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EVALUATING RURAL DEVELOPMENT THROUGH WOMEN EMPOWERMENT USING MICROFINANCE PROGRAMMES

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ABSTRACT

The salvation of an underdeveloped economy lies in its development. The basic objectives of this paper are to estimate Women Empowerment Index using Principal Component Analysis and to examine the effectiveness of joint liability microfinance programmes through cooperative banks in empowering rural women socially and economically. The sample has been selected from one block of Hooghly district. The role of Hooghly district cooperative bank is significant. Results show that the women are empowered socially and economically which has contributed to rural development.

INTRODUCTION

The salvation of an underdeveloped economy lies in its development. Development has traditionally meant the capacity of an economy to generate and sustain an annual increase in its gross national income at rates of 5% or 7% or more. In the past it has been typically seen in terms of the planned alteration of the structure of production and employment so that agriculture's share of both declines and that of the manufacturing and service industries increases. During the 1970s, economic development came to be redefined in terms of the reduction or elimination of poverty, inequality and unemployment within the context of a growing economy. But the phenomenon of development or the existence of a chronic state of underdevelopment is not merely a question of economics or even one of the quantitative measures of incomes, employment and inequality. Development must therefore be conceived of as a multidimensional process involving major changes in social structures, popular attitudes and national institutions as well as the acceleration of economic growth, reduction of inequality and eradication of poverty. Nobel laureate Amartya Sen points out that development have to be more concerned with enhancing the lives we lead and the freedom we enjoy. Traditionally in economic development, agriculture has been assumed to play a passive and supportive role. Its primary purpose was to provide sufficient low-priced food and manpower to the expanding industrial economy which was thought to be the leading dynamic sector in any overall strategy of economic development. Lewis' two-sector model is an example of such a situation. But today, the rural economy must play an indispensable part in any overall strategy of economic progress. Without integrated rural development, in most cases, industrial growth either would be stultified or if it succeeded, would create severe internal imbalances in the economy making poverty, inequality and unemployed more pronounced. Rural development is possible only with an organized rural credit system.

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Rural Credit System

The organizational framework of the rural credit system has evolved into a very complex multiagency system and an equally complex credit system for non-institutional sources which, however, charges high interest rates due to risk evaluation, limited funds for consumption purposes and a limited area of operations. Expansion of the rural credit system is severely restricted due to scarce financial resources,

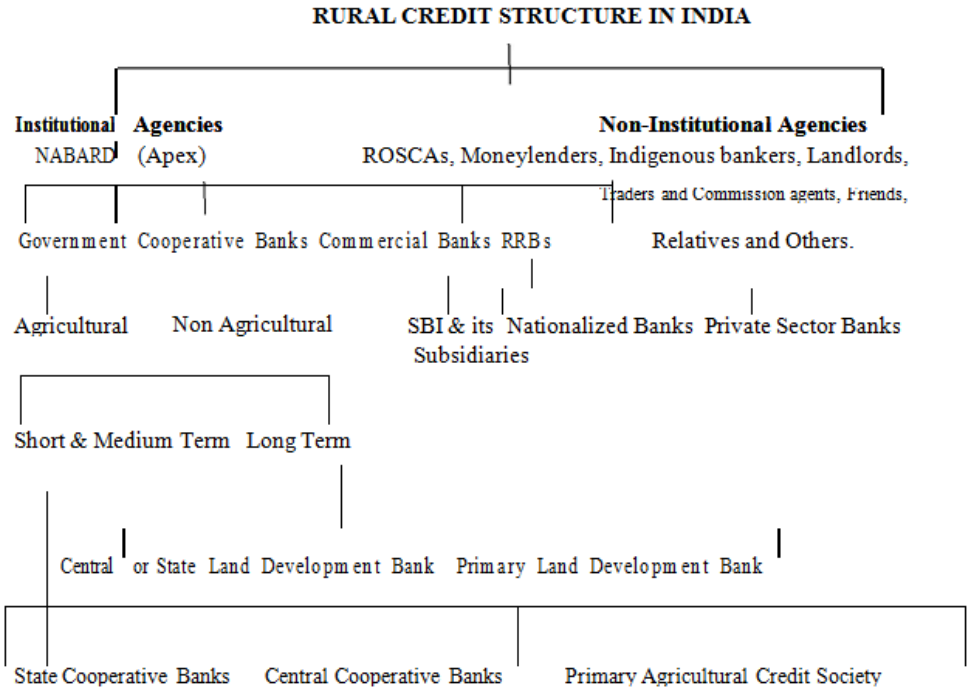
profitability considerations and the consolidation of the banking system. Informal credit markets which form an important part of the financial system function outside the purview of regulations imposed on institutional credit. Having no restrictions on capital subscription, liquidity lending and deposit rates, informal lenders are able to avoid legal fees and reduce transaction costs relating to loan appraisal and documentation, to levels sharply below those for institutional credit sources.

