UNIT – 2

IRRIGATION METHOD

PART-A

1) List some types of irrigation? **(AU MJ2008)**

- Canal Irrigation
- Lift Irrigation
- Tank Irrigation

2) What are the types of irrigation? **(AU MJ2008)**

- Surface Irrigation
- Sub-Surface Irrigation.

3) What are the techniques of water distribution in the farms? **(AU ND2008)**

- Free Flooding
- Border Flooding
- Check Flooding
- Basin Flooding
- Furrow Irrigation Method
- Drip Irrigation Method.

4) What are the types of sprinkler system? **(AU ND2008)**

- Permanent System
- Semi-Permanent System
- Portable System

5) What are the advantages of sprinkler irrigation? **(AU MJ2009)**

- Land Levelling Is Not Required
- Fertilisers Can Be Uniformly Applied
- It Is Less Labour Oriented

6) What are the limitation of sprinkler irrigation? **(AU MJ2009)**

- Initial Cost Of The System Is Very High
- It Requires Larger Electrical Power
- High Wind May Distort Sprinkler Pattern

7) What are the types of canals? **(AU ND2009)**

- Alluvial Canal
- Non-Alluvial Canal

8) What are alignment of canals? **(AU ND 2009)**

- Watershed Canal Or Ridge Canal
- Contour Canal
- Side Slope Canal

9) What are distribution system of canal irrigation? **(AU MJ2010)**

- main canal
- branch canal
- major canal
- watercourses
- minor canal

10) Define tank irrigation? **(AU MJ2010)**

It is defined as the storage irrigation scheme,which utilizes the waterstored on the upstream side of a smaller earth dam

11) Define tank banks? **(AU ND 2010)**

The earthen bunds,spanning across the steams are called tank bunds ortank banks

12) What is called alluvial soil? **(AU ND 2010)**

The process of silt deposition may continue over long periods oftime,resulting in the formation is called alluvial soil

13) What is called non-alluvial soil? **(AU MJ2011)**

Mountainous regions may go on disintegrating over a period oftime,resulting in the formation of a rocky plain area called non-alluvial soil

14) What is called watershed canal? **(AU MJ 2011,MJ 2012)**

The dividing ridge line between the catchment areas of two streams iscalled watershed canal]

15) What is the other name for drip irrigation? **(AU ND 2011,2012)**

Drip irrigation is also called as trickle irrigation.

16. What is called sprinkler irrigation system? **(AU ND 2011,2012)**

Water is applied to the soil in the form of a spray through a network ofpipes and pumps is called sprinkler irrigation system

17. What is called borders? **(AU MJ 2012)**

Land is divided into a number of strips separated by low leeves calledborders.

PART-B

1. **What are the merits and demerits of irrigation? (AU MJ2008)**

Merits of irrigation

1. During the period of low rainfall or drought, yield of crops may increased or remains same, due to irrigation system.
2. The food production of a country can be improved by ensuring the growth of crops. This helps a country to prevent famine situation.

3. Securing increased agricultural production and thus improving the nutrition of the population.
4. Irrigation helps to improve the cultivation of cash crops like vegetables, fruits, tobaccos, sugar cane.
5. In some river valley projects, multi purpose reservoirs are formed by constructing high dams. At these river valleys, hydro electric power may be generated.
6. Retention of water in reservoirs and possible multi purpose use thereof.
7. Irrigation canal may be the source of water supply for domestic and industrial purposes.
8. The reservoirs and canals can be utilized for the development of the fisher project.
9. Culturing the area, increasing the social and cultural level of the population.
10. Recreation facilities in irrigation canals and reservoirs.
11. Increases employment by providing jobs to people.
12. Improvement of the micro climate. Possibility provided for waste water use and disposal.
13. Improvement of water regime of the irrigated soils.

Demerits of irrigation

1. Danger of water logging and salination of soils.
2. It may change properties of water in reservoirs due to waste water use and disposal.
3. Deforestation of area is to be done which is to be irrigated. With it, change of water regime in the area.
4. Possible spread of diseases from certain types of surface irrigation.
5. Danger of pollution of water resources by return run off from irrigation.
6. New diseases caused by retention of waste water in large reservoirs.
7. Due to excessive irrigation, climate becomes damp and cold. Thus humidity increases, which is not good for health.
8. Careless irrigation may lead to retention of water and create places for breeding of mosquitos.
9. Excess of irrigation may result in raising the sub soil water table and lead to water logging of the area.

