

CONTROLLED ENVIRONMENT AGRICULTURE (FAN and PAD)



Compare to above all protected cultivation models, this is very costlier model. This enables one to create a microclimate essential to the plants. Exotic fruits, vegetables and flowers can be cultivated year around, with greater quality and in quantities.,

Water is made to continuously fall and make The cellulose / Honeycomb evaporative panel wet, the air from outside, when blows through these pads brings cooler air into the polyhouse, in opposite side, The negative exhaust fans, sucks the hot air and exhaust to the outside of the polyhouse. Simply the cool air comes-in from pads and the hot air blown-out through the exhaust fans. This way Temperature, Relative Humidity, and Co₂ parameters are controlled. The smart agriculture (Sensor based automation) ensures that all the growing parameters within the limits, if there's any changes, the respective sensors sense the changes, and immediately activate their respective systems to operate and bring the parameters within the prescribed ranges.

These polyhouses are equipped with boom sprayer for irrigation and fertigation (Optional), Heaters, Cooling system, Artificial lighting, Co₂ generators, Humidifier / dehumidifiers etc.... Installation of all with complete automation costs more. Based on the necessity and budget few can be installed.

Overall, growing crop under Fan-Pad polyhouse, ensures a quality and quantitative crop yield, round the year.

To obtain desired and greater results, regular scouting (Observation) of crops manually, and with few devices is very much advised. Ie., Hygrometer (Temperature / Humidity), Anemometer (Air velocity / pressure), IR thermometer (Leaf surface temperature), Co₂ meter (Carbon dioxide level checking), PAR/Quantum meter (Light intensity) pH/EC/TDS meter (Water and nutrients parameters), Sodium meter (Sodium level checking in water/nutrients), Hand held lenses/mobile lenses (Pest / insect detection) etc....

SPECIFICATION OF THE FAN-PAD POLYHOUSE

Item	Specification / Standard
Structural Grid	8 x 4 Mtrs.
Height of the Structure (Ridge)	6 Mtrs.
Longitudinal slope	1-2%
Type and Shape	Tunnel Type, Aerodynamic at gutter side only .
Foundation	Crimped / Anchoring type foundation, with 76mm OD, 2 /3 mm thickness pipe. Foundation should be 90+ cm; PCC/Concrete 1:2:3/ 1:3:6. properly compacted over 10 cm layer of 1:8:16.Two holdfast to be used in perpendicular direction at 20 cm apart in concrete starting from 20 cm from base.
Air velocity / Pressure	Air velocity: 110-120 Km/Hr; Least 50 Kg/Sqm. wind pressure.
Live Load / Dead load	live load: Maximum of 25 Kg/Sqm.; Each member of roof should be capable of supporting 45 kg of concentrated load when applied at its centre.
Galvanized pipes	375-400 GSM, Zinc coated GI Tabular pipes, Size: OD: 76.1 mm, 60.3 mm, 48.3mm, 42.4mm, 33.7mm, 26.9 mm, 21.3 mm ... Thickness.: 2mm / 3mm.
Columns	76mm OD, 2mm thick.
Trusses	Bottom cord 60mm OD, 2mm thick; 8 Mtrs. Long, preferably without joints for better load bearing.
Trusses member/ Arch's	50mm OD with 2mm thickness; Bracing 33mm OD with 2.0mm thickness; G.I. Pipe Structural members to be fitted in plated nuts, bolts and washers without welding. (33 mm bracing to increase the strength and to with stand vertical and horizontal pressures.)
Stay/ Hockey pipes	60mm OD with 2mm thickness, fixed in the ground without any joints and welding at a distance of 2-2.5 m.
Purline	48 mm OD with 2.0mm thickness at ridge gutter arch and 42/43 OD with 2.0 mm thickness for 2nd purline.
Purline member and other	43 mm,2mm thickness
Horizontal bracings	42mm OD with 2mm thickness horizontal bracing 2 No's must provide each bay in both sides.
Cross Bracing	Every 3rd column top to 2nd column bottom of both sides must be connected 42mm OD with 2mm thickness GI pipe to ground the wind load. (In vegetable Poly houses to take the weight of the crop and transfer the wind pressure cross bracings are essential).
Bottom to pillar Bracing	33mm OD with 2mm thickness 1.2m long bracing to be fixed from pillar to bottom.
Nut-Bolts and Connectors	22 Micron Zinc Ferrous coated, Main connectors with 5mm Zinc Coating.

