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Research Paper

Economic Impact of Primary Agricultural Cooperative Societies (PACS): Findings from Nadia District of West Bengal

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ABSTRACT

With the passage of time and needs of rural people, the number and activities of PACSs have increased manifold and undergone changes with government patronage. This paper seeks to address how and to what extend the farming people have been benefited from PACS for their economic frontier in Nadia district of West Bengal. Primary data have been analysed through different statistical methods including multivariate analyses viz. principal component analysis, cluster analysis, and group characterization. The results show a positive relationship of the PACS' role and family income of the farming community and majority of the sampled farmer members expressed the moderate role of PACS on overall economic development of farming community. Perception of the members on economic development by PACS is mostly homogeneous in nature. General perception of the members indicates the disappointing performances of the PACS in raising agricultural productivity or opening business opportunity at village level.

HIGHLIGHTS

- Economic Impact of PACS on rural people.
- Sense socio-economic issues influence people's perception regarding PACS.
- What is the special characteristic of the member which influences the perception.

Keywords: PACS, economic impact, Nadia, perceptions, Principal component analysis

Primary Agricultural Cooperative Society (PACS) in India is a socio-economic and democratic institution that tries to fulfil social and economic needs of its members throughout the country since 1904, for protecting them from exploiting clutches of rural money lenders and landlords. Primary Agricultural Cooperative Societies (PACS) in India are said to be farmers' centric village-level financial institution upholding human values guided by some co-operative principles that works closely specially with farming communities. It promotes saving, especially among farmers and its members, accepts deposits from them, lends money to qualified people, and collects payments. According to the Cabinet Committee on Economic Affairs, 2022 report with over 13 crore farmers as members, the PACS is the lowest tier of the country's three-tiered Short-Term Cooperative Credit (STCC), which is essential for the growth of the rural economy. 95% KCC loans made through PACS go to small and marginal farmers. PACS accounts for 41% (3.01 crore farmers) of the total number of KCC loans made by all organisations in the nation. Emphasizing its role, Government has been extending financial, administrative and legal support time to time to

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strengthen and promote these rural institutions for development of agricultural community. In this broad context, this paper seeks to address how and to what extend the farming people have been benefited from PACS for their economic frontier in Nadia district of West Bengal.

As a result, this paper uses perceptions of the sample respondents to analyse the effects of PACS in terms of specific economic metrics. The study is important for assessing how PACS members perceive themselves. The current study can be used to enhance the PACS administrative-management system now in place in the Nadia district in particular and India in general by students, researchers, and policy strategists. The report also discussed and came to a conclusion about many problems with improving PACS performance. The PACS's primary responsibility is to support farmers financially. It is significant to note that farmers have never had access to any traditional sources of agricultural loan. To lessen the reliance on and abuse of "rural money lenders," PACS plays a specific role in agricultural lending. It also played a crucial role in revamping the system for agricultural financing. This study was undertaken with the explicit goals of empirically assessing the role of PACS on the economic development of members and also to analyse the economic repercussions of PACS. It examines whether the effects of PACS have been reflected from an economic point of view.

METHODOLOGY

The study employed a multi-stage random sampling technique for selecting 290 members from 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 and we utilized Likert-scale with 5 points, which indicates 1 means strongly 'agree', 2 means 'agree', 3 means 'undecided', 4 means 'disagree' and 5 denotes '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 have been done. Principal Component Analysis, K-means Cluster Analysis, analyses related to Group Characterization have been done to arrive meaningful interpretations and conclusions of the study.

Principal component analysis

Principal Component Analysis is a statistical technique that linearly transforms an original set of variables into a considerably smaller set of uncorrelated variables preserving most of the information in the original set of variables. First few Principal Components usually account for most of the variation in the original set of data.

The technique of Principal Component Analysis has been used in the study. The standardized data have been transformed into a new set of uncorrelated variables without loosing the information present in the original set of variables. This technique reduces the dimensionality of the dataset.

