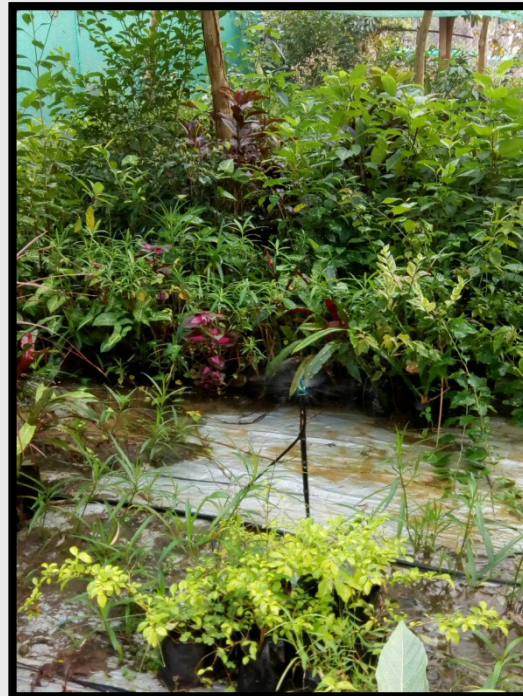




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Center for Smart Agriculture **Applied Hi-Tech Horticulture**



Module 2: Micro irrigation
Session 18: Sprinkler irrigation in different horticultural crops.



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Introduction

Sprinkler Irrigation is a method of applying irrigation water which is similar to rainfall.

Water is distributed through a system of pipes usually by pumping at pressure above 2 kg/cm².

- It is then sprayed into the air and irrigated entire soil surface through spray heads so that it breaks up into small water drops which fall to the ground.
- Pressurized irrigation through devices called sprinklers



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Advantages of sprinkler irrigation

- ✓ Elimination of the channels for conveyance, therefore no conveyance loss
- ✓ Suitable to all types of soil except heavy clay
- ✓ It is most suitable for oil seeds and other cereal and vegetable crops
- ✓ Water saving
- ✓ Closer control of water application convenient for giving light and frequent irrigation and higher water application efficiency
- ✓ Increase in yield
- ✓ Mobility of system
- ✓ May also be used for undulating area
- ✓ Saves land as no bunds etc. are required
- ✓ 16-70 % water saving.



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Response of different crops to sprinkler irrigation

Crops	Water Saving (%)	Yield increase (%)
Bhindi	28	23
Cabbage	40	3
Cauliflower	35	12
Chillies	33	24
Cowpea	19	3
Fenugreek	29	35
Garlic	28	6
Onion	33	23
Potato	46	4



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Classification sprinkler irrigation

