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Evolution and drivers of farmer producer organizations in Karnataka: Trends and membership determinants

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Abstract

This study examines the growth trends, influencing factors, and economic impact of Farmer Producer Organizations (FPOs) in Karnataka, with emphasis on Kalyana Karnataka. Data from 2010 to 2023 showed rapid FPO expansion, achieving a compound annual growth rate (CAGR) of 65.23% statewide. In Kalyana Karnataka, the number of FPOs rose significantly from 1 in 2013 to 378 by 2023, with a CAGR of 42.71%. Logistic regression analysis identified key factors influencing FPO participation, including landholding size (Odds Ratio = 1.8), farming experience (Odds Ratio = 1.7), and farm income (Odds Ratio = 1.57), all positively impacting membership likelihood. Conversely, younger farmers had greater participation rates than older counterparts (Odds Ratio = 0.57). The findings suggest that policy support, market access, and collective action have driven FPO growth, yet targeted support for smallholders and young farmers could further enhance inclusivity. This study highlights FPOs' critical role in strengthening agricultural value chains and improving livelihoods, underscoring their potential as catalysts for sustainable rural development.

Keywords: Farmer producer organizations, agricultural growth, rural development, market access, smallholder farmers

Introduction

Farmer Producer Organizations (FPOs) are pivotal in enhancing the socio-economic status of farmers in India, particularly for smallholder farmers who frequently face substantial challenges in accessing markets, resources, and essential information. By aggregating farmers into collective entities, FPOs effectively leverage economies of scale, which helps to reduce costs and increase bargaining power. This collective action ensures better price realization for their produce and leads to improved livelihoods for members (Patil, 2022) [7]. Additionally, FPOs play a crucial role in facilitating access to quality inputs, credit, and technology while strengthening supply chains and market linkages.

As of 2023, India boasts over 12,000 registered FPOs, encompassing more than 10 million farmers (Ministry of Agriculture and Farmers Welfare, 2023). These organizations have made significant strides in promoting sustainable agricultural practices and enhancing productivity. For instance, an FPO in Madhya Pradesh reported an impressive 20% increase in crop yields due to the adoption of organic farming practices and efficient water management techniques. (Sharma, 2022) [8].

Furthermore, FPOs play a vital role in reducing post-harvest losses, which are estimated to range between 10% and 12% for cereals and pulses in India. By providing critical infrastructure, such as storage facilities and logistics support, FPOs help maintain the quality of produce and extend its shelf life. This reduces wastage significantly, directly impacting farmers' incomes. A notable example is an FPO in Maharashtra that established a cold storage facility, resulting in a 15% increase in profits for its member farmers due to reduced spoilage of perishable goods.

In addition to enhancing productivity and reducing waste, FPOs facilitate access to government schemes and subsidies, which are essential for their growth and sustainability. Organizations such as the Small Farmers' Agri-Business Consortium (SFAC) and the National Bank for Agriculture and Rural Development (NABARD) provide financial assistance and capacity-building support to FPOs. In 2022 alone, SFAC supported over 5,000 FPOs with grants and loans amounting to INR 1,500 crore,

empowering them to scale up their operations and enhance their market presence (SFAC, 2022).
In conclusion, FPOs serve as transformative entities that empower farmers, providing them with the tools, resources, and networks necessary for sustainable agricultural practices and improved livelihoods. By addressing the challenges faced by smallholder farmers and promoting collective action, FPOs significantly contribute to rural development and the overall growth of the agricultural sector in India.

Methodology

Type and source of data

Primary as well as secondary data were collected to fulfil the designed objectives. The secondary data regarding FPOs was collected from NABARD, SFAC and COEFPO. Primary data was collected from FPO member farmers, non-FPO farmers and FPO directors through field survey by the interview.

Analytical tools

Compound Annual Growth Rate (CAGR)

The collected data was analysed using CAGR. To measure the growth performance in terms of the number of FPOs in Karnataka state, compound growth rates were calculated using the following exponential growth model.

$Y=AB^tV_t$ …(1)

Where,
Y = number of FPOs in the year t
A = Intercept indicating Y in the base period
B = 1 + g
t = Time period

Equation (1) was converted into the logarithmic form as indicated below in order to facilitate the use of linear regression.

In Yt = In A + (In B)t + Et

This was of the following form

Qt = a + bt + Et

Where,
Q_t = ln Y
a = ln A
b = ln B
E_t = ln V_t

The values of 'a' and 'b' were estimated by using ordinary least squares estimation technique. For the effective comparison, the growth rates worked out with the help of equation were multiplied by 100 to obtain the percentage change in the variable concerned.

