

UNIT 5

IRRIGATION TECHNIQUES



arid or arid, mountainous regions. It is actual to know that floodwater harvesting belongs to the accepted irrigation methods, but rainwater harvesting is usually not considered as a form of irrigation. Rainwater harvesting is the collection of runoff water from roofs or unused land and the concentration of this. Some of Ancient India's water systems were pulled by oxen.

Now it is time to speak on non-conventional sources of irrigation. it is known around 90% of wastewater produced globally remains untreated, causing widespread water pollution, especially in low-income countries. Consequently, agriculture in Uzbekistan also is using untreated wastewater as a source of irrigation water. Cities provide lucrative markets for fresh produce, so are attractive to farmers. There is often no alternative for farmers but to use water polluted with urban waste, including sewage, directly to water their crops. There can be significant health hazards related to using water loaded with pathogens in this way, especially if people eat raw vegetables that have been irrigated with the polluted water.

We can conclude here natural and artificial sources (or the types of irrigation sources classified above) of irrigation are the main actual subjects (let it say problems) for today which need to be solved as they closely connected with human being and preservation of environment.

Step 2. Explain the following water combinations.

- wastewater – all the throw away water we produce from our homes, schools, farms, hospitals, public places and so on.
- desalinated water –
- rainwater –
- floodwater –

Step 3. Determine the following words in a group of water sources.

treated wastewater, floodwater, reservoirs, lakes, drainage water, spate irrigation, springs, rivers, wells, desalinated water

Surface water	rivers,
Groundwater	
Non-conventional	

Step 4. Write down advantages and disadvantages of water sources.

<i>water sources</i>	<i>advantages</i>	<i>disadvantages</i>
Groundwater	used by nature	
Surface water		
Non-conventional		Can be used untreated water

Step 5. Find out from the text water sources which are used by nature or by human being.

By nature <i>river</i>	By human being <i>well</i>
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HELP DESK

WHAT DO THESE WORDS MEAN?

irrigation water source – watering resource

spate irrigation – using seasonal floods of rivers, streams, ponds and lakes to fill water storage canals

floodwater harvesting – the process or period of gathering in crops after flood

non-conventional source – unusual resource

desalinated water – water removed of salt

drainage water – the action or process of draining water

runoff (water) – is the flow of water that occurs when excess stormwater, meltwater, or other sources flows over the Earth`s surface

rainwater harvesting – crops which grow after rain

water pollution – dirtying of water

SESSION 19

SPRINKLER

⇒ **STARTER:** Look at the pictures below and tell your understanding.



Step 1. Read the passage carefully.

Sprinklers are the most essential devices of modern irrigation in the world, especially in Uzbekistan that are used not only for watering plants, but for dust suppression as well. We meet them in our gardens and fields, and we can monitor their mechanism and structure: *water is piped to one or more central locations within the field here* and distributed by overhead high-pressure sprinklers or guns. A system utilizing sprinklers, sprays, or guns mounted overhead on permanently installed risers. Higher pressure sprinklers that rotate are called *rotors* and are driven by a ball drive, gear drive, or impact mechanism. Rotors can be designed to rotate in a full or partial circle.

You can see another type of sprinklers, which are mounted on moving platforms connected to the water source by a *hose*. Automatically moving wheeled systems known as *traveling sprinklers* and they may irrigate areas such as small farms, sports fields, parks, pastures, and unattended cemeteries. This type of the system is known to most people as a "*water reel travelling irrigation sprinkler*" and they

are used extensively for dust suppression, irrigation, and land application of waste water. Other travelers use a flat rubber hose that is dragged along behind while the sprinkler platform is pulled by a cable. These cable-type travelers are definitely old technology and their use is limited in today's modern irrigation projects.

As it was mentioned above, sprinklers are very important and actual for today means which need to be developed in the future not only for plant-growing, irrigating and decorating, but also for keeping the fresh air and environment, for solving some ecological and human (biological) problems as well.

Step 2. Match the words in A with the words in B and complete the sentences.

Example: Automatically moving wheeled systems known as traveling sprinklers.