Algebraically, the first Principal Component, P_1, is a linear combination of the variables x_1, x_2, x_3, ……x_n

i.e. $p_1 = a_{11}x_1 + a_{12}x_2 + a_{13}x_3 + \ldots\ldots + a_{1n}x_n$ or $P_1 = \sum_{i=1}^{n} a_{1i}x_i$

such that the variance of p_1 is maximized. Factor loadings (a_i) are the correlation between the original variables and the factors. It indicates the under laying nature of a particular factor. Summation of the squared factor loadings of a factor results the Eigen value of that factor. Factor score coefficients are the weights associated with respective variables in a factor given the constraint that sum of the squared weights is equal to one $\left(\text{i.e. } \sum_{i=1}^{n} a_{1i}^2 = 1\right)$.

Similarly, the second Principal Component, p_2, involves finding a second set of factor loadings in such a manner that the variance of p_2 is maximized among the rest Principal Components subject to the constraints that it is uncorrelated with p_1 having the next largest Eigen value. Factor score coefficients have been used to obtain the score of individuals surveyed.

Generally, Eigen value over one is considered. In this study, Eigen value less than one has also been considered for better explanation of the information

present in the dataset. Relative size of the Eigen value associated with a particular Principal Component indicates the relative contribution of the concerned component to the total variance of original data set.

The scores of each individual have been calculated by multiplying the factor score coefficients with the corresponding standardized values of the variables. Total Score has been calculated to use in further analyses. For computing Principal Component Analysis, Tanagra 1.4.50 has been used.

K – means Clustering Method

It is an analysis to partition n observations into k clusters in which each observation belongs to the cluster with the nearest mean, serving as a prototype of the cluster. It assigns k– centers to represent the clustering of n points ($k < n$). The points are iteratively adjusted (stating with a random samples of n points) so that each of the n– points is assigned to one of the k – clusters and each of the K clusters is the mean of its assigned points.

Computationally, k – means Clustering method is analogous to "ANOVA in reverse". The programme starts with k – random clusters and then joins more objects between those clusters with a goal to (i) minimize variability within the clusters and (ii) maximize variability between the clusters. In k – means clustering, the programme tries to move objects (cases) in and out of groups (clusters) to get the most significant ANOVA results. For computing k – means clustering, Tanagra 1.4.50 has been used in computer. In the study, the factor scores obtained for individuals have been considered to classify them into three clusters according to the perceptions.

Group Characterization

Group characterizations of all the groups obtained through Cluster Analysis have been done to indentify the contributing attributes in formation of the different clusters. The standardized variables obtained though Principal Component Analysis have been used in this analysis to identify the causal variables in formation of the different clusters. Variables are arranged according to the importance within the groups. Higher group mean value than the overall mean of a variable is considered to be important one for formation of the group. 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.

RESULTS AND DISCUSSION

Perception of farming community on economic impacts of PACS

In the research paper thirteen economic indicators were used to assess the economic contribution of PACS. The first economic parameter is to know the role of PACS to improve the diversification options related to livelihood of members. It is observed from the Table 1 that 38.28 percent of the members strongly agreed that PACS changed the livelihood diversification option.

PACS play important role towards augmenting the gross family income of the members through various activities such as suggestion of introduction of new cash crops, low cost cultivation, low cost new technology, training for set up new business initiatives, etc. More than 55 percent of members strongly agree that cooperatives help to increase the family income. PACS play very important role by supplying the modern agricultural inputs viz., high yielding seeds, modern technology, chemical fertilizers, pesticides, etc. at the right time which in turn helps to stabilize the farmers' income. In contrast, the study indicates that the role of PACS in increasing agriculture income is meagre (24.83% members strongly agree) as opined by the members. This may be attributed to the use of the funds borrowed from PACS for agricultural activities in non-farm activities.

It was also evident from the study that majority of the members agree that PACS play an important role in increasing the household savings (74.14%). Most of members are agreed upon the perceptions that PACS help to avoid the distress sale of household assets and agricultural produce at low price at the time of cash requirement particularly during peak

season of agricultural operations. In this regard, the PACS have taken initiative in giving credit at the right time.

