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Introductory of Canals and their Importance

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Introduction

India is classified as a tropical nation due to its uneven rainfall patterns and little or sporadic rainfall. Under order to increase crop productivity, artificial watering of the field becomes necessary. Thus, canals are built to provide an artificial water supply. A canal is an artificial conduit that is often trapezoidal in shape and is built on the ground, occasionally below the ground, and occasionally above the ground to transport water from a reservoir or river to fields. An irrigation canal is one that is utilised for irrigation purposes. An irrigation canal needs to have enough water in it to flow across the surrounding land gravitationally.

Importance of canals

A major factor in the development of a nation is irrigation canals. The following highlights the significance of building canals for irrigation purposes:

- They transport fine silt particles in suspension, which makes for excellent soil for raising crop yields.
- In addition to irrigation, these are utilised to provide amenities for drinking, bathing, and washing.
- Because the water delivered to the land for irrigation is charged, these are highly beneficial in raising the government's revenue.
- These also contribute to an increase in employment.
- Because numerous trees are planted along the canal banks, these contribute to the county's increased timber wealth.

Classification of Canals

A. Based on the Nature of Supply Source

1. Permanent Canal
2. Inundation Canal

1. Permanent Canal- A canal that has water available all year round is known as a permanent canal. Typically, this kind of

canal is fed by a steady supply of water sources. This kind of canal has multiple permanent hydraulic structures built for water distribution and regulation. Perennial canals are another name for permanent canals.

2. Inundation Canal- One kind of canal where water is only available during floods is an inundation canal. In order to regulate the water level in rivers during floods, these kinds of canals are removed from rivers. To control the amount of water entering the canal, a canal head regulator is offered.

B. Based on Functions/Purpose of Canal

1. Irrigation canal
2. Power canal
3. Feeder canal
4. Carrier canal
5. Navigation canal

1. Irrigation canal- An irrigation canal is defined as a waterway that is positioned along the edges of cultivated land and supplies water for irrigation.

2. Power canal- A power canal is one that is designed to transport water in order to produce hydropower. Another name for it is a hydel canal.

3. Feeder canal- To supply water to another canal, a feeder canal is built. It is situated outside of the canal system's commanded area.

4. Carrier canal- A carrier canal is a multipurpose canal that fulfils the roles of a feeder canal and an irrigation canal. It indicates that water is supplied for direct irrigation and is carried by the carrier canal for use by other canals.

5. Navigation canal- A navigation canal is one that is built specifically for navigational purposes. These canals are suitable for steamships and small ships.

C. Based on Type of Boundary Surface of Canal

1. Lined canal- To stop water from seeping through, a lined canal's bed and sides are lined with an impermeable substance. Additionally, high velocities are allowed in lined canals, resulting in a smaller cross-sectional area.

2. Unlined canal- An unlined canal is one in which there is no surface lining and the surface is made of the natural material used in construction. These also fall into two categories:

a. Alluvial canal- An alluvial canal is one that has been dug out of alluvial soils, such as silt, sand, gravel, etc. that have been deposited by rivers. These canals have a huge cross-sectional area since the velocity is relatively modest.

b. Non-alluvial canal- A canal is considered non-alluvial if its border surface consists of hard soils, non-alluvial soils, or broken rocks, such as rock, loam, or clay. These canals have a fast velocity and a short cross-sectional area because the firm surface of the canal typically prevents scouring.

c. Rigid Surface canal- Non-alluvial canals also include rigid surface canals; however, in these cases, the canal's boundary surface is artificially lined with a hard layer of lining material, such as cement, concrete, stones, etc.


Perennial Canal


Irrigation Canal


Power Canal


Feeder Canal


Carrier Canal


Navigation Canal

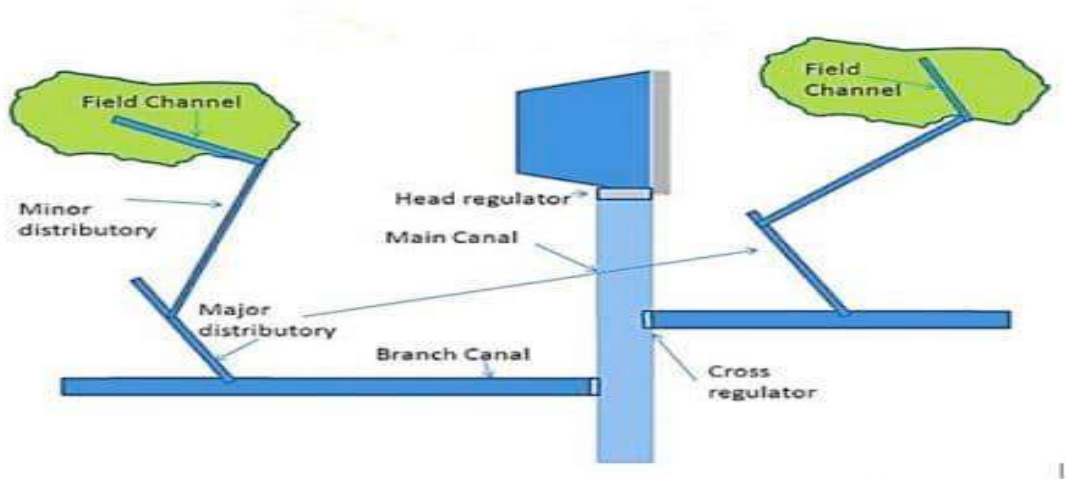
D. Based on Financial Output

1. Protective canal
2. Productive canal

1. Protective Canal- Relief projects known as protective canals are built to shield a certain region from a water scarcity. The primary aim of a protected canal is to meet the needs of farmers at a time of hunger. The state receives no income from these canals.

2. Productive Canal- Canals that generate sufficient revenue to cover their operational and maintenance expenses and to recoup the initial investment made during construction are considered productive. If it recoups 6% to 8% of its original investment annually, it is considered successful. Therefore, it takes 12 to 16 years to recover the total expenditure.

E. Based on Discharge/Size/Carrying Capacity



Different canals Based on discharge

Alluvial Canal

Non-alluvial Canal

Rigid surface or lined Canal

Protective Canal

Productive Canal

1. Main canal
2. Branch canal
3. Major distributary canal
4. Minor distributary canal
5. Field canal

1. Main canal- The main canal emerges straight from a reservoir or river. Large volumes of water are transported by it to supply the branch and distributary canals. It is not advised to undertake direct irrigation from the main canal due to the extremely high discharge that it conveys. India's principal canals have a capacity of between 280 and 425 cubic metres per second.

2. Branch Canal- At regular intervals, the branch canal splits off from the main canal. Both main and minor distributary canals receive water from these canals. Typically, the branch canal discharges between 4 and 8.5 cubic metres per second. Direct irrigation is not advised for branch canals either, unless their water carrying capacity is extremely limited.

3. Major Distributary Canal- The branch canal, or sometimes the main canal, is where the major distributary canal originates. Field channels and smaller distributaries receive water from them. When a canal is utilised mostly for direct irrigation and has a discharge rate of 0.75 to 5.5 cubic metres per second, it is considered a significant distributary.

4. Minor Distributary Canal- Depending on how the canals discharge, minor distributary canals might originate from main distributaries or, in certain cases, straight from branch canals. Usually, they release less than 0.75 cubic metres per second. Direct irrigation is another usage for the minor distributaries.

5. Water courses (or field channels)- Water courses are tiny waterways that bring water to agricultural areas from large or minor distributaries, branch canals, or other sources. The farmers are the ones who built, own, and maintain the water courses. Typically, the water stream discharges between 0.03 and 0.12 cubic metres per second.