I METHODS OF IRRIGATION

1.1 SURFACE IRRIGATION:

•Surface irrigation is defined as the group of application techniques where water is applied and distributed over the soil surface by gravity.

•It is by far the most common form of irrigation throughout the world and has been practiced in many areas virtually unchanged for thousands of years.

1.2 SURFACE IRRIGATION:

There are four variations under this method viz.

1. Flooding,
2. Bed or border method (Saras and flat beds
3. Basin method (ring and basin) and
4. Furrow method (rides and furrows, broad ridges or raised beds)

1. Flooding:

•It consist of opening a water channel in a plot or field so that water can flow freely in all directions and cover the surface of the land in a continuous sheet.

•It is the most inefficient method of irrigation as only about 20 percent of the water is actually used by plants. The rest being lost as a runoff, seepage and evaporation.

•Water distribution is very uneven and crop growth is not uniform. It is suitable for uneven land where the cost of leveling is high and where a cheap and abundant supply of water is available.

•It is unsuitable for crops that are sensitive to water logging the method suitable where broadcast crops, particularly pastures, alfalfa, peas and small grains are produced.

Adaptations:

1. An abundant supply of water
2. Close growing crops
3. Soils that do not erode easily
4. Soils that is permeable
5. Irregular topography
6. Areas where water is cheap.

Advantages:

1. Can be used on shallow soils

2. Can be employed where expense of leveling is great

3. Installation and operation costs are low

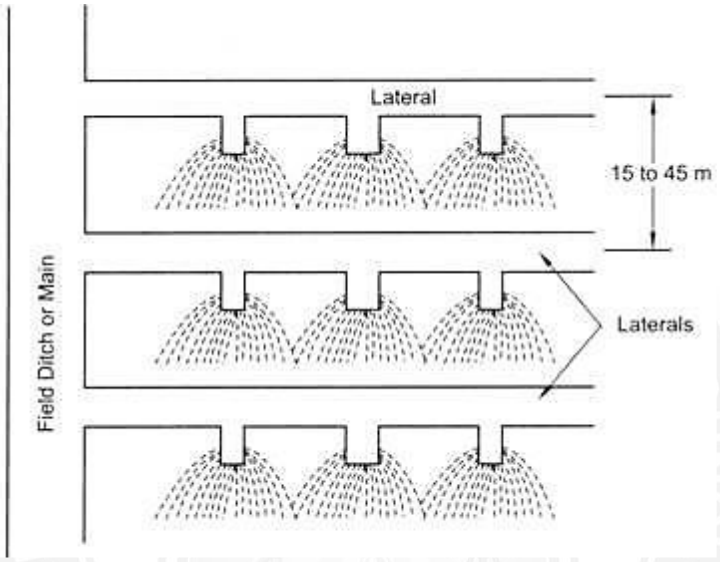
4. System is not damaged by livestock and does not interfere with use of farm implements.

Disadvantages:

1. Excessive loss of water by run of and deep percolation

2. Excessive soil erosion on step land.

3. Fertilizer and FYM are eroded from the soil.



2. Bed or border method (Sara and Flat beds or check basin):

•In this method the field is leveled and divided into small beds surrounded by bunds of 15 to 30 cm high. Small irrigation channels are provided between two adjacent rows of beds.

•The length of the bed varies from 30 meters for loamy soils to 90 meters for clayey soils.

•The width is so adjusted as to permit the water to flow evenly and wet the land uniformly.

•For high value crops, the beds may be still smaller especially where water is costly and not very abundant.

•This method is adaptable to most soil textures except sandy soils and is suitable for high value crops. It requires leveled land.

•It is more efficient in the use of water and ensures its uniform application. It is suitable for crops plant in lines or sown by broadcast. Through the initial cost is high requires less labour and low maintenance cost.

•This may also be called a sort of sara method followed locally in Maharashtra but the saras

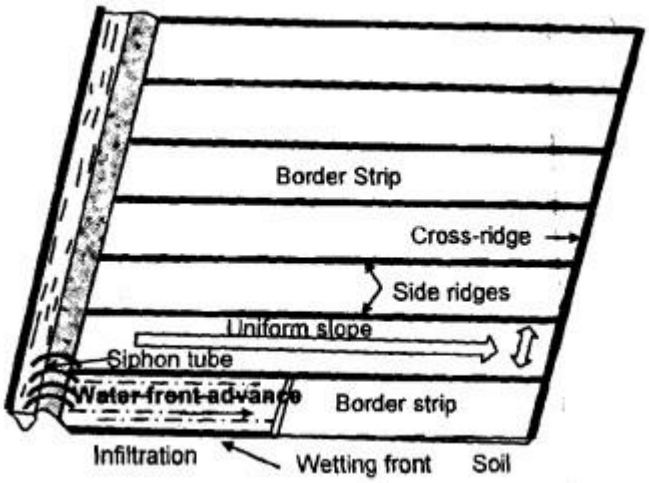
to be formed in this method are much longer than broader.

Types of Border Irrigation

Two types of borders are formed :

•Straight Border

•These border are formed along the general slope of the field. These are preferred when fields can be levelled or be given a gentle slope economically.



Contour Border

•These are formed across the general slope of the field and are preferred when land slope exceeds the safe limits.

•As fields are undulating and require a lot of earth work to level, economical levelling is not possible. Design criteria for both are not different.

Adaptations:

1. A large supply of water
2. Most soil textures including sandy Loam, loams and clays
3. Soil at least 90 cm deep
4. Suitable for close growing crops.

