

**Impact of Farm and Farmers Characteristics
On Repayment of Agriculture Credit**
(A case study of D.I.Khan, Khyber Pakhtoonkhawa)

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Abstract

This paper examines the impact of farm and farmers' characteristics on repayment of farm credit user for agricultural growth in D.I.Khan district during 2007-09. A total of 320 respondents were selected by using stratified random sampling technique. For analysis of data T -Test and ANOVA was used. The result was significant for impact of age, education, marital status, farm type, farm size, farm status and numbers of times credit obtained. But regression result showed significant influence of marital status, farm type and numbers of times credit attained on repayment of farm credit. Collectively all farm and farmers characteristics used in present study are significantly affecting repayment of credit.

Keywords; Farmers' characteristics, agricultural credit, Repayment of agriculture credit

Introduction

Agriculture's role in Pakistan's economy is undeniably like that of a backbone in a human body. According to GOP 2006, it is directly or indirectly connected with all segment of economic life of the country. Fact of the matter is that nearly 65.9 percent people of Pakistan lives in rural areas. Not only rural people are directly attached with agriculture for their earnings but also 44.8 of total country's employment are being produced by it. That is why imports, exports, industrials growth and ultimately GDP are totally dependent on the performance of agriculture. So if any thing happens to agriculture, it certainly disturbs the output of the country as a whole.

The farming business in Pakistan has been under going changes in replacing old traditional production methods and archaic farm implements with new farm technology. But for rapid changes and to enhance the level of adoption of new farm technological innovations for increasing agricultural production and hence GDP of the country, poor farmers of the country are

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required to be strengthened financially. This means increase of private investment in farming. Easy availability of credit is a greater determinant on this way.

The rural populace of Pakistan and especially living in the province of Khyber Pakhtoonkhawa are too poor to purchase modern agricultural tools. Poverty is the main obstacle in their way to work on their fields. They can neither buy water, nor certified seed, nor fertilizers and nor costly inputs to increase their productivity (Zubair, 2002). Credit is necessary to enable farmers take advantage of new farm technology and to pay for buying new farm machinery, fertilizer, labor cost and other necessary inputs not only for increase in agricultural production but also for production protections. (Ijere, 1978). However, rural farm production involves greater risk and uncertainty. There is risk of crop failure through out break of crop diseases, floods insect attacks etc. These risks inherent in farm production hinder prompt loan repayment. This in turn effect amount of credit given to farmers. Therefore this paper identifies factors that enable farmers to minimize risk, protect their crops, enhance their crops and be able for prompt repayment.

Literature Review

Various researchers have put forwarded the benefits, problems, access and role of credit for increased productivity. But prompt repayment of credit is necessary for good credit worthiness. The review revealed that there are many factors that influence repayment of credit. Oladeebo et al (2008) examined socio-economic factors such as amount of loan repaid, amount of loan collected and spent on agricultural production, annual net farm income, age, farm size cultivated, farming experience with credit use, and level of education influencing loan repayment among small-scale farmers in Ogbomoso agricultural zone of Oyo State of Nigeria. Among them amount of loan obtained by farmers, years of farming experience with credit use and level of education were the major factors that positively and significantly influenced loan repayment. However, age of farmers influenced loan repayment negatively but significantly. At the end it was concluded that for increase in agricultural production, further disbursement of loans should be targeted at young and better-educated farmers who are more likely to adopt new innovations in agricultural production than their older Counterparts. Data was collected from 100 farmers from 10 villages in 2 Local Government Areas from the zone through multistage random sampling techniques with the help of structured questionnaire and were analyzed using descriptive Statistics and Ordinary Least Square multiple regression analysis.

Kohansal et al (2009) studied the factors influencing on repayment performance of farmers in Khorasan-Razavi province of Iran during 2008. The logit model was used to explain the probability of loan on time repayment as a result of any of the identified independent variables. The signs of the coefficient of independent variables and significance of the variables were used determining largely the impact of each variable on probability of dependent variable. Results showed that farmer's experience, income, received loan size and collateral value have positive effect while loan interest rate, and total application costs and number of installment implies a negative effect on repayment performance of recipients. Comparison of the elasticity of significant variables indicated that loan interest rate is the most important factor in our model. Farming experience and total application costs are the next factors respectively.

