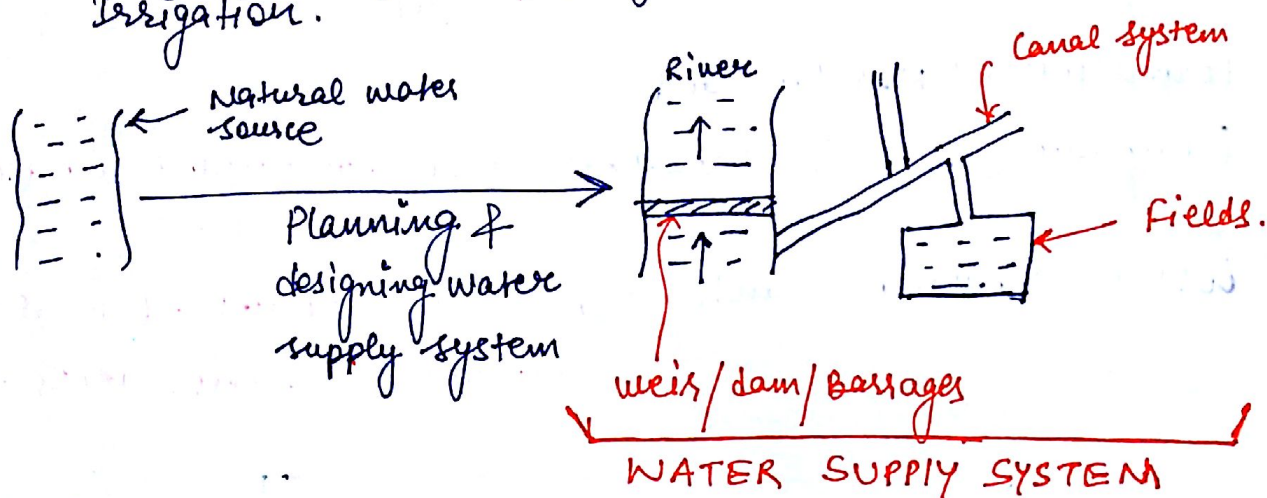


Irrigation & water Resources

Definition - The process of artificial application of water to the soil for the growth of agriculture crops is termed as Irrigation.



Necessity of Irrigation -

- ✓ Insufficient Rainfall
- ✓ Uneven distribution of Rainfall
- ✓ Perennial crops (like Sugarcane, cotton etc.) - Require water almost for full year
- ✓ Development of Agriculture in Desert area.

