

**Microfinance and the Rural Poor:
Impact Assessment Based on Fieldwork in Madhya Pradesh, India**

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1 INTRODUCTION

A number of anti-poverty policies and programmes have been launched in India during the 1970s and 1980s, including those of credit delivery programmes, targeting the poor. Various methodologies have been devised and nation wide surveys have been conducted in identifying the poor for the successful delivery of the programmes. Unfortunately, such programmes have always been under criticism for mistargeting either due to lackluster implementation or elite capture at the ground level. For example, Gaiha *et al.* (2001) argued that benefit to the rural poor of two major anti-poverty programmes (Rural Public Works and Integrated Rural Development Programme) are likely to be limited, given their gross mistargeting. Larger sections among the poor were not covered and moreover, the non-poor were the majority among the participants. Similar outcomes were also reported by Dreze (1990) in his study on IRDP in the state of Uttar Pradesh. Such mediocre targeting and performance of the public programmes on poverty alleviation during the 1980s questioned the poverty alleviation strategies, particularly identifying poor households/individuals, besides other bottlenecks in governance and appropriateness. During this period, popularity of group-based microfinance services grew in many developing countries of Asia, Africa and Latin America as a new form of institutional arrangement in targeting the poor and, thereby, helping them rise above poverty line through provision of financial services. Some popular examples that have been Grameen Bank in Bangladesh, NABARD SHG-Bank linkage programme in India, BancoSol in Bolivia, and many other microfinance programmes in different developing countries. Microfinance programmes in India are promoted primarily as an instrument of anti-

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poverty measures through delivering credit for expanding production and employment choices of poor. The country-wide spread of these programmes in recent years is overwhelming and it has generated concern among researchers and policymakers in scrutinizing the outcomes of such large outlay, most particularly the issues of targeting and impact on improving household income.

The efficacy of the microfinance programmes in targeting the poor and making an impact, simultaneously, has been under scrutiny by a number of empirical studies². Evidence from a variety of social programmes in both developed and developing countries suggest that information sets differ, even among those eligible, and that participation rates vary widely and are sensitive to programme design. For example, in Bangladesh, programmes with clear eligibility conditions have often been violated them due to expectation of higher returns from wealthy borrowers (Morduch, 1998; Rahman, 1999). In India, many of the group-based microfinance programmes do not have any clear cut guidelines in targeting and therefore, the possible bias against the very poor cannot be ruled out. One of the leading microfinance institutions (MFIs) in India believes that MFIs are not designed to serve the very poor, rather there may be a trickle down effect in the rural economy which would take care of the very poor (Mahajan, BASIX webpage).

There has been a plethora of research in assessing the impact of these programmes on a variety of outcomes, in developing as well as developed countries. But, little emphasis is given to understand how well targeted these group-based microcredit programmes actually are. Besides, researchers also widely differ in methodology³ of measuring targeting of microfinance programmes. Nevertheless, there is no consensus among the researchers about the impact of these programmes, as they claim. These studies can be categorized in three frames;

- Some empirical studies have supported the claims of microfinance programmes and measured the economic and social gains of participation in the programmes, at the household or individual or enterprise level⁴.

² See Hulme and Mosley, 1996; Pitt and Khandker, 1996; 1998; Morduch, 1998; Zaman, 2000; Puhazhedi and Badatya, 2002, Khandker, 2003.

³ See Navajas *et al.*, 2000; Diagne and Zeller, 2001; Amin *et al.*, 2003; Somanathan and Dewan, 2003.

⁴ See Hossain, 1988; Otero and Rhyne, 1994; Schuler and Hashemi, 1994; Schuler, Hashemi and Riley, 1997; Pitt and Khandker, 1996, 1998; Khandker, 2003.

- Some studies have contested the claims of the microfinance programmes and cautioned that there exists a trade-off between outreach and sustainability⁵.
- Some studies that have estimated the beneficial impacts of microfinance programmes but argued that microfinance programmes largely exclude the poorest⁶.

Evaluation studies on Indian microfinance programmes have been mostly conducted by the microfinance institutions (MFIs). Most of them have found measuring impact to be challenging in terms of methodological rigour, but using simplistic analysis they supported the view that microfinance is a tool against poverty and the poor can escape poverty by turning up as an entrepreneur⁷. Puhazhedi and Badatya (2002) evaluated the impact of SHG-Bank linkage scheme, which is the most prominent microfinance programmes in India. Again, this is NABARD's evaluation of its own programme. They concluded that institutional credit has deepened and widened among the rural poor while there has been substantial reduction of loans from moneylenders and other informal sources. They also suggested that credit has substantial beneficial impact of various household outcomes. But this study has simply followed the difference in means, among the groups of participants and non-participants, in measuring impact and therefore, the results are not robust enough to be acceptable. Comprehensive impact assessment studies in India are very much limited. Most of them are qualitative studies giving emphasis on empowerment of women and other social benefits, rather than quantitative estimation of household gains from the programme. There is no significant academic endeavour in India in measuring impact of microfinance programmes, at the household level, in a comprehensive manner, although at the international level a lot of work has been done on this subject.

Against this background, the present paper is an attempt to examine the extent to which microfinance services have been successful in delivering their promise, particularly targeting the poor and impact on household income. In view of unavailability of published data for measurement of targeting and impact assessment, the present study employs household level data collected from field work in Madhya Pradesh. The survey

⁵ See Adams and von Pischke, 1992; Montgomery, 1996; Rogaly, 1996; Buckley, 1997; Wood and Shariff, 1997; Morduch, 1999.

⁶ See Hulme and Mosley, 1996; Mosley and Hulme, 1998; Diagne and Zeller, 2001.

⁷ See Fisher and Sriram, 2002; Tankha, 2002; Sinha and Sinha, 2002.

data and methodology of measuring targeting and impact assessment is discussed in the following section. The third section analyses the measurement of targeting of microfinance programme. The fourth section presents the estimates of impact of participation in microfinance programmes on household level outcomes, particularly per capita income and share of off-farm income. The final section infers conclusions from the analysis.

2 DATA AND METHODOLOGY

The present study evaluates the impact of group-based microfinance programmes, primarily focussing on rural poor households in the backward regions in India. In particular, it examines three most popular group-based microfinance programmes in India, such as; (i) government supported Swarnajayanti Gram Swarozgar Yojana (SGSY) programme, which is operational in all over the country since April 1999; (ii) NABARD's SHG-Bank linkage programme, particularly the second model in which a facilitator promotes the SHGs (PRADAN in the present study⁸); and (iii) the World Bank promoted SWASHAKTI SHG programme with participation of state government and local community level organisations, which is operative since 1999. There was neither random placement of the programmes nor any strict eligibility criterion followed to join in the programme⁹, in all the three programmes as implemented. Further, we had no baseline database of the households in the area and it was not feasible for the study to undertake any baseline exercise.

In view of above, a “non-experimental” survey design¹⁰ was suitable for the present study in which our sampling framework involved both participant and non-participant (control) group of households that are exhaustive in any particular village and the sample households were drawn through a multistage stratified random sampling method. The final unit of the survey was household and the study arrived at the household through a systematic process of zeroing down from selection of the state, then to districts, then to blocks and villages and then to household. The detail discussions on the processes are discussed in the following section.

⁸ Professional Association for Development and Action (PRADAN) is an NGO working in nine states of the country and, importantly, it is promoting microfinance initiative in the tribal areas.

⁹ The participant households in groups under PRADAN and SWASHAKTI microfinance programs self-select themselves. The SGSY allows some members with a selection rule and others self-select to the group. In all, members even under SGSY are mostly self-selected. For detail see Sarangi, 2007b.

¹⁰ For detail discussion on selection of evaluation design, see Sarangi, 2007a.

2.1 Data

2.1.1 Selection of Study Area

The idea of the present study was to look at the impact on poor in a backward region in the country. Therefore, the prime criterion for choosing the field area was incidence of rural poverty. However, we also attached another important criterion with poverty, i.e., the operation of certain microfinance programmes. Further, the study attempted to examine impact in two different regions where microfinance programmes were active. The idea of selection of two districts was to examine the regional variation in impact of microfinance programmes. So, the motive was to take one tribal region and another relatively prosperous region. Under the framework of the selection of regions Betul and Sehore in the state of Madhya Pradesh were typical for the present study¹¹. In short, the fieldwork area in Betul represents tribal and high poverty region whereas the fieldwork area in Sehore is agriculturally prosperous and relatively better off than Betul. After the selection of regions, the sample villages were selected, again on the basis of programme availability.

