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Delineation of Constraints Faced by Farmers in Adopting Agroecological Practices in Meghalaya

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Abstract

Agroecology offers a sustainable pathway to resilient food systems by combining ecological principles with farmers traditional knowledge. This study was conducted in South West Garo Hills District of Meghalaya, covering one purposively selected block i.e. Selsella block. A total of 40 farmers practicing sustainable agriculture practices from the selected blocks were chosen to assess their socio-economic profile, farming practices and constraints in adopting agroecological approaches. Data were collected using a structured pre-tested interview schedule for survey and analysed using frequency, percentage, mean scores and Garrett's ranking technique to prioritize the constraints faced by farmers in adopting agroecological practices. Despite its potential, adoption by the farmers in the area remains limited. Understanding the specific constraints that hinder adoption is crucial to designing effective interventions. This study explores the key barriers faced by farmers in adopting agroecological practices. Some of the major challenges faced by the farmers includes lack of targeted agroecology policies, inefficient value chains, limited community knowledge, high labour and investment costs and climatic risks. The findings suggest that supportive policies, targeted training programs, accessible financial services, strengthening market linkages and promoting climate-resilient strategies are essential are essential to overcome these constraints and facilitating wider adoption of agroecological practices.

Keywords: Agroecology, Constraints, resilient, Adoption, Sustainability

Introduction

India's heterogeneous climate and diverse topography, covering at least ten recognised biogeographical zones, sustain a wide spectrum of forest ecosystems and encompass three of the world's terrestrial biodiversity hotspots. Presently, forests constitute the primary reservoirs of the nation's terrestrial biodiversity, as most other natural ecosystems have been substantially modified or degraded. Despite the enforcement of forest conservation policies and regulatory measures, biodiversity depletion persists due to population growth, land. Alongside these ecological concerns, agriculture the backbone of rural livelihoods faces mounting challenges from human expansion and climate change (Kanianska, 2016) ^[1]. One of the most critical outcomes of these pressures is the erosion of agrobiodiversity. Rapid and extensive changes in land use, monocropping and over-reliance on chemical inputs have significantly reduced the diversity of crops and farming systems, resulting in both immediate and long-term implications for food security (Behera *et al.*, 2016) ^[2]. This decline threatens not only ecological balance but also the resilience of smallholder farmers, who remain highly vulnerable to environmental and economic shocks.

To address these challenges, agroecology has emerged as a sustainable alternative that integrates ecological principles with agricultural practices. By emphasizing crop diversification, soil fertility management, integrated pest control, conservation of indigenous seeds and use of traditional knowledge, agroecology seeks to harmonize food production with ecosystem conservation. It strengthens the adaptive capacity of farming systems, reduces dependence on external inputs and contributes to both environmental sustainability and livelihood security. As such, agroecology provides a holistic framework for achieving resilience in agriculture while simultaneously safeguarding biodiversity (FAO, 2019) ^[3]. However, despite its proven benefits, the adoption of agroecology among farmers remains limited. Many farmers face constraints such as lack of awareness and training, inadequate institutional support, limited access to markets, high initial labour requirements and risk

perceptions associated with shifting away from conventional methods. These barriers hinder large-scale transition toward agroecological systems, particularly among small and marginal farmers.

In this context, the challenges faced by the farmers in adoption of agroecological farming practices in South West Garo Hills District of Meghalaya assumes greater significance and the present study has been taken up with following specific objectives.

1. To study the socio-economic conditions of farmers in South West Garo Hills District.
2. To identify and analyse the constraints faced by farmers in adopting agroecological Practices in Meghalaya.

Gaining such insights is crucial for formulating context specific policies, strengthening capacity building initiatives and developing supportive market incentives that can enable farmers to adopt agroecology as a practical and sustainable pathway toward resilient agriculture and long term food security.

Materials and Methods

Multistage purposive sampling technique was followed for the selection of primary sampling units. The present study was conducted in South West Garo Hills District of Meghalaya. There are eight Community and Rural development (C&RD) Blocks from which Selsella Block was purposively selected. According to the data of the Block Agriculture Office (BAO), maximum number of farmers in the block are engaged in organic farming, agroforestry and other sustainable agricultural practices. Hence, Harigaon and Sankarigre village under Biodiversity Management Committees (BMC) were selected for the study as representative areas showing significant progress in agroecological transitions and sustainable farming initiatives. A total of forty agroecological farmers were selected i.e. twenty farmers from Harigaon and twenty from Sankarigre village. The data were collected using a structured and pretested interview schedule and analysed using frequency, percentage, mean scores and Garrett's ranking technique to prioritise the constraints faced by farmers in adopting agroecological practices. Both primary and secondary data were collected to achieve the objectives of the study. Primary data were obtained through a field survey using the interview method with the aid of a structured schedule and secondary data collected from the Block Agriculture Office highlighted that a significant proportion of progressive farmers in the study area have adopted various sustainable practices and regularly

participate in capacity-building and training programmes organised by the Department of Agriculture. Tabular analysis using percentages and averages was employed to derive meaningful results. To prioritise the constraints faced by small farmers in agriculture, Garrett's ranking technique was applied. The major constraints identified during the preliminary survey were arranged in ascending order of importance by the farmers and converted into ranks using Garrett's formula. These ranks were then transformed into scores with the help of Garrett's table. The formula used for converting ranks into percentages is as follows:

$$\text{Percent Position} = \frac{100(R_{ij} - 0.5)}{N_j}$$

Where,

R_{ij} = the rank assigned to the i^{th} constraint experienced by the j^{th} individual,