A	B
Water is piped to ...	traveling sprinklers
Automatically moving wheeled systems known as ...	the sprinkler is pulled across the field.
When the sprinkler arrives back at the reel ...	one or more central locations within the field
As the tubing is wound on the drum powered by the irrigation water or a small gas engine...	the system shuts off.

Step 3. Regroup sentences from the text in the given two types of sprinklers.

<i>Traveling sprinklers</i>	<i>Higher pressure sprinklers</i>
	may irrigate farms, parks, sport fields

Step 4. Find out gerunds from the text and explain the way of using them in this sentences and make your own sentence.

watering plants – after prepositions gerund is always used.

Watering is useful for growing plants well.

Step 5. Choose the synonyms or appropriate definitions from column B to the following words from column A.

Feature (n)	To find an original way to make an object or plan
Sprinkler (n)	Characteristic
Devise (v)	Put together with one or more other parties
Joined (adj)	Machine
Mounted (adj)	Construction, building
System (n)	Bunch, cluster
Truss (n)	Fixed or fitted

HELP DESK

WHAT DO THESE WORDS MEAN?

sprinkler (or overhead) irrigation – watering with a device (sprinkler) that releases water from overhead pipes through nozzles opened automatically by a rise in temperature

central locations – central areas

high-pressure sprinklers or guns – devices that spray water highly

industrial applications – things which is used in industry

moving platforms – platform which is in motion

waste water – unnecessary water

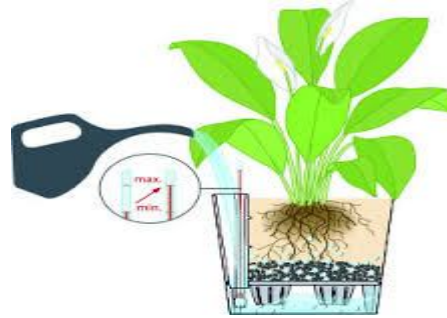
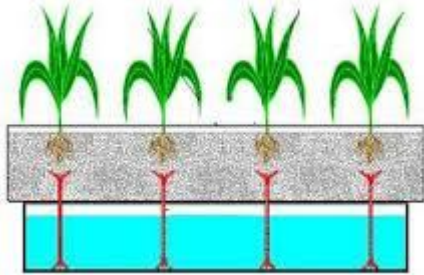
cable-type travelers – travelling sprinklers with a platform pulled by a cable

modern irrigation projects – modern watering enterprises

SESSION 20

SUB-IRRIGATION

⇒ **STARTER:** Look at the pictures below and tell your understanding.



Step 1. Read the passage carefully and fill in the gaps using Present forms of the verbs given in brackets.

1. Sub-irrigation ... (have, be) used for many years in field crops in areas with high water tables. It ... (be) a method of artificially raising the water table to allow the soil to be moistened from below the plants' root zone. Often those systems ... (be) located on permanent grasslands in lowlands or river valleys and combined with drainage infrastructure. A system of pumping stations, canals, weirs and gates ... (allow) it to increase or decrease the water level in a network of ditches and thereby control the water table.³

2. Sub-irrigation ... (be) also used in commercial greenhouse production, usually for potted plants. Water ... (be) delivered from below, absorbed upwards, and the excess collected for recycling. Typically, a solution of water and nutrients ... (flow) through a trough for a short period of time, 10–20 minutes, and is then pumped back into a holding tank for reuse. Sub-irrigation in greenhouses ... (require) fairly

³ <http://en.wikipedia.org/wiki/Subirrigation>

sophisticated, expensive equipment and management. Advantages (be) water and nutrient conservation, and labor-saving through lowered system maintenance and automation. It ... (be) similar in principle and action to subsurface drip irrigation.

Step 2. Reorder the ideas given below according to the paragraphs and parts of the paragraphs.

Irrigating the land below. 1

Maintaining water and nutrients in the plants. ____

Using high balance of water. ____

Sub irrigation is similar to sub-surface drip irrigation. ____

Step 3. Find the single words in paragraph 1 which mean the following.

