

## Access to Rural Credit and Input Use: An Empirical Study

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### Abstract

This paper has empirically examined the relative access of different categories of farm households to formal credit and its impact on fertiliser-use. The study has brought out that inequalities in the distribution of number of loans vis-à-vis operational holdings have increased over time. The bias that existed during 1990s in favour of marginal and small farmers obtaining proportionately higher share of credit compared to their share in area operated, had vanished by 2001-02. The distribution of credit during 2006-07 marked the return of such a positive bias to some extent. The proportion of borrowing households in the total households increased during 2006-07 with maximum gains for large farmers. Efforts should be made to consolidate the gains obtained by marginal farmers in terms of better access in 2006-07. Fertiliser consumption across states could be explained by credit levels, irrigation availability, share of short-term credit and farm-size. Higher credit levels are associated with higher fertiliser consumption levels, as revealed by cross-section data across the states and farm-size classes during 2006-07. Across states, marginal farmers, on an average, could increase fertiliser-use by 0.381 kg with every ₹100 of credit they received. The response was stronger on large farmers. The elasticity of fertiliser-use w.r.t. credit has been found between 0.20 and 0.24 on marginal and small farms, and between 0.52 and 0.54 on medium and large farms.

**Key words:** Agricultural credit, input use, institutional credit, inequality in distribution, farm size

**JEL classification:** Q12 to Q15, R51, D63

### Introduction

Farmers as economic agents are sandwiched between forward and backward linkages. They need quality inputs in adequate quantity, at appropriate time with certainty. The demand for inputs and services, however, is derived from the demand for their output. Thus, the output markets and input supply systems have complex and multidirectional linkages. The income received from the sale of produce gives the liquidity needed for capital. The need for capital is for day-to-day farming operations (working capital), family

expenses and long-term improvements on farm (investment). But, a farmer is needed to invest first in his farming activities and then realise the income at a later date, sometimes after one year (depending on crop duration) from the time he starts land preparation. That is, a farmer needs some liquidity in hand, enough to spend on both family and farm. It implies that unless a farmer is able to raise enough liquidity as and when required during the crop season, the input use is going to be suboptimal. Juxtaposing the fact that savings of an average Indian farm household are often meagre and even negative, one cannot expect the farmers to be able to raise the needed liquidity.

Traditionally, farmers depended for their credit needs on local moneylenders, friends and relatives, local merchants and commission agents. Raising credit

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from these sources has often proved expensive and exploitative. Hence, institutionalisation of rural credit system was thought of as an alternative. The process comprised promoting cooperatives, nationalisation of commercial banks and formation of regional rural banks. As a result, the share of institutional credit in the total credit availed by the farm households increased significantly over time, from 31.7 per cent in 1971 to 61.1 per cent in 2002 (Subbarao, 1012). During the same period, due to onset of Green Revolution, which embarked on the use of modern inputs like HYV seeds, fertilisers and pesticides, the use of purchased inputs in agriculture increased manyfold. Farming was commercialized and the farm economy was increasingly monetized. Simultaneously, the use of farm machines, especially tractors and water extracting machines like pump sets and tube-wells, multiplied manyfold. All these developments increased the capital needs, differentially though, across farm-size classes. In the race between the supply of formal credit and the demand for capital on farms, the former lagged behind, leaving a big gap to be filled by high-cost alternatives such as private moneylenders, dealers, Microfinance Institutions (MFIs), etc. In the whole process, as several past studies have concluded, small and marginal farmers are usually left out of the purview of formal credit (Asian Development Bank, 2007; GoI, 2010; Satish and Mehrotra, 2009; Satyasai, 2010). In contrast, they need more external liquidity support due to limited recourse to own savings and other inherent vulnerabilities that limit their creditworthiness. In this context, this paper has measured the access to credit and its impact on input use across different farm-size classes.

### Data and Methodology

This paper has used the data collected through Input Surveys conducted quinquennially by Agricultural Census Division, Ministry of Agriculture, Government of India. This set of data is relatively underused in studying the access to credit though available at 5-year intervals. Most of the studies and committees have used decennial All-India Debt and Investment Surveys and/or Situation Assessment Survey, 2003 of National Sample Survey Organisation (NSSO). This paper has utilized credit-related information contained in the input surveys. Input Survey data were collected through household enquiry

in the selected villages from each stratum, viz., i.e. *taluka*. About 7 per cent of the villages in the state were covered for the survey during the previous two rounds. For the second stage sampling, four operational holdings from each size-group, viz., marginal, small, semi-medium, medium and large holdings were selected randomly. In this survey, the sampling frame was the list of operational holdings excluding institutional holdings, covering only the resident cultivators of the selected village. The data from input surveys conducted during 1981-82, 1986-87, 1991-92, 1996-97, 2001-02 and 2006-07 were used for the analysis in this paper (<http://agcensus.nic.in/>). We have focused on both all-India and state level situations. Since we were interested mainly in the distribution and relative terms, we did not make any price adjustments. The data on institutional credit pertain to the credit availed during the reference year and covers loans taken for agricultural purposes only (GoI, 2012).

### Important Concepts and Definitions

**Operational Holding (OH)** — Total land which was used wholly or partly for agricultural production and was operated as one technical unit by one person alone or with others without regard to the title, legal form, size or location.