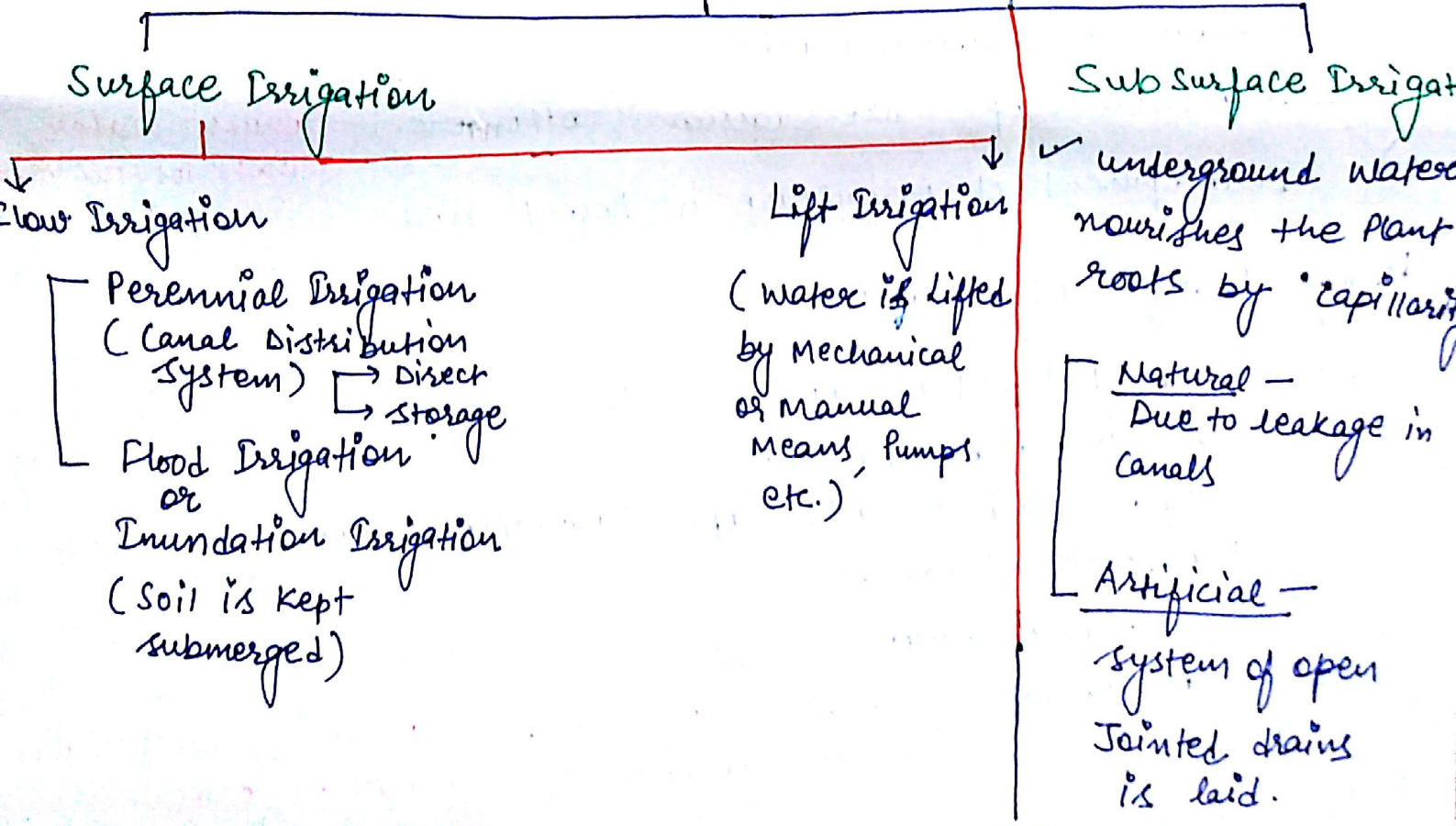
Benefits of Irrigation -

- ✓ Increased Yield of crops
- ✓ Protection from famine
- ✓ Improvement of Cash crops (vegetables, fruits, tobacco etc.)
- ✓ Prosperity of farmers
- ✓ Source of Revenue
- ✓ Navigation. - Canal system can be use for communication & Transportation of Agriculture goods.
- ✓ Hydroelectric Power generation.
- ✓ water supply - for Both Domestic & Agriculture Purpose
- ✓ Development of fishery.

All Effects of Irrigation -

- ✓ Rising of water Table - Due to seepage soil may develop alkaline property which is harmful to the crops.
- ✓ Formation of marshy land
- ✓ Dampness (cold) in weather - In Commanded area of an Irrigation Project.
- ✓ Loss of valuable lands - Land get submerged in storage reservoirs of Dams, weirs etc.

Types and Methods of Irrigation.



Surface Irrigation

Low Irrigation

- Perennial Irrigation (Canal Distribution System)
 - Direct storage
- Flood Irrigation or Inundation Irrigation (Soil is kept submerged)

Lift Irrigation

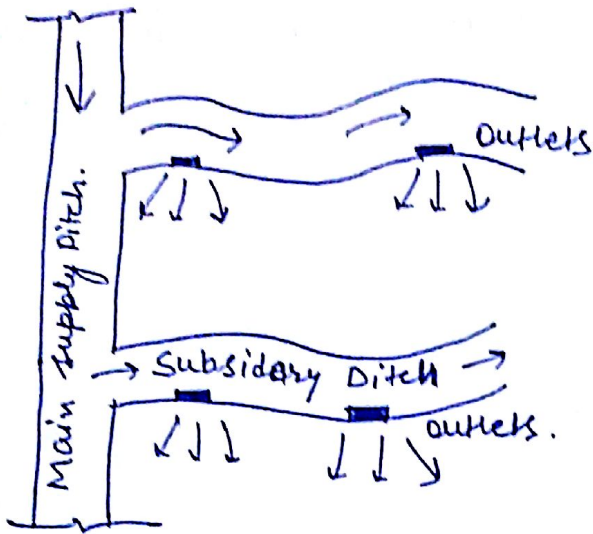
(water is lifted by mechanical or manual means, pumps etc.)

Subsurface Irrigation

- underground water nourishes the plant roots by capillary action
- Natural - Due to leakage in canals
- Artificial - system of open jointed drains is laid.

