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# Constraints and suggestions perceived by farmers due to climate change in south Gujarat region

**[1]SB Patel, [2]MR Bhatt, [1]Aparna Jayan R and [1]Sanjay VC**

[1]Ph.D. Scholar, Department of Agricultural Extension and Communication, N. M. College of Agriculture, Navsari Agricultural University, Navsari, Gujarat, India

[2] Associate Professor and Head, Department of Agricultural Extension and Communication, College of Agriculture, Navsari Agricultural University, Campus Bharuch, Gujarat, India

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**Corresponding Author:** SB Patel

**Abstract**

Climate change has emerged as a major threat to sustainable agriculture, particularly in vulnerable regions thereby significantly impacting agriculture, leading to reduced crop yields, increased food insecurity and shifts in agricultural practices. This study aims to assess the constraints experienced by farmers due to climate change and to their suggestions for overcoming these constraints. The present study was conducted in Three districts Navsari, Surat and Tapi of South Gujarat. Ex-post facto research design was used for study. From each district, three talukas were selected and each taluka two villages were selected purposively. From each village 15 respondents were selected. So, total 270 respondents were selected for study. The results revealed that the most critical constraints include high cost of implementing water conservation measures, lack of awareness of climate-resilient technologies, and market price instability. Farmers suggested more accurate weather forecasting, timely assessment for crop losses, and improved infrastructure for water harvesting as priority solutions. This study emphasizes the need for timely interventions and farmer-centric policies to enhance climate resilience at the grassroots level.

**Keywords:** Climate change, constraints, climate resilience, suggestions, weather advisory, South Gujarat, adaptive strategies

## Introduction

Climate refers to conditions of the atmosphere at a particular location over a long period of time, it includes patterns of temperature, precipitation (rain or snow), humidity, wind patterns and seasons (Krishnamurti and David, 2025) [5]. The concern over the shocking effects of climate change, particularly in the agriculture sector, has become very severe now a days. This climate variability impacts on agriculture sector have been severely harmful. For instance, sporadic impacts such as droughts and floods make threats to the livelihood of rural people who are dependent on agriculture (Ranganathan *et al*., 2010) [7]. A decrease in the availability of water for irrigation is likely due to rainfall deficits caused by the intensity of droughts, reducing the amount of irrigated food production (Anon., 2002) [1]. Crop losses may raise due to increased climate variability, and this impact will be one of the deciding issues that manipulate future food security (Ranganathan *et al.*, 2010) [7]. Climate change refers to long-term shifts in weather patterns and global temperatures caused primarily by human activities, such as the burning of fossil fuels and deforestation. India, as the world's second-most populous country, is particularly vulnerable to the impacts of climate change due to its vast geographical diversity and high population density.

The impacts of climate change in Gujarat are similar to those faced by the country as a whole but may vary in intensity and regional specificity. One of the significant concerns in Gujarat is water scarcity. Rapid urbanisation, prolific industrialisation and multiple cropping practice have increased the water demand and consumption manifold over the years. At the same time, frequency of heatwaves and intensity of droughts have increased resulting in severe water scarcity. The state suffers from water scarcity every year, particularly during the summer (Bandyopadhyay, 2022) [2]. Coastal regions of Gujarat are particularly vulnerable to the impacts of climate change, including sea-level rise and increased coastal erosion. Rising sea levels pose a threat to coastal infrastructure, human settlements, and ecosystems. The frequency and intensity of cyclones and storm surges can also lead to severe coastal flooding and damage. Among the most affected are small and marginal farmers whose livelihoods are intricately tied to climate-sensitive practices. South Gujarat, a region with a diverse agro-climatic setting and high rainfall variability is increasingly experiencing the adverse effects of climate change.

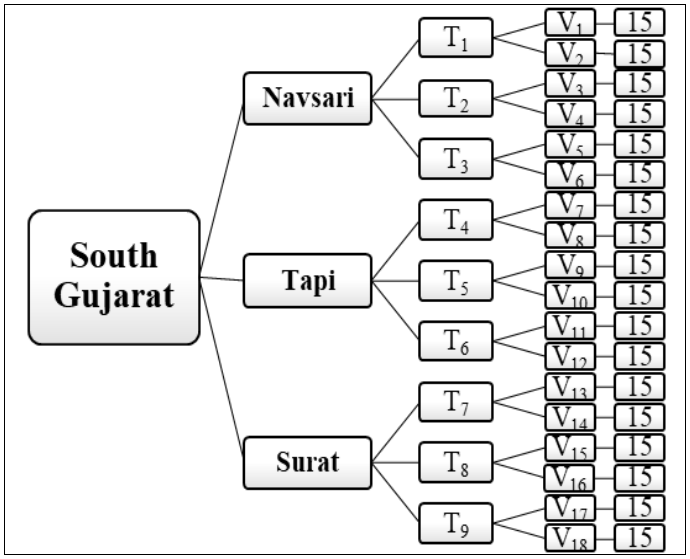
## Objective

Constraints faced by farmers due to climate change and seek the suggestions of farmers to overcome constraints

## Methodology

The present study was conducted in South Gujarat region.