Rural Credit Structure in India

Since nationalization, the involvement of commercial banks in the rural sector got reflected mostly in four major areas – branch expansion, credit to priority sectors, lead bank scheme and special schemes for weaker sections. Apart from direct financial participation, commercial banks have actively involved themselves in the implementation of NABARD schemes.

Challenges of Rural Lending

The challenges of rural lending can be broadly classified under three major areas – coverage, impact and recovery. The effectiveness of rural lending lies in its ability to reach those sectors of the population who are yet to come into the fold of banking system within the shortest span of time, in its ability to sustain the developmental activities already initiated in the villages by continuing banker-customer relationship and its ability to hasten the process of transformation of rural borrowers into rural depositors. The dynamics of the rural economy have resulted in rapid sectoral changes of far-reaching magnitude. Institutional credit is being cornered by the better-off sections of the rural people and the poorer sections have little or no access to rural credit at regulated rates of interest. The non-availability of adequate amounts of credit in times of need, accompanied by cumbersome procedures and documentation, are a problem of rural clientele.



Rural credit structure in India

Inspite of the enlargement of the institutional finance the informal sector continues to cater to rural credit requirements in a significant way. But proportion of credit supplied by money lenders has declined over the decades. In recent years, many state governments have enacted laws for restricting the activities of moneylenders.

The measures provided in the enactments cover compulsory registration and licensing of moneylenders, maintenance of systematic accounts and records for purpose of inspection and audit by government officials encouraging moneylenders to form cooperative organizations. Efforts need to be made to reorganize and strengthen this agency so as to enable it to form an effective link between the organized institutional structure and the unorganized rural money market.

Thus the rural banking institutions are out of step with the changing rural credit requirements and are unable to come up with systems and credit/savings instruments as required by the rural clientele. The formal sector's thrust even within the priority sector lending framework has been on productive activities, whereas the poor need credit mainly for emergent needs like financing income- consumption gap or tiding over occasional crises and emergencies. There appears to be a mismatch between the services provided by the formal rural finance sector and the loan requirements of the rural people and hence the need for parallel credit systems which are better able to meet the genuine credit needs of rural people. Microfinance can be efficient and fiscally attractive option to meet the financial needs of the poor households and small enterprises. There has been a shift of focus of public policies on the role of microfinance for more than five decades. Also, informal savings schemes such as ROSCAs were

progressively recognized (Mol, 1992). Public authorities consider microfinance as a poverty alleviation instrument contributing to Millennium Development Goals (MDGs) (Helms, 2006) and are more proactive on microfinance (Labie and Mersland, 2010).

Concept of Microfinance

The universal appeal of microfinance stemmed from its ability to reach the poor without social collateral and generation of near full recovery rates through what has been described as a Win- Win proposition. Since the beginning of microfinance, the flagship product of microfinance has been microcredit. It was based on the assumption that the poor are able to work themselves out of poverty if they get access to the capital to grow their income generating activities into more profitable business. The beginning was made with NABARD's pilot project in Karnataka (1991-92) of linking self-help groups with formal banks mediated through the NGO. A self-help group is a small, economically homogeneous and affinity group of the rural poor, voluntarily coming together to save small amount of money regularly, provide collateral-free loan with terms decided by the groups and have collective decision-making. The objectives of this project were:

- To evolve supplementary credit strategies for meeting the credit needs of the poor by combining the flexibility, sensitivity and responsiveness of informal credit system with the strengths of the technical and administrative capabilities and financial resources of the formal credit institutions.
- To build mutual trust and confidence between the bankers and the rural poor.
- To encourage banking activity both on the thrift as well as credit sides in a segment of the population that the formal credit institutions usually find difficult to cover.

The project's apparent success in building a bridge between the banks and the poor led to its institutionalization in 1996 by RBI as a normal lending activity of banks under priority sector and service area approach. With the launching of NABARD s pilot scheme, microfinance, the development buzz word of the 1990s gained visibility in the Indian development landscape. Microfinance is defined as the provision of thrift, credit and other financial services such as money transfer and micro-insurance products for the poor, to enable them to raise their income levels and improve living standards. Microfinance rests on the following principles:

- Self-employment/enterprise formation is a viable means for poverty alleviation.
- Lack of access to capital assets/credit is a constraint for existing and potential microenterprises.
- The poor are able to save despite their low-level and sporadic incomes.

Microfinance concepts have existed since 1904, when the Cooperative Societies Act was passed for ensuring production credit loans for farmers through primary credit societies. With the various priority sector targets under social banking in 1967 and after bank nationalization in 1969, microfinance concepts in banking institutions once again came to the fore. Under priority sector norms, microfinance was extended for investment credit purposes but included elements of production credit and even consumption credit. With the NABARD programme on self-help groups in 1992, the emphasis shifted to loans without collateral, 100 percent repayment norms and lending to groups of people who would also invest their savings and regulate their groups and group loans, thus reducing transaction costs for borrowers and for the banks. There are different models of linking self-help groups with banks –

MODEL 1: The bank may provide credit in bulk directly to the group which may be an informal or formal (i.e., registered) body, but mostly the formal. The quantum of credit given to the group should be in proportion to the savings mobilized by the group, savings-credit ratio varying from 1:1 to 1:4 depending upon the assessment of capabilities of self-help group by the banks.

