Primary Agriculture Credit Societies' Economic Impact on Gross State Domestic Product for Long-Term Agricultural Development

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ABSTRACT

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Economic growth with social justice has been an important objective of Indian and state planning. The Gross State Domestic Product (GSDP) is one of the important indicators to measure the economic development of the State/UT. India is an agrarian economy since decades. Indian agriculture sector accounts for 17-18% of India's Gross Domestic Product (GDP) and provides employment to 60% of the country's workforce. Agriculture sector provides raw materials to industry and industry provides essential inputs to the agriculture sector and service sector plays a significant role as middle path. This sector's financial reliance has transitioned from the informal to the formal sector, which includes commercial banks, microfinance institutions, and cooperative credit organisations.

The research objective of this paper is to understand the performance of Primary Agriculture Credit Societies (PACS) and to study the economic impact of the number of PACS on the Gross State Domestic Product for sustainable or long-term agricultural development. The scope of the study covers the western zone of India which includes Goa, Gujarat and Maharashtra for the last twenty-two years i.e., from 2002-03 to 2019-20. The study is based on the secondary data: research papers and Journals, Government published documents.

The study analysis the data using p-value and regression equation. The result reveals that the aggregate numbers of the PACS have increased in India over the study period. In terms of paid-up capital, total reserves, total borrowings, working capital, number of borrowers, and GSDP, Goa comes out on top. As per the results of the hypothesis testing, for all the three states, we accept the hypothesis i.e., there is a negative relationship between the primary agriculture credit societies and gross state domestic product of agriculture and allied activities. The loans disbursed by the banks for agricultural loans have been seeing a steady rise in non-payments due to several factors. Such loans are leading to Banks writing off such loans as bad loans and take a loss upon themselves. The Banks also must lend such loans under the Priority Sector Lending (PSL) scheme which leads to compulsory lending and banks are not able to sustain over a long run. The study is focused on implementing a better system to securitize such loans so that banks which lend have their loans secured and increases the opportunities in the debt market for investors. The managerial implication of the study includes bringing better products and securing the interest of the banks. The study would also help in sustainable existence of small lending institutions which get bankrupt due to rising NPAs generated out of agricultural loans.

Keywords: **Primary Agriculture Credit Societies (PACS), Gross State Domestic Product, Agriculture Sector, Growth Rate, Western Zone.**

INTRODUCTION

Agriculture is extremely important to the Indian economy. Agriculture supports more than 70% of rural families. Indian agriculture has shown extraordinary endurance during the COVID-19 period. The agriculture sector could withstand the COVID-19 shock and registered over 17% of total GDP and employing more than 60% of the population. The Agriculture and Allied sector's proportion of overall Gross Value Added (GVA) in the economy was 20.2 percent in 2020-21, according to statistics issued by the National Statistics Office

(NSO) in the Periodic Labour Force Survey (PLFS). Furthermore, the agriculture sector employs 45.6 percent of regularly working people, suggesting that 45 persons out of every hundred in India are employed in the agriculture sector directly or indirectly. Over the decades, as indicated in Table 1, the proportion of the people engaged in agriculture has decreased.

The agricultural and associated sector has fared well in the aftermath of COVID 19. The industry grew at a rate of 3.6 percent in 2020-21, and 3.9 percent in 2021-22. The sector's contribution of total GVA increased to 20.2 percent in 2020-21 and 18.8 percent in 2021-22, according to data from the Department of Agriculture and Farmers Welfare (DAFW). Higher expansion in associated industries against crop sectors has obvious repercussions in terms of the former's growing importance in overall agricultural GVA versus the latter. It is worth mentioning that livestock, fisheries, and aquaculture's share of total agricultural GVA has risen over time.

It is also observed from Table 1, the input is higher than output in India. Several factors have been identified in the social science literature as the most important sources of productivity change in agriculture. These can be divided into three categories, namely- General factors, Institutional factors, and Technological factors. The general factors are pressure of population on agriculture, rural environment, role of non- farm services, lack of professionalism, no uniformity in monsoons, soil fertility. The institutional factors include size of holdings, pattern of land tenure, and lack of organization. The technological factors are lack of proper irrigation facilities, old methods of production, lack of proper government support, lack of entrepreneurship lack of crop management, agriculture finance, inadequate research etc.

Agriculture finance is one of the important inputs, which is made available by number of institutional and non-institutional agencies. To deal with institutional agricultural credit, we have a multi-agency approach. Cooperative credit is an important sector of the broader co-operative movement. In fact, the movement arose from the need for credit by farmers in the nineteenth century, who were exploited by non-institutional credit agencies.

