

Certificate Course on Participatory Irrigation Management (PIM)

Module 6- Water requirement of crops and efficient irrigation methods

Topic 6.3 - Computation of irrigation time in crops

Topic 6.3

Computation of
irrigation time
in crops

Topics of Module 6:

- 6.1 Factors affecting water requirement of crops
- 6.2 Critical stages of crops and crop water requirement
- 6.3 Computation of irrigation time in crops
- 6.4 Prevalent irrigation practices and their water losses and efficient irrigation methods

1- Water availability

(a) Water availability in canals

Water is allocated in each crop season to canals on equity basis in ratio to their CCA as per availability of water at source. Water resource department issues a schedule of time of canal running, water delivery in it and timing of running, it is known as Roster and Regulation orders. It is widely publicized. Farmers must know it before planning their crops. For computation of water

availability from canal, one requires to know its discharge in cusec and running period in hours. Multiplication of discharge in cusec into its running period in hours gives us cusec-hours which are equal to hectare centimeter.

(b) Availability of ground water,

For determining quantity of ground water, one has to take help of Ground Water Atlas or piezo meters established by ground water department. This quantity may also be calculated roughly by taking depths of water in open wells in the area taking pre- and post-monsoon. For it one may take difference of the two readings and multiply them with the gross command area, then taking 20% of it will give a rough estimate of ground water quantity. Suppose if the ground water is 25 meters below ground at pre-monsoon and 10 meter post-monsoon then difference of the two is $(25-10) = 15$ multiplying it with gross command of minor say 675 hectare gives us 10125 hectare meter, taking 20% of it will give 2025 hectare meter, its conversion to hectare centimeter is equal to 202500 hectare centimeter.

2- To compute time for irrigating a particular crop

To compute time for irrigating a particular crop, we will require two factors, (i) the water requirement of the crop in single irrigation for unit area and (ii) quantity of water in unit time available from the source.

In the table given below the time required for irrigating a crop in a single irrigation is calculated assuming delivery from a 4" outlet or 4" delivery tube-well equal to 11 litre per second and from 6" outlet 25 litre per second and taking water depth for single irrigation from the table above for one hectare:

Sl.No	Name of Crop	Total water depth required(cm)	No of irrigations	Water Depth of a single irrigation (cm)	Time required in hours for single irrigation by 4" outlet or 4" tube-well pipe	Time required in hours in a single irrigation if irrigated by a 6" outlet
1.	Maize	30	2	15	50	21
2	Millet	20	2	10	33	14
3.	Ground Nut	15	2	8	26	12

4.	Soyabean	20	2	10	33	14
5.	Seasame	10	1	10	33	14
6	Arhar	10-15	1	10-15	40	20
7	Urd	10	1	10	33	14
8	Mustard	15	2	8	26	12
9	Peas	15	2	8	26	12
10.	Paddy	70	7	10	33	14
11.	Wheat	40	5	8	26	12
12.	Potato	55	10	6	18	8
13.	Sugar cane	100	10	10	33	14
14.	Mentha	80	8	10	33	14

Example: Computation of time for irrigation

To compute time for one irrigation to a particular crop of one hectare area we may follow the following computation procedure :

1 cusec hour= 1 hectare cm

Example: Suppose we want to irrigate a hectare of wheat requiring 8 cm water depth for one irrigation which will be 8cm X 1 Ha=8 hectare-cm, by an outlet of 4" diameter or 4" delivery pipe from tube-well having a discharge of 11 liter per second or 0.31 cusec, it will provide 0.31 ha-cm in one hour, then the time require will be = $(8/0.31) = 26$ hours. If this field is irrigated by a 6" outlet delivering 25 liter per second or 0.71 cusec which will be equal to 0.71 cusec hour =0.7075-hectare cm, then the time taken will be = $(8/0.71) = 11.3$ or 12 hours

Do yourself:

A crop which requires 10 cm depth in one irrigation to be irrigated by 4" delivery pipe of a tube-well having discharge of 11 litre per second, how much time will it take to irrigate 1 hectare field?

And if this crop is irrigated by 6" canal outlet discharging 25 litre per second how much time will it take to irrigate one hectare?