2 What are the factors affecting duty? (AU ND 2008)

1. Soil Characteristics:

If the soil of the canal bed is porous and coarse grained, it leads to more seepage loss and consequently low duty. If it consists of alluvial soil, the percolation loss will be less and the soil retains the moisture for longer period and consequently the duty will be high.

2. Climatic Condition:

When the temperature of the command area is high the evaporation loss is more and the duty becomes low and vice versa.

3. Rainfall:

If rainfall is sufficient during the crop period, the duty will be more and vice versa.

4. Base Period:

When the base period is longer, the water requirement will be more and the duty will be low and vice versa.

5. Type of Crop:

The water requirement for various crops is different. So the duty varies from crop to crop.

6. Topography of Agricultural Land:

If the land is uneven the duty will be low. As the ground slope increases the duty decreases because there is wastage of water.

7. Method of Ploughing:

Proper deep ploughing which is done by tractors requires overall less quantity of water and hence the duty is high.

8. Methods of Irrigation:

The duty of water is high in case of perennial irrigation system as compared to that in inundation irrigation system.

9. Water Tax:

If some tax is imposed the farmer will use the water economically thus increasing the duty.

3 Briefly explain about irrigation efficiencies? (AU MJ2009)

Definition

The ratio of the amount of water available (output) to the amount of water supplied (input) is known as Irrigation Efficiency. It is expressed in percentage.

Types of Irrigation Efficiency

The following are the various types of irrigation efficiencies:

(a) Water Conveyance Efficiency (ηc):

It is the ratio of the amount of water applied, to the land to the amount of water supplied from the reservoir. It is obtained by the expression,

ηc = WlWr × 100 Where, ηc = Water conveyance efficiency Wl = Amount of water applied to land Wr = Amount of water supplied from reservoir

(b) Water Application Efficiency (ηa):

It is the ratio of the water stored in root zone of plants to the water applied to the land. It is obtained by the expression,

ηa = WzWl × 100 Where, ηa = Water application efficiency Wz = Amount of water stored in root zone Wl = Amount of water applied to land

(c) Water Use Efficiency (ηu):

It is the ratio of the amount of water used to the amount of water applied. It is obtained by the expression,

ηu = Wu Wl × 100 Where, ηu = Water use efficiency Wu = Amount of water used Wl = Amount of water applied to land

(d) Consumptive use Efficiency (ηcu):

It is the ration of the consumptive use of water to the amount of water depleted from the root zone. It is obtained by the expression, ηcu = Cu Wp × 100

4. What are the consumptive use of water? (AU ND 2009)

Definition:
It is the quantity of water used by the vegetation growth of a given area. It is the amount of water required by a crop for its vegetated growth to evapotranspiration and building of plant tissues plus evaporation from soils and intercepted precipitation. It is expressed in terms of depth of water. Consumptive use varies with temperature, humidity, wind speed, topography, sunlight hours, method of irrigation, moisture availability.

Mathematically,

Consumptive Use = Evapotranspiration = Evaporation + transpiration It is expressed in terms of depth of water.

Factors Affecting the Consumptive Use of Water
Consumptive use of water varies with:

- Evaporation which depends on humidity
- Mean Monthly temperature
- Growing season of crops and cropping pattern
- Monthly precipitation in area

- Wind velocity in locality
- Soil and topography
- Irrigation practices and method of irrigation
- Sunlight hours
- Types of Consumptive Water Use
- Following are the types of consumptive use,

Types of consumptive use

- Optimum Consumptive Use
- Potential Consumptive Use
- Seasonal Consumptive Use

1. Optimum Consumptive Use:
It is the consumptive use which produces a maximum crop yield.
2. Potential Consumptive Use:
If sufficient moisture is always available to completely meet the needs of vegetation fully covering the entire area then resulting evapotranspiration is known as Potential Consumptive Use.
3. Seasonal Consumptive Use:
The total amount of water used in the evapo-transpiration by a cropped area during the entire growing season.