Commercial banks were nationalised over the last century to enhance financial access for India's poor in rural areas, and they spanned every sector of the economy (Basu 2006). It was also made mandatory for the banks to provide subsidised credit to rural households. India now has over 32,000 commercial and regional rural bank branches, 14,000 cooperative bank branches, 97,961 Primary Agriculture Credit Societies, thousands of mutual fund sellers, several non-bank finance companies, and a large post office network with 154,000 outlets that must focus on deposit mobilisation and money transfer. Various institutional entities (commercial banks, Microfinance Institutions, and Cooperative Credit Societies) have begun to give loans to farmers with an effortless process and terms.

In a country where 60 percent of the population lives below poverty line, most of the farmers are small and marginal farmers and landless labourers, 35% people are illiterate (UNESCO 2017). Cooperatives are the best sector to address and improve the socio-economic conditions of poor farmers. Usually Primary Agricultural Co-operatives (PACS) are ground-level cooperative credit institutions that provide farmers with short-term (S.T.) and medium-term (M.T) agricultural loans for a variety of agricultural and farming activities. It operates at the gram panchayat and village levels. However, the total disbursement of S.T. loans is higher than that of M.T. and L.T. loans. The viability of PACS is determined by the agricultural profiles of the region.

However, because farmers are economically poor, credit with the lowest rate of interest is critical for them to use all these factor inputs that are responsible for agricultural change. And the PACS is playing a key role by providing lower-cost financial assistance to its member farmers and bringing a meaningful change. Also, farmers who use sustainable practices will use less non-renewable energy, use fewer chemicals, and conserve scarce resources. When considering the rising population and demand for food, keeping the land healthy and replenished can go a long way. As a result, studying the economic impact of primary farm credit societies on the gross domestic product is critical for long-term agricultural development.

Related Literature

Several works of literature were studies to understand the evolution of cooperatives in India, importance of agricultural credit pre/post-

independence, institutional credit for agriculture and allied activities, government of India and agriculture credit etc.

Agriculture and allied sectors gave birth to the cooperative movement in India. The problems of rural indebtedness and the resulting conditions of farmers created an environment for chit funds and cooperative societies toward the end of the nineteenth century. The problems of credit, supplies of inputs and marketing of agricultural produce were solved by pooling their meagre resources. The Cooperative Credit Societies Act of 1904 ushered in the Indian cooperative movement, providing the path for the establishment of Thrift and Credit Cooperatives. The subsequent Cooperative Societies Act 1912 made it easier to establish other types of cooperatives.

Like other occupations, agriculture also require finance for development as the Indian farmers are poor and depends on credit. The farmer's debt increases due to irregularities and drought situations. They spend more on non-productive activities rather than on fertilizers, irrigation, land development etc. Marketing of agricultural goods is more complex as it requires infrastructure facilities like storage, cheap transport, market information on prices and agricultural credit.

During the pre-independence period, Money Lenders and Indigenous Bankers played a dominant role in the supply of credit to agriculture. Later it was recognised as a social good and changes were made by appointment of Rural Credit survey committee in August 1951.

The PACS are the basic level institutions of the short-term and medium-term credit structure for farmers. These organisations also provide seeds, fertilisers, insecticides, agricultural equipment, and farm produce marketing. These societies will provide short and medium-term credit with repayment terms of one year and three to five years, respectively. These societies set credit limits on an annual basis. The Reserve Bank of India, the Banking Commission, the National Commission on Agriculture, and the Working Group on Cooperatives (chaired by T.A. Pai) all recommended that all farmers be able to obtain all types of credit through a single point of contact.

Basu (2006) in his report emphasized the government's effort to improve the link between inadequate finance and the rural poor. The paper delves into the many forms of rural finance sources, as well as their credit penetration and shortcomings. Agriculture being a risky venture, financiers are reluctant due to high NPAs and lack of collateral. He further shares, despite the growth of microfinance and partnership between the government, non-government organization and banks, still informer sector lenders retain a strong presence in rural India. As a result, the agricultural sector's contribution to national GDP has decreased dramatically.

Khan (2014) addressed various issues and challenges of agricultural credit in India. Most people in rural areas rely on non-farm activities to supplement their income. Rural population is un-bankable as agriculture economically is riskier than industry and trade. Furthermore, he stated that creating an inclusive rural financial system is difficult because the rural economy is imperfect, lacking in information, communications, and infrastructure, as well as the geographical spread of the rural population and the diversity of needs for small-ticket financial transactions.

Certain factors, such as Gross Domestic Product (GDP), interest rates on bank lending, financial performance of banks (NPAs, asset quality, capital adequacy ratio, etc.), commodities prices, and consumption increased inclination, according to Bhuyan (2017), play a key impact in credit banks.