	M6, M8 and M10, Various sizes Nut-Bolts are used.
Gutter material	Thickness: 1.6mm to 2.0mm ; 450 mm width; GI Sheet with perimeter of 450 mm and with industrial press; 100% leakage proof; 275 GSM (grams per sq.mt.) Zinc coating. FYI: Ensure that proper silicon sealant is applied between gutter joints while installing for leak proof gutter system.
Gutter Slope	2.0%
Gutter height	4.0-4.5 Mtrs.
Gutter orientation	North-South (Default) , Can be changed based on other parameters ie., Wind direction, Latitude, Climate etc...
Negative exhaust / Coaxial FAN	Size: 50" Box Fan CFM: 21000 RPM: 500 to 600 Louvers: Auto Power: 1.5Hp, 3 phase, SS Blades Belt type Recommended: Munters (Sweden)
Cellulose evaporative pad	Material: Cellulose (CELdek) Thickness: 100 mm, (4") Height: 1.5 / 1.8 Mtrs Top & Bottom Assembly: ALUMINIUM Make Recommended: Munters (Sweden)
Water circular pump n Piping system	A water pump to the required capacity, with proper Piping system, for evenly water supply across the pad length. Ensuring, pad receives water, 6 Ltrs/Sqft. Water tank will be installed according to this quantity.
Digital Control with Sensory system	AUTO CONTROLLER: Controlling humidity & temperature and accordingly, operate fan & pad system. System comes with ISI standard materials, including Control panel & inside copper electrical wiring, Temperature & humidity Sensors also.
Curtain Wall. Brick / MS angle	22 cm brick wall of 1m height (24 cm below and 80 cm above ground level on all the four sides. The wall needs to be plastered and water proofing cement with 1:6 ratio. Provision to be made for opening & closing of ventilation OR 45 mm x 4 mm / 40mm 4 mm thickness, MS epoxy coated, frames are made to install Fan and Pads,
Rainwater harvesting	Provision of PVC pipe of min 4"-6" diameter with the lateral and ground support pipe with bend should be made, from gutter to ground for collecting rainwater from the roof top. Drainage gutter and end caps to be provided., either at one side or two sides (Highly recommended)
Reinforcement and Anti wind breakers	Multiple reinforcement and anti-wind breakers for the strength of the structure.

Polyethylene film	200 Microns, UV stabilized, Anti-drip/mist, Anti-dust, Diffused / IR blocking (Sulphur resistant for Rose), having minimum 85% level of light transmittance. Agriplast-Genegar (Israel); Agripolyane-Polywhite-3D (France), Politiv (Israel); Greenpro (India)
Polythene fixing	Aluminium profile, PVC coated 2-3 mm thick, Zig-Zag springs.
Shade net	UV stabilized, 50% shade, 115-120 Gsm, Mono net / Aluminet. Manual / Automatic collapsible mechanism.
Polythene fixing	Aluminium profile, PVC coated springs
Cladding Material	200 Microns, UV stabilized, Anti-drip/mist, Anti-dust, Diffused / IR blocking (Sulphur resistant for Rose), having minimum 85% level of light transmittance. Agriplast-Genegar (Israel); Agripolyane-Polywhite-3D (France), Politiv (Israel); Greenpro (India)
Anti-Chamber / Entrance room	Separate anti-chamber, Entrance room of size: 4 x 3 x 2.5 / 3 x 3 x 3 Mtrs.
Entrance room door	2 Mtrs x 2Mtrs, Sliding door, Aluminium/ Polycarbonate sheet.
Trellis	For cultivation of Capsicum, Tomato and Cucumber, GI wire of 80 GSM of 4 mm (8 guage) along the gable & 2.5 mm (12 guage) along the gutter, to be fixed over the beds in horizontal/ vertical direction.

Schemes and Subsidy for the Protected farming.

In India under National Horticulture Board (NHB), National Horticulture Mission (NHM), Mission for Integrated Development of Horticulture (MIDH), Rashtriya krishi vikas yojana (RKVY), and Horticulture Mission for Northeast Himalayan states (HMNEH), both central and state governments are providing subsidy on setup of Polyhouses/ Net house / Bamboo poly/net houses. the subsidy availability is subjected to respective states under NHM and the subsidy ranges from 50% to 100% based on different parameters (Region / Caste/Reservations etc..). Subsidy is available on Polyhouse, irrigation, and planting materials too. Under NHB, minimum area to get the subsidy for the polyhouse is 2500+ Sqm, whereas under NHM,MIDH and HMNEH there is no such restrictions.

NHB offers, 55 lakhs/project/person, that is the maximum subsidy one can get for the installation of the polyhouse.



POLYHOUSE LAYOUT