Olagunju and Adeyemo (2007) studied factors that determine loan repayment decision among farmers in Southwestern Nigeria during 2005. Data from 180 respondents were collected through multistage sampling technique. Tobit regression results showed farming experience, farm location, cost of obtaining loan, visitation, borrowing frequency and education as important factors in determining loan repayment with coefficients of -0.0285 , -0.0661 , $-0.1196E$, 0.1048 , 0.0518 and 0.0112 respectively. Farm size and dependence showed no significant effect.

Koopahi and Bakhshi (2002) Identified defaulter farmers from non-defaulters of agricultural bank recipients in Iran by using a discriminate analysis. They found use of machinery, length of repayment period, bank supervision on the use of loan had significant and positive effect on the agricultural credit repayment performance. In the other hand incidence of natural disasters, higher level of education of the loan recipient and length of waiting time for loan reception had a significant and negative effect on dependent variable.

Chirwa (1997) specified a probit model to assess the determinants of the probability of credit repayment among smallholders in Malawi. The model allows for analysis of borrowers as being defaulters or non-defaulters. Various specifications of the X-vector were explored by step-wise elimination. However, only five factors (sales of crops, size of group, degree of diversification, income transfer and the quality of information) were consistently significant determinants of agricultural credit repayment. The explanatory power of the model is plausible with the log likelihood statistically significant at 1- percent. Four independent variables – gender, amount of loan, club experience and household size were not statistically significant in various specifications.

Eze and Ibekwe (2007) studied determinants of loan repayment under the Indigenous Financial System in Southeast, Nigeria During (2005). 180 respondents were selected randomly for primary data collection. Data were collected by means of questionnaire and observation. Descriptive statistics and multiple regression techniques were used for analysis. Age of beneficiaries, household size, year of formal education, and occupation were found significant under the system. Amount of loan borrowed and loan duration were found insignificant.

Adeyemo and Agbonlahor (2007) provides empirical analysis of microcredit repayment in Southwestern Nigeria. Multi-stage stratified random sampling procedure was used to collect data from 200 members of microfinance institutions (MFIs) in the study area. Linear multiple regression was used to determine the variables that affected microcredit repayment. The variables that significantly influence repayment: income, distance between dwelling place and bank, amount of business investment, socio-cultural expenses, amount of loan borrowed, access to business information, penalty for lateness to group meetings, membership of cooperative society, number of days between loan application and disbursement and poverty indicator were analyzed. Poverty was found to hamper repayment.

Methodological Framework

The population for this particular study comprises of farmers practicing agriculture in Dera Ismail Khan's district of Pakhtoonkhawa province (Pakistan). The population for this particular study is too large and it was not possible for researcher to contact each and every member of the population. To overcome this difficulty the study was delimited to certain boundaries, easily approachable to the researcher. Therefore the study was to be confined to a selected numbers of respondents from within the population based on time and cost constraints i.e.320. To give maximum chance of selection to each and every member of the population as respondent stratified sampling method was used. For the purpose of collecting data from the concerned quarters, the questionnaire was used as a tool. In this connection, a structured questionnaire was developed, containing appropriate number of questions. Along with most of the closed form of questions, few questions were of unscheduled form to allow the respondent to provide maximum information and not bound them to just researcher's maneuvered question -answers.

Primary data collected during the course of this study was subjected to statistical analysis by using SPSS (Statistical Package for Social Sciences) version 11. T test and ANOVA test was used to determine statistical significance among the categories.

Modeling Farms and Farmers Characteristics

The General Linear Model is commonly estimated using ordinary least square has become one of the most widely used analytic techniques in social sciences (Cleary And Angel 1984). Most of the statistics used in social sciences are based on linear models, which means trying to fit a straight line to data collected. Ordinary least square is used to predict a function that relates dependent variable (Y) to one or more independent variables ($x_1, x_2, x_3 \dots x_n$). It uses linear function that can be expressed as

$$Y = a + bX_i + e_i$$

Where

- a Constant
- b Slope of line
- X_i Independents variables
- e_i Error term

Hence by using ordinary least square technique, the regression model in present case can be expressed as:

$$\text{Repayment of credit (Y)} = a + bX_1 (\text{Occupation}) + X_2 (\text{Marital Status}) + X_3 (\text{Farm Type}) + X_4 (\text{Farm status}) + X_5 (\text{Age}) + X_6 (\text{Education}) + X_7 (\text{Farming Experience}) + X_8 (\text{Dependence}) + X_9 (\text{Farm size}) + X_{10} (\text{Nos of times credit attained}) + e_i (\text{Error term})$$

