



Smart Tomato Cultivation under Polyhouse Technology

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Tomato is one of India's most important vegetable crops, but open-field cultivation faces challenges like erratic weather, pests, and low yields. Polyhouse technology offers a controlled environment that increases productivity, quality, and year-round production. This article covers the basics of smart polyhouse tomato cultivation, from structure selection to post-harvest management.

Introduction

Polyhouse, or protected cultivation, uses UV-stabilized polyethylene to create a microclimate. For tomatoes, this means better temperature control, reduced disease pressure, and 2-3x higher yield compared to open fields. "Smart" polyhouses add sensors, automation, and fertigation for precision farming.

Site Selection & Structure

- Location : Flat land with good drainage, low wind velocity. Udaipur's climate is suitable with shade nets in summer.
- Orientation : North-South for uniform light distribution.
- Type : Naturally ventilated polyhouse for tomatoes is most cost-effective. Fan-pad system for extreme heat.
- Size : 500-1000 sqm is ideal for beginners.

Variety Selection

Choose determinate or indeterminate hybrids bred for protected cultivation. Key traits: heat tolerance, TYLCV resistance, good shelf life.

Examples: NS 4266, Abhinav, Heemsohna, Rakshita. Check ICAR-IIHR recommendations for Rajasthan.

Smart Practices for Higher Yield

- Climate Control : Maintain 20-28°C day, 15-18°C night. Use exhaust fans + shade net >50% in Udaipur summers. Humidity 60-70%.
- Drip + Fertigation : Drip irrigation saves 40% water. Fertigate with NPK + micronutrients based on soil + sap testing. EC 2.0-3.5 dS/m.
- Training & Pruning : Single-stem training with plastic twine. Remove side shoots weekly. Improves air circulation and fruit size.
- Pollination : Use bumblebees or vibrators. Polyhouses lack natural pollinators.
- Sensors & IoT : Soil moisture, temperature, humidity sensors linked to mobile apps help automate irrigation and alerts.
- IPM : Yellow sticky traps, neem-based sprays, biocontrol agents like Trichoderma. Avoid calendar spraying.

Crop Calendar & Yield

- Nursery : 25-30 days in pro-trays under 50% shade net

- Transplanting : 45-60cm spacing, 2 rows/bed
- First Harvest : 70-80 days after transplanting
- Yield : 25-40 kg/sqm/cycle in a well-managed polyhouse vs 6-8 kg/sqm in open field

Advantages & Economics

Advantages : Year-round production, better quality, 50% less water, 70% less pesticide.

Economics : Initial cost ₹1200-1800/sqm for NVPH. Subsidy available under MIDH/NHM. B:C ratio often >2.5 for tomatoes with good market linkage.

Challenges

High initial investment, need for technical knowledge, power dependence for fan-pad systems, and market price fluctuations.

Conclusion

Smart tomato cultivation under polyhouse technology is a viable option for farmers in Udaipur and similar regions. With proper training, automation, and market planning, it shifts farming from risk management to profit management