5 Write a short note on sub-surface irrigation, state clearly the conditions under which thismethod is suitable. What are the essential requirements for a successful sub-surfaceirrigation? (AU MJ2010)

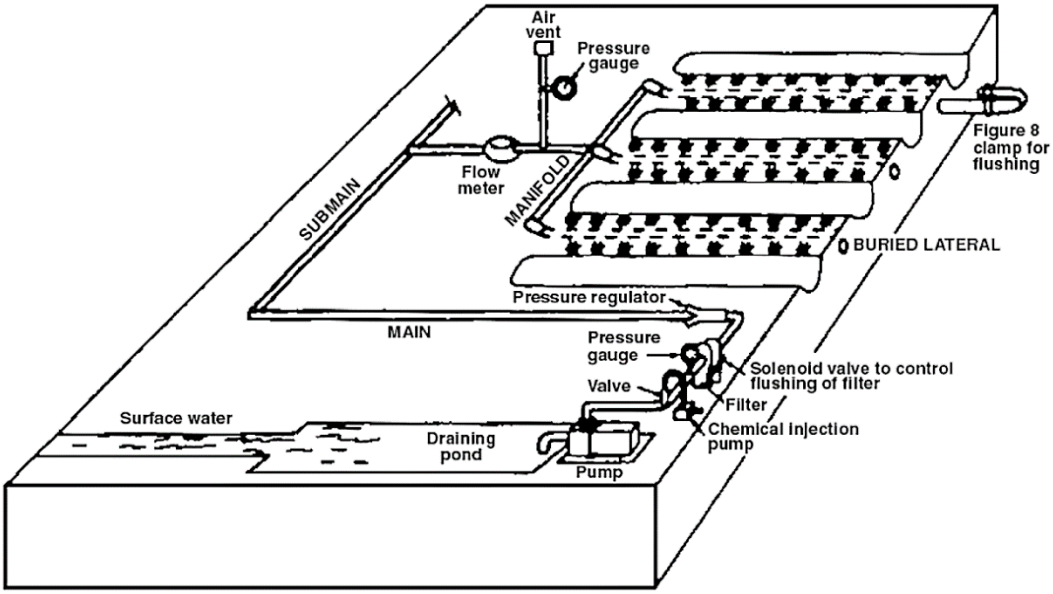
A field irrigated by a subsurface drip system. Source: SELA (n.y.)

Subsurface drip is a highly efficient irrigation system that uses buried drip tubes or drip tape to meet crop water needs. Since the water is applied below the soil surface (as opposed to surface irrigation or traditional drip irrigation), the effects of surface infiltration, such as crusting, saturated condition of ponding water, and water losses via evaporation and surface runoff (including soil erosion) are eliminated. With an appropriately sized and well-maintained subsurface drip irrigation system, water application is highly efficient and uniform.

Wetting occurs around the tube and water moves out in all directions. Moreover, water is applied directly to the root zone of the crop as opposed to the soil surface where most weed seeds hibernate. As a result, germination of annual weed is reduced. This lowers the pressure on valuable crops. Furthermore, some crops may benefit from the additional heat provided by dry surface conditions, and produce more biomass. When managed properly the application of fertiliser can be optimised. Fields can still be worked when irrigation systems are installed.

Basic Design Principles

A subsurface drip irrigation system has a similar design as a common drip irrigation system. A typical system layout consists of a settling pond (where possible), pumping unit, pressure relief valve, check valve or back flow prevention valves, hydrocyclone separator (if a settling pond is not feasible), chemical/fertiliser injection unit (see also fertigation and nutrient requirements), filtration unit equipped with back flush valves, pressure regulators, air vent valves and PVC pipes delivering the water to the crop. The piping is 10 to 60 cm below the ground, depending on crop and soil (capillary attraction). As a water source, treated greywater or even blackwater is possible, with the risk of clogging being greater if the influent flow has not properly settled. Therefore, treatment of the water (e.g. a non-planted filter system, constructed wetlands (horizontal flow or vertical flow) or at least a septic tank) before the settling pond is necessary.



A typical subsurface drip irrigation field layout. Source: REICH et al. (2009)

Subsurface drip irrigation is generally a high-tech, automatically operated technology applied to medium and large scale production (see also automatic irrigation). However, several low-cost and simple methods of subsurface (drip) irrigation like pitcher or bottle irrigation (see manual irrigation) exist that are equally effective for small-scale farming. There are several subsurface techniques used for secondary wastewater treatment such as leach field or evapotranspiration bed that also provide uncontrolled irrigation to fields.