Crop diversification is important tool to improve the agriculture income and also to minimize the risks involved in agriculture. Sometime, PACS organised various training cum demonstrations programmes for their farmer-members to encourage adopting suitable diversified farming practices. The farmers learn new scientific methods, techniques and hand holding support of diversified farming from such trainings. Farmers are also encouraged to apply them to their own farm practices. Table 1, exhibits that the majority of (74.83%) members agreed upon the fact that PACS help to diversify the agriculture through different training.

Farmers' perception has been taken regarding the regular distribution of dividend among the members. The members expressed their positive nod in these aspects.

The farmer-members strongly disagreed on the roles of PACS in creation of business and employment opportunities. Sometimes PACS take different programs to create employment generation - such as forestry, digging of pond, water tank etc. Table 1 indicates that most of the members do not know or have no idea about the activities of the PACS. The farmer-members disagreed on the contributions that cooperatives should make to increases in non-farm income, land ownership, and agricultural productivity. The PACS generally don't disburse medium term loan which is helpful in development of non-farm activities. Lack of training to the members by PACS related to latest technology may inhibit the augmentation of agricultural productivity. PACS have also lack of technical facilities like soil testing lab.

Principal component analysis (PCA) on economic perception of members

Table 2 presents correlation matrix of thirteen (13) variables considered for the analysis of economic perception. In order to obtain meaningful results free from any inter-correlations among the various socio-economic variables or indicators used in this research paper, principal component analysis was used.

Table 3 shows the Eigen values with a respective proportions of variance explained. The first component (Axis) explained 19.99 percent of the total variance of the data set followed by the second component (11.99%). First two (2) components explained 31.98 percent of the total variance present within the data set. Only six (6) components (Axis) are extracted with the Eigen value more than one (1) which cumulatively explained only 66.70 percent of the total variance present in the data set. The study considers the seven (7) components (Axis) to explain 74.25 percent of the variance of the data

Table 1: Degree of economic perception of PACS members

Perception	Members (N=290)				
	Strongly Agree (%)	Agree (%)	Undecided (%)	Disagree (%)	Strongly Disagree (%)
Improve livelihood diversification options	38.28	6.55	39.66	15.52	0.00
Increases your family total income	55.52	5.86	26.55	12.07	0.00
Improve any business opportunity	4.48	1.72	60.00	33.45	0.34
Improved any employment opportunity	3.79	2.41	59.31	34.14	0.34
Improve to Agricultural income	24.83	14.83	2.76	57.59	0.00
Increasing others households assets	24.83	14.83	2.76	57.59	0.00
Improve to Non-Farm income	0.34	1.38	54.83	43.45	0.00
Increase in household savings	74.14	0.00	15.86	10.00	0.00
Increase in land holding	2.41	10.34	0.34	86.90	0.00
Increase in agricultural productivity	0.00	0.69	0.34	98.62	0.34
Distress sale of household assets	86.55	9.66	0.69	3.10	0.00
Helping Crop diversification	12.07	74.83	0.69	12.41	0.00
Providing Bonus to farmers	75.52	24.48	0.00	0.00	0.00