According to Chand (2004), most agricultural development efforts during the green revolution focused on high-potential areas such as Uttar Pradesh, Haryana, Punjab, Tamil Nadu, and Andhra Pradesh, which account for half of India's new irrigated land. In Eastern and Central India, output and productivity growth have developed slowly. Yusuf (2014) in his article brought into notice- in Northern India, many farmers rely on vendors for loans to purchase crops, equipment, and pesticides. Due to inaccessibility and high transaction fees, this was ineffectual. Climate change and financing trends have led in a plateauing of production in the region, necessitating greater funding to maintain production. Because of sectoral limits, the formal measures implemented by the government and corporate institutions to combat poverty in the region lack enough funding and have proven unsuccessful. The number of persons who have access to bank-based rural financing is quite

low. Because credit and marketing are not integrated in cooperative societies like PACS, they are ineffectual in providing access to financing.

Co-operative banking should be made strong and efficient to confront the challenge in a competitive environment, according to Yashoda (2017), to boost the efficiency of the PACS and to serve the rural farming people. Despite issues such as a lack of adequate and trained staff, lack of professional management, lack of necessary funds, poor industrial relations climate, lack of professional management, political interference, change in economic conditions, overdues, and farmers' limited source of income, Chakrabarty (2010) recognised that rural cooperative credit institutions with a vast network of PACS have an enormous potential to increase the flow of credit to agriculture.

Financing, particularly PACS and cooperative banks along with climate change, played a crucial role in allowing farmers to pool their production and resources in the region's agricultural progress (Zwerdling 2009).

According to the Directorate of Economics and Statistics, Gross State Domestic Product (GSDP) is the total value added by various economic sectors (agriculture, industry, and services) produced within the state's borders measured without duplication over the course of a year. It is one of the indicators of a state's economic growth. It is calculated by deducting the subsidies from the sum of gross value added and taxes.

GSDP = Gross Value Added + Taxes – Subsidies.

Individual sector-level Gross Value Added (GVA) is estimated using the methods provided by the Central Statistics Office in the 2004-05 base (CSO). The methodology for estimating GVA vary per industry. Production Approach calculates five sectors: agriculture and animal husbandry, forestry, fishing, mining, and quarrying, and registered manufacturing. Expenditure Approach is used to calculate the Construction sector. The remaining industries (Unregistered Manufacturing, Electricity, Gas & Water Supply, Trade, Hotel & Restaurant, Railway, Other Means of Transport, Storage, Communication, Banking & Insurance, Real Estate, Ownership of Dwellings & Business Services, Public Administration, and Other Services) are calculated using the Income Approach.

According to Pathak and Shah (2021), the GSDP of agriculture and related activities is influenced by a variety of factors such as climate, location, and the proportion of the people engaged in such activities.

Research Gaps and Significance of the Study: As previously stated, India is primarily an agrarian economy, with agriculture employing more than half of the population. PACS provides short-term credit to small and marginal farmers. The timely delivery of loans will assist rural farmers in increasing agricultural productivity, resulting in overall economic growth. Based on the several studies, the level of concentration on PACS in general is exceptionally low, even though multiple research articles in cooperative banking have been contributed. There is a lack of focus on how the PACS have been instrumental in the upliftment of the poor rural farmers.

This empirical study focuses on the understanding of PACS, function of PACS in empowering the economically and socially disadvantaged rural poor. The current study is based on the examination of primary agricultural credit societies in the western zone of the country over the last twenty years. It thus focuses on how these credit institutions have aided these underserved groups in India.

III Research Methodology

The study is based on secondary data available in the form of books, articles, annual reports, audit reports, progress reports of various cooperative credit institutions. These were referred to draw the concept and approaches on the cooperative organization in general and particular in India.

The research objective is:

1. To gain a better understanding of PACS' performance in terms of their number, membership, paid-up share capital, total reserves and deposits, borrowings and working capital, short-term loan issues, loans, and advances per state. This will reveal the extent to which PACS is used in rural areas, as well as the extent to which it is used.

2. Second, to ensure long-term agricultural development in India's western zone, researchers are looking at the economic impact of primary farm credit societies on the gross state domestic product.

Scope of the study:

The goal of the study is to determine the influence of PACS on GSDP in three states in India's western zone, namely Goa, Gujarat, and Maharashtra, from 2002-01 to 2019-20.

Data Collection:

The current analysis relies solely on secondary data. The data has been collected from National Federation of State Cooperative Banks Ltd (NFSCoB), Reserve Bank of India, Indiastat- e-resource of socio-economic statistical information of India and other government published documents.