MODEL 2: In situations where the local branch does not have adequate confidence in lending to the SHG or where the latter for certain reasons is unwilling to be linked directly to the bank, the bank may finance such SHGs through the NGO that has promoted them, if the NGO is willing to borrow.

MODEL 3: In the event of some members requiring loans of larger size than would normally be feasible under the savings-linked loaning to the SHG, the group could appraise the requirement of the individuals and recommend the proposal to the bank for direct lending to the respective individual members.

Microfinance services in India are provided mainly by the first two models viz. SHG-bank linkage model and MFI-bank model. The SHG- bank linkage model has emerged as the more dominant model due to its adoption by state-owned formal financial institutions, namely, commercial, regional rural and cooperative banks. In India, a range of institutions in the public sector as well as the private sector, offers microfinance services. This paper deals with the SHG – cooperative bank linkage model.

A Brief Profile of Hooghly District

The geographical area of Hooghly is 3149 sq.km. There are 4 sub-divisions and 18 blocks. There are 18 panchayat samities and 210 gram panchayats. Hooghly is one of the agriculturally advanced districts in the state of West Bengal. In the district 19 commercial banks of which 15 public sector banks, one Regional Rural Bank and three cooperative institutions are operating with 242, 35 and 22 branches respectively. There are about 306 active cooperative credit societies functioning in the district. Besides, West Bengal Financial Corporation is also operating in the district. The district reached a distinct place in the country in terms of Self – Help Movement. The concept of Self – Help Group (SHG) financing has been very well accepted and is being spearheaded by the Hooghly district Central Cooperative Bank (HDCCB) and Primary Agricultural Credit Societies (PACS) associated with it. HDCCB is playing a major role in the formation of SHGs. Its contribution outweighs that of commercial banks and Regional Rural Banks.

Hooghly District Central Cooperative Bank Ltd. was registered on 29.04.66. The functions of the Bank are:

1. Mobilization of deposit. 2. Formation of self – help groups and credit linkage. 3. Earning of net profits on regular basis. 4. Declaration of dividend to member shareholders everyday. 5. Completion of statutory audit every year on a regular basis. 6. Advance of short – term (SAO) loans through Kisan Credit Card, medium – term agricultural loans, farm loans, non – farm loans and housing loans. 7. Providing short – term weavers' loan. 8. Providing credit for other agricultural allied activities to the farmers for farm mechanization, irrigation, fertilizer and insecticides, animal husbandry, fishery etc.

The Bank had been identified as the Project Implementation Agency for the NCDC assisted Integrated Child Development Programme I (ICDP) and II projects involving all the blocks for the development of Primary Agricultural Credit societies, Weaver's Cooperative societies, Cooperative Marketing Societies, cooperative Cold Storage, other cooperative societies affiliated to this bank for catering to the infrastructural assistance like godown construction, iron safe purchase, margin money, construction of weaving shed, construction of self – help group training hall etc. The projects have been implemented under the leadership of the Bank along with a team of officers deputed by the Government of West Bengal. The second project was completed on 31.12.2005.

Role of Hooghly District Central Cooperative Bank Ltd. in SHG-Linkage- Bank Programme

Hooghly District Central Cooperative Bank Ltd. formed six groups in the month of January 1996. Since then the Bank has attached importance to promotion of self-help groups for social and economic uplift of the poor families. Considering the urgency the Bank has established a SHG Cell with one senior officer in-charge and one senior supervisor under the leadership of the Board of Directors and at present one retired officer of the Bank has been appointed as an advisor of the SHG Cell on contract basis. The bank has deployed a sizeable amount of fund for implementation of different training programmes in the field as well as at the training institutes under State Cooperative Union for imparting training to the members and leaders of different self-help groups.

Role of Women in Rural Development

As women are an important part of the community, building their capabilities to manage communities should be enhanced. Since the 1970s, many women's organizations worldwide have included credit and savings, both as a way of increasing women's incomes and to bring women together to address wider gender issues. Through their contribution to women's ability to earn an income, their programmes are assumed to initiate a series of virtuous spirals of economic empowerment, increased well-being for women and their families and wider social and political empowerment. Self-Help Groups (SHGs) would be used as an entry point for wider empowerment interventions. SHGs have been instrumental in empowerment by enabling women to work together in collective agency. Women networks do not usually obtain business or political favours as they command few economic resources. However, SHGs, when combined with savings and credit have enabled women to benefit economically by monetizing their contributions and in the process have empowered them to become agents of change. To maximize the contribution of microfinance to women's empowerment requires equality in access to all micro finance services and an adequate and non-discriminatory regulatory framework.

