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Impact of Micro Finance on Agriculture Development in District Badin of Sindh Province of Pakistan

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Conflicts of Interest
There are no conflicts to declare.

ABSTRACT

The impact assessment of micro finance on agriculture development in district Badin was performed. The results showed that the total credit disbursement by various commercial banks in Badin district was 103.97, 72.84, 90.33, 39.97, 139.44, 103.37 and 131.28 million rupees during the years 2010-11, 2011-12, 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17; while total amount of loans under short and long term schemes during this period was 103.97, 72.84, 90.33, 39.97, 139.44, 103.37 and 131.28 million rupees, respectively. The cross partial correlation coefficient results suggested that total credit (TCR) is significantly correlated with GNP. This gives greater association of agricultural production with micro credit, where fertilizer is highly correlated with seed and production is highly correlated with cropping intensity. The seed is highly correlated with pesticides which are all important purchased inputs. The regression analysis indicates that the total institutional credit was a significant determinant of seed, fertilizer, pesticides, cropping intensity and GNP. In all cases, the total credit appears also to be highly significant. The flow of agricultural credit from institutional sources resulted in significant expansion after the participation of commercial banks which made appreciable efforts to accomplish the objectives and captured substantial market. The results of the present study show that the institutional credit proves to have more impact on farm productivity. It is suggestible that in Badin district, the credit availability and loan size, farmers' education and landholding structure need to be improved for all farmers and farmers are not homogenous in their demand for credit and subsequently in their credit constraints, and this has important effect on their technical efficiency.

Keywords: IMPACT, MICRO-FINANCE, AGRICULTURAL DEVELOPMENT, AGRICULTURAL CREDIT, PAKISTAN

Introduction

Agriculture is the mainstay of the Pakistan economy, as it constitutes the backbone of the rural livelihood security system. It is the core of planned economic development in Pakistan, as the trickle-down effect of agriculture is significant in reducing poverty and regional inequality in the country. Growth in agriculture has a maximum cascading impact on other sectors, leading to the spread of benefits over the entire economy and

the largest segment of population. Pakistan is also one of the world's largest producers and suppliers of various agricultural produces; ranks fifth in the Muslim world and twentieth worldwide in farm output. It is the world's fifth largest milk producer. Pakistan's principal natural resources are arable land and water (DAWN, 2007 and Anonymous, 2007). About 25% of Pakistan's total land area is under cultivation and agriculture accounts for about 23% of GDP and employs about 44% of the labor force.

The most important crops are wheat, sugarcane, cotton, and rice, which together account for more than 75% of the value of total crop output. Pakistan's largest food crop is wheat. In 2005, Pakistan produced 21,591,400 metric tons of wheat, more than all of Africa (20,304,585 metric tons) and nearly as much as all of South America (24,557,784 metric tons). The economic importance of agriculture has declined since independence, when its share of GDP was around 53%. Following the poor harvest of 1993, the government introduced agriculture assistance policies, including increased support prices for many agricultural commodities and expanded availability of agricultural credit. From 1993 to 1997, real growth in the agricultural sector averaged 5.7% but has since declined to about 4%. Agricultural reforms, including increased wheat and oilseed production, play a central role in the government's economic reform package (John Wall, 2006).

Sindh is gradually losing its share in agricultural credit which is being attributed to the limited availability of farmers' passbooks, the lack of cooperation by the provincial revenue departments to verify these books, issuance of bogus passbooks and closure of the Sindh Provincial Cooperative Bank. From a 21 % share in the national credit disbursement in 2000-01, Sindh's share, dropped to a mere 11 % in 2005-06 and bankers are convinced that it has declined 10 % in the first half of the current fiscal when overall credit disbursement is 45 % of the officially fixed target of Rs. 160 billion (Ghausi, 2007). The above situation clearly demands rectification in the micro credit policies for agriculture in Sindh to utilize land resources of the province, which will obviously improve socio-economic conditions of the poor, associated with agriculture.

The credit needs of the farmers ought to be considered as whole and a realistic policy and must not be confined to the requirements for productive purposes alone. It is also argued that, for small holders who are at very low level of living more expenses on consumption would increase the productivity of labour which is a vital component of growth. The reasons for higher rates of interest charged by private sources are attributed to the lender risk and uncertainty. There is no statistical evidence to show the relationship between use of credit and interest rates. It is also observed that there are investment opportunities in agriculture and most of the farmers need credit. With the use of modern technology, there is increase in operating expenses, therefore, credit is required to meet these additional expenditure, credit thus assume more important only after the adoption of technology. The present investigation was therefore, aimed at impact assessment of micro credit on agriculture development in Badin district of Sindh province. The study will not only examine the flow of micro-credit for agriculture purposes in the district, but also aims to assess the consequent development in agriculture crop productivity in the study area.

