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Social Impact of Primary Agricultural Co-operative Societies (PACS) in Nadia District of West Bengal

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aims: The researcher has endeavored to analyze impacts of PACS in-terms of selected social parameters using perception of the sample respondents. The study is significant to evaluate the perception of members PACS.

Place and Duration of Study: The researchers have employed 290 members in 29 PACS out of the 365 operating PACS found in the Nadia district of West Bengal. Primary data for the study have been collected during 2017-2019.

Methodology: The researchers have employed a multi-stage random sampling technique for selecting 290 members in 29 PACS in the Nadia district of West Bengal. The Likert-scale used with 5 points in the questionnaire in which, the respondents were required to grade the scale of their satisfaction for particular thing. Data have been standardized for in the study with Zero mean and Unit Standard Deviation. Qualitative as well as quantitative techniques of data analysis were used

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to describe and analyze the research questions. The data collected from household survey were organized, coded and entered into statistical package, TANAGRA and Statistical Package of Social Sciences (SPSS). Descriptive statistics such as, frequency distribution, percentages etc. multivariate analyses for data reduction, Principal Component Analysis, K-means Cluster Analysis, analyses related to Group Characterization have been done to arrive meaningful interpretations for conclusions of the study.

Results: The score obtained from the PCA are then grouped through cluster analysis. Social perception is to arrange the score according to deviations from Standard Deviation (SD). More than 76 percent of the total members fall in the group implying the perception of the members on social development by PACS is mostly homogeneous in nature. The researcher has find two variables namely, PACS role on empowering women in decision making and PACS Social business with other rural institutions comprise the first factor. Similarly second factor consist of the two (2) variables namely, PACS role in sensitizing women leadership in PACS management and role in skill development of women though training/ handholding etc. The second factor may be viewed as the factor of woman empowerment.

Conclusion: The study concludes that PACS play important role in social development of the family. Most of the members agreed upon the positive role of the PACS Empowering women in decision making, Generating awareness of ongoing social development schemes of Government, Mobilizing of weaker sections, Educating Co-operative principles and Social business with other rural institutions. Moreover, PACS help to improve education level and improve habit of agricultural loan at the time of cash requirement particularly during peak season of agricultural operations.

Keywords: *Primary Agricultural Co-operative Society (PACS); social impact; impact of agricultural credit societies; social perception study; role of PACS.*

1. INTRODUCTION

Primary Agricultural Co-operative Society (PACS) purported to be a socio-economic and democratic institution. Since, 1904 the PACS are protecting to farmers from exploiting clutches of rural money lenders and landlords. With the passage of time and needs of rural people, the number and activities of PACSs have increased variously, and have undergone changes with Government supports [1-4]. PACSs have been providing institutional credit, as a major part of its activity, to its members since inception. After nationalization, the commercial banks have put emphasis on social banking through opening of large number of branches in rural areas, but PACS have been constantly playing its role as a major rural credit provider to farmers [5-9]. PACS provide both short and medium term credits and undertake distribution and marketing of agricultural inputs among farming people as a multi-lending institutions and multi-service providers [10-13]. Besides banking facilities and credit supply, activities of PACS helped farmers in improvement of their livelihood and social upliftment.

In the era of globalization, present rural socio-economic system, there is a need or review and re-thinking the activities of PACS as compare with other rural institutions at the grassroots level and to know the perceptions of farming

community regarding PACS. In this broad context, this research paper seeks to deal with how and to what extend the farming people have been benefited from PACS for their social frontier in Nadia district of West Bengal . Accordingly the researcher has endeavoured to analyse impacts of PACS in-terms of selected social parameters using perception of the sample respondents. The study is significant to evaluate the perception of members PACS [14-16]. The present study is useful to the students and researchers at the same time policy planners in their efforts to improve the working of the present administrative-management system of PACS in Nadia district in particular and India in general. The paper has been also highlighted and concluded on the different issues related to better functioning of PACS based on study. PACS takes a special role in agricultural credit to reduce the dependency and exploitation of the 'rural money lenders', and played a pivotal role in restructuring agriculture credit system. The study assesses whether the effects of PACS have been reflected from a social point of view.

The major objectives of the study are as follows:

- I) To empirically assess the role of PACS on social development of members
- II) To analysis different factors regarding perception of members about social impacts of PACS.

2. MATERIALS AND METHODS

The researchers have employed a multi-stage random sampling technique for selecting 290 members in 29 PACS out of the 365 operating PACS found in the Nadia district of West Bengal. Primary data for the study have been collected during 2017-2019 related to perceptions of members of PACS through questionnaire method from randomly selected members of the selected PACS. We have used Likert-scale with 5 points in the questionnaire in which, the respondents were required to grade the scale of their satisfaction for particular thing. We designed a Likert scale questionnaire in which 1 was strongly 'agree', 2 'agree', 3 'undecided', 4 'disagree' and 5 'strongly disagree'.

Data have been standardized for the study with Zero mean and Unit Standard Deviation. Qualitative as well as quantitative techniques of data analysis were used to describe and analyze the research questions. The data collected from household survey were organized, coded and entered into statistical package, TANAGRA and Statistical Package of Social Sciences (SPSS). Descriptive statistics such as, frequency distribution, percentages etc. multivariate analyses for data reduction, Principal Component Analysis, K-means Cluster Analysis, analyses related to Group Characterization have been done to arrive meaningful interpretations for conclusions of the study.

