

PROTECTED CULTIVATION – A NEW AGE AGRICULTURE

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ARTICLE ID: 036

INTRODUCTION

Our mother nature is being wounded by several bruises day by day. As a result, natural resources such as land, water, and air are polluted and limited. In today's era, increasing population and modernization of infrastructure works are leading to declined land especially agricultural land. Simultaneously, the value of land is increasing. Another major factor is the diminishing water resource worldwide. To bridge the gap between higher production and limited resources, a new way of an approach called "Protected Agriculture" germinated.

Protected Cultivation is a technique in which a plant is grown under microclimatic conditions i.e., the plant is grown under fully or partially controlled or modified atmospheric conditions to protect the plant from biotic and abiotic stress factors. This technique is being mostly used for horticultural crops like vegetables, flowers, etc. where the yield is higher than the normal conventional method of planting.

PRINCIPLE

Photosynthetic activity is usually done at the range of 400- 700 nm wavelength. These protected structures generally reflect 43% of the net solar radiation incident upon it (Range 400-700 nm) which in turn increases the photosynthetic activity of plants inside the protected structure.

ROLE OF NANOTECHNOLOGY

Nanotechnologies too can be applied to regulate the protected environment in a greenhouse, especially in places with difficult weather conditions. Nanotechnologies can work as a shield against infrared rays while maintaining transmittance unaltered. This means that the quantity

of light that reaches plants is not modified, but the temperature is lowered. Besides, films last longer as rays are reflected. In some cases, they can last double the time of normal films.

By the architected cellular technology, the robotic gripper was capable of handling soft objects such as bell peppers, tomatoes, and even eggs without breaking or damaging them, mimicking the strength and tenderness of a human hand.

PRODUCTION SYSTEM FOR VEGETABLE CROPS UNDER PROTECTED CULTIVATION

Soil system (Geonics)	Soil
Soilless Cultivation	Coconut fibre, perlite, vermiculite, rock wool, Rice hulls, coco peat, etc.
Hydroponics	Water and Nutrient solution
Aeroponics	Hang in the air (Roots absorb atmospheric moisture)

TYPES OF POLYHOUSES

- Low cost or naturally ventilated poly house.
- Medium cost or partial climate-controlled polyhouses.
- High cost or fully climate-controlled polyhouses.
- Plastic low tunnels.
- Net houses.

ADVANTAGES

- Plants grew more quickly and mature earlier.
- Improves the efficiency of production and quality of produce thereby preventing the nutrients from leaching.
- Black plastic mulch prevents the growth of weeds.
- Increases the photosynthetic efficiency during daytime due to the greenhouse effect.

- Mulching facilitates less water requirement than open field conditions.
- Clean and disease-free quality products can be obtained.
- The soil under plastic low tunnels is loose, friable, and well aerated.

DISADVANTAGES

- Higher establishment cost and maintenance cost than traditional practices.
- Requires skilled persons to harness the full potential of protected cultivation technology.
- Timely management of operations is necessary to derive higher returns.

CONCLUSION

In the nutshell, the protected agriculture is a cost-effective technique in long run. This technique also provides a congenial environment for season cultivation as well as high and quality production. Therefore, the increasing demand for vegetables for the growing population can be fulfilled by this technology. Nowadays this is an emerging business idea among young farmers and the government is also supporting them by providing subsidies the establishment of this technology.