**Operated Area (OA)** — It has included both cultivated and uncultivated area, provided part of it was put to agricultural production during the reference period.

**Farm-size Classes** — Farmers have been classified based on operational area into marginal (less than 1 ha), small (1 to 1.99 ha), semi-medium (2 to 3.99 ha), medium (4 to 9.99 ha) and large (10 ha and above) farm-size classes.

**Agricultural Credit** — Input survey records the loans taken during the year for agricultural purposes only from institutional sources, viz. cooperatives, regional rural banks and commercial banks.

### Analytical Techniques

The analytical framework of this paper is around measuring differential access to credit across farm-size classes and impact of credit on input use on farms. The use of fertilisers has been considered in terms of nutrients (NPK) which is the single crucial input accounting for major expenditure on farms.

**Access**

Access to credit can be measured in terms of proportion of operational holdings which could avail institutional credit and also in terms of amount they could obtain. In fact, equity in access is a better measure as the distribution of number of borrowers or amount of credit in different farm-size classes can be judged against their due. The distribution of total number of operational holdings or area can be generally taken as the standard to compare with. Index of access has been computed using the following formula:

$$(Y_i/\sum Y_i)/(X_i/\sum X_i)$$

where, X and Y are the two parameters like number of operational holdings and number of borrowing OH, which have been compared for their relative distribution. An index value of less than one means less than due share to the farm-size class in question (Bakshi, 2008).

There are several other measures of inequality. In this paper we have computed Theil's index to measure inequality among 'm' groups using the following formula (for more details on the index and its interpretation, see Conceição and Ferreira, 2000).

$$T' = \sum_{i=1}^m w_i \log \frac{w_i}{n_i}$$

where,

w<sub>i</sub> = Share of the i th size class in credit/number of households availing credit, and

n<sub>i</sub> = Share of i th size class in the area operated/ population

We have implicitly assumed that the share of farmers covered by institutional agencies in a given size-class should be in accordance with the proportion of farmers in that size class in the total number of farmers. The Index value close to zero indicates a more equitable coverage. Similar interpretation would be done in the case of distribution of credit amount across size classes with reference to the distribution of operated area.

**Credit and Fertiliser-use**

Multiple regression framework with dummy variables has been used to measure the relation between credit and fertiliser-use. The model used is given below:

$$\begin{aligned} \text{NPKHA} = & a + b_1.\text{CREDIT} + b_2.\text{GIANSA} + b_3. \\ & \text{BORROH} + b_4.\text{SF} + b_5.\text{SMDF} + b_6.\text{MDF} \\ & + b_7.\text{LF} + b_8.\text{SF}*\text{CREDIT} + b_9. \text{SMDF}* \\ & \text{CREDIT} + b_{10}.\text{MD}*\text{CREDIT} + b_{11}. \text{LF}* \\ & \text{CREDIT} + b_{12}.\text{STSHARE} + e \end{aligned}$$

where,

NPKHA = Fertiliser (NPK) use (kg/cropped ha),

CREDIT = Credit (₹100),

GIANSA = Irrigation ratio, gross irrigated area as ratio to net sown area (%),

BORROH = Proportion of borrowing households in total (%)

SF, SMDF, MDF and LF = Intercept dummy variables representing small, semi-medium, medium and large farm-size classes, respectively, taking value of '1' for that size class and zero otherwise. Marginal farm-size class was the comparison category.

SF\*CREDIT, SMDF\*CREDIT, MD\*CREDIT and LF\*CREDIT = Slope dummy variable for small, semi-medium, medium and large farm-size classes, respectively, measured as the product of dummy variables and CREDIT.

STSHARE = Share of short-term credit in total (%),

a and b<sub>i</sub> = Intercept and regression coefficients, and

e = Error-term.

**Results and Discussion**

**Credit Delivery Arrangements in the Country**

India pursued institutionalization of rural credit to address to the problems of adequacy and exploitation by informal sources of credit and followed the multi-agency approach. Today, the major sources of formal credit are cooperatives, regional rural banks and commercial banks. The rural households also depend on semi-formal agencies like non-banking financing companies (NBFCs), micro finance institutions (MFIs), self-help groups (SHGs), joint liability groups (JLGs) and informal agencies like dealers, friends, relatives, private moneylenders, etc. The rural credit system and its structural constraints thereof have been discussed in details by Satyasai (2008). Due to several structural and other constraints, the credit delivery has not yielded the desired results. In fact, it has resulted in certain

anomalies like inequitable access of certain regions and weaker sections of the society including small and marginal farmers, to formal credit. The market share of cooperatives has declined severely. Several needy rural households continued to remain out of the formal credit net. This happened in spite of remarkable growth in credit to agriculture at an annual compound rate of 13.86 per cent during the 36 year period between 1971-72 to 2006-07 (Satyasai, 2010).

Over time several changes have taken place in the rural credit scenario and some of them are of serious concern. Subbarao (2012) has identified a few long-term trends, both positive and negative, in rural credit, viz., (i) increasing share of formal credit, (ii) increasing credit intensity (credit to GDP ratio), (iii) increasing share of commercial banks in formal credit, (iv) faster growth of indirect credit, (v) decline in share of term credit, (vi) skewed regional distribution, (vii) growing importance of Kisan Credit Cards, and (viii) higher level of non-performing assets (NPAs). One important aspect missing in this list is, the inter-farm-size class distribution of credit or differential access. The

resource-poor among the farming community do not have due access to formal credit, the issue that has attracted the attention of policymakers and researchers.

