



Farmers' Perception towards Climate and Millet Producer Organizations

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Authors' contributions

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

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ABSTRACT

Aims: Majority of the farmers in India are small and marginal (nearly 88.6%) & facing issues in getting timely inputs (seed, fertilizer, pesticide and farm implements), credit access, market linkages, & existence of intermediaries reduced the producers share in consumer rupee. Farmers as collectives viz., FPOs/Co-operatives/FPC helps small, marginal and tenant farmers in

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enhancing their production, marketing, income, bargaining power, and provides benefits through joint action by eliminating the intermediaries. FPOs boost farmers income by establishing businesses among farming communities, brings industry and agriculture together that develops rural areas.

Study Design: Random sampling.

Place and Duration of Study: Karnataka, January 2023.

Methodology: Four millet FPOs promoted by ICAR-IIMR from Northern Karnataka were taken for the study. Data regarding perception of millet farmers towards FPOs was collected by using well framed interview schedule from 120 farmers which were selected randomly. The data pertaining to study was collected during 2022-23 and basic statistical tools like descriptive statistics, percentage analysis, factor analysis were employed for analyzing the perception levels of farmers.

Results: Majority of the millet farmers in the study area were medium aged with family size of four to six members. The average land holding capacity of farmers was 7.85 acres and are customized with organic farming of cultivation. It was noticed that majority of the millet FPO farmers have medium level of perception towards general (80 %) and service activities (68.3 %) of FPOs and have higher level (73.3 %) of perception towards extension activities of FPOs. Lack of effective market linkages, Timely availability of agri-inputs and lack of coordination among FPO members were major constraints faced by millet FPO members.

Conclusion: Establishment of Millet farm gate processing units at FPOs, CHCs, linking small holders to market through FPOs, value addition of millets, e-marketing, organizing trainings on aspects of second agriculture programs will make FPOs sustain in long run and thereby strengthen millet value chain. Collective efforts of Millet FPOs can contribute in building climate-resilient agricultural systems and support sustainable livelihoods for millet farmers.

Keywords: Small & marginal farmer; market linkages; millet FPOs; secondary agriculture; extension activities.

1. INTRODUCTION

Agriculture is the backbone of the Indian economy with small and marginal farmers making up 60% of rural households to depend on agriculture as the principal means of their livelihood. Small and marginal farmers make up the majority of India's agricultural sector, with approximately 85 percent of operational landholders falling into this category. Among these landholders, about 66 percent are classified as marginal farmers, owning less than one hectare of land [1]. Even though the Indian agriculture has undergone rapid transformation in the past two decades, the small and marginal farmers are still stuck in a time warp. Although small and marginal farmers possess valuable expertise in local agriculture and benefit from affordable access to family labour, they face the drawback of encountering significant transaction costs in almost all non-labour-related transactions [2]. Today scenario, these small and marginal farmers are more vulnerable regarding agricultural problems like lower scale of operational land holding, natural hazards, lack of a market link, lower productivity, crop failures, lack of information, lack of agricultural credits, increasing cost of input and cultivation, poor

communication linkages with the wider markets and consequent exploitation by intermediaries in procuring inputs and marketing fresh produce, access to and cost of credit and aggressive loan recovery practices, etc. and farmers struggling to meet their basic need [3]. Mishra [4] revealed that farmers' monthly per capita income increased after becoming the members of collectives.

Producer Organizations are expected to function as a political entity with the objective of offering business services to smallholder farmers based on the principle of self-sufficiency [5]. Farmer producer organisations have emerged as a means of connecting small farmers with the outside world, facilitating both forward and backward linkages [6]. Farmer Producer Organization (FPO) is recognized as an entity that enables the distribution of profits or benefits among its members [7]. The main aim of FPO is to ensure a better income for the producers through an organization of their own. Small producers do not have the volume individually to get the benefit of economies of scale. FPOs function as catalysts for development, taking on a leading role at the local level and providing advantages that extend to the wider society [8].

The primary objective envisioned for FPOs is to bring together small-scale farmers in order to facilitate access to various resources and services. These include inputs like seeds, fertilizers, credit, insurance, knowledge, and extension services, as well as opportunities for collective marketing, processing, and market-oriented agricultural production [9]. Group stability within the FPOs were fostered by the attitudes towards FPO, cooperation, and significant relationship between the factors and performance of the FPOs [10,11].