- i. territory, region
- ii. harvest
- iii. enlarge, intensify.....
- iv. hothouse , conservatory.....
- v. forever, usual.....

Step 4. Matching Sentence Halves: Refer to the text and match the halves of the given sentences together.

- 1. Subirrigation has been used... + b.....
- 2. A system of pumping stations, canals, weirs and gates ... +.....
- 3. Sub-irrigation is also used in commercial greenhouse production, usually ... +.....

4. Sub-irrigation in greenhouses ... +.....

- a) never in plants protection.
- b) for many years.
- c) completed by engineers.
- d) allows it to increase or decrease the water level in a network of ditches and thereby control the water table.
- e) requires fairly sophisticated, expensive equipment and management.
- f) only in fields.
- j) for potted plants.
- h) by containers full with water and nutrients.

Step 5. Find out from the text irrigation systems made by man or not made by man (by nature).



river

canals

HELP DESK

WHAT DO THESE WORDS MEAN?

permanent grassland – usual grassland

river valley – a low area of land between hills or mountains, typically with a river or stream flowing through it

drainage infrastructure – the action or process of draining basic physical and organizational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise

pumping station – a mechanical device using suction or pressure to raise or move liquids, compress gases, or force air into inflatable objects such as tires

potted plant – plant which grows in a flower-pot; indoor plant

nutrient – a substance that provides nourishment essential for the maintenance of life and growth

automation – the use or introduction of automatic equipment in a manufacturing or other process or facility

subsurface – the stratum or strata below the earth's surface

SESSION 21

DRAINAGE

➡ **STARTER:**

1. What do you see in the picture?
2. Is it used in nowadays? What is it used for?
3. Can you explain advantages and disadvantages of it for human being?



Step 1. Read the following passage carefully.

Perhaps, there is not anybody who doesn't know anything about the drainage and draining. Because it is the popular way of ancient and present-day irrigation everywhere. So the **drainage** is considered as the natural or artificial removal of surface and [sub-surface water](#) from an area. Many agricultural soils need drainage to improve production or to manage water supplies.

The best time for this operation is always in [spring](#) or [summer](#), when the ground is dry. Main drains ought to be made in every part of the field where a cross-[cut](#) or open drain was formerly wanted; they ought to be cut four feet (1.2 m) deep, upon an average. This completely secures them from the possibility of being damaged by the treading of [horses](#) or [cattle](#), and being so far below the small drains, clears the water finely out of them. In every situation, pipe-turfs for the main drains, if they can be had, are preferable. Analogically, If good stiff [clay](#), a

single row of pipe-turf and if sandy, a double row.

It is clear from the above-stated method of draining that the expense will vary very much, according to the quantity of main drains needful for the field, also the distance of the small drains from each other, and the distance the turf is to be carried.

Step 2. Match the definition with the table A and B.

A	B
ridge	waste matter carried away in sewers or drains
dig	to make available for use; provide.
<u>plough</u>	to break up, turn over, or remove (earth or sand, for example), as with a shovel, spade, or snout, or with claws, paws or hands.
<u>cattle</u>	an agricultural implement with sharp blades, attached to a horse, tractor, etc., for cutting or turning over the earth
<u>sewerage</u>	a long narrow raised land formation with sloping sides esp. one formed by the meeting of two faces of a mountain or of a mountain buttress or spur
supply	any of various chiefly domesticated mammals of the genus <i>Bos</i> , including cows, steers, bulls, and oxen, often raised for meat and dairy products.

Step 3. Count the right way of making drainage according to the text.

1. *The best time of making drainage is in spring and summer.*
- 2.
- 3.
- 4.