### Access to Credit

Details about the average credit per cropped hectare have been given in Table 1 farm-size-wise as well as state-wise. At the country level, an average loan of ₹ 5580 could be obtained per hectare. The marginal farmers could obtain maximum amount (₹ 7754/ha), followed by small (₹ 6024/ha), semi-medium (₹ 5113/ha), medium (₹ 4572/ha) and large (₹ 2953/ha) farmers. Thus, credit amount per unit cropped area was inversely related to farm-size. State-wise, except in Uttar Pradesh where credit availed for agriculture by the marginal farmers was lower than the overall average, in all the states marginal farmers received a higher amount of credit per hectare compared to the overall across states. Credit obtained per operational holding was ₹ 8425 on all-India basis with the ratio between what large farmers obtained to that availed by marginal farmers of almost 11. The Punjab farm-households obtained

**Table 1. Average credit obtained per cropped hectare and per operational holding in different states of India: 2006-07**

(Rupees)

| State            | Marginal farmers |        | Small farmers |        | Semi-medium farmers |        | Medium farmers |        | Large farmers |        | All farmers |        |
|------------------|------------------|--------|---------------|--------|---------------------|--------|----------------|--------|---------------|--------|-------------|--------|
|                  | Per OH           | Per ha | Per OH        | Per ha | Per OH              | Per ha | Per OH         | Per ha | Per OH        | Per ha | Per OH      | Per ha |
| All-India        | 4291             | 7754   | 10212         | 6024   | 15899               | 5113   | 29246          | 4572   | 45689         | 2953   | 8425        | 5580   |
| Andhra Pradesh   | 10222            | 19671  | 15496         | 10887  | 18702               | 7440   | 37407          | 7900   | 47909         | 5160   | 13664       | 11709  |
| Assam            | 339              | 709    | 567           | 431    | 733                 | 287    | 1544           | 321    | 2577          | 228    | 472         | 455    |
| Gujarat          | 3053             | 5411   | 7858          | 5232   | 12868               | 4451   | 18238          | 3111   | 21990         | 1630   | 8883        | 4001   |
| Haryana          | 12770            | 11685  | 23418         | 8349   | 37909               | 7273   | 64555          | 6192   | 119493        | 5467   | 28659       | 7373   |
| Himachal Pradesh | 2725             | 4806   | 1363          | 803    | 865                 | 311    | 0              | 0      | 0             | 0      | 2198        | 1923   |
| Jammu & Kashmir  | 431              | 951    | 416           | 233    | 537                 | 153    | 2664           | 419    | 0             | 0      | 456         | 540    |
| Karnataka        | 4526             | 9123   | 12095         | 8149   | 20298               | 7228   | 36042          | 6371   | 60771         | 4697   | 12082       | 7302   |
| Kerala           | 4892             | 39369  | 25626         | 20317  | 38930               | 15876  | 57559          | 11410  | 79309         | 5355   | 5992        | 30621  |
| Madhya Pradesh   | 1113             | 2523   | 3383          | 2065   | 6046                | 1923   | 12974          | 1949   | 24390         | 1406   | 4198        | 1969   |
| Odisha           | 1743             | 2787   | 3185          | 2010   | 5258                | 1818   | 8879           | 1572   | 13570         | 1020   | 2731        | 2110   |
| Punjab           | 18630            | 13751  | 30629         | 11046  | 52646               | 10096  | 105780         | 9456   | 166395        | 5727   | 67722       | 8809   |
| Rajasthan        | 3662             | 5518   | 8033          | 4591   | 13678               | 4130   | 24694          | 3756   | 29794         | 2016   | 12194       | 3519   |
| Tamil Nadu       | 3759             | 10519  | 9760          | 8170   | 15866               | 7247   | 24072          | 5998   | 40341         | 4407   | 5960        | 8528   |
| Uttar Pradesh    | 4164             | 6096   | 17629         | 8954   | 26216               | 7387   | 34845          | 5533   | 75511         | 5386   | 8102        | 6948   |
| West Bengal      | 2347             | 2838   | 3147          | 1086   | 5879                | 1489   | 12719          | 1787   | 46683         | 1854   | 2646        | 2074   |