2.1.2 Selection of Microfinance Programmes and Villages

A pilot survey to the district headquarters helped identifying programmes at the local level (blocks, gram *Gram panchayats* and villages) and on the basis of duration of the programme operation (where a programme is functioning at least more than a year) one block in each district is selected, without losing the macro characteristics of district selection. Thus, we selected “*Shahpur*” block in Betul and “*Sehore*” block in Sehore. It may be noted that meeting with the key resource persons from government and non-government officials was crucial in selecting a block.

Finally, cluster of villages from each block are chosen on the basis of programme availability and their duration. Availability of groups were highly scattered and in many villages there were only one or two groups. There were many villages that don't have any group at all¹². For economising on time and resources, we selected village cluster where higher number of groups are functioning, so that number of villages are minimised.

¹¹ For details of selection of state and districts, see Sarangi, 2007a.

¹² The number of groups in the village is depended on the level of functioning of the external agency (NGO or government agent). For some reason (not exactly explored in this present research) the agents do not prioritise those villages to intervene in group formation. The common explanation they gave was that the intervened villages are more poverty stricken, than many other villages.

Although we had thought of restricting the villages into one *Gram Panchayat*, we could not find the requisite number of groups in one *Gram Panchayat* (all the villages in any *Gram Panchayat* don't necessarily have groups). So in both the blocks we have to go for more than one *Gram Panchayat*.

All the 15 groups of PRADAN are in *Shahpur* block while all the 15 groups of SWASHAKTI are in *Sehore* block, because these programmes are not in every district or in every block. So we cannot take them in all areas. But, the 15 groups of SGSY are divided between *Shahpur* and *Sehore*, as it is a universal government programme. But their density varies widely. In *Shahpur* the density of SGSY are much less than in *Sehore*. We, therefore, took 5 groups in *Shahpur* and 10 groups in *Sehore*.

2.1.3 Village Census, Stratification and Selection of Households

Given the framework of a “non-experimental” evaluation design, the final unit households were selected through an *endogenous stratified random sampling* process in which *membership status* was the stratifying variable¹³. First, I take a quick *census with house listing* to identify the participant and non-participant households in the villages. The census questionnaire provided information on head of household, number of members in the household, caste group, membership status in any microfinance programme, name of the group and the group promoting organisation (SHPI). So we obtained information about all the groups in the village. Then, we used *membership status* as the stratifying variable. All the groups in the village are included in the sampling frame. The group size differs from each other. We selected 4 participants from each group stratum by systematic random sampling without replacement, thus assigning equal weight to each participant household of the group. A total of 15 groups from each microfinance programme are selected and, therefore, total 60 members from the programme are selected for detail household survey which statistically gives equal weight to each programme in the final sample. As we have taken three programmes, the total numbers of participant households become 180 encompassing the two districts and the three programmes.

¹³ For more on similar evaluation design, see Diagne and Zeller, 2001.

2.1.4 Selection of Counterfactual

As we stratified the households in the village on the basis of *membership status*, we obtained the stratum on non-participant households in the village. From this stratum we selected non-participant households (systematic random sampling without replacement) with a ratio of 1:2 to participants in each village. However, in case any household was unavailable/ non-cooperative during the time of survey, that was replaced with the next randomly selected household from the stratum. The selection of non-participants from the entire stratum satisfies the property that the control group is not conditional upon any criterion. Therefore, the control group average outcome may be better off or worse off depending upon the factors that affect participation of household in the programme.

2.2 Methodology

2.2.1 Targeting

First, a number of indicators are compared for participants and non-participants by using t-test procedure. For example, we apply t-test to test whether the mean for per capita income is the same for participants and non-participants. It has been noted earlier that the participant sample is drawn from three different programmes. It is, therefore, a matter of interest to know if the mean indicators across the different groups are same. Treating the participant sample into three different groups, we apply ANOVA to test the null hypothesis that the mean indicator across the different groups, including non-participants, is same. A rejection of t-test would imply that the sample means are different for different groups.

Second, we employ probit regression to estimate the probability of joining microfinance programme by controlling for a number of household and village level characteristics. Use of probit or logit regression is on the basis of the assumption regarding the distribution of sample variance. We have a fairly large sample and every household was free to join the programme. Whether the household joins or not, therefore, is a case of self selection issue. The latent threshold limits of joining or not-joining the programme are unobserved for any particular household. In this context, we assume sample variance to be normally distributed and therefore, we employ probit regression. When ε is normal

$E(\varepsilon | x) = 0$ and $\text{var}(\varepsilon | x) = 1$, the pdf is; $\phi(\varepsilon) = \frac{1}{\sqrt{2\pi}} \exp(-\frac{\varepsilon^2}{2})$ and cdf is

$\Phi(\varepsilon) = \int_{-\infty}^{\varepsilon} \frac{1}{\sqrt{2\pi}} \exp(-\frac{t^2}{2}) dt$ (Long, 1997). Using the probit regression, we estimated the

predicated marginal effects and the predicted probabilities of participation, given X variables. Plotting the predicted probabilities across per capita income will give us idea about the probability of participation of households at different points of the income distribution. Therefore, we can estimate the probability of participation for the households below a threshold level of living. If the probability of participation below this threshold level is higher than those above the threshold level, then the programme is well targeted.

2.2.2 Impact Assessment

Most of the evaluation studies adopted a counterfactual framework which allows us to consistently estimate various treatment effects that may be of interest, under different evaluation designs¹⁴. However, the fundamental evaluation problem arises due to identification of a counterfactual, particularly in a “non-experimental” evaluation design with cross-section data. A counterfactual is defined as - each observation has potential outcome with and without treatment, such as; y_1 - outcome with treatment and y_0 - outcome without treatment. But a particular observation can not be seen in both states at the time of survey. We can get the observable outcome to be either y_1 or y_0 but not both. Let w be a binary indicator for treatment (participation in programme); $w = 1$ for treatment and $w = 0$ for no treatment. Assume y_1 and y_0 to be independently and identically distributed (i.i.d) random sample, which implies that the effect of treatment on any particular observation has no influence on the effect on outcome of any other observation. Under this condition, the effect of treatment is calculated as simply the difference in the outcomes with and without treatment, i.e., $y_1 - y_0$, which is $(y_1 |_{w=1} - y_0 |_{w=0})$.

¹⁴ Some important references are Rosenbaum and Rubin, 1983; Maddala, 1983; Mofitt, 1991; Hulme, 1997; Mosley, 1997; Heckman, Ichimura and Todd, 1997; Pitt and Khandecker, 1996; 1998; Jalan and Ravallion, 1999; Diagne and Zeller, 2001; Ravallion, 2001.

However, randomisation of treatment is often infeasible in evaluation studies, particularly in the absence of proper eligibility condition¹⁵. The individual often decides or gets motivated by the influence of the agents of the programme whether to join or not in the programme. In other words, they self select themselves into the programme. The decision to join in the programme might be his/her vision of personal gains that he/she is expecting out of participation. Alternately, the people who do not select themselves into treatment may expect no gain from participation. Therefore, assuming randomness of treatment would contaminate the estimates by sample selection bias (Heckman, 1979).

In case there is self-selection of treatment, the selection process has to be included in the estimation process for a correct specification of the model. So, we employ the “treatment effect” model to take care of the selection bias in the sample by simultaneously estimating the outcome linear regression and the participation equation (Moffitt, 1999; Greene, 2002). We then test for the existence of selection bias in treatment¹⁶. The method is discussed as follows;

Outcome linear equation: $y = x\beta + w\delta + u$

Suppose programme participation is defined as: $w^* = z\delta + v$; $v \sim N(0,1)$

where w^* is a latent indicator of participation, z are observable characteristics and v are unobservables, such as;

$$w^* = \begin{cases} 1 & \text{if } z\delta + v > 0 \\ 0 & \text{if } z\delta + v \leq 0 \end{cases}$$

The treatment effect model assumes $(u, v) \sim \text{binormal}(0,0, \sigma_u, 1, \rho)$. It implies that the model assumes u and v are distributed bivariate normal with means zero, variances σ_u and 1, respectively, and with correlation ρ .

The conditional mean of y will be equal to

$$E(y | x_{w=1}) = x\beta + \delta + E(u | x_{w=1}) = x\beta + \delta + \theta\lambda(z\delta)$$

where $\theta = \sigma\rho$ and $\lambda(z\delta) = f(z\delta)/F(z\delta)$ is the inverse mills ratio. Consistent estimates of β can be obtained by estimating the outcome and participation equation either by

¹⁵ It may be mentioned that in the presence of strong eligibility conditions of program membership, randomization of treatment within the eligible population is feasible.