3. RESULTS AND DISCUSSION

3.1 Perception of Farming Community on Social Impacts of PACS

The study considers ten indicators to analyze the social perception of respondents of PACS. Different statistical methods have been used to find out the result according to the set objectives. This sub-section will discuss elaborately the results obtained from analyses. The methods considered in the study are Principal Component Analysis, Cluster Analysis and Group Characterization. The perceptions of selected respondents on social impact of PACS have been represented in the Table 1. Ten (10) social parameters have been selected for perception analysis of respondents to discern the social impacts of PACS on farming community.

Perception has been taken for whether the PACS play any role in the rights and opportunities for women to active participation and leadership in

the management system of PACS particularly in our rural male-dominated socio-economic structures. In the present context, involving women's in this regard can be considered an important timely step and social activity of PACS. The participation of women in the PACS management system is seen very low. At present direct and indirect connections to women's in socio-economic development cannot be denied. On the other hand, women participation in agricultural processing and value addition system are socially desirable. Therefore, this indicator is one of the important one in present social activity of PACS. The table (Table 1) reveals that 72.76 percent Members are strongly agreed with these parameters. So it has been clear that PACS play a meaningful role in sensitizing the women's leadership of PACS management of the member's households.

In the issue of skill development of women's through handholding-training, perception has been taken on role of the PACS in training for women's self dependence. At the village level, there is a need for demand and market oriented production with the help of available rural resources. The skills are needed to accelerate the market-oriented production system. Training is needed to make women self dependent and work-oriented in the short run with minimum financial support. Attempts have been made to find out if PACS has taken steps to address this need. From the above table (Table 1) majority are agreed. It has been observed that only female Members of the member's household's got the opportunity of training.

Apart from the PACS at the rural level, there are many other socio-economic institutions i.e. Panchayats, Gramin banks, educational institutions and some public-private organizations, NGOs working various multi-faceted activities for socio-economic welfare of the farming community. The third parameter is taken into consideration whether PACS are playing a specific role in linking of rural base public welfare institutions. The study reveals that (Table 1) 42.07 and 35.52 percent, respectively, of the Members group have strongly agreed and agreed on the PACS association with other rural institutions for social business.

Participation in decision making process is one of the important indicators of women empowerment. It is also important for family matter or in agricultural production or in the management of the PACS. Women's active

participation and their views are entitlement to transfer into the socio-economic development of the family through their decision-making process. The table (Table 1) exhibits that 26.55 percent of Members under strongly agree category and 35.17 percent are under agree category. The reason might be that since Members have entitlement as owners of the PACS, they could have felt that the PACS as a great enabling force providing empowerment benefits of women in decision making.

Various farmers' oriented and social welfare related programmes and schemes have been implemented by the Central and State Governments. PACS is one of the important rural financial institutions to implement farmer oriented development programme. In the fifth paradigm, the perception has been taken for whether the PACS play role in promoting the projects and schemes. From the table (Table 1), it may be inferred that 93.45 percent of the Members who said that the PACS have played its role. The reasons for this have been found that people who are directly involved with the PACS or who are regularly connected with the PACS are aware of Government projects.

Dissemination of Co-operative principles and education is considered as a social and public responsibility of the PACS. The indicators answer whether the PACS play any role in involvement of Members in a collective way. As a result, majority of Members (93.10 percent) are strongly agreed with the indicator. It was clearly indicated that the PACS have extended Co-operative principles and education among their Members. It has been also observed that the Non-member respondents are disappointed in this regard.

Agricultural is the main source of livelihood in rural area. Still agriculture faces uncertainty and new challenges. To eliminate the uncertainty in agriculture, Government initiatives have been taken at all levels. It has been assessed whether the PACS plays a positive role in reducing agriculture uncertainty in general and farming community in particular. Table 6.1 reveals that 99.66 percent Members in households get benefited from the insurance. It is also observed that Members of the PACS who took agricultural loans only get the benefit of insurance coverage.

Promotion of SHG (Self Help Group) is a major effort at the all India basis by the Central and the State Government. Table (Table 1) highlights that the PACS takes a part in the upliftment of SHGs at the rural level. The data presented in the following table (Table 1) reveals that 85.86 percent Members strongly agree on this issue.

Similarly, it has been reviewed whether the PACS takes part in the development of the tenant farmers in the form of JLGs (Joint Liability Group). The table (Table 1) clearly indicates that the majority of the Members (80 percent) strongly disagreed with this indicator. The reason for that, agricultural land is the primary factor being a Member of the PACS. Since the farmers of such groups have small holding of agricultural land, they do not get any benefit from the PACS.

Further, it has been discussed that whether the PACS get attention to the weaker section of the community for their socio-economic upliftment. One of the social responsibilities of the PACS is to specifically look after the weaker section of the society. In this context the researcher has already seen that PACS Members follow the Co-operatives principles and they work for the upliftment of weaker section. So they have expressed 84.48 percent strongly agree in this regard.