OH = Operational holding

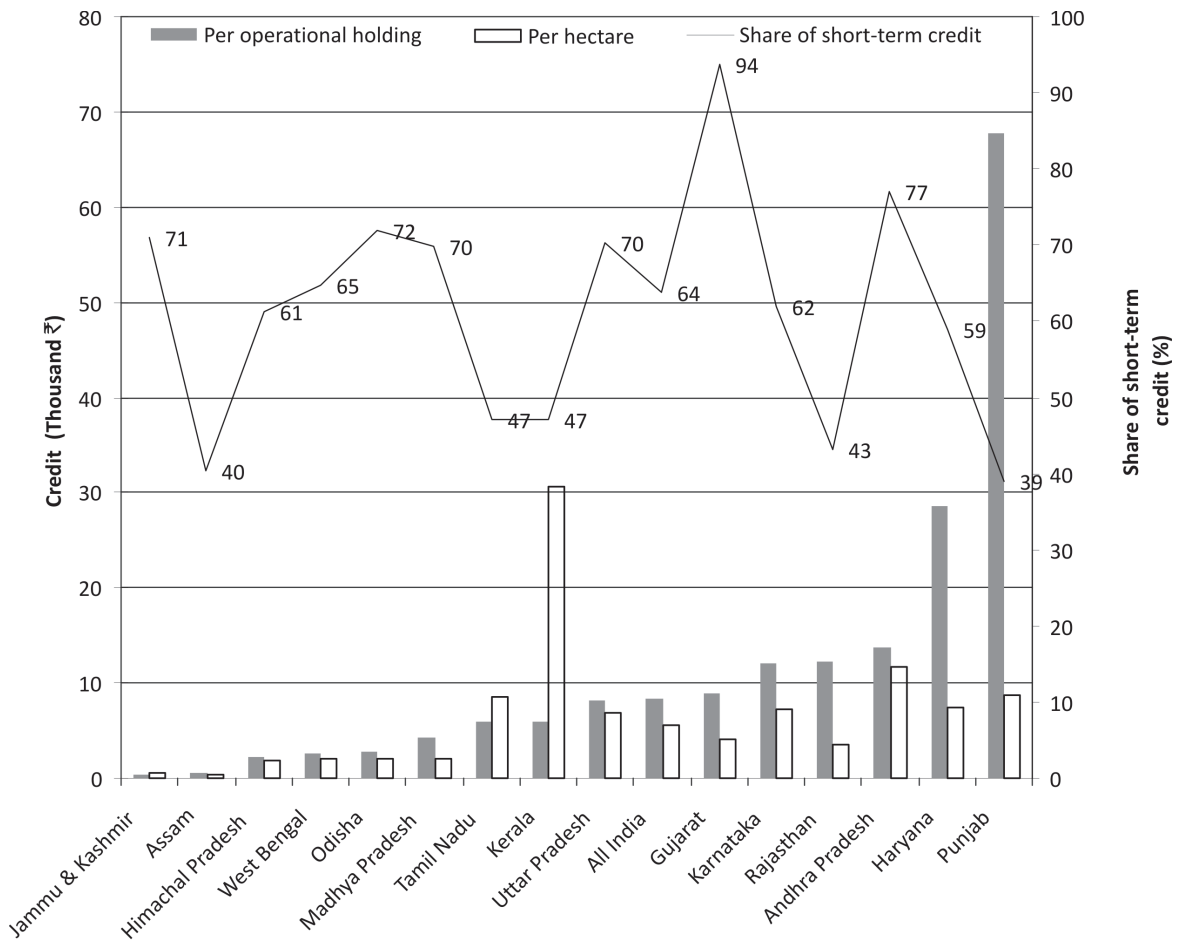


Figure 1. Credit per operational holding and per hectare and share of short-term credit

the maximum credit of ₹ 67,722 per operational holding compared to mere ₹ 452 by a farm-household in Jammu & Kashmir. Overall, about 64 per cent of the credit was short-term at all-India level with variations across the states. The short-term credit accounted for 39 per cent of the total in Punjab and 94 per cent in Gujarat. These variations for all farm-size classes as a group are shown in Figure 1.

**Size Class-wise Distribution of Credit**

Smaller farm-size leads to lower borrowing capacity and bargaining power in credit and other markets. Lack of adequate access to credit is at the root of this problem. Several studies including NSSO situation assessment and input surveys have pointed to the limited access of small farmers to credit. The share of marginal farmers in number of borrowing operational holdings has been lower vis-à-vis their share in the total number of operational holdings at all points in time. However, their share in credit increased

substantially by 2006-07 to 50.16 per cent, regaining the share they enjoyed during 1991-92. Thus, the efforts towards inclusion seem to have paid off. Small farmers gained in the share over time till 2001-02 and lost a bit during 2006-07 (Table 2).

The situation was brighter way back in 1980s when small farmer-friendly credit policy orientation produced more than equitable credit access with small and marginal farmers getting a higher share of total credit than their share in the total area operated. After the financial sector reforms (FSR) since 1991, the credit flow grew faster. But, inequalities soared. Table 3 shows the index of access computed as the ratio of shares of each size class in the borrowing operational holdings to their share in total operational holdings. Higher the index, better is the access of the given farm-size class to the institutional sources. Medium and large farm-size classes of farmers have much better access as reflected by their higher values of index of access. The value of the index is much lower than one for the

