CHAPTER 19

ESG Metrics and Disclosure Practices in Farmer Producer Organizations: Adoption, Performance Linkages, and Reporting Challenges in Agri-Based Enterprises

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ABSTRACT

The growing significance of Environmental, Social, and Governance (ESG) responsibility has extended beyond major corporations to incorporate Agri-based cooperative businesses like Farmer Producer Organizations (FPOs). There is however, slight data on how FPOs implement ESG standards and share data pertaining to sustainability. The implementation of ESG, disclosure producers, and their correlation with organizational performance in FPOs are all examined in this research. The study employs a mixed- methods strategy based on stakeholder and legitimacy concepts, combining survey data, content analysis of disclosures, and interviews with FPO leaders. The investigation evaluates the prevalence of environmental, social and governance measurement techniques and analyzes the adequacy to disclosure. Additionally, it looks at how ESG disclosure affects access to finance, market prospects, stakeholder confidence, and long-term viability. The Primary findings indicate that formal governance indicators and organized ESG disclosures are still lacking, despite the fact that environmental and social practices are frequently integrated into FPO activities. Differences in reporting methods are affected by market networks, managerial skills, and institutional support.

Keywords: Farmer producer organizations; Sustainability; ESG metrics; Performance; Rural development.

1.0 Introduction

The agricultural segment is critical for food safety rural service and reasonable financial development particularly in emerging countries like India. The impressions of weather variation resource reduction instability in smallholder revenue and governance inadequacies through value chains are particular of the important sustainability tasks that agri-business faces.

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Accordingly cooperative official organizations such as Farmer Producer Organizations (FPOs) have developed as critical implements for cumulative agriculturalist's market contribution improving revenue strength and encouraging environmentally approachable agribusiness practices. FPOs which are member-owned businesses are exclusively located to incorporate ESG ideologies into their processes as they combination the public purposes of organizations through the profitable effort of manufacturer enterprises. In effect ESG performs can increase risk administration, investor faith and functioning efficiency altogether of which have a optimistic result on organizational results from a presentation viewpoint allowing to new investigation. Definitely governance actions are energetic to cooperative organizations as they confirm member contribution responsibility and compliance by rules. The application of ESG ideologies, the economic and effective results of farmer centric productions though stand still not healthy sustained by experiential facts. Huge agroindustry groups or registered businesses are the attention of furthermost present ESG studies exit a important investigation breach in the situation of small and medium Agri centered productions with FPOs.

Additionally FPOs have exceptional tasks when the situation derives towards ESG revelation. The nonappearance of ESG structures definitely planned for the farming segment uniform pointers appropriate for smallholder centered initiatives and unawareness of ESG reporting necessities altogether delay methodical revelation. Organizations that support FPOs such as NABARD residence a great precedence on economic sustainability and supremacy nevertheless they don't offer greatly supervision on authorized ESG observing and broadcasting. Such as a outcome the mainstream of FPOs, ESG disclosures are elective inconsistent and insufficient for outward estimation.

1.1 Problem statement

Environmental Social and Governance (ESG) structures remain existence used extra and supplementary towards estimate sustainability and organizational accomplishment. Though they remain still accepted and released in minor quantities via Farmer Producer Organizations (FPOs) which are important objects in the farming segment. Maximum FPOs absence official expose processes uniform writing structures or well-known ESG indicators even with their characteristic participation in public centered and public presence creativities.

Insufficient ESG valuation reduces transparency challenges, investor faith and limits contact towards funding connected to sustainability. Additionally, there is a lack of experiential indication nearly the association among ESG performs and structural achievement in FPOs. Though NABARD and additional official funding groups highlight economic sustainability and supremacy they don't deliver considerable supervision on combined ESG broadcasting schemes.

The degree of ESG acceptance its effect on presentation and the tasks related with ESG discovery must everything be observed in direction to improve the sustainability and long-standing feasibility of Farmer Producer Organizations.

1.2 Concept of ESG in agriculture

The Environmental Social and Governance (ESG) structure can be used to evaluation, group's sustainability moral behavior and supremacy values in adding to outdated economic metrics. ESG adopts specific significance in the agronomic segment due to the straight requirement of farming on natural assets rural groups and official supremacy methods.

1.3 Environmental dimension in agriculture

The main attention of the ecological ESG factor of agronomy is the answerable use and preservation of regular assets. Agronomic dealings have a adjacent connection with soil fitness, water usage, biodiversity conservation, carbon releases and environment flexibility. Maintainable agricultural practices such as combined hassle running biological farming effective irrigation structures, the usage of renewable energy and excess reprocessing are mainly answerable for ecological presentation.