Materials and methods

Each research study entails different lines of work depending upon its objectives and working plan. Thus

a meaningful research work involves an appropriate planning before proceeding further. Therefore a workable plan is chalked out for all research studies particularly in social sciences. New innovations, agricultural technologies and improved farm parasites are practices are pre conditions for sustained improvement in levels of out puts and productivity (Todaro 1982).

Collection of data

This is a macro study which involves whole country, thus secondary data is collected from various sources such as statistical year book, Agricultural Statistical of Pakistan and data for Ministry of food and Agriculture, Pakistan Economics Survey, Annual reports of all credit institutions, Statistical Data from the ADBP and Federal Bank for Cooperatives Statistics Departments, Pakistan Rural Credit Survey, and Annual Reports of the state Bank of Pakistan.

Productivity Estimation

Productivity can best be estimated through production function analysis by including institutional credit, as an additional variable in it but due to some serious statistical problems line multi-colinearity and auto correlation we can not get the satisfactory estimates on the coefficient of inputs.

Equation for Agri-GNP

$$GNP\ Nt = \alpha 1 + ß1\ TCRt + U1t \quad \text{----------} \quad (1)$$

$$GNP\ Nt = \alpha 2 + ß2\ TICRt + U2\ t \quad \text{----------} \quad (2)$$

Similarly the impact of credit on the cropping intensity & input use is also evaluated and Formulated in the model below.

Equation for Cropping Intensity

$$CI_t = \alpha_3 + ß_3\ TCR_t + U_{3\,t} \quad \text{----------} \quad (3)$$

$$CI_t = \alpha_4 + ß_4\ TICR_t + U_{4\,t} \quad \text{----------} \quad (4)$$

Equation for Cash Inputs

$$FERT_t = \alpha_5 + ß_5\ TCR_t + U_{5\,t} \quad \text{----------} \quad (5)$$

$$FERT_t = \alpha_6 + ß_6\ TICR_t + U_{6\,t} \quad \text{----------} \quad (6)$$

$$SEED_t = \alpha_7 + ß_7\ TCR_t + U_{7\,t} \quad \text{----------} \quad (7)$$

$$SEED_t = \alpha_8 + ß_8\ TICR_t + U_{8\,t} \quad \text{----------} \quad (8)$$

$$PESTQ_t = \alpha_9 + ß_9\ TCR_t + U_{9\,t} \quad \text{----------} \quad (9)$$

$$PESTQ_t = \alpha_{10} + ß_{10}\ TCR_t + U_{10\,t} \quad \text{----------} \quad (10)$$

In this Equation

α J = Is a constant term.

ß J = Is the slope coefficient the value of which shows the total increase in the dependent variable due to one unit increase in the independent variable.

GNP = Gross national products measured at current Factor.

CI	=	Cropping Intensity
FERT	=	Fertilizer quantity in Nutrient Tons.
SEED	=	The seed quantity measured in 000 tons.
PESTQ	=	The quantity of Pesticides Measured in m. tons.
TCR	=	Total Credit (Formal+ informal) (Million Rs).
t	=	Is subscript used for time period.
U_{jt}	=	Is the error term
α	=	α_{10} are intercept line and
ß	=	$ß_{10}$ are slope coefficient

Results and Discussion

i) Term-wise position of agricultural credits of ZTBL in District Badin

The term-wise position of agricultural credit advanced by ZTBL in Badin district (Table-1) indicated that the amounts of short term loaning was considerably higher than the mid-term and long term loans advanced to farmers of Badin district for various agricultural purposes. The amount of short term loans during the years 2010-11, 2011-12, 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 was 83.24, 55.56, 45.54, 35.21, 51.98, 72.98 and 104.56 million rupees, respectively. The amount of medium term loans during the years 2010-11, 2011-12, 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 was 36.23, 38.88, 36.12, 26.41, 37.51, 43.56 and 45.84 million rupees, respectively. Similarly, the amount of long term loans during the years 2010-11, 2011-12, 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 was 14.50, 18.58, 29.23, 22.90, 33.11, 38.36 and 36.00 million rupees, respectively. It was noted that the amount of all types of loans was remarkably increased by the bank with the passage of time.