Table 2: Correlation matrix among perceptible economic indicators for members

		Perception												
		Access to employment opportunity	Access to business opportunity	Impact on Non-Farm income	Impact on total income	Livelihood diversification	Access to others households assets	Minimizing distress sale of household assets	Household savings	Supporting crop diversification	Access to land holding	Regular flow of dividend to farmers	Increasing agricultural productivity	Agricultural income
Perception	Access to employment opportunity	1.00	0.97	0.5	0.14	0.27	0.27	0.04	-0.04	-0.01	-0.04	0.03	0.03	-0.01
	Access to employment opportunity	0.97	1.00	0.5	0.13	0.26	0.23	-0.01	-0.04	-0.01	-0.06	0.05	0.02	0
	Access to employment opportunity	0.5	0.5	1.00	-0.12	0.01	0.18	-0.06	-0.03	0.06	0.01	0.04	0.06	0.01
	Access to employment opportunity	0.14	0.13	-0.12	1.00	0.51	-0.13	-0.06	0.14	0.01	0	-0.07	-0.04	-0.04
	Access to employment opportunity	0.27	0.26	0.01	0.51	1.00	0.3	0.04	0.08	0	0.07	-0.1	0.02	-0.11
	Access to employment opportunity	0.27	0.23	0.18	-0.13	0.3	1.00	0.14	0.02	-0.03	0.03	0.01	0.14	-0.12
	Access to employment opportunity	0.04	-0.01	-0.06	-0.06	0.04	0.14	1.00	-0.06	-0.01	0.04	-0.05	0.03	-0.03
	Access to employment opportunity	-0.04	-0.04	-0.03	0.14	0.08	0.02	-0.06	1.00	-0.11	0.01	0.06	0.04	0.11
	Access to employment opportunity	-0.01	-0.01	0.06	0.01	0	-0.03	-0.01	-0.11	1.00	0.03	-0.02	0.01	-0.02
	Access to employment opportunity	-0.04	-0.06	0.01	0	0.07	0.03	0.04	0.01	0.03	1.00	0.02	0.05	0
	Access to employment opportunity	0.03	0.05	0.04	-0.07	-0.1	0.01	-0.05	0.06	-0.02	0.02	1.00	-0.04	0
	Access to employment opportunity	0.03	0.02	0.06	-0.04	0.02	0.14	0.03	0.04	0.01	0.05	-0.04	1.00	-0.04
	Access to employment opportunity	-0.01	0	0.01	-0.04	-0.11	-0.12	-0.03	0.11	-0.02	0	0	-0.04	1.00

Table 3: Components wise Eigen value on Economic Perception for Members

Axis/Component	Eigen value	Proportion (%)	Cumulative (%)
1	2.60	19.99	19.99
2	1.56	11.99	31.98
3	1.29	9.96	41.94
4	1.15	8.88	50.83
5	1.05	8.08	58.91
6	1.01	7.80	66.70
7	0.98	7.55	74.25
8	0.89	6.86	
9	0.82	6.28	
10	0.75	5.76	
11	0.52	4.00	
12	0.34	2.65	
13	0.03	0.20	
Total	**13**	**100.00**	—

set. Scree plot (Fig. 1) also gives a visual explanation for considering the seven (7) components in the analysis.

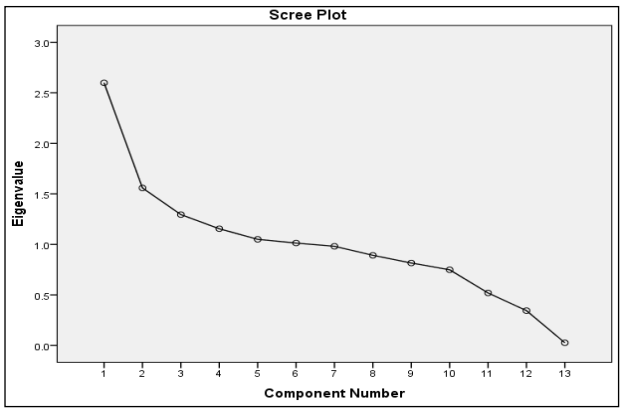

Fig. 1: Scree plot indicating component wise Eigen values for members' economic perception

Table 4 depicts the estimation results of factor loading for the correlation between the original variables and the factors. First factor comprises three (3) variables exhibiting the highest loading among the seven (7) extracted factors. These three (3) variables are perception on access to employment opportunity, role of PACS on access to business opportunity and impact of PACS on non-farm income. Second factor highlights the two (2) variables, such as impact of PACS on total income and perception on livelihood diversification. The second factor can be viewed as the factor of livelihood related issues. Third factor represents one variables, i.e. perception on access to others household's assets. It is clear that the third factors are household's assets related factor. All the variables under the economic perception study are distributed in above mentioned seven (7) factors.