Advantages:

1. Fairly large supply of water is needed.
2. Land must be leveled
3. Suited only to soils that do not readily disperse.
4. Drainage must be provided

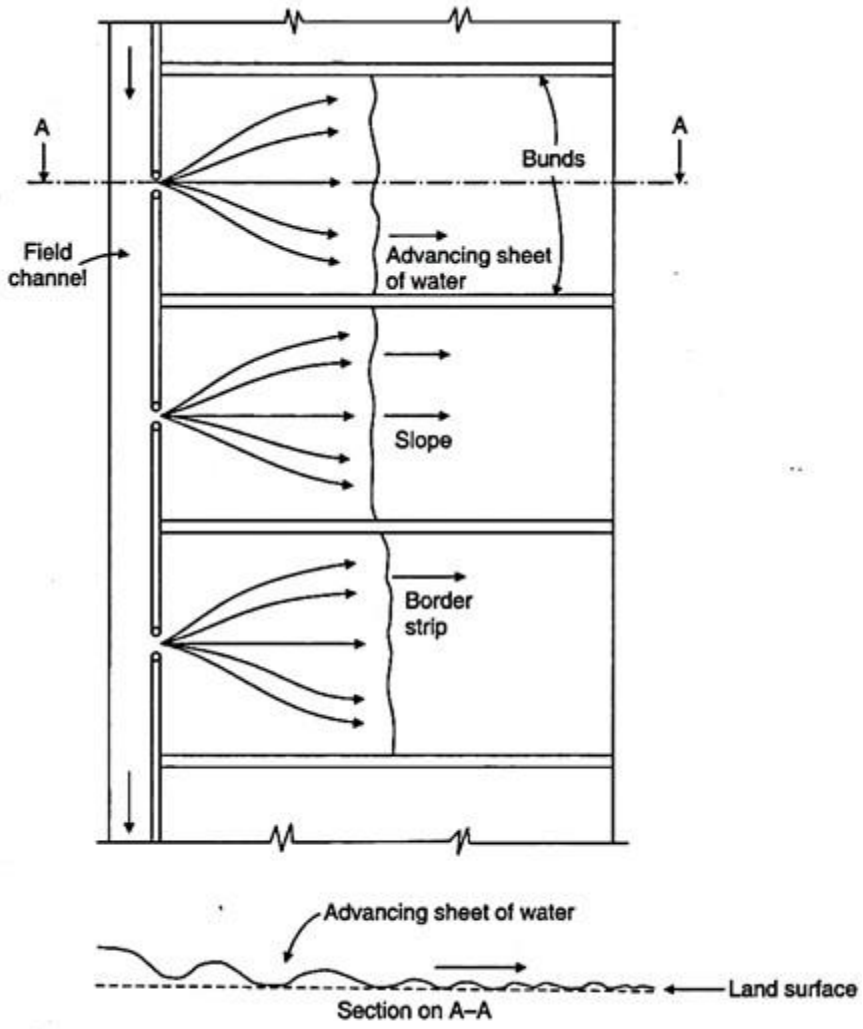


Fig. 17.1 Border strip method of irrigation

3. Basin irrigation:

•This method is suitable for orchids and other high value crops where the size of the plot to be irrigated is very small.

•The basin may be square, rectangular or circular shape. A variation in this method viz. ring and basin is commonly used for irrigating fruit trees.

•A small bund of 15 to 22 cm high is formed around the stump of the tree at a distance of about 30 to 60 cm to keep soil dry.

•The height of the outer bund varies depending upon the depth of water proposed to retain. Basin irrigation also requires leveled land and not suitable for all types of soil. It is also efficient in the use of water but its initial cost is high.

•There are many variations in its use, but all involve dividing the field into smaller unit areas

so that each has a nearly level surface. Bunds or ridges are constructed around the areas forming basins within which the irrigation water can be controlled. Check basin types may be rectangular, contour and ring basin.

Types of Check Basins

Based on Size and Shape

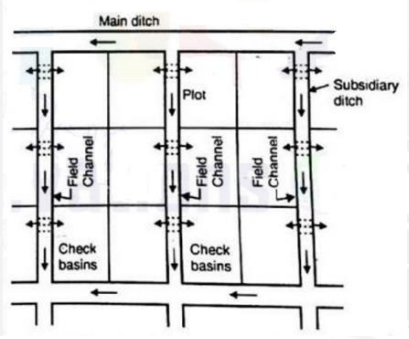
The size of check basins may vary from one meters square, used for growing vegetables and other intensive cultivation, to as large as one or two hectares or more, used for growing rice under wet land conditions. While the following points need to be considered :

Rectangular

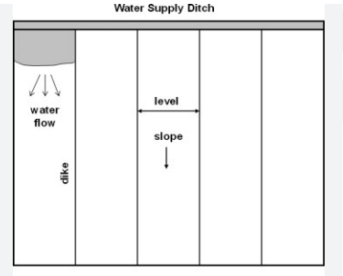
The basins are rectangular in shape when the land can be graded economically into nearly level fields.

Contour

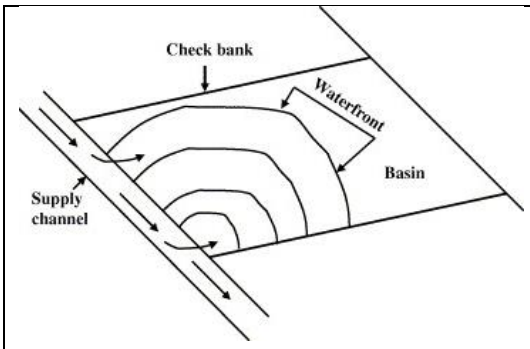
•The ridges follow the contours of the land surface and the contour ridges are connected by cross ridges at intervals when there is rolling topography.



CHECK BASINS



Rectangular



Contour

•The vertical interval between contour ridges usually varies fkom 6 to 12 cm in case of upland irrigated crops like wheat and 15 to 30 cm in case of low land irrigated crops like rice.

Adaptations:

1. Most soil texture
2. High value crops
3. Smooth topography.
4. High water value/ha

Advantages:

1. Varying supply of water
2. No water loss by run off
3. Rapid irrigation possible
4. No loss of fertilizers and organic manures
5. Satisfactory

Disadvantages:

1. If land is not leveled initial cost may be high
2. Suitable mainly for orchids, rice, jute, etc.
3. Except rice, not suitable for soils that disperse easily and readily from a crust.

4. Furrow Method

•In this method, irrigation water is useful for row crops. Narrow channels are dug at regular intervals. Water from the main supply is allowed to enter these small channels or furrows.

•Water from the furrows infiltrates into soil and spread laterally to saturate the root zone of

the crops.

•It is suitable for row crops like potatoes, sugarcane, tobacco, maize, groundnut, cotton, jowar, etc.

•Row crops such as potatoes, cotton, sugarcane, vegetable etc. can be irrigated by furrow method. Water is allowed to flow in furrow opened in crop rows.

•It is suitable for sloppy lands where the furrows are made along contours. The length of furrow is determined mostly by soil permeability. It varies from 3 to 6 meters. In sandy and clay loams, the length is shorter than in clay and clay loams. Water does not come in contact with the plant stems.

•There is a great economy in use of water. Some times, even in furrow irrigation the field is divided into beds having alternate rides and furrows. On slopes of 1 to 3 percent, furrow irrigation with straight furrows is quite successful.

