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Impact of Climate Change on Flower Crops in India

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India's vibrant floriculture sector, valued at over ₹15,000 crores, has blossomed in recent decades, with major flower crops like rose, marigold, jasmine, chrysanthemum, tuberose, and gerbera forming the backbone of domestic and export markets. Flowers are integral to Indian culture—for worship, festivals, weddings, and social functions. However, climate change is emerging as a serious threat to this blooming industry. Unpredictable rainfall, heatwaves, shifting flowering times, and rising pest attacks are already disrupting flower crop production, quality, and farmer livelihoods across the country. This article explores the current and future impacts of climate change on India's floriculture, while also highlighting farmer experiences, coping strategies, and policy support needed for resilience.

Rising Temperatures: A Silent Stressor

Many flower crops are highly temperature-sensitive:

- Roses thrive best at 24–28°C. Higher temperatures cause reduced bud size, discolouration, and shorter stems.
- Gerberas and carnations grown under polyhouses face heat stress when temperatures cross 35°C.
- Tuberose exhibits flower deformities under heatwave conditions.
- Heat also impacts pigment formation, fragrance development, and shelf life—key commercial qualities. States like Karnataka, Maharashtra, and Tamil Nadu report declining flower quality during unseasonal hot spells.

Erratic Rainfall and Droughts

Climate change is making rainfall more erratic and intense:

- Excess rain causes fungal diseases like botrytis and downy mildew, especially in rose and marigold.
- Prolonged dry spells affect water availability, delaying flowering in crops like jasmine and gladiolus. Unseasonal rains damage ready-to-harvest crops during festivals or export schedules.
- Open-field flower crops are especially vulnerable. Farmers in Maharashtra and Odisha have reported frequent damage to marigold and chrysanthemum during monsoons.

Increased Pest and Disease Incidence

Warmer winters and humid summers enable pests to thrive year-round:

- Aphids, thrips, and mites increase under mild winters.
- Powdery mildew, rust, and leaf blight outbreaks are common in high humidity.
- Whitefly infestations in gerbera and tuberose are rising, even under protected cultivation.
- This results in increased pesticide use, higher production costs, and residue concerns in export markets. Integrated Pest Management (IPM) adoption is still limited among smallholders.

Extreme Weather Events: Cyclones and Hailstorms

Extreme events like cyclones, hailstorms, and floods have become more frequent:

- Cyclone Amphan damaged flower nurseries in West Bengal.
- Hailstorms in Punjab and Himachal Pradesh affected rose and gladiolus production.
- Polyhouses and net houses are being torn apart by windstorms in parts of Maharashtra.
- Such events lead to direct crop loss, infrastructure damage, and missed marketing windows, especially around festivals like Diwali, Valentine's Day, and weddings.

Shifting Flowering Patterns

Changes in temperature and photoperiod are disrupting flowering cycles:

- Jasmine is blooming 10–15 days earlier in Tamil Nadu.
- Chrysanthemum is flowering out of sync with winter markets.
- Marigold shows shorter blooming duration and staggered flowering.
- This affects both domestic sales and export timelines, where synchronized flowering and harvest are critical.

Impact on Flower Quality and Export Potential

- Flower exports require strict standards on stem length, bud size, color uniformity, and absence of pest damage.
- Heat and stress reduce fragrance and petal size.
- Increased pesticide use raises concerns over chemical residues.
- Global buyers demand uniformity, which becomes harder to maintain under climate variability.
- India's competitiveness in floriculture exports to Europe, UAE, and Southeast Asia is at risk without climate-resilient practices.

Farmer Experiences and Adaptations

Flower growers are experimenting with several coping mechanisms:

- Shifting sowing dates based on changing weather.
- Using mulching and drip irrigation to manage water efficiently.
- Installing polyhouses and shade nets to reduce temperature and humidity stress.
- Growing heat- and disease-tolerant varieties developed by institutions like ICAR-IIHR and TNAU.
- However, these adaptations need financial support, timely information, and institutional backing.

Policy Support and Government Initiatives

Government and research institutions are taking steps:

- Mission for Integrated Development of Horticulture (MIDH) supports protected cultivation infrastructure.
- Krishi Vigyan Kendras (KVKs) offer agro-advisories and training on pest management and climate adaptation.
- National Innovations in Climate Resilient Agriculture (NICRA) is piloting climate-smart models in floriculture clusters.
- However, many schemes focus on food crops; flower crops need dedicated support for insurance, research funding, and marketing infrastructure.

Role of Research and Innovation

Key research directions include:

- Developing climate-resilient flower varieties (heat- and drought-tolerant).
- Use of plant growth regulators to manage flowering and stress.
- Remote sensing and AI tools for pest prediction and flowering models.
- Innovations in post-harvest handling (cold chains, packaging) to reduce climate-induced losses.

- India's floriculture research needs to be mainstreamed into national climate action plans.

Way Forward: Recommendations for a Resilient Future

- Breed and promote stress-tolerant flower varieties
- Expand insurance coverage to include floriculture crops.
- Provide incentives for protected cultivation, especially for smallholders.
- Integrate floriculture into climate-smart village programs.
- Encourage youth and women entrepreneurship in sustainable floriculture.

Conclusion

Securing the Fragrance of India's Future

India's flowers bring beauty, income, and cultural pride—but they are wilting under the pressure of a changing climate. With coordinated action across research, policy, and farmer empowerment, the sector can continue to bloom sustainably. Investing in climate-smart floriculture is not just an agricultural necessity, but also an economic and cultural imperative.