The table of factor score coefficients show the relative weights of the each variable in a component.

Table 6 depicts the ranges of principal component scores (or factor scores). The factor scores of 290 members on economic perceptions ranges between 11.67 (maximum) to -20.90 (minimum) with Zero (0) mean and 3.12 Standard Deviation (SD). The graphical distribution of factors scores is presented in Fig. 2.

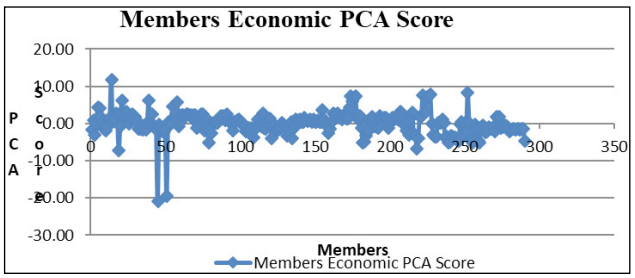

Fig. 2: Distribution of members according to PCA scores on economic perception

The economic perceptions score of members (Table 7) have been distributed into 4 dissimilar categories according to the PCA scores. Table 7 reveals that near about 45.52 percent of total Members fall in the negative score category whereas 50 percent fall in the low score group. It implies that the role of PACS on the economic development of farming community is moderate as perceived by the selected Members. A very low, 3.79 percentages of Members are considered that PACS play important role in economic development.

Table 4: Component-wise (Axis) factor loadings of perceptible economic attributes of members

Economic Attributes	Axis_1	Axis_2	Axis_3	Axis_4	Axis_5	Axis_6	Axis_7
	Corr.	Corr.	Corr.	Corr.	Corr.	Corr.	Corr.
Access to employment opportunity	**0.93**	-0.12	0.14	0.04	0.06	-0.02	0.07
Access to business opportunity	**0.93**	-0.13	0.18	0.04	0.05	-0.01	0.05
Impact on Non-Farm income	**0.62**	-0.44	0.09	0.00	-0.18	-0.07	-0.04
Impact on Gross income	0.22	**0.80**	0.27	0.15	-0.06	0.02	0.00
Livelihood diversification	0.47	**0.71**	-0.14	0.03	-0.02	0.06	0.02
Access to others households assets	0.44	-0.01	**-0.56**	-0.30	0.08	0.08	-0.07
Minimizing distress sale of household assets	0.04	0.01	-0.53	-0.05	0.35	-0.06	0.56
Household savings	-0.02	0.30	0.26	**-0.67**	-0.11	-0.07	-0.08
Supporting Crop diversification	0.01	-0.07	-0.06	**0.54**	**-0.56**	-0.07	0.04
Perception on access to land holding	-0.02	0.10	-0.25	-0.16	**-0.63**	0.16	0.48
Regular flow of dividend to farmers	0.02	-0.23	0.20	-0.31	-0.16	**0.74**	0.01
Increasing agricultural productivity	0.09	-0.03	-0.40	-0.30	-0.35	-0.41	-0.44
Impact on Agricultural income	-0.08	-0.13	0.46	-0.29	-0.08	**-0.50**	0.46

Table 5: Component-wise (Axis) factor score coefficients on perceptible economic attributes of members

