



ASSESSING EFFECTIVENESS AND ECONOMIC IMPACTS OF CLIMATE RESILIENT FARMING AMONG SMALLHOLDER FARMERS IN WAYANAD DISTRICT, KERALA

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ABSTRACT

The study examines the economic impacts of climate resilient farming among the smallholder farmers in Wayanad District, Kerala State. The study is based on both Primary and secondary data. The primary data for the study were collected from 121 smallholder farmers practicing climate resilient farming practices in their field from Kalpetta Block, Wayanad through a structured questionnaire using purposive sampling. The study analysed the effectiveness, adaptability and input cost reduction under climate resilient farming. Statistical tools such as Percentage analysis, Chi-square test and weighed mean rank is used for analysis. The findings reveal that the climate resilient farming model is highly effective and adaptable. It reduces the input cost and improves resilience. Chi-square analysis shows that respondent's perceptions were significantly skewed towards high rankings, indicating strong agreement regarding the benefits of climate-resilient farming practices. The study concludes that the climate-resilient farming practices contribute significantly to improved economic outcomes, food security, and the overall sustainability of farming systems among smallholder farmers.

KEYWORDS: Climate Resilient Farming, Smallholder Farmers, Food Security, Sustainable Agriculture, Wayanad, Economic Impacts

1. INTRODUCTION

Agriculture is highly vulnerable to the impacts of climate change. Climate resilient farming is considered as a sustainable approach to address the vulnerability of climate change. Wayanad district is an agrarian region and has experienced frequent climatic uncertainties including irregular rainfall, landslides, pest outbreaks, and changing weather patterns. These challenges adversely affected the agriculture productivity and livelihood of smallholder farmers. Climate resilient farming practices have been promoted in the district to improve food security, reduce input cost of production and strengthen resilience to climate shock. Several studies highlighted the environmental and agronomic benefits of Climate-resilient agriculture. However limited attention was given to the economic impacts and adaptability of the climate resilient farming among smallholder farmers. The present study was conducted to assess the economic benefits, adaptability and effectiveness of climate resilient farming among farmers in Wayanad District, Kerala.

2. OBJECTIVES

1. To study the climate resilient farming practices among smallholder farmers in Wayanad District
2. To examine the relation between the adoption of climate resilient farming and reduction in input cost
3. To analyse the adaptability of climate resilient farming practices among small holder farmers
4. To examine whether the climate resilient practices improve farm resilience

3. METHODOLOGY

The study is based on both primary and secondary data. The primary data were collected from 121 smallholder farmers selected from 3 different Panchayaths of Kalpetta Block, Wayanad District, Kerala. The study adopted a descriptive and analytical research approach to evaluate the socio-economic impact of climate resilient farming. The respondents were selected through purposive sampling technique for the study. Farmers practicing climate resilient farming were intentionally selected based on their experience and involvement in farming. The primary data is collected through structured questionnaire. The questionnaire included the information about farming practices adopted, income improvements, food security outcomes, effectiveness and adaptability of climate resilient farming. The secondary data were collected from books, journals and official publications related to climate resilient farming. The collected data were classified, tabulated and analysed using appropriate statistical tools. Percentage analysis, frequency, Weighed mean rank and Chi-square test were used to assess the economic benefits and adoption of climate resilient agriculture.

4. REVIEW OF LITERATURE

1. Laura Lengnick (2022) studied the climate smart and sustainable farming practices that can adopted for regenerative economy in Florida. The study shows that climate resilient farming practices facilitative the transition from an extractive agricultural economy to regenerative economy.
2. Nitesh Halder and Rinitta Pearlin A (2023) studied the sustainable agriculture and climate resilient farming practices for enhancing food security in India. The study found that the sustainable food security can be achieved through sustainable farming



3. Shaswath Shukla, Sijo Abraham, and Saahil Parekh (2025) examined the climate-resilient farming in India by assessing the adoption of climate-resilient agricultural practices in Bihar and Odisha. The study concluded that the adoption of climate resilient farming practices can contribute to sustainable agricultural development by strengthening farmers' livelihoods and enhancing resilience to climate-related challenges.