1. Perforated pipe system
2. Rotating head system



Perforated pipe system



Rotating head system



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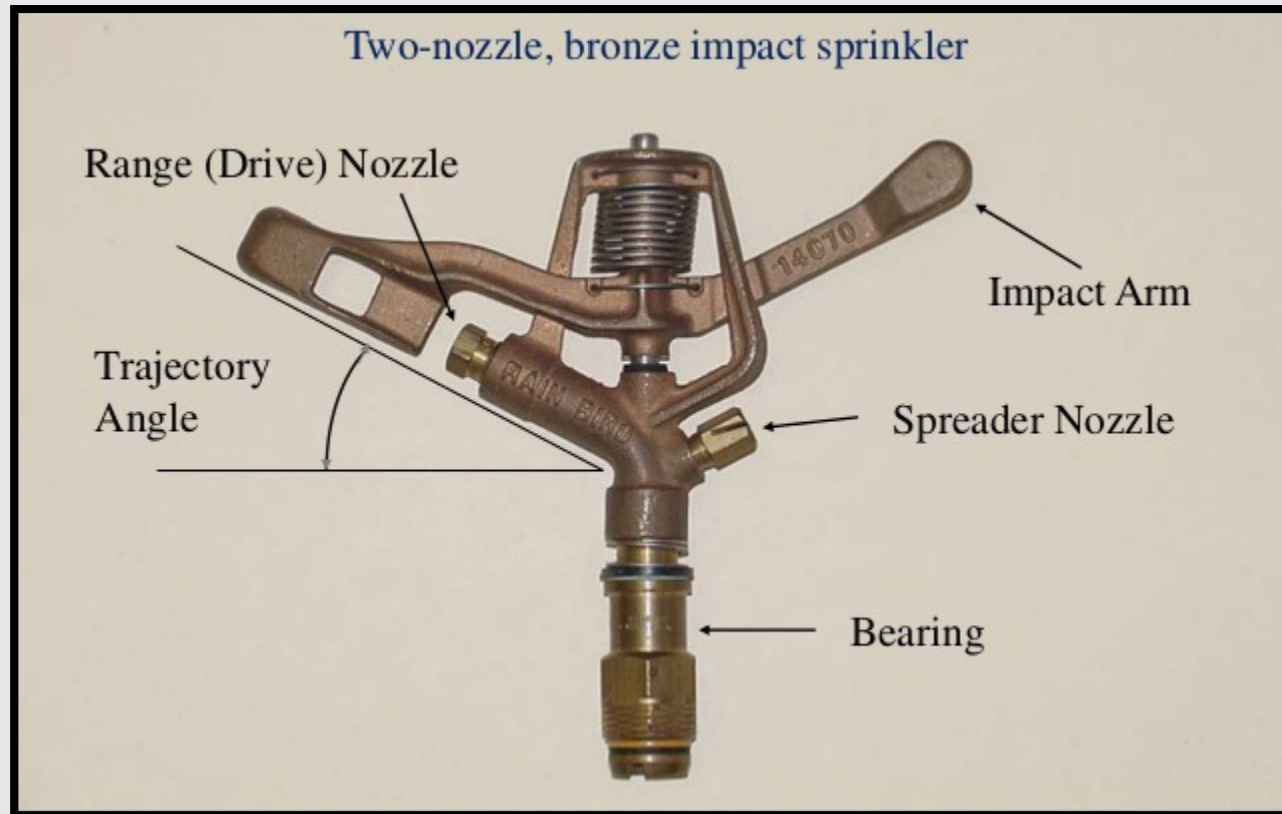
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Components of sprinkler irrigation system

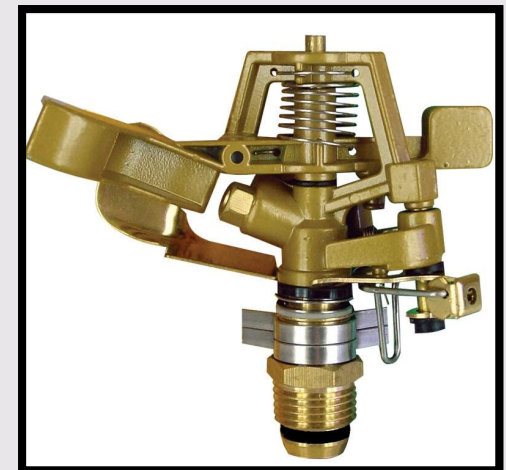
- (i) A pump unit
- (ii) Tubings- main/submains and laterals
- (iii) Couplers
- (iv) Sprinkler head
- (v) Other accessories such as valves, bends, plugs and risers.



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Impact sprinkler



Sprinkler head



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Sprinkler distribution for at different operating pressure