**Table 2. Size class-wise distribution of number of farm households borrowing institutional credit at all-India level: 1981-82 to 2006-07**

| Operational holding size-group | (per cent) |       |         |       |         |       |         |       |         |       |         |       |
|--------------------------------|------------|-------|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|
|                                | 1981-82    |       | 1986-87 |       | 1991-92 |       | 1996-97 |       | 2001-02 |       | 2006-07 |       |
|                                | STOH*      | SBOH* | STOH    | SBOH  | STOH    | SBOH  | STOH    | SBOH  | STOH    | SBOH  | STOH    | SBOH  |
| Marginal                       | 55.57      | 42.19 | 57.24   | 42.08 | 57.15   | 51.10 | 60.73   | 43.03 | 60.61   | 41.99 | 63.90   | 50.16 |
| Small                          | 19.05      | 22.62 | 18.44   | 22.13 | 20.29   | 20.72 | 18.93   | 24.90 | 19.96   | 27.37 | 18.66   | 24.49 |
| Semi-medium                    | 14.23      | 19.13 | 13.91   | 20.26 | 13.72   | 16.85 | 12.46   | 18.49 | 12.39   | 19.34 | 11.15   | 15.39 |
| Medium                         | 8.93       | 12.86 | 8.35    | 12.53 | 7.29    | 9.33  | 6.48    | 11.17 | 5.92    | 9.69  | 5.30    | 8.36  |
| Large                          | 2.22       | 3.20  | 2.06    | 3.00  | 1.55    | 2.00  | 1.40    | 2.41  | 1.12    | 1.61  | 1.00    | 1.60  |

\* STOH: Share in total operational holdings & SBOH: Share of operational holdings borrowing from institutions

Source: Computed based on data from Input Survey reports published by Agricultural Census Division, Government of India.

**Table 3. Inequality in distribution of number of operational holdings availing formal credit at all-India level: 1981-82 to 2006-07**

| Operational holding size-group | Value of index of access |         |         |         |         |         |
|--------------------------------|--------------------------|---------|---------|---------|---------|---------|
|                                | 1981-82                  | 1986-87 | 1991-92 | 1996-97 | 2001-02 | 2006-07 |
| Marginal                       | 0.76                     | 0.74    | 0.89    | 0.71    | 0.69    | 0.78    |
| Small                          | 1.19                     | 1.20    | 1.02    | 1.32    | 1.37    | 1.31    |
| Semi-medium                    | 1.34                     | 1.46    | 1.23    | 1.48    | 1.56    | 1.38    |
| Medium                         | 1.44                     | 1.50    | 1.28    | 1.72    | 1.64    | 1.57    |
| Large                          | 1.44                     | 1.46    | 1.28    | 1.72    | 1.45    | 1.60    |
| Theil's index of inequality    | 0.038                    | 0.049   | 0.010   | 0.066   | 0.072   | 0.041   |

marginal farm-size class which indicates that they enjoyed less than their due access to institutional sources. The Theil's index of inequality has further indicated that the inequality, though not very high, increased over time from 0.038 to 0.072. This was the picture till 2001-02. The trend reversed to some extent by 2006-07, as the index of access value for marginal farmers rose to 0.78 and the Theil's index value declined.

The data on farm-size-wise distribution of borrowings (amount) vis-à-vis that of operated area (OA) are given in Table 4. During 1981-82, the marginal farmers enjoyed a higher share in the institutional credit amount (21.51 %) compared to their share (12.05 %) in operated area. At the same time, in spite of operating 23.02 per cent of area, large farmers as a group could get mere 9.16 per cent of the institutional credit. By 2001-02, though marginal farmers operated a higher (by 6.65 percentage points)

proportion of the area compared to 1981-82, their share in credit increased marginally by 2.07 percentage points to reach 23.58 per cent. A similar trend was observed in the case of small farmers. Here also, the year 2006-07 marked a significant improvement in the access of marginal farmers to formal credit as their share in the total credit improved by about 9 percentage points and that of small farmers increased by 2.21 percentage points.

The index of access and Theil's measure of inequality computed based on the data in the Table 4 are presented in Table 5.

The estimates reveal that the index of access value was greater than one for marginal and small farmers, signifying that the adverse bias was not present in the distribution of credit amount across farm-size classes. However, the declining inter-class inequality reveals that the bias in favour of marginal and small farmers

**Table 4. Farm-size-wise distribution (amount) of institutional credit at all-India level: 1981-82 to 2006-07**

| Operational holdings<br>size-group | 1981-82 |                  | 1986-87 |       | 1991-92 |      | 1996-97 |      | 2001-02 |       | 2006-07 |       |
|------------------------------------|---------|------------------|---------|-------|---------|------|---------|------|---------|-------|---------|-------|
|                                    | SA*     | SIC <sup>§</sup> | SA      | SIC   | SA      | SIC  | SA      | SIC  | SA      | SIC   | SA      | SIC   |
| Marginal                           | 12.05   | 21.51            | 13.39   | 25.51 | 14.86   | 24.6 | 17.42   | 26.4 | 18.70   | 23.58 | 20.76   | 32.55 |
| Small                              | 14.14   | 21.64            | 15.62   | 19.02 | 17.33   | 20.7 | 18.18   | 21.3 | 20.16   | 23.84 | 20.40   | 22.61 |
| Semi-medium                        | 21.15   | 22.81            | 22.28   | 23.66 | 23.16   | 24.2 | 23.20   | 23.2 | 23.95   | 25.09 | 23.58   | 21.03 |
| Medium                             | 29.64   | 24.88            | 28.65   | 22.99 | 27.20   | 21.5 | 25.73   | 22.0 | 23.97   | 21.45 | 23.32   | 18.40 |
| Large                              | 23.02   | 9.16             | 20.05   | 8.82  | 17.45   | 9.0  | 15.47   | 7.1  | 13.22   | 6.05  | 11.94   | 5.41  |