3.1.1 Principal component analysis (PCA) on social perception of members

Principal Component Analysis (PCA) is done to avoid the multicollinearity present among the different variables considered in the study. This analysis is so done to reduce the dimensionality of data set to a few new set of variables without losing any information present in the original set of variables. The original data set has been transformed into a new set of standardised variables distributed with Zero (0) mean and unit standard deviation (SD) for analysis.

Table 2 present the 10 indicators of members for social perception study. The matrix exhibits the interrelationship among the variables. Some of the variables show a close interdependence with others. PCA represents a statistical technique that linearly transform the original set of variables into a substantially smaller set of uncorrelated variables giving most of the information present in original set of variables.

Table 1. Degree of Social Perception of Selected PACS Members and Non-Members across Indicators in Nadia District of West Bengal

| Perception | Members | | | | | Total (Nos.) |
|--|--------------------|-----------|---------------|--------------|-----------------------|--------------|
| | Strongly Agree (%) | Agree (%) | Undecided (%) | Disagree (%) | Strongly Disagree (%) | |
| PACS role in Sensitizing Women leadership in management | 72.76 | 27.24 | 0.00 | 0.00 | 0.00 | 290 |
| PACS role in Skill development of Women though training/ handholding etc | 51.03 | 48.97 | 0.00 | 0.00 | 0.00 | 290 |
| PACS Social business with other rural institutions | 42.07 | 35.52 | 0.00 | 22.41 | 0.00 | 290 |
| PACS role on empowering women in decision making | 26.55 | 35.17 | 8.97 | 29.31 | 0.00 | 290 |
| PACS role in generating awareness of ongoing social development schemes of Government | 0.69 | 93.45 | 0.00 | 5.86 | 0.00 | 290 |
| PACS role in educating Co-operative principles | 93.10 | 6.90 | 0.00 | 0.00 | 0.00 | 290 |
| PACS role in propagating Agricultural Insurance | 0.00 | 0.00 | 0.34 | 99.66 | 0.00 | 290 |
| PACS role in mobilizing of SHGs movement | 85.86 | 14.14 | 0.00 | 0.00 | 0.00 | 290 |
| PACS role in mobilizing of JLGs | 7.93 | 10.69 | 1.38 | 80.00 | 0.00 | 290 |
| PACS role in mobilizing weaker sections | 84.48 | 6.55 | 0.00 | 8.97 | 0.00 | 290 |

(Source: Primary Data)

Table 2. Correlation Matrix among Perceptible Social Indicators for Members

| | Perception | | | | | | | | | |
|--|---|---|---|-------------------------------------|--|-----------------------------------|------------------------------------|-----------------------------|--------------------|-------------------------------|
| Perception | Sensitizing Women leadership in PACS management | Skill development of Women though training/ handholding | Social business with other rural institutions | Empowering women in decision making | Generating awareness of ongoing social development schemes of Government | Educating Co-operative principles | Propagating Agricultural Insurance | Mobilizing of SHGs movement | Mobilizing of JLGs | Mobilizing of weaker sections |
| Sensitizing Women leadership in PACS management | 1.00 | 0.21 | 0.03 | -0.02 | -0.06 | 0.05 | 0.04 | 0.06 | 0.05 | 0.04 |
| Skill development of Women though training/ handholding | 0.21 | 1.00 | -0.08 | 0.00 | 0.01 | 0.06 | -0.06 | 0.06 | 0.06 | -0.08 |
| Social business with other rural institutions | 0.03 | -0.08 | 1.00 | -0.24 | -0.06 | -0.02 | -0.10 | 0.01 | -0.04 | -0.06 |
| Empowering women in decision making | -0.02 | 0.00 | -0.24 | 1.00 | -0.01 | 0.00 | -0.08 | 0.04 | 0.14 | 0.05 |
| Generating awareness of ongoing social development schemes of Government | -0.06 | 0.01 | -0.06 | -0.01 | 1.00 | -0.01 | 0.01 | 0.03 | -0.02 | 0.09 |
| Educating Co-operative principles | 0.05 | 0.06 | -0.02 | 0.00 | -0.01 | 1.00 | 0.02 | 0.05 | 0.00 | 0.04 |
| Propagating Agricultural Insurance | 0.04 | -0.06 | -0.10 | -0.08 | 0.01 | 0.02 | 1.00 | 0.02 | -0.03 | -0.05 |
| Mobilizing of SHGs movement | 0.06 | 0.06 | 0.01 | 0.04 | 0.03 | 0.05 | 0.02 | 1.00 | -0.06 | 0.02 |
| Mobilizing of JLGs | 0.05 | 0.06 | -0.04 | 0.14 | -0.02 | 0.00 | -0.03 | -0.06 | 1.00 | -0.04 |
| Mobilizing of weaker sections | 0.04 | -0.08 | -0.06 | 0.05 | 0.09 | 0.04 | -0.05 | 0.02 | -0.04 | 1.00 |

(Source: Source: Primary Data, Computed)