Millet Farmer Producer Organizations plays significant role in addressing environmental challenges and climate change. Millet FPOs formed by small and marginal farmers cultivate millets collectively can show positive impact on the environment and contribute to climate change mitigation and adaptation in several ways like biodiversity conservation, reforestation and afforestation, climate-awareness and education, access to climate finance and subsidies, reducing greenhouse gas emissions as millets have a lower carbon footprint compared to resource-intensive and climate-resilient farming practices. By promoting millet cultivation through FPOs they will indirectly contribute to mitigating climate change.

In order to overcome the problems associated with small size of holdings, many farmers come together and form FPOs. Farmer Producer Organizations serve as a significant platform for the improvement of smallholder farming, enhancing agricultural productivity, and augmenting farmers' income [12]. FPOs are considered as effective mechanisms as they give voice to the small farmers, help overcome the challenges, by reducing the transaction costs and improving market access. They possess the ability to bring about significant transformation in our country's economic system by enhancing business expansion and providing capacity-building initiatives for both member and non-member farmers [13]. FPOs provide quality life to farmers through the provision of guaranteed income, employment opportunities, improved production technologies, and post-harvest management activities [14,15]. Farmers' collectives emerged as alternatives for increasing market participation and reducing transaction costs through collective action. Against this background a study was conducted for understanding farmer perception towards FPOs.

2. MATERIALS AND METHODS

The study was conducted with the FPOs promoted by Indian Council of Agricultural Research – Indian Institute of Millet Research in Northern Karnataka and 4 FPOs were selected purposively out of 21 FPOs. A total of 120 farmers from 4 FPOs viz., Dharwad Taluka FPCL, Annigeri Takula FPCL, Kayakrushu Mitra FPCL, Kukanuru Dharani Millets FPCL were selected randomly for the study. The major crops cultivated by the selected FPOs was millets with the help of ICAR-IIMR millet model. The sample includes farmers of these millet FPOs. A well framed interview schedule was used for collecting data regarding perception of millet farmers towards millet FPOs. Five continuum Likert's scale was used for collecting the qualitative data from FPO farmers. The data pertaining to study was collected during 2022-23 and basic statistical tools like descriptive statistics, percentage analysis, garatte ranking were employed for analyzing the perception levels of farmers. Garrett's ranking technique was employed to identify the factors influencing member participation in MACS. Garrett's formula for converting ranks into percent is given by,

$$\text{Percent position} = 100 * (\text{R}_{ij} - 0.5) / \text{N}_j$$

Where,

R_{ij} = Rank given for i^{th} factor (constraint) by j^{th} individual

N_j = Number of factors (constraints) ranked by j^{th} individual

3. RESULTS AND DISCUSSION

3.1 Profile Characters of Millet Farmers

Table 1 states that majority of the FPO farmers belongs to the middle age group (62.5%) of 35 to 50 years followed by young group (20 percent) of 20 to 35 years and old group (17.5 percent) of above 50 years. The education levels of FPO farmers were noted as degree (32.5 percent) followed by Intermediate (20 percent), illiterates (17.5 percent), primary and middle (10 percent) and Secondary School Education (7.5 percent). Farming was the major occupation of selected FPO farmers with organic type of farming (71.66 percent), chemical based (16.66 percent) and natural farming (11.66 percent). Majority of the FPO farmers had medium level of family size with 4 to 5 members.

3.2 Perception of Farmers towards FPOS

3.2.1 General activities

Table 2 depicts the perception of farmers on general management aspects of FPOs. Majority of the farmers perceived and agreed that FPOs helped farmers in connecting with public and private entities to avail benefits in agri and allied activities. The farmers accepted that the FPOs provide collateral free loans (50.8 percent) and mutual help (85.8 percent) for the wellbeing of

farmers. 69.1 percent of the farmers opined that FPOs work towards the needs of farmers for increasing their incomes levels. Nearly 54.1% farmers disagreed that benefits from FPOs are not restricted to one specified location. Most of the farmers opined that FPOs facilitated farmers to participate in decision making & developmental activities (77.5 percent), ensuring sustainable income (79.1 percent) and provided with the trainings on value addition (64.1 percent).