¹⁶ Another method to correct for the selection bias is to apply instrumental variable (IV) regression. IV method requires appropriate instrument(s), variable(s) that is(are) highly correlated with the endogenous regressor but not with the outcome variable, to correct for the problem of selection bias and endogeneity bias¹⁶ in the framework of a simultaneous equation system. However, finding suitable IV is critical and therefore, in the final specification we drop the use of IV model. For more see Sarangi, 2007a.

maximum likelihood method or by a two step procedure in which probit estimates of participation equation are used to estimate the linear outcome regression, using weighted least square method. The sign and significance of the term $\lambda = \rho * \sigma$ tells whether there is selection bias. It may be mentioned that since σ must be positive, the sign of λ is determined by ρ . If ρ is positive (negative), the OLS coefficient on w will be biased upward (downward).

3. MICROFINANCE PROGRAMMES AND TARGETING OF THE POOR

3.1 Difference in Group Means

Table 1 presents the average values of different indicators pertaining to participant and non-participant households. The exercise has been carried on for the aggregative sample and also for the samples pertaining to the two districts separately. Further, we also look at the differences in sample means of participants belonging to different microfinance programmes, as given in Table 2. Tests are applied for the indicators including demographic structure such as household size and number of children of age upto 6 yrs; economic status captured by number of usual workers in the household, agricultural landowned and percent of households reporting self-employment in off-farm business; value of productive assets such as livestock, farming and transportation; consumption expenditure per capita on food, clothing and footwear and total monthly consumption per capita; and monthly income per capita. It can be seen from the Table 1 that average household size of the participant households is significantly higher than non-participants in total sample as well as in district samples separately. The difference among average number of children upto age of 6 years is not significant either in Betul or in Sehore. The average number of usual workers is significantly higher for the member households than the non-members in Betul whereas there does not seem to be much difference across the groups in Sehore. However, the work participation ratio (workers/household size) turns out to be high among the non-member households than their counterparts, in each of the districts as also in aggregate sample. One would, therefore, infer that high work participation ratio tend to be negatively correlated with programme participation. Nevertheless, the direction of relationship between programme participation and work participation rate is a proposition to be examined.

One of the most crucial indicators of economic well-being of rural household is agricultural land. This does not seem to be different across the population groups. The test statistics are not significant for any of the categories. However, percent households reporting self-employment in off-farm activities (excluding livestock) is much higher for the participant households than their counterpart in Betul. Indeed, intervention of PRADAN in promoting poultry, mushroom cultivation and sericulture among the participating households has helped diversifying their economic portfolio, whereas undertaking off-farm activities is a distant possibility for the non-participant households. However, the sample from Sehore indicates that the overall percent of households reporting self-employment is higher than that of Betul. Understandably, the locational factors contribute to creation of opportunities for diversifying production and employment choices and thus, Sehore being situated near a town has greater opportunities for undertaking off-farm activities. But there does not seem to be much difference among the participants and non-participants in terms of off-farm activities undertaken. It was also observed in the study that there was not much extra effort by the microfinance programmes in promoting off-farm activities among the participant households in Sehore. The activities of the participants were mostly self-induced which might have been indirectly supported by access to finance or market exposure training provided by the self-help group promoting institution (SHPI). One would, however, observe higher incidence of off-farm activities by member households than the non-member households in both the regions and also at the aggregate level.

One of the direct gains from participating in microfinance programmes in rural areas seem to be increase in livestock holding which is significantly different for the participants than the non-participants. Most of the Bank finances provided to the participants are for livestock and the household's demand for livestock, particularly buffaloes, is not only for its net contribution to household earning but also for the purpose of consumption needs. The difference in value of livestock assets across the groups is well noticeable in both Betul and Sehore. Value of transportation assets is also higher for the participant households than the non-participants in all the regions and also at the aggregate level. But the pattern is not similar in accumulation of farming assets. Overall, the non-participants have higher values of farming assets than the participants and the difference is mainly due to the high difference observed in Sehore.

Indicators on consumption items, particularly clothing and footwear, seem to obtain high average values for the participant households than the non-participants. Many of the respondents reported that increase in sociability in the recent years (which may be attributed to the effect of television, increasing schooling of children, interacting with officials through participating in group-based activities etc.) has led to higher spending on clothing and footwear. Noticeably, in Betul many households have reported expenditure on footwear, which they were not doing before their participation in self-help groups (SHGs). Similar is the case for clothing of children, particularly those who are going to school. Attending meetings of SHGs has positively influenced many households to invest in such necessities of social life.

However, overall monthly consumption per capita is higher for the non-participants than those of the participants. Similarly, at the aggregate level, average monthly per capita income of the non-members is higher than that of the members. In Betul, average income is significantly higher for the non-participants than the participants. But, the difference is not statistically significant in Sehore, although the average income is higher for the non-participants than the participants. Indeed, both the regions report higher monthly per capita income (MPCINC) for the non-participants than those of the participants. However, the aggregative sample shows that the difference rarely becomes significant at only 10 percent level.

Noticeably, the behaviours of multiple indicators indicate that the distribution of economic well-being for the two groups differ across different indicators and we can not come to any conclusion about targeting from examining these indicators differently. One way is to look at probability of participation with per capita income, while controlling for other covariates of household (Diagne and Zeller, 2001). The other way is to construct a level of living index by aggregating the multi-dimensional indicators and measure the relative poverty between members and non-members (Henery *et al.*, 2001). Both the results are largely identical and they are discussed in detail in Sarangi, 2007b. In this paper, I restrict the analysis to the results of probability regressions only.

3.2 Determinants of Participation: Probit Regression Model

3.2.1 Data and Variables

The probit regression is applied to estimate the probability of participation as a function of level of per capita consumption of household (as a proxy for income), off-farm activity, work participation rate, years of schooling of principal earner of household, adult literacy ratio, productive assets, agricultural land (acres), distance index, regional dummy and years of operation of different microfinance programmes in the villages. The level of monthly per capita consumption is divided into five quintile groups. For the five quintiles we introduced four dummies in the model, keeping the dummy of the bottom quintile as the default category. Understandably, if the programme is appropriately targeted towards the poor then the dummies of the higher categories should be having negative coefficients, as compared to the default category.

We have observed from the descriptive statistics that the percentage of households reporting self employment in non-agricultural activities is higher for the participating households than the non-participants. However, the variable is introduced as a dummy to capture the unobserved quality of the household for taking risk in non-farm activities or the entrepreneurial attitude of any member in the household, which may induce a person in the household to become a member of the group. Becoming a member might have helped her/him in getting access to resources for which she/he could have been able to realize her/his expected earnings. If the expected probability coefficient is positive and significant then it would confirm that the households with strong motivation for non-farm activities have higher probability of participation in the programme.

Work participation ratio (ratio of workers to total household size) captures the stock of labour in the household. Higher the work participation ratio, lower will be the dependency ratio and therefore, average per capita earnings will be higher. Households with higher work participation ratio tend to be in the upper quintile of income distribution. So the probability coefficient of participation is expected to be negative with increase in work participation rate in case the programmes are targeted to the poor.

Education, captured by the indicator years of schooling of principal earning member, helps enhancing opportunities and economic prospects of the person. Importantly, it also

increases access and participation in different institutions in the village. Literacy ratio¹⁷ (ratio of literate adults to total household members) reflects the capacity of the household in terms of getting access to the village institutions as well as being aware about the anti-poverty programmes and policies meant for upliftment of the rural households. One would, therefore, expect a positive coefficient of probability of participation for both the educational indicators.

Value of productive assets including farming, livestock and transportation represent household non-liquid wealth and in the model they are used as control variables. Owning of agricultural land is another non-liquid wealth which is also used as a control variable. Distance is a major factor in accessing information and also accessing village institutions for a rural household. Inaccessibility to outside village institutions, say local agricultural *mandi*¹⁸, local *hat*¹⁹ or nearest town makes a household vulnerable to local middleman. More importantly, remoteness restricts flow of information about different programmes and schemes to the targeted sections. But capturing distance effect by using a particular distance variable brings biasness in regression equation as it may overestimate the effect while there are other points which also influence the household or the households in the entire village. So we construct a *distance index* by considering multi-point distances from the village, measured in kilometers, such as distance of village from block office, nearest town, bus stop, agricultural *mandi* and local *hat*. The hypothesis is that with increase in score of the *distance index* household's probability of participation in programme declines.

Our sample represents two regions and we include a dummy for the region Sehore which has been selected to represent agriculturally prosperous region and it is also different because of its better access to state level institutions and better infrastructure facilities, as compared to Betul. The hypothesis to be examined is whether there exists any regional effect in participation of programme which will account for the unobserved effects that the region is representing for.

Finally, we have included three variables for three programme effects which are introduced as number of years of operation of the programme in the village. For example,

¹⁷ We have excluded the literacy rate of children (age below 15 years) because the participating decisions in village institutions is taken by the adults.

¹⁸ *Mandi* is a government administered trading centre.

¹⁹ *Hat* is the local weekly or monthly regular market place.

a positive and significant coefficient will imply that with increase in operation of the programme the rate of participation in the village will increase.