N_j = the no of constraints ranked by the j^{th} individual

Here, 0.5 is subtracted from R_{ij} , because a rank is considered as an interval on a scale and its midpoint best represents that interval. The percent positions thus obtained were converted into Garrett scores using Garrett's table. The mean scores for each constraint were then calculated, and the constraint with the highest mean score was considered the most important problem faced by the sample small farmers.

Results

The socio-economic conditions of small farmers were examined by considering factors such as age, education, family size, landholding, income level.

Socio- economic conditions of small farmers

Age and education

Table 1 presents the categorization of age and education status of the sample farmers in Selsella block of South West Garo Hills district, Meghalaya. It was found that 55 percent of farmers were in the middle age group of 50–63 years, followed by 30 percent in the old age group (>63 years), 7.5 percent in the young age group (<35 years) and 7.5 percent in the adult age group of 35–49 year. Education-wise, the majority of the farmers attained 45 percent of higher secondary education, followed by 40 percent with secondary education and 15 percent with upper primary education, while none of the farmers had attained a degree.

Table 1: Age and education status of farmers (N=40)

Sl. no	Age	Number of farmers		Education	Number of farmers	
		f	%		f	%
1	Young age (< 35 years)	3	7.5%	Upper primary	3	15%
2	Adult age (35- 49 years)	3	7.5%	Secondary	16	40%
3	Middle age (50-63 years)	22	55%	Higher secondary	18	45%
4	Old age (>63 years)	12	30%	Degree	0	0%
5	Total	40 farmers		Total	40 farmers	
6	Mean age	55 years		Mean education level	Secondary education	

Family size, land holdings and Annual income

The family size, landholdings and income particulars of the sample farmers were presented in Tables 2, 3 and 4 respectively. For analytical purposes, the farm households were classified into four categories: small family (<4

members), medium family (5–7 members), large family (8–10 members), and very large family (>10 members). The results revealed that 40 percent of the respondents belonged to the small family category, 45 percent had medium families, 20 percent had large families. The average family

size was 8 members, which corresponds to the large family category. Therefore, the findings indicated that the average family size was 6.2 members, which falls within the medium family.

The average operational area of the sample farmers was calculated to understand the distribution of land resources and their utilization. This information provides insight into the scale of farming, resource availability and the economic status of the respondents in the study area. The landholding pattern of the respondents was grouped into four categories: marginal (<1 ha), small (1-2 ha), semi-medium (2-4 ha), medium (4-10 ha) and very large >10. The operational landholding distribution of the sample farmers indicates that the majority of 37.5 percent belonged to the small category

(2-4 ha), followed by marginal category and semi farmers, each constituting 25 percent and lastly, 12.5 percent of the respondents had medium holdings (4-10 ha). This shows that farming in the study area is predominantly managed by small landholders.

Similarly, farm households were grouped into four income classes: low (<1 lakh), medium (1-5 lakhs), high (5-10 lakhs), and very high (>10 lakhs). Nearly half of the respondents i.e. 85 percent reported annual income level in the low income range, while 15 percent falls under medium income category, respectively. None of the farmers falls under high and very high income category. The average annual income of the households was about 0.88 lakh, indicating that most families had a low income level.

Table 2: Categorization of family size of farmers in ha (N=40)

Sl. No	Members	Frequency	Percentage
1	Small family (4 members)	16	40%
2	Medium family (7 members)	16	45%
3	Large family (8-10 members)	8	20%
4	Very large family (<10 members)	0	0%
5	Total	40	100%
6	Average mean family size	Large family	-----

Table 3: Categorization of operational landholding size of farmers in ha (N=40)

Sl.no	Landholding	Frequency	Percentage
1	Marginal (<1 ha)	10	25%
2	Small (1-2 ha)	15	37.5%
3	Semi-medium (2-4 ha)	10	25%
4	Medium (4-10 ha)	5	12.5%
5	Large farmers (<10 ha)	0	0
6	Total	40	100%
7	Mean landholding size	Small farmers	-----

Table 4: Categorization of annual income patterns of farmers (N=40)

Sl. No	Category	Frequency	Percentage
1	Low (< 1 lakh)	34	85%
2	Medium (1 lakh – 5 lakhs)	6	15%
3	High (5 lakhs – 10 lakhs)	0	0
4	Very high (>10 lakhs)	0	0
	Average mean income	0.88 lakh	

Constraints faced by farmers in in adopting agroecological Practices in Kerala

The study identified and ranked the major constraints hindering the adoption of agroecological practices using Garrett's ranking technique presented in table 5. The results revealed that limited access to markets was ranked as the most critical constraint faced by farmers in Selsella block, with the highest mean score of 74.2. The second and third most important constraints were limited knowledge on agroecology (70.8) and lack of training and education (68.6) related to sustainable and agroecological practices. The lack of an efficient value chain (66.3) and few supporting policies (63.9) also emerged as major institutional barriers.