•But on steeper slopes contour furrows, not only check erosion but ensure uniform water penetration. Irrigation furrows may be classified into two general types based on their alignment. They are :

(a) straight furrows, and

(b) contour furrows.

a)Straight Furrows

•They are best suited to sites where the land slope does not exceed 0.75 per cent. In areas of intense rainfall, however, the furrow grade should not exceed 0.5 per cent so as to minimise the erosion hazard.

•The range in furrow slopes for efficient irrigation in different soil types are the same as those recommended for borders.

b)Contour Furrows

•Contour furrows carry water across a slopping field rather than the slope. Contour furrows are curved to fitthe topography of the land.

•Contour furrow method can be successfully used in nearly all irrigable soils. The limitations of straight furrow are overcome by contouring to include slopping lands. Light soils can be irrigated successfully across slopes up to 5 per cent.

Adaptations:

1. Medium and fine textured soils.

2. Variable water supply

3. Farms with only small amount of equipment.

Advantages:

1. High water efficiency

2. Can be used in any row crop

3. Relatively easy in stall

4. Not expensive to maintain

5. Adapted to most soils.

Disadvantages:

1. Requirement of skilled labour is more

2. A hazard to operation of machinery

3. Drainage must be provided.

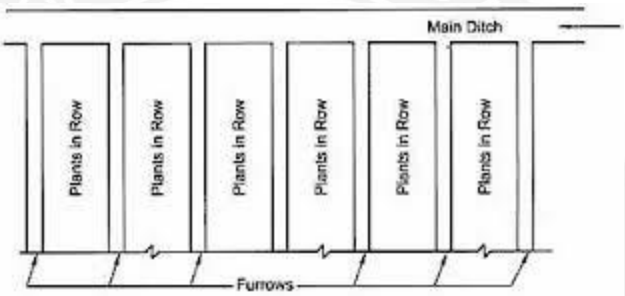


Fig. 6.5 Furrow Irrigation

5. Contour farming

•Contour farming involves ploughing, planting and weeding along the contour, i.e, across the slope rather than up and down.

•Contour lines are lines that run across a (hill) slope such that the line stays at the same height and does not run uphill or downhill.

•As contour lines travel across a hillside, they will be close together on the steeper parts of the hill and further apart on the gentle parts of the slope.

•Experiments show that contour farming alone can reduce soil erosion by as much as 50% on moderate slopes.

•However, for slopes steeper than 10%, other measures should be combined with contour farming to enhance its effectiveness.

Benefits :

1. Contouring can reduce soil erosion by as much as 50% from up and down hill farming
2. By reducing sediment and run off and increasing water infiltration
3. Contouring promotes better water quality
4. It gives 10-15% additional yield.

Criteria for Surface Irrigation Method Selection

The deciding factors for the suitability of any surface irrigation method are natural conditions (slope, soil type), type of crop, required depth of application, level of technology, previous experiences with irrigation, required labour input.

•Moreover the irrigation system for a field must be compatible with the existing farming operations, such as land preparation, cultivation, and harvesting practices.

•The following outline lists a number of factors of the environment which will have a bearing on the evaluation of irrigation system alternates and the selection of a particular system.

•Not all points will be equally significant in each case, but the outline can serve as a useful Check list to prevent overlooking important factors.

Physical Factors

•Crops and cultural practices are of prime importance while selecting an irrigation system.

•Hence, proper knowledge of agronomic practices and irrigation intervals is necessary for proper use of irrigation water and to increase water use efficiency.

•The following physical factors need to be given due consideration.

Crop Parameters

•Tolerance of the crop to soil salinity during development and maturation.

•Magnitude and temporal distribution of water necessary for maximum production.

•Economic value of crop.

Soils Parameters

•Texture and structure;infiltration rate and erosion potential;salinity and internal drainage, bearing strength.

•Sandy soils have a low water storage capacity and a high infiltration rate. Under these circumstances, sprinkler or drip irrigation are more suitable than surface irrigation. Clay soils with low infiltration rates are ideally suited to surface irrigation.

•High intake characteristicrequire higher flow rate to achieve the same uniformity and efficiency.

•Crusting of soil and its effects on infiltration

•Reclamation and salt leaching- basin irrigation

•Spatial variability

Field Topography

•Uniform, mild slopes facilitate surface irrigation.

•Location and relative elevation of water source – water diversion, pumping

•Acreage in each field

•Location of roads, natural gas lines, electricity lines, water lines and other obstructions.

•Shape of field – non rectangular shapes are more difficult to design for

•Field slope – steepness & regularity

•Furrow&borders 2-6% maximum

Climate and Weather Conditions

•Under very windy conditions, drip or surface irrigation methods are preferred.

•Scalding (the disruption of oxygen-carbon dioxide exchange between the atmosphere and the root)& the effect of water temperature on the crop at different stages of growth -risk in basin irrigation.

•Irrigation with cold water early in the spring can delay growth, whereas in the hot periods of the summer, it can cool the environment— both of which can be beneficial or detrimental in somecases.

Water Supply

The following parameters are important:

1. Source and delivery schedule
2. Water quantity available and its reliability
3. Water quality
4. Water table in case of ground water source.
5. Availability and Reliability of Electricity
6. Availability and reliability of energy for pumping of water is of much importance.

Economic Considerations

The following points need to be considered while selecting irrigation alternatives.

1. Capital investment required and recurring cost.
2. Credit availability and interest rate.
3. Life of irrigation system, efficiency and cost economics.

Social Considerations

The education and skill of common farmers and labours available for handling the irrigation system

•Social understanding of handling of cooperative activities and sharing of water resources
•Legal and political considerations, local cooperation and support, availability and skill of labour and level of automatic control

Suitability and Limitations of Surface Irrigation Methods

•Some form of surface irrigation is adaptable to almost any vegetable crop. Basin and border strip irrigation have been successfully used on a wide variety of crops.
•Furrow irrigation is less well adapted to field crops if cultural practices require travel across the furrows. However, it is widely used in vegetables like potato.
•Basin and border strip irrigations flood the soil surface, and will cause some soils to form a crust, which may inhibit the sprouting of seeds.
•Surface irrigation systems perform better when soils are uniform, since the soil controls the intake of water. For basin irrigation, basin size should be appropriate for soil texture and infiltration rate.
•Basin lengths should be limited to 100 m on very coarse textured soils, but may reach 400 m on other soils. Furrow irrigation is possible with all types of soils, but extremely high or low intake rate soils require excessive labor or capital cost adjustments that are seldom economical.
•A major cost in surface irrigation is that of land grading or leveling. The cost is directly related to the volume of earth that must be moved, the area to be finished, and the length and size of farm canals.