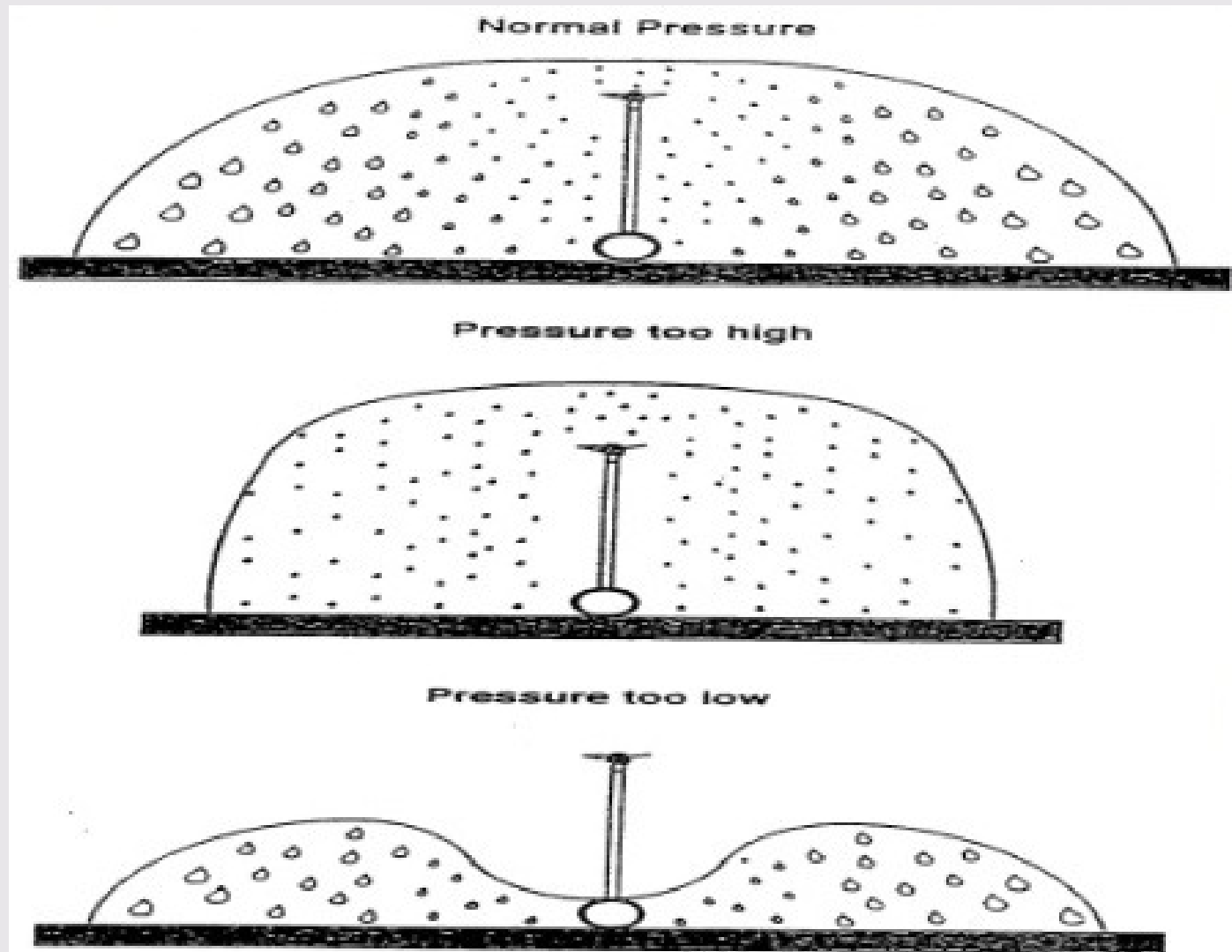