Environmental ESG metrics might contain of:

- Well-organized usage of water and organization of irrigation
- Richness of soil and mechanism of nutrients
- Reduction in biochemical efforts
- Applying weather smooth agribusiness approaches
- Usage of renewable energy
- Administration of unused and excesses

1.4 Social dimension in agriculture

The public measurement concentrations on how agriculturalist's workers and rustic groups are obstructed through agronomic dealings. In emerging countries social presence stays vital towards sustainability since smallholders control the popular of the farming segment.

Typical social ESG pointers in farming contain the following:

- Development of agriculturalist revenue
- Youth participation and gender presence
- Worker security and reasonable employment practices
- Platforms for training and ability constructing
- Creativities aimed at public improvement
- Marketplace and economic facility convenience

1.5 Governance dimension in agriculture

Governance is the set of observes strategies and inaccuracy apparatuses that guarantee transparency answerability and moral management. Governance is critical to constructing faith and confirming justifiable advantage involvement in farming enterprises mostly participant based clusters like Farmer Producer Organizations.

In farming, governance connected ESG pointers might be:

- Clear business recording
- Self-governing actions for defining conclusions
- Board freedom and responsibility
- execution to lawful necessities
- Instruments for hazard administration
- Structures for inside inspecting and observing

1.6 Importance of ESG in agricultural enterprises

ESG values require the following welfares once practical to farming.

- Sustainability of the atmosphere over period.
- Greater agriculturalist incomes.
- Improved the organizations integrity.
- Subsidy for sustainability is effortlessly available.
- Reduced working and governing hazards.
- A growth in race in the marketplace.

1.7 Overview of farmer producer organizations (FPOS)

Farmer Producer Organizations (FPOs) to collective enhance significance and marketplace their goods jointly in directive to increase additional financial control. FPOs are participant possessed corporations that combination cooperative ethics through the functioning elasticity of organizations. Permitting to the Businesses Act the massive bulk of FPOs in India are integrated as Manufacturer Corporations permitting them to function as renowned profit-making bodies whereas maintaining agriculturalist ownership and independent authority. The Central Division Scheme for Formation and Promotion of 10000 FPOs was launched by the Indian government to encourage cooperative agribusiness and increase farming production.

1.8 Objectives of FPOs

The following are the primary aims of FPOs.

- Merging manufacture to attain a well amount.
- Getting resources in huge amounts at a bargain rate.

- Economic facilities and credit accessibility.
- Supply chain addition and marketplace connectivity.
- Ability constructing and ability improvement for memberships.

1.9 Challenges faced by FPOs

Even with strategy provision FPOs face an amount of functioning limitations including the following.

- Limited capability for skilled administration.
- Not having sufficient operational funds.
- Bad marketplace networks.
- Poor record keeping and documents classifications.
- Governance inadequacies at the beginning.

2.0 Literature Review

The theoretical expansion of Environmental Social and Governance (ESG) structures is established on numerous basic concepts that clarify why businesses assume sustainability focused on performs and in what way these performs influence investor interactions performance and validity.

2.1 ESG and corporate financial performance

The association amongst corporate financial performance (CFP) and environmental social and governance (ESG) creativities is of countless attention to researchers and experts.

The business and manufacturing segments are the motivation of considerably of the ESG-CFP literature nevertheless current studies in the arena of agroindustry deal understanding information. Agronomic businesses with greater ecological presentation had greater market estimations signifying to stakeholders that environmental sustainability is a symbol of flexibility (Hao Wang & Yang 2019).

Similar to this Ghosh (2021) exposed that agronomic organizations that accepted publically accountable performs established better-quality economic results and participant happiness even in the lack of systematic ESG dimension.

2.2 ESG in agricultural and agri-business enterprises

Singh and Sharma (2018) claim that maintainable agribusiness performs similar to harvest variety, combined nutrient administration and water-saving equipment are necessary to decreasing the ecological influence of Indian farming. Because these methods strictly support with ecological ESG actions they display the importance of organized sustainability assessment in the Indian environment. The implementation of weather smart farming performs by Indian agriculturalists was furthermore observed by Kumar and Singh (2020) who initiate that ecological administration performs meaningfully prejudiced farm yield and source effectiveness. Even though the ESG tag was not used straight the study's conclusions validate the fundamental ecological factor of sustainability that is significant to ESG structures.