Discussions and Results

Table 2 reflects that mostly loan takers personally go for repayment to credit center and most practiced method of repayment is repayment in lump sum. Out of 320 sampled respondents 152 (47.5%) respondents told that they repay their loan in installments, while repayment in commodity is told only by 80 respondents, which is 25% of the sample size. Main reason behind this is that these farmers take loan from sugar mills only to cultivate sugar cane on the condition to provide their produce these sugar mills. However loan repayment is influenced by different socio economic factors which are discussed below.

Age: Table 1 reflects that keeping in view age factors 250 respondents told that they personally go to repay their loan. This response is of 96 middle age (31-45) years old farmers followed by 82 older farmers (46 and above years old). Age wise 152 farmers out of 320 farmers say that they repay in installments while 168 tell that they repay in lump sum. Whatever mode of repayment and method of repayment, there is no repayment problem keeping in view age factor. ANOVA result from table 4 shoe significant impact of age on repayment with p-value 0.026. The same results have been obtained by Oladeebe et al (2008), Kohansal et al (2008), and Ezw et al (2007). Negative sign with value of coefficient shows that further disbursement of loans should be

targeted at younger farmers, as they are more likely to adopt new innovations in agricultural production than their older Counterparts.

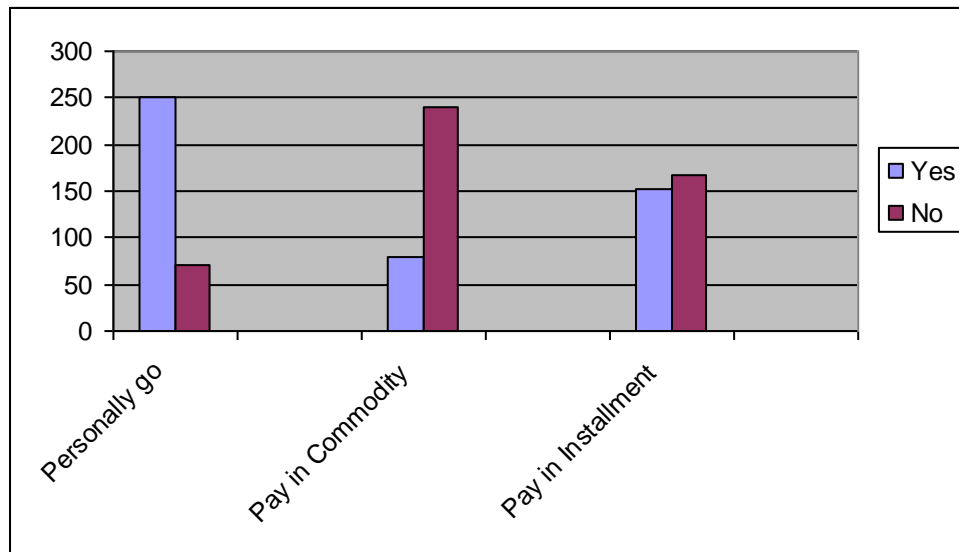
Table-1: Descriptive Statistics

Farm/Farmer Characteristics	Attributes	Method of Repayment								
		Personally go			Repay in commodity			Repay in installments		
		Yes	No	% of Yes	Yes	No	% of yes	Yes	No	% of yes
Age (in years)	15-30	72	22		30	64		36	58	
	31-45	96	28		30	94		66	58	
	46 Above	82	20		20	82		50	52	
	Total	250	70	78.13	80	240	25	152	168	47.5
Education	Up to primary	46	14		12	48		32	28	
	Up to secondary	98	28		28	98		62	64	
	Above Secondary	106	28		40	94		58	76	
	Total	250	70	78.13	80	240	25	152	168	47.5
Tenancy Status	Owner	228	50		58	220		136	142	
	Tenant	22	20		22	20		16	26	
	Total	250	70	78.13	80	240	25	152	168	47.5
Occupation	Farming	126	48		52	122		78	96	
	Farming+ others	124	22		28	118		74	72	
	Total	250	70	78.13	80	240	25	152	178	47.5
Farming Experience (in years)	1-10	52	16		20	48		36	32	
	11-20	92	18		24	86		38	72	
	Above 20 years	106	36		36	106		78	64	
	Total	250	70	78.13	80	240	25	152	168	47.5
Marital status	Married	194	64		72	186		128	130	
	Un-married	56	6		8	54		24	38	
	Total	250	70	78.13	80	240	25	152	168	47.5
Farm size (in canals)	1-400	158	44		44	158		98	104	
	401-800	42	10		14	38		20	32	
	801-Above	50	16		22	44		34	32	
	Total	250	70	78.13	80	240	25	152	168	47.5
Farm Type	Irrigated	206	56		60	202		122	140	
	Un-irrigated	44	14		20	38		30	28	
	Total	250	70	78.13	80	240	25	152	168	47.5
Farming status	Tractor Operated	228	50		56	222		134	144	
	Bullock operated	22	20		24	18		18	24	
	Total	250	70	78.13	80	240	25	152	168	47.5
Dependence	1-5	82	12		24	70		36	58	
	6-10	136	34		32	138		96	74	
	11-above	32	24		24	32		20	36	
	Total	250	70	78.13	80	240	25	152	168	47.5
Nos of times credit attained (In years)	1-2	60	22		14	68		34	48	