The districts of South Gujarat region are Bharuch, Narmada, Surat, Tapi, Valsad, Navsari and The Dands. Out of these districts, three district *viz.*, Navsari, Surat and Tapi were selected purposively. From each district, three talukas will be selected. From each taluka, two villages will be selected randomly. From each village, 15 farmers will be selected randomly. Thus, total 270 farmers will be selected for the present study. An Ex-post-facto research design was used in the present investigation. The collected data was classified, tabulated, analyzed and interpreted in order to make the findings meaningful. The statistical measures frequency and percentage were used in the study.




T= taluka V=village

**Fig 1:** Sampling framework

## Results and Discussion

### Constraints faced by farmers due to climate change

Constraint refers to situations or circumstances that restrict, impede or limit the activity or performance of an individual. The data in this regard are presented in table 1 and figure 2.

**Table 1:** Constraints faced by farmers due to climate change (n=270)

| Sr. No. | Constraints | Frequency | Percentage | Rank |
|---|---|---|---|---|
| 1 | Lack of adequate awareness about climate resilient technologies | 205 | 75.93 | II |
| 2 | Lack of knowledge and understanding about climate change issue | 178 | 65.93 | V |
| 3 | Lack of awareness about drought tolerant Varieties | 150 | 55.56 | VII |
| 4 | Lack of effectively and timely weather advisory systems | 120 | 44.44 | IX |
| 5 | High cost for implementing water harvesting and conservation measures | 220 | 81.48 | I |
| 6 | More reliance on traditional method of farming | 180 | 66.67 | IV |
| 7 | Inadequate infrastructure for fodder and input storage | 175 | 64.81 | VI |
| 8 | Market instability and price fluctuations | 200 | 74.07 | III |
| 9 | Limited access to credit and financial services | 160 | 59.26 | VII |
| 10 | Labour shortages during critical farm operations | 110 | 40.74 | X |

The data presented in table 1 and figure 2 indicated that out of all constraints, high cost for implementing water harvesting and conservation measures was reported as a major constraints followed by lack of adequate awareness about climate resilient technologies (II), market instability and price fluctuations (III), more reliance on traditional method of farming (IV), lack of knowledge and understanding about climate change issue (V), inadequate infrastructure for fodder and input storage (VI), lack of awareness about drought tolerant Varieties (VII), limited access to credit and financial services (VIII), lack of effectively and timely weather advisory systems (IX) and labour shortages during critical farm operations (X). This finding was similar with findings of Niranjan and Bose (2020) [6], Chouksey *et al.* (2021) [3] and Shelar *et al.* (2022) [9].

