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Farmer producer organizations and their role in farm consultancy and technology dissemination in Nandurbar district of Maharashtra

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Abstract

As a vital link between individual smallholder farmers and the contemporary agricultural environment, Farmer Producer Organisations (FPOs) offer crucial technology and consulting services that boost output, cut expenses, and expand market access. Farmers can overcome the constraints of small landholdings and implement sophisticated agricultural practices by pooling resources through FPOs. Present study about to find the role of FPO in agricultural consultancy, technological services, and value added services of FPO and market access which is provided by FPO for the farmers. This research paper identifies key dimensions Planning & Business Development, Marketing Management, Financial Management, Democratic Leadership, and Business Operations. In farm practices, small farmers achieved a score of 4.28, significantly higher than marginal farmers' 3.71, indicating better adoption of improved agricultural techniques and practices. Modern training services showed a similar pattern, with small farmers scoring 4.08 compared to marginal farmers' 3.51, suggesting greater participation in capacity building initiatives. Production training services revealed scores of 3.98 for small farmers and 3.41 for marginal farmers, highlighting the gap in practical skill development and application. These differences can be attributed to several factors including landholding size, educational background, financial capacity, and prior exposure to institutional support.

Keywords: Farmer producer organization, capacity building service, small farmer, marginal farmer, farm efficiency, correlation

1. Introduction

Farmer Producer Organisations (FPOs) are a critical institutional innovation that empowers resource-constrained farmers through collective action in India's agrarian terrain, where over 86% of operational holdings are small and marginal. This study investigates how FPOs influence the capacity-building services supplied to small and marginal farmers in Nandurbar, Maharashtra's tribal area. This region is notable for its rainfed agriculture, fragmented landholdings, and socioeconomic instability. Business operations include financial management, democratic leadership, and operational control. The findings reveal that, while FPOs significantly boost access to market knowledge, technology, and training, the benefits are not evenly distributed, with small farmers consistently outperforming marginal farmers in all service areas. The findings reveal that, while FPOs significantly boost access to market knowledge, technology, and training, the benefits are not evenly distributed, with small farmers consistently outperforming marginal farmers in all service areas cure malaria, stomach aches, fever, diarrhea, and nematode infections in humans and animals in West and South Africa. It is used as a chewing stick and as a treatment for stomach problems and tuberculosis in Kano, Nigeria ^[10].

Pharmacologically, various parts of the plant have antioxidants ^[11], antidiabetic ^[12], Anticholesterol and antihypertensive ^[13], anti-malarial ^[14], anthelmintic ^[15], anti-viral ^[16], and antibacterial ^[17, 18] activities.

2. Methodology

The research region was Nandurbar district in Maharashtra, where forty FPOs were found to be involved in various government and NGO programmes. FPO selection was narrowed down to FPOs with more than 75% of their membership made up of small and marginal

farmers, resulting in the final selection of two FPOs: to FPOs with more than 75% of their membership made up of small and marginal farmers, resulting in the final selection of two FPOs: Vanashree Farmers Producer Company Limited and Akkarani Self-Reliant Farmer Producer Company Ltd. Based on these two FPOs, 202 farmers were chosen as a sample, accounting for almost 30% of the total membership. This sample comprised 101 marginal and 101 small farmers. The Agriculture Technology Management Agency (ATMA) and the District Agriculture Statistics Office of Nandurbar are the secondary data sources used in the analysis of the function of Farmer Producer Organisations (FPOs) for agricultural consulting and technology transfer for marginal and small farmers in the Nandurbar district. Primary data collected at the farm level is used to gather specific insights regarding the impact of FPOs.

3. Results

3.1 Agricultural consultancy and technology services offered to farmers by Farmer Producer Organizations.

This research gauges the effect of agricultural consultancy and technology services within the context of two Farmer Producer Organizations (FPOs): Vanashree Farmers Producer Company Limited (VFPC) and Akkarani Self-Reliant Farmers Producer Company Limited (ASFPC Ltd.) in the Nandurbar district of Maharashtra. From small and marginal farmers, data were collected using a structured questionnaire that employed a five-point Likert scale, with Very Poor defined as 0.01-1.00, and Excellent defined as 4.01-5.00. Over 202 farmers were approached for the research. The study focused on 6 major services: extension services, agrarian government services and crop insurance, ICT access and use including technology and mechanization, and government scheme guidance.