1.3 MICRO IRRIGATION METHOD

•Micro irrigation methods are precision irrigation methods of irrigation with very high irrigation water efficiency.

•In many parts of the country there is decline of irrigation water and conventional methods are having low water use efficiency.

•To surmount the problem, micro irrigation methods h8s recently been introduced in Indian agriculture.

•These methods save a substantial amount of water and helps increasing crop productivity particularly valuable cash crops like vegetables.

•The research results have confirmed a substantial saving of water ranging between 40 to 80% and there are reports of two times yield increase for different crops by using micro irrigation.

Two main micro irrigation systems are :

Advantages of Micro Irrigation

(a) Water saving, possibility of using saline water.

(b) Efficient and economic use of fertilizers.

(c) Easy installation, flexibility in operation.

(d) Suitable to all types of land terrain also suitable to waste lands.

(e) Enhanced plant growth and yield and uniform and better quality of produce.

(f) Less weed growth.

(g) Labour saving.

(h) No soil erosion, saves land as no bunds, etc. are required.

(i) Minimum diseases and pest infestation.

1.3.1 SPRINKLER IRRIGATION

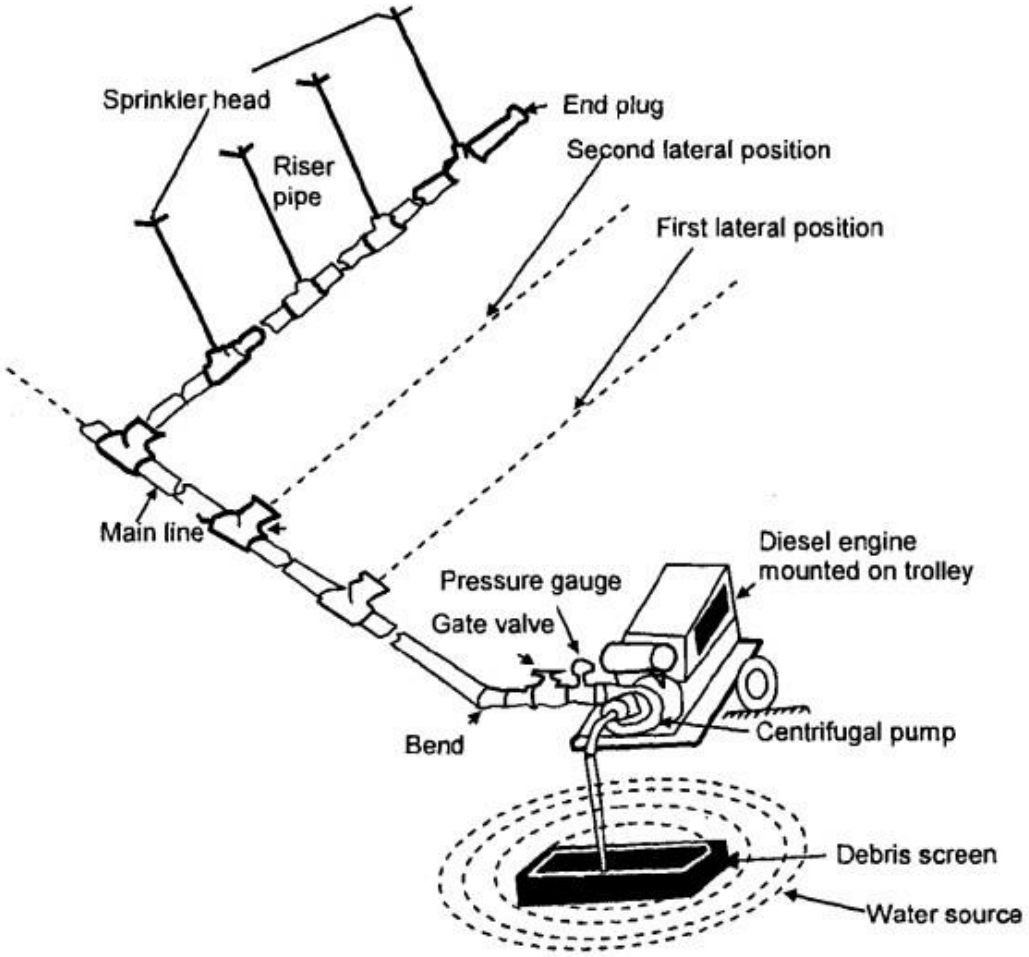
•In sprinkler irrigation, water is delivered through a pressurized pipe network to sprinklers nozzles or jets which spray the water into the air.

•To fall to the soil in an artificial "rain". The basic components of any sprinkler systems are : a water source. a pump to pressurize the water.

•A pipe network to distribute the water throughout the field. Sprinklers to spray the water over the ground, and valves to control the flow of water.

•The sprinklers when properly spaced give a relatively uniform application of water over the

irrigated area.



Sprinkler systems are usually fthere are some exceptions) designed to apply water at a lower rate than the soil infiltration rate so that the amount of water infiltrated at any point depends upon the application rate and time of application but not the soil infiltration rate.

General Classification of Sprinkler Systems

Sprinkler systems are classified into the following two major types on the basis of the arrangement

for spraying irrigation water.

(a) Rotating head or revolving sprinkler system.

(b) Perforated pipe system.

Components of Sprinkler Irrigation System

Sprinkler system usually consists of the following components :

(a) A pump unit

(b) Tubings-main/sub-mains and laterals

(c) Couplers

(d) Sprinker head

(e) Other accessories such as valves, bends, plugs and risers.

Suitability and Limitations

- With regards to crops, soils, and topography nearly all crops can be irrigated with some type of sprinkler system though the characteristics of the crop especially the height, must be considered insystem selection.
- Sprinklers are sometimes used to germinate seed and establish ground cover for crops like lettuce alfalfa and sod.
- The light frequent applications that are desirable for this purpose are easily achieved with some sprinkler systems.
- Sprinklers are applicable to soils that are too shallow to permit surface shaping or too variable for efficient surface irrigation.
- In general, sprinklers can be used on any topography that can be formed. Land leveling is not normally required.
- With regards to labour and energy considerations, it has been observed that labour requirements vary depending on the degree of automation and mechanization of the equipment used.
- Hand-move systems require the least degree of skill, but the greatest amount of labor.