Table 3. Component -wise Eigen values on Social Perception for Members

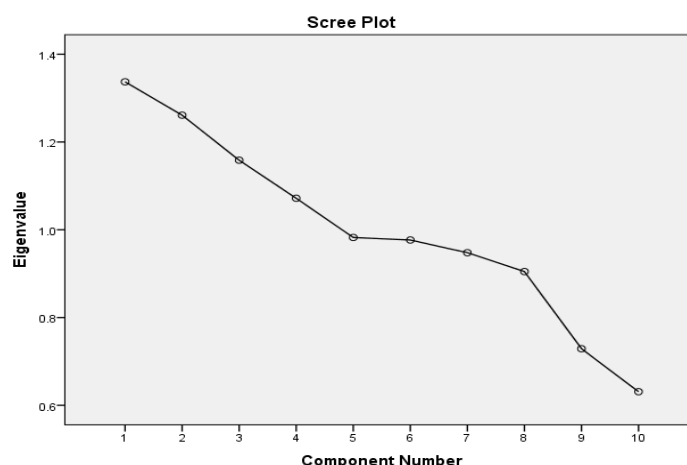
| Axis | Eigen value | Proportion (%) | Cumulative (%) |
|-------|-------------|----------------|----------------|
| 1 | 1.34 | 13.37 | 13.37 |
| 2 | 1.26 | 12.61 | 25.98 |
| 3 | 1.16 | 11.58 | 37.57 |
| 4 | 1.07 | 10.72 | 48.28 |
| 5 | 0.98 | 9.82 | 58.11 |
| 6 | 0.98 | 9.77 | 67.87 |
| 7 | 0.95 | 9.48 | 77.35 |
| 8 | 0.90 | 9.05 | |
| 9 | 0.73 | 7.29 | |
| 10 | 0.63 | 6.31 | |
| Total | 10 | 100.00 | - |

(Source: Source: Primary Data, Computed)

Table 3 shows the Eigen values and corresponding proportion of variance explained. The first component (Axis) explained 13.37 percent of the total variance of the data set followed by second components explained 12.61 percent of the total variance. Thus first two (2) components explained 25.98 percent of cumulative variance present within the data set. Only four (4) components (Axis) are extracted with the Eigen value more than one (1) which cumulatively explained only 48.28 percent of the total variance present in the data set. The study considers the seven (7) components (Axis) to explain more than 75 percent of the variance of the data set.

Eigen values are plotted against the component numbers in Scree Plot. Scree plot (Fig 1) also gives a visual explanation for retaining the the seven (7) components.

Factor loading exhibits (Table 4) the correlation between the original variables and the factors. This is the key to understand the underlying nature of a particular factor. Summation of the squared factor loadings of a factor results the Eigen value of that factor. First factor comprises of the two (2) variables exhibiting the highest loading among the seven (7) extracted factors. The researcher has found two variables namely, PACS role on empowering women in decision making and PACS Social business with other rural institutions comprise the first factor. Similarly second factor consist of the two (2) variables namely, PACS role in sensitizing women leadership in PACS management and role in skill development of women through training/ handholding etc. The second factor may be viewed as the factor of woman empowerment. Third factor also loads two (2) variables. Weaker section of the society comprises the third factor. All the variables under the social perception study are distributed in seven (7) factors.

**Fig. 1. Scree Plot Showing Component wise Eigen Values for Members' Social Perceptions**

(Source: Author, Computed)

Table 4. Component-wise (Axis) Factor Loadings of Perceptible Social Attributes of Members

| Social Attributes | Axis_1 | Axis_2 | Axis_3 | Axis_4 | Axis_5 | Axis_6 | Axis_7 |
|--|--------------|--------------|-------------|-------------|--------------|-------------|--------------|
| | Corr. | Corr. | Corr. | Corr. | Corr. | Corr. | Corr. |
| Empowering women in decision making | 0.64 | 0.39 | -0.18 | -0.08 | -0.06 | -0.31 | 0.08 |
| Social business with other rural institutions | -0.62 | -0.36 | -0.16 | -0.35 | -0.05 | -0.02 | -0.01 |
| Sensitizing Women leadership in PACS management | 0.31 | -0.62 | 0.13 | -0.06 | -0.06 | 0.24 | 0.45 |
| Skill development of Women though training/ handholding etc | 0.45 | -0.57 | 0 | -0.04 | 0.35 | 0.13 | -0.17 |
| PACS role in propagating Agricultural Insurance | -0.05 | -0.01 | 0.32 | 0.83 | -0.13 | 0.16 | 0.16 |
| PACS role in educating Co-operative principles | 0.19 | -0.23 | 0.3 | -0.06 | -0.66 | 0.02 | -0.61 |
| Generating awareness of ongoing social development schemes of Government | 0.04 | 0.27 | 0.47 | -0.14 | 0.53 | 0.39 | -0.36 |
| Mobilizing of SHGs movement | 0.15 | -0.23 | 0.46 | -0.06 | 0.17 | -0.7 | 0.04 |
| Mobilizing of JLGs | 0.42 | 0 | -0.5 | -0.02 | -0.07 | 0.26 | -0.09 |
| Mobilizing of weaker sections | 0.13 | 0.29 | 0.47 | -0.47 | -0.29 | 0.27 | 0.41 |