Table-1 Term-wise position of agricultural credit advanced by Zarai Tarqiati Bank Limited in district Badin (2011-2017)

(Million Rupees)

Year	Short-term	Medium-term	Long-term	Total
2010-11	83.24	36.23	14.50	133.97
2011-12	55.56	38.88	18.58	113.02
2012-13	45.54	36.12	29.23	110.89
2013-14	35.21	26.41	22.90	84.52
2014-15	51.98	37.51	33.11	122.6
2015-16	72.98	43.56	38.36	154.9
2016-17	104.56	45.84	36.00	186.4

Source: Zarai Tarqiati Bank Limited, Badin.

ii) Item-wise break-up of loans disbursed by ZTBL in District Badin

Item-wise break of loans disbursed by ZTBL in Badin district of Sindh province was scrutinized and it was noted that during last seven years, the amount of loan disbursement under seed, fertilizers, pesticides and poultry farming has substantially been increased and in the year 2006-07, the loans disbursed for purchase of

quality seed of crop varieties in the district were 20.55 million rupees, while the amount disbursed for purchase of fertilizers was 27.81 million, for purchase of pesticides 13.98 million, for dairy farming 8.7 million, for poultry farming 3.1 million, for fisheries 10.45 million, for installation of tube wells 28.9 million, for purchase of tractors 45.09 million and for other miscellaneous crop production expenditures 36.52 million rupees. The total loans disbursed by ZTBL in Badin district were 133.90, 113.02, 110.89, 84.52, 122.60, 154.90 and 186.40 million rupees during the years 2010-11, 2011-12, 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17, respectively (Table-2).

Table-2 Item-wise break-up of loans disbursed by Zarai Tarqiati Bank Limited in district Badin (2011-2017)

(Million Rupees)

Years	Seed	Fertilizer	Pesticides	Dairy farming	Poultry farming	Fisheries	Tube wells	Tractors	Others	Total
2010-11	15.56	18.65	14.85	3.3	0	2.8	16.56	32.854	29.51	133.90
2011-12	19.12	17.12	13.7	3.12	0	2.1	14.12	18.32	26.41	113.02
2012-13	14.12	19.1	13.1	2.13	1.8	2.8	13.12	27.23	19.62	110.89
2013-14	11.12	13.32	11.23	0	0	0	12.9	16.7	15.13	84.52
2014-15	16.76	12.89	10.34	4.12	3.3	6.1	20.45	19.34	26.02	122.60
2015-16	17.88	21.55	14.15	7.4	4.3	2.9	33.23	28.29	23.9	154.90
2016-17	20.55	27.81	13.98	8.7	3.1	10.45	28.9	45.09	36.52	186.40

Source: Zarai Tarqiati Bank Limited, Badin.

iii. Farm/Non-Farm loans by Commercial Banks in district Badin

The farm and non-farm loans advanced by commercial banks were studied and it was observed that the farm loans advanced by commercial banks in Badin district were 63.65, 50.62, 24.84, 17.27, 89.85, 66.23 and 83.90 million and non-farm credits were 30.32, 12.22, 55.49, 12.70, 49.59, 37.14 and 47.38 million rupees during the years 2000-01, 2001-02, 2002-03, 2003-04, 2004-05, 2005-06 and 2006-07, respectively. The total credit disbursement by various commercial banks in Badin district was 103.97, 72.84, 90.33, 39.97, 139.44, 103.37 and 131.28 million rupees during the years 2000-01, 2001-02, 2002-03, 2003-04, 2004-05, 2005-06 and 2006-07, respectively (Table-3). It was noted that the amount of farm loans was remarkably higher than the non-farm loans.

Table-3 Agricultural credit advanced by Commercial Bank (Farm and Non-Farm) in District Badin (2001-2007)

(In million Rs.)