Table 1. Profile characters of FPO Farmers

Category	Number (N = 120)	Percentage (%)
Age		
Young	24	20.00
Middle	75	62.50
Old	21	17.50
Education		
Illiterate	21	17.50
Primary (I – V class)	6	5.00
Middle (VI – IX class)	6	5.00
Secondary School Education (X std.)	9	7.50
Intermediate (XI – XII class)	24	20.00
Degree	39	32.50
PG	15	12.50
Occupation		
Farming	58	48.33
Wage Earners	23	19.16
Self-Employed or own business	18	15.00
Farming and business	21	17.50
Family Size		
Small (less than 4)	15	12.50
Medium (4-5)	75	62.50
Big (6-10)	30	25.00
Farming Type		
Natural	14	11.66
Organic	86	71.66
Chemicals	20	16.66

Table 2. Perception of farmers towards general activities of FPOs

S.No	Statement	Agree	Neutral	Disagree	Total
1	FPO connect the group of farmers with public and private entities to avail benefits in agri and allied activities	91 (75.83)	16 (13.33)	13 (10.83)	120
2	Through FPOs farmers can get collateral free loans	61 (50.83)	30 (25.00)	29 (24.16)	120
3	FPOs focuses on mutual help and well-being of farmers	103 (85.83)	14 (11.66)	3 (2.5)	120
4	FPO works towards the needs of farmers and focus on increasing levels of farmers	83 (69.16)	23 (19.16)	14 (11.66)	120
5	The FPOs operational area is restricted to specified to one location and hence most of the farmers are not benefitted	21 (17.5)	34 (28.33)	65 (54.16)	120
6	FPO facilitates farmers participation in decision making process of developmental activities	93 (77.50)	19 (15.83)	8 (6.66)	120

S.No	Statement	Agree	Neutral	Disagree	Total
7	FPO is ensuring sustainable income	95 (79.16)	21 (17.50)	4 (3.33)	120
8	Trainings organised by IIMR motivated FPOs to focus on value addition	77 (64.16)	35 (29.16)	8 (6.66)	120

3.2.2 Services provided by FPOs

Perception of farmers towards FPO services were outlined in Table 3. About 80.83 percent of the farmers agreed that trainings through FPOs helped them to acquire new skills. Majority (84.16 percent) of the farmers agreed that FPO participation have ensured market security and better price for the produce. Around half (50 to 55 percent) of the sample farmers perceived neutral towards FPOs eased the farmers work and credit linkage through FPO helped farmers to overcome financial crisis. Majority of the farmers agreed that price of the agri-inputs provided by FPO are cheaper compared to outside market, technical guidance of FPO improved crop productivity, CHCs and collection centre helped in avoiding distress sale and the study of Virendra et al [16] showed similar results.

3.2.3 Extension activities provided by FPO

The farmers response towards extension service of FPOs was shown in Table 4. Majority of the farmers responded positively towards extension services provided by FPOs i.e., hands on training helped farmers to adopt new millet techniques and cultivation practices (72.5 percent), field demonstrations have given insights on millet value added technologies (75.83 percent), trainings improved the skills of farmers (90.00 percent), regular visit of extension personnel to FPOs helped in getting timely solutions for the issues in farming (82.5 percent), advisory and technology services provided by IIMR to FPOs helped in understanding new techniques (91.66 percent) and establishment of farm gate

processing units at FPC boosted farmers interest in processing of millets (95.83 percent). It was noted that the advisories, trainings, technology dissemination by the extension person employed by ICAR-IIMR at FPO helped farmers to process their millet grains at farm gate with the help of FPO.

3.2.4 Perception of farmers on FPO

From the Table 5 it could be inferred that, majority of the millet FPO famers have medium level of perception towards general (80 %) and service activities (68.3 %) of FPOs and have higher level (73.3 %) of perception towards extension activities of FPOs. The medium level of perception towards general and FPO services should be increased to higher levels by focusing on individual aspects separately.

3.3 Constraints Faced by FPO Members

Lack of effective market linkages, unavailability of agri-inputs at right time to farmers, lack of bargaining power due to existence of intermediaries, high deposit amount to input dealers for getting inputs were major constraints faced by millet FPO farmers as shown in Table 6. The other constraints include insufficient fund to build infrastructure for processing and value addition of millets, absence of direct markets for millet FPOs, inefficiency of FPO members in taking decisions, inability in paying high shareholder amount for becoming FPO member and lack of proper coordination among FPO members and these results are in line with the outcomes of Kumar et al. [17]. To overcome

Table 3. Perception of farmers towards FPO services

S. No	Statement	Agree	Neutral	Disagree	Total
1	Training programs helped the farmers to learn and equip new skills	97 (80.83)	18 (15.00)	5 (4.16)	120
2	Market linkages provide and advised by FPO has helped the farmers in market assurance and with better price	101 (84.16)	12 (10.00)	7 (5.83)	120
3	The technologies provided by FPO eased farmers work	41 (34.16)	60 (50.00)	19 (15.83)	120
4	Fund mobilization and credit linkage through FPO helped farmers to overcome financial crisis	33 (27.50)	65 (54.16)	22 (18.23)	120