	3-5	124	32		40	116		80	76	
	6 and above	66	16		26	56		38	44	
	Total	250	70	78.13	80	240	25	152	168	47.5

Source: Field Survey

Table 2: **Summary**

Personally go		Pay in Commodity		Pay in Installment	
Yes	No	Yes	No	Yes	No
250	70	80	240	152	168



Education: Table 1 shows that by increase in education level, farmers learn repayment. Therefore they personally go and repay in time. Out of 250 farmers who say that they personally go for repayment 106 farmers have education above secondary level followed by 98 secondary level educated farmers. Also there is considerable change with respect to mode of repayment in highly educated farmers. 76 farmers say that they repay in lump sum and 58 say that they repay in installments. There is no considerable change in mode of repayment below this level of education among farmers. Table 4 shows highly significant impact of education upon repayment ($p=0.000$). Confirming results with Oladeebe et al (2008), Olagunju et al (2007), Ezw et al (2007), Koopahi et al (2002). Major cause behind this is that educated farmers can easily and quickly learn how to use modern farm technology and can get benefit more, therefore repayment does not become problem for them. Furthermore, they considered that prompt repayment creates good credit worthiness for them.

Tenancy Status: Table 1 shows that owners are more interested in repaying personally. Out of 278 respondent owner farmers 228 farmers personally go to the credit source for repayment. Only 42 farmers are tenants and there is no distinctive difference in method of

repayment among tenants. Out of 42 tenants 22 tenants personally go for repayment and 20 tenants say that staff of credit supplying source come to them for collection. Similarly out of 278 owners who repay in cash 142 owners are interested in lump sum repayment. Only 42 tenants repay in cash. But there is no significant impact of tenancy status upon repayment ($p=0.240$). It is because of very low numbers of tenants who takes loan for farming purpose. Owners are more in number in loan taking hence interested in repayment.

Occupation: Table 1 shows that out of 320 respondents 174 respondents do only farming as occupation while 146 do farming and other jobs as well. 126 farmers who do only farming and 124 farmers who do other jobs along with farming repay personally. Among 178 farmers who repay in lump sum cash 96 belongs to those farmers who do only farming and 72 do other jobs as well. Table 3 depicts that occupation has no significant impact on Repayment ($p=0.269$) It is due to reason that respondents who do only farming due to their farming experience and farming knowledge try to get benefit of the credit taken in enhancing their agriculture produce. They promptly repay to earn good credit worthiness image. While respondents with other jobs along with farming are able for prompt repayment because of more earning sources. Results are against the finding of Eze et al (2007). According to him farmers having farming as occupation are more interested in repayment because they need credit more than farmers along with other jobs as well. Hence they are in need to develop credit worthiness image more.