Cost Considerations

REICH et al. (2009) estimates that investment costs of a subsurface drip irrigation system are high (1000 to 2000 US$ per acre). The costs vary depending on water source, quality, filtration needs, choice of material, soil characteristics and degree of automation (see also automatic irrigation). Normal life expectancy is between 12 and 15 years. With good maintenance and high water quality the system can be used even longer.

Operation and Maintenance

The performance and life of any system depends on how well it is designed, operated and maintained. It should either be automatically controlled or regularly inspected. Repairing the buried pipes is difficult, cumbersome and time-consuming. To prevent rodents from chewing the pipes, precautionary measures should be undertaken. The mechanical components such as pumps, valves and filters need to be maintained as well as checked and cleaned regularly.

6 Write the merits and demerits of surface irrigation. (AU ND2010)

Advantages of Surface Irrigation

Followings are the surface irrigation advantages.

- Management is quite easy, you do not need any modern technology. If you have local traditional knowledge, you can do it.
- You do not need high financial support. You can be beneficial with small lands too.
- If you have short time water supplies, then this is the best process for you.
- If your drainage system is far, then you just need longer tubes.
- This is a nature-friendly system, you can utilize rainwater.
- It also works effectively in a low filtration rate.
- Low capital and no energy cost needed.
- You can use this irrigation process in sloping lands and long fields.

Disadvantages of Surface Irrigation

Followings are the surface irrigation disadvantages.

- Level lands require high accuracy, you cannot use it there.
- This is a big no-no for big fields.
- Not applicable on soil with a high filtration rate.
- Plants are always covered with water even when they do not need it.
- Sometimes limited space gets more water than required.
- No drainage outlet.

7 Briefly explain about canal irrigation? (AU MJ2011)

A *canal* is an artificial waterway. The word "canal" origins from the Old French word chanel, which means “channel.” Sometimes it is also known as navigation.

In ancient time, A canal is used to connect waterfalls with the intention of shortening routes. Now it is constructed to allow the passage of boats or ships inland or to convey water for irrigation, human-made strip of water used for irrigation or boat access to a more significant body of water.

A canal plays a vital role when it comes to transportation and global commerce. We use the canal for irrigation, land drainage, urban water supply, hydroelectric power generation, transportation of cargo and people, power generation, the canal is also used to connect industrial centers with ports to speed movement of raw materials. Water filled canals at high levels can deliver water to any place where there is a water crisis. However, Canals weaken the foundation of the dam.

Canals of Burano. Source- Linda D Lester

Types of Canals

We can identify different types of canals based on usage, discharge, branches, provider, alignment, etc.

Based on usage there are two types of canals:

1. Aqueducts
2. Waterways

Based on discharge there are five types of canals:

1. Main canal
2. Branch canal
3. Major distributary
4. Minor distributary
5. Watercourse or field channel

Based on provider canals can be classified into two types

1. Unlined canals
2. Lined canal

Based on alignment there are three canal types:

1. Contour canal
2. Watershed canal
3. Side slope canal

Canal Types Based on Usage

Aqueducts

Aqueduct is a significant watercourse which carries water from a source to the far distribution point. There are many versions of aqueducts. The simplest types are mostly small ditches cut into the earth. They run through underground tunnels. However, modern aqueducts use the pipeline as their path. This types of canals are used for the conveyance and delivery of water for consumption, and agricultural irrigation.

Waterways

Inland waterways canal. Source- Conway Photography

Waterways are the type used for carrying ships and boats and conveying people. Waterway paths are known as a secondary by-product of our country's extensive historical waterway network, and their essential contribution to everyday life has mostly gone unrecognized. They include water features like river, canal, streams, as well as lakes, reservoirs, and docks. Related features of waterways include weirs, locks, rapid, etc. Waterways provide a safe operating environment by reflecting the local conditions. Mostly waterways are used for transformation, irrigation, headrace, trail race, penstock, spillway, etc. They cater to a wide range of boating and water activities as well as control of pests. Waterways act as refuges for

terrestrial fauna species during times of drought and as corridors for dispersal. Waterway paths attract more commuting, tourism. It helps to decrease carbon footprints, reduce road congestion and improve the health of local communities.

