest

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

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