**Class-6 (Agriculture)**

**Chapter-3**

**Agricultural Inputs**

**Lecture-2 Date-11.05.2020**

**Lesson: 3-7**

❖ **Properties of soil:**

There are 3 different properties of all soils. These are – i) Physical properties ii) Chemical properties and iii) Biological properties.

**i. Physical properties of soil:**

1) Soil texture
2) Soil structure
3) Soil density
4) Soil colour
5) Soil temperature
6) Water holding capacity
7) Air movement of soil, etc.

**ii. Chemical properties of soil:**

1) Acidity and alkalinity
2) Quantity of available plant nutrient
3) Salinity of soil, etc.

**iii. Biological properties of soil:**

1) Type of micro-organisms
2) Number of micro-organisms
3) Functions of micro-organisms etc.

**Irrigation:**

Artificial supply of water in the field for crop plant growth is called irrigation.

**Sources of irrigation water:**

Irrigation water mainly found from two sources, such as

1) **Surface water:** Sources of surface water are rivers, canals, ditches, haor (marshes), baor, ponds, etc. This water is mainly stored from rainfall.
2) **Underground water:** Irrigation is done by digging well or lifting underground water using shallow tube –well. This water is called underground water.


**Fig-** Different techniques of irrigation

**Necessity of irrigation:**

- To supply required adequate quantities of water near the root zone for the plants growth throughout the crop period.
- Insufficient rainfall
- Uneven or non-uniform distribution of rainfall
- Development of agriculture in desert area
- Meeting crops requirements and soil needs
- To maximize production
- To regulate the temperature of the plant system
- To increase the effectiveness of micro-organisms
- To supply important ingredient in photosynthesis

**Drainage of water:**

When the water is comparatively more than the required amount, it needs to be removed and it is called drainage.

**Importance of water draining:**

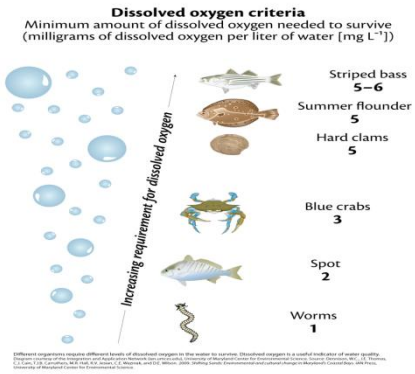
- Increase aeration of soil by increasing air movement at the root zone area of soil
- Activate root functions
- Decrease oxygen deficiency in soil and save the roots of crops from getting rotted
- Increase activities of beneficial microbes
- Balance soil temperature
- Restore perfect soil condition for sowing and transplanting
- Plants lack oxygen if excess water gathers in the land. As a result many plants die.

**Properties of water which are suitable for fish culture:**

The productive capacity of a pond can be assumed by observing the physical and chemical properties of water in it. The following properties of water are suitable for fish culture:

- **Physical properties of water:**
  1) **Water colour:** If the water is green or brown green in colour there is enough natural food for fish in water.
  2) **Clearness of water:** There is enough food for fish when the clearness of water is upto 25 cm or below.
  3) **Depth of water:** For fish culture the depth of water of a pond ranges between 1.5-3 meter. So 2 meter depth is best for fish culture.
  4) **Water temperature:** Growth of fish is less during winter ( at low temperature) and more in summer (at comparatively high temperature). For Rui (carp) culture the best temperature is $25^0$C -$30^0$C.
  5) **Sunlight:** Food production for fish in pond water depends on sunlight.