Different perception exists regarding the ability of microfinance to contribute to women empowerment. Empowerment is defined as the processes by which women take control and ownership of their lives through expansion of their choices. The core elements of empowerment have been defined as agency (the ability to define one's goals and act upon them), awareness of gendered power structures, self-esteem and self-confidence (Kabeer 2001). Two vital processes have been identified as important for empowerment. The first is social mobilization and collective agency. Second, the process of social mobilization needs to be accompanied and complemented by economic security (UNDP 2001). There may be manifestations of empowerment in the broader social sphere as well like campaigns against social ills or more active participation in local institutions. The first report (2004-05) of the Committee on Empowerment of Women on the functioning of SHGs highlights a number of weaknesses in both the programmes. One of the constraints in providing hassle-free and adequate credit to SHGs is that banks do not follow consistent norms in grading SHGs while procedural requirements are cumbersome and vary to a large extent.

The basic objectives of this paper are as follows:

1. To estimate Women Empowerment Index using Principal Component Analysis
2. To examine the effectiveness of joint liability microfinance programmes through cooperative banks in empowering rural women socially and economically.

Few Overviews of Existing Literature

In order to study the impact of microfinance on women empowerment there is a need for appropriate indicators that can measure it. The UNDP report of 1995 introduced two main complementary indices – Gender-Related Development Index (GDI) and Gender Empowerment Measure (GEM). Evidence from South Asian Studies suggests that within the family, the purchase of food and other items of household consumption and decisions related to children's health appear to fall within the women's arena. It has been well documented that an increase in women's resources results in increased well-being of the family, especially children (Mayoux, 1997, Kabeer, 2001: Hulme and Mosley, 1996). Hashemi et al. (1996) suggest that women's access to credit contributes significantly to the magnitude of the economic contributions reported by women, to the likelihood of an increase in asset holdings in their own names to an increase in their exercise of purchasing power, and in their political and legal awareness. They also found that access to credit is also associated with higher levels of mobility, political participation and involvement in 'major decision making' for particular credit organizations. Khandker (1998) carried out one anthropological study of Grameen Bank and indicated that

inclusion of drop-outs and villages away from the 'key success areas' would substantially increase estimates of negative impact and reveal more cases of serious disempowerment. A proportion of the funds made available for this microcredit schemes were utilized by women, enabling them to meet the subsistence needs of their families during those difficult economic times (ESCAP, 2002). In Bangladesh, women showed a great deal of empowerment in their capacity to articulate their needs and in their receptivity to new ideas. The perception that microcredit is an empowering tool for women has in recent years come under close and in some instances negative scrutiny. Critics have charged that microcredit accessed by women has often been appropriated by other household members, leaving women burdened with the responsibility of repayment and the sanctions of default (Goetz and SenGupta, 1996). Kabeer (1999) stress that women's empowerment is about the process by which those who have been denied the ability to make strategic life choices acquire such ability. Chakrabarti and Biswas (2008) concluded that in spite of all government effort by adopting developmental programme since first five year plan and a multi-disciplinary approach with a special thrust on health, education and employment level of women since sixth five year plan, empowerment level of women did not increase to the expected level till 1998-99.

Sample Size and Design

The study employed purposive sampling method. This is deliberately a non-random method of sampling which aims to sample a group of people or setting with a particular characteristic. The sample is selected on the basis of individual judgement of the sampler. There is no special technique for selecting a purposive sample. The respondents are selected because they have knowledge that is valuable to the research process. This ensured that the respondents who had participated in the microfinance programme and all those who did not were selected. The sample is drawn from Hooghly district of West Bengal. Out of 18 districts in West Bengal, the cumulative number of SHGs provided with bank loan and the cumulative amount of bank loan disbursed was largest in Hooghly. As on 31 March 2005, the cumulative number of SHGs provided with bank loan and the cumulative amount of bank loan disbursed in Hooghly was 14,589 and Rs. 189.67 million respectively. (Source: Progress of SHG –Bank Linkage in India 2004-05, NABARD). This is the reason why the sample is drawn from Hooghly district of West Bengal. The role of the Hooghly District Central Cooperative Bank Ltd. (HDCCB) in microfinance is also significant compared to the Cooperative Banks of other districts and has been considered as the role model for many districts and states. Among all the DCCBs in Hooghly, Hooghly District Central Cooperative Bank Ltd. (HDCCB) had the maximum number of SHGs (cumulative) provided with bank loan, and the cumulative amount of bank loan disbursed by HDCCB was also the largest as on 31 March 2005. They were 13900 and Rs. 176.02 million respectively. (Source: Progress of SHG –Bank Linkage in India 2004-05, NABARD). This Bank is the highest lending financial institution among all the banks including any nationalized bank in Hooghly. At the end of that financial year it was estimated that the repayment rate of borrowing under joint liability was 98%. (Annual Report of Hooghly District Central Cooperative Bank Ltd.). Thus the reason for selecting Hooghly is justified. Out of eighteen blocks in Hooghly, only one block has been selected - Chinsurah-Mogra. This block has been selected because it has a tribal based community with a considerable percentage of people below the poverty line. One colony named 'Sukantapally' has been selected. All members of this colony have migrated from Bangladesh. All are women SHGs formed by Mogra cooperative bank – a branch of HDCCB Ltd in 2005. As our basic objective is to estimate Women Empowerment Index and also to determine the effectiveness of joint liability microfinance programme in empowering rural women economically and socially, the sample consists of one treatment group and one control group or reference group. The survey was carried out twice once during August-November 2009-10 and again during September-December 2013-14 in order to determine the impact of microfinance programme on the treatment group and to evaluate whether there has been any change among the members of self-help groups as compared to the control group. The socio economic conditions were studied of the sample respondent with the help of a well framed detailed questionnaire in order to determine the contribution of microfinance in empowering rural women. In our sample, the rural households of the same villages had the option of either joining any of the self-help groups or stay away from them. Thus the sample has two categories:

