

## WATER REQUIREMENT AND MANAGEMENT TECHNIQUES IN FIELD AND FRUIT CROPS

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