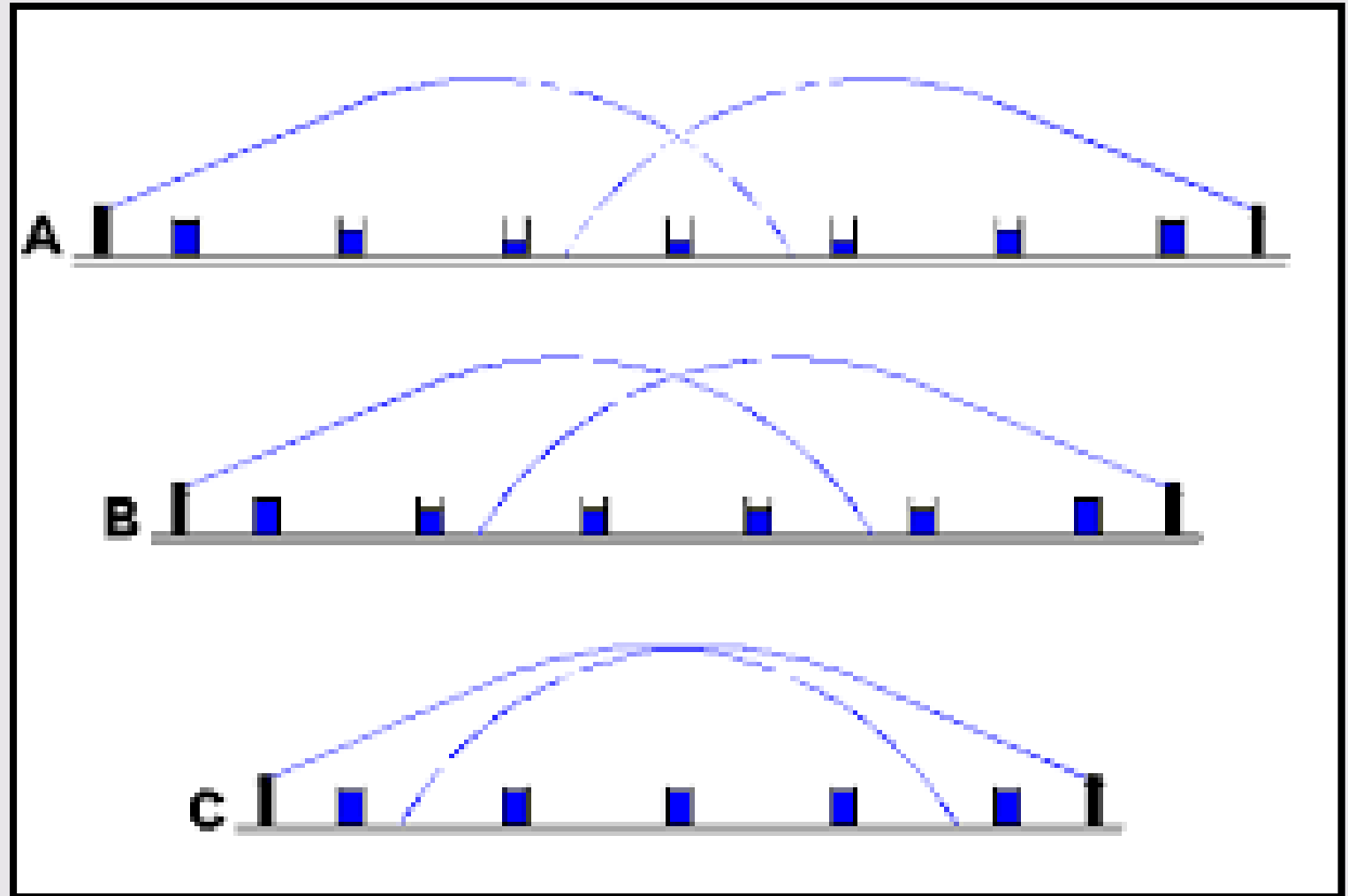