Hypothesis:

The purpose of this study is to see if there is a link between the number of primary agriculture credit societies (independent variable) and the Gross State Domestic Product (dependent variable) (Agriculture and Allied activities)

H0: There is a negative relationship between the number of primary agriculture credit societies (independent variable) and gross state domestic product (Agriculture and Allied activities)

H1: There is a positive relationship between the number of primary agriculture credit societies (independent variable) and gross state domestic production (Agriculture and Allied activities)

Statistical tools:

To determine how much growth has happened in each state, the researchers examine at zonal statistics. To meet the normalcy condition, the dependent variable is log-transformed before being used to calculate the growth rate. The growth rate is then calculated using the semi-log approach as follows:

$\ln (Yt) = a + b.t$; where Yt is the variable of interest, a is constant, b is the growth rate coefficient, and t denotes time (t = 1 to 22).

Because data for 2001-02 was not available, the rate for 2002-03 was not calculated in the tables on growth rate of various parameters.

To check the impact of PACS on GSDP of selected states p-value and regression analysis is used.

Findings and Data Analysis

Cooperatives have grown rapidly in recent years. In terms of geography, the cooperatives have a 100% penetration rate through the principal Agriculture Credit Societies (PACS). The share of cooperatives in agricultural credit finance and their growth trajectory demonstrate that this sector has significant potential to expand its reach and serve farmers and others involved in linked activities. This section of the study gives the findings to better understand the PACS' performance and economic impact on the GSDP for long-term agricultural growth.

Trend analysis is used to examine the current research. Using the semi-log growth equation, the researchers calculate the growth rate of various heads.

Growth rate in number of PACS:

Table 2 displays the number of PACS and the rate of increase in the number of PACS. Over the twenty-two-year study period from 2002–03 to 20019–20, it was discovered that the number of PACS in three states grew at a reasonable rate. PACS that are viable, possibly viable, dormant, defunct, and others make up the total number of PACS.

Among the three states, Maharashtra has the maximum no of PACS and Goa with the minimum number. There is a vast difference between the three states. Over the last 22 years Goa had a maximum no of PACS in the year 2004-05 and a minimum of seventy-five in the year 2008-09. after that, the number has gone down. There was a slight increase in the number to hundred in the year 2012-13.

Figure 1: No of PACS in three states

Except for Maharashtra (which has a negative growth rate of –0.82), the growth rate in the number of PACS in three western states shows that the other two states, Goa, and Gujarat, have a positive growth rate. Goa has an 8.25 percent growth rate, while Gujarat has a 0.54 percent growth rate. As a result, the western zone's performance has been underwhelming. It is, in fact, unsatisfactory.

Growth rate of Membership in PACS: In the cooperative sector, the aspect of membership is

critical to success. This is because members contribute a set amount and make deposits, which helps the institutions' financial stability and liquidity. Total membership growth includes tribal communities like scheduled castes, scheduled tribes, small farmers, rural artisans, and other marginal farmers.

From the above table 3, it is apparent that the importance of PACS in the states of western zone is increasing, as evidenced by the fact that membership strength of these institutions is expanding with a positive pace. The average growth rate of membership of PACS is highest in Gujarat i.e., 15.13 percent, Goa with 13.41 percent and lowest in Maharashtra with 4.18 percent..

Growth rate in Paid-up Share Capital: Paid up capital is the amount of money the primary agricultural credit society has received from different stakeholders. The major stakeholder is the government.

The table 4 shows the average growth rate of paid-up capital is highest in Goa with 31.47 percent, Gujarat with 7.29 percent and lowest in Maharashtra with 6.4 percent.

Growth rate in Total Reserves of PACS: Total reserves of PACS in the states of western zone show a growth with the highest in Goa 63.14 percent, followed by Gujarat 14.73 percent and Maharashtra 8.88 percent.

Growth rate of total deposits of PACS: The table 6 below shows the growth rate of total deposits of PACS in the states of western zone. Gujarat has the highest growth rate in total deposits of 27.87 percent, Goa with 15.36 percent and Maharashtra with 0.06 percent.

Growth rate of total borrowings of PACS: Table 7 below shows the growth rate of total borrowings of PACS in the three states of western zone. Goa is having the highest average total borrowings of 130.96 percent, which is more than 100 percent. Whereas Gujarat is having the average total borrowings of 11.20 percent and Maharashtra with the lowest of 6.00 percent.

Growth rate of working capital of PACS: Working capital is the excess of current assets over current liabilities of the primary agricultural credit societies. The PACs' working capital is primarily drawn from Central Co-operative Bank (CCB) borrowings, with a small percentage derived from owned money and deposits. Table 8 shows the growth rate of working capital in the three states of western zone. The average growth rate of working capital is highest in Goa with 23.51 percent, Gujarat with 10.02 percent, and Maharashtra with 5.84 percent..