Advantages of Sprinkler Irrigation

The followings are the advantages of sprinkler irrigation :

(a) Elimination of the channels for conveyance, therefore no conveyance loss.

(b) Suitable to all types of soil except heavy clay, suitable for irrigating crops where the plant population per unit area is very high. It is most suitable for oil seeds and other cereal and vegetable crops.

(c) Water saving, closer control of water application convenient for giving light and frequent irrigation and higher water application efficiency.

(d) Increase in yield.

(e) Mobility of system.

(f) May also be used for undulating area, saves land as no bunds etc. are required, areas located at a higher elevation than the source can be irrigated.

(g) Influences greater conducive micro-climate.

(h) Possibility of using soluble fertilizers and chemicals.

(i) Less problem of clogging of sprinkler nozzles due to sediment laden water

Capacity of Sprinkler System

The capacity of the sprinkler system may be calculated by the formula :

$$Q = 2780 \times \frac{A \times d}{F \times H \times E}$$

Where,

Q = Discharge capacity of the pump, liter/second,

A = Area to be irrigated, hectares,

d = Net depth of water application, cm,

F = Number of days allowed for the completion of one irrigation,

H = Number of actual operation hours per day, and

E = Water Application Efficiency in %

1.3.2 DRIP IRFUGATION

•Drip irrigation, also known as trickle irrigation or microirrigation is an irrigation method which minimizes the use of water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters.

•It is becoming popular for row crop irrigation. This system is used in place of water scarcity as it minimizes conventional losses such as deep percolation, evaporation and run-off or recycled water is used for irrigation.

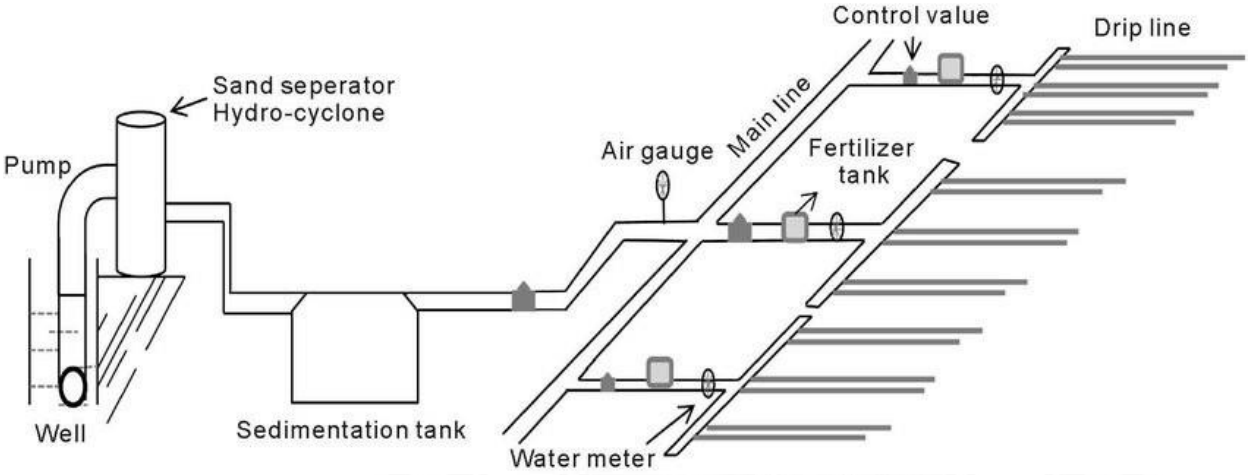
•Small diameter plastic pipes fitted with emitters or drippers at selected spacing to deliver the required quantity of water are used. Drip irrigation may also use devices called micro-spray heads, which spray water in a small area, instead of dripping emitters.

•Subsurface drip irrigation (SDI) uses permanently or temporarily buried drip per line or drip tape located at or below the plant roots.

•Pump and valves may be manually or automatically operated by a controller Drip irrigation is the slow, frequent application of water to the soil though emitters placed along a water delivery line.

•The term drip irrigation is general, and includes several more specific methods. Drip irrigation applies the water through small emitters to the soil surface, usually at or near the plant to be irrigated.

Subsurface irrigation is the application of water below the soil surface. Emitter discharge rates for drip and subsurface irrigation are generally less than 12 liters per hour.



Components of Drip Irrigation System (Listed in Order from Water Source)

(a) Pump or pressurised water source.

(b) Water Filter(s) - Filtration Systems : Sand Separator, Cyclone, Screen Filter, Media Filters.

(c) Fertigation Systems (Venturi injector).

(d) Backwash Controller.

(e) Main Line (larger diameter Pipe and Pipe Fittings).

(f) Hand-operated, electronic, or hydraulic Contvl Valves and Safety Valves.

(g) Smaller diameter polytube (often referred to as "laterals").

(h) Poly fittings and Accessories (to make connections).

(i) Emitting Devices at plants (Example : Emitter or Drippers, micro spray heads, inline

drippers, trickle rings).

Suitabi1ity:and Limitation

(a) From stand point of crops, soil, and topography, drip irrigation is best suited for tree, vine, and row crops. A lot of research work has been conducted to establish the suitability of drip irrigation for different vegetable crops. Drip irrigation has been found suitable both for field vegetable crops and also under covered cultivation practices.

(b) With respect to water quantity and quality, drip irrigation uses a slower rate of water application over a longer period of time than other irrigation methods. The most economical design would have water flowing into the farm area throughout most of the day, every day, during peak use periods. If water is not available on a continuous basis, on-farm water storage may be necessary.

(c) Though a form of pressurized irrigation, drip is a low pressure, low flow rate method. These conditions require small flow channel openings in the emission devices, which are prone to plugging.

(d) High efficiencies are USP of drip irrigation system. Properly designed and maintained drip systems are capable of high efficiencies. Design efficiencies should be on the order of 90 to 95%.

(e) Labour and energy considerations are very important consideration in drip irrigation system. Due to their low flow characteristics, drip irrigation systems usually have few sub-units, and are designed for long irrigation times.

(f) Drip irrigation systems generally use less energy than other forms of pressurized irrigation systems. The emission devices usually operate at pressures ranging from 5 to 25 PSI. Additional pressure is required to compensate for pressure losses through the control head (filters and control valves) and the pipe network.

(g) Economic factors need special attention in case drip irrigation system as initial cost and operational cost is reasonably high. Drip systems costs can vary greatly. Depending on crop (plant. and therefore. emitter and hose spacings) and type of hose employed (permanent or "disposable" thin-walled tubing).

