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Constraints faced and suggestions offered by banana growers: A study for strengthening extension services

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Abstract

Climate change and variability have intensified the vulnerability of banana growers by affecting productivity, resource availability, and farm income. The present study investigates the constraints faced by banana growers and documents their adaptive suggestions in Jalgaon district of Maharashtra. Using an ex-post facto research design, data were collected from 300 banana growers through structured interviews. The findings revealed that major constraints included more loss in banana yield due to natural calamities. (89.00%), inaccessible climate information like early warning system, automatic weather station etc. on time. (86.67%), lack of knowledge about climate change and its impact on banana cultivation (83.33%), and limited knowledge about climate resilient practices (80.33%). The great majority (96.66 per cent) of the banana growers suggest that 'Training should be arranged for farmers on climate change aspects in local language'. Followed by 90.00 per cent of the banana growers suggest that 'government should make policies to combat against natural calamities. About 87.66 per cent of the banana growers suggested that 'Climate related information should be made available in local languages'. The study concludes that bridging knowledge, infrastructure, and institutional gaps is essential to enhance adaptive capacity and ensure sustainable banana production under changing climatic conditions.

Keywords: Banana growers, climate change, constraints, suggestions, extension services, climate variability, agricultural sustainability

1. Introduction

Agriculture plays a pivotal role in the Indian economy, contributing significantly to food security, employment generation, and rural livelihoods. Among the horticultural crops, banana is one of the most important fruit crops cultivated extensively across tropical and subtropical regions of India. Maharashtra, particularly Jalgaon district, is widely recognized as a major banana-producing region due to its favorable agro-climatic conditions and adoption of improved cultivation practices.

Banana cultivation is highly remunerative and serves as a major source of income for farmers. However, in recent years, the sustainability and productivity of banana farming have been increasingly threatened by climate change and climatic variability. The changes in temperature patterns, erratic rainfall, prolonged droughts, and extreme weather events such as storms and floods have adversely affected banana production systems. Being a climate-sensitive crop, banana is particularly vulnerable to fluctuations in temperature and moisture, which influence growth, yield, quality, and pest and disease incidence.

Climate change has led to several challenges in banana

cultivation, including increased heat stress, water scarcity, nutrient leaching, soil degradation, and the emergence of new pests and diseases. These challenges have not only reduced crop productivity but have also increased the risk and uncertainty associated with farming. As a result, banana growers are facing multiple constraints that hinder their ability to effectively adapt to changing climatic conditions. In addition to climatic factors, farmers encounter various technological, infrastructural, socio-economic, and institutional constraints. Lack of awareness about improved cultivation practices, inadequate extension support, poor access to climate-resilient technologies, and limited availability of information in local languages are some of the major technological and informational barriers. Similarly, insufficient cold storage facilities, lack of advanced packing houses, and poor market infrastructure contribute to post-harvest losses and reduced profitability. Moreover, institutional limitations such as inadequate training programs, lack of expertise among extension personnel, and weak linkage between research institutions and farmers further aggravate the problem. Labour shortages and increasing production costs also add to the

burden of farmers, making banana cultivation more vulnerable under climate change scenarios.

Despite these challenges, farmers possess valuable experiential knowledge and practical insights that can contribute to effective adaptation strategies. Understanding the constraints faced by banana growers and documenting their suggestions is crucial for designing need-based interventions, improving extension services, and promoting climate-resilient agricultural practices.

Therefore, the present study was undertaken to systematically analyze the constraints experienced by banana growers in the context of climate change and variability, and to collect their suggestions for overcoming these constraints. The findings of this study are expected to provide useful inputs for policymakers, extension agencies, and researchers to develop effective strategies for enhancing the adaptive capacity and resilience of banana growers.

2. Objective

1. To identify the major constraints faced by banana growers under climate change
2. To document the suggestions provided by banana growers
3. To analyze the implications for extension services and policy

3. Conceptual Framework

The study is based on the concept that: Climate Change → Constraints → Reduced Adaptive Capacity → Need for Interventions

Types of Constraints Identified

Technological Constraints, Infrastructural Constraints, Institutional Constraints and Socio-economic Constraints

4. Material and Methods

The study was conducted in Jalgaon district of Maharashtra using an ex-post facto research design.

- **Selection of study Area:** The selection of district on the basis highest area under commercial banana cultivation, tahsils based on maximum number of growers and villages was basis on the maximum area under commercial banana cultivation. Jalgaon district of Maharashtra state had purposively selected for present study. Because maximum area under banana

production, and productivity among the other districts. Furthermore, this district is located in Maharashtra's western region and had administered by MPKV, Rahuri. The list of banana growers obtained from the District Superintendent Agricultural Officer (DSAO), Agricultural Development Officer (ADO), and Regional Banana Research Station Jalgaon. In addition, similar other institutions were consulted for preparing a tahsil-wise of commercial banana growers in Jalgaon district. The tahsils having maximum number of banana growers had selected. Accordingly, the tahsils namely Raver, Yawal and Muktainagar from district were selected.