Growth rate of number of borrowers of PACS: The following table provides an overview of the number of borrowers from economically and socially disadvantaged groups, such as scheduled castes, scheduled tribes, small farmers, rural artisans, and other borrowers who use these low-cost lenders to meet their funding needs. From the table 9 below, it can be immediately seen that the except for Goa, the growth rate of number of borrowers is continuously declining. The average growth rate in Goa is 39.95 percent whereas in Gujarat it is minus 0.62 percent and similarly in Maharashtra minus 9.78 percent.

Growth rate in Gross State Domestic Product of Agriculture and Allied activities: In this study the level of production of agriculture and allied activities which is a dependent variable and an especially important macro-economic indicator. It includes Agriculture, Horticulture, Animal husbandry, Fishery, Soil and water conservation, Poultry, dairy farming, Agriculture Marketing, Milk-fed financial institute, and social forestry. Table 10 shows State wise GSDP (Agriculture and Allied activities) at Current Prices. The average growth rate of state-wise Gross State Domestic Product of agriculture and allied activities of Goa and Gujarat are remarkably close despite having variations in the other parameters. The average GSDP of Goa is 15.06 percent, followed by Gujarat of 14.75 percent and Maharashtra with 7.88 percent.

Relationship between number of PACS and GSDP through regression analysis

Regression analysis is done for one of two purposes: To predict the value of the dependent variable for individuals for whom some information concerning the explanatory variables is available, or to estimate the effect of some explanatory variable on the dependent variable. The regression has been conducted using Excel in the MS office. The level of significance considered is 95%. The degree of freedom is same as the data has been taken for the period of 2002-03 to 2019-20. Table 11 shows the data

used for regression analysis.
In the ANOVA table, Significance f is the p-value to check the validity of the model. For the validity of the model, we frame the null hypothesis that is the model is statistically significant, the model is statistically significant. If the p-value is less than 0.05, the model is statistically significant, and the stronger the evidence -you should reject the null hypothesis. A p-value higher than 0.05 is not statistically significant and indicates strong evidence for the null hypothesis. Table 12 below shows the results of the hypothesis testing, for all the three states, we accept the Null hypothesis i.e., there is a negative relationship between the primary agriculture credit societies and gross state domestic product of agriculture and allied activities.

The regression equation for GSDP and PACS in the three western zone states is shown in table 13.

Table 13: Regression Equation for GSDP and PACS of western zone

The regression equation shows the influence of the independent variable on the dependent variable which is represented by the Beta values(m) in the equation. The slope of the regression line is what it is called. It depicts the change in the dependent variable because of a change in the independent variable of one unit. As seen in the above table, for the Goa state-one per cent increase in the independent variable will decrease by 0.03 units. Similarly, for Gujarat state one per cent increase in the independent variable will decrease the by 1.33189022 units. Whereas for Maharashtra state, one per cent increase in the independent variable will increase the dependent variable by 1.723810716 units. Maharashtra have positive beta values, indicating that an increase in PACS in these states will result in an increase in GSDP from agriculture and allied activities. The intercept (constant) of Goa, Gujarat and Maharashtra is negative, indicating that even if the state does not have any PACS, it will still produce the same Gross State Domestic Product (GSDP).

In regression statistics table 14, shows multiple R (r =correlation coefficient). The correlation coefficient is positive for the three states. But when we look at the slope, Goa and Gujarat has negative slope, therefore the correlation coefficient must also be negative i.e., -0.035218662286107 for Goa and -1.33189902238566 for Gujarat. The slope for Maharashtra is positive so the correlation coefficient will also be positive.

The coefficient of determination R squared (R2) tells the per cent of variation that is explained by the regression. For Goa, 1.80 percent of the variation in y is explained by x and 98.2 per cent is unexplained. For Gujarat, 10.1 per cent of the variation in y is explained by x and 89.9 per cent is unexplained. For Maharashtra 0.055 per cent in y is explained by x and 99.99 per cent is unexplained.

CONCLUSION AND MANAGERIAL IMPLICATIONS

PACS, which have been around for more than a century, are in critical need of a new policy push. They may be able to help Atmanirbhar Bharat achieve its goal. Due to the fast-changing financial system that emphasises efficiency, profitability, technology, and sustainability, cooperatives' share in rural credit has dwindled, and their relevance has dwindled.

The current study examines the economic impact of financial credit facilities such as PACS on the Gross State Domestic Product (GSDP) to promote long-term agricultural development. PACS has no substantial economic impact or association with the GSDP of agriculture and associated activities, according to hypothesis testing utilising statistical techniques. Lack of active participation by members, lack of professionalism, lack of corporate governance, politicisation, bureaucratization, ageing and unenthusiastic personnel, and so on are some of the elements that contribute to small impact. The number of PACS has also decreased as commercial banks have gained a larger piece of the market.

What is more significant is that the Goa holds the highest position in the growth rate of paid-up capital, total reserves, total borrowings, working capital, number of borrowers and GSDP still the overall economic impact of PACS on GSDP is insignificant.

