THE ROLE OF AGRICULTURAL CREDIT IN THE GROWTH OF LIVESTOCK SECTOR: A CASE STUDY OF FAISALABAD

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ABSTRACT

This study employed stratified random sampling approach to collect the input-output and socioeconomic data set to see the impact of credit on the growth of livestock sector in the rural areas. The income elasticities of meat and livestock products were highest compared to all other food items except fruits, defining the future role of livestock sector in our food basket. It was observed that credit availability expanded the livestock sector more than double (economies of size), which increased per family per month income from livestock sector by 181%. The elasticity values of family size, literacy rate (schooling years) and credit were 0.18, 0.05 and 0.06, respectively. The elasticity of family size was highest, followed by credit and literacy rate, indicating that adequate potential exists that can be explored to utilize unemployed and untrained rural labor in the agriculture sector. It would help to mitigate the increasing population pressure on mega cities of Pakistan by providing employment opportunities at the door steps of rural community.

Key words: Agriculture credit, education, rural labor, livestock sector, economies of size, resource use efficiency.

INTRODUCTION

Despite the speedy growth in the other sectors, agriculture is still the single largest sector contributing nearly 22% to the national income of Pakistan (GDP) and employing nearly 45% of its workforce. As much as 67.5% of country's population living in the rural areas is directly or indirectly dependent on agriculture for its livelihood (Government of Pakistan, 2008). Given its importance to national economy, almost all governments gave high priority to raise agricultural productivity and hence farmer's income.

Credit is the back bone for any business and more so for agriculture which has traditionally been a non-monetary activity for the rural population in Pakistan. Agricultural credit is an integral part of the process of modernization of agriculture and commercialization of the rural economy. The introduction of easy and cheap credit is the quickest way for boosting agricultural production. Therefore, it was the prime policy of all the successive governments to meet the credit requirements of the farming community of Pakistan. Agriculture as a sector depends more on credit than any other sector of the economy because of the seasonal variations in the farmers returns and a changing trend from subsistence to commercial farming. Credit may provide them opportunity to earn more money and improve their standard of living (Vogt, 1978). Under Agriculturists Loan Act of 1958 (ALA), credit is provided for relief of distress and for purchasing seed, fertiliser, cattle and implements (Yusuf, 1984). The importance of credit availability can be seen by the fact that mean input expenditures per hectare are significantly higher for farmers with credit, regardless of their level of assets. Higher input expenditures are presumably associated with higher productivity growth (Saeed *et al.*, 1996). The impact of institutional credit on agricultural production in Pakistan has been found to be positive and significant (Iqbal *et al.*, 2003).

However, in spite of considerable efforts to streamline, reinforce, expand and institutionalize the agricultural credit system, the achievement falls short of proclamations, policies and programmes. Unless agriculture credit is systematically institutionalized for small farmers, agricultural development can not be materialized. Due to small holdings, low crop yields and small income, there is very little saving among the majority of the farmers of Pakistan. Therefore, it is need of time that credit agencies come up to help them in undertaking the improved farm practices.

The role of livestock sector in enhancing agricultural productivity is well recognized and its contribution to alleviate poverty in rural areas is enormous. It significantly contributes in the total supply of nutrients in food intake and increases the productivity of human labor.

The income elasticities (the percentage change in the quantity demanded due to one percent change in income) of different commodities in Pakistan have been reported (Umar and Ali, 2002). The income elasticity of meat and livestock products is highest compared to all other commodities, except fruits. It implies that as income increases with the development process, demand of meat and livestock products will increase at

a higher rate compared to all other products, except fruits. Hence, in order to fulfill the increasing future demand of livestock products, the top priority sector for investment purpose in food sector after fruits is livestock. It implies that investment in livestock sector is more important compared to crop sector in order to fulfill the future needs.

The distribution of credit in agricultural sector indicates that Government's top priority has been towards farm sector. Out of total disbursements of Rs 159,281 million, an amount of Rs 111,841 million (70%) was disbursed for crop sector and only Rs 23,903 million (15%) was provided to livestock sector (State Bank of Pakistan, 2008). However, potential growth of livestock sector is highest and more reliable compared to crop sector, indicating that livestock sector can play more effective and vital role to mitigate poverty in rural areas than crop sector.

The objective of the present study was to assess the role of credit in the growth of livestock sector and to estimate its efficiency in the contribution of farmer's income. Briefly, it will help to guide the policy agents for the formulation of future credit policy in agriculture sector.