Both of FPOs in the study provided agricultural consultancy and agritech services and performed differently in different areas of this service. On most indices, Vanashree FPC performed better than Akkarani FPC. In extension services, for example, Vanashree got a score of 4, while Akkarani got 3.8, showing a better tier of technical and advisory services offered. On access to technology, Vanashree's score was 4 while Akkarani's score was 3.7, suggesting Vanashree had superior technology and better expert technical management. In mechanization services, Vanashree scored 3.9 while Akkarani scored 3.4, illustrating that Vanashree had more capacity to provide shared machinery and equipment to its members than Akkarani. These gaps could be because Vanashree has been operational for a longer time, has stronger institutional linkages with KVKs, and has more funds to provide better services than the rest. On the small farmers and marginal farmers comparison, the data suggests small farmers rate the services substantially higher than the marginal farmers, and this result is consistent throughout the data set. For example, in the case of crop insurance, small farmers had an average score of 3.76, whereas marginal farmers had a score of 3.50. This is a reflection of the small farmers' greater awareness and use of insurance, which can be attributed to higher literacy, greater formal banking engagement, and more active engagement with FPOs. Even more pronounced is the case of government scheme assistance, where small farmers rated

the service at 4.16, and marginal farmers rated the service at only 2.80. This very large difference illustrates the fundamental inequities in access to public programs, which are more navigable by small farmers to subsidised, credit and input supplies schemes, and are consequently more able to be extracted from the bureaucratic systems of small farmers.

The mark with the highest score in the use of ICT digital tools by small farmers was 3.6. In comparison, marginal farmers received a 3.4 ICT score, indicating that the use of digital technologies by farmers was adopted on a limited basis and unevenly distributed. In the category of mechanization, small farmers achieved a 3.9, and marginal farmers a 3.4, indicating that small farmers have much easier access to hardware than marginal farmers. The scores by marginal farmers in both instances show that access to some training and the use of machinery provided by both FPOs does not overcome the primary challenges of digital illiteracy, immobility, and impoverishment, which disproportionately affect marginal farmers. This situation is consistent with the rural development situation in the western state of Maharashtra, where a digital and mechanization productivity gap in farming is still apparent to the most remote, disadvantaged farmer communities. Matters related to private extension services on demand are the most informative. These pertain to the responsiveness of FPOs to requests for advisory support from individual farmers. Small farmers rated this service at 3.5, while marginal farmers rated it at 2.9. These scores still reveal a service gap, in terms of service accessibility and timeliness. Among the FPOs internal to the study, Vanashree scored 3.9 while Akkarani scored 3.4, confirming once again that Vanashree responds to member need. This indicates that service design must consider farmer profiles, including landholding size and socio-economic status, to enhance balanced access and effectiveness of services. The lower scores among marginal farmers could result from weak communication, infrequent visits from extension personnel, or lower service priority.

Correlation metrics between service use and involvement with FPOs demonstrated a positive association on all levels. The strongest connections were seen in relation to assistance with government schemes ($r = 0.87$), access to technology ($r = 0.79$), and technology use (ICTs) ($r = 0.78$). The positive correlation with FPOs suggests that the higher the involvement in activities of the FPO (Attending meetings and trainings or performing leadership roles), the higher the chances of utilizing these services. The Evidence suggests that attendance incentivizes service usage. Targeting outreach efforts, educational activities, and governance transparency will increase service utilization of the FPO. Taken together, the findings indicate that there is a marked success with the improvement of agricultural consultancy and technology access by the Vanashree and Akkarani FPOs to small and marginal farmers. However, there is a notable difference in the performance of the Vanashree FPC in the rates of technology adoption, timely advisory services, and extension support. On the other hand, Akkarani FPC is known for the the prompting of government schemes; however, its performance is trailing in crucial areas of digital technology and mechanization, which need to be addressed to support the marginal farmers. The works by Krishna (2018) and others suggest that FPOs facilitate

access to agri-technologies while highlighting FPOs' enduring imbalances Shrivastava *et al.* (2022) [5] and Toillier (2015)'s [4] concerns for socio-technological equity for diminished extension support. FPOs have been acknowledged to serve as promoters of agricultural transformation. Yet their effectiveness as institutions depend on equitable oriented governance structures and services, disproportionate marginal farmers and socioeconomic capacity contraction. FPOs are paradoxically hampered in their potential by poor mechanization strategy access and by

dominated ICT FPO ICT frameworks. These restraints are countered by enhanced FPO distributed community digital engagement and mechanization access. As described above, stronger FPO member-initiated profiling, demand-responsive extension, and decentralization of inclusive governance decision-making and primacy to FPOs' social objectives guarantees FPOs their multiplier effects as constructed innovative socio-economic enterprises. Sustainable equity and development in rural India depend on FPOs' widened focus.