Advantages

The advantages of drip irrigation are :

1. Minimisedfertilizerlnutrient loss due to localized application and reduced leaching, allows safe use of recycled water.

2. High water distribution efficiency. Moisture within the root zone can be maintained at field capacity.

3. Leveling of the field not necessary. Soil type plays less important role in frequency of irrigation, minimised soil erosion.

4. Highly uniform distribution of water, i.e. controlled by output of each nozzle.

5. Lower labour cost.

6. Early maturity and good harvest.

7. Foliage remains dry thus reducing the risk of disease.

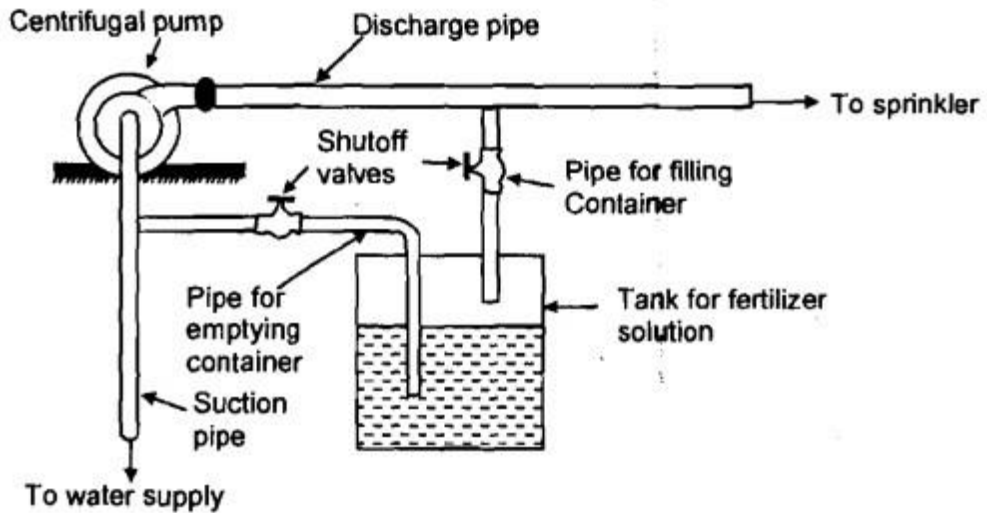
Irrigation Method	Water Efficiency	Energy Efficiency
Surface Irrigation	50–65%	Low
Level Basin	60–80%	Low
Sub irrigation	50–75%	Low to Medium
Overhead irrigation	60–80%	Medium
Sprinkler irrigation	60–85%	Medium
Drip irrigation	80–90%	Medium to High

FERTIGATION

•Fertigation is the process of application of water soluble solid fertilizer or liquid fertilizers through drip irrigation system.

•Through fertigation nutrients are applied directly into the wetted volume of soil immediately below the emitter where root activity is concentrated.

•Fertigation is practiced only in drip irrigation system. However, fertilizer solution can be added with sprinkler irrigation system also.



Components of Fertigation

The main component of a fertigation is drip irrigation system. The main components are :

(a) Venturi pump (injector)

(b) Fertilizer tank with flow bypass

(c) Pressure bypass tank

(d) Injection pump.

Advantages of Fertigation

1. The fertilizer solution is distributed evenly in the irrigation network with the same uniformity as the irrigation water.

2. The availability of nutrients including micro-nutrients is high, therefore the efficiency is very good.

3. The fertilizer system can also be used for other activities such as incorporating acid to flush the drip system.

4. It eliminates the work of spreading fertilizer. Manual spreading of fertilizer causes soil compaction and may damage the growing crop.

5. Fertilizer placement is exactly to the root zone of plant and can be uniformly applied through drip irrigation system.

6. All types of nutrients can be given simultaneously.

7. Lower doses of fertilizer could be applied daily or weekly (i.e. a large number of split application) to avoid leaching and fixation in soil.

8. Some liquid fertilizers are free of sodium and chloride salts, so these are not harmful to soil.

9. Optimum production in light soil is possible.

10. Spraying with liquid fertilizer is possible.

11. Liquid fertilizers are immediately available to plants.

12. Fertilizer use efficiency can be increased by 25 to 30% over the tradition method of fertilizer application.

13. It decreases labour and energy cost.

14. The quality and quantity of crop production can be improved

Limitations

•The fertigation system also has some limitations. The main one is the danger of poisoning people who drink the irrigation water particularly laborers those work on the farm.

•It is therefore necessary to warn the people in the field about drinking water separately and put up warning signs. The reverse flow of water mixed with fertilizer must be prevented.

Toxicity and Contamination

Care must be taken whenever fertilizer solution is introduced into a water supply system.

Fertilizer Suitability

Slowly water-soluble fertilizer such as super phosphate or calcium ammonium phosphate is not suitable. This method is suitable for liquid fertilizers or those that are readily soluble in water.

Corrosion

The metallic parts of the equipment are highly prone to corrosion. Sensitive parts of the equipment

must be made out of corrosion resistant materials and extra care should be taken when filling the tanks.

Keywords

Border Irrigation: It uses land formed into strips which are located across the narrow dimension,

but sloping along the long dimensions.

Check Basin Irrigation : In this irrigation system, water is applied to a completely level or dead level area enclosed by dikes or boarders.

Furrow Irrigation : Furrows are sloping channels formed in the soil. Infiltration occurs laterally and vertically through the wetted perimeter of the furrow and plants get water in its root zone.

Sprinkler Irrigation : In this system of irrigation, water is delivered through a pressurised pipe

network to sprinklers nozzle or jets which spray water into the air.

Drip Irrigation : It minimises the use of water and fertilizer by allowing water to drip slowly to the roots of plants.