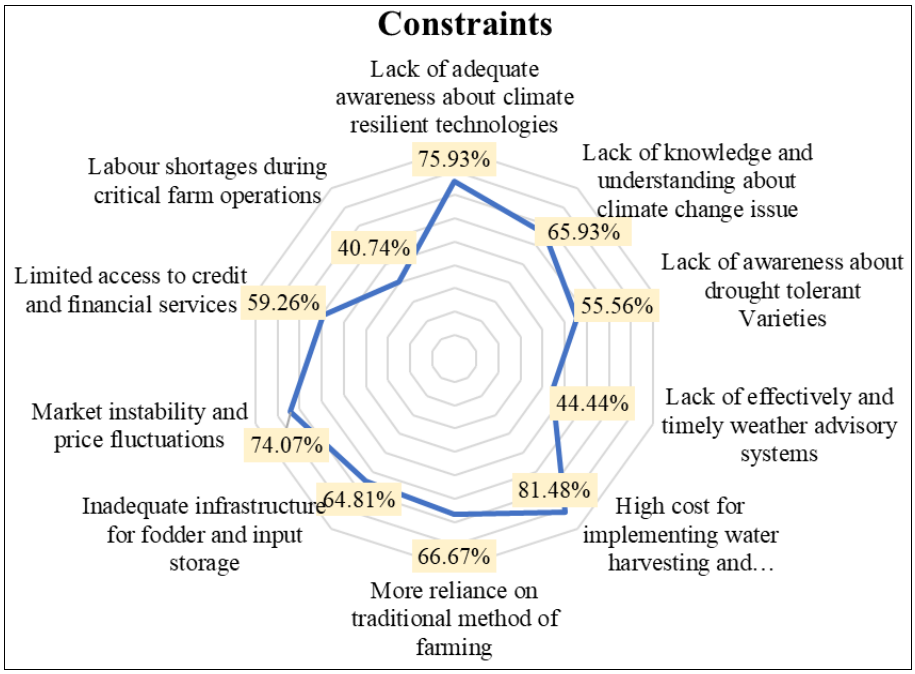



**Fig 2:** Constraints faced by farmers due to climate change

**Suggestions of farmers to overcome constraints**

Suggestion refers as solution about constraints which can be used as to overcome or to minimize them. The data in this regard are presented in table 2 and figure 3.

**Table 2:** Suggestions of farmers to overcome constraints (n=270)

| Sr. No. | Suggestions | Frequency | Percentage | Rank |
|---|---|---|---|---|
| 1. | Weather forecasting and delivering of information should be more accurate and timely | 205 | 87.25 | I |
| 2. | There should be proper assessment of crop damage and compensation should be timely deliver to the farmers | 178 | 75.74 | II |
| 3. | Government should built more water harvesting infrastructure to reduce scarcity of irrigation water | 163 | 69.36 | III |
| 4. | Early warnings are to be issued in case of adverse weather conditions | 143 | 60.85 | IV |
| 5. | More and frequent visits of extension agents should be there to help and assist farmers on climate resilient technology | 180 | 76.60 | V |
| 6. | Government should ensure availability of inputs near to village throughout the year | 129 | 54.89 | VI |

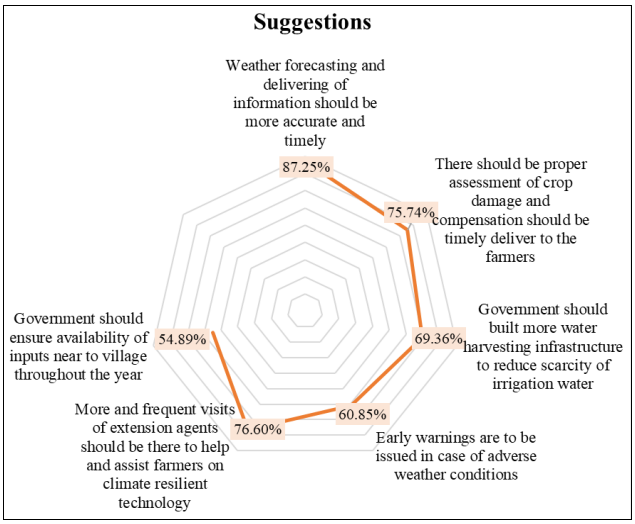



**Fig 3:** Suggestions of farmers to overcome constraints

The data presented in table 2 and figure 3 indicated that suggestions offered by farmers. Major suggestion were weather forecasting and delivering of information should be more accurate and timely (I) followed by there should be proper assessment of crop damage and compensation should be timely deliver to the farmers (II), government should built more water harvesting infrastructure to reduce scarcity of irrigation water (III), early warnings is to be issued in case of adverse weather conditions (IV), more and frequent visits of extension agents should be there to help and assist farmers on climate resilient technology (V) and government should ensure availability of inputs near to village throughout the year (VI). This finding was similar with findings of Dupdal and Patil (2019) [4] and Shanabhoga *et al.* (2023) [8].

## Conclusion

It can be concluded that farmers are facing several constraints due to climate change, with the major constraints were the high cost of adopting water harvesting and conservation practices followed by limited awareness of climate-resilient technologies, unstable market prices, heavy dependence on traditional farming methods, and inadequate understanding of climate change. Additionally, poor infrastructure for fodder and input storage, lack of access to finance, and insufficient weather advisory systems further hinder farmers' adaptive capacity. To address these

challenges, farmers proposed several key solutions. These include improving the accuracy and timeliness of weather forecasts, ensuring proper evaluation of crop losses and prompt compensation, constructing more water harvesting systems, issuing early warnings for extreme weather, increasing the frequency of extension visits, and ensuring year-round availability of agricultural inputs near villages.

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