Canal Types Based on Discharge

Main Canal

Canals are having discharge more significant than ten cumecs are called as main canals. The main canal is also known as the arterial canal. In drainage, the main canal is the superior canal of the drainage system; it collects water from the drainage canals and conducts it to the water intake. The main canal carries discharge directly from the river. It takes off directly from the upstream side of weir head works or dam. Usually, no direct cultivation is proposed. It supplies water from a river, reservoir, or canal to irrigated lands by gravity flow. It supplies water to a branch canal. We cannot use the main canal for direct irrigation.

Branch Canal

Halifax Branch canal. Source: pinterest.ca

Branch canals have discharge in the range of 5-10 cumecs. The branches of the main canal go in either direction at regular intervals. It offtakes from the main canal where the head discharge is not more than 14-15 cumecs. Branch canal also plays the role of feeder channel for major and minor distributaries. Branch canals do not carry out direct irrigation, but they provide direct outlets.

Major Distributary

Canals who offtake from the main canal or branch canal with head discharge from 0.028 to 15 cumecs are termed as significant distributaries. It takes off water from branch canals. Sometimes getting supply from the main canal, their discharge is less than branch canal. These are mostly known as irrigation channels because of their supply of water to the field directed through outlets.

Minor Distributary

Canals in which discharge ranged from 0.25 up to 3 cumecs are termed as minor distributors. It offtakes from a major distributary carrying discharge less than 0.25 cumecs are termed as minor distributary. Sometimes minor distributary gets supply from the branch canals. The discharge in minor distributary is less than in the major distributary. They also provide water to the courses through outlets provided along with them.

Watercourse or Field Channel

The discharge in watercourses is less than 0.25 cumecs. A field channel either take off from a significant distributary or minor- it solely depends on which extent the irrigation will happen. In a few cases, it also takes off water from the branch canal for the field. Small channels which carry water from the outlet of a major or minor distributary or a branch canals to the areas to be sprayed. There are small channels for feeding water to the irrigation fields.

Canal Types Based on the Provider

Unlined Canals

Unlined canals consist of bed and banks made of natural soil. They are not provided with a lining of impervious materials. It produces the growth of aquatic weed retards the flow which leads to massive maintenance cost. Unlined canals can tolerate velocities no more than 0.7 m/s because of erosion. In unlined canals, there is a danger of canal bank breakage caused by overtopping, erosion and animal burrowing. Weeds had severely slowed down the water flow of the canals, preventing up to 50% of the water from reaching the tail end of the canal. It also causes waterlogging of the adjacent net.

Lined Canal

Lined canals are provided with a lining of impervious materials on its bed and banks to prevent the seepage of water. The most commonly used types of padding are concrete, shotcrete, brick or burnt clay tile, boulder, concrete blocks, stone masonry, sand-cement, plastic, and compacted clay. Possible benefits of lining a canal include water conservation; no seepage of water into adjacent land or roads; reduced canal dimensions; and reduced maintenance

8. Briefly explain about lift irrigation? (AU ND 2011)

Lift Irrigation:

In lift irrigation water is lifted from a river or a canal to the bank to irrigate the land which are not commanded by gravity flow. Lift irrigation is being increasingly practiced in India. Every State such areas exist where irrigation can be extended only by lift canals. Lift irrigation also includes tube well irrigation but the latter is not feasible in areas where scarcity of water exists, climate is dry and groundwater is low, i.e., groundwater is in insufficient quantity and unsuitable quality. Lift canal then constitutes the only means of extension of irrigation to sound perched lands. A lift canal can cater for much larger areas than a tube well and is suitable when supplies either from a river or a canal are available for lifting to higher elevation.

Lift area is defined as the area the level of which is too high to permit irrigation by gravity flow from the source, but which can be irrigated by lifting water to the necessary level by means of pump Gross lift area is the portion of gross irrigable area which can be irrigated only by pumping.

Surface water may be lifted from a reservoir, a river, or from a gravity flow canal. From river, water may be lifted by installing pumps either on the ground or on floating barges. Floating barge installation envisages economical and expeditious execution of the project for lift irrigation. Moreover, the pumping installation can be made mobile by rowing to the ne xt pumping sit after completing irrigation at one installation. In a canal, water may be lifted at the point f the off take of the lift distributary or in between the length of a canal wherefrom high tract to be irrigated starts. Figure shown the longitudinal section of a lift canal