Farming Experience: From table 1 it becomes clear that out of 320 respondents 142 farmers have more than 20 years of farming experience followed by 110 farmers with 11 – 20 years farming experience. Table 1 also reflects that as farming experience farmers increases their interest in repaying loan personally increases. 52 farmers having experience of 1 – 10 years repay loan personally. 92 farmers have experience up to 20 years. 106 farmers have more than 20 years of farming experience. 78 farmers who repay their credit in cash but in installments belong to farmers with more than 20 years farming experience. But 72 farmers with experience of 11 – 20 years say that they repay credit in lump sum cash. Farming experience grouping has insignificant impact upon repayment ($p=0.233$). Results are against the findings of researchers such as Oladeebe et al (2008), Kohansal et al (2008). Actually in study area farmers with more or less farming experience arranges for loan repayment some how. While in other researchers areas farmers with more farming experience can produce more and do business. Hence with greater income there is no repayment problem for them. Farmers with less farming experience cannot earn more and also do not take interest for repayment using other means.

Marital status: Out of 320 respondents 194 respondents are married and 56 are unmarried who say that they personally go for repayment. 130 married and 38 UN married say that they repay in lump sum cash. Marital status has strongly significant impact upon repayment ($p=0.000$). It is because in study area mostly credit taken farmers are married and most of them have only farming as an occupation. These poor farmers have not only to meet daily expenses of their family in these hard days when the prices of every thing are touching sky but have to improve the standard of livings of the dependence. For meeting these challenges agriculture production should be more. More production is when farmer is able to apply new farm technology. Therefore poor farmer has to depend upon credit. For taking credit among other considerations considered by credit supply sources good credit worthiness is required on the part of farmer. Prompt repayment creates good credit worthiness.

Farm size: In study area mostly farmers have small piece of land. Out of 320 respondents' farmers 202 farmers have 1 – 400 canals of land leading 66 farmers with more than 800 canal of land. Out of these 202 farmers 158 farmers say that they go themselves for repayment of their loan to credit supply sources. Out of 202 farmers of this farm size group who repay in cash 104 farmers repay in lump sum. Only 44 farmers of this farm size group repay in commodity. Farm size group has strongly significant impact on repayment with p value 0.000. Actually poor farmers with small piece of land require more credit for using new farm inputs to enhance production from this small piece of land. Prompt repayment of previous loan would make the environment favorable among credit supplying source for them to get credit once again to meet their farming requirements.

Farm type: Table 1 shows that out of 320 sampled farmers 262 farmers irrigated lands and only 58 farmers have rainfed lands. 206 farmers with irrigated land go themselves to institutional sources for credit supply for repayment of loan in cash. 122 of these farmers say that they repay lump sum. T test in table 3 show strongly impact of farm type on repayment. Farmers with irrigated lands have better production due to availability of water and also they can employ new farm inputs for this facility. Better production causes better profit, Hence no problem of repayment of credit for them.

Farm status: Table 1 reflects that 278 farmers out of 320 use tractor on their lands. All these 278 repay their credit in cash. 228 personally go for repayment. 134 repay in lump sum. 56 repay in commodity. Farm status shows significant impact on repayment of loan using T test ($p=0.038$) as reflected in table 3. Using tractor not only finishes the work of farmer in time but also enables the

farmer to use other new farm inputs. This causes better production hence better profit. Farmer feels no problem in repayment.

Dependence size: From table 1 it is clear that out of 320 farmers 94 are supporting 1 – 5 members.170 farmers are supporting 6- 10 members and only 56 farmers are supporting more than 10 members. Out of these 170 farmers (large numbers of farmers supporting a medium family) who repay their loan in cash 136 repay by going personally and 96 repay in installments.32 say that repay in commodity. Table 4 shows insignificant impact of dependence group on repayment using ANOVA with p - value 0.650.Confirming results with Olagunju et al (2007), Chirwa (1997). Actually in study area farmers do not mostly involve their dependants in their farming activities. They either make them to get education or do other services in cities. Therefore farmers with every dependence size try to continue farming using modern agricultural techniques to support their family, which is possible for poor farmers to use credit properly and repay in time.