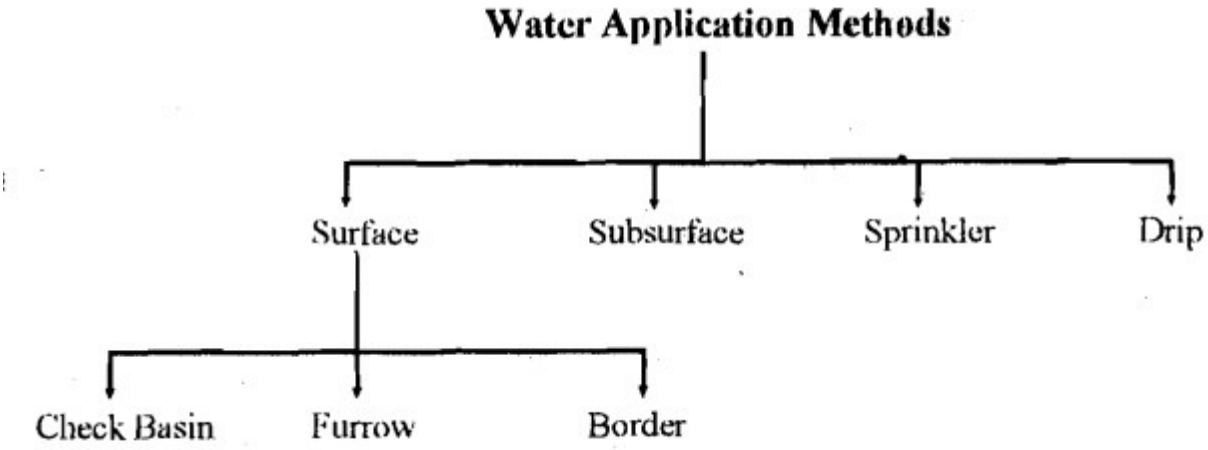
Fertigation: It is the process of application of water soluble solid fertilizer or liquid fertilizer through drip irrigation system.

Water distribution system

Irrigation water inay be applied to crops either by flooding the field. by applying water beneath the

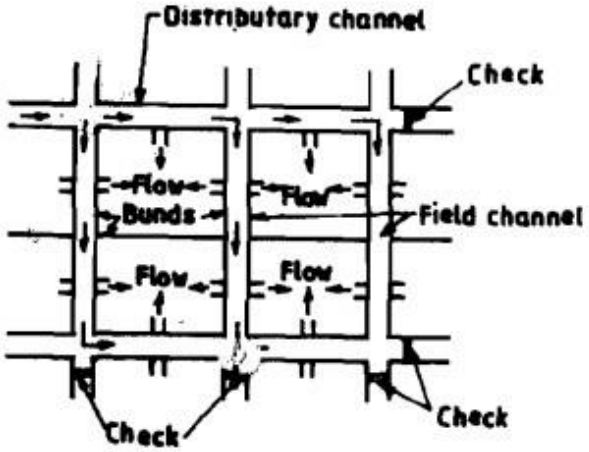
soil surface, by spraying it under pressure. or by applying it in drops. Selection of the suitable method, from among these methods, depends on topography. soil condition, land preparation, type

of crop and its value. available water supply and other factors

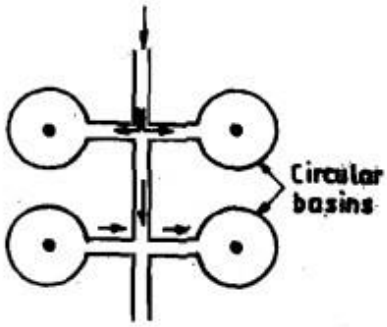


1.4 CHECK BASIN IRRIGATION

Check basin irrigation or simply basin irrigation is the simplest available mode of irrigation and commonlypractised in India end other countries. The principle underlying this system involves dividing tile field or fanil into smaller unit areas such that each has a nearly level surface.



(a) Check basins

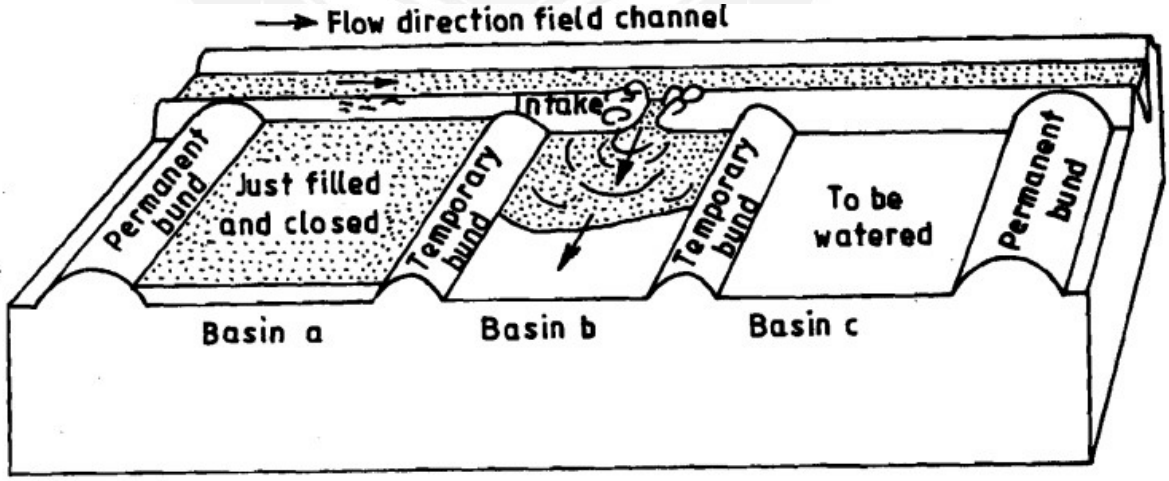


(b) Ring or circular basins

Methods to Apply Irrigation Water to check Basins

There are two methods to supply irrigation water to check basins, namely, direct method, and cascadeinetliod.

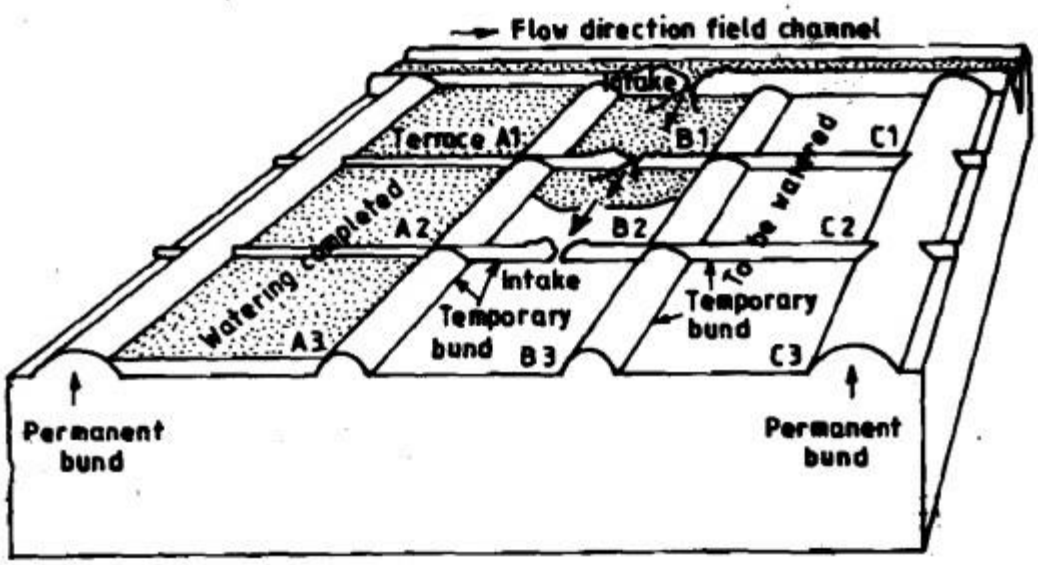
In the direct method. Irrigation water is led directly from the field channel into the basins through siphons. or bund breaks, basin A is irrigated first and then basin B and so on. This method can be used for most crop types. and is also suitable for most type of soil.