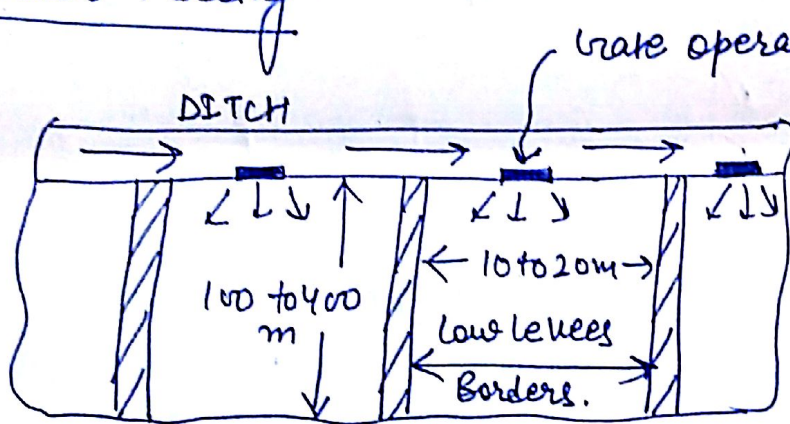
Techniques of water Distribution in the farms -

(i) Free Flooding or ordinary Flooding / wild Flooding -



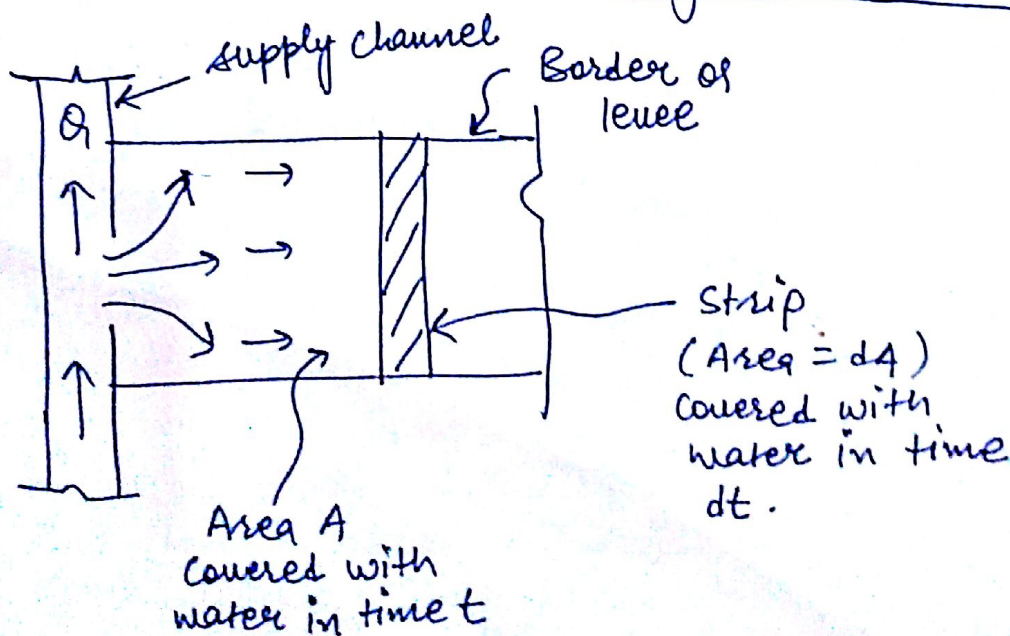
✓ May be used on Rolling lands.

(ii) Border Flooding -



✓ Land is divided into Number of strips. Separated by low levees called borders.

Time Required to cover the given area with water -



4

$$Q \cdot dt = \underbrace{y \cdot dA}_{\text{Volume of water stored above G.L.}} + \underbrace{f \cdot A \cdot dt}_{\text{Volume of water percolated into ground in time dt}}$$