1. Individuals who have taken membership of self-help group in the t^{th} period and plans to take credit in future when required from her respective group under joint liability loan contract. These individuals in our paper belong to Treatment Group.
2. Individuals, from almost identical socio-economic background who are not members of joint liability loan contract system not only in the t^{th} period but also in the end line period though they have the eligibility to join any of the groups. These sample respondents here treated as control group.

The total sample size is 170 out of which the treatment group has 130 individuals and the control group has 40 individuals.

Estimation of Women Empowerment Index Using Principal Component Analysis

It is insufficient to explain empowerment of women by using only single variable because such descriptive analyses are based on a uni-dimensional assumption that a variable obtains no other relational and / or interrelation pattern with any other variable,. Therefore, it is necessary to apply multivariate method which aims to find meaningful method of measuring empowerment. The primary advantage of multivariate technique is their ability to accommodate multiple variables in an attempt to understand the complex relationships which is not possible with univariate and bivariate methods. For this reason, 'Factor Analysis' is chosen as the method to examine the multidimensional relationships among the variables in this study. Factor Analysis is a generic name given to a class of multivariate statistical method whose primary purpose is to define the underlying structure in a data matrix. It addresses the problem of analyzing the structure of the interrelationships among a large number of variables by defining a set of

common underlying dimensions known as factors. In this study, Principal Component Analysis is preferred for model building because this method attempts to reach a set of factors which can account for all the common and unique variance in a set of variables (Garson, 2003). The goal of PCA is to summarize the interrelationships among a set of original variables in terms of a smaller set of orthogonal principal components that are linear combinations of the original variables. Therefore while choosing the variables we have kept in mind that all variables describe a common phenomenon. The primary application we are looking at in this paper is the empowerment analysis. PCA requires that the variables being examined be based on similar units of measurement. Therefore it is customary to standardize (normalize) the variables when each variable has mean zero and variance one, so that PCA indeed analyses the dependencies among the variables rather than the differences in measurement scales. In order to normalize the values we have to first identify the maximum and minimum values of each variable. To find out whether the rural women have been empowered through microfinance programme or not we have assigned values to the variables with the help of a four pointer scale, thereby examining how discrete data can be appropriately used with PCA. If there are several categories of a discrete variable, they may or may not have some natural ordering. If they do, the discrete data are referred to as ordinal. When we turn to the ordinal data, a simple and naïve plug-in strategy would be to use the discrete x's as if they were continuous in the PCA.

If x is a random vector of dimension p with finite p x p variance-covariance matrix V[x] = $\sum$, then the principal component analysis solves the problem of finding the directions of the greatest variance of the linear combinations of x's. In other words, it seeks the orthogonal set of coefficient vectors a_1,……., a_k , such that

$a_1 = \arg\max V [a^{/} x]$

……

$a_k = \arg\max V [a^{/} x]$ ……(1)

The linear combinations $a^{/}_k x$ is referred to as the k-th principal component. The first principal component will have the greatest variance and extract the largest amount of information from the data; the second component will be orthogonal to the first one, and will have the greatest variance in the subspace orthogonal to the first component, and extract the greatest information in that subspace and so on. The solution to equation (1) is found by solving the Eigen problem for the covariance (or correlation) matrix $\sum$: find λ's and a's such that

$\sum a = \lambda a$ …….. (2)

The solution of the Eigen problem (2) for the covariance or more commonly correlation matrix gives the set of principal component weights 'a' also referred to as factor loadings, the linear combinations $a^{/} x$ and the Eigen values $\lambda_1 \geq$ …….. $\geq \lambda_p$. The linear combination that corresponds to the largest Eigen value is the one that has the greatest variance. Let us first identify the variables used to measure empowerment using PCA.

To measure empowerment we have used 17 variables to understand whether there has been an increase in women's empowerment after joining self-help groups.