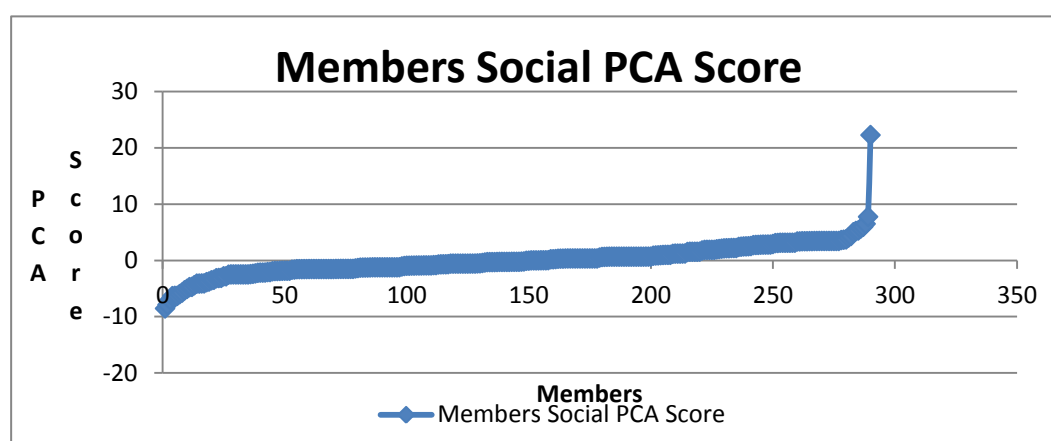
(Source: Primary Data, Computed)

Factor score coefficients (Table 5) for each factor are distributed with Zero (0) mean and Unit variance. Factor score coefficients are used to generate a new set of uncorrelated variables from original variables. The coefficients are distributed where sum squared of the coefficients is equal to unity (1). The sum of the cross products of any two columns adds up to Zero (0). Factor score coefficients transform the original data set to new set of variables with mean Zero

(0). Each score coefficient represents the associated weights of the variable in the factor.

Factor scores of all the members on social aspects are presented as annexure.

The factor scores of 290 members respondent (Table 6) ranges between 22.22 to -8.58 with Zero (0) mean and 2.78 Standard Deviation (SD). The graphical distribution of factors scores is presented in Fig. 2.

**Fig. 2. Graphical Representation of Distribution of Members According to PCA Scores on Social Perception**

(Source: Primary Data, Computed)

Table 5. Component-wise (Axis) Factor Score Coefficients on Perceptible Social Attributes of Members

| Social Attribute | Mean | Std-dev | Axis_1 | Axis_2 | Axis_3 | Axis_4 | Axis_5 | Axis_6 | Axis_7 |
|--|------|---------|--------|--------|--------|--------|--------|--------|--------|
| Sensitizing Women leadership in PACS management Skill | 0 | 1 | 0.27 | -0.56 | 0.12 | -0.06 | -0.06 | 0.24 | 0.47 |
| development of Women through training/ handholding etc | 0 | 1 | 0.39 | -0.51 | 0 | -0.04 | 0.36 | 0.13 | -0.17 |
| Social business with other rural institutions | 0 | 1 | -0.53 | -0.32 | -0.15 | -0.34 | -0.05 | -0.02 | -0.01 |
| Empowering women in decision making | 0 | 1 | 0.56 | 0.35 | -0.16 | -0.08 | -0.06 | -0.31 | 0.08 |
| Generating awareness of ongoing social development schemes of Government | 0 | 1 | 0.04 | 0.24 | 0.44 | -0.13 | 0.53 | 0.39 | -0.37 |
| Educating Co-operative principles | 0 | 1 | 0.16 | -0.2 | 0.28 | -0.06 | -0.67 | 0.02 | -0.63 |
| Propagating Agricultural Insurance | 0 | 1 | -0.04 | -0.01 | 0.29 | 0.8 | -0.13 | 0.16 | 0.16 |
| PACS role in mobilizing of SHGs | 0 | 1 | 0.13 | -0.2 | 0.43 | -0.06 | 0.18 | -0.71 | 0.04 |
| movement | 0 | 1 | 0.36 | 0 | -0.46 | -0.02 | -0.07 | 0.27 | -0.1 |
| Mobilizing of JLGs | 0 | 1 | 0.11 | 0.26 | 0.43 | -0.46 | -0.29 | 0.27 | 0.42 |
| Mobilizing of weaker sections | 0 | 1 | 0.11 | 0.26 | 0.43 | -0.46 | -0.29 | 0.27 | 0.42 |

(Source: Primary Data, Computed)

Table 6. Maximum-Minimum PCA Scores of Members Relating to Social Perception

| | Nos. | Range | Minimum | Maximum | Mean | Std. Deviation |
|--------|------|-------|---------|---------|------|----------------|
| Scores | 290 | 30.80 | -8.58 | 22.22 | 0 | 2.78 |

(Source: Primary Data, Computed)

Table 7. Distribution of Members in Different Classes of Social Perception According to PCA Score

| Score Categories | Nos. | Percentage (%) |
|-------------------|------|----------------|
| Less than 0 (0 <) | 157 | 54.14 |
| 0 to 5.0 | 126 | 43.45 |
| 5.01 to 8.0 | 6 | 2.07 |
| Above 8.0 | 1 | 0.34 |
| Total | 290 | 100 |

(Source: Primary Data, Computed)

The PCA score have been distributed into 4 different categories of (less than 0), (0 to 5.0), (5.01 to 8.0) and above 8.0 according to the scores for ease understanding. Table 7 depicts that more than 54 percent of total members fall in the negative score category whereas 43 percent of members fall in the low score group. It implies that the role of PACS on the development of community or society as a whole is negligible as perceived by the majority of the members. A low percentage of members think that PACS play important role in social development.

