

Water Use Efficiency and ways to improve it
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Water Use Efficiency (WUE): The water utilization by the crop is generally described as water use efficiency. It is denoted as kg/ha-cm or q/ha-cm. It may be defined in two ways.

- (1) **Crop Water Use Efficiency (CWE):** It is the ratio of crop yield (y) to the amount of water depleted by the crop in the process of evapo-transpiration.

$$WUE = \frac{Y}{ET}$$

- (2) **Field Water Use Efficiency (FWUE):** It is the ratio of crop yield (y) to the total amount of water required or used (WR) in the field.

$$WUE = \frac{Y}{WR} \quad WR = \text{Water required or used}$$

Ways to improve Water Use Efficiency (WUE):

Principle objective is to conserve and utilize a large portion of the available rainfall for crop production. To increase the water use efficiency the following practices are required to adopt.

- (I) **Maximum absorption of the precipitation into the ground that is elimination of surface runoff. The following practices are adopted.**

- (1) **Runoff Control:** Different measures should be adopted to control the runoff.

(2) **Tillage:** The use of implements for mechanical manipulation to prepare seed-beds conducive for field crop production. This operation increases water holding capacity of the soil & infiltration rate.

(3) **Water harvesting:** Collection of the rainfall for the immediate and future use.

(4) **Recycling of Water:** Reclaimed or recycling of water (also called wastewater reuse or water reclamation) is the process of converting wastewater into water that can be reused for other purposes. Reuse may include irrigation of gardens and agricultural fields or replenishing surface water and groundwater i.e., groundwater recharge.

(II) Following practices are adopted to decrease unproductive losses of moisture like evapo-transpiration, consumption of water by weeds and losses by sub-surface flow and deep percolation etc.

(1) **Weed Control:** Weeds are the measure source of water loss through evapo-transpiration. These can be controlled by different mechanical, agronomical practices, biological & chemical control etc.

(2) **Harvesting of crops at right time:** Crops should be harvested at their appropriate time to reduce water losses.

(3) **Mulching:** Use of any material such as straw, plant residues, leaves, loose soil or plastic film placed on the soil surface to reduce ET, erosion or to protect plant roots from extremely low or high temperature is called mulching and this material is called mulch.

(4) **Primary & Secondary Tillage:** Application of primary and secondary tillage also reduces these losses.

(III) Following measures are adopted to increase effective utilization of rain and stored soil moisture.

(1) **Cropping System:** Adoption of suitable cropping sequence plays vital role in the proper & effective utilization of rainwater & stored soil moisture.

(2) **Selection of Crop & Variety:** As per the availability of water, crop and variety should be selected.

(3) **Seeding & Fertilizer Placement Technique:** Proper placement of seeds and fertilizers become important in rabi season crop, which grow on stored soil moisture.