Economic Attributes	Mean	Std-dev	Axis_1	Axis_2	Axis_3	Axis_4	Axis_5	Axis_6	Axis_7
Livelihood diversification	0	1.00	0.29	0.57	-0.12	0.03	-0.02	0.06	0.02
Impact on total income	0	1.00	0.14	0.64	0.23	0.14	-0.06	0.02	0.00
Access to business opportunity	0	1.00	0.57	-0.11	0.16	0.04	0.05	-0.01	0.05
Access employment opportunity	0	1.00	0.58	-0.09	0.12	0.04	0.06	-0.02	0.07
Impact on Agricultural income	0	1.00	-0.05	-0.11	0.40	-0.27	-0.07	-0.49	0.47
Access to others households assets	0	1.00	0.28	-0.01	-0.49	-0.28	0.07	0.08	-0.07
Impact on Non-Farm income	0	1.00	0.38	-0.35	0.08	0.00	-0.17	-0.07	-0.04
Household savings	0	1.00	-0.01	0.24	0.23	-0.62	-0.11	-0.07	-0.08
Access to land holding	0	1.00	-0.01	0.08	-0.22	-0.15	-0.62	0.16	0.49
Increasing agricultural productivity	0	1.00	0.06	-0.02	-0.35	-0.28	-0.34	-0.40	-0.45
Minimizing distress sale of household assets	0	1.00	0.03	0.01	-0.47	-0.04	0.34	-0.06	0.57
Supporting Crop diversification	0	1.00	0.01	-0.06	-0.06	0.51	-0.55	-0.07	0.04
Regular flow of dividend to farmers	0	1.00	0.01	-0.19	0.17	-0.29	-0.16	0.73	0.01

Another way of looking into the scores (Table 8) obtained from the PCA of the members on economic perception is to arrange the score according to deviations from Standard Deviation (SD). More than 80 percent of the total members fall in the group within the limit of deviation from SD implying the perception of the members on economic development by PACS is mostly homogeneous in nature. Higher score (more than 1SD) is obtained from 7.24 percent of Members reflecting the positive opinion of the Members on the role of PACS on economic development.

Table 6: Ranges of PCA scores of members relating to economic perception

	Nos.	Range	Min.	Max.	Mean	Std. Deviation
Scores	290	32.56	-20.90	11.67	0	3.12

Table 7: Distribution of members in different classes of economic perception according to PCA scores

Score Categories	Nos.	Percentage (%)
Less than 0 (0 <)	132	45.52
0 to 5	145	50.00
5.01 to 8	11	3.79
Above 8	2	0.69
Total	290	100

Cluster analysis of PCA scores on economic perception of members

The scores obtained from the PCA are then grouped through cluster analysis. The members have been grouped into three (3) different clusters according to PCA scores obtained in economic analysis on the basis of k-means clustering method.

Table 7: Distribution of members according to score values deviating from Standard Deviation

Items	Nos. of Members	Percentage (%) of Members
Perception of Members with Score Less than -1SD	33	11.38
Perception of Members with Score Within 1 SD (±SD)	236	81.38
Perception of Members with Score greater than +1 SD	21	7.24
Total	**290**	**100.00**

A very high average value of score (6.68), depicted as Cluster Centroids of PCA score in Table 8, is obtained for 17 members (Group A) accounting for 5.86 percent of total selected members from surveyed PACS. It implies that 5.86 percent of members appreciate that PACS play important roles in economic development. Similarly, 58.97 percent members (Group B) find moderate role of the PACS on economic development. On the contrary, 35.17 percent Members (Group C) found indifferent or no roles of the PACS in economic development are also observed from the analysis with centroids value of -2.81. Fishers F statistics (234.13) shows a very high level of significance of test besides the high R square value (0.62).

Table 8: Cluster analysis of members according to the PCA scores

Description					Statistical test		
Cluster Group	**Nos.**	**Percentage (%)**	**Cluster Centroids of PCA Score**	**Std. Dev.**	**Variance decomposition**		
A	17	5.86	6.68	1.85	**Source**	**Sum of square**	**d.f.**
B	171	58.97	1.01	1.07	BSS	1739.8	2
C	102	35.17	-2.81	2.85	WSS	1066.4	287
					TSS	2806.2	289
R-Square = 0.62					**Significance level**		
					Statistics	**Value**	**Probability**
					Fisher's F	234.13	0

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

Table 9: Characterization of clusters according to members' economic perceptions indicators

