



Table 1: Comparison Between Open Field and Polyhouse Vegetable Production

Parameter	Open Field Production	Polyhouse Production
Environmental control	No control	Controlled environment
Yield	Moderate	Very high
Vegetable quality	Average	Superior
Pest and disease incidence	High	Low
Seasonal limitation	Yes	Year-round production
Water use efficiency	Low	High
Income	Moderate	High

#### Smart Technologies Used in Polyhouse

Modern polyhouse vegetable production uses advanced technologies such as drip irrigation, fertigation, plastic mulching, insect-proof nets, temperature and humidity control systems, and improved hybrid varieties. These technologies help provide precise water and nutrient supply, protect crops from pests, and maintain ideal growing conditions. As a result, they enhance crop growth, increase productivity, improve quality, and ensure efficient use of resources.

#### Challenges

Some limitations include:

- High initial investment
- Need for technical knowledge
- Maintenance cost

However, government subsidies and training programs help farmers adopt this technology.

#### CONCLUSION

Smart polyhouse vegetable production is a revolutionary technology in modern horticulture. It provides a controlled environment for growing high-quality vegetables throughout the year. This system increases yield, improves quality, saves water, and ensures higher income for farmers. Although it requires initial investment and proper management, the long-term benefits make it a highly profitable and sustainable option. Polyhouse technology represents the future of vegetable production in horticulture.

#### Introduction

Vegetable production is an important part of horticulture, but open-field cultivation often faces problems like extreme temperatures, heavy rainfall, frost, pests, and diseases. These factors reduce yield and quality, leading to lower income for farmers. To overcome these challenges, smart polyhouse vegetable production has emerged as a modern and profitable technology in horticulture. A polyhouse is a protected structure covered with transparent polythene that creates a favorable environment for plant growth. Smart polyhouse technology allows farmers to control temperature, humidity, irrigation, and nutrients, resulting in higher productivity and better quality vegetables. This system is becoming increasingly popular among farmers, entrepreneurs, and horticulture students due to its high income potential and efficient resource use.



#### What is Smart Polyhouse Vegetable Production?

Smart polyhouse vegetable production refers to the cultivation of vegetables inside a controlled polyhouse using modern technologies like drip irrigation, fertigation, mulching, and environmental management. The polyhouse protects crops from unfavorable weather and provides ideal conditions for growth.

Key features include:

- Controlled temperature and humidity
  - Protection from rain, wind, and frost
  - Efficient water and nutrient management
  - Reduced pest and disease incidence
- This ensures healthy plant growth and high yield.

#### Importance in Modern Horticulture

Polyhouse technology plays a major role in modern horticulture by enabling year-round vegetable production. Farmers can grow vegetables even in the off-season when market prices are high. It also improves water-use efficiency and reduces crop losses caused by climate change.

Polyhouse cultivation is especially useful in areas with:

- Extreme temperatures
- Water scarcity
- Unpredictable climate

It supports sustainable and profitable vegetable production.

#### Major Vegetables Grown in Polyhouse

Several vegetables are highly suitable and profitable under polyhouse cultivation due to the controlled growing environment and higher productivity. Important crops include capsicum (Shimla Mirch), tomato, cucumber, lettuce, spinach, and exotic vegetables such as cherry tomato and zucchini. These crops perform well under protected conditions, producing higher yields with better quality. Among them, colored capsicum is considered the most profitable polyhouse vegetable crop because of its high market demand, premium price, and excellent productivity under protected cultivation.

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कोटा, राजस्थान



Smart Polyhouse Vegetable Production in Horticulture: Complete Guide for Higher Yield and Profit

संकलन

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