

“A Multidimensional Analysis of Farmer Producer Organisation Sustainability”

¹Ms.P. Gajalakshmi, ²Dr. A. Mayilmurugan

¹Research Scholar in Commerce, Madurai Kamaraj University,
Madurai, Tamil Nadu

²Associate Professor, Department of Commerce, The Madura College, Madurai, Tamil Nadu

Abstract: Farmer Producer Organisation (FPO's) stresses the need for proper governance structures, participation of members, community and efficient mobilization of financial, technical and marketing resources for its sustainability. The attitude of the stake holders and principal theories shows the significance of economic viability, social cohesion, environmental responsibility and transparent governance together plays a crucial role in determine the success of the FPO's in the long run. This study aims to determine the various economic, social, environmental and governance (ESG) aspects which affect the sustainability of Farmer Producer Organizations (FPO) in Madurai. Members of Farmer producer organisation across Madurai District are the primary respondents. The main objective is to identify the various factors that contributes to the sustainability of FPOs and the factors of hindrance. Primarily, the data has been collected from the participants using structured questionnaire. Quantitative methods have been employed to study and analyse the data. The result indicates that governance and marketing are the two most important factors that affect the long-term sustainability of FPOs. This study provides an action plan for FPOs through implementation of changes by the policy makers and other stakeholders.

Keywords: FPO Sustainability, ESG Factors, Governance, Rural Development and Farmer Producer Organizations.

1. Introduction

Farmer producer organisations were established by farmers with the mission of improving their economic well-being and social well-being. They help the farmers work together, improve their income and reduce challenges in agriculture. By banding together, farmers can purchase inputs at reduced prices obtain better prices for their produce and gain more market power. To assist the small and marginal farmers, the government and other institutions have motivated FPOs in recent years. Organisations such as Small Farmers Agri Business Consortium (SFAC) and the National Bank for Agriculture and Rural Development (NABARD) facilitate financial assistance and capacity building support to the Farmer producer organisations.

However, many FPOs find difficult to survive in the long run. Some of the FPOs failed because of inadequate planning, poor management or inadequate support. Long term success of FPO's depends on the factors other than profits. Sustainability does not just entail the economic development, but it also involves the determinants of social, environmental and governance. Several research studies mostly focus on economic variables sometimes neglecting other important aspects. The main aim of the study is to focus the economic, social, environmental and governance factors that influence the farmer producer organisations sustainability and to analyse the relationship between select demographic profile and factors influencing the sustainability of FPOs.

2. Scope Of The study

The main aim of the study focuses on identifying and analysing the economic, social, environmental and governance factors influence the sustainability of farmer producer organisations. It also examines how selected demographic characteristics relate to these influencing factors.

The area of the study covers Madurai district. The researched has used both quantitative and qualitative data collected from members of FPOs. Based on the findings the study aims to provide suggestions to enhance the sustainability of farmer producers' organisations in long run.

3. Statement Of The Problem

Farmer producer organisations play a important role enhancing the collective bargaining power and accessing resources. FPOs aims to address the challenges faced by small and marginal farmers by pooling their resources, improving their access to markets, technology and financial services. However, the sustainability of FPOs is influenced by a range of economic, social, environmental and governance factors. Moreover, the demographic profile of farmers may influence how the factor affects the performance of FPOs.

However the aim of the farmer producer organisations to improve the sources of smallholder farmers, the majority of the organisations find difficulty to sustain their operations in long run. There is limited research examines the influences and interrelationship. Hence the researcher made an attempt to examine the factors influence the resilience and long-term sustainability of FPOs and to analyse the relationship between select demographic profile and factors influencing the FPOs.

4. Obhective Of The Study

The objectives of this study are

1. To analyse the economic, social, environmental and governance factors influencing the Farmer producer organisations.
2. To analyse the relationship between select demographic profile and factors influencing Farmer producer organisations.
3. To provide recommendations for strengthening the sustainability of FPOs

