

# **Certificate Course on Participatory Irrigation Management (PIM)**

## **Module 6- Water requirement of crops and efficient irrigation methods**

### **Topic 6.4 - Prevalent irrigation practices and their water losses and efficient irrigation methods**

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Prevalent irrigation practices, water losses and efficient irrigation methods

#### **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

According to an estimate 60-70% of water go waste and crops take only 30-40% water coming from source. Out of this wastewater about 50% wastage is due to erroneous irrigation methods. If we could select appropriate methods of irrigation, we can save 30-40% water.

#### **1- Selection of appropriate irrigation methods,**

The method, a farmer irrigates his fields after getting water from channel is known as “method of irrigation”. A farmer can irrigate his fields using ‘chak’ ‘basin’ or furrow methods. None of the methods can be marked

erroneous as each method is suitable in different situations. Separate irrigation methods are adopted for separate purposes. To select irrigation method following factors are considered.

1. Type of soils
2. Type of crops
3. Size of field and its slope
4. Irrigation needs of the crop
5. Ease of harrowing

All methods require field preparations. Since last few years modern methods of irrigation are getting prominence being efficient saving water, time and labor along with higher production.

The appropriate method is that in which each plant could get water as its root is being fed by bucket and there are least losses in transit. The symptoms of appropriate irrigation method are as follows,

- The crop could get exact quantity of water according to its growth stage.
- Every corner of field could get water with ease and least efforts.
- Ease in control.
- There should not be water logging in the field and no plant should remain dry.
- The plants get most of the water. The method should be such that water is reached to root depths of every plant.

Various irrigation methods are described below,

#### **I. Basin method,**

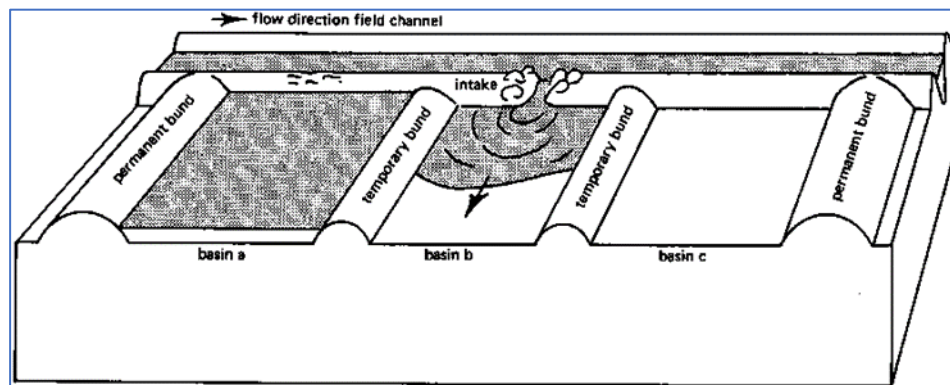
Basin method is appropriate in levelled fields. In this method, the field is divided, parallel to the slope making low height ridges, in various plain benches and water is applied in these benches. In this way water is diverted in another bench after irrigation of previous bench is completed.

The length and width of bench depends upon soil type, type of slope, type of crop and quantum of water received at field.

- There is a reciprocal ratio between slope and width of the field meaning by where there is more slope the width should be less.
- Where there is less soil depth, the width should be less.
- The basin size should be smaller where slope is higher, soil is sandy, discharge is smaller, root depth of crop is shallow, and basin is to be constructed manually.

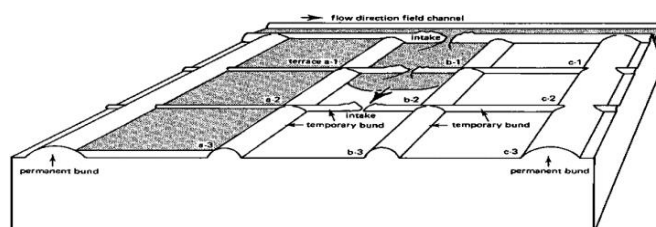
- Basin size may be larger if the field is almost plane, heavy or loam soils, moderate water discharge, deep rooted crops and field is to be prepared mechanically.
- Generally, length of basin is kept along the slope and 10 times the width which is perpendicular to slope. This method is suitable to wheat, paddy and Green fodder etc where the plants can grow in water logged conditions.
- This method is not suitable for the crops like potato, carrot etc which can not tolerate water more than 14 days. The basin method is suitable for black & heavy soils but not suitable for sandy one.
- Water should be stopped when it covers 75% length the rest will be covered by it.

**Figure-1 Basin irrigation method**



- II. **Chak method** :- This is almost like basin method, the difference being the size of chak. In chak method small rectangular chaks are made parallel to slope. Generally, basins are used in plane fields whereas the chaks are prepared in slopy land.

**Figure-2 Chak method**



### III. **Furrow method,**

This method of irrigation is suitable to all those crops which can not tolerate the water logging for long. In this method small drains are excavated parallel to slope one after another and the excavated earth is used in making ridges in sides of the drains. The water flows along the

slope and get the roots wetted infiltrating inside the soil. The crop is grown on the ridges to avoid direct contact of water with roots like vegetables, sugarcane, potato, sunflower etc. This irrigation method is suitable for all type of soils, but the slope should not exceed beyond 0.5% otherwise the water may flow rapidly out of the field and plants may remain dry. The length of the furrows is kept longer in heavy & loam soils and shorter in sandy soils. Width of furrows is kept 10-15 cm. Interval between two consecutive furrows is kept 75-150 cm in heavy & loam soils whereas it is kept 30-60 cm in sandy soils. According to scientists discharge in furrows should be kept around 0.5 liter per second. The furrow may be dislodged in more discharge and may be underutilized if discharge is lesser than 0.5 liter per second. The furrows are constructed using plough like equipment. The water is better applied if it is flown in alternate furrow.

Figure-3 Furrow irrigation method



#### Self Test:

1. Which method of irrigation is suitable to Sugarcane crop?
2. Name the method of irrigation which suits to Potato crop?

#### IV. Drip & Sprinkler Irrigation Method:

Figure- 6 -Sprinkler & Drip Irrigation system



These are being the modern and efficient methods of irrigation are becoming popular among farmers. In these methods network of small and large size pipes and valves is laid in fields and controlled irrigation is carried out. Every drop of water is utilized by the plant. Being controlled adequate water is provided to the crop which gives higher production and economize the cost. Drip & Sprinkler irrigation is suitable not only to undulated hilly regime but also to plane areas especially to orchards and vegetable crops. The sprinklers in plane areas are used to irrigate wheat & mustard crops. The drip irrigation method utilizes 95 % of water whereas efficiency of sprinkler irrigation is 75-80 %. Both methods require electric motor or diesel pumps to create pressure for ejecting water from pipes. In Gujarat & Rajasthan farmers' group is provided water in 40–50-hectare chak for drip / sprinkler irrigation. Drip irrigation costs about Rs one lac whereas the sprinkler about 50000/=per hectare.

**Self-test:**

What percentage of water is used by the crop under drip irrigation method?  
To which crops sprinkler irrigation method is suitable?