Another way of looking into the scores (Table 8) obtained from the Principal Component Analysis of the members on social perception is to arrange the score according to deviations from Standard Deviation (SD). More than 76 percent of the total members fall in the group within the limit of deviation from SD implying the perception of the members on social development by PACS

is mostly homogeneous in nature. Higher score (more than 1SD) is obtained from 14 percent of members reflecting the positive opinion of the members on the role of PACS on social development. Nearly 9 percent members express their indifferent attitude on the role of PACS on social development.

3.1.2 Cluster Analysis of PCA Scores on Social Perception of Members

The score obtained from the PCA are then grouped through cluster analysis. K-means Clustering Method is done to assign K-Centre to represent the Clustering of N ($K < N$) points. Each of the N-points is assigned to one of the K-Cluster. The main principle of formation of the cluster is to (i) To minimize the variability within the cluster and (ii) Maximize the variability between the clusters. A cluster is formed on the basis of values of the centroids of that cluster.

Table 8. Distribution of Members in Different Classes on Social Perception According to Deviations from Mean PCA Score

| Items | Nos. of Members | Percentage (%) of Members |
|--|-----------------|---------------------------|
| Perception of Members with Score Less than -1SD | 26 | 8.97 |
| Perception of Members with score Within 1 SD (\pm SD) | 223 | 76.90 |
| Perception of Members with Score Greater than +1SD | 41 | 14.14 |
| Total | 290 | 100 |

(Source: Primary Data, Computed)

Table 9. Cluster Analysis of Members on the Basis of Social Perception PCA Score

| Description | | | | | Statistical test | | |
|---------------|------|----------------|--------------------------------|-----------|------------------------|---------------|-------------|
| Cluster Group | Nos. | Percentage (%) | Cluster Centroids of PCA Score | Std. Dev. | Variance decomposition | | |
| A | 75 | 25.86 | 3.28 | 2.49 | Source | Sum of square | d.f. |
| B | 189 | 65.17 | -0.66 | 1.03 | BSS | 1503.55 | 2 |
| C | 26 | 8.97 | -4.82 | 1.56 | WSS | 723.62 | 287 |
| | | | | | TSS | 2227.18 | 289 |
| | | | | | Significance level | | |
| | | | | | Statistics | Value | Probability |
| | | | | | Fisher's F | 298.17 | 0 |

(**BSS**-Between Sum of Square, **WSS**- Within Sum of Square, **TSS**- Total Sum of Square, **d.f.**- Degree of Freedom)

(Source: Primary Data, Computed)

The PCA scores have been grouped into three different clusters on the basis of K-means Clustering Method. A very high average value of score (3.28), depicted as Cluster Centroids of PCA Score in Table 9, is obtained for 76 members (Group A) accounting for more than 26 percent of total members surveyed. It implies that 26 percent of the total members perceive that PACS play important roles in social development. On the other hand, nearly 65 percent of the total members (Group B) find moderate role of the PACS on social development. On the contrary, dismal views of 9 percent members (Group C) on indifferent or no roles of the PACS in social development are also observed from the analysis with centroids value of (-) 4.82. Fishers F statistics shows a very high level of significance of test besides the high R square value (0.68).

3.2 Group Characterization of Social Clusters in terms of Socio-economic Indicators of Members

Group characterizations of all the groups obtained through Cluster Analysis (Table 10) have been done to identify the contributing attributes in formation of the different clusters. Accordingly, mean values of indicators of a particular group have been compared with the mean values of the overall respondents or virtual group. Test value indicates the level of mean-difference between a selective group and overall. The results of group characterization obtained from Tanagra 1.4.50 is presented in table 10. The variables considered for group characterization are found to be continuous for all the groups. Variables within the groups are arranged according to the importance of the same in groups. Higher group mean value than the overall mean of a variable indicates the higher importance of that variable in the groups. Thus the variables are arranged in descending order in accordance with the Test Values representing the decreasing importance of the subsequent variables in the groups. The Test Value column shows the strength of the difference between two means. The higher is the absolute value of the indicators, the higher is the mean computed in the sub group and the mean computed on whole data set. Positive test values of the variables are the indicators of the relative importance of the indicators in formation the group.

Members of the Group A (Table 10) opined that PACS play the important role in social

development. Members of this Group think that PACS play a very important role on empowering the women in decision making. One fourth of the total surveyed members think that women have been empowered by the PACS in decision making. Other contributing attributes for formation of this group are PACS role in generating awareness of ongoing social development schemes of Government, role in mobilizing of weaker sections, role in propagating Agricultural Insurance, role in mobilizing of JLGs, role in skill development of women through training/ handholding etc [17-20]. Furthermore, if the researcher has look into the table of Group characterization of social cluster according to the socio-economic indicators (Table 11), it is observed that percentage of credit to gross income plays important role in formation of the Group A. Other contributory socio-economic indicators in this group are years of association with PACS, amount of credit, proportion of agriculture income to gross income, age, cultivable land and agricultural income.