S. No	Statement	Agree	Neutral	Disagree	Total
5	Inputs (supplied by the FPO are as lower price than the price at outside in the market	86 (71.66)	24 (20.00)	10 (8.33)	120
6	Crop productivity increased due to the technical guidance of FPO	91 (75.83)	18 (15.00)	11 (9.16)	120
7	Custom hiring centre, processing units, market linkages and storage facilities are innovative ideas of FPO	68 (56.66)	37 (30.83)	15 (12.50)	120
8	Collection clusters have helped farmers in avoiding distress sale of their produce	92 (76.66)	26 (21.66)	2 (1.66)	120

Table 4. Perception of farmers towards extension services of FPOs

S. No	Statement	Agree	Neutral	Disagree	Total
1	Hands on training helped the farmers (FPOs) to adopt new techniques in millet cultivation	87 (72.50)	14 (11.66)	19 (15.83)	120
2	Field demonstrations have given insights on millet value added technologies	91 (75.83)	17 (14.16)	12 (10.00)	120
3	Training programs have improved the skills of farmers and resulted in enhancing the efficiency of carrying out of activities	108 (90.00)	8 (6.66)	4 (3.33)	120
4	Regular visits of extension personnel to FPOs helped in getting the timely solutions for the issues in farming	99 (82.50)	12 (10.00)	9 (7.50)	120
5	Advisory and technology services provided by FPOs helped in understanding the new techniques of millet cultivation	110 (91.66)	7 (5.83)	3 (2.50)	120
6	Establishment of farm gate processing units at FPC boosted farmers interest in processing of millets	115 (95.83)	3 (2.50)	2 (1.66)	120

Table 5. Perception of farmers towards FPO

Category	Perception of farmer on FPO		
	General	Service	Extension
Low	12 (10.00)	19 (15.83)	24 (20.00)
Medium	96 (80.00)	82 (68.33)	8 (6.66)
High	12 (10.00)	19 (15.83)	88 (73.33)
Total	120	120	120

Table 6. Constraints faced by FPO members

SI No.	Constraints	Frequency	Percentage	Rank
1	Inefficient market linkages	107	89.16	I
2	Unavailability of need-based inputs at the correct time	101	84.16	II
3	Lack of collective bargaining power due to existence of middlemen	97	80.83	III
4	High deposit amount to input dealers for getting agri-inputs	93	77.50	IV
5	No adequate capital with FPO to build infrastructure for processing and value addition	89	74.16	V
6	The own markets are not set up by FPO	85	70.83	VI
7	Difference among the members of the FPO while taking the decisions	83	69.16	VII
8	Unable to pay high shareholding amount for becoming the FPO member	81	67.50	VIII
9	The inefficient management of the FPO	79	65.83	IX
10	Lack of proper coordination among the members of FPO	77	64.166	X
	Total	120		

these constraints, it could be suggested that, for successful transformation and enhancement of millets, it is crucial for the FPOs to be supportive and this can be achieved by establishing custom

hiring centres in accessible regions by facilitating convenient access to the FPO members. Effective coordination between FPO and its farmers for successful running of FPOs. Need

based inputs should be provided to farmers at right time for enabling them to optimize their agricultural practices. Organising need-based training programs for members of FPO will enable them with right decisions.

4. CONCLUSION

Small and marginal farmers are more vulnerable to agricultural problems like lower scale of operational land holding, natural hazards, lack of a market link, lower productivity, crop failures, lack of information, lack of agricultural credits, increasing cost of input and cultivation, poor communication linkages with the wider markets and consequent exploitation by intermediaries. FPOs are considered as effective mechanisms as they give voice to the small farmers, help overcome the challenges, by reducing the transaction costs and improving market access. Creating ICTs linkage of millets and establishing digital market linkages in e-commerce platforms helps millet FPOs to expand their market for millets and millet value added products. Millet FPOs have the potential to positively influence environmental conservation and climate change adaptation by promoting sustainable farming practices, preserving biodiversity, reducing emissions, and enhancing carbon sequestration. These collective efforts can contribute to building climate-resilient agricultural systems and support sustainable livelihoods for millet farmers. FPOs should develop connections and federate with nearby FPOs for collaborative growth. Adoption of advanced technologies increases the production and productivity of millet cultivation.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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