The other method. Namely, the cascade method is suitable for sloping land where terraces are used.

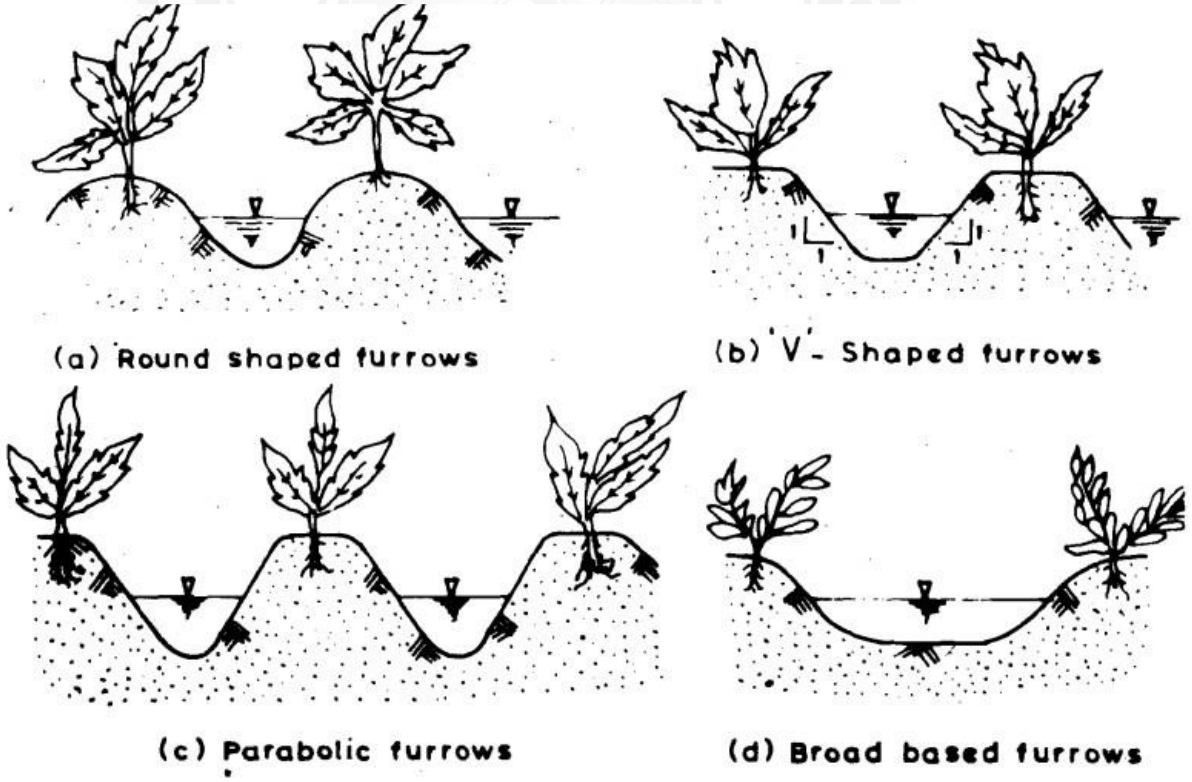
In this method, the irrigation water is supplied to the highest terrace, and then allowed to flow to a lower terrace and so on. In Figure water is supplied to thearea A1 until the lowest terrace A3 is filled. The supply to A1 is then closed and irrigation water is diverted to terrace B1 until B I, B2

and B3 are filled, and so on.



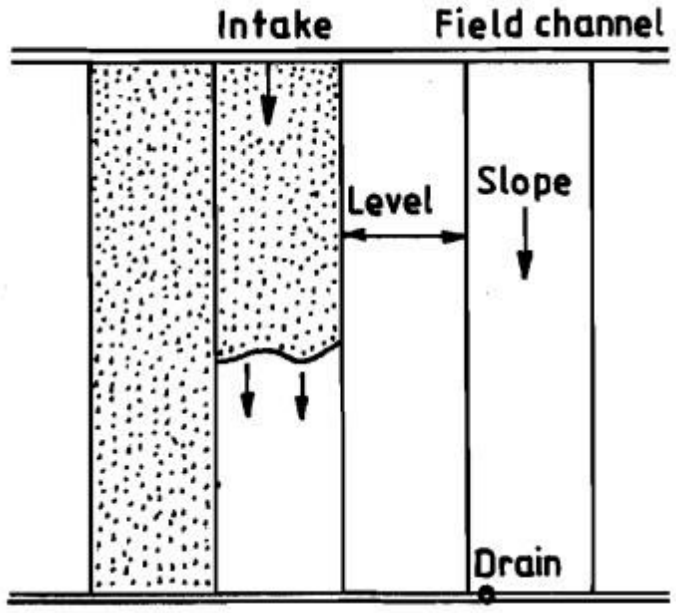
1.5 FUIIROW IRRIGATION

Furrows arc small, parallel channels, made lo c a m water for irrigating the crops. The crops are usually grown on thc ridges between the furrows



1.6 BORDER IRRIGATION

Borders are usually long, uniformly gradcd strips of land. separated by earth bunds In contrast to basin irrigation these bunds are not to contain water for ponding but to guide its flow down the field.



CHOICE OF METHOD OF IRRIGATION

1. Natural conditions (slope & soil type).
2. Type of crop,
3. Level of technology that is available,
4. Previous experience with the practice of irrigation and
5. Required labour inputs.

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