Numbers of times credit attained: Table 1 shows that among 320 sampled farmers 82 farmers took credit for 1 – 2 times (in years). 156 took credit for 3 – 5 times and 82 for more than 5 times. Among these 240 repay in cash and only 80 repay in commodity. Among 250 farmers who personally go and repay 124 are those farmers who took credit for 3 – 5 times followed by 66 farmers who took credit more than 5 times. Out of 156 farmers who took credit for 3 – 5 times 116 repay in cash followed by 68 farmers who repay in cash but took credit 1 – 2 times. Greater number of farmers who say that they repay in lump sum is 76 and they took credit for 3 – 5 times followed by 48 farmers of taking credit 1 – 2 times. Numbers of times credit attained has significant impact on repayment using ANOVA test. Table 4 shows p=0.045. Confirming results with Olagunju and Adeyemo (2007). It is because of proper use of credit by this group.

Table 3: **Impact of Variables on Repayment of Credit using T test**

Variables	F	Sig	t-values	df	Sig (2-tailed)
Occupation	.811	.3698	-1.107	318	.269
Marital Status	1.289	.182	-3.463	318	.000
Farm Type	5.454	.020	7.073	318	.000
Farm Status	11.777	.001	2.085	318	.038
Tenancy status	8.957	.003	1.177	318	.240

Table 4: Impact of variables on Repayment of credit using ANOVA

Variable	Levels	Sum of Squares	df	Mean Square	F	Significant
Age	Between group	48.178	2	24.089	3.675	0.026
	With in Group	2078.022	317	6.555		
	Total	2126.200	319			
Education	Between group	104.190	2	52.095	8.167	0.000
	With in Group	2022.010	317	6.379		
	Total	2126.200	319			
Farming Experience	Between group	19.471	2	9.735	1.465	0.233
	With in Group	2106.729	317	6.646		
	Total	2126.200	319			
Dependence	Between group	5.769	2	2.885	0.431	0.650
	With in Group	2120.431	317	6.689		
	Total	2126.200	319			
Farm Size	Between group	102.335	2	51.167	8.014	0.000
	With in Group	2023.865	317	6.384		
	Total	2126.200	319			
Nos of times credit attained	Between Groups	41.164	2	20.582	3.129	.045
	Within Groups	2085.036	317	6.577		
	Total	2126.200	319			

Table 5 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.434 ^a	.189	.160	2.36643

a. Predictors: (Constant), NTCA, Number of dependents, Marital Status, Farm Size (acres), Tenancy Status, Farm Type, farm.exp, Occupation, Education, Age (years), farm status

Table 6 ANOVA^b

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	401.403	11	36.491	6.516	.000 ^a
Residual	1724.797	308	5.600		
Total	2126.200	319			

a. Predictors: (Constant), NTCA, Number of dependents, Marital Status, Farm Size (acres), Tenancy Status, Farm Type, farm.exp, Occupation, Education, Age (years), farm status

b. Dependent Variable: repay new

Table 7 : Coefficients^a

Model	Un-standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	12.392	.962		12.883	.000
Age (years)	-.024	.020	-.100	-1.206	.229
Education	-.002	.035	-.004	-.053	.958
Occupation	.204	.297	.039	.687	.493
Number of dependents	-.014	.046	-.016	-.295	.768
Marital Status	.793	.381	.122	2.082	.038
Farm Size (acres)	2.693E-5	.000	.017	.323	.747
Farm Type	-2.308	.354	-.345	-6.522	.000
Farm status	-.778	.739	-.102	-1.054	.293
Tenancy Status	-.122	.732	-.016	-.167	.868
Farming experience	.017	.018	.075	.956	.340
Nos of times credit attained	-.171	.077	-.128	-2.224	.027

a. Dependent Variable: Repayment of credit

Estimation of the Model

Tables 5 - 7 show estimated coefficient from a regression model, standard error, F-statistics (test the null hypothesis). out of eleven variables included in the model only marital status, farm type and numbers of times credit attained are found significant. However collectively all the variables used in model influence significantly repayment. The analysis revealed findings that reject null hypothesis and confirm that different farm and farmers characteristics collectively are important in accessing farm credit.

Conclusion

From the findings of the present survey, it can be concluded that repayment of farm credit depends upon farms and farmers characteristics. Present study show that farmers decision for repaying agriculture credit is significantly predicted by age, education, marital status, farm type, and farm size and farm status. F value 6.516 show significant impacts of all variables collectively with p value 0.000 that all independent variables affect significantly with collaboration of marital

status farm type and numbers of times credit attained on dependent variable repayment of farm credit at 5% level of significant rejecting the null hypothesis.

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