Climate variability (61.7) was perceived as a moderate constraint, reflecting the frequent occurrence of erratic rainfall and changing weather patterns in the region, which adversely affect productivity and farm planning. Meanwhile, government subsidies favouring synthetic inputs (59.5) were seen as discouraging in the adoption of organic and natural alternatives, indicating a misalignment between current agricultural policies and sustainable goals. On the other hand, lack of assured market price (56.8), limited access to credit or finance (54.2) and high initial investment (51.4) were ranked lower, suggesting that although financial barriers exist, they were considered less severe compared to market and knowledge related issues.

Table 5: Constraints faced by farmers in adopting agroecological practices

Sl. No	Constraint	Garrett Mean Score	Rank
1	Limited access to markets	74.2	1
2	Limited knowledge on agroecology	70.8	2
3	Lack of training and education on sustainable agriculture practices	68.6	3
4	Lack of efficient value chain	66.3	4
5	Few policies based on agroecology	63.9	5
6	Climate variability	61.7	6

7	Government subsidies favour synthetic inputs	59.5	7
8	Lack of assured market price	56.8	8
9	Limited access to credit/finance	54.2	9
10	High initial investment for farm transition	51.4	10

Discussion

The present study was conducted in Selsella block of South West Garo Hills district, Meghalaya, with the objective of understanding the socio-economic characteristics of farmers and identifying the major constraints influencing the adoption of agroecological practices. The study assumes importance in the context of the agroecological transition currently being promoted under national and global sustainability frameworks, as Meghalaya represents a region with high biodiversity, traditional ecological knowledge, and growing pressure from climatic and market-related stresses.

The socio-economic analysis revealed that most farmers (55%) belonged to the middle-age group (50–63 years), followed by 30 percent in the old-age group, indicating that agroecological farming is largely practiced by experienced farmers. However, the low participation of young farmers (7.5%) points to a potential generational gap in agricultural engagement. Education-wise, 45 percent of farmers had completed higher secondary education, 40 percent secondary, and 15 percent upper primary, suggesting a moderate literacy level that supports understanding of agroecological practices but with limited scientific exposure. The average family size of 6.2 members indicates adequate family labour, though pressure on small and marginal landholdings (62.5%) remains high. Income analysis showed that 85 percent of farmers earned below ₹1 lakh annually, highlighting economic vulnerability and limited investment capacity.

The constraint analysis using Garrett's ranking technique revealed that limited access to markets (mean score = 74.2) was the most critical barrier to agroecological adoption in Selsella block. Farmers reported inadequate marketing facilities and poor price realization for sustainably grown produce. The next major constraints were limited knowledge on agroecology (70.8) and lack of training and education (68.6), indicating a strong need for awareness and capacity-building initiatives. Institutional issues such as lack of an efficient value chain (66.3) and few supporting policies (63.9) further hindered adoption, reflecting weak institutional linkages. Climate variability (61.7) was perceived as a moderate challenge, showing farmers' vulnerability to changing weather patterns. Financial factors such as limited access to credit (54.2) and high initial investment (51.4) ranked lower, suggesting that knowledge and market constraints are more critical than purely economic barriers. Overall, the findings highlight that while farmers in the study area possess strong traditional knowledge and adequate family labour support, structural constraints such as small landholdings, low income levels, and moderate educational attainment limit the broader adoption of agroecological practices.

Conclusion

The study demonstrates that farmers in Selsella block of South West Garo Hills, Meghalaya, possess substantial traditional knowledge and family labour resources, yet face socio-economic and institutional constraints that limit the adoption of agroecological practices. Small landholdings,

low income levels, moderate educational attainment, limited access to markets, and inadequate training opportunities emerged as the primary barriers to sustainable farming transitions. To enhance agroecological adoption, targeted interventions are necessary. Strengthening market linkages for sustainably produced crops, expanding farmer training and extension services, and reorienting policies to support sustainable inputs and value chains can significantly improve adoption rates. Such measures would not only increase farm productivity and income security but also promote environmental sustainability, biodiversity conservation, and climate resilience, ensuring long-term food and livelihood security for smallholder farmers in the region.

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References

1. Kanianska R. Agriculture and its impact on land-use, environment, and ecosystem services. In: Landscape ecology - The influences of land use and anthropogenic impacts of landscape creation. 2016 Jul 27;1-26.
2. Behera RN, Nayak DK, Andersen P, Maren IE. From jhum to broom: Agricultural land-use change and food security implications on the Meghalaya Plateau, India. *Ambio*. 2016 Feb;45(1):63-77.
3. FAO [Food and Agriculture Organization]. Tool for Agroecology Performance Evaluation (TAPE) [Internet]. Rome: FAO; 2019 [cited 2024 Apr 8]. Available from: <https://www.fao.org/agroecology/tools-tape/en/>