Some of the limitations of the present study include the inability to conduct research for all the six zones of PACS in India due to time constraints.

The managerial implication of the study includes bringing better products and securing the interest of the banks. The study would also help in sustainable existence of small lending institutions which get bankrupt due to rising NPAs generated out of

agricultural loans.

VI. Future Areas of Research

Future studies on the same topic can be conducted covering all the zones. Other variables apart from GSDP can be studied like employment opportunities, income rise, and repayment aspects for rural artisans, small farmers, marginal farmers, Scheduled tribes, and scheduled castes.

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Table 1, the proportion of the people engaged in agriculture has decreased.

	1951	1961	1971	1981	1991	2001	2011	2021
Proportion of Population	69.9	69.5	69.7	60.5	59	58.2	54.6	39.4
Contribution to GDP	51.9	46.3	40.5	35.4	28.5	22.4	14.4	18.8

Source: Compiled from Registrar General of India and Central Statistics Office, First Advance Estimates of National Income, 2021-22

Table 2: Total Number of PACS in the western zone of India over the period of 2002-03 to 2019-20.

	In Numbers			Growth rate		
Year	Goa	Gujarat	Maharashtra	Goa	Gujarat	Maharashtra
2002-03	87	8176	23340	N/A	N/A	N/A
2003-04	84	8482	20866	-3.45	3.77	-10.60
2004-05	255	9093	20984	203.57	7.21	0.57
2005-06	75	8487	21045	-70.59	-6.70	0.29
2006-07	77	7956	21045	-2.67	-6.26	0.00
2007-08	75	8092	21184	-2.60	1.71	0.66
2008-09	75	8044	21199	0.00	-0.59	0.07
2009-10	79	7763	21240	5.33	-3.49	0.19
2010-11	81	8117	21343	2.53	4.56	0.48
2011-12	77	8154	21402	-4.94	0.46	0.28
2012-13	100	8810	21394	29.87	8.05	-0.04
2013-14	79	8313	21268	-21.00	-5.64	-0.59
2014-15	79	8605	21199	0.00	3.51	-0.32
2015-16	79	8804	21094	0.00	2.31	-0.50
2016-17	81	8484	21217	2.53	-3.63	0.58
2017-18	81	8535	21181	0.00	0.60	-0.17
2018-19	81	8613	21150	0.00	0.91	-0.15
2019-20	78	8823	20151	-3.70	2.44	-4.72

Source: Indiastat, National Federation of State Cooperative Banks Ltd.