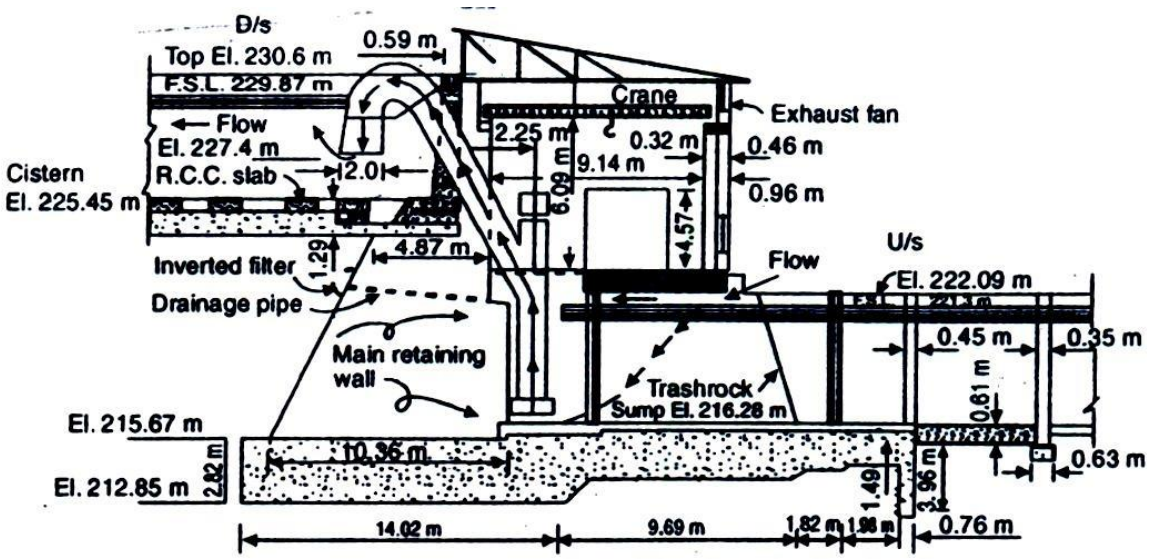


Figure: Typical pumping station

Optimal alignment of the lift canal is of paramount important because it involves dealing with costly process of water lifted and then diverted to flow by gravity. The essence of the arrangement is to command maximum area with minimum lift.

In lift irrigation mechanical devices like pumps, or electric motors and pumps are required to be installed for lifting water. Electrical pumps are generally provided for lifting water. Diesel pumping sets are also installed as standby. The provision of standby pumps is essential to cater forget lack of facilities for immediate replacement of defective pumping sets and to switch over to diesel set in case of power failure. Figure shows a typical pumping station at a lift canal.

Lift irrigation canals are essentially lined due to obvious advantages of a lined section and hence low pumping lift and greater area commanded. Lifted water is costly and transmission losses are required to be cut down to the minimum. Water surface slope is kept the minimum possible to command greater area with minimum lift. Escape is provided upstream of pumping station so that in the event of failure of pumping equipment, the supply reaching upstream is disposed off.

9) Briefly explain about tank irrigation? (AU MJ2012)

Tank Irrigation:

Tanks on local streams form a significant source of irrigation especially in the peninsula area in the States of Karnataka, Maharashtra and Tamil Nadu. Tank irrigation

belongs to category of storage irrigation. Tanks are small sized reservoirs formed by small earthen embankments to store runoff for irrigation. The site is selected within a watershed protected by vegetation and containing minimum of cultivated land so as to ensure minimum rate of sedimentation which lowers its storage capacity. Adequate soil conservation measures are essentially adopted to ensured quantity and quality of water inflow into the tank. The essential components of irrigation that are tank embankment, surplus or escape weir, and outlet sluice. A suitable breaching section also sometimes provided to ensure that the tank embankment is not overtopped in the event excessive discharge from the catchment. The breaching section is a low level embankment of certain length designed to have a localized breach to escape excessive inflow.

Irrigation tanks are classified, as under, according to the nature of supply of water:

1. System tanks: The system tanks get assured supply from nearby rivers or canal system at as such they may not have their own catchment.

2. Non '?'system tanks: Also called 'isolated'?'systemtanksdepend. onThethe no runoff from their own catchment. They are not connected to any other tank.

3. Grouped tank: The grouped tanks, as the name implies, consist of a series of tanks connected together such that outflow from the upper tank is stored in the lower one for irrigation.