- **Selection of respondents:** A list of all banana-growing villages was prepared for each selected tahsil separately. From the list, only those villages, having maximum area under banana cultivation, had considered for sampling. Later first four villages were selected from each of the three tahsils by random sampling method.
- **Sample Size:** Thus, total numbers of twelve villages were selected for the study. The village wise list of the banana growers for the selected tahsils was prepared. The farmers growing minimum 2 ha. Area of banana trees on commercial basis has considered respondents for this study. Twenty-Five banana growers from each selected village had selected randomly.
- **Sampling Technique:** A multistage sampling technique was use for the selection of districts, tahsils, and villages. At the first stage, the leading district from the zone had selected. In the second stage, three tahsils selected from the district. The final stage consisted of selecting four villages from the each selected tahsil.
- **Data Collection:** The data were collected through the personal interview.
- **Analysis Tools:** The collected data were scored, tabulated and analyzed by using frequency, percentage and rank.

5. Results and Discussion

5.1 Constraints Faced by Banana Growers

The study revealed that banana growers face multiple constraints affecting production, post-harvest management, and adoption of improved practices.

Table 1: Distribution of major constraints experienced by banana grower

Sr.	Constraints	Frequency	Percentage	Rank
1	More loss in banana yield due to natural calamities	267	89.00	I
2	Inaccessible climate information like early warning system, automatic weather station etc. on time	260	86.67	II
3	Lack of knowledge about climate change and its impact on banana cultivation	250	83.33	III
4	Limited knowledge about climate resilient practices	241	80.33	IV
5	Less scientific knowledge about impact of climatic variations	226	72.00	V
6	Non-availability of climate information in local languages	202	67.33	VI
7	Maximum losses due to chilling injury	190	63.33	VII
8	Field level extension staffs are less expertise in climate change management aspects	180	60.00	VIII
9	Lack of government policies to combat natural calamities	170	56.67	IX

The major constraint reported by the respondents were overwhelming majority (89.00 per cent) of the banana growers revealed about more loss in banana yield due to natural calamities. Majority (86.67 per cent) of the banana

growers revealed about inaccessible climate information like early warning system, automatic weather station etc. on time. Almost 83.33 per cent of the banana growers revealed that there is lack of knowledge about climate change and its

impact on banana cultivation. About 80.33 per cent of the banana growers faced the constraints of limited knowledge about climate resilient practices. Majority of the banana growers i.e. 72.00 per cent faced the constraint like less scientific knowledge about impact of climatic variations. Almost 67.33 per cent of the banana growers had faced constraints of non-availability of climate information in local languages. A nearly half (63.33 per cent) of the banana growers revealed that maximum losses due to chilling injury. About the 60.00 per cent of the banana growers faced constraint that field level extension staff was

less expertise in climate change management practices. More than half (56.67 per cent) of the banana growers revealed that there is lack of government policies to combat natural calamities.

Similar findings with Maddison (2006)^[7], Battaglini *et al.* (2009)^[4], Abid *et al.* (2014)^[1], Mundhe *et al.* (2019)^[8], and Patil (2021)^[10].

5.2 Suggestions of Banana Growers

The respondents provided several practical and need-based suggestions to overcome the constraints faced by them.

Table 2: Distribution of major suggestions to overcome the constraints faced by them

Sr.	Suggestions	Frequency	Percentage	Rank
1	Training should be arranged for farmers on climate change aspects in local languages	290	96.66	I
2	Government should make policies to combat against natural calamities	267	90.00	II
3	Climate related information should be made available in local languages	263	87.66	III
4	Weather forecast should be more accurate and timely	250	83.33	IV
5	Knowledge about climate change to mitigate its impact on banana cultivation	243	81.00	V
6	Establishment of advanced weather forecasting station at each village	225	75.00	VI
7	To give better way of learning about scientific techniques	202	67.33	VII
8	Climate change tolerant varieties of banana should be developed	190	66.33	VIII
9	Extension officers should upgrade themselves on climate change	180	60.00	IX

In response to banana growers' constraints with respect their perceived impact about climate change and variability they were asked to give some meaningful suggestions to overcome this constraints. The great majority (96.66 per cent) of the banana growers suggest that 'Training should be arranged for farmers on climate change aspects in local language'. Followed by 90.00 per cent of the banana growers suggest that 'government should make policies to combat against natural calamities. About 87.66 per cent of the banana growers suggested that 'Climate related information should be made available in local languages'. Almost 83.33 per cent of the banana growers suggested that weather forecast should be more timely and accurate. 'Provide workshop and training on value addition and waste management to farmwomen'. About 81.00 per cent of the banana growers suggested that knowledge about climate change to mitigate its impact on banana cultivation should be provided. Three fourth (75.00 per cent) of the banana growers suggested to establish advanced weather forecasting station at each village. Majority (67.33 per cent) of the banana growers suggested to give better way of learning about scientific techniques. More than half (66.33 per cent) of the banana growers suggested that 'Climate change tolerant varieties of banana should be developed'. Almost 60.00 per cent of the banana growers suggested that 'Extension officers should upgrade themselves on climate change'.

Similar findings with Pandey *et al.* (2012), Ravishankar *et al.* (2013), and Ansari *et al.* (2018)

6. Conclusion

The study concludes that banana growers face significant constraints related to knowledge, infrastructure, and institutional support. However, farmers are proactive and provide meaningful suggestions to overcome these challenges. Effective extension services, infrastructure development, and capacity-building programs are essential for improving farmers' adaptive capacity and ensuring

sustainable banana production under climate change.

7. Implications for Agricultural Extension Education

The findings clearly show that banana growers are willing to adopt improved practices but are constrained by lack of knowledge, infrastructure, and institutional support. Addressing these issues through effective extension education, improved communication, and supportive policies will significantly enhance farmers' resilience and sustainability.

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