Members of Group B (Table 10) find moderate roles of PACS in social development. The major attributes for formation of this group are PACS social business with other rural institutions, PACS role in educating Co-operative principles, role in generating awareness of ongoing social development schemes of Government, role in mobilizing of weaker sections, role in Sensitizing Women leadership in PACS management and role in mobilizing of SHGs movement. Majority of farmers (65 percent) think that PACS play a moderate role on the above mentioned aspects in social development. The major contributory socio-economic indicators (Table 11) for formation of this group are education level, main occupation, credit, savings, gross income, expenditure, secondary occupation, non farm income. Education level plays the most important role in formation of this group.

Group C comprises nearly 9 percent (Table 10) of the total members. Members of this group think that PACS don't play any important role in social development. The perception of this group is found to be negative. The members of the Group C perceive (Table 11) the negligible role of the PACS in social development. The important variables for formation behind this group are PACS social business with other rural institutions followed by PACS role in educating Co-operative principles, role in mobilizing of JLGs, role in mobilizing of SHGs movement, role in sensitizing women leadership in PACS

Table 10. Group Characterization of Clusters According to Members' Social Perception Indicators

| Indicators | Group-A | | | Group-B | | | Group-C | | | Overall | |
|--|---------------|------|-----------|----------------|------|-----------|---------------|------|-----------|-------------|-----------|
| | [25.86 %] 75 | | | [65.17 %] 189 | | | [8.97 %] 26 | | | [100 %] 290 | |
| | Test Value | Mean | Std. Dev. | Test Value | Mean | Std. Dev. | Test Value | Mean | Std. Dev. | Mean | Std. Dev. |
| Empowering women in decision making | 3.45 | 3.99 | 1.10 | -2.82 | 3.45 | 1.16 | -0.59 | 3.46 | 1.21 | 3.59 | 1.17 |
| Generating awareness of ongoing social development schemes of Government | 2.89 | 4.03 | 0.16 | 4.29 | 3.98 | 0.21 | -11.61 | 2.85 | 1.01 | 3.89 | 0.48 |
| Mobilizing of weaker sections | 2.35 | 4.87 | 0.44 | 3.08 | 4.78 | 0.70 | -8.76 | 3.23 | 1.48 | 4.67 | 0.87 |
| Propagating Agricultural Insurance | 1.68 | 2.01 | 0.11 | -1.36 | 2.00 | 0.00 | -0.31 | 2.00 | 0.00 | 2.00 | 0.06 |
| Mobilizing of JLGs | 0.91 | 2.55 | 1.06 | -1.33 | 2.41 | 0.92 | 0.82 | 2.62 | 1.06 | 2.47 | 0.97 |
| Skill development of Women though training/ handholding etc | 0.59 | 4.54 | 0.50 | -0.48 | 4.50 | 0.50 | -0.11 | 4.50 | 0.51 | 4.51 | 0.50 |
| Mobilizing of SHGs movement | -0.48 | 4.84 | 0.37 | -0.48 | 4.50 | 0.50 | 0.40 | 4.88 | 0.33 | 4.86 | 0.35 |
| Sensitizing Women leadership in PACS management | -0.99 | 4.68 | 0.47 | 0.88 | 4.74 | 0.44 | 0.04 | 4.73 | 0.45 | 4.73 | 0.45 |
| Educating Co-operative principles | -6.18 | 4.78 | 0.42 | 4.82 | 4.98 | 0.13 | 1.45 | 5.00 | 0.00 | 4.93 | 0.25 |
| Social business with other rural institutions | -12.86 | 2.51 | 1.03 | 10.27 | 4.48 | 0.62 | 2.63 | 4.54 | 0.71 | 3.97 | 1.15 |

(Source: Primary Data, Computed)

Table 11. Group Characterization of Social Clusters According to Socio-economic Indicators of Members