They usually have limited depth of 5 to 10 m and fill up two or three times in the rainy season and redistribute to some extent the available supplied and tide over breaks in the monsoon. The maximum flood discharge from the catc formula. The length of escape weir is worked out from the formula, $Q= CLH^{3/2}$, where C is a coefficient of discharge with value for broad crested weir and 1.84 for short crested weir. Water losses from tanks are enormous as the usually have more wetted area for the given storage capacity. The water losses due to evaporation and absorption are taken as 1.75 m per year in Southern India and about 1.25 m in Mumbai.

10 Briefly explain about flooding methods(AU MJ2012)

Several methods of irrigation are used today depending on water availability, the type of irrigated crop and the financial investment the grower is willing to make. A firm knowledge regarding the irrigation techniques available can help one understand the different types of deficit irrigation.

Flood irrigation:

In flood irrigation, a large amount of water is brought to the field and flows on the ground among the crops. In regions where water is abundant, flood irrigation is the cheapest method of irrigationand this low-tech irrigation method is commonly used by societies in

developing countries. It should be applied only to flat lands that do not concave or slope downhillso that the water can evenly flow to all parts of the field, yet even so, about 50% of the water is wasted and does not get used by the crops. Some of this wasted water accumulates at the edges of a field and is called run-off. In order to conserve some of this water, growers can trap the run-off in ponds and reuse it during the next round of flood irrigation. However a large part of the wasted water cannot be reused due to massive loss via evaporation and transpiration.

One of the advantages of flood irrigation is its ability to flush salts out of the soil, which is important for many saline intolerant crops. However, the flooding causes an anaerobic environment around the crop, which can increase microbial conversion of nitrogen from the soil to atmospheric nitrogen, or de-nitrification, thus creating low nitrogen soil.

Surge flooding is an attempt at a more efficient version of conventional flood irrigation in which water is released onto a field at scheduled times, thus reducing excess run-off.

Furrow irrigation:

Furrow irrigation is actually a type of flood irrigation in which the water poured on the field is directed to flow through narrow channels dug between the rows of crops, instead of distributing the water throughout the whole field evenly. The furrows must all have equal dimensions, in order to guarantee that the water is distributed evenly. Like flood irrigation, furrow irrigation is rather cheap in areas where water is inexpensive.

Spray irrigation:

The more modern spray irrigation in all its various forms is a more expensive type of irrigation, requiring more complex machinery than flood irrigation, but it utilizes water more efficiently, reducing the amount of water needed to irrigate a field. That said, even more water is lost through evaporation in spray irrigation compared to flood irrigation and plant diseases due to excess moisture can occur at over watering.

In spray irrigation systems, a long hose is set to a water source on one side and on the side reaching the field, water is released through spray guns.

The center-pivot system is an efficient way to irrigate a large field with minimum machinery. This system is built of many triangular metal frames on wheels that hold the central hose above the field. The hose transports water from a pump at the center of the system and water is sprayed through sprinklers along the tube. The whole structure circulates the field spraying water, with the water source as the center of the circle. The disadvantages of this method, and other types of traditional spray irrigation, are the electric motors needed to help the system roll in a circle and the large amounts of water (about 35%) that evaporate or get blown away by winds before they even reach the ground.

The Low Energy Percision Application (LEPA) center pivot system is a more efficient irrigation method than the conventional center pivot system, boosting the irrigation efficiency from about 60% to more than 90%. This rise in effectiveness is also due to the decline in the electricity usage, but mostly because the water is applied directly onto the crops and not sprayed out into the air. This system also consists of a central hose, but instead of high power sprinklers, pipes hang from the central hose and attached to the bottom of each pipe, very close to the ground, is a nozzle that sprays water directly onto the crops. This way, less water is lost through evaporation compared to traditional spray irrigation- more than 90% of the water applied is used by the crop and less electricity is required.

Drip irrigation:

While drip irrigation may be the most expensive method of irrigation, it is also the most advanced and efficient method in respect to effective water use.

Usually used to irrigate fruits and vegetables, this system consists of perforated pipes that are placed by rows of crops or buried along their root lines and emit water directly onto the crops that need it. As a result, evaporation is drastically reduced and 25% irrigation water is conserved in comparison to flood irrigation. Drip irrigation also allows the grower to customize an irrigation program most beneficial to each crop.

Water high in salts should be filtered before use since otherwise they may clog the emitters and create a local build-up of high salinity soil around the plants if the irrigation water contains soluble salts.