\*SA = Share in area operated

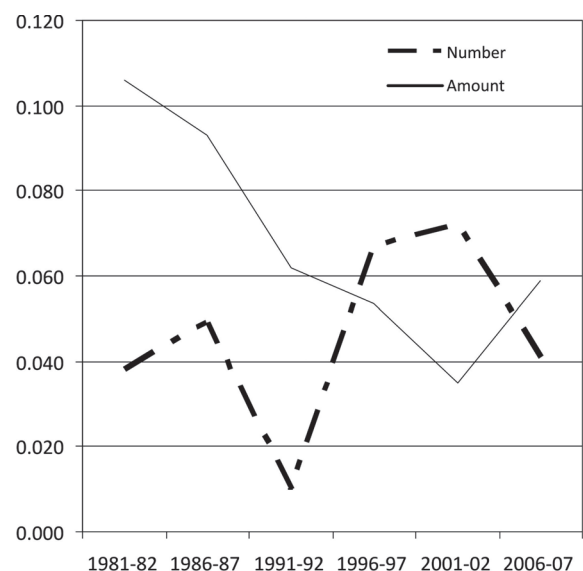
§SIC = Share in institutional credit

**Table 5. Inequality in distribution (amount) of institutional credit with respect to that of area operated at all-India level: 1981-82 to 2006-07**

| Operational holdings<br>size-group | Index of access |         |         |         |         |         |
|------------------------------------|-----------------|---------|---------|---------|---------|---------|
|                                    | 1981-82         | 1986-87 | 1991-92 | 1996-97 | 2001-02 | 2006-07 |
| Marginal                           | 1.78            | 1.90    | 1.66    | 1.52    | 1.26    | 1.57    |
| Small                              | 1.53            | 1.22    | 1.20    | 1.17    | 1.18    | 1.11    |
| Semi-medium                        | 1.08            | 1.06    | 1.04    | 1.00    | 1.05    | 0.89    |
| Medium                             | 0.84            | 0.80    | 0.79    | 0.85    | 0.89    | 0.79    |
| Large                              | 0.40            | 0.44    | 0.51    | 0.46    | 0.46    | 0.45    |
| Theil's index of inequality        | 0.106           | 0.093   | 0.062   | 0.053   | 0.035   | 0.059   |

once prevalent during 1981-82, has faded over time. Small and marginal farmers need to have a relatively higher share in the credit due to their low propensity to save and hence, lower owned-resources, lower credit worthiness and ability to offer collateral security and hence, lower access to instant credit, among others. The higher index value for 2006-07 (1.57) marked the return of positive bias towards marginal farmers. The trend in inequalities in terms of Theil's index for distribution number of borrowers showed an upward trend with a dip in 1991-92 and declined again in 2006-07 and the index in case of amount of credit showed a reverse trend (Figure 2).

The data on the extent of coverage of different farm-size classes by institutional sources have been given in Table 6. Of the marginal operational holdings, borrowing holdings accounted for 17.53 per cent in 1981-82 which declined to 14.02 in 2001-02. This proportion is lower compared to the overall proportion (23.09%) for all operational holdings put together. Except for marginal farm-size class, all other size-classes have a higher proportion of borrowing

**Figure 2. Trend in Theil's index of inequality**

operational holdings than that in the overall sample. During the year 2006-07, there was a considerable increase in the proportion of households borrowing

**Table 6. Proportion of operational holdings availing institutional credit, farm-size-wise at all-India level: 1981-82 to 2006-07**

| Operational holdings size-group                           | Proportion of operational holdings availing institutional credit (%) |         |         |         |         |         | Increment in 2006-07 over 2001-02 (% points) |
|---|--|---------|---------|---------|---------|---------|--|
|   | 1981-82  | 1986-87 | 1991-92 | 1996-97 | 2001-02 | 2006-07 |  |
| Marginal  | 17.53  | 14.78   | 15.68   | 9.50    | 14.02   | 19.6    | 4.6  |
| Small   | 27.42  | 24.12   | 17.90   | 17.63   | 27.74   | 32.8    | 5.0  |
| Semi-medium   | 31.03  | 29.27   | 21.53   | 19.90   | 31.57   | 34.5    | 3.0  |
| Medium  | 33.24  | 30.16   | 22.45   | 23.10   | 33.13   | 39.4    | 6.3  |
| Large   | 33.19  | 29.40   | 22.49   | 23.04   | 29.38   | 40.1    | 10.6   |
| Overall   | 23.09  | 20.10   | 17.53   | 13.41   | 20.24   | 25.0    | 4.75   |
| Index of number of marginal borrowers vs. total borrowers | 100  | 99.72   | 121.12  | 102.00  | 99.52   | 118.98  |  |

from formal sources. Overall, the proportion of borrowers from formal agencies in the total improved to 25.0 per cent in 2006-07 from 20.2 per cent in 2001-02, i.e., an increment of 4.8 percentage points. The increment was higher by 10.6 percentage points for large farmers. That is, more operational holdings were included by 2006-07, though the degree of incremental inclusion was higher with higher farm-size class.

