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# Center for Smart Agriculture

## Protected floriculture



**Module 1:** Importance and types of protected structure  
**Session 4:** Types of protected structure  
(Types of greenhouse)



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## Introduction

Greenhouse structures of various types are used successfully for crop production. Although there are advantages in each type for a particular application, in general there is no single type greenhouse, which can be considered as the best. Different types of greenhouses are designed to meet the specific needs.





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## Types of greenhouse

### 1. Based on shape

- ❖ Lean-to type
- ❖ Even span type
- ❖ Uneven span type
- ❖ Ridge and furrow type
- ❖ Saw tooth type
- ❖ Quonset type



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**Saw tooth type greenhouses**



**Quonset Type Greenhouse**

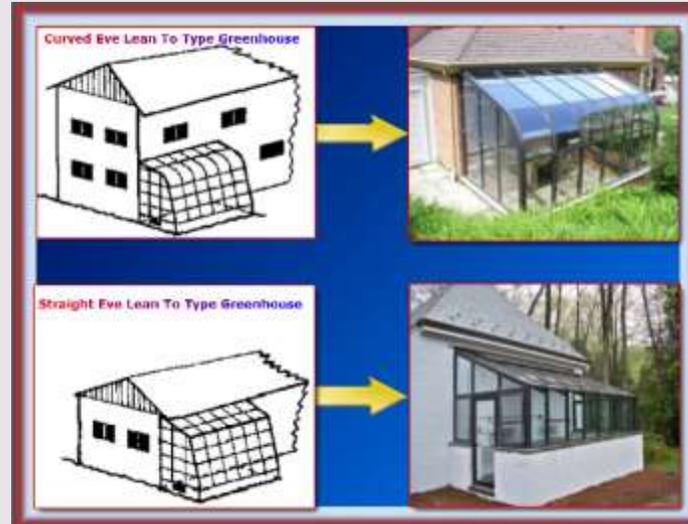


**Ridge and furrow type greenhouses**



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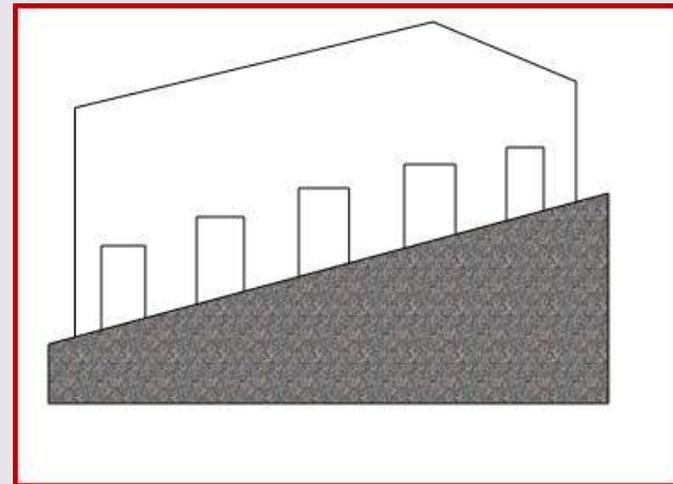
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**Lean-to-type type greenhouses**



**Even Span Type Greenhouse**



**Uneven Span Type Greenhouse**



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# 1. Based on shape

For this purpose of classification, the uniqueness of the cross section of the greenhouses can be considered as a factor.

## 1. Lean-to type

- A lean-to design is used when a greenhouse is placed against the side of an existing building.
- It is typically facing south side.
- It is limited to single or double-row plant benches with a total width of 7 to 12 feet. It can be as long as the building it is attached to.
- It should face the best direction for adequate sun exposure.



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## **Advantages**

- It is usually close to available electricity, water, and heat.
- Least expensive structure.
- Makes the best use of sunlight and minimizes the requirement of roof supports.

## **Disadvantages**

- Limited control of space, light, ventilation and temperature.
- The height of the supporting wall limits the potential size of the design.
- Temperature control is more difficult.
- It is a half greenhouse, split along the peak of the roof.



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## 2. Even span type

- It is the standard type and full-size structure. ,
- the two roof slopes are of equal pitch and width.
- This design is used for the greenhouse of small size, and it is constructed on level ground.
- It can accommodate 2 or 3 rows of plant benches.
- For single span type the span in general, varies from 5 to 9 m, whereas the length is around 24 m. The height varies from 2.5 to 4.3 m.
- Several single and multiple span types are available for use in various regions of India.



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### **3. Uneven span type**

This type of greenhouse is constructed on hilly terrain.

The roofs are of unequal width; make the structure adaptable to the side slopes of hill.

This type of greenhouses is seldom used now-a-days as it is not adaptable for automation.



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#### 4. Ridge and furrow type

- Polyvinyl chloride rigid panels, fibre glass-reinforced plastic, acrylic and polycarbonate rigid panels are used for covering.
- The main disadvantage is that these panels tend to collect dust as well as to harbor algae, which results in darkening of the panels and subsequent reduction in the light transmission.



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## 2. Based on utility

### Utility of Greenhouse

**Active heating**



**Active cooling**

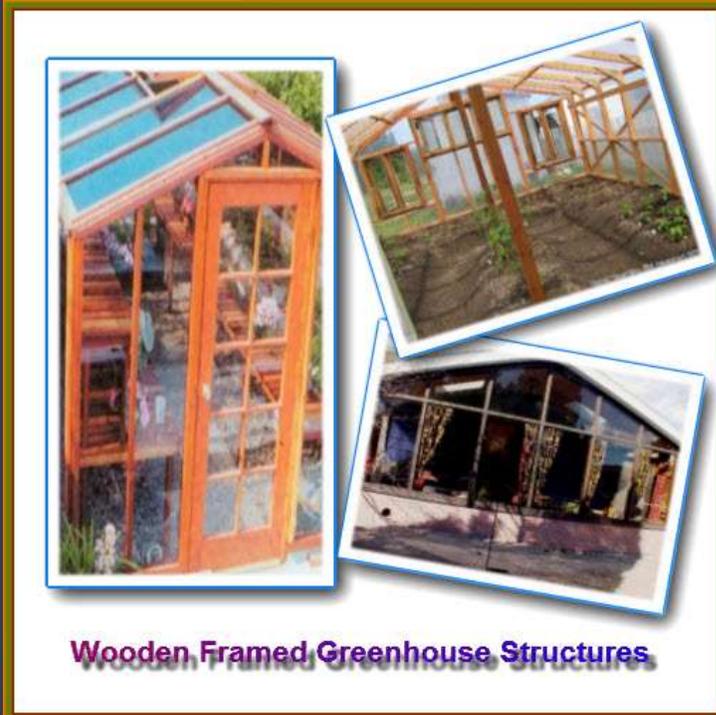




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### 3. Based on construction



**Wooden Framed Greenhouse Structures**



**Pipe Framed Greenhouse Structures**



**Truss Framed Greenhouse Structures**



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## 4. Based on covering materials



**Glass Greenhouse**



**Polyethylene film greenhouse**



**Shading nets**



**Rigid panel greenhouses**



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**Thank You**