Indicators	Group-A			Group-B			Group-C			Overall	
	[5.86 %] 17			[58.97 %] 171			[35.17 %] 102			[100 %] 290	
	Test value	**Mean**	**Std. Dev.**	**Test value**	**Mean**	**Std. Dev.**	**Test value**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Access to business opportunity	11.38	4.65	0.61	-0.49	2.75	0.49	-5.09	2.48	0.52	2.77	0.70
Access employment opportunity	11.35	4.59	0.62	-0.27	2.74	0.46	-5.31	2.46	0.52	2.75	0.69
Livelihood diversification	4.93	5.00	0.00	7.36	4.09	0.99	-10.01	2.76	0.80	3.68	1.14
Supporting Crop diversification	1.05	4.06	0.66	-3.36	3.74	0.83	2.95	4.05	0.67	3.87	0.78
Access to land holding	-1.27	2.06	0.24	-0.70	2.26	0.75	1.34	2.36	0.79	2.28	0.75
Increasing agricultural productivity	-1.66	1.94	0.24	-1.52	2.00	0.00	2.38	2.05	0.29	2.01	0.19
Impact on Agricultural income	-0.45	4.71	0.59	-2.10	4.71	0.58	2.39	4.86	0.40	4.76	0.53
Impact on Non-Farm income	2.79	2.94	0.83	-1.82	2.54	0.52	0.50	2.61	0.49	2.59	0.54
Impact on total income	2.88	4.82	0.53	9.36	4.57	0.79	-11.06	3.04	1.02	4.05	1.14
Household savings	-1.68	4.18	0.95	-0.85	4.50	1.00	1.70	4.67	0.76	4.54	0.92
Minimizing distress sale of household assets	1.02	4.94	0.24	-0.44	4.78	0.66	-0.05	4.79	0.53	4.80	0.60
Access to others households assets	0.16	3.12	1.45	-1.25	2.99	1.23	1.21	3.20	1.41	3.07	1.31
Regular flow of dividend to farmers	0.09	4.76	0.44	-0.59	4.74	0.44	0.56	4.77	0.42	4.76	0.43

Characterization of economic Clusters in terms of Socio-economic Indicators of Members

The result of group characterization of economic perceptions of the members is presented in Table 9. The variables considered for group characterization are continuous for all the groups. Variables within the groups are arranged according to the importance of the same in groups. Members under Group A think that PACS play important positive roles in economic upliftment. Members of the Group A exhibit higher mean values than the overall mean in Perception on access to business opportunity, perception on access employment opportunity, Perception on livelihood diversification, Impact of PACS on total income and impact of PACS on Non-Farm income. Others important contributing attributes for formation of this group are, PACS role in supporting crop diversification, role in minimizing distress sale of household assets, perception on access to others household's assets, opinion on regular flow of dividend to farmers etc. Furthermore, if we look into the table (Table 10), of Group characterization of economic clusters according to the members' socio-economic indicators, it is observed that agriculture income, loan, cultivable land, expenditure play the important roles in formation of the Group A. Other contributory socio-economic indicators in this group are percentage (%) of savings to gross income, secondary occupation, age, gross income, and percentage (%) loan to gross income etc.

Table 10: Characterization of economic clusters according to socio-economic indicators of members