Table 1: Comparative Assessment of Agricultural consultancy and technology services offered to farmers by Farmer Producer Organizations

Services	Marginal Farmer	Interpretation	Small Farmer	Interpretation	Vanashree FPO	Akkarani FPO	Difference	Correlation with FPO involvement
Ext Services	3.50	Very Good	3.70	Very Good	4.0	3.8	0.20	0.75
Ext On Demand	2.90	Good	3.50	Very Good	3.9	3.4	0.60	0.8
Govt Agri Services	2.50	Good	3.97	Very Good	4.0	3.9	1.47	0.85
Crop Insurance	3.76	Very Good	4.37	Excellent	3.5	3.5	0.60	0.81
Govt. Scheme Assistance	2.80	Good	4.16	Excellent	3.9	3.5	1.36	0.87
Tech Access	2.70	Good	4.27	Excellent	4.0	3.7	1.57	0.79
ICT Use	2.87	Good	3.86	Very Good	3.6	3.4	0.99	0.78
Mech Services	3.43	Very Good	3.50	Very Good	3.9	3.4	0.07	0.72

3.2 The value-added and market access services offered to farmers by Farmer Producer Companies.

Farmer Producer Organizations (FPOs) have a significant impact on improving the economic resilience and market competitiveness of small and marginal farmers through the promotion of collective action. In the case of Nandurbar district of Maharashtra, this paper studies the impact of two prominent FPOs - Vanashree Farmers Producer Company Limited (VFPC) and Akkarani Self-Reliant Farmers Producer Company Limited (ASFPC Ltd.) - on the provision of value addition and market access services. The evaluation was conducted on seven services within the assessment framework - storage, packing, cleaning, branding, drying, and pricing, and market price information & services. These services were measured using the Likert scale from Very Poor (0.01-1.00) to Excellent (4.01-5.00) level of performance assessment. The members of small and marginal farmers from both FPOs were used for the data collection, allowing the analysis of the effectiveness of service delivery from both FPOs.

The results show that smallholder farmers rated all services more highly than marginal farmers, which means that there are more gaps regarding awareness, use, and access to value-added services. This pattern is particularly strong with respect to post-harvest handling activities. For example, cleaning received an average score of 4.33 from small farmers, whereas marginal farmers rated it 3.53 giving rise to a score difference of 0.80. The same is true with drying services. Small farmers scored 4.56 while marginal farmers scored 3.62 giving a score difference of 0.93. The big gaps point towards the fact that marginal farmers are economically structurally disadvantaged. This is illustrated by their weak access to essential physical infrastructure, in particular solar dryers, storage, and processing facilities. In addition, smallholder farmers also face disqualifying land, dryer, and financial scarcity which constrains their ability to engage in value chain activities. The analysis presents two FPOs with considerable differences in service delivery efficacy. In value addition service of Vanashree FPC performed better than most FPCs. In cleaning Vanashree scored 3.9 while Akkarani scored 3.7. In drying the scores were 4.0 and 3.8 respectively. In grading Vanashree scored

4.1 while Akkarani scored 3.7. In storage Vanashree scored 3.9 while Akkarani scored 3.5. These results indicate Vanashree FPC has better served physical facilities and has more sophisticated training and more developed coordination with technical systems. The supported systems by seamless integration with technical experts leads to advanced service delivery systems. Vanashree is deeply linked to agricultural extension agencies funding in more than the extension framework and operational period to derive benefits reflected in value addition. Vanashree is more effective in brand building and communication with members and buyers than Akkarani. In the domain of branding Vanashree scored 4.2 while Akkarani scored 3.8. This shows more investment in brand development, quality certification, and foster marketing communication. Trust building is important Vanashree has more advanced brand and market positioned with better differentiated organized retail chain. Community of safe consuming brand with high confidence value added brand can be stored for consumer premium enabling price confidence.