3.2.2 Regression Results

The regression coefficients and predicted marginal probability of participation in group-based credit programmes is presented in Table 3. The coefficient of dummy for the 2nd quintile is positive but insignificant. The coefficients of dummies for the 3rd and 4th quintiles are positive and highly significant. Importantly, the values of the coefficients are increasing, the figures being 0.476 and 0.571. One would, therefore, see increase in the marginal effects of probability of participation with increase in level of living upto a certain point, i.e., fourth quintile of population distribution and then it declines. Noticeably, the marginal effect of the dummy for the fifth quintile is negative, although not significant.

A household's probability of participation increases if any person from the household is having entrepreneurial attitude, which is confirmed from the positive direction of the indicator on self employment in off-farm business. The coefficient is also statistically significant at 5 percent level. One might say that this is *post facto* situation. Indeed, we do not have baseline data in which we have information about the participant; whether he/she was interested to join the group for undertaking off-farm business. It is generally observed that the households with some inclination to start business or other non-farm enterprises are incapable of doing so because of restricted knowledge of product or factor markets, procedures of starting business or, most importantly, shortage of capital. Propaganda of microcredit programmes motivated these households to join the programme and then they took the initial step in starting off-farm business by borrowing from the group. *For example, one participant reported that she wanted to support her son to start a business (selling items by moving from place to place in a bicycle), but she had no capital. At that time Swashakti SHGs were formed in the village and she joined a group with the hope that she can borrow from the group at a later date. Indeed, after some time she borrowed from the group for the purpose of business support to her son, and now their earnings from business has grown significantly.* Nevertheless, many households reported that main purpose of joining the group was to avail credit for income generation purposes, besides fulfilling consumption needs. So the dummy for self

employment activities represents that with motivations for non-farm work the probability of participation increases.

Work participation is inversely related with probability of programme participation, the coefficient being significant at 10 percent level. This indicates that higher the ratio of workers in the household lower is the probability of participation in programme. As work participation rate is higher among the better off households, it implies that participation rate of such households in the programme is low.

The coefficient of education of earning member turns out to be negative and significant which implies that higher the level of education lower will be the incentive to join the programme. Although this contradicts our hypothesis of positive influence of education on programme participation, it may be explained by the fact that education increases economic opportunities of a person and if the returns are higher in alternative occupation then he/she will not prefer to join the programme, because the opportunity costs of joining the programme may be higher for him/her. In our context, higher level of education has been observed for the persons with higher level of household income or wealth and the participation rate of these households is low as compared to others. On the other hand, educational attainments are very low among the poor or the population belonging to the lower strata of income distribution. With the population highly skewed in terms of educational attainment (high concentration of persons with higher schooling years in higher income strata) the probability of participation, therefore, declines with increase in level of educational attainment. However, this may not be seen as a consequence of higher schooling years, rather an interaction effect of higher schooling years and higher income. It may be noted that the effect of literacy ratio on probability of programme participation is positive although it is not statistically significant.

Distance index has negative effects on probability of participation in the programme. For instance, if the index has higher values for a particular village then the households in that village have lower probability of participation. This is primarily due to the fact that with increase in distance in accessing the village, the cost of communication for the programme agents increases and the level of intervention decreases. So penetration of the programme is restricted to few households in the village. Similarly coefficient of the dummy for district Sehore is negative and significant at 10 percent level. We found that penetration rate is higher in Betul than Sehore, although the later has geographical

advantages over the former. However, the region effect should not be seen in isolation. We must take into account the interaction of programme effect with the region effect. One would notice that the higher penetration in Betul villages is due to greater amounts of efforts of PRADAN, whose processes of SHG formation and management is much more rigorous and professional than the agents of programme promotion in Sehore. Another factor is that the density of households in Betul is much less than Sehore. However, probability of participation differs across the regions, which can mostly be attributed to the nature of institutions supporting the programme. Longevity of operation of programme in the village has a positive influence on probability of participation in the programme, particularly for the households in the villages where the PRADAN programmes are in operation. But, the same effect is not seen in case of the SGSY programmes or the SWASHAKTI programmes.

The predicted probabilities, estimated from the above regression model, are shown in Figure 1 across consumption quintile groups, for the regions of Sehore and Betul separately. Further, we also estimated probabilities across annual monthly per capita income which is plotted in Figure 2. Using either consumption or income as an indicator of economic well-being one would observe that the predicted probabilities are low for the households belonging to the lower section of population distribution. The probability of participation increases with increase in economic well-being upto the fourth quintile in both Betul and Sehore. Of course, the probabilities decline at the top most quintile but that may not be a concern since many households in the upper section will never participate in the programme and also they are discouraged to participate in the programme by the programme agents.

In figure 2 the three vertical lines represent the minimum expenditures required for different levels of living for the rural population. They are national level estimates by the latest NSS quinquennial round of consumption expenditure, pertaining to the year 2004-05 (NSS, 2006). This is also the survey year of this research and therefore, the estimates don't require adjustment for prices. The first line represents Rs. 3240 per capita per annum, which is calculated as a threshold limit for extreme low levels of living (Rs. 9 per day); the second line is the threshold limit for subsistence level of living of Rs. 4380 per capita per annum (Rs. 12 per day) and the third line represents Rs. 8040 per capita per annum (which belongs to the 80th percentile of the all-India distribution of per capita

consumption of the rural population)²⁰. NSS uses consumption as proxy for income. In our context, we have the income figures and therefore, the lines are drawn on incomes rather than consumption.

Figure 1 Probability of Participation of Household by Consumption Expenditure Quintiles Across Districts

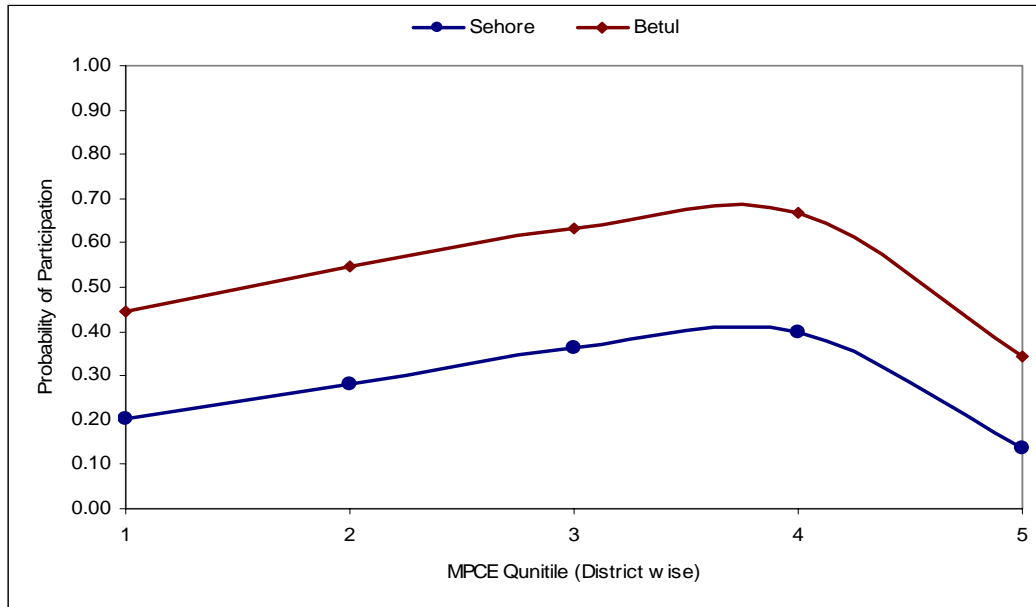
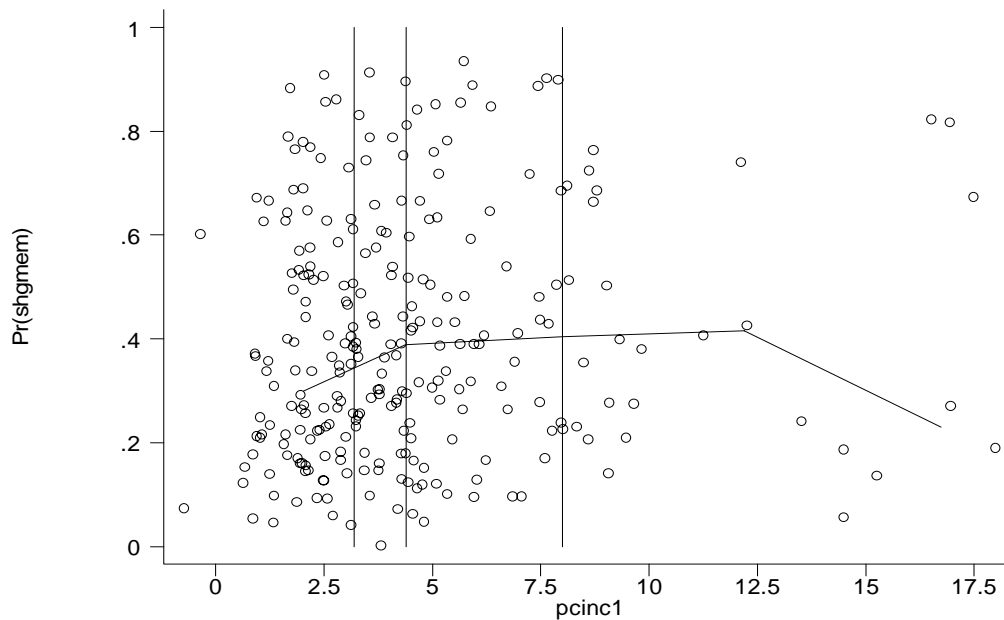


Figure 2 Probability of Participation of Household by Annual Per Capita Income (Rs. 000)



²⁰ The NSS consumption expenditure figures are given as per capita per month, such as Rs. 270, Rs. 365 and Rs. 690 respectively.