4. Raj Kumar Jat et.al (2026) investigated the impacts of climate change in Bihar, India and the adopted climate resilient agriculture strategies to address the challenges of agri-food security and climate change. The study shows that farm-level income can be improved by adopting climate resilient strategies.

5. DATA ANALYSIS AND INTERPRETATION

5.1 Percentage Analysis

To assess the effectiveness and adaptability of climate resilient farming practices, respondents were asked to rate their overall experience. The responses were analysed using percentage analysis to determine the distribution of perceptions among 121 small holder farmers.

Table 5.1.1 Effectiveness and adaptability of climate resilient farming

Response	Number	Percentage
Highly effective	68	56.20
Moderately effective	38	31.40
Slightly effective	14	11.60
Not effective	1	0.80
Total	121	100.00

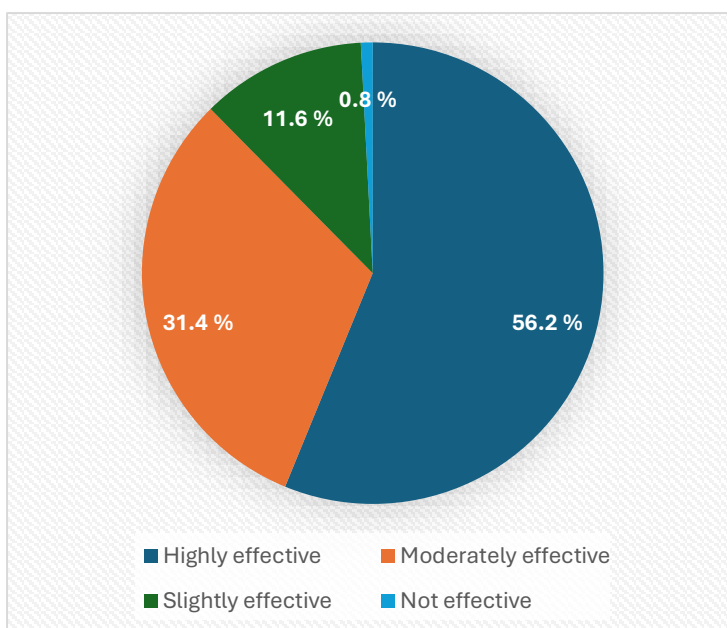


Chart 5.1.1 Effectiveness and adaptability of climate resilient farming

Interpretation

Majority of the respondents viewed that the climate resilient farming practices are adaptable and effective. This indicates that the adoption of climate resilient farming practices has been widely accepted among smallholder farmers.