- **Women's awareness about child care facilities (chcare):** As women are responsible for rearing of children, therefore they will have to be aware of their children's nutritional status, vaccination at proper times etc. because greater is the awareness among the mothers better should be the health conditions of the children.
- **Women's awareness about prenatal care (prenat):** Prenatal care is important both for the mother and the child. Women should be aware of their health conditions for a better future.
- **Place of child's birth (chborn):** Birth of a child should take place either in a primary health centre or in a hospital which is important both for the child and the mother.
- **Meal with family (mealfml):** Whether the female counterpart has the right to have her food with the rest of the family or does she have to survive with the leftovers is an indicator of women empowerment.
- **Right to take decisions about fertility (fert):** Illiterate women often do not have the right to take decisions about fertility; decisions are imposed on them by the male counterpart.
- **Right to make small or large purchases independently (purchs):** Since the female counterpart of the household did not have any economic independence before joining the group, therefore they did not have any right to make purchases on their own, they had to take their husband's permission or the husband makes the purchase according to his own will.
- **Right to take decision about child's education (chedu):** Whether the child will go to school or not depends on the husband's decision because the expense has to be borne by the father as women did not have any earnings.
- **Initiative to mobilize other women to stop illegal activity (illigact):** Illegal activities such as alcoholism, domestic violence are common among rural families thus causing harm to the female members of the family and depriving them of their own rights.
- **Mobility (mobility):** Whether the women have the right to move freely without their husband's permission is important for women empowerment because this variable takes care of the social independence of rural women.
- **Right to attend meetings (attmeet):** Rural women are usually conservative and thus they are compelled to take their husband's permission for every action. Whether they have the right to attend meetings of self-help groups which is compulsory is again an indicator of social independence of rural women and thus have been included.
- **Literacy (literate):** Rural women are usually illiterate and this acts as an obstacle to women empowerment.
- **Use of birth control measures (brthctrl):** It is often observed that as rural women are unaware of the different birth control measures, they give birth too

many children which increases the dependency ratio and reduces monthly per capita consumption expenditure thereby accentuating poverty.

- **Decision about use of loan (useloan):** What is to be done with the loan taken through joint liability loan contract system is usually decided by the male member of the household. Right to take decision about the usage of loan by the female member at par with the husband is an indicator of empowerment.
- **Employment opportunity (employ):** As the basic motive of joint liability loan contract system is to help members of self-help groups to undertake economic activity to generate income to alleviate poverty thereby empowering rural women through economic independence, this variable can be an important component to estimate economic empowerment.
- **Savings habit (save):** Mostly rural households are unable to save because of abject poverty. Even if they can save, the amount is so small such as Rs. 5 or Rs. 10 that cannot be deposited in any financial institution. The ability to save such small amounts has been possible only because of joint liability loan contract system which induces savings habit among rural women and in turn provides credit to them. This acts as an indicator of economic empowerment.
- **Right to decide about the source of loan (loansrc):** Since the rural households usually borrowed from moneylenders in spite of exorbitant interest rates charged by them because of lack of access to financial institutions for credit, this variable effectively measures empowerment to understand whether the female counterpart of the household who is a member of self-help group has the right to take decision about the source of loan i.e. from the group where the interest rate is very less.
- **Borrowing (borrow):** This variable is used to understand whether there has been a change in the source of borrowing after joining self-help group.

Since our main objective is to study whether there has been any enhancement of empowerment of rural women through participation in microfinance operated by PACS we have to make a comparative study of the treatment group with the control group. But all 17 variables have not been considered for the control group for both t^{th} and $(t+1)^{th}$ period because there are some variables which are relevant only for the treatment group. The four variables which have not been included for the control group analysis in the t^{th} period are 'attmeet', 'loansrc', 'borrow' and 'useloan'. These variables have been excluded because the non-members do not have to attend any meeting (which is relevant for a self-help group) and they have not borrowed from any other source in our study because repayment is a problem for them as they either lie below the poverty line or lie just above the poverty line both in t^{th} and $(t+1)^{th}$ period. In the (t+1)th period the same variables are excluded for the control group for the same reason. Out of 17 variables only 'useloan' variable has been omitted for the treatment group analysis in the t^{th} period because no one has taken loan in the t^{th} period. The group members are eligible for loan only after six months of formation of the group provided savings are regular and they meet regularly which is constantly monitored by the SHG coordinator. But all the variables are relevant for the treatment group in $(t+1)^{th}$ period because by then they have enjoyed the benefits of joint liability loan contract system.