5. Literature Review

1. N Sivavishnu, M Malarkodi, K Uma, R Vasanthi and SR Padma (2023) found the factors influencing the performance of the farmer-producer organizations deals with non- perishable products in Medhak district of Karnataka. A majority of the FPO's had a turnover of less than Rs 50 lakhs and were in existence for a minimum period of 4 years. About 80% of the members were undergraduates and there were around 900 -1100 members in majority of the FPO's. Exploratory analysis was used and the factors influencing the performance of FPO was categorized into highly influencing, moderately influencing, and low influencing factors. It was identified based on the group participation, group leader, education and group leadership were the factors which mostly influenced the performance of the FPOs. For this purpose, the factors were grouped as functional, marketing and financing factors.
2. Jayashree et al. (2023) focused on the major constraints in the functioning of FPO in Tamil Nadu. Several difficulties were identified, lack of initiatives among the members, absence of various facilities, absence of insurance facilities, high transportation expenses and poor economic status to run the organisations.
3. Monmath Gopal, Supriya, RR Kushwaha, Km. Deepshikha, Avinash Pratap and Deep Narayan Yadav (2024) explored the factors influencing in farmer producer organizations and problems which were faced by farmers. Principal component analysis was applied and it was found that the majo challenges faced were delayed payments, intermediaries exploiting the farmers, and lack of easy access to credit facilities. Other challenges identified were low quality inputs, lack of transportation, infrastructure, communication gaps, lack of awareness about grading and packaging, and market information. Garrett's ranking technique was used to find the distinct constraints faced by FPO's. They were identified as lack of infrastructure, credit facilities, instable level of prices and also issues related to untimely, costly, and quality inputs, lack of communication, lack of awareness about grading and packaging, and extreme exploitation by intermediaries.



4. Ranjit Kumar Paul, D.U.M. Rao, R.N. Padari, Monika Wason, Sudipta Paul and Sudip Kumar Gorai (2022) measured the stability of FPOs in West Bengal among four districts. A Stability index was developed taking mutual trust, role clarity of the members, level of involvement of members in group works, satisfaction of the members, sense of attachment and conviction and sense of ownership as the indicators. It was revealed that all the farmers were stable in their level of involvement of members in group works and on possessing a sense of ownership of their FPOs. The members of active farmer producer organisations displayed a great degree of trust, responsibility, attachment and satisfaction with the effective functioning of their FPOs. The members of inactive farmer producer organisations suffered from lack of trust, responsibility, attachment and dissatisfaction in the effective functioning of their FPOs. This had affected their group stability.

5. Santosh, Amrutha T Joshi, BS Reddy, Satishkumar (2024) applied the compound growth rate model to measure the growth performance in terms of the number of FPOs. The study revealed the significance of tangible resources like land size, experience, and income in influencing engagement, while factors like age and education had limited impacts. The study suggested that FPOs should target small and marginal farmers with proper support to ensure more inclusive growth. The study concluded that farmers with larger landholdings, more experience, and higher income levels are more likely to join or actively participate in FPOs.

6. Research Design And Methods:

Research design is a detailed frame work used to conduct the research study. It outlines the procedure for collecting, measuring and analysing the data in a systematic manner. The research design is based on the following criteria like objectives of the study; sources of resources and nature of the phenomenon being considered. In this study, the researchers used a descriptive design. The area random sampling method is used to select the respondents.

6.1 Sample Size

Sampling is a methodology or process of selecting samples and the sample is a percentage of the population. In this study the researcher used the area random sample methodology, which is the suitable method for research. In this study the researcher was taken 100 responses as sample size were collected from various FPOs.

6.2 Method adopted for communication

The questionnaire is the communication medium used with the respondents.

6.3 Sources and data collection:

The researcher used Primary data and secondary sources of data used the study. Structured questionnaire was administered to active members of registered FPOs to gather quantitative information. The researcher is prepared questionnaire to collect the data across the ESG dimensions. The secondary data were obtained from Government reports, websites and from various journals and magazines. The data were processed by statistical methods such as tables, graphs correlation matrices and factor analysis.

6.4 Study Area

The study was conducted among Members and Chief Executive Officers of farmer producer organisations located in Madurai district.

7. Analysis And Discussion

7.1general Profile Of Fpo Membrs

Table 1 : GENERAL PROFILE OF FPO MEMBRs

Factors	Classification	No. of respondent	Percent age
Gender	Male	67	67%
	Female	33	33%
Age	Less than 35	23	23%
	36-50	42	42%
	51-65	12	12%
	Above 65	23	23%
Educational Qualification	Illiterate	13	6%
	Primary education	28	33%
	Higher secondary	24	29%
	Graduate	23	18%
	Post Graduate	12	14%
Occupation	Farming	28	28%
	Agricultural labour	11	11%
	Business	27	27%
	Government employee	21	21%
	Others	13	13%
Annual household Income	< 50000	9	9%
	50001-100000	23	23%
	100001-300000	31	31%
	Above 300000	37	37%
No. of Family Members	Less than 3	38	38%
	4 to 6	39	39%
	More than 6	23	23%
Position in FPO	Member	37	37%
	Executive/Board member	33	33%
	Staff/Employee	30	30%

