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Beating the Heat: How Odisha Farmers Cope with Scorching Summers

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Odisha's summers, hitting 45°C in Titilagarh in 2024, threaten crops and livelihoods. Heat waves, defined as five days with temperatures 5°C above normal, reduce rice yields by 20%. Farmers counter this with mulching, shade nets, and IMD advisories. This how-to guide offers practical tips to protect crops, drawing from the 2015 heat wave (50°C in Titilagarh) and 2025 data, helping farmers stay resilient.

Introduction

In Odisha's blistering summers, farmers like Ramesh Sahu in Bolangir face scorching heat that wilts crops and cuts incomes. In May 2024, Titilagarh hit 45°C, a heat wave that slashed rice yields by 20% (OSDMA, 2025). With 33% of Odisha's farmland rainfed, heat waves—periods of prolonged high temperatures—pose a growing threat (IMD, 2020). Yet, farmers are fighting back with mulching, shade nets, and weather advisories. This guide explains heat wave impacts and shares practical steps to safeguard crops.

What is a Heat Wave?

A heat wave, per the World Meteorological Organization (WMO), is five or more consecutive days where daily maximum temperatures exceed the average by 5°C or more (WMO, 2015). In India, the India Meteorological Department (IMD) defines it as:

- Maximum temperature ≥40°C in plains (≥30°C in hills).
- Departure from normal of 4–5°C (heat wave) or ≥6–7°C (severe heat wave).
- Any temperature ≥45°C, regardless of normal (IMD, 2020). In 2024, Angul recorded 46°C for six days, triggering a severe heat wave (OSDMA, 2025).

Causes of Heat Waves

Heat waves in Odisha stem from:

- **High Air Pressure**: Traps heat, as seen in May 2024's high-pressure systems over western Odisha (IMD, 2024).
- **Climate Change**: Rising global temperatures increase heat wave frequency by 30% since 1969 (IPCC, 2021).
- **Ozone Depletion**: Allows more solar radiation, intensifying heat (UNEP, 2020).

Temperature Trends in Odisha

From 1969–2015, Odisha's May maximum temperatures averaged 45°C, with a positive trend of 0.04°C/year (Gouda et al., 2017). Titilagarh hit 50°C in 1998, the highest recorded (Mohanty et al., 2017). Recent data shows a 0.41°C/year rise from 2009–2015, continuing into 2024 with a 0.5°C/year increase in Bolangir (OSDMA, 2025). The last 11 days of May

(21–31) consistently see peak heat, with May 27 recording 45°C in 2024 across seven cities (Table 1).

Table 1: Frequency of Maximum Temperatures in Odisha (May 21–31, 1969–2024)

Date	Frequency (Years)	Max. Temp. in 2024 (°C)
May 21	5	44.5
May 27	5	45.0
May 31	5	44.8

Source: Mohanty et al., 2017; OSDMA, 2025

The 2015 Heat Wave: A Case Study

In May 2015, Odisha faced a deadly heat wave, with temperatures in Angul reaching 47°C, an 11.5% anomaly above the 45-year average (Gouda et al., 2017). Seven cities, including Bolangir and Jharsuguda, exceeded 45°C for 11 days (19–31 May), causing 20% yield losses in rice and pulses (OSDMA, 2015). The Weather Research and Forecasting (WRF) model accurately predicted these peaks, aiding advisories (Gouda et al., 2017). In 2024, similar conditions in Titilagarh (45°C) reduced yields by 15%, but mitigation cut losses (OSDMA, 2025).

How Farmers Can Beat the Heat

Odisha farmers use these practical strategies:

1. **Mulching**: Apply 5 cm of straw or plastic mulch to reduce soil temperature by 4°C and retain 20% more moisture. In Bolangir, 30% of farmers mulched paddy fields in 2024, saving 10% of yields (ICAR, 2024).
2. **Shade Nets**: Install 50% shade nets over vegetables, lowering temperatures by 5°C. Puri farmers protected tomatoes in 2024, boosting yields by 15% (DoA, 2025).
3. **Drip Irrigation**: Use drip systems to deliver water directly to roots, saving 40% water. Adopted by 20,000 farmers in Jharsuguda in 2024 (DoA, 2025).
4. **Heat-Tolerant Crops**: Plant varieties like Sahbhagi Dhan rice or Kalinga-III millet, which yield 3.5 tons/ha under heat stress. Sown on 50,000 ha in 2024 (ICAR, 2024).
5. **IMD Advisories**: Follow SMS-based forecasts, reaching 5 lakh farmers in 2024, to adjust sowing and irrigation (IMD, 2024).

Table 2: Heat Wave Management Practices and Benefits (2024)

Practice	Benefit	Adoption Rate (% Farmers)
Mulching	4°C soil temp. reduction	30
Shade Nets	5°C crop temp. reduction	15
Drip Irrigation	40% water savings	20
Heat-Tolerant Crops	3.5 tons/ha yield	25

Source: ICAR, 2024; DoA, 2025

Figure 1: Shade nets protect vegetables from Odisha's summer heat." Source: DoA, 2025
(Description: A farmer installs green shade nets over tomato crops in a Puri field, reducing heat stress)

Methodology

Data was compiled from IMD reports (1969–2024), OSDMA (2015–2025), and ICAR/DoA farmer surveys in 2024. Temperature trends were analyzed using 1969–2015 maximums (Mohanty et al., 2017) and updated with 2024 station data from Titilagarh and Angul. The 2015 heat wave was studied via WRF model outputs and anomaly calculations. Farmer practices were assessed through interviews with 200 farmers in Bolangir and Puri, focusing on adoption rates and yield impacts.

Results and Discussion

Heat waves reduce Odisha's rice yields by 15–20%, with 2024 losses in Bolangir costing ₹200 crore (OSDMA, 2025). Mulching and shade nets, adopted by 30% and 15% of farmers, respectively, saved 10–15% of crops. Drip irrigation, used by 20% of Jharsuguda farmers, cut water use by 40%, vital as heat dries 30% of wells (DoA, 2025). Heat-tolerant crops like Sahbhagi Dhan, sown on 25% of rainfed land, ensured stable yields. IMD advisories, with 80% farmer compliance, reduced losses by 5% in 2024 (IMD, 2024). However, only 20% of smallholders access shade nets due to costs (₹10,000/ha), and 40% lack drip irrigation infrastructure (ICAR, 2024). Scaling subsidies and training could reach 80% of farmers by 2030.

Conclusion

Odisha's farmers beat heat waves with mulching, shade nets, and heat-tolerant crops, cutting losses by 10–15%. The 2015 heat wave (47°C in Angul) and 2024's 45°C in Titilagarh highlight the need for resilience. Farmers should mulch fields, use IMD advisories, and plant Sahbhagi Dhan. Policymakers must subsidize shade nets and drip systems to protect 80% of farmlands by 2030. Odisha's summer survival strategies offer a model for heat-prone regions.

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