

INTRODUCTION TO GREEN HOUSE TECHNOLOGY

**PROTECTED CULTIVATION AND POST
HARVEST TECHNOLOGY
(ASAE3204)**



PROTECTED CULTIVATION

Defined as a **cropping** technique wherein the micro climate surrounding the plant body is controlled partially or fully as per the requirement of the vegetable species grown during their period of growth.



Protected cultivation ensures:

- ❖ Conservation of soil moisture
- ❖ Efficient use of energy mainly solar

CROPS FOR PROTECTED CULTIVATION

Greenhouse technology is more suited to vegetables crops (such as **tomato, capsicum, cucumber, french bean, cabbage, chillies, spinach, cauliflower** etc.)

Flowers (like rose, gerbera, carnation etc.) and nursery for all vegetable crops, because of their small lifespan.

Need of Protected Cultivation

- Higher yield
- Year round cultivation
- Better quality
- Off-season production
- Assured production
- Generate self employment for the educated rural youth in the farm sector
- Least pesticide residues
- Controlled pollination
- Easier plant protection
- Weed free cultivation

Green house



A greenhouse is a **framed or an inflated** structure covered with a **transparent or translucent material** in which crops could be grown under the conditions of at least partially controlled environment and which is large enough to permit persons to work within it to carry out cultural operations.

HISTORY

- The growing of off - season cucumbers under transparent stone for Emperor Tiberius in the 1st century, is the earliest reported protected agriculture and was rarely employed during the next 1500 years.
- In the 16th century, glass lanterns, bell jars and hot beds covered with glass were used to protect horticultural crops against cold.
- In the 17th century, low portable wooden frames covered with an oiled translucent paper were used to warm the plant environment.
- The first greenhouse in the 1700s used glass on one side only as a sloping roof. Later in the century, glass was used on both sides. Glasshouses were used for fruit crops such as melons, grapes, peaches and strawberries, and rarely for vegetable production.

CONTINUED.....

- The first use of polyethylene as a greenhouse cover was in 1948, when professor Emery Myers Emmert, at the University of Kentucky, used the less expensive material in place of more expensive glass.
- Protected agriculture was fully established with the introduction of polyethylene after the World war II.
- Since 1960, the greenhouse has evolved into more than a plant protector. It is now better understood as a system of controlled environment agriculture (CEA), with precise control of air and root temperature, water, humidity, plant nutrition, carbon dioxide and light.

GREENHOUSE EFFECT

- In general, the percentage of carbon dioxide in the atmosphere is 0.035% (345 ppm).
- Due to the emission of pollutants and exhaust gases into the atmosphere, the percentage of carbon dioxide increases which forms a blanket in the outer atmosphere.
- This causes the entrapping of the reflected solar radiation from the earth surface and leads to increase in atmospheric temperature & causing global warming, melting of ice caps and rise in the ocean levels which result in the submergence of coastal lines.
- This phenomenon of increase in the ambient temperature, due to the formation of the blanket of carbon dioxide is known as **GREENHOUSE EFFECT**.

- The greenhouse covering material acts in a similar way, as it is transparent to shorter wave radiation and opaque to long wave radiation.
- During the daytime, the shorter wave radiation enters into the greenhouse and gets reflected from the ground surface.
- This reflected radiation becomes long wave radiation and is entrapped inside the greenhouse by the covering material.
- This causes the increase in the greenhouse temperature. It is desirable effect from point of view of crop growth in the cold regions.

PRESENT SCENARIO

Country	Area (Ha)
China	81.0
Spain	70.4
South Korea	47.0
Japan	36.0
Turkey	25.0
India	25.0
Italy	16.5

ADVANTAGES OF GREENHOUSES

1. Throughout the year **four to five crops** can be grown in a green house due to availability of required plant environmental conditions.
2. It gives **higher yield**.
3. **Superior quality** produce can be obtained as they are grown under suitably controlled environment.
4. Gadgets for efficient use of various inputs like water, fertilizers, seeds and plant protection chemicals can be **well maintained** in a green house.
5. Effective **control of pests and diseases** is possible as the growing area is enclosed.

6. Percentage of germination of seeds is high.
7. The **acclimatization** of plantlets of tissue culture technique can be carried out in a green house.
8. Agricultural and horticultural crop production schedules can be planned to take advantage of the market needs.
9. Different types of **growing medium** like peat mass, vermiculate, rice hulls and compost that are used in intensive agriculture can be effectively utilized in the greenhouse.

10. Export quality produce of international standards can be produced in a green house
11. When the crops are not grown, drying and related operations of the harvested produce can be taken up utilizing the entrapped heat.
12. Greenhouses are suitable for automation of irrigation, application of other inputs and environmental controls by using computers and artificial intelligence techniques.
13. Self-employment for educated youth .

Disadvantages

- High installation cost.
- Skilled operator is required.
- High maintenance cost.
- User friendly software in case of automation of green-houses



**THANK
YOU**