Years	Farm	Non-Farm	Total
2000-01	63.65	30.32	103.97
2001-02	50.62	12.22	72.84
2002-03	24.84	55.49	90.33
2003-04	17.27	12.70	39.97
2004-05	89.85	49.59	139.44
2005-06	66.23	37.14	103.37
2006-07	83.90	47.38	131.28

Source: NBP, HBL, MCB, UBL, ABL.

iv. Term-wise loans advanced by Commercial Banks in District Badin

Term-wise position of loans advanced by various commercial Banks in District Badin (Table-4) showed that the

amounts of short term loans was comparatively higher than the long term loans advanced to farmers. The amount of short term loans was 60.50, 42.84, 61.33, 28.97, 100.40, 80.07 and 100.08 million rupees, during the years 2000-01, 2001-02, 2002-03, 2003-04, 2004-05, 2005-06 and 2006-07, respectively. The amount of long term loans during the years 2000-01, 2001-02, 2002-03, 2003-04, 2004-05, 2005-06 and 2006-07 was 43.47, 30.00, 29.00, 11.00, 39.04, 23.30 and 31.20 million rupees, respectively. It was noted that the amount of short term loaning was remarkably increased by the commercial banks, while considerable reduction in long term loaning was recorded with passage of time. However, the total amount of loans under short and long term schemes during the years 2010-11, 2011-12, 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17 was 103.97, 72.84, 90.33, 39.97, 139.44, 103.37 and 131.28 million rupees, respectively.

Table-4 Term-wise loans advanced by Commercial Banks to farmers in District Badin (2011-2017)

(In million Rs)

Years	Short term	Long-Term	Total
2010-11	60.50	43.47	103.97
2011-12	42.84	30.00	72.84
2012-13	61.33	29.00	90.33
2013-14	28.97	11.00	39.97
2014-15	100.40	39.04	139.44
2015-16	80.07	23.30	103.37
2016-17	100.08	31.20	131.28

Source: NBP, HBL, MCB, UBL, ABL.

Impact assessment

i. Descriptive Statistics

For impact assessment seven indicators were selected for the analysis, which included Gross National Product (GNP), total credit (TCR), fertilizer (FRT), seed, cropping intensity (CI) and pesticides and the data for last seven years was used. The data for non-institutional sources was based on distribution of micro credits as a percentage of all loans, percentage of all sizes. The correlation derived a significant estimation on coefficient of inputs. Hence, the single variable production function, Agri-GNP was used as the dependent variable and micro credit as the independent variable. The analysis included descriptive statistics, followed by cross partial correlation coefficient. TCR and TICR showed significant association with GNP (Table-5).

Table-5 Descriptive Statistics

Variable	Mean	Standard Deviation (S.D.)	Range		S.D. / C.V = Mean X 100
			Max	Min	
GNP	19202	15230	25171	16672	79.31 %
TCR	14648	10100	21624	10423	68.95 %
FERT	2494	1101	3981	1521	44.15 %
SEED	653	315	888	531	48.23 %
CI	56	13	91	52	23.21 %
PESTQ	6815	3909	9432	5923	57.35 %

GNP = Gross National Product

CI = Cropping Intensity

FERT = Fertilizer quantity

SEED = Seed quantity

PESTIQ = Pesticide quantity

TCR = Total credit

ii. Cross partial correlation coefficient

The cross partial correlation coefficient results are reported in Table-6, which suggested that TCR is significantly correlated with GNP. This gives greater association of agricultural production with micro credit, where fertilizer is highly correlated with seed and production is highly correlated with cropping intensity. The seed is highly correlated with pesticides which are all important purchased inputs.

Table-6 Cross partial correlation coefficient

Variable	GNP	TCR	CI	FERT	SEED	PESTQ
GNP	I					
TCR	0.466	I				
CI	0.677	0.522	I			
FERT	0.600	0.754	0.771	I		
SEED	0.118	0.248	0.266	0.371	I	
PESTQ	0.827	0.762	0.602	0.814	0.021	I

iii. Regression analysis

For regression analysis five equations were regressed each for seed, fertilizer, pesticides, cropping intensity and GNP. Each equation was estimated by two years, it was regressed separately on total credit. The results of regression are recorded in Table-7 and according to the results all the coefficients appeared highly significant. The regression analysis further indicates that the total institutional credit was a significant determinant of seed, fertilizer, pesticides, cropping intensity and GNP. In all cases, the total credit appears also to be highly significant.

The regression coefficient of total credit and total institutional credit shows the marginal impact, but the coefficient of total institutional credit was more remarkably higher than the coefficient of total credit in all equations. This showed that the marginal impact of institutional credit is far greater than the non-institutional credit. This probably happened because the institutional credit had smaller share in the total credit; whereas the non-institutional credit had larger share in the total credit and hence one unit increase in institutional credit cost much less than the non-institutional credit.