Running the PCA in the software package SPSS, we have identified the Eigen Values which is more than one. The number of Eigen values above one varies from data to data. In our study there are four data sets –two for control group, one for t^{th} period and the other for $(t+1)^{th}$ period and similarly two for the treatment group, one for t^{th} period and the other for $(t+1)^{th}$ period. In case of control group for the t^{th} period there are four Eigen values – 5.052, 1.256, 1.247, and 1.155. Incidentally, the four components explain 72.58% variance of the variables included in the analysis. The variable 'mealfml' has been ignored during the analysis because this variable's communality is less than .5 which implies that it does not have sufficient explanation. For this analysis we have used 'Orthogonal Rotations' as our objective is to reduce a larger number of variables to a smaller set of uncorrelated variables. In practice, the objective of all methods of rotation is to simplify the rows and columns of the factor matrix to facilitate interpretation. By simplifying the rows, we mean making as many values in each row as close to zero as possible (i.e., maximizing a variable's loading on a single factor). By simplifying the columns we mean making as many values in each column as close to zero as possible (i.e., making the number of high loadings as few as possible). Three major orthogonal approaches have been developed – Quartimax, Varimax and Equimax. The Varimax method has been used in this analysis. Varimax criterion centres on simplifying the columns of factor matrix. This method maximizes the sum of variances of required loadings of the factor matrix. With the Varimax rotational approach, there tend to be some high loadings (i.e., close to -1 or +1) indicating a clear positive or negative association between the variables and the factor and some loadings near 0 in each column of the matrix indicating a clear lack of association. This structure is fundamentally simple. For example, Table 1 shows the Rotational Component Matrix of control group in the t^{th} period.

Table 1. Rotational Component Matrix of Control Group in the t^{th} period

Variables	Components			
	1	2	3	4
Chcare	.934	.015	.003	.031
Prenat	.910	.071	-.088	-.030
Chborn	.949	.151	-.110	-.072
Fert	.959	.130	-.096	.037
Purchs	-.080	-.083	-.320	-.763
Chedu	.669	-.213	-.040	.077
Illgact	-.130	.002	.701	-.059
Mobility	-.055	-.762	.133	.160
Literate	-.060	-.054	.710	.065
Brthctrl	.960	.128	-.093	-.020
Employ	-.100	-.057	-.338	.731
Save	.063	.772	.080	.190

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 5 iterations

To calculate the weights of the different variables we have multiplied the 1st Eigen value with 1st Extracted Component Column, 2nd Eigen value with 2nd Extracted Component Column, 3rd Eigen value with 3rd Extracted Component

Column, and the 4th Eigen value with 4th Extracted Component Column and then summed them up to obtain the weight. We have considered absolute values (irrespective of sign, negative values are treated as positive). For example, for the first variable 'chcare' we have 5.052*.934+1.256*.015+1.247*.003+1.155*.031= 4.78. In the same way the weights of the other variables are also calculated. Similarly the weights of the different variables for the control group in $(t+1)^{th}$ period are estimated. The Eigen values for the control group in $(t+1)^{th}$ period are 5.170, 1.417, 1.254 and 1.147. There are six Eigen values whose values more than one for the treatment group in the t^{th} period- 3.296, 2.033, 1.309, 1.162, 1.083 and 1.045. For treatment group in the $(t+1)^{th}$ there are five Eigen values having values more than one. They are 4.6, 2.678, 2.081, 1.594 and 1.182. The weights of all the variables for the control group and the treatment group in both t^{th} and $(t+1)^{th}$ periods are given in Tables 2.

Table 2. Weights of Variables for the Treatment Group and Control Group in t^{th} and $(t+1)^{th}$ periods

Variables	Treatment Group(Weights)		Control Group(Weights)	
	t^{th} period	$(t+1)^{th}$ period	t^{th} period	$(t+1)^{th}$ period
Chcare	3.16	2.78	4.8	4.8
Prenat	3.32	3.01	4.83	5.12
Chborn	3.10	2.93	5.2	5.44
Mealfml	1.17	-	-	-
Fert	2.09	3.97	5.17	5.49
Purchs	1.4	3.78	1.79	0.91
Chedu	2.17	3.88	3.78	4.20
Illgact	-	-	1.60	1.73
Mobility	1.47	3.5	1.58	2.10
Literate	0.53	1.35	.33	1.00
Brthctrl	-	1.27	6.37	6.59
Employ	0.92	1.14	1.84	2.92
Save	1.08	-	1.60	-
Useloan	-	3.14	-	-
Loansrc	2.25	1.8	-	-
Borrow	2.25	1.93	-	-
Attmeet	0.82	3.57	-	-
Total Weight	25.73	38.05	39.89	40.9

The following formula is used to determine the Women Empowerment Index:

$$WEI = \sum X_i \left(\sum |L_{ij}| \, . \, E_j\right) / \sum \left(\sum |L_{ij}| \, . \, E_j\right)$$

Where WEI is the women empowerment index, Xi is ith variable, Lij is the factor loading of the ith variable on the jth factor, Ej is the Eigen value of the jth factor. Thus, Table 3 reflects the women empowerment index of control and treatment groups both in t^{th} and $(t+1)^{th}$ periods.