2.3 ESG in agricultural and agri-business enterprises

A study on the public performs of farming organizations in Rajasthan found that organizations through participant capability constructing reasonable valuing and public well-being packages taken greater participant fulfillment and administrative flexibility (Meena, 2021). While these findings are not clearly categorized as ESG they support with the communal presentation metrics that are share of the ESG structure.

In the framework of Farmer Producer Organizations (FPOs) solid governance elements such as participant demonstration exposed inspections and board responsibility improved access to organized provision and credit services (Bansal and Agarwal 2022). Their conclusions show that the excellence of governance has an impression on equally operating presentation and investor faith.

Although ecological recording particularly with respect to pollution control and reserve productivity was honestly reliable social and governance revelations remained frequently distributed and non-standardized agreeing to Reddy and Reddy's (2020) investigation of sustainability recording performs through main Indian agroindustry businesses. They planned personalized ESG outlines for the farming manufacturing to increase comparability and clearness.

2.4 ESG and corporate financial performance

Present business sustainability structures according to Sahu and Banerjee (2021) do not satisfactorily takings into interpretation ESG pointers detailed to farming such as maintainable property consumption supply chain traceability and agriculturalist security principles. Their study recommended general sustainability recording strategies that reflect the exceptional features of Indian farming structures.

In their search obsessed by the transparency of governance in dairy organizations Jain and Gupta (2021) found a connection amongst self-governing management transparent economic writing and improved additional cohort as well as institutional reliability.

2.5 Governance and sustainability in farmer producer organizations

Exposed governance abridged information irregularity a serious governance faintness in numerous rural groups and augmented access to working capital which improved economic sustainability (Singh & Dubey 2021). Singh et al. (2023) found that in manufacture governance documents more accessible and verifiable digital governance improves communal and economic sustainability. By increasing the views on policymaking gender demonstration recovers supremacy morals and encourages social sustainability claim Yadav & Kothari (2022).

2.6 Empirical studies on ESG–performance linkages

According to Lee and Yeos (2020) investigation of registered corporations in the Asia-Pacific area greater ESG scores are related through better-quality return on assets (ROA) and return on equity (ROE) chiefly in businesses through strong governance structures. Marquardt & Wiedman (2022) state that ecological and governance elements ensure a better effect on typical presentation and stakeholder self-confidence than social issues mainly in tall contamination companies.

3.0 Research Gap

Publicly operated businesses that are mandatory to follow to SEBIs Business Responsibility and Sustainability Reporting (BRSR) guidelines are the topic of the mainstream of ESG investigation approved available in India. Investigation on ESG performs in minor and middle sized private farming industry like Farmer Producer Organizations (FPOs) is actual incomplete. Farming absences satisfactory experimental statistics. Even however agronomy is crucial to India's economy there aren't numerous studies that methodically study ESG acceptance revelation performs and performance relations inside agrarian supply chains or rural manufacturer organizations.

Modern Indian research typically appearances at ecological sustainability, governance or corporate social responsibility individually rather than adding the three ESG supports into a single logical structure. Numerous studies in India use qualitative valuations and circumstance revisions. Significant measurable authentication of the associates amongst ESG and performance is rare mainly for developing organized brands like FPOs. Insufficient thought of ESG disclosure procedures. Limited studies have been directed on transparency broadcasting supplies and discovery experiments in Indian Agri-enterprises even with the improved lawmaking importance on sustainability writing.

4.0 Objectives of the Study

- To evaluate the organizational performance of FPOs in relative to ecological sustainability policies.
- To estimate the effect that social sustainability practices have on the administrative presentation of FPOs.

- To study the impact of governance performs on the organizational performance of FPOs.
- To study the effects that joint integrated ESG practices have on the financial performance of FPOs.
- To determine whether greater implementation of ESG practices increases member incomes.
- To examine the association among social and environmental performances and organizational achievement as it relates to governance excellence.

5.0 Hypothesis

- H1: Ecological sustainability initiatives have a positive and significant impact on FPOs organizational performance.
- H2: Social sustainability initiatives have a satisfactory and significant effect on FPOs organizational performance.
- H3: Governance practices meaningfully and positively affect FPOs organizational performance.
- H4: Integrated ESG practices have a positive effect on the financial performance of FPOs.
- H5: As ESG practices are executed more often member revenue levels significantly rise.
- H6: The quality of governance regulates the association between social and environmental actions and organizational performance.

6.0 Scope of the Study

The influence of Environmental Social and Governance (ESG) performs on the organizational and economic achievement of Farmer Producer Organizations (FPOs) is observed in this study. This one highlights the social, governance and environmental characteristics of ESG. An administrations performance can be measured over economic, functioning and member centered metrics. Effective governance controls outcomes by influencing member revenue and the adoption of ESG principles. The study is restricted to a subcategory of listed FPOs in the definite geographic region and is based on figures collected over a definite study period.