Logit Model

A logistic model is a univariate binary model. We used a binomial logistic regression model given that the dependent variable is a dichotomous i.e., 0 when farmer is not a member of FPO and 1 when farmer is member of FPO. Predictor variables are a set of socioeconomic variables. Let P_j denote the probability that J^{th} farmer is member of FPO. We assume that P_j is Bernouli variable and its distribution depends on vector of predictors X, so that.

$$P_j(X) = \frac{e^{\alpha+\beta x}}{1+e^{\alpha+\beta x}}$$

The logit function to be estimated is then written as:

$$ln\ [P_j/\ (1\text{-}P_j)] = \alpha + \Sigma_i\ \beta_i\ X_{ij}$$

The logit variable ln {Pj/(1-Pj)} is the natural log of the odds in favour of farmer having membership. Equation (b) is estimated by maximum likelihood method and the procedure does not require assumptions of normality and heteroscedasticity of errors in predictor variables.

Results and Discussion

Table 1: Trends in the number of FPOs over the years in Karnataka

Year	No of FPOs	Cumulative number of FPOs	Per cent change
2010	1	1	-
2011	1	2	100.00
2013	2	4	100.00
2014	20	24	500.00
2015	7	31	29.17
2016	87	118	280.65
2017	129	247	109.32
2018	70	317	28.34
2019	65	382	20.50
2020	80	462	20.94
2021	280	742	60.61
2022	654	1396	88.14
2023	170	1566	12.18
CAGR (%)		65.23	

Table 1 highlights the growth trends in the number of Farmer Producer Organizations (FPOs) in Karnataka from 2010 to 2023. Starting with only one FPO in 2010, the state saw a steady increase in both the number of new FPOs formed each year and the cumulative total. Significant growth spurts occurred in 2014, 2016, 2017, 2021, and

2022, with notable spikes in 2014 (500% increase), 2016 (280.65%), and 2022 (88.14%), suggesting focused efforts or favourable conditions for FPO development during these years. From 2020 onward, the pace of FPO formation accelerated, particularly in 2021 and 2022, when new FPOs formed rose sharply, adding 280 and 654 organizations, respectively. This trend likely reflects increased government and institutional support to promote FPOs. In 2023, the number of new FPOs slowed to 170, marking a more moderate 12.18 per cent growth rate, yet Karnataka achieved a cumulative total of 1,566 FPOs. The compound annual growth rate (CAGR) for the period stands at an impressive 65.23 per cent, underscoring the rapid and sustained expansion of FPOs in the state over the past decade.

The table 2 illustrates the growth trends in Farmer Producer Organizations (FPOs) in Kalyana Karnataka from 2013 to 2023, reflecting a pattern of initial growth, periods of stabilization, and renewed expansion. Starting with just one FPO in 2013, the number grew to 10 in 2014, marking a remarkable 1000% increase and reaching a cumulative total of 11 FPOs. However, growth paused in 2015, with no new FPOs formed. The upward trend resumed in 2016, adding 14 new FPOs, and continued in 2017 with 25 more, reflecting steady expansion in these years. From 2018 onward, growth fluctuated, with moderate increases each year until a significant surge occurred in 2022, when 151 new FPOs were established, reflecting an 89.35% increase and bringing the cumulative total to 320 FPOs.

Table 2: Trends in number of FPOs over the years in Kalyana Karnataka

Year	No of FPOs	Cumulative number of FPOs	Per cent change
2013	1	1	-
2014	10	11	1000.00
2015	0	11	0
2016	14	25	127.27
2017	25	50	100.00
2018	12	62	24.00
2019	22	84	35.48
2020	22	106	26.19
2021	63	169	59.43
2022	151	320	89.35
2023	58	378	18.13
CAGR (%)		42.71	

In 2023, 58 additional FPOs were formed, marking an 18.13% increase and a cumulative total of 378 FPOs. The compound annual growth rate (CAGR) over the entire period from 2013 to 2023 stood at 42.71%, underscoring rapid average growth. This trend suggests phases of early foundational growth, periods of stabilization, and later rapid expansion, likely driven by policy support and growing awareness of FPO benefits in the region.