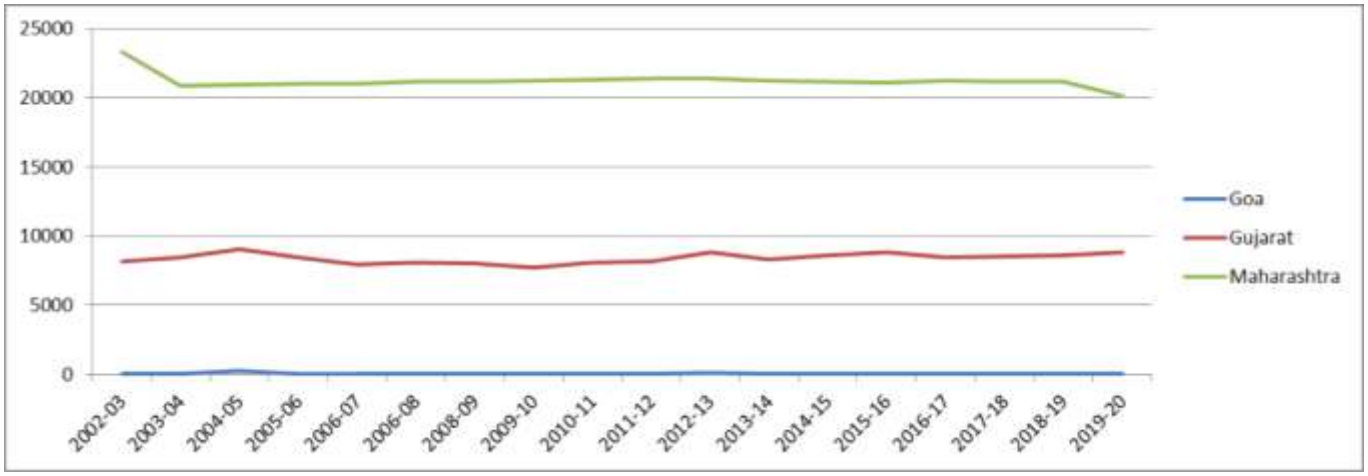

Table 3: State -wise Growth rate of membership in PACS in Western Zone

Year	Goa	Gujarat	Maharashtra
2002-03	N/A	N/A	N/A
2003-04	4.36	323.57	6.51
2004-05	282.78	-76.77	0.91
2005-06	-73.68	4.83	1.21
2006-07	-4.88	-6.83	0.00
2007-08	11.09	2.46	1.36
2008-09	-26.69	9.21	24.24
2009-10	28.72	5.03	1.41
2010-11	3.35	-1.68	1.35
2011-12	0.60	-1.29	2.72
2012-13	-7.07	5.74	5.02
2013-14	7.11	1.56	0.03
2014-15	-12.10	1.69	-6.80
2015-16	23.53	-0.02	3.46
2016-17	4.94	-7.79	5.70
2017-18	-0.39	-3.97	-3.43
2018-19	-26.16	0.17	0.24
2019-20	12.55	1.37	27.11

Source: Indiastat, National Federation of State Cooperative Banks Ltd.

Table 4: State -wise Growth rate of Paid-up Capital of PACS in Western Zone

Year	Goa	Gujarat	Maharashtra
2002-03	N/A	N/A	N/A
2003-04	-8.12	8.26	10.92
2004-05	464.66	32.73	4.17
2005-06	-84.14	-10.9	7.28
2006-07	9.42	1.86	0
2007-08	22.13	12.54	10.03
2008-09	-1.34	-4.87	15.87
2009-10	8.36	-0.69	-4.29
2010-11	3.92	10.37	1.09
2011-12	-38.86	10.67	8.97
2012-13	21.06	8.73	9.9
2013-14	17.48	29.46	-3.27
2014-15	-23.57	39.55	21.2
2015-16	99.09	-25.05	-11.51
2016-17	-9.82	3.53	14.26
2017-18	4.37	3.69	0.12
2018-19	59.12	5.47	2.14
2019-20	-8.81	-1.48	21.89

Source: Indiastat, National Federation of State Cooperative Bank LTD.

Table 5: State -wise Growth rate of total reserves of PACS in Western Zone

Year	Goa	Gujarat	Maharashtra
2002-03	N/A	N/A	N/A
2003-04	7.92	7.74	-15.56
2004-05	314.69	18.24	11.06
2005-06	-82.80	-50.70	10.41
2006-07	89.71	142.66	0.00
2007-08	-21.71	45.88	36.08
2008-09	128.71	-1.09	18.98
2009-10	4.63	-26.84	-8.58
2010-11	3.25	36.28	18.26
2011-12	-21.36	-9.34	12.55
2012-13	-7.08	13.46	14.87
2013-14	109.20	21.39	-0.60
2014-15	8.52	20.91	10.19
2015-16	22.95	6.79	-13.58
2016-17	-39.75	1.13	9.40
2017-18	10.03	9.94	35.03
2018-19	545.05	13.89	4.27
2019-20	1.36	0.06	8.11

Year	Goa	Gujarat	Maharashtra
2002-03	N/A	N/A	N/A
2003-04	24.95	11.39	-90.71
2004-05	51.35	23.33	16.97
2005-06	-24.26	16.75	4.94
2006-07	-7.97	5.48	0.00
2007-08	73.96	31.99	-9.20
2008-09	-10.85	1.53	4.05
2009-10	6.28	-4.35	-22.10
2010-11	2.54	389.00	9.22
2011-12	-6.18	-0.67	29.88
2012-13	15.80	28.22	30.89
2013-14	15.03	3.86	0.01
2014-15	-34.82	-50.98	0.69
2015-16	16.26	2.33	-6.99
2016-17	76.00	2.69	1.62
2017-18	0.10	-2.05	19.09
2018-19	46.18	9.43	26.08
2019-20	16.71	5.81	-13.46

Year	Goa	Gujarat	Maharashtra
2002-03	N/A	N/A	N/A
2003-04	-12.44	-6.80	17.13
2004-05	1323.35	20.97	9.65
2005-06	-85.36	26.17	11.03
2006-07	-49.86	-4.55	0.00
2007-08	-3.35	6.14	16.71
2008-09	-9.44	-4.47	18.68
2009-10	2.34	8.47	-13.48
2010-11	3.12	-6.02	2.95
2011-12	72.27	38.60	4.95
2012-13	-68.59	24.11	-0.18
2013-14	1046.66	14.44	-0.83
2014-15	6.82	24.09	21.42
2015-16	-82.54	3.51	-8.17
2016-17	33.62	15.25	0.05
2017-18	-3.51	5.64	-2.61
2018-19	-57.43	0.82	11.41
2019-20	110.60	23.95	13.28