Noticeably, much of the sample concentrates below Rs. 12 per day. However, it is a matter of concern that probability of participation is very low below this level of income and the predicted probability rises with rise in per capita income. One would also see that below the income level of Rs. 9 per day there are many households whose probability of participation is near to zero. These are the section of population who are very poor and they are excluded from the programme. Identical results are obtained through construction of a *level of living index*, by taking into account the multiple aspects of poverty, which indicate the exclusion of very poor households from programme participation (Sarangi, 2007b).

4 IMPACT ASSESSMENTS

4.1 Impact on Per Capita Income

We attempt to estimate the impact of participation in group-based credit programmes on annual per capita income of the household. The method of impact estimation is discussed in detail in section 2.2.2. The final impact estimation model uses the treatment effect regression²¹. Table 4 represents the estimates of the model, in which the second equation is like a control equation used for estimating first equation. So, we analyse the first equation in the rest of the analysis. Before we analyse the determinants, we must check for *rho* which is negative and significant at .05 level. This implies that if we had estimated effect of participation using OLS, the coefficient would have a downward bias²². The coefficient of participation status gives estimation of average treatment effect (ATE) and it turns out to be positive and significant at 10 percent level. The positive

²¹ We first started estimating impact using OLS regression. But, membership is an endogenous dummy variable subject to bias and there may be two way causal relations between membership and per capita income. Therefore, we applied the instrumental variable (IV) method with 2SLS. We estimated the coefficients and employ the *Hausman test* to test the null hypothesis that the estimated coefficients from IV model are not different from those of the OLS. The test is not rejected at .05 level. Therefore, we drop the use of IV model. But coefficient of membership estimated through OLS either overestimates or underestimates the true effect, depending on characteristics of participant and non-participant households. It is assumed that the household self selects it to join the programme. In this context, use of treatment effect regression accounts for the self-selectivity bias in estimates and gives consistent estimate of effect of membership. These methods are discussed in section 6.3 in detail. The results of OLS and IV method are not reported in the chapter. We only report the results of treatment effect estimation.

²² This is understandable because the average per capita income of the participant sample is lower than the corresponding figure for the non-participants. In fact, the distribution of income for members lies under that of the non-participants. So the average effect will not capture the impact. Instead, we should measure the improvement in distribution of income of the members due to participation over that if they had not participated.

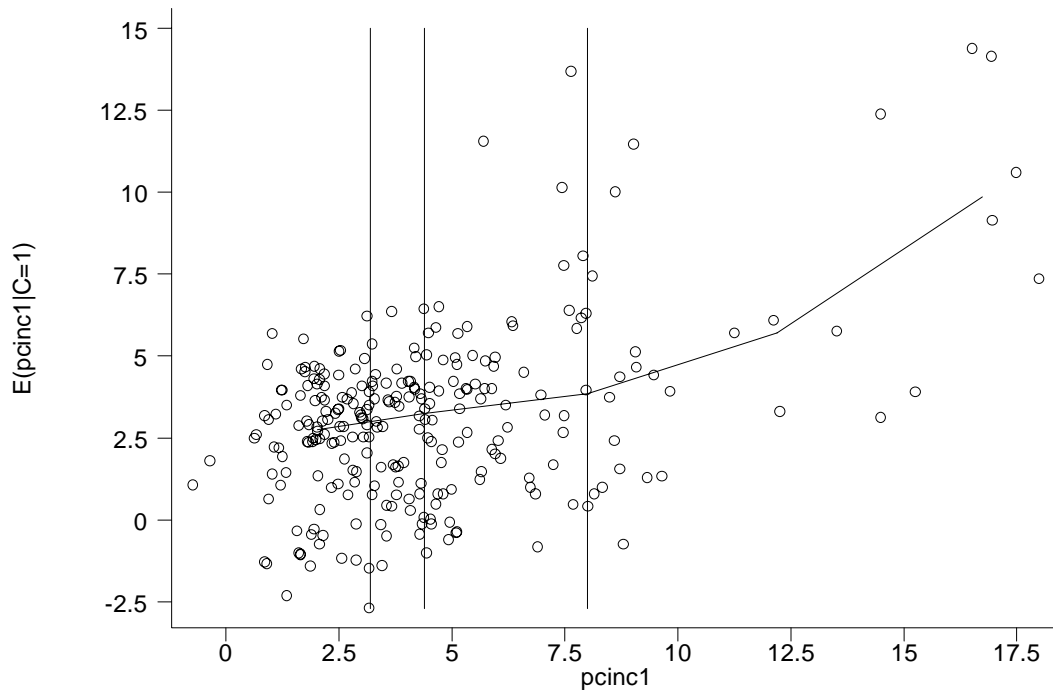
coefficient indicates an increase in per capita income when a household participates in a group-based credit programme. The overall positive impact is expected, even for the poor, because by joining the programme the member gets easy access to credit from group-savings fund, for meeting the emergencies or for retail farm and off-farm activities, although access to credit from institutional sources is more directed towards the better-off sections of population. We have also noted that by joining the programme her dependence on informal loans reduce significantly which also reduces her vulnerability to the moneylender. All these influence positively to the household income. However, for understanding the impact on poor, we need to analyse the distribution of impact across income class, which is discussed in detail in the next paragraph.

Further, high work participation ratio and per capita landsize also influence in improving income of households. Looking at the contribution from diversification of rural income of household, one would notice that per capita income is higher for the households that have higher share of off-farm income in total income. Similarly, the households having higher non-liquid wealth in terms of livestock assets and transportation assets also report high per capita income. Importantly, distance effect is negative and statistically significant at 1 percent level which implies that the villages that have low access (increase in distance) to outside village institutions such as markets or nearest towns witness a decline in overall per capita income of the households in the entire village. Years of operation of microfinance programmes in villages do not have any significant relationship in improving village income, for any of the three programme.

The results indicate that the effect of participation in group-based credit programmes helps improving one's per capita income, but there lies caveats as the impact is significant at the maximum confidence interval limit. We looked at the predicted effect of participation across levels of per capita income (Figure 3). We also introduced the threshold limits (the three vertical lines) in the graph to examine the impact at the bottom end of the income distribution. Noticeably, the average effect is positive and it is increasing with increase in income. But, a close look at the movement of the line indicates that the poor are benefited only marginally. For instance, much of the concentration of observation lie to the left of the 2nd line which stands for the minimum level of income for supporting a minimum level of living. Impact for this cluster is low and very slowly rising, even upto the 3rd line, but then it rises sharply. We have earlier

noticed that many of the poor households are excluded from the microfinance programme. In addition to that we found a marginal impact for the poor households while most of the impact is biased towards the upper segment of income distribution. This questions the hypothesis of microfinance to be regarded as an anti-poverty strategy. Indeed, it is not able to take care of the very poor and the destitute.