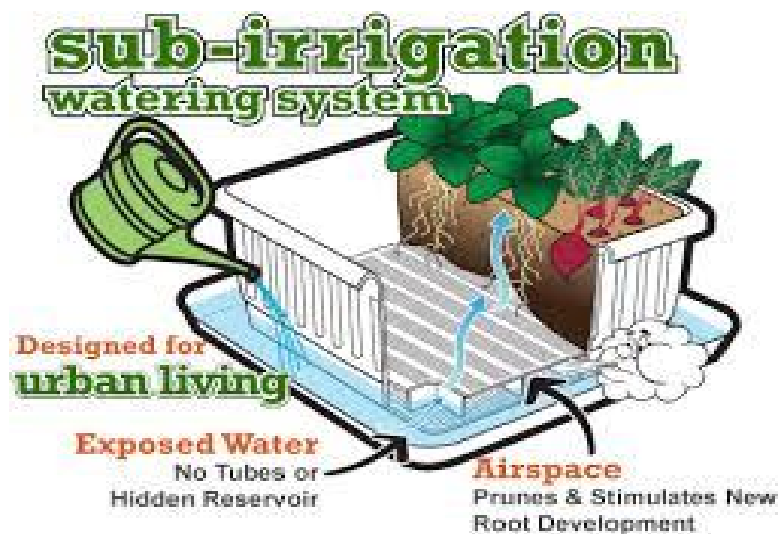
5.

Step 4. Find adverbs ending with *-ly* from the text and make up sentences.

Adverbs	Sentences
formerly	

Step 5. Find the antonyms to the given words from the text.

<i>surface</i>	
<i>natural</i>	
<i>become worse</i>	
<i>ancient</i>	<i>present-day</i>
<i>not fully</i>	



HELP DESK

WHAT DO THESE WORDS MEAN?

sow – plant (seed) by scattering it on or in the earth

plough – a large farming implement with one or more blades fixed in a frame, drawn over soil to turn it over and cut furrows in preparation for the planting

ridge – a long, narrow hilltop, mountain range, or watershed

sandy – covered in or consisting mostly of sand

clay – a stiff, sticky fine-grained earth that can be molded when wet, and is dried and baked to make bricks, pottery, and ceramics

cattle – 1) large ruminant animals with horns and cloven hoofs, domesticated for meat or milk, or as beasts of burden; cows and oxen 2) animals of a group related to domestic cattle, including yak, bison, and buffaloes

sub-surface water – the stratum or strata below the earth's surface

drain – 1) cause the water or other liquid in (something) to run out, leaving it empty or dry 2) deprive of strength or vitality

dig – break up and move earth with a tool or machine, or with hands, paws, snout, etc.

SELF-CONTROL on UNIT 5 (total 15 points)

Step 1. VOCABULARY CHECK (5 points). These are the important words that you have studied in Unit 5. You should make sure that you know these words before you go on to Unit 6.

artificially raising	modern irrigation projects
automation	nutrient
cattle	permanent grassland
central location	plough
clay	potted plant
commercial greenhouse	pumping station
dig	ridge
desalinated water	river valleys
drain	sandy
drainage infrastructure	seeds
drainage water	sub-surface
higher pressure	sub-surface water spate irrigation
high-pressure sprinkler or gun	treated wastewater
hydrothermal vents	waste water
industrial application	water pollution
liquid phase	

Step 2. TRUE-FALSE ACTIVITY (5 points). Which of the following bits of information is given (G) or not given (NG) in Unit 1?

1. Waste water, mostly called untreated water causes water pollution and harms the crops. _____
2. Sprinkler irrigation is always used by the help of rotors which are driven by ball drive, gear drive or impact mechanisms. _____
3. A number of farmers take use of sub-irrigation because of advantages of water and nutrient conservation and labor saving_____

4. The most effective fertilizer comes from the USA. _____
5. The most commonly used fertilizers are soil and liquid one . _____

Step 3. COMPREHENSION TASK (5 points). Read and explain the meaning of the following proverbs and wise-sayings on gardening and planting. Underline metaphorical and specific usage of some expressions.

1. Agriculture is the noblest of all alchemy; for it turns earth, and even manure, into gold, conferring upon its cultivator the additional reward of health.
2. Agriculture is our wisest pursuit, because it will in the end contribute most to real wealth, good morals, and happiness.
3. Agriculture is best, enterprise is acceptable, but avoid being on a fixed wage.
4. Agriculture for an honorable and highminded man, is the best of all occupations or arts by which men procure the means of living.
5. Agriculture engenders good sense, and good sense of an excellent kind.