Regarding formal financial institutions, it has been observed that over time the market share of

cooperatives has declined and that of regional rural banks (RRBs) has increased. As per the latest input survey data, cooperatives accounted for half of the loans and 38 per cent of the amount at all-India level, while RRBs purveyed 26 per cent of the loans accounting for 39 per cent of the amount. The commercial banks had a share of 23 per cent both in terms of amount and number of loans (Table 7). State-wise, the cooperatives in Gujarat, Haryana, Madhya Pradesh, Odisha, Punjab and Tamil Nadu had higher

**Table 7. Shares of formal financial agencies in credit disbursed during 2006-07, state-wise**

| State          | Share of formal agencies in number of loans |                  |      | Share of formal agencies in amount of credit |                  |      | Theil's Index value (Credit w.r.t. GCA) |
|----------------|---|------------------|------|--|------------------|------|---|
|                | Cooperatives                                | Commercial banks | RRBs | Cooperatives                                 | Commercial banks | RRBs |   |
| All-India      | 51  | 23               | 26   | 38   | 23               | 39   | 0.0349                                  |
| Andhra Pradesh | 30  | 37               | 33   | 29   | 36               | 35   | 0.0899                                  |
| Assam          | 16  | 61               | 23   | 12   | 61               | 27   | 0.0699                                  |
| Gujarat        | 65  | 16               | 19   | 61   | 15               | 23   | 0.0435                                  |
| Haryana        | 79  | 9                | 13   | 60   | 6                | 34   | 0.0310                                  |
| Karnataka      | 43  | 35               | 23   | 32   | 31               | 37   | 0.0138                                  |
| Kerala         | 34  | 28               | 38   | 30   | 28               | 42   | 0.0755                                  |
| Madhya Pradesh | 88  | 8                | 5    | 72   | 15               | 12   | 0.0098                                  |
| Odisha         | 82  | 16               | 2    | 72   | 26               | 2    | 0.0247                                  |
| Punjab         | 78  | 12               | 10   | 44   | 18               | 38   | 0.0271                                  |
| Rajasthan      | 50  | 9                | 41   | 29   | 13               | 59   | 0.0487                                  |
| Tamil Nadu     | 58  | 11               | 31   | 33   | 23               | 45   | 0.0224                                  |
| Uttar Pradesh  | 28  | 25               | 47   | 23   | 25               | 52   | 0.0156                                  |
| West Bengal    | 52  | 38               | 10   | 48   | 37               | 15   | 0.0827                                  |



**Table 8. Credit flow and fertiliser (NPK) use per cropped hectare: 1996-97 to 2006-07**

| Operational holdings<br>size-group | 1996-97    |          | 2001-02    |          | 2006-07    |          |
|------------------------------------|------------|----------|------------|----------|------------|----------|
|                                    | Credit (₹) | NPK (kg) | Credit (₹) | NPK (kg) | Credit (₹) | NPK (kg) |
| Marginal                           | 968        | 104      | 2809       | 126      | 7754       | 140      |
| Small                              | 779        | 83       | 2790       | 101      | 6024       | 128      |
| Semi-medium                        | 688        | 75       | 2556       | 89       | 5113       | 108      |
| Medium                             | 610        | 68       | 2270       | 76       | 4572       | 95       |
| Large                              | 376        | 51       | 1438       | 56       | 2953       | 68       |
| All farms                          | 697        | 77       | 2475       | 93       | 5580       | 113      |

shares compared to the national average. RRBs had a higher than average share in Rajasthan, Uttar Pradesh, Tamil Nadu and Kerala. Table 7 also gives the state-wise values of Theil's index of inequality between distribution of credit vis-à-vis gross cropped area. The average index value being 0.0349 at the country level, six out of 13 states showed a higher than average index value. The higher index value indicates pro-marginal farmer bias, as revealed by the distribution in question except in the case of Punjab and Rajasthan, where the distribution was in favour of medium farmers.

### Credit and Fertiliser-use

Credit is expected to improve the input use, especially of fertilisers on the farm. The per hectare credit flow (in nominal terms) and fertiliser-use during three input survey years has shown a positive relation between them (Table 8). Credit per cropped hectare increased from ₹ 697 in 1996-97 to ₹ 5580 in 2006-07, an eight-fold increase (in nominal terms). Fertiliser-use increased from 77 kg to 113 kg during the same period. There was a wide inter-state variation in the use of fertilisers per hectare.

Several other factors must have contributed towards the level of fertiliser-use across states, most important one being irrigation availability. Disbursement of a portion of the short-term loan as kind component towards the purchase of inputs (directly paid to the dealer), proportion of short-term credit in total may be a few other factors apart from level of credit. To segregate the impact of credit on fertiliser-use, we have used linear multiple regression model on state-wise data for 2006-07 across five farm-size classes. Kerala with abnormal credit figures was dropped from the regression. The results are given in Table 9.