Years of Membership	Less than 2 years	17	17%
	2 to 4 years	34	34%
	4 to 6 years	28	28%
	More than 6 years	21	21%

Source: primary data

7.2. Factor Analysis:

In order to determine the preference assigned to each statement, based on the current research for identifying the preference allotted to each statement the researcher used 5-point Likert scale to assess the 24 selected statements. SPSS Software was used by the researcher to analyse the significant factors.

To figure out how much members liked something, the researcher used 24 picked statements. They asked people to rate these on a scale from 1 to 5. That they looked at all the answers together to spot patterns. The researcher used five different ways to look at the data collected.

7.2.1 Correlation matrix: The researcher used in their study. The matrix shows a strong positive link between statement six, fourteen, fifteen and twenty-three. The researcher builds the matrix from first hand data. It was created using primary data. These statements are well suited for factor analysis.

Kaiser-Meyer-Olkin measure of sampling adequacy [MSA] :

The main goal of multiple sequence Alignment is to examine the diagonal elements of the partial correlation matrix. The results show that all these diagonal components in the partial correlation matrix were high enough to proceed with factor analysis.

Table 2: KMO and Bartlett's Test

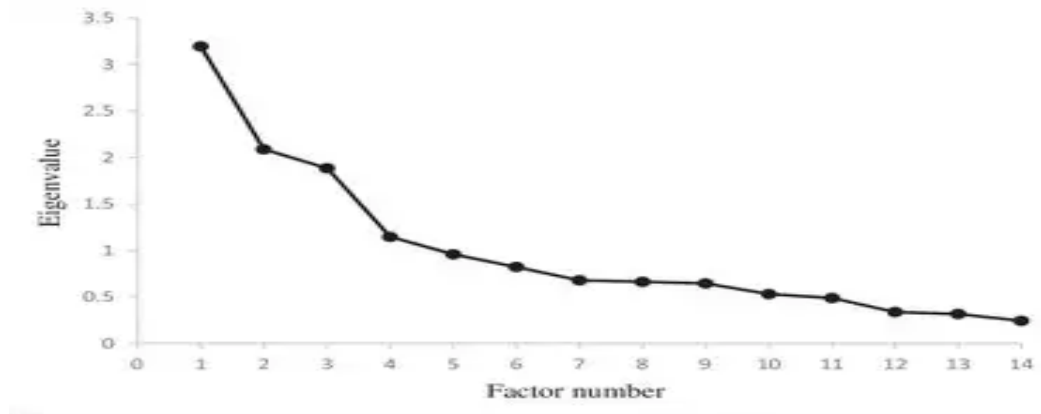
Measure of Sampling Adequacy.		0.78
Bartlett's Test of Sphericity	Chi-Square	1189.87
	Df	178
	Sig.	0.000

Source: Primary Data

This shows that statement is good enough for sampling adequacy.

5.2.3 Bartlett's Test of Sphericity [BTS]: According to the Bartlett's Test of Sphericity, in the table no.2 was also conducted by the researcher to check the overall significance of the correlation matrices. The value of the Kaiser-Meyer-Olkin measure of sampling adequacy is 0.780. The test value of Bartlett's Test of Sphericity was significant and it is representing that the correlation matrix is not an identity matrix.

Figure 1: Scree Plot



Source: Primary Data

A scree plot is a plot of the Eigenvalues against the number of factors in order of extraction of 4 factors came out from the 24 variables of Scree plot, whose Eigen value is greater than 1 but for this study, the researcher got only 4 factors. Number of factors determined with the help of shape of the plot. The plot has a distinct break between the steep slope of factors, with large Eigenvalues and a gradual trailing off linked with the remaining factors.

7.2.4 Principal component analysis: un-rotated factor matrix

This paper aims to explore the significance of the un-rotated factor matrix in principal component analysis, its computational derivation, and its role in identifying underlying data structure. There are four factors extracted from the twenty-four statements related to economic, social, environmental and governance.