MATERIALS AND METHODS

Data collection

Stratified random sampling approach was adopted to collect the necessary data for the present study. The stratum consisted of the farmers who got credit from the formal institutions such as banks. The list of credit holders was taken from the banks including Punjab Bank and Kushali Bank. The data was collected from 50 farmers about their milk production, number of animals, inputs and other costs before and after taking the credit from Government institutions such as banks in 2007. The sample was small because of resource constraints and it did not include the credit holders from private institutions or local sources. The data was collected from 10 villages and three tahsils (Khurrianwala, Chuck Jumra, and Jarranwala) of Faisalabad city by selecting 5 farmers from each village.

Data analysis

To conduct an empirical study, a systematic approach was adopted to ensure the meaningfulness and accuracy. Income from livestock sources before and after taking the credit by farmer was estimated for each family from the empirical data. Analysis was based on per month income and costs incurred by each family. Hence, the profit from livestock business before taking the loan was estimated by employing the following equation:

$$\Pi_1 = P\,Y - P_1 X_1 - P_2 X_2 - C_1 - C_2 \qquad \text{Where} \qquad (1)$$

P = Price of milk/liter
Y = Total amount of milk produced in a month (liters)
X_1 = Amount of feed used in a month
X_2 = Number of visits of veterinarian in a month
C_1 = Miscellaneous expenses per month
C_2 = Fixed cost per month, e.g. utility bills etc
P_1 = Price of feed per kg
P_2 = Fee of veterinarian for each visit

Similarly, profit equation after taking the loan was estimated as follow:

$$\Pi_2 = P\,Y - P_1 X_1 - P_2 X_2 - C_1 - C_2 - I \qquad (2)$$

All the variables in above equation were similar to equation (1) except 'I'' which is the interest rate paid by farmers on monthly basis. Although, farmers paid interest on yearly basis but the total amount of interest was divided by 12 to convert it into monthly basis. Per month increase in profit only from livestock sector due to loan was estimated as follow:

$$\Pi = \Pi_2 - \Pi_1 \qquad (3)$$

In order to investigate the role of credit to enhance livestock productivity of each milking animal, production function was employed. Regression of average income per milking animal on family size, literacy rate and amount of credit was estimated. To establish such relationship between input and output, the econometrical form of production function was employed as below:

$$Y = A\,F^{\alpha_1} L^{\alpha_2} C^{\alpha_3}\, e^{\varepsilon} \qquad \text{Where} \qquad (1)$$

Y = Income per milking animal per month (Rupees)
A = Intercept
F = Family size (numbers)
L = Literacy level (years of schooling), stands as proxy for the quality of human resources
C = Amount of credit (Rupees)
ε = Random shocks or error term

Equation (4) was simplified by taking log on both sides:

$$\ln Y = \ln A + \alpha_1 \ln F + \alpha_2 \ln L + \alpha_3 \ln C + \varepsilon \qquad (5)$$

The coefficients were direct elasticities in our model. The concept of elasticity which explained the percentage change in dependent variable (income per milking animal per month) due to percentage change in independent variable was written as follow:

$$\alpha_1 = \frac{\ln Y}{\ln F}, \quad \alpha_2 = \frac{\ln Y}{\ln L}, \quad \alpha_3 = \frac{\ln Y}{\ln C}$$

Where α_1 is the elasticity of family size and it could be interpreted as the percentage change in income per milking animal due to one percent change in family size. The elasticity of literacy rate (α_2) and credit (α_3) could also be explained similarly.

RESULTS AND DISCUSSION

The frequency distribution of education level among farmers is illustrated in Table 1. It indicates that a large fraction of respondents i.e 40% were illiterate. Only 24% got education up to primary level, 10% were middle, 16% had 10 years of education and only 10% respondents were found to have more than 10 years of education.

Table 1: Distribution of respondents by educational level

Educational level	Frequency	Percent
Illiterate	20	40
Primary	12	24
Middle	5	10
Matriculation	8	16
Above matriculation	5	10
Total	50	100

The distribution of respondent by amount of credit is shown in Table 2. It was observed that amount of credit was correlated with the level of education and farm size. The farmers with higher level of education were demanding large amount of credit compared to farmers with low education. It might be due to the reason that educated farmers have better understanding about the role of credit in getting modern technology

and the role of technology to enhance productivity. Generally, it is assumed that educated farmers can efficiently use the amount of credit in livestock sector because of having better capacity to visualize the relationship between input, technology and outputs. The farm size was another important variable which had strong positive correlation with the amount of credit obtained from different institutions. The possible reason is that large farmers can afford to take bigger amount of credit because they have relatively large piece of land to put in the bank as collateral.