Figure 3 Impact of Participation on Annual Per Capita Income



4.2 Impact on Share of Off-farm Income

We attempt to estimate the effect of participation on contribution of off-farm income²³ to total income of the households. The method of estimation follows similar procedure as mentioned in section 2.2.2. The results are given in Table 5 which shows that participation in group-based credit programme significantly improves share of non-farm earnings of household. The coefficient is positive and statistically significant. Per capita land is insignificant in improving share of non-farm earnings, but per capita land square turns out to be positive and significant at .05 level. Generally, diversification from agriculture is less in rural India. One of reason may be the lack of educational and professional skills of the farmer households which restricts the traditional farmer to move out of agriculture, particularly with increase in land concentration. But, the small and

²³ The model is estimated for the sample reporting off-farm income. So the total sample reduced to 176. Off-farm income includes net income from livestock and net income from other non-agricultural business.

marginal land owners have to depend on other sources of livelihood, since agriculture is subsistence and it could not provide them earning through out the year. This pattern is regarded as a distress kind of diversification (Vaidanathan, 1986). Under such circumstances, participation in group may help the small and marginal farmers to get access to credit, so that they can diversify their livelihood strategies and consequently share of earnings from non-farm sector increases for these households. Plotting the effect across land size, one would notice that the predicted share of non-farm earnings increases with increase in landholding (Figure 4). However, the returns seem to be much higher for the very big land owners; the line steeply increasing towards the top right. This implies that with groups in operation in village the large landowners, who become members of the group, have started diversifying household income sources. It is possible that livestock income is contributing a greater part of the total off-farm income. However, the share of off-farm income of the large land owners improves significantly while they join the group. Plotting the predicted values across per capita income, one would observe that average share of off-farm income increases with increase in income (Figure 5). Noticeably, the impact on poor and the landless is lower than the better-off households with high per capita income and the large farmers. One would, therefore, infer that credit alone may not contribute to expand the production choices of the poor and the small and marginal farmers. Rather, credit should be corroborated by other mechanisms, including those of capacity building, market linkage, entrepreneurial skill training and investment in infrastructure.

Figure 4 Impact of Participation on Share of Off-farm Income by Landsize

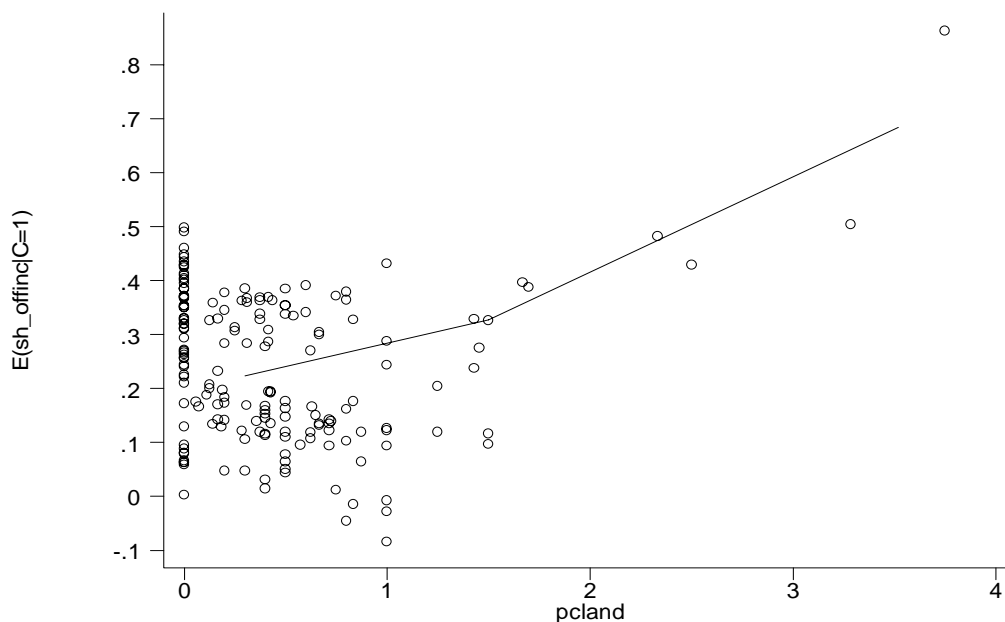
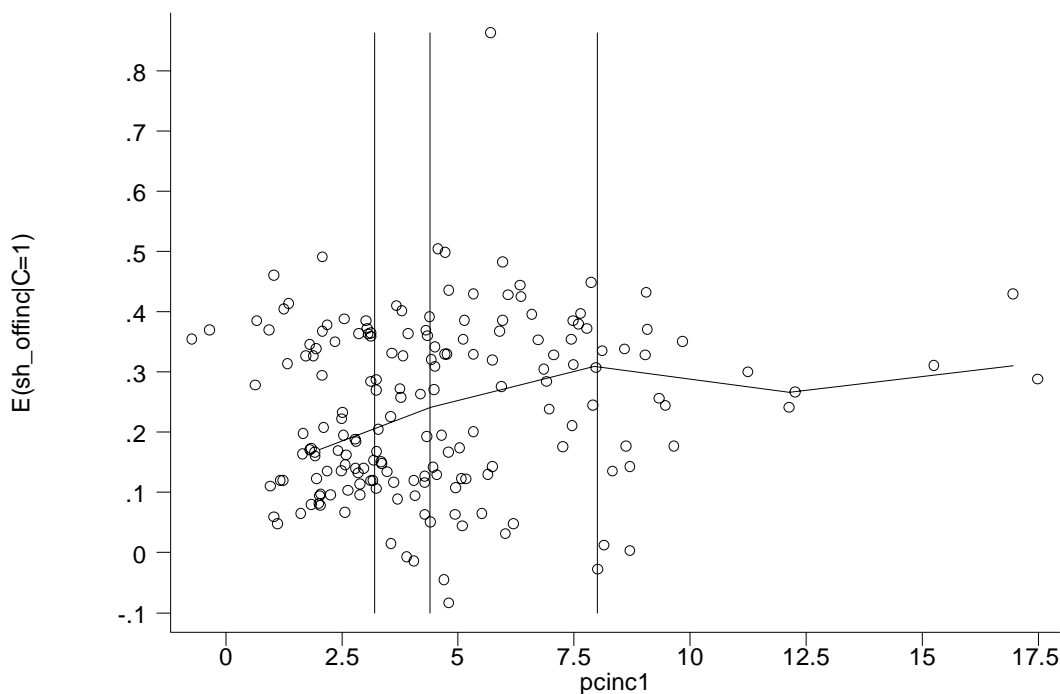


Figure 5 Impact of Participation on Share of Off-farm Income by Per Capita Income



5 CONCLUSION

First, our results indicate the exclusion of very poor households from participation in group-based credit programmes, at large. The probability of participation is found to be low at the lower end of income distribution and it increases with increase in per capita income of the household. Of course, it declines with very high level of per capita income of household, in particular for the top 20 percent of the households. One would, however, argue that the rich households might never participate in the programme. Since microfinance programmes are aimed at meeting the credit needs of low income clientele, or supporting micro enterprises, they might not be attractive for the high income clients. They would participate only if the returns from joining the programme were higher than their present occupation. The study also finds that some rich households did not join because they were discouraged by the programme agents to join the programme. Besides, it was also below the status of the women in the village from rich households to join the group to save small amount. But exclusion of the very poor is a matter of concern. Many of them reported their inability to join the programme because they could not contribute to the group savings fund. Some of the households also reported that they were rejected

by the group as the quorum for the group formation was complete. Therefore, the issue of rejection of households to join the group may not be ruled out on the grounds of vulnerability of the households alone.

A clear regional dynamics can be observed in the analysis of the probability of participation. Results indicate high probability of participation in Betul, which is tribal and more backward, than Sehore. But, the regional effect may not be explained in isolation. The interaction of programme characteristics needs to be examined before drawing any conclusion about the regional effect. Among the programme characteristics, the principal research question is whether the *design and process variables* of the programme affect group participation? It is found that the programme effect (PRADAN) was significant. In other words, the *design and process variables* of the programme do influence the household to participate in the group. However, there is no conclusive evidence on whether *peer selection* affects the exclusion of very poor from the programme, although qualitative observation point towards such a conclusion. Nevertheless, the exclusion of the poorest households is a matter of concern for the policy makers as it questions the hypothesis that microfinance is a tool for poverty alleviation. Therefore, results in this study manifest that, unfortunately, this is not going to help those who need it the most.

Second, impact assessment results show a positive and significant effect of programme participation on increase in the income of the household. This is expected, even for the poor, because the participant in the programme gets easy access to credit from group savings fund, although access to formal sector loans is directed more towards better-off income households. However, the impact is negligible for the households at the lower end of income distribution. Further, the predicted impact on income is not found to be highly significant for any of the programmes individually although the impact is positive.

The estimates does show that predicted share of off-farm earnings (including earnings from livestock) increases with increase in landholding. However, the returns seem to be much higher for the very big land owners than the small farmers. This implies that the relatively large landowners, some of whom became members of the group, are able to diversify household income sources whereas the landless or small farmers are unable to do so. The impact of participation on increasing share of off-farm income is also

noticeable for households with higher level of per capita income compared to the relatively worse-off.

The findings, thus, suggest that on the one hand, many of the very poor households are excluded from the programme, and on the other, the gains from participation of the programme are mostly observed for the better off section of households, particularly those with high per capita income or the large land holders. Therefore, credit to serve as a sole instrument of poverty alleviation does not seem to be plausible, without other corroborative mechanisms that help increase the potential of credit use by the poor or the small farmer.