Table 3. Women Empowerment Index of Treatment and Control Group in t^{th} and $(t+1)^{th}$ periods

SAMPLE	WEI (t^{th} period)	WEI $(t+1)^{th}$ period
Treatment Group	0.44	0.76
Control Group	0.49	0.56

The right to move freely without their husband's permission to attend meetings and interaction with other group members and officials of PACS has increased their confidence and awareness. Increased awareness has helped them to use birth control measures effectively and thereby take decisions regarding fertility. The ability to save and borrow has enhanced their importance in the family. This has increased their right to make small household purchases without their husband's consent. Rural women are able to send their children to school and spend for their children's education. Literacy among rural women has increased due to awareness through microfinance programme. There is significant economic and social independence among women of these two blocks. Now in order to determine the effectiveness of joint liability microfinance programmes through cooperative banks in empowering rural women socially and economically we use the difference-in-difference method

Assessment of Empowerment Using Difference-In-Difference Method

Pooled cross section can be very useful for evaluating the impact of a certain event or policy. In our survey the data arises from a quasi experiment. A quasi experiment occurs when some planned exogenous event like any change in government policy can possibly change the socioeconomic environment of the individuals or households. This quasi experiment always has a control group which is not affected by the policy changes and a treatment group which is thought to be affected by the policy changes. In order to control for systematic differences between the control and treatment group we need two years data, one just before the implementation of the policy and one after the change. To collect the longitudinal data we attempt to follow the same households or individuals across time. Let the two time periods be denoted as t^{th} period and $(t+1)^{th}$ time period. These years are not adjacent i.e. t^{th} period corresponds to 2005 and $(t+1)^{th}$ to 2012 in which year the actual impact have been measured. Thus our sample is usefully broken down into four groups, (i) the control group before the change, (ii) the control group after the change, (iii) the treatment group before the change and (iv)the treatment group after the change. In this 'before versus after' comparison the time gap here taken is four years. We can call 'C' as control group and 'T' as the treatment group. DT is here treated as dummy variable and equal to 1 for those in the treatment group 'T' and 'zero' for control group. We here also consider D2 as the dummy variable for the second time period. So the equation of our interest is

$$\alpha_3, \; \alpha_3 \, WEI_{it} = \alpha_0 + \alpha_1 D2 + \alpha_2 DT + \alpha_3 D2DT + u_{it} \qquad \ldots\ldots\ldots\ldots (3)$$

Here α_3 measures the effect of the policy. Without other factors, in the regression α_3 is the difference-in difference estimator. It is also called average treatment effect because it measures the effect of the 'treatment' or policy on WEIit. In the model represents $\{(WEI_{2T} - WEI_{1T}) \; (WEI_{2C} - WEI_{1C})\}$ where the bar denotes average, the first subscript denotes the year, and Table 4 represents the regression results of the model. From Table 5, it is clear that α_3 i.e., the parameter estimate of D2DT is highly significant in the model.

Thus it can be stated that there has been empowerment of rural women both economically and socially belonging to joint liability loan contract system during the concerned time periods.

Table 4. Regression Results of the Model represented by equation (α_3)

Variables	Outcome Variable (WEIit)
Constant	.519*
D_2	4.789E-02
DT	-6.591E-02*
D_2DT	.266*
Adjusted R^2	.279

* ⟶ significant at 1% and 5% level

The microfinance programmes have reached out to women belonging to marginalized sections. Power of individual women members and their female fetus or infant or children to firstly survive and then have control over their labour, mobility, resources, reproduction and decision making has indeed improved since group formation. The degree of power exercised by members on these issues is significantly higher than that of non-members. Women's access to savings and credit has given them a greater economic role in decision-making through their decision about savings and credit thereby optimizing their own and household's welfare. Access to savings and credit and women's say in economic decisions of the households enabled them to increase expenditure on the well-being of their children. Women's control over decision-making is also seen as benefitting men through preventing leakage of household income for unproductive and harmful activities. The available evidence does point to a considerable potential of microfinance for empowerment- women's demand for credit and savings facilities is high, savings propensity as well as the loan repayment rates are quite high. Decision on the use of loan also shows remarkable result. Evidence indicates that women spend much of their income on household well-being including children's education and their health. Even where women do not directly control incomes, perceptions of their contributions to the household have changed. Increased confidence and awareness through interaction with insert bank officials. The reset of the sentence remains intact and other groups during meetings have improved their role in decision-making within the household.

Conclusion

Microfinance programmes have generally targeted women as clients. Under the joint liability micro-credit contract there is a strong link between participation and generation of social capital which plays an important role to enhance empowerment of the rural women. The empowered women now become more confident, more assertive, more likely to participate in family and community decisions and better able to confront systemic gender inequities. Improvements in health care, nutritional advice and education can be sustained only when households have increased earnings and greater control over financial resources.

As microfinance programmes approach financial sustainability, they can reach far beyond the limits of scarce donor resources. The upliftment of the women in a society has been recognized as a major factor to accelerate the developmental process, which is possible through empowering the women more and more. Because people have unconditional freedom of choice and action in turn enable them to better influence the course of their lives and the decisions which affect them (Sen 1985, 1999).

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