7.0 Research Methodology

A quantitative descriptive and analytical research strategy is used in the study to examine the association between ESG practices and the organizational achievement of

FPOs. Structured questionnaires are used to collect the primary data and financial statements reports are used for secondary data. Regression correlation reliability analysis and moderation analysis are used to analysis the data.

Table 1: Mean Scores of ESG Adoption

Construct	Mean	Std. Dev.	Interpretation
Environmental Practices	3.68	0.61	Moderate–High Adoption
Social Practices	3.92	0.58	High Adoption
Governance Practices	3.75	0.64	Moderate–High Adoption
ESG Disclosure Practices	3.21	0.72	Moderate
Organizational Performance	3.89	0.60	Strong Performance
Reporting Challenges	3.54	0.66	Moderate Constraints

The highest acceptance is understood in communal practices.
In assessment, ESG disclosure actions are less robust.

Table 2: Reliability

Construct	Cronbach's Alpha	Interpretation
Environmental	0.842	Good
Social	0.876	Very Good
Governance	0.821	Good
ESG Disclosure	0.889	Very Good
Organizational Performance	0.861	Very Good
Reporting Challenges	0.804	Acceptable
Overall Scale	**0.923**	Excellent

Every construct exceeds the recommended cutoff of 0. 70.
Total scale reliability (α = 0. 923) specifies excellent internal consistency.

Table 3: Correlation Matrix (Key Relationships)

Variable	Environmental	Social	Governance	Disclosure	Performance
Environmental	1				
Social	0.62	1			
Governance	0.58	0.65	1		
Disclosure	0.60	0.63	0.66	1	
Performance	0.68	0.71	0.69	0.72	1

($p < 0.01$)
Every ESG attribute has a strong positive correlation with organizational success.
ESG disclosure practices are also strongly related with performance.

Table 4: Summary of Regression Results

Hypothesis	Independent Variable	Dependent Variable	β (Standardized)	t-value	Sig. (p-value)	Result
H1	Environmental Practices	Organizational Performance	0.281	3.842	0.000	Supported
H2	Social Practices	Organizational Performance	0.324	4.516	0.000	Supported
H3	Governance Practices	Organizational Performance	0.247	3.395	0.000	Supported
H4	Integrated ESG Score	Financial Performance	0.412	5.768	0.000	Supported
H5	ESG Adoption Level	Member Income Improvement	0.368	4.987	0.000	Supported
H6	Governance (Environmental & Social)	Organizational Performance	0.189	2.764	0.006	Supported

- *$R = 0.781$*
- *$R^2 = 0.610$*
- *F-value = 56.842*
- *Sig. = 0.000*

8.0 Findings

The experimented FPOs mean values and standard deviations for ESG acceptance disclosure performs organizational performance and reporting issues are displayed in the Table 1. The results indicate that Social Practices (Mean= 3.92, SD= 0.58) had the highest score. This specifies a strong promise to training creativities inclusivity member prosperity actions and reasonable profit distribution. The comparatively small standard deviation recommends that social sustainability practices are applied consistently all over FPOs.

Organizational performance (Mean = 3. 89, SD = 0. 60) which validates developments in market entrance, operating efficiency and income growing. This recommends that maximum FPOs view their performance results positively. The acceptance of governance practices (Mean= 3. 75, SD = 0. 64) and environmental practices (Mean= 3. 68, SD= 0.61) is reasonable to extraordinary. Even still refined climate-resilient performs digital governance and efficient observing schemes still essential to be improved this shows that FPOs have practically firm governance structures and maintainable agribusiness performs. ESG Disclosure Practices on the other hand display simply reasonable acceptance (Mean= 3.21 SD= 0.72) and the maximum variety between constructs. This recommends that proper ESG reporting and organized disclosure procedures are still developing and remain not used by FPOs. Reporting Challenges (Mean= 3.54, SD = 0.66) displays reasonable restrictions mainly about economic assets technical proficiency and recognized writing outlines.

