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Center for Smart Agriculture

Protected floriculture



**Module 2: Components Pre-requisites for
protected cultivation of flower crops**

**Session 12: Irrigation system used in protected
structure**

growing
area

crop

weather
conditions

time of
year

The quantity of
water needed would
depend on-

Operation of
heating or
ventilation
system

soil type or
soil mix

size and type
of the
container

size and type
of the bed



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Rules of Watering

Rule 1

- Use a well drained substrate with good structure

Rule 2

- Water thoroughly each time

Rule 3

- Water just before initial moisture stress occurs



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Hand watering

- The most traditional method of irrigation is hand watering.
- Growers can afford hand watering only where a crop is still at a high density, such as in seed beds, or when they are watered at a few selected pots or areas that have dried sooner than others. In all cases, the labour saved will pay for the automatic system in less than one year. It soon will become apparent that this cost is too high.
- Where hand watering is practiced, a water breaker should be used on the end of the hose. Such a device breaks the force of the water, permitting a higher flow rate without washing the root substrate out of the bench or pot. It also lessens the risk of disrupting the structure of the substrate surface.
- Hand watering requires considerable time and is very boring.



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Cont....

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Hand watering



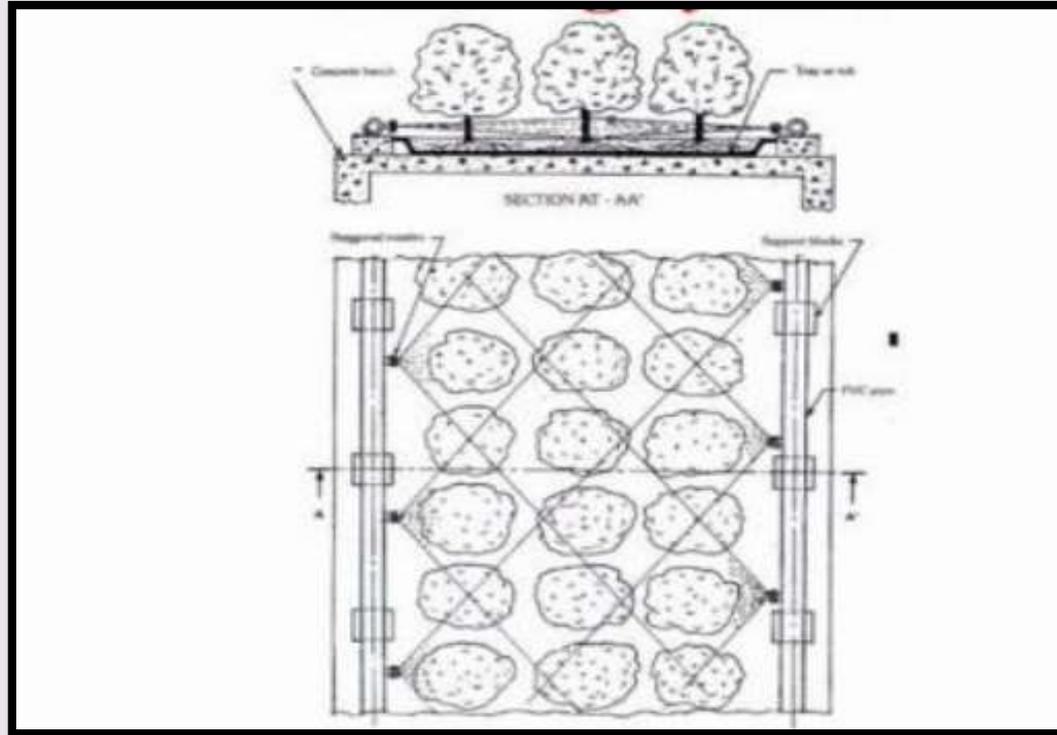
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Perimeter watering

- Perimeter watering system can be used for crop production in benches or beds. A typical system consists of a plastic pipe around the perimeter of a bench with nozzles that spray water over the substrate surface below the foliage. Either polythene or PVC pipe can be used. While PVC pipe has the advantage of being very stationery, polythene pipe tends to roll if it is not anchored firmly to the side of the bench. This causes nozzles to rise or fall from proper orientation to the substrate surface.



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Perimeter watering



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Overhead sprinklers

- A pipe is installed along the middle of a bed. Riser pipes are installed periodically to a height well above the final height of the crop. A total height of 0.6 m is sufficient for bedding plants flats and 1.8 m for fresh flowers.
- A nozzle is installed at the top of each riser. Nozzles vary from those that throw a 360° pattern continuously to types that rotate around a 360° circle. Trays are sometimes placed under pots to collect water that would otherwise fall on the ground between pots and wasted.



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Overhead sprinklers



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Boom watering

- Boom watering can function either as open or a closed system, and is used often for the production of seedlings grown in plug trays.
- A boom watering system generally consists of a water pipe boom that extends from one side of a greenhouse bay to the other. The pipe is fitted with nozzles that can spray either water or fertilizer solution down onto the crop. The boom is attached at its center point to a carriage that rides along rails, often suspended above the centre walk of the greenhouse bay. In this way, the boom can pass from one end of the bay to the other.



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Boom watering



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Drip Irrigation





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Benefits of drip system

- (i) More efficient water use
- (ii) More efficient use of fertilisers
- (iii) Less pumping cost
- (iv) Less chemical usage
- (v) Less labour required
- (vi) Significantly higher yield
- (vii) Better crop quality
- (viii) Better uniformity of application



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Misters and Foggers

- Fogging system is fairly effective and uniform method of greenhouse cooling that provides a reasonable increase in relative humidity inside greenhouse.
- Foggers are connected to lateral with micro-tube and it is hanging over iron wire in greenhouse (3 m above). Misters are attached to stakes in beds.
- Foggers and misters spray about 70 micron size of water in air and evaporated before falling onto the crop canopy.



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Cont...

- Foggers and misters are equipped with an anti-leak devices which does not allow flow of water droplets to fall down after the system is switched off.
- They have small discharge rate with small area coverage. The operating pressure of fogger and mister varies from 3 to 5 kg/cm².
- Generally the time of operation of foggers and misters are 30 to 60 sec, three or four times in an hour at specific time interval.



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Foggers



Misters



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THANK YOU