Table-7 Regression analysis

Dependent Variable	Coefficient of Independent variables (TCR)	R-Square	F-State
SEED	0.00387**	0.337	6.0210**
FERT	0.0102*	0.651	43.552**
PESTQ	0.00104**	0.757	28.668**
CI	0.00024**	0.493	11.174**
GNP	2.889	0.400	9.1918**

** Significant at 1% level of significance

* Significant at 5% level of significance

iv. Impact of agricultural credit on inputs

The regression of purchase inputs illustrated that credit had significant impact on the use of inputs. Furthermore, there was a consistency in the coefficients for different types of credit. This indicated that the coefficient of institutional credit is greater to that of total credit for all the inputs. In all equations credit affects the inputs use in the same manner as they affect GNP. The value of F-Statistics and all the coefficients appeared to be highly significant.

v. Flow of credit during last seven years and impact on farm productivity

Descriptive statistics, cross partial correlation and regression analysis indicated an encouraging trend of results, which implies that the flow of credit has increased substantially from 2000-2001 to 2006-2007 in Badin district of Sindh province. The flow of agricultural credit from institutional sources resulted in significant expansion after the participation of commercial banks which made appreciable efforts to accomplish the objectives and captured substantial market. The results of the present study show that the institutional credit proves to have more impact on farm productivity.

Discussions

Agricultural credit in Pakistan could not play effective role in improving the crop productivity to a desired level. The reasons are simple, that the commercial banks are giving loans for agriculture purpose only to big landlords and the average farmer is deprived of the facility. The government is giving loan to the farmers in commercial sense, while it is the need of the time to advance loans to small farmers with priority and medium farmers also on lowest markup rates. The socio-economic condition of the small farmer is miserable. He has no awareness about his right, no effective source of information for him and the media is doing nothing for educating the farmers. Small farmers may be encouraged for obtaining agricultural credit and extension services may be strengthened to aware them of the need of increasing per acre yields. Extension services are weak in the study area and could be said poorest. No effective information is provided by the Agriculture Officers, Deputy Directors or other extension personnel. It is suggestible that target oriented personnel in Agricultural Extension be appointed and they must be bound to achieve their targets in specified area of the farming community regarding credit and crop yields.

Although, ZTBL in Badin district is working for loaning agriculture purpose, but crop productivity is not being improved because general situation is changed by improving productivity of average farmers and not only by the big landlords. Khandker and Faruqee (2003) remarked that the ADBP is not a cost-effective institution in delivering rural finance; its cost-effectiveness can be improved by reducing its loan default cost and partially by targeting smallholders in agriculture where credit yields better results. In a similar study, Charles and Koeing (2004) mentioned that agricultural credit markets are dominated by two institutional retail lender groups, and commercial banks more likely to serve small, part-time, and hobby farmers. Gulrajani (2006) suggested that the credit lending procedure may be made easy and feasible just as for the average illiterate farmer. The banks should make such arrangements to provide credits at farmers' door steps to develop their confidence and encourage them for higher crop yields. In a study in Pakistan, Miah et al. (2006) found that small farmers avoid cumbersome procedure of obtaining loan from the institutional sources and they felt better to borrow loan from NGOs. It was found that the technical efficiencies of the average farmers were significantly affected by not availability of agriculture credit on easy terms and conditions. The average farmer is reluctant of obtaining credit from bank due to high markup rates. It is suggested that the loaning procedure may be made feasible for the small farmers and even better that they may be offered agriculture loans on lowest markup rates with easy terms and conditions.

Conclusion

For a loan to result in higher technical efficiency, it needs to adequately satisfy the effective credit demand of the farmers. The implication of this result for lenders is that the farmers' effective demand for credit needs to be identified for different types of farmers before determining the size of loans to the farmers, since farmers are not homogeneous in their demand for credit. Besides one's ability to repay, factors affecting repayment incentives also need to be assessed, in view of possible credit risk.

Another important implication of the results for credit policy is related to the cost of credit supply. The insignificant effect of interest rates on the efficiency of farmers suggests that factors other than the direct cost of borrowing may be important to consider. For example, some farmers may find monetary and non-monetary transaction costs (such as paper works, loan processing speed and speed of loan disbursement) considerably higher relative to the interest rates, so that lenders need to consider the effect of such costs on the demand for credit of the borrowers.

A case in point here is the use of information technology, which has a potential effect on cost reduction. A wider use of information technology may have important impact on lowering costs of credit transaction, monitoring and evaluation. On the contrary, its absence means that the geographic location of lenders relative to borrowers may be more important than it appears under improved infrastructural settings where information technology can be widely used to reduce such costs. This has relevance for decision on branch expansion of formal lenders and associated costs.

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