References

- Adams, D.W., & von Pischke, J.D. (1992). Microenterprise credit programs: Déjà vu. *World Development*, 20(10), 1463-70.
- Amin, S., Rai, A. S., & Topa, G. (2003). Does micro credit reach the poor and vulnerable? Evidence from Northern Bangladesh. *Journal of Development Economics*, 70, 59–82.
- Buckley, G. (1997). Micro-finance in Africa: Is it either a problem or solution? *World Development*, 25(7), 1081-1094.
- Diagne, A., & Zeller, M. (2001). *Access to credit and its impact on welfare in Malawi*. IFPRI Research Report 116, Washington, D. C.: IFPRI
- Dreze, J. (1990). Poverty in India and the IRDP delusion. *Economic and Political Weekly*, 25(39), A95-A104.
- Fisher, T., & Sriram, M. S. (2002). *Beyond microcredit: Putting development back into microfinance*. New Delhi: Vistaar Publications
- Gaiha, R., Imai, K., & Kaushik, P. D. (2001). On the targeting and cost effectiveness of anti-poverty programmes in rural India. *Development and Change*, 32, 309-342.
- Greene, W.H. (2002). *Econometric analysis*. New Delhi: Prentice Hall of India
- Heckman, J. D. (1979). Sample selection bias as a specification error. *Econometrica*, 47(1), 153–161.
- Heckman, J.D., Ichimura, I., & Todd, P.E. (1997). Matching as an econometric evaluation estimator: Evidence from evaluating a job training program. *Review of Economic Studies*, 64(4), 605-654.
- Henry, C., Sharma, M., Lapenu, C., & Zeller, M. (2000). *Assessing the relative poverty of microfinance clients: A CGAP operational tool*. Washington, D.C.: IFPRI.

- Hossain, M. (1988). *Credit for alleviation of rural poverty: The Grameen Bank in Bangladesh*. Research Report 65, Washington, DC: IFPRI.
- Hulme, D., & Mosley, P. (1996). *Finance Against Poverty (I) and (II)*. London: Routledge.
- Hulme, D. (1997). *Impact assessment methodologies for microfinance: A review*. Institute for Development Policy and Management, University of Manchester.
- Jalan, J., & Ravallion, M. (1999). *Income gains to the poor from workfare: Estimates for Argentina's trabajar program*. Policy Research Working Paper 2149, Washington, DC: World Bank.
- Khandker, S. (2003). *Micro finance and poverty: Evidence using panel data from Bangladesh*. Policy Research Working Paper 2945. Washington, DC: World Bank
- Long, J. S. (1997). *Regression models for categorical and limited dependent variables*. Thousand Oaks: Sage Publications, Inc.
- Maddala, G.S. (1983). *Limited-dependent and qualitative variables in econometrics*. Cambridge: Cambridge University Press.
- Mahajan, V. *Is Microcredit the Answer to Poverty Eradication?* URL: <http://www.basixindia.com/publication.asp>.
- Moffit, R. (1991). Program evaluation with non-experimental data. *Evaluation Review*, 15(3), 291-314.
- Moffit, R. (1999). New developments in econometric methods for labour market analysis. In O. Ashenfelter and D. Card (Eds.), *Handbook of Labour Economics, III*. 1367-1397.
- Montgomery, R. (1996). Disciplining or protecting the poor? Avoiding the social costs of peer pressure in microcredit schemes. *Journal of International Development*, 8 (2), 289-305.
- Morduch, J. (1998). *Does microfinance really help the poor? New evidence from flagship programs in Bangladesh*. Dept of Economics and HIID, Harvard University, and Hoover Institution, Stanford University.
- Morduch, J. (1999). The microfinance promise. *Journal of Economic Literature*, 37(4), 1569-1614.
- Mosley, P. (1997) *The use of control groups in impact assessments for microfinance*. Working Paper No. 19, Geneva: ILO.
- Mosley, P., & Hulme, D. (1998). Microenterprise finance: Is there a conflict between growth and poverty alleviation? *World Development*, 26(5), 783-90.
- Navajas, S., Schreiner, M., Meyer, R., Gonzalez-Vega, C. & Rodriguez-Meza, J. (2000). Microcredit and the poorest of the poor: Theory and evidence from Bolivia. *World Development*, 28(2), 333-346.
- NSSO. (2006). *Level and Pattern of consumer expenditure, 2004-05*, NSS 61st Round (July 2004-June 2005), Report No. 508, Government of India.
- Otero, M., & Rhyne, E. (1994). *The new world of microenterprise finance*. West Hartford, CT: Kumarian Press.

- Pitt, Mark M., & Khandker, S. R. (1996). *Household and intrahousehold impact of the grameen bank and similar targeted programs in Bangladesh*. World Bank Discussion Papers, No. 320, Washington, DC: World Bank.
- Pitt, Mark M., & Khandker, S. R. (1998). The impact of group-based credit programs on poor households in Bangladesh: Does the gender of participants matter? *Journal of Political Economy*, 106(5), 958-997.
- Puhazhedi, V., & Badatya, K.C. (2002). *SHG-Bank linkage programme for the rural poor – An impact assessment*. Mumbai: NABARD
- Rahman, A. (1999). Microcredit initiatives for equitable and sustainable development: Who pays? *World Development*, 27(1), 67-82.
- Ravallion, M. (2001). The mystery of vanishing benefits, *World Bank Economic Review*, 15(1), 115-140.
- Rosenbaum, P. & Rubin D. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70, 41-55.
- Sarangi, N. (2007a). *Microfinance and the rural poor: A study of group-based credit programmes in Madhya Pradesh, India*. Ph.D Thesis, Jawaharlal Nehru University, New Delhi, India
- Sarangi, N. (2007b). *Measuring depth of outreach of microfinance programs in India: A study based on fieldwork in Madhya Pradesh*”, paper presented in Indian Econometric Society Conference, IIT, Mumbai, January 5-7.
- Schuler, S. R., & Hashemi, S. M. (1994). Credit programmes, women’s empowerment and contraceptive use in Rural Bangladesh. *Studies in Family Planning*, 25 (2), 65-76.
- Schuler, S. R., Hashemi, S. M., & Riley, A. P. (1997). The influence of women’s changing roles and status in Bangladesh’s fertility transition: Evidence from a study of credit programs and contraceptive use. *World Development*, 25 (4), 563-576.
- Sinha, S., & Sinha, F. (2002). Sustainability and development: Evaluating the performance of Indian microfinance. In T. Fisher & M. S. Sriram (Eds.), *Beyond Microcredit: Putting Development back into Microfinance*, New Delhi: Vistaar Publications.
- Somanathan, R. & Dewan I. (2003). *Identifying targeting with nonparametric methods: An application to an Indian microfinance program*. Discussion Paper 03-11, Delhi: Indian Statistical Institute.
- Tankha, A. (2002). *Self-help groups as financial intermediaries in India: Cost of promotion, sustainability and impact*. New Delhi: Sa-dhan.
- Vaidanathan, A. (1986). Labour use in rural India: A study of spatial and temporal variations, *Economic and Political Weekly*, 21(52), A130-A146.
- Wood, G. D. & Shariff, I. A. (Eds.) (1997). *Who needs credit? Poverty and finance in Bangladesh*. London: Zed Books.
- Zaman. H. (2000). *Assessing the poverty and vulnerability impact of microcredit in Bangladesh: A case study of BRAC*. Background Paper for WDR 2000/01.

Table 1 Sample Mean of Selected Indicators by Membership Status of Household

	Nonmembers	Members	t-test (p-value)
Total Sample			
Household size	5.3	6.5	0.000
No. of children of age upto 6 yrs.	1.3	1.3	
No. usual workers	3.0	3.4	0.053
Own land (acre)	2.2	2.4	
Value of livestock (Rs. 000)	4.3	7.2	0.036
Value of farming assets (Rs. 000)	10.9	8.7	
Value of transport vehicles (Rs. 000)	1.4	3.5	0.065
Monthly expenditure on food per capita (Rs.)	178.0	177.6	
Monthly expenditure on clothing and footwear per capita (Rs.)	13.7	16.9	0.063
Monthly consumption expenditure per capita (Rs.)	319.2	298.1	
Monthly income per capita (Rs.)	414.6	356.3	0.092
% households self-employed in off-farm business	11.4	19.5	
Betul			
Household size	4.4	6.2	0.000
No. of children of age upto 6 yrs.	1.1	1.4	
No. usual workers	2.6	3.4	0.008
Own land (acre)	2.1	2.6	
Value of livestock (Rs. 000)	3.2	5.2	0.007
Value of farming assets (Rs. 000)	0.8	1.9	
Value of transport vehicles (Rs. 000)	0.5	1.0	
Monthly expenditure on food per capita (Rs.)	149.5	137.8	
Monthly expenditure on clothing and footwear per capita (Rs.)	8.9	12.0	0.024
Monthly consumption expenditure per capita (Rs.)	243.6	212.3	
Monthly income per capita (Rs.)	350.4	276.6	0.014
% households self-employed in off-farm business	2.6	18.2	
Sehore			
Household size	5.9	6.7	0.083
No. of children of age upto 6 yrs.	1.4	1.2	
No. usual workers	3.2	3.4	
Own land (acre)	2.2	2.3	
Value of livestock (Rs. 000)	5.1	8.8	
Value of farming assets (Rs. 000)	18.6	14.1	
Value of transport vehicles (Rs. 000)	2.2	5.4	0.079
Monthly expenditure on food per capita (Rs.)	199.7	209.3	
Monthly expenditure on clothing and footwear per capita (Rs.)	17.4	20.7	
Monthly consumption expenditure per capita (Rs.)	376.7	366.2	
Monthly income per capita (Rs.)	463.3	419.4	
% households self-employed in off-farm business	18.0	20.6	