Table 2 demonstrations the reliability of the study constructs in-house stability using Cronbachs Alpha. The outcomes prove that all constructs surpass the suggested threshold value of 0.70 confirming the measuring scale strong in-house constancy. Environmental Practices (α = 0.842) displays strong consistency signifying a reliable association between the metrics measuring maintainable farming supply administration and climate flexibility. Outstanding reliability is confirmed by Social Practices (α = 0.876) which displays remarkable reliability between items connected to member contribution, training, revenue development. Governance Practices similarly shows good consistency (α = 0.821) sanctioning that governance-related components such as responsibility, clearness and constancy in policymaking are in association. The extraordinary consistency of ESG Disclosure Practices (α = 0. 889) specifies strong in-house reliability between pointers connected to disclosure and reporting. When it arises to calculating achievement variables like market growth, effectiveness and economic development Organizational Performance (α = 0. 861) displays excellent reliability. Reporting Challenges (α = 0.804) indicates satisfactory reliability by sanctioning constant replies about ESG execution and disclosure restrictions.

The exceptional overall scale reliability (α=0.923) indicates an actual reliable device for measuring ESG acceptance disclosure strategies and achievement relations in FPOs. Table 3 demonstrates the Pearson correlation coefficients between these variables. As showed by the strong positive correlation among Environmental Practices and Social Practices (r= 0.62) and Governance Practices (r= 0.58). FPOs that accept maintainable ecological events also regularly have strong social and governance procedures. Environmental practices and organizational performance are positively correlated (r= 0.68) signifying that better sustainability creativities are related with improved performance conclusions.

Organizational performance and social practices are more positively correlated (r = 0.71) than governance and social practices which are positively correlated (r= 0.65). This indicates that agriculturalist prosperity comprehensive and empowerment, creativities are strongly correlated with developed administrative results. Performance and Governance Practices are strongly positively correlated (r = 0.69) highlighting the importance of planned policymaking responsibility and clarity in refining FPO achievement. All the ESG elements the one that has the strongest correlation with organizational performance is ESG disclosure practices (r = 0.72). This recommends that FPOs suggest having improved functioning and economic results when their broadcasting and clarity methods are stronger.

Table 4 shows the regression results for measuring hypotheses H1–H6. All of the hypotheses are sustained and statistically significant ($p < 0.01$) as per the outcomes.

Performs connected to the environment (β= 0.281), social interactions (β= 0.324) and governance (β= 0.247) altogether ensure a confident and significant result on organizational achievement. Social Practices is the greatest significant of the three measurements. The important effect of the Combined ESG total on Financial Performance (β= 0.412) specifies that joint ESG acceptance increases economic outcomes. In the same way here is a positive correlation (β= 0.368) between Member Income Improvement and

ESG Adoption Level signifying that maintainable performs rises participants income. As established by the important controlling influence of governance on the association among environmental, social practices and organizational performance (β= 0.189, p= 0.006) strong supremacy reinforces ESG achievement relations. ESG elements clarify 61% of the variation in organizational performance giving to the important descriptive control of the complete model (R= 0.781, R^2 = 0.610). In relations of statistical significance the model has (F= 56. 842 and p = 0.000.)

9.0 Conclusion

The experimental conclusions of the study clearly determine that the acceptance of ESG expands the sustainability and performance of Farmer Producer Organizations. The descriptive investigation demonstrations that social performs are the greatest strongly executed whereas environmental social and governance actions are accepted at reasonable to high degrees. Strong administrative achievement stages also recommend that ESG concentrated FPOs is in succession efficiently.

Even if ESG disclosure does have made certain development broadcasting difficulties continue due to practical and source constraints. Reliability and validity testing illustrates that the measurement device has decent in-house reliability (overall Cronbachs Alpha = 0. 923) and acceptable construct strength making it statistically comprehensive. This supports the experimental conclusions accuracy.

Every hypothesis is additional reinforced by the regressions outcomes. Combined ESG adoption meaningfully increases participant revenue levels and enhancements economic Achievement. Moreover governance helps as a serious mediator consolidation the association among social, environmental and organizational performances. The model explain 61% of performance variation (R2 = 0. 610) demonstrating solid clarifying ability.

All of the conclusions show that FPOs improved participant revenue; economic sustainability and organizational achievement are intentionally focused by ESG adoption. Even using the extensive acceptance of ESG values expands governance and planned disclosure events can additional progress clarity and long-standing sustainability. The study highlights the significance of incorporating ESG principles into Agri-based industries to promote strong comprehensive and maintainable rural improvement.

10.0 Limitations of the Study

- The study may not be representative of all FPOs in India due to its geographic limitations.
- Response biased may be present in self-reported data.
- Financial performance is based on observation rather than audit.

11.0 Scope for Further Research

- Examine mediating aspects like digital acceptance and policy support.
- Give FPOs access to a standardized ESG reporting framework.
- Investigate the ways in which ESG supports the goals of rural development and sustainability.

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