Indicators	Group-A [5.86 %] 17			Group-B [58.97 %] 171			Group-C [35.17 %] 102			Overall [100 %] 290	
	Test value	Mean	Std. Dev.	Test value	Mean	Std. Dev.	Test value	Mean	Std. Dev.	Mean	Std. Dev.
Age (Yrs.)	0.30	45.18	10.66	-3.40	42.53	9.26	3.35	47.32	12.95	44.39	10.99
Education Level (Score)	-0.16	7.76	3.77	-1.25	7.67	3.82	1.37	8.31	3.62	7.91	3.75
Cultivable Land (Bigha)	0.77	6.12	3.64	0.24	5.54	3.21	-0.63	5.33	3.71	5.50	3.41
Main Occupation (Score)	-0.48	1.00	0.00	2.25	1.04	0.20	-2.08	0.99	0.17	1.02	0.19
Secondary Occupation (Score)	0.34	7.88	7.88	-0.30	7.15	7.57	0.14	7.35	8.17	7.26	7.78
Associate with PACS (Yr.)	-2.37	9.88	5.13	1.62	16.69	11.28	-0.50	15.41	9.94	15.83	10.64
Agriculture Income (₹)	1.61	51176.47	38912.14	0.96	42220.24	25037.56	-1.78	37107.84	27272.34	40933.80	26941.52
Non-agriculture Income (₹)	-0.55	25552.94	29981.52	-1.29	29360.42	49441.16	1.59	40452.94	72670.18	33077.18	58081.52
Gross Income (₹)	0.21	79082.35	39640.69	-1.11	72425.89	51819.79	1.04	81286.27	83040.11	75969.16	64102.33
Expenditure (₹)	0.63	56823.53	22313.77	0.78	53863.10	25832.01	-1.12	50441.18	28888.17	52822.30	26754.77
Saving (₹)	-0.08	22258.82	21929.89	-2.05	18562.80	32867.03	2.15	30845.10	61244.72	23146.86	44897.95
Loan (₹)	0.85	50852.94	39582.89	0.51	44747.02	36373.85	-0.95	41205.88	32283.81	43850.17	35130.53
% Loan to Gross Income	0.14	74.16	71.96	0.08	72.48	58.38	-0.16	71.52	54.23	72.24	57.61
% of Agri. Income to Gross Income	-0.01	63.25	28.80	1.99	66.06	27.87	-2.05	58.74	27.60	63.29	27.94
% of Non Agri. Income to Gross Income	-0.43	32.05	27.81	-1.98	32.11	28.29	2.25	39.95	27.75	34.89	28.22
% of Saving to Gross Income	0.55	23.11	17.06	-1.63	19.46	15.68	1.40	22.79	19.57	20.86	17.26

Similarly members of Group B find moderate roles of PACS in economic development. The major attributes for formation of this group are impact of PACS on total income and perception on livelihood diversification. Majority of farmers (58.97 percent) think that PACS play a moderate role in economic development. The major contributory socio-economic indicators (Table 10) for formation of this group are main occupation, association with PACS, agriculture income and expenditure etc.

Whereas in Group C comprises nearly 35.17 percent (Table 10) of the total members perceived that PACS don't play any important role in economic development. The important contributing variables for formation of this group are PACS role in supporting crop diversification, impact of PACS on agricultural income, role in increasing agricultural productivity, PACS role in household savings, perception on access to land holding, access to others households' assets and regular flow of dividend to farmers etc. The members of the Group C perceive (Table 10) the negligible role of the PACS in economic development. The important indicators of this group are secondary occupation, age, percentage (%) of non agriculture income proportion to gross income, non-agriculture income and percentage (%) of savings income proportion to gross income. The major causative socio-economic indicators (Table 10) found from the Group C are age, saving, Non-agriculture Income, education level and gross income etc. It is interesting to note that almost all the Members considered for the study expressed their positive perceptions on PACS role particularly in their income generation issues. PACS need to effort on more credit facility and initiatives for generation secondary occupation in rural areas.

CONCLUSION

The study concludes that PACS play important role in increasing the gross income of the family by timely supplying of the farm inputs, modern agricultural equipment's and also generate awareness for farmers. Most of the members agreed that PACS played a positive role in household savings. Moreover, PACS help and provide support to avoid the distress sale of household assets and agricultural produce at low price at the time of cash requirement particularly during peak season of agricultural operations. PACS are also playing crucial roles to adopt diversification the agriculture practices.

On the contrary, members strongly disagreed on the roles of PACS in creation of business and employment opportunities besides the improvements in non-farm income, increase in land holding and increase agricultural productivity. PACS have not succeeded in terms of raising agricultural productivity or opening business opportunity at village level. From this research paper we can conclude that the rules and regulations need to be more farmers cum members centric.

Principal Component Analysis concludes the moderate role of the PACS on the economic development of farming community as perceived by the majority of the selected Members. More than 80 percent of the total members fall in the group within the limit of deviation from SD implying the perception of the members on economic development by PACS is mostly homogeneous in nature.

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

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