Year	Goa	Gujarat	Maharashtra
2002-03	N/A	N/A	N/A
2003-04	-13.78	-0.28	-2.92
2004-05	312.81	8.92	7.60
2005-06	-63.30	32.86	12.11
2006-07	-13.97	-7.33	0.00
2007-08	0.13	11.73	22.56
2008-09	23.11	34.66	11.92
2009-10	4.70	-22.23	-7.83
2010-11	1.32	46.48	7.49
2011-12	64.36	12.86	30.13
2012-13	-39.26	11.12	-20.02
2013-14	24.51	14.03	5.15
2014-15	-2.71	-2.41	0.00
2014-15	-2.71	-2.41	0.00
2015-16	-0.17	-0.07	15.34
2016-17	-2.18	14.33	9.57
2017-18	2.36	2.01	0.75
2018-19	81.39	1.46	6.52
2019-20	20.39	12.24	0.94

Year	Goa	Gujarat	Maharashtra
2002-03	76955	2023600	3911277
2003-04	88039	2965900	4522581
2004-05	99811	3270600	4492660
2005-06	132317	4232000	5276384
2006-07	128746	5004300	6722886
2007-08	141050	5789700	8068446
2008-09	149120	5904900	7583257
2009-10	165778	6727600	8857753
2010-11	187062	10320048	12933622
2011-12	227418	12105758	13406827
2012-13	255180	11393015	14246930
2013-14	285116	15626637	17022854
2014-15	285857	11657931	16655868
2015-16	370442	10413800	18361200
2016-17	444484	10603700	24087400
2017-18	693521	13290951	2352782
2018-19	718530	14921560	2579628
2019-20	748282	16302402	2818555

Year	Goa	Gujarat	Maharashtra
2002-03	N/A	N/A	N/A
2003-04	-	4.55	-72.50
2004-05	-89.87	-1.82	-7.91
2005-06	-50.00	0.24	27.11
2006-07	50.00	3.86	0.00
2007-08	-50.00	0.46	-17.94
2008-09	33.33	7.16	-2.70
2009-10	-14.25	-0.65	-5.29
2010-11	1.17	-11.87	7.90
2011-12	27.09	-3.04	19.37
2012-13	15.65	4.56	-3.32
2013-14	961.57	4.61	0.03
2014-15	-17.58	-5.14	-86.68
2015-16	-95.05	0.97	-10.40
2016-17	-72.85	-18.53	-0.93
2017-18	0.00	-0.10	2.81
2018-19	-100.00	5.67	-15.03
2019-20	-	-1.47	-0.80

Gujarat (Growth rate)		Goa (Growth rate)		Maharashtra (Growth rate)	
X-PACS	**Y=GSDP**	**X-PACS**	**Y=GSDP**	**X-PACS**	**Y=GSDP**
3.767123288	46.56552678	-3.448275862	14.40322266	-10.59982862	15.62926891
7.213578501	10.27344145	203.5714286	13.37134679	0.565513275	-0.661591246
-6.69525066	29.395218	-70.58823529	32.56755267	0.290697674	17.44454288
-6.256627784	18.24905482	2.666666667	-2.698821769	0	27.41464609
1.709401709	15.69450273	-2.597402597	9.556801765	0.660489427	20.01461872
-0.593178448	1.989740401	0	5.721375399	0.070808157	-6.01341324
-3.493286922	13.93249674	5.333333333	11.1708691	0.193405349	16.80670983
4.560092748	53.39865628	2.53164557	12.83885678	0.484934087	46.01470599
0.455833436	17.30331099	-4.938271605	21.57359592	0.276437239	3.658719885
8.045131224	-5.88763628	29.87012987	12.20747698	-0.037379684	6.266232868
-5.641316686	37.15980362	-21	11.73132691	-0.588950173	19.48436611
3.512570672	-25.3970576	0	0.259894218	-0.32443107	-2.155842963
2.312608948	-10.67197087	0	29.58996981	-0.495306382	10.23862581
-3.634711495	1.823541839	2.53164557	19.98747442	0.5831042	31.18641483
0.601131542	25.34257853	0	56.02833848	-0.16967526	-90.23231233
0.913884007	12.26856528	0	3.606091236	-0.146357585	9.641607255
2.438174852	9.254005613	-3.703703704	4.140676103	-4.723404255	9.262071896

State	p-value	Interpretation of p-value	Accept/ Reject Null Hypothesis
Goa	0.620269291	higher than 0.05, not statistically significant	Accept null hypothesis
Gujarat	0.229818932	higher than 0.05, not statistically significant	Accept null hypothesis
Maharashtra	0.784440222	higher than 0.05, not statistically significant	Accept null hypothesis

Regression Statistics			
Multiple R		***Slope***	***R square***
Goa	0.134189612048446	-0.035218662286107	0.0180068519817125
Gujarat	0.318134612	-1.33189902238566	0.101209632
Maharashtra	0.0743184227812096	1.723810716	0.00552322796468662