Table:3. Table of Extraction Sums of Squared Loadings		
Factor	% of Variance	Cumulative %
Factor 1	24.117	24.117
Factor 2	19.432	43.549
Factor 3	17.232	60.781
Factor 4	15.682	76.463

Source: Primary data

It shows that four factors extracted from 24 statements have cumulative percentages up to 76.463% of the total variance. The researchers were able to decrease the number of variables from 24 statements; the statements were decreased into 4 main factors.

7.2.5 Principal component analysis: varimax rotation matrix

The study was done using Principal component analysis with varimax rotation matrix. The matrix clearly shows that the factor loading is differs from un-rotated matrix, but the commonalities remain the same. In this case, factor 1, the statement numbers 6,7,9,12 ,15 and 21 have strong positive relationship. For factor 2, the statements 4,11,14,17,19 and 20 exhibit the strong positive relationship. For factor 3 the statement numbers 2,3,10,16,22 and

24 have strong positive relationship. Statements numbers 1,5,8,13,18 and 23 and 8 exhibit the strong positive relationship with factor 4.

Table 4 Extracted Factors

S.NO	Factors	Economics	Social	Environmental	Governance
1	Legal compliance is maintained.	0.213	0.182	0.376	0.732
2	Organic farming is encouraged.	0.249	0.123	0.756	0.262
3	Eco-friendly inputs are supported	0.192	0.243	0.612	0.321
4	FPO builds farmer cooperation.	0.224	0.728	0.457	0.231
5	Decision-making is participatory.	0.398	0.487	0.312	0.699
6	Financial records are transparent.	0.627	0.340	0.234	0.312
7	Collective input purchase reduces costs.	0.728	0.211	0.185	0.328
8	Meetings and reports are regular.	0.376	0.162	0.261	0.697
9	FPO helps in better price realization.	0.775	0.234	0.276	0.398
10	Resource conservation is practiced.	0.213	0.182	0.682	0.376
11	Women and marginalized groups are included.	0.217	0.582	0.197	0.387
12	FPO generates surplus for reinvestment.	0.691	0.452	0.354	0.213
13	Member feedback is valued.	0.189	0.365	0.408	0.812
14	Trust exists among FPO members.	0.294	0.706	0.301	0.301
15	FPO improves access to credit.	0.783	0.125	0.308	0.365
16	Environmental awareness is created.	0.160	0.401	0.654	0.255
17	Training programs are regularly offered.	0.234	0.567	0.312	0.237
18	Roles and responsibilities are clear.	0.382	0.217	0.197	0.787
19	It enhances leadership skills.	0.376	0.762	0.261	0.297
20	It Address social conflict among members	0.432	0.612	0.369	0.211
21	Establishment savings or credit systems	0.601	0.297	0.278	0.218
22	FPO promotes sustainable practices.	0.281	0.189	0.631	0.212
23	Long-term sustainability in all operations	0.213	0.416	0.376	0.682
24	Practice to improve soil health and fertility	0.213	0.278	0.821	0.354

7.2.6 Naming Of Factors

The researcher tried to make sense of the factor loading. Variables with meaning to the factor loadings. Variable with higher loadings were seen as more crucial and had a bigger impact on naming or picking a factor. The researcher looked at all the highlighted variables for a specific factor focusing more on those with higher loadings. This helped them come up with the name or label for a factor that matched the variables loadings on the factor.

Factor 1 Governance This factor is significance which defined 24.11% of the difference. The factor explained as Maintenance of legal compliance (0.732) participation of decision making (0.699) regular meeting and reports (0.697) feedback of the member (0.812) Clear role and responsibility (0.787) sustainability of all operations (0.682) and these statements so the impact of sustainability of FPOs.

Factor 2 Social: This factor clarified 19.432% of the variations. FPO builds farmer cooperation (0.728) women and marginalized groups are included (0.582) Trust existing among FPO member (0.706) training programs are

regularly offered (0.567) enhance leadership skills (0.762) Address social conflict among members (.612). These statements replicate the social factors influence the sustainability of FPOs.

Factor 3 Economic: This factor explained 17.232% of the variations. Transparency of financial records (0.627), collective purchase reduces the cost (0.728), helps in better price realization (0.775), Generate surplus of reinvestment (0.691) improve access to credit (0.783) establish savings and credit system (0.601) and these statements show the economic factor that influence the sustainability of FPO.

Factor 4 Environmental: This factor explained 15.682% of the variations. Requirement of organic farming (0.756), supporting of eco-friendly inputs (0.612), resource conservation is practiced (0.682), environment awareness is created (0.654), promotion of sustainable practices (0.631) improve soil health and fertility. These statements clarified the environmental factor that influence the sustainability of FPOs.