$f =$ Rate of Infiltration of soil.
 $y =$ depth of water

$$dt = \left(\frac{y \cdot dA}{Q - f \cdot A} \right)$$

Considering y, f & Q as constant. & integrating

$$t = \frac{y}{f} \log_e \left(\frac{Q}{Q - fA} \right) + C$$

at $t=0, A=0$
 $C=0$

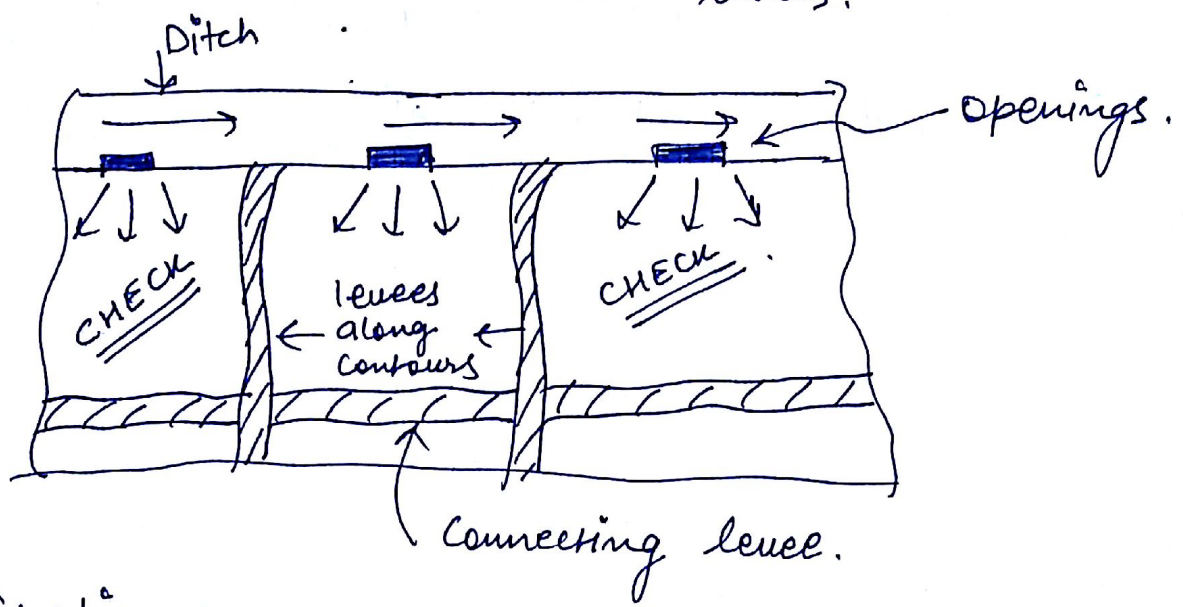
$$t = 2.3 \frac{y}{f} \log_{10} \left(\frac{Q}{Q - fA} \right)$$

$$A_{\max} = \frac{Q}{f}$$

Max. area that can be irrigated with a supply ditch of discharge Q and soil having infiltration capacity f

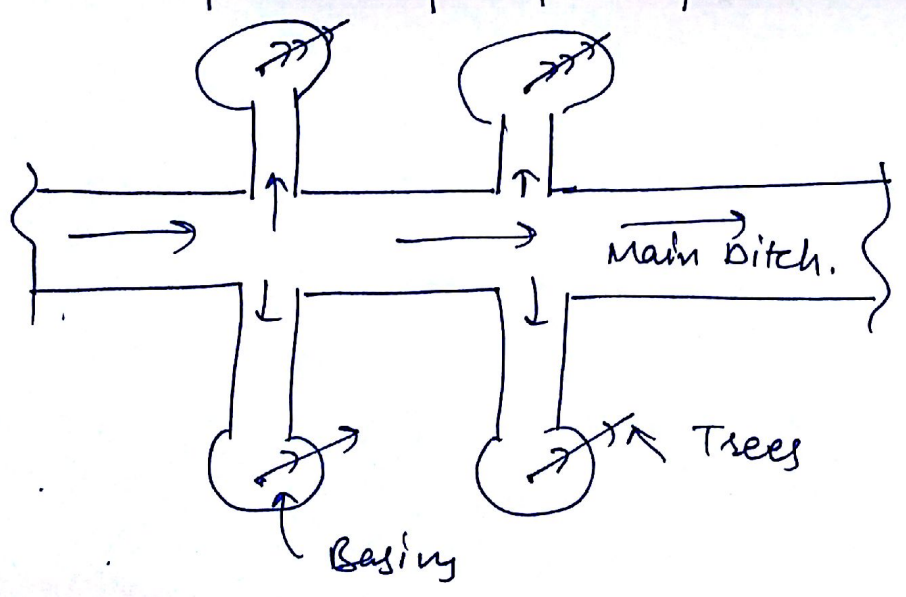
Check Flooding -

- ✓ Similar to Ordinary Flooding
- ✓ water is controlled by surrounding the check area with low and flat levees.



Basin Flooding -

- ✓ Special Type of Check Flooding
- ✓ Adopted ~~for~~ Specially for orchard trees.



Furrow Irrigation Method -

(8)

- ✓ only $\frac{1}{5}$ to $\frac{1}{2}$ of the land surface is wetted by water
- ✓ less evaporation, less puddling of soil,
- ✓ permits cultivation sooner after irrigation.