- **Chemical properties of water:**

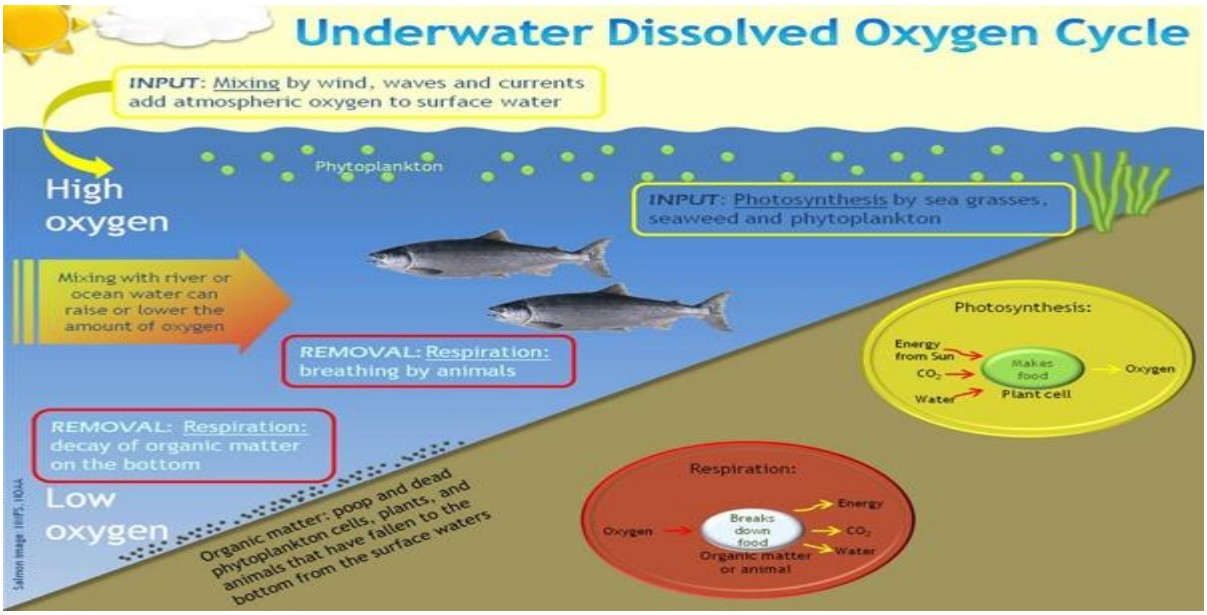



  1) **Dissolved Oxygen:** Healthy water should generally have dissolved oxygen concentrations above 6.5 -8 mg/L.
  2) **Dissolved carbon-dioxide:** Carbon dioxide levels of below 10mg/L are thought to be well tolerated by fish, although sensitivity to the gas varies between species.
  3) **Water $p^H$:** Relatively alkaline water is good for fish culture. So the water $p^H$ 6.5 -8.5 is helpful to grow natural food in a pond.
  4) **Phosphorus:** Phosphorus increases the amount of fish food in water.
  5) **Nitrogen:** Nitrogen is very beneficial to aquatic micro-organism. This micro-organism is the principle food for fish.
  6) **Potassium:** There is need to apply potas in the water to fulfill the demand of food for fish.

❖ **What is called dissolved oxygen?**

Dissolved oxygen (DO) is a measure of how much gaseous oxygen is dissolved in the water - the amount of oxygen available to living aquatic organisms.

Oxygen enters the water by direct absorption from the atmosphere, by rapid movement, or as a product of plant photosynthesis.




❖ **Causes of decreasing oxygen in the water:**

- Decomposition of leaves and branches of plants, seaweeds, phytoplankton and other organic matters under the water.
- Respiration of sea animals
- Use of excess raw cow dung.
- Cloudy sky
- Water being too muddy

❖ **How to recover oxygen deficiency in water?**

- By creating waves on the water surface. Waves can be created by swimming or stirring the water using bamboo. Nowadays advanced aeration systems are used for increasing dissolved oxygen in water.

Fig- Aeration system

❖ **Functions of water in the bodies of animals and birds:**

- helps to absorb food
- helps to control body temperature
- helps to digest food
- helps to transmit nutrients to the cell
- helps to maintain body fluidity
- helps to transport different types of enzymes

❖ **Sources of drinking water for livestock:**

Clean and pure water from—

- a tube well,
- pacca dug well,
- pond, etc.

❖ **Water deficiency problems of domestic animals and birds and it's solution:**

**Problems:**

- There will be obstacle to taking other foods if sufficient amount of water is not taken.
- The production of animals and birds will decrease.
- Their weight will decrease.
- The birth of a baby or laying of eggs may face danger from water deficiency during pregnancy of domestic animals and birds.
- They may die even due to shortage of water.

**Solution:**

- To drink plenty of clean and pure water.
- To sterilize the water.
- To resist from drinking polluted water.

❖ **Water requirement:**

Water requirements are influenced by a number of factors:

- **Food intake:** water is more needed if dry grass and granular feed are taken more. A hen drinks water double of its food taken. A hen daily drinks 200-300 mL of water.
- **Weather and temperature :** Water is more needed in summer (at high temperature) than in winter( at law temperature).
- **Age:** Water is more needed at the growing period of livestock. Water is more essential for milking cow. A milking cow daily drinks 30-40 litres of water.

**Related questions:**

1. Discuss the properties of soil.
2. Discuss the importance of soil properties in crop production.
3. What is irrigation?
4. What are the sources of irrigation water?
5. Discuss the necessity of irrigation.
6. How to recover oxygen deficiency in water?
7. Mention the functions of water in the bodies of animals and birds:
8. What are the main sources of drinking water for livestock?
9. What are the water deficiency problems of domestic animals and birds and how can solve them?
10. Mention the factors which influence the water requirements of domestic animals and birds.
11. Mention the causes of decreasing oxygen in the water.
12. What is called dissolved oxygen?
13. Describe the properties of water which are suitable for fish culture.
14. What is drainage of water?