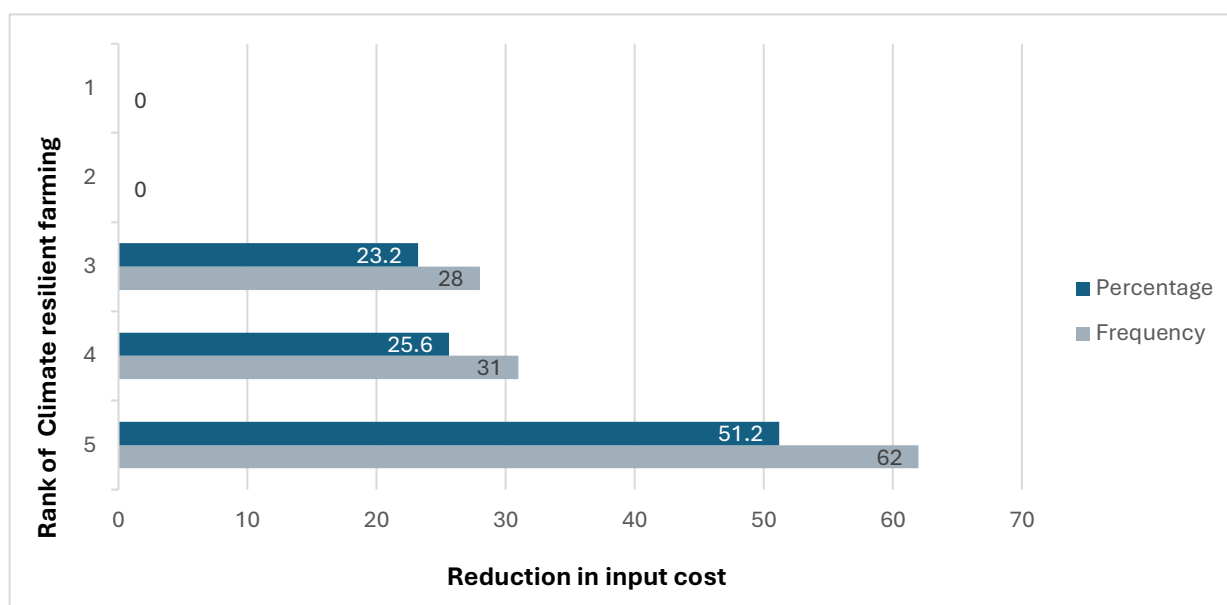
5.2 Weighed Mean Rank Analysis

The respondents were asked to rank the reduction in input cost on a five-point scale. Rank 5 represented the highest reduction and Rank 1 represented the lowest reduction. The weighed mean rank was calculated to identify the overall perception regarding effectiveness of climate resilient farming in reducing input costs.

Table 5.2.1 Assessment of input cost reduction under climate resilient farming model

Rank	Frequency	Percentage
5	62	51.20
4	31	25.60
3	28	23.20
2	0	0
1	0	0

Chart 5.2.1 Assessment of input cost reduction under climate resilient farming model



Interpretation:

The results indicate the majority of respondents assigned highest rank to the reduction in input costs under climate resilient farming. The weighed mean rank is 4.28 out of 5, indicating high level of agreement among respondents. It suggests that adoption of climate resilient farming practices improve economic benefits.

5.3 Chi Square Analysis

Rank	Observed frequency	Expected frequency	(O-E) ^2	(O-E) ^2 / E
5	82	24.2	3340.84	138.05
4	21	24.2	10.24	0.42
3	18	24.2	38.44	1.59
2	0	24.2	585.64	24.20
1	0	24.2	585.64	24.20
				188.46

Table 5.3.1 Improved resilience due to climate resilient farming

Hypothesis

Ho: There is no statistical difference between ranking of respondents regarding improved resilience due to climate resilient farming and an equal distribution across the five categories

H1: There is a significant statistical difference between ranking of respondents regarding improved resilience due to climate resilient farming and an equal distribution across the five categories

Calculations

$$\chi^2 = 188.46$$

Degree of freedom = 4

Critical value @ 5% level = 9.48

Interpretation

The calculated χ^2 value is significantly greater than the critical value at 5% level of significance. Thus, the null hypothesis is rejected. Majority of respondents selected the higher ranks particularly Rank 5. It indicates that the strong positive perception towards the climate resilient farming among smallholder farmers.



6. FINDINGS, SUGGESTIONS AND CONCLUSION

6.1 Findings

1. Majority of the respondents consider climate resilient farming is highly effective
2. Climate resilient farming practices are acceptable and adaptable among small holder farmers
3. The reduction in input cost was considered as a major benefit of climate resilient farming
4. The study shows that the climate resilient farming practices provide economic benefits while helping smallholder farmers adapt to changing climatic conditions
5. A strong positive perception regarding the climate resilient farming in improving farm resilience
6. Adoption of climate resilient farming is economically viable among small holder farmers

6.2 Suggestions

- It is necessary to strengthen the training programmes to promote climate resilient agriculture
- Promote low cost and locally available inputs among farmers
- Demonstration plots should encourage and expand for further adoption
- The government institutions should support the farmers in adoption of resilient agriculture
- It is vital to strengthen the farmer groups and community demonstrations
- Diversified farming should promote among farmers

6.3 Conclusion

The study concludes that the adoption of climate resilient farming is highly effective among small holder farmers. The adoption of such practices facilitates the reduction in input costs thereby providing economic benefits to farmers.

The study further indicates that the climate resilient farming practices help to withstand changing climatic conditions. It helps to improve the farm resilience.

The climate resilient agriculture is considered as an effective approach to promote sustainable and economically viable agricultural practices among smallholder farmers. Trainings and technical support from government institutions will strengthen the further adoption of climate resilient agriculture.

7. REFERENCES

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