| Indicators | Group-A | | | Group-B | | | Group-C | | | Overall | |
|---------------------------------------|---------------|-------------|-----------|----------------|----------|-----------|--------------|----------|-----------|-------------|-----------|
| | [25.86 %] 75 | | | [65.17 %] 189 | | | [8.97 %] 26 | | | [100 %] 290 | |
| | Test Value | Mean | Std. Dev. | Test Value | Mean | Std. Dev. | Test Value | Mean | Std. Dev. | Mean | Std. Dev. |
| Age (Yrs.) | 1.24 | 45.75 | 10.81 | -0.51 | 44.15 | 11.04 | -1.05 | 42.23 | 11.04 | 44.39 | 10.99 |
| Education Level (Score) | -2.68 | 6.91 | 4.01 | 2.49 | 8.31 | 3.60 | -0.03 | 7.88 | 3.58 | 7.91 | 3.75 |
| Cultivable Land (Bigha) | 0.34 | 5.61 (3.34) | 3.34 | -0.36 | 5.44 | 3.46 | 0.08 | 5.55 | 3.38 | 5.50 | 3.41 |
| Main Occupation (Score) | -1.13 | 1.00 | 0.00 | 1.40 | 1.03 | 0.23 | -0.60 | 1.00 | 0.00 | 1.02 | 0.19 |
| Secondary Occupation (Score) | -0.64 | 6.77 | 7.78 | 0.31 | 7.37 | 7.78 | 0.45 | 7.92 | 7.99 | 7.26 | 7.78 |
| Associate with PACS (Yr.) | 1.72 | 17.65 | 11.98 | -1.40 | 15.18 | 10.16 | -0.30 | 15.23 | 9.67 | 15.83 | 10.64 |
| Agriculture Income (Rs.) | 0.33 | 41813.33 | 29328.38 | -0.28 | 40602.15 | 26434.68 | -0.03 | 40769.23 | 24153.36 | 40933.80 | 26941.52 |
| Non-agriculture Income (Rs.) | -1.49 | 24476.67 | 35781.62 | 0.23 | 33658.06 | 57100.22 | 1.90 | 53730.77 | 100036.92 | 33077.18 | 58081.52 |
| Gross Income (Rs.) | -1.52 | 66290.00 | 39397.10 | 0.47 | 77281.72 | 66421.55 | 1.54 | 94500.00 | 95474.60 | 75969.16 | 64102.33 |
| Expenditure (Rs.) | -0.73 | 50880.00 | 19510.88 | 0.37 | 53258.06 | 29352.25 | 0.50 | 55307.69 | 25836.05 | 52822.30 | 26754.77 |
| Saving (Rs.) | -1.73 | 15410.00 | 25998.16 | 0.45 | 24023.66 | 45236.22 | 1.91 | 39192.31 | 73922.81 | 23146.86 | 44897.95 |
| Loan (Rs.) | 1.55 | 49266.67 | 32312.38 | 0.89 | 45209.68 | 36261.24 | -3.85 | 18500.00 | 22978.69 | 43850.17 | 35130.53 |
| % Loan to Gross Income | 2.22 | 84.93 | 53.88 | 0.40 | 73.24 | 58.56 | -4.05 | 28.49 | 38.94 | 72.24 | 57.61 |
| % of Agri. Income to Gross Income | 1.50 | 67.47 | 28.66 | -1.07 | 61.99 | 26.93 | -0.53 | 60.54 | 32.58 | 63.29 | 27.94 |
| % of Non Agri. Income to Gross Income | -0.84 | 32.53 | 28.66 | 0.25 | 35.20 | 27.46 | 0.86 | 39.46 | 32.58 | 34.89 | 28.22 |
| % of Saving to Gross Income | -1.81 | 17.76 | 14.41 | 0.64 | 21.34 | 17.67 | 1.70 | 26.35 | 20.52 | 20.86 | 17.26 |

(Source: Primary Data, Computed)

management. The important indicators for formation of this group are savings, non-agricultural income, gross income, expenditure, secondary occupation etc. It is noteworthy to mention that the members of the group belong to higher income category and mostly depend on non-farm sources of income. This is one of the main reasons for not observing the important roles played by the PACS as perceived by the members in social development.

In our opinion, almost all the members considered for the study expressed their perceptions on the idle PACS role particularly in social business with other rural institution and educating Co-operative principals. PACS needs to focus on mobilizing SHGs operating in rural areas.

4. CONCLUSION

The study concludes that PACS play important role in social development of the family. It is clear from the study that PACS play a meaningful role in sensitizing the women's leadership. So more no of women members should be included in the Board of Directors in the PACS, so that demand for and supply of financial facilities are well reasonably made.

Most of the members agreed upon the positive role of the PACS Empowering women in decision making, Generating awareness of ongoing social development schemes of Government, Mobilizing of weaker sections, Educating Co-operative principles and Social business with other rural institutions. Moreover, PACS help to improve education level and improve habit of agricultural loan at the time of cash requirement particularly during peak season of agricultural operations. The study points out that Member of the PACS who took agricultural loans come under insurance coverage. Further steps are to be taken to bring the all the farmers under agricultural insurances. PACS plays very important role in developing the SHGs (Self Help Group) in rural areas as observed from the study.

Principal Component Analysis concludes that PACS role on empowering women in decision making and PACS Social business with other rural institutions are most important factor in explaining the social development by PACS. The analysis further points out the moderate role of the PACS on the social development of farming community as perceived by the majority of the selected Members. The factor of woman

empowerment comprising of two variables viz. PACS role in sensitizing women leadership in PACS management and role in skill development of women though training/handholding has been emerged out as second most important factor in social development by PACS. The study suggests to bring the weaker section of the society and mobilize them to engage in the activities of PACS. More than 75 percent of the total members fall in the group within the limit of deviation from SD implying the perception of the members on social development by PACS is mostly homogeneous in nature.

According to Cluster Analysis, majority of the respondents (65.17%) think that PACS play moderate roles in social development. The major attributes for formation of this group are PACS social business with other rural institutions, PACS role in educating Co-operative principles, role in generating awareness of ongoing social development schemes of Government, role in mobilizing of weaker sections, role in Sensitizing Women leadership in PACS management and role in mobilizing of SHGs movement. The major contributory socio-economic indicators for formation of this group are education level, main occupation, credit, savings, gross income, expenditure, secondary occupation, non farm income. Education level plays the most important role in formation of this group.

Factors influencing perception levels have been studied in this paper. The major findings were that education, income and borrowings are major causal agents for variation in levels of perception.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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