Table 2 Selected Indicators by Type of SHG Membership of Household

	Non-member	Members			Anova (p-value)
		SGSY	PRADAN	SWASHAKTI	
Household size	5.3	6.5	6.3	6.7	0.001
No. of children of age upto 6 yrs.	1.3	1.1	1.4	1.3	
No. usual workers	3.0	3.4	3.5	3.3	
Own land (acre)	2.2	2.2	2.6	2.5	
Value of livestock (Rs. 000)	4.3	11.3	4.6	5.5	0.000
Value of farming assets (Rs. 000)	10.9	16.2	1.8	7.8	
Value of transport vehicles (Rs. 000)	1.4	4.4	1.1	4.8	0.016
Monthly expenditure on food per capita (Rs.)	178.0	184.3	144.8	203.2	0.006
Monthly expenditure on clothing and footwear per capita	13.7	18.4	11.6	20.5	0.000
Monthly consumption expenditure per capita (Rs.)	319.2	312.5	218.1	362.0	0.000
Monthly income per capita (Rs.)	414.6	359.2	280.0	428.2	0.007
% households food insecure in past 12 months	48.9	38.3	35.0	35.0	
% head of households illiterate	57.8	56.7	45.0	48.3	
% head of households >=primary education	32.2	31.7	28.3	36.7	
% head of households >=secondary education	5.6	6.7	1.7	8.3	
% households with any adult >=primary education	55.6	65.0	61.7	71.7	
% households with any adult >=secondary education	11.1	16.7	10.0	21.7	
% households with Katcha roof	86.7	81.7	85.0	86.7	
% households with Katcha walls	73.3	61.7	80.0	70.0	
% households with Katcha floor	88.9	91.7	90.0	91.7	
% ST households	44.4	33.3	96.7	0.0	
% SC households	12.2	15.0	1.7	38.3	
% households with self employment in off-farm business	11.1	18.3	18.3	23.3	

Table 3 Probit Regression: Determinants of Participation and Marginal Effects**Dependent Variable: Participation of Household in SHG Programme (1=Yes, 0=No)**

	Coefficient estimates			Predicted Marginal Effect
	Mean	Robust Std. Err.	P>z	dF/dx
HH in mpce quintile 2nd (1,0)	0.256	0.284	0.369	0.089
HH in mpce quintile 3rd (1,0)	0.476	0.282	0.091	0.170
HH in mpce quintile 4th (1,0)	0.571	0.291	0.050	0.207
HH in top mpce quintile (1,0)	-0.265	0.288	0.358	-0.085
Self employment in off-farm business (1,0)	0.614	0.276	0.026	0.227
Ratio of workers to hhszize (Ratio)	-0.814	0.468	0.082	-0.273
Log of years of schooling of principal earner	-0.314	0.150	0.037	-0.105
Ratio of literate adults to hhszize (Ratio)	0.638	0.425	0.134	0.213
Value of farming assets (Rs. 000)	-0.002	0.003	0.504	-0.001
Value of livestock assets (Rs. 000)	0.037	0.011	0.001	0.012
Value of transport assets (Rs.000)	0.042	0.019	0.025	0.014
Own land (acres)	-0.023	0.032	0.473	-0.008
Years of SGSY operation in the village	-0.016	0.062	0.801	-0.005
Years of Pradan operation in the village	0.161	0.069	0.019	0.054
Years of Swashakti operation in the village	0.092	0.082	0.263	0.031
Distance index	-0.570	0.316	0.071	-0.191
Dummy for district Sehare	-0.695	0.416	0.095	-0.242
Constant	-0.005	0.629	0.993	
Log pseudolikelihood	-131.73			
N	262			
Wald chi2	66.59			
Prob > chi2	0.000			
McFadden's R2	0.19			
Cragg & Uhler's R2	0.29			

(*) Discrete change of dummy variable from 0 to 1

Table 4 Impact of Participation on Household's Annual Per Capita Income

	Coefficient estimates		
	Mean	Std. Err.	P>z
Eq1: Y1= Per capita annual income (Rs.000)			
Participation (1=yes, 0=No)	3.117	1.882	0.098
Years of schooling of principal earner	0.048	0.055	0.379
Ratio of workers to household members (Ratio)	3.504	0.974	0.000
Per capita land (acres)	1.412	0.460	0.002
Share of off-farm income to total income (Ratio)	1.346	0.713	0.059
Share of livestock income to total income (Ratio)	-0.814	0.687	0.236
Value of farming assets (000)	0.010	0.005	0.051
Value of livestock assets (000)	0.007	0.024	0.778
Value of transport assets (000)	0.098	0.032	0.002
Years of SGSY operation in the village	0.167	0.126	0.185
Years of Pradan operation in the village	0.099	0.130	0.446
Years of Swashakti operation in the village	0.154	0.153	0.315
Distance index	-1.810	0.633	0.004
constant	0.345	1.763	0.845
Eq2: Y2= Participation in group-based credit program (1=Yes, 0=No)			
HH in 2nd mpce quintile (1,0)	0.381	0.278	0.170
HH in 3rd mpce quintile (1,0)	0.532	0.267	0.047
HH in 4th mpce quintile (1,0)	0.491	0.274	0.073
HH in top mpce quintile (1,0)	0.011	0.301	0.972
Ratio of workers to household members (Ratio)	-0.734	0.409	0.073
Ratio of literate adults to hhsz (Ratio)	0.384	0.288	0.183
Per capita land (acres)	-0.324	0.206	0.115
Value of farming assets (000)	-0.003	0.003	0.185
Value of livestock assets (000)	0.024	0.012	0.043
Value of transport assets (000)	0.039	0.019	0.039
Years of SGSY operation in the village	-0.023	0.057	0.689
Years of Pradan operation in the village	0.020	0.059	0.733
Years of Swashakti operation in the village	-0.003	0.071	0.967
Distance index	0.079	0.283	0.781
constant	0.253	0.565	0.654
hazard			
lambda	-2.501	1.152	0.030
rho	-0.842		
sigma	2.971		
N	262		
Wald chi2	142.89		
Prob > chi2	0.00		

Table 5 Impact of Participation on Household's Share of Off-farm income (including Livestock) in Total Income

	Coefficient estimates		
	Mean	Std. Err.	P>z
Eq1: Y1= Share of Off-farm income (including Livestock) (Rs.000)			
Participation (1=yes, 0=No)	0.404	0.224	0.072
Ratio of workers to household members (Ratio)	0.184	0.170	0.278
Years of schooling of principal earner	0.006	0.008	0.476
Value of per capita productive asset (Rs.000)	0.001	0.003	0.764
Per capita land (acres)	-0.116	0.105	0.270
Per capita land square	0.078	0.035	0.027
Years of SGSY operation in the village	0.017	0.021	0.430
Years of Pradan operation in the village	0.014	0.023	0.545
Years of Swashakti operation in the village	0.020	0.025	0.419
Dummy for district Sehore (1,0)	0.181	0.117	0.121
Constant	-0.343	0.287	0.231
Eq2: Y2= Participation in group-based credit program (1=Yes, 0=No)			
Per capita income (Rs.000)	-0.050	0.042	0.228
Ratio of workers to household members (Ratio)	-1.254	0.520	0.016
Ratio of literate adults to household members (Ratio)	0.662	0.393	0.092
Households demanding investment loans (1,0)	0.707	0.244	0.004
Per capita land (acres)	-0.374	0.201	0.062
Years of SGSY operation in the village	-0.059	0.076	0.438
Years of Pradan operation in the village	-0.037	0.073	0.613
Years of Swashakti operation in the village	-0.075	0.078	0.334
Constant	1.332	0.539	0.013
hazard			
lambda	-0.273	0.135	0.043
rho	-0.726		
sigma	0.377		
N	176		
Wald chi2	39.01		
Prob > chi2	0.00		