Figure 11.5. Sprinkler distribution for at different operating pressures.



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Overlapped sprinklers uniform application

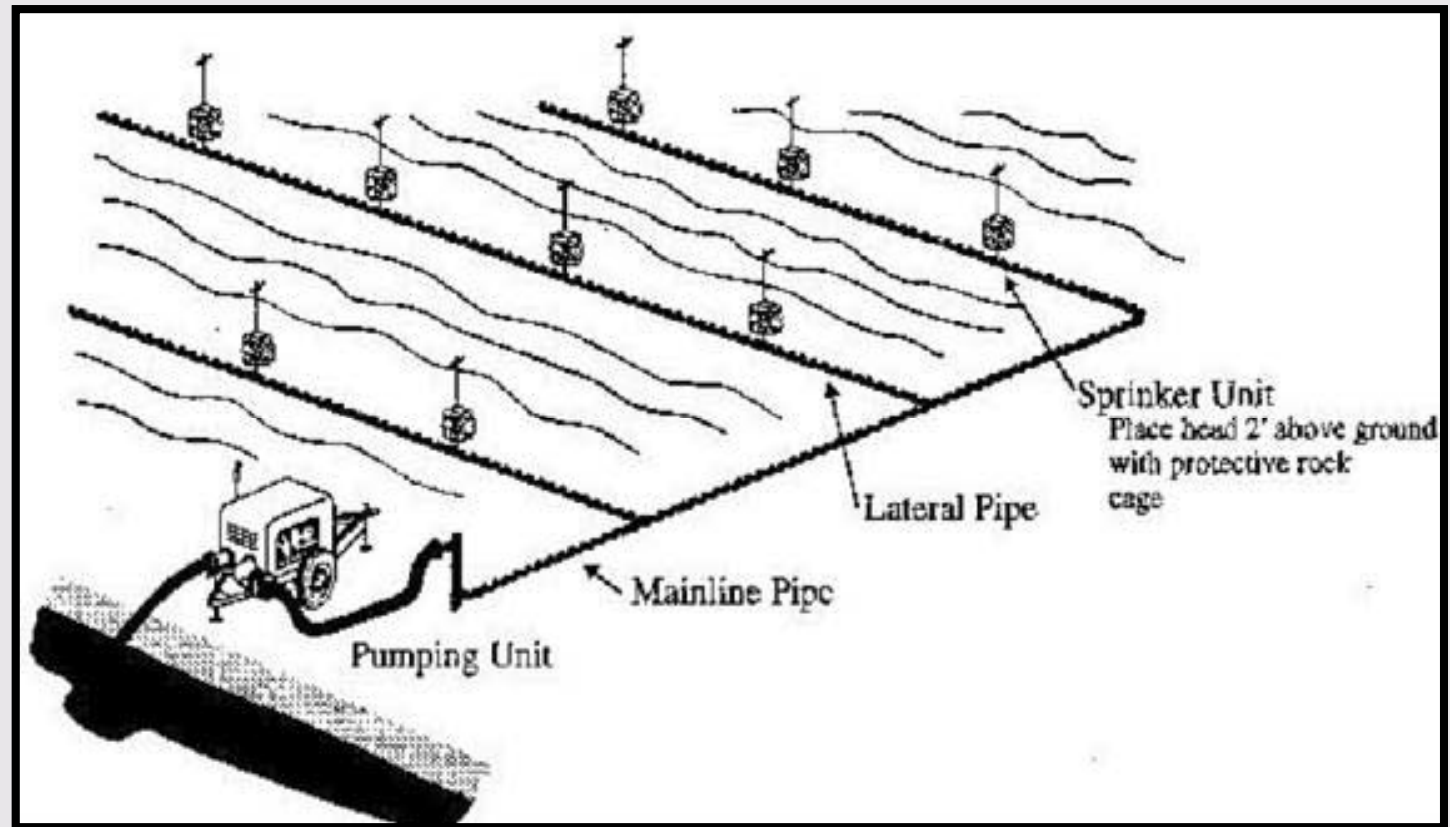




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Layout of sprinkler irrigation system





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General rules for sprinkler system design

- ✓ Main should be laid up and down hill
- ✓ Lateral should be laid across the slope or nearly on the contour
- ✓ For multiple lateral operation, lateral pipe sizes should not be more than two diameter
- ✓ Water supply source should be nearest to the center of the area
- ✓ Layout should facilitate and minimize lateral movement during the season
- ✓ Booster pump should be considered where small portion of field would require high pressure at the pump
- ✓ Layout should be modified to apply different rates and amounts of water where soils are greatly different in the design area.



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Soil suitability

- Suitable for lands and on shallow soils.
- Best suited to coarse sandy terrain.
- Suitable in undulating terrain.
- Adopted in hilly regions.

Crops suitability

The dry crops, vegetables, flowering crops, orchards, plantation crops like tea, coffee are all suitable and can be irrigated through sprinklers.



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Constraints in application of sprinkler irrigation

- (i) Uneven water distribution due to high winds
- (ii) Evaporation loss when operating under high temperatures
- (iii) Highly impermeable soils are not suitable
- (iv) Initial cost is high
- (v) Proper design
- (vi) Lack of Package of practices
- (vii) Lack of awareness
- (viii) Lack of social concern to save natural resources
- (ix) High water pressure required in sprinkler ($>2.5\text{kg/cm}^2$)
- (x) Difficulty in irrigation during wind in sprinkler

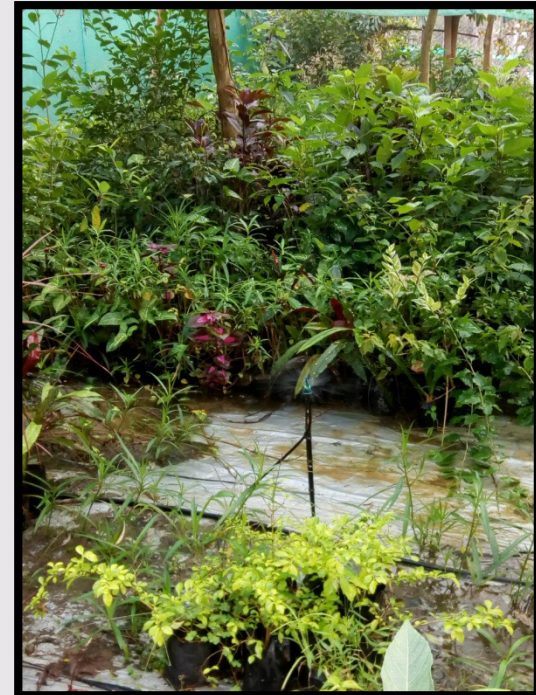


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Vegetable field



Sprinkler irrigation in CUTM



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