The term economies of size is sometimes used in conjunction with economies associated with increase in one or more (but not all) major input categories and inputs are normally thought of as fixed or as variable (Debertin, 2002). The impact of credit supply on family's income (through economies of size) is shown in Table 3. Credit supply increased the number of milking animals per family from 5 to 13, indicating that number of milking animals became more than double due to availability of credit. The increase in number of milking animals improved the income of each family by 181%, which is a significant contribution of credit supply. Hence, it is logical to conclude that credit supply is a deriving force to increase the economies of size in livestock sector.

An attempt was made to explore the impact of family size, literacy rate and amount of credit on income generated by each milking animal. The results in Table 4 clearly demonstrate that all the three independent variables significantly and positively affected per month income from each milking animal which is according to our prior expectation. The coefficient of family size was highest compared to that of literacy rate and the amount of credit. It indicates that a one percent increase in family size increases per month income from each milking animal by 0.18%.

Table 2: Distribution of respondents by amount of credit

Amount of credit disbursed	Frequency	Percent	Average farm size (Acres)	Average level of education (years)
100,000-300,000	21	42	8	7.8
300,001-600,000	14	28	14	8.4
600,001-900,000	8	16	21	10.2
Above 900,000	7	14	30	11.8
Total	**50**	**100**		

Table 3: Distribution of respondents by the average income before and after credit and percentage change in the income

Category	Before credit	After credit
Average number of milking animals/ family	5	13
Average monthly income from total number of milking animals/family (Rs.)	13991	39377
Average per month income from each milking animals (Rs)	2798	3029
Percentage change in income	181%	

Table 4: The results of econometrical model indicating the contribution of different inputs

Variables	Coefficients	T-Stat
Intercept	6.79[*]	38.13
Family size (Numbers)	0.18[*]	3.00
Literacy level (years of schooling)	0.05[*]	3.19
Amount of credit (Rupees)	0.06[*]	4.66
R-square	0.73	

* Represents the significance level at $P<0.05$.

It clearly demonstrates that unemployed and untrained rural labor could be absorbed by the livestock sector which could help to mitigate the population burden on mega cities of Pakistan. The elasticity of education was 0.05 which indicates that by increasing one percent of schooling years in the literacy rate, per month income from each milking animal would increase by 0.05%, implying that education is an important sector for future investment purpose in rural areas. Hence, education is critical to improve the resource use efficiency of livestock sector in the long run.

Our results indicate that elasticity of credit (0.06) is higher than education, implying that supply of credit is more important than education to improve the resource use efficiency in livestock sector. Coefficient of credit recorded in this study is slightly lower than that observed by Iqbal *et al.* (2003), who estimated the impact of credit on agricultural productivity. Our dependent variable was per month income from each milking animal and results imply that income from each milking animal can be increased by improving education and credit facilities in the study area without changing the level of any other input. It can be interpreted that education and credit helps to enhance the productivity of the inputs being used in livestock sector because of their rational and timely use. We referred this to resource use efficiency. The value of R-square indicates that variation in the dependent variable (Y i.e income per milking animal per month) has been explained upto 73% by the independent variables and the remaining variation in dependent variable could be due to random shocks which are beyond the farmer's control.

The increase in income from each milking animal can be referred towards resource use efficiency in livestock business. Our regression results indicate that livestock sector is labor intensive. Unemployed and untrained rural labor in livestock sector can be absorbed by expanding its scale of production through credit supply and by improving its efficiency through allocation of extra labor. The results reported in Table 3 indicate that credit for livestock sector significantly contributes to increase the economies of size. It implies that favorable credit policy for livestock sector will not only increase the total supply of livestock nutrients in food basket but it can also help to absorb the unemployed labor of rural areas at their door steps. Moreover, it can play an enormous role to alleviate poverty in Pakistan because 60% of poor people are residing in rural areas (Govt. Pakistan 2008). Our empirical results support the findings of Saeed *et al.* (1996) that credit must be available to support productivity growth for agricultural smallholders and small producers of the rural non-farm sector where Pakistan's growth potential lies. The results clearly depict that improvement of credit supply in livestock sector could considerably facilitate to alleviate poverty in rural areas because credit not only helps to expand the economies of size of livestock sector but also assists to increase the income from the given set of resources (i.e. per month revenue from each milking animal).

Conclusion

This study indicates that credit supply enhanced the income of livestock growers more than 100% and it is clearly defining the role of credit in livestock sector. It not only helps to expand the economies of size but also helps to increase the productivity of livestock sector from the available resources. The role of family labor is found to be even more critical than credit. Hence, expansion in livestock sector could help to absorb the unemployed and untrained rural labor at their door steps which could help to mitigate the migration process of untrained rural labor towards cities.

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