Another important dimension of market access is market customer profiles and strategic intelligence. Members of Vanashree have reported an average score of 3.7 for market price awareness, while members of Akkarani scored 3.4. This gap demonstrates that Vanashree performs better in informing her members. This decision could be through mobile phone alerts, routine meetings, or through direct linkages with traders and processors. Assured and timely market price information helps farmers plan most profitable time and manner of selling their produce, allowing them to negotiate a price, and eliminate unnecessary middlemen. There was correlation between farmer participation in FPO activities and service rating. This analysis showed that participation in the activities is a determinant of the outcomes of service. Of all services, grading justified the highest correlation coefficient of $r = 0.88$, while cleaning and better pricing had $r = 0.78$ and $r = 0.70$ respectively. This indicates that farmers that are more active members in the FPO activities, that is, attending general body meetings, trainings and holding leadership positions, are more likely to gain from and appreciate the services. This illustrates the need to mobilize members of the FPO through ensuring that

there is governance accountability, and decision making is participatory to provide effective and equitable services to all members.

Though the improvements are notable, the study points out several points which need immediate action. In branding services, both FPOs scored Vanashree at 4.2 and Akkarani at 3.8, which demonstrates a neglect towards brand development. In the case of Rural India, this is a vocalized issue in many FPOs that only engage in aggregation and marketing, but neglect brand building. Building brand equity through quality assurance and strategic digital marketing, packaging innovation, and quality improvement can improve market position and profitability. Similarly, the inadequate linkages to direct buyers is the most important reason as to why better pricing is rated positively but not highly. A much better result can be achieved through a combination of lengthy offline contracts and e-commerce integration. The maintained absence e-commerce integration and the over-reliance on tradition markets and borders strategic pricing for premium crops.

One important finding of this study is the role of infrastructure and institutional integration as a determining factor for the effectiveness of FPOs. Part of Vanashree's success can be attributed to the investment in physical infrastructure, including processing, cold storage, and transport, as well as the collaboration with local government, universities, and private buyers. Much of the improvement potential in Akkarani has to do with insufficient capital, weak contracts, and integration to the external system. This corroborates the work of Krishna (2018) regarding the role of infrastructure in the success of FPOs. Rondot (2001) ^[2] argued the importance of developing the integrated value chain. Shrivastava *et al.* (2022) ^[5] examined the inequities in the access of services differentiated by the size of the farm. Lastly, Toillier (2015) ^[4] advocated the role of market information in the empowerment of smallholders.

In summary, FPOs in the Nandurbar district have contributed to the market access and value addition for small and marginal farmers. The persistent differentials among small and marginal farmers, and the two FPOs themselves, point to the need for purposeful outreach and institutional strengthening in addition to the capacity that has already been built. FPOs need to undertake proactive member-centered approaches that enable value chain control to branding and digital marketing, balanced infrastructure investment, and active member control to ensure equity and livelihood sustainability. By overcoming these weaknesses, FPOs can transition from aggregators to multifaceted ventures promoting inclusive rural transformation in India.

4. Conclusion

In farm practices, small farmers achieved a score of 4.28, significantly higher than marginal farmers' 3.71, indicating better adoption of improved agricultural techniques and practices. Modern training services showed a similar pattern, with small farmers scoring 4.08 compared to marginal farmers' 3.51, suggesting greater participation in capacity building initiatives. Production training services revealed scores of 3.98 for small farmers and 3.41 for marginal farmers, highlighting the gap in practical skill development and application. These differences can be attributed to several factors including landholding size,

educational background, financial capacity, and prior exposure to institutional support. Small farmers typically possess greater resources and social capital that enable them to engage more effectively with FPO services and benefit from collective action. The strong positive correlations between service ratings and FPO participation further confirm that active engagement is a key determinant of service uptake and satisfaction. In the domain of agricultural advisory and technology services, Vanashree FPC demonstrated clear superiority over Akkarani FPC. Extension services performance, with Vanashree scoring 4.0 versus Akkarani's 3.8, reflects better coordination with technical experts and more effective knowledge transfer mechanisms. Access to technology showed an even more pronounced difference, with Vanashree achieving 4.0 compared to Akkarani's 3.7, indicating superior integration with technological innovations and modern farming practices. The analysis of value-added services and market access revealed significant disparities between small and marginal farmers, as well as between the two FPOs. Small farmers consistently rated market access services higher than marginal farmers, with differences ranging from 0.33 to 0.93 across various service categories. This wide variation indicates that marginal farmers face substantial barriers in accessing value-added services and market opportunities.

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