Table 3: Factors influencing FPO membership

Sl. No.	Variables	Estimate	Std. Error	Z –Value	Odds ratio
1	Constant	4.00	4.52	0.89	
2	Age	-0.56*	0.3	-1.86	0.57
3	Education	0.06	0.10	0.60	1.08
4	Size of land holding	0.59**	0.26	2.29	1.8
5	Experience in farming	0.53*	0.31	1.73	1.7
6	Farm income	0.45***	0.14	3.22	1.57
7	Access to market information	0.64	0.86	0.74	1.94
8	Contact with State Agriculture Department officials	1.37	0.94	1.46	3.92

Note: ***, **, and * indicates significant at 1%, 5% and 10% levels of probability.

This logistic regression analysis reveals key factors influencing the FPO membership participation. The constant term indicates a baseline log-odds of the outcome (4.00), although it is not statistically significant given its high standard error (4.52) and Z-value (0.89). The influence of age shows a negative relationship, with a coefficient of -0.56, indicating that each additional year decreases the likelihood of the outcome. This effect is statistically significant at the 0.1 level, with an odds ratio of 0.57, suggesting that younger individuals are more likely to engage in the outcome compared to older counterparts.

Education shows a slight positive association with the outcome, having a coefficient of 0.06 and an odds ratio of 1.08, indicating that additional years of education marginally improve the odds of achieving the outcome. However, this effect is not statistically significant. Size of landholding plays a notable role, with a positive coefficient of 0.59 and an odds ratio of 1.8, indicating that larger landholders are more likely to achieve the outcome. This relationship is statistically significant at the 0.05 level, underscoring the impact of land size on participation or engagement.

Experience in farming positively influences the outcome, with a coefficient of 0.53 and an odds ratio of 1.7. Significant at the 0.1 level, this suggests that experienced farmers are more inclined toward the outcome, likely due to accumulated knowledge and skills. Farm income also shows a strong, positive impact, with a coefficient of 0.45 and a statistically significant odds ratio of 1.57 at the 0.01 level. This implies that financial stability encourages higher engagement, potentially due to reduced financial barriers.

Other variables, such as access to market information and contact with State Agriculture Department officials, though positively associated with the outcome (coefficients of 0.64 and 1.37, respectively), are not statistically significant. The odds ratios (1.94 for market information access and 3.92 for department contact) suggest potential benefits, but these relationships do not strongly predict the outcome in this model. This analysis highlights the importance of tangible resources like land size, experience, and income in influencing engagement, while factors like age and education have limited or marginal impacts.

Similar studies have highlighted the importance of education and access to information in influencing farmers'

decisions to join FPOs. For instance, a study by Singh and Singh (2022) in Northeast India found that education and access to market information were significant determinants of FPO membership. These findings underscored the critical role of knowledge and information dissemination in promoting collective action among farmers.

Conclusion

This study provides a comprehensive analysis of the trends, influencing factors, and growth impact of Farmer Producer Organizations (FPOs) in Karnataka, with a particular focus on Kalyana Karnataka. The first table demonstrated a significant upward trend in the number of FPOs in Karnataka from 2010 to 2023, with notable growth phases that included rapid expansion in certain years, such as 2016 and 2021. This pattern suggests that various external factors, such as supportive government policies, increased awareness, and strategic interventions by organizations like NABARD, played key roles in bolstering FPO growth across the state. The compound annual growth rate (CAGR) of 65.23% over this period further underscores the overall positive trajectory of FPOs as essential agents in the agricultural value chain.

In Kalyana Karnataka, the second table highlighted similarly encouraging growth, showing substantial increases in FPO establishment after an initial phase of slow development. The presence of 378 FPOs in 2023, covering diverse crop portfolios across seven districts, reflects a region-wide commitment to fostering collective action among farmers. Phases of stabilization and renewed growth, with a 42.71% CAGR, indicate how FPOs are adapting to the unique challenges and needs of the region's farming community, further supporting sustainable agricultural practices and farmer empowerment.

The third table's logistic regression analysis identified critical factors influencing FPO membership or participation. Key variables, such as landholding size, farming experience, and farm income, showed significant positive effects on engagement with FPOs, indicating that farmers with larger landholdings, more experience, and higher income levels are more likely to join or actively participate in FPOs. This suggests that FPOs may need to target small and marginal farmers with additional support to ensure more inclusive growth. Other factors, like age and contact with agricultural officials, were less influential but highlighted potential areas for further outreach.

Overall, this study concludes that FPOs in Karnataka have grown both in number and impact, driven by policy support, enhanced market linkages, and collective farming benefits. However, targeted interventions are necessary to make FPOs more accessible to the entire farming community, particularly for younger and smaller landholders, to maximize FPOs' potential for economic resilience and rural development.

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