Table 5 - ANOVA test

Null Hypothesis – Ho – There is no significant relationship between educational qualification of FPO members and extracted factors towards sustainability of FPO

Factors	Educational Qualification
Economic	0.02*
Social	0.69
Environmental	0.08
Governance	0.04*

* Significance at a 95% confidence level.

Based on the analysis, it is noted that

➤ In the table 5, we see that the economic factor (0.02) and governance factor (0.04) have p-values below 0.05. This means we reject the null hypothesis (Ho) and accept the alternative hypothesis for these factors. On the other hand, the social factor (0.69) and environmental factor (0.08) have p-values above 0.05. For these we accept the null hypothesis (Ho) and reject the alternative hypothesis. These results show a clear link between educational qualification and both economic & governance factor.

Table 6 - ANOVA test

Null Hypothesis – Ho – There is no significant relationship between Position in FPO members and extracted factors towards sustainability of FPO

Factors	Position in FPO
Economic	0.03*
Social	0.73
Environmental	0.56
Governance	0.03*

Based on the analysis, it is noted that

- In the table 6, we see that the economic factor (0.0) and governance factor (0.04) have p-values below 0.05. This means we reject the null hypothesis (Ho) and accept the alternative hypothesis for these factors. On the other hand, the social factor (0.73) and environmental factor (0.56) have p- values above 0.05. For these we accept the null hypothesis (Ho) and reject the alternative hypothesis. These results show a clear link between members position and both economic & governance factor.

Table 7 - ANOVA test

Null Hypothesis – Ho – There is no significant relationship between Position in FPO members and extracted factors towards sustainability of FPO

Factors	Membership in FPO
Economic	0.09
Social	0.02*
Environmental	0.78
Governance	0.04*

Based on the analysis, it is noted that

- In the table 7, we see that the social factor (0.02) and governance factor (0.04) have p-values below 0.05. This means we reject the null hypothesis (Ho) and accept the alternative hypothesis for these factors. On the other hand, the social factor (0.09) and environmental factor (0.78) have p- values above 0.05. For these we accept the null hypothesis (Ho) and reject the alternative hypothesis. These results show a clear link between FPO membership and both economic & governance factor.

8. Findings Of The Study

Economic, social, Environmental and governance factors extracted from the factor analysis which are influencing the sustainability of farmer producer organisations.

➤ **Economic Factors:**

- Support and Access from the financial institutions are crucial economic factors that enables the FPOs performance.

- Because of limited members, many FPOs facing difficulties in achieving economies of scale
- Lack of planning and market linkage affect the profitability and sustainability of FPOs.

➤ **Environmental factors**

- Variability of climate and unpredictable weather affect the production and FPOs performance.

➤ **Social Factors**

- Because of lack of awareness and trust among members, reduce the member participation particularly women and smallholders

➤ **Governance Factors**

- The major thing to be considered here are the Lack of transparency and responsibility were critical to FPOs success.

9. Suggestions Of The Study

- Facilitate easy access to finance and generate partnership with private sector for the purpose of ensuring fair prices.
- develop e platform to direct market linkage and getting real time pricing.

- Provide regular training and awareness program to educate the benefits of farmer producer organisations.
- Motivate the small farmer holders and women participation to outreach the target.
- Promote sustainable practices help the farmer producer organisations to adopt environment friendly farming techniques.
- Improve governance and leadership programs, help the FPO member to govern, manage the finance and legal compliance.

10. Conclusion

The present study aims to analyse the factor influencing the sustainability of FPO in Madurai district of Tamil Nadu. Based on the factor analysis, it is identified by the researcher that, the sustainability of FPO will be having greater impact on the minds of the farmer producer organisation members and effect the results in Governance factor followed by the social factor, economic factor and environmental factor. Sustainability of FPO depends on the active interaction of ESEG factors. Economic factors offer the resource for operation, while social factor ensures the members commitment. Environmental factor safeguards the resources and good governance factors ensures accountability and transparency. The study highlights the multifaceted of FPO sustainability in long run. Effective policies and programs must:

- Facilitates easy access to finance and markets.
- Promote inclusive participation
- Encourage the sustainable agricultural practices
- Strengthen the governance structure with the help of training and transparency
- Support continuous capacity building and knowledge sharing

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