The regression results show the positive and highly significant role of irrigation (measured as ratio of GIA to NSA) in explaining the inter-state differences in fertiliser consumption wherein every one percentage point increase in irrigation ratio explained increased fertiliser-use by 0.35 kg. Increase in credit by ₹ 100 across states, on the other hand, was associated with a higher fertiliser-use by 0.381 kg, though statistically significant at 9.8 per cent. Fertiliser-credit relation for medium and large farmers showed a structural break with significant intercept and slope dummy variables. In the case of semi-medium farmers, the hiatus in both intercept and slope variables was significant at lower level of confidence (88 - 89 %). That is, incremental fertiliser-use on semi-medium to large farms in response to increase in credit amount by ₹ 100 was higher and significantly so compared to that on marginal and small farms. Share of kind component did not show any impact and hence, was dropped from the model. Share of short-term credit had a positive and significant impact on fertiliser-use. One percentage point increase in the share of short-term credit could account for 0.71 kg of NPK. The marginal impact of credit on fertiliser-use for different farm-size classes were computed based on the results presented in Table 9 and is given in Table 10.

The fertiliser-use per hectare was much higher on marginal farms compared to large farms. In fact, the fertiliser-use on marginal farms was found higher even under the adverse conditions (Chand *et al.*, 2011). However, marginal farms were weak in terms of marginal impact of credit on fertiliser-use. Across states, marginal farmers on an average increased fertiliser-use by 0.381 kg with every ₹ 100 of credit they received. The response was stronger with 1.469 kg per ₹ 100 credit on large farmers. The elasticity of

**Table 9. Impact of credit and farm-size on fertiliser consumption: Regression results**

| Variable | Coefficient | t-ratio | P[ T  > t] | Mean of X |
|----------|-------------|---------|------------|-----------|
| Constant | 52.491      | 1.878   | 0.067      |           |
| CRED100  | 0.381       | 1.688   | 0.098      | 52.552    |
| GIANSA   | 0.360       | 3.773   | 0.001      | 72.178    |
| BORROH   | -0.322      | -0.898  | 0.374      | 34.848    |
| SF       | -13.532     | -0.509  | 0.613      | 0.200     |
| SMDF     | -44.817     | -1.630  | 0.110      | 0.200     |
| MDF      | -53.811     | -1.971  | 0.055      | 0.200     |
| LF       | -58.965     | -2.113  | 0.040      | 0.200     |
| SFCRED   | 0.164       | 0.476   | 0.637      | 11.828    |
| SMDCREC  | 0.635       | 1.578   | 0.121      | 10.128    |
| MDCRED   | 0.957       | 2.128   | 0.039      | 8.991     |
| LFCRED   | 1.088       | 1.802   | 0.078      | 6.500     |
| STHAPC   | 0.714       | 2.246   | 0.029      | 60.180    |

R-square =0.64 and F (12, 47)= 6.79

No. of observations =60

**Table 10. Marginal impact on fertiliser-use and elasticity w.r.t credit on different farm-size classes**

| Farm-size   | Intercept | Marginal impact of credit<br>(kg/₹ 100) | Elasticity of credit w.r.t. fertiliser-use* |
|-------------|-----------|---|---|
| Marginal    | 52.491    | 0.381                                   | 0.20  |
| Small       | 38.959    | 0.545                                   | 0.24  |
| Semi-Medium | 7.674     | 1.016                                   | 0.44  |
| Medium      | -1.320    | 1.338                                   | 0.54  |
| Large       | -6.474    | 1.469                                   | 0.52  |

\*Computed using means for respective size classes.

fertiliser-use w.r.t. credit was between 0.20 and 0.24 on marginal and small farms and 0.52 to 0.54 on medium and large farms.

### Summary and Conclusions

Credit has played an important role in farm production over time. Measures towards institutionalisation of rural credit have paid off in terms of diminishing share of informal sources in total credit availed by the farmers. However, inequitable access to credit across different farm-size classes and regions has remained an intractable problem with growing inequalities in access to credit. The present study has measured the access and degree of inequality in distribution of credit vis-à-vis operated or cropped area. It has also measured the impact of credit on fertilizer-

use. The data collected through quinquennial input surveys the recent one being for the year 2006-07, were used for the analysis.

The study has brought out that inequalities in distribution of number of loans vis-à-vis that of operational holdings have increased over time and access to credit for marginal farmers, measured in terms of an index, has been poor than for large farmers. The bias that existed once (during 1990s) in the favour of marginal and small farmers who obtained a proportionately higher share of credit compared to their share in area operated vanished by 2001-02. The distribution of credit during 2006-07, marked a return of such positive bias to some extent. During this year, the share of marginal farmers in credit increased by about 9 percentage points compared to the share in

2001-02. The proportion of borrowing households in the total has increased during 2006-07 pointing to higher inclusion levels. In terms of gain in proportion of borrowing operational holdings to total, large farmers have gained by maximum of 10 percentage points while all size classes have gained to different degrees.

Efforts should be made to consolidate the gains obtained by marginal farmers in terms of better access in 2006-07. Perhaps, the programme for doubling of agricultural credit launched during 2004-05 must have contributed towards this positive trend. Fertiliser consumption across states could be explained by credit levels, irrigation availability, share of short-term credit and farm-size. Higher credit levels could be associated with higher fertiliser consumption levels, as has been revealed by a cross-section data across the states and farm-size classes during 2006-07. Across states, marginal farmers on an average could increase fertiliser-use by 0.381 kg with every ₹100 of credit they received. The response was stronger with 1.469 kg per ₹100 credit on large farmers. The elasticity of fertiliser-use w.r.t. credit has been found between 0.20 and 0.24 on marginal and small farms and between 0.52 and 0.54 on medium and large farms.

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