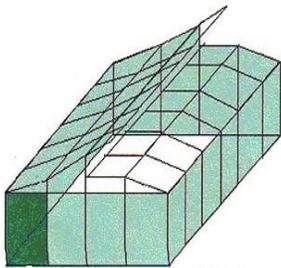


**Tropical Greenhouses: Design, Construction and Supply Lists**  
**(metric units) (also called: polyhouses, hightunnels)- 3 designs**

**(Polyethylene roof with PVC pipe, wood or bamboo supports;  
insect netting side walls)**



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## **Overview**

This manual provides detailed construction information for two sizes of tropical greenhouse designs- 12 m x 6 m and 11 m x 52 m. It also provides specific supply and parts lists, construction sequence with photographs, and estimated costs for each item. References for a greenhouse vegetable production manual in tropical regions is given. The definition of “tropical” used here is an area that has lowest temperatures above 0 ° C. The technical definition of “tropics” is any location between 23° N and 23° S latitudes. However, for the purposes of greenhouse design, the need for improved ventilation, rain protection, and insect exclusion are the primary factors.

## **Introduction**

Greenhouses are used in many tropical regions of the world for the production of vegetable crops. The primary reasons for protected cultivation in the tropics are for pest exclusion, protection from extreme solar radiation, and heavy rain / wind protection. These are somewhat different primary reasons than for greenhouses in temperate zones where controlling temperature extremes are the primary factors in greenhouse construction.

Because tropical greenhouses are used for different reasons than temperate ones, their design and construction is also different. An effective design uses insect netting for side walls and a passively ventilated polyethylene or polycarbonate panel roof. In many developing countries, a need exists for a low-cost greenhouse, using locally available materials where possible.

The following designs incorporate the needed components for a greenhouse in the tropics: locally available support materials

(bamboo, “greenwood” or finished lumber poles), passive ventilation (no electricity required), reliable protection from heavy rain, and a low-cost pest exclusion side wall material. Working examples of this design are currently in El Salvador, Malawi, Nicaragua, Honduras, Costa Rica, Jamaica and Guyana. Similar designs are used in Thailand, Mexico, Egypt, among other places.

One underlying factor that is important in any design is the amount of vent area. For passive or naturally ventilated greenhouses, the roof vent area should be 20% of the floor area and located on the leeward side of the greenhouse. Thus, for the first design in this manual, 6 meters by 12 meters equals 72 meters of floor area. The roof vents should be  $72 \times 0.20 = 14.4$  square meters. The design below has roof vents of 12 meters long by 1.2 meters wide, which equals 14.4 square meters. Bottom/ side vent area is important in temperate greenhouses, but with insect netting for side walls in this tropical design, it is not a factor. The total estimated cost is \$1000 or \$14 / square meter.

Construction time (after site is level and all supplies are on-site) is about 40 person-days (10 people x 4 days, or 5 people x 8 days).