

# Impact of Extreme Weather Events on Agriculture

**Rahul Punia<sup>1</sup>,  
Pardeep Kumar<sup>2</sup>**

<sup>1</sup>Department of Agriculture  
Meteorology, CCSHAU,  
Hisar-125004, Haryana

<sup>2</sup>Krishi Vigyan Kendra, Khunti,  
ICAR-NISA, Ranchi



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\*Corresponding Author

**Rahul Punia\***

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## INTRODUCTION

India's agriculture is increasingly vulnerable to extreme weather events, including heatwaves, floods, cyclones, and droughts. These events disrupt food production, threaten livelihoods and exacerbate food insecurity. This article explores the multifaceted impacts of extreme weather on Indian agriculture, highlighting recent events, regional variations and adaptive strategies.

**1. Overview of Extreme Weather Events in India:-** In 2024, India experienced extreme weather events on 93% of the days in the year's first nine months, including heatwaves, cyclones, lightning, heavy rain, floods and landslides. These events resulted in 3,238 deaths, affected 3.2 million hectares of crops, destroyed over 235,000 houses and killed approximately 9,457 livestock.

**2. Heatwaves and Their Impact:** - In May 2024, India endured a severe heatwave, with Churu in Rajasthan recording temperatures of 50.5°C, the highest in eight years. The heatwave led to 219 fatalities and over 40,000 heatstroke cases nationwide.

### Impact on Agriculture:

- **Crop Stress:** High temperatures caused heat stress in crops like wheat, pulses and vegetables, leading to reduced yields and quality.
- **Water Scarcity:** Increased evaporation rates depleted water resources, affecting irrigation and exacerbating drought conditions.
- **Soil Degradation:** Prolonged heat led to soil moisture loss, reducing soil fertility and increasing the need for irrigation.

**3. Floods and Waterlogging:-** In June 2024, heavy rainfall and flooding in Assam affected 1,325 villages across 19 districts, displacing over 400,000 people and causing significant crop damage.

### Impact on Agriculture:

- **Crop Submergence:** Floodwaters submerged paddy fields, leading to the loss of standing crops and delayed sowing for the next season.
- **Soil Erosion:** Floods eroded fertile topsoil, reducing land productivity and increasing vulnerability to future floods.
- **Infrastructure Damage:** Flooding damaged irrigation systems, storage facilities and transportation networks, hindering agricultural activities.

**4. Cyclones and Storm Surges:-** Cyclone Asna, which struck Gujarat, Rajasthan and Madhya Pradesh in August 2024, caused widespread flooding and infrastructure damage, resulting in 73 fatalities and significant agricultural losses.

### Impact on Agriculture:

- **Crop Destruction:** Strong winds and heavy rains destroyed standing crops, including cotton, groundnuts and vegetables.
- **Soil Salinization:** Saltwater intrusion from storm surges degraded soil quality, making it less suitable for agriculture.
- **Livelihood Losses:** Damage to agricultural assets and infrastructure led to loss of income and increased poverty among farming communities.

**5. Droughts and Water Scarcity:-** Prolonged dry spells in regions like Maharashtra and Rajasthan in 2024 led to significant water shortages, affecting both irrigation and drinking water supplies.

### Impact on Agriculture:

- **Reduced Crop Yields:** Insufficient water availability led to poor germination, stunted growth and reduced yields in crops like maize, pulses, and vegetables.
- **Groundwater Depletion:** Over-reliance on groundwater for irrigation led to a decline in water tables, making future irrigation unsustainable.
- **Livestock Stress:** Lack of water and forage led to dehydration and malnutrition in livestock, affecting milk production and meat supply.

### 6. Regional Variations and Vulnerabilities

- **North-East India:** States like Assam and Manipur frequently experience flooding due to heavy monsoon rains and overflowing rivers.
- **Western India:** Rajasthan and Gujarat face heatwaves and droughts, impacting water availability and crop productivity.
- **Southern India:** Tamil Nadu and Andhra Pradesh are prone to cyclones and heavy rainfall, leading to coastal flooding and crop damage.
- **Central India:** Madhya Pradesh and Maharashtra experience a mix of droughts and floods, affecting both rain-fed and irrigated agriculture.

### 7. Socio-Economic Impacts

- **Food Insecurity:** Crop losses and reduced yields lead to higher food prices and limited availability, affecting low-income households.
- **Migration:** Agricultural distress forces farmers to migrate to urban areas in search of alternative livelihoods.
- **Health Risks:** Exposure to extreme heat and waterborne diseases increases health risks among farming communities.
- **Debt Burden:** Crop failures and income losses push farmers into debt, leading to long-term financial instability.

### 8. Adaptive Strategies and Policy Interventions

- **Climate-Resilient Crops:** Development and promotion of drought-tolerant and heat-resistant crop varieties can reduce vulnerability to extreme weather.
- **Water Management:** Implementing efficient irrigation systems, rainwater harvesting and groundwater recharge can mitigate water scarcity.
- **Early Warning Systems:** Establishing robust weather forecasting and early warning systems can help farmers prepare for extreme events.
- **Insurance Schemes:** Expanding crop insurance coverage and providing financial support can help farmers recover from losses.

- **Policy Support:** Integrating climate change considerations into agricultural policies and providing subsidies for sustainable practices can promote resilience.

### CONCLUSION

Extreme weather events have significantly impacted Indian agriculture, leading to reduced crop yields, increased food prices and heightened vulnerability among farmers. The frequency and intensity of these events, including heatwaves, floods, and droughts, have disrupted traditional

farming practices and strained existing agricultural systems.

In response, various adaptive strategies have been implemented, such as the adoption of climate-resilient crop varieties, improved water management techniques, and the diversification of farming practices. For instance, in Nashik, Maharashtra, farmers adjusted their harvest schedules to mitigate the effects of unseasonal rains, successfully maintaining grape export volumes despite adverse weather conditions.