



# SNS COLLEGE OF TECHNOLOGY

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**The water requirement of crops** is defined as the entire amount of water required for the crop and the method, from the time it is planted, to the time of collection.

Different types of crops have different water requirements. It also depends on the condition of agricultural land.

Each **planted crop** demands a certain amount of water at fixed intervals during its growth period. If this demand is met by sufficient rainfall, there is no need for irrigation water. If not, irrigation is necessary to meet the demands of crops. Sufficient water is required at the required time to provide proper nutrition and yield to the crops.

Each **harvested plant** requires a specific amount of water at specific timespans all through their development period. On the off chance that this interest is met by the precipitation at an adequate sum, at that point, there is no prerequisite of irrigation water. If not, the water system is important to satisfy the needs of the harvests. Harvests require adequate water at their necessary time so as to feed and yield appropriately.

**Some of the parameters required for calculating the water requirement of crops are described as:**

## **Crop Period and Base Period**

### **Crop Period**

The time period from the plant of the crop to the instant of its harvesting is known as a crop period.

### **Base Period**

The time period from the first watering of the crop during its sowing to the last watering of the crop before its harvesting is known as a base period. It is also known as the base of the crop.

Normally, the crop period is greater than the base period. Practically, both terms are considered the same and are expressed in days. In the calculation of water requirements of crops, the crop period, base period, and the growth period are considered the same and represented by  $\Delta t$  in days.

## **What is the Duty and Delta of a Crop?**

### **Duty of Water (D)**

Duty is defined as the number of hectares of land that is irrigated for the complete growth of a crop by supplying 1-meter cubes per second of water continuously throughout the crop or base period  $\Delta t$  of the respective crop. Duty gives a relation between the volume of water and the area of the crops that are harvested.

For example, 200 hectares per cumec to the base of B days means that the water flowing at a rate of 1 cubic per meter cube per second running continuously for B days, matures 200 hectares of crop.

### **Delta (Î”)**

It is defined as the total depth of water required by a particular crop to attain its maturity condition. It is represented by delta in cm.

Every crop requires a certain amount of water at certain intervals throughout its period of growth. The time interval between such consecutive watering is called “Frequency of irrigation” or “Rotation period”. Every time, the water depth required by the crop varies from 5 to 10 cm which again varies with the type of crop. The rotation period can also vary in the range of 6 to 15 days depending on the type of crop.

Hence, the total depth of water required during the crop period represents the total quantity of water required for its complete nourishment. This total quantity of water required by the crop measured in hectare-meter or acre-ft or million cubic meters or million cubic ft.

### **Problems:**

1. If rice requires about 10 cm depth of water at an average interval of 10 days and the crop period of the rice is 120 days, Determine delta?

### **Soln:**

Crop Period, B = 120 days

Interval of watering = 10days

Number of Intervals demanded by the crop =  $120/10 = 12$  Intervals

The depth of water at each interval = 10 cm

Delta = Total depth of water throughout the crop period =  $12 \times 10 = 120\text{cm}$

To solve:

1. Determine the delta value for black gram crop if the requirement is 5 cm depth at an interval of 15 days. The crop period is 75 days.
2. A coconut tree planted under irrigated condition requires 15 cm depth of water at an average interval of 10 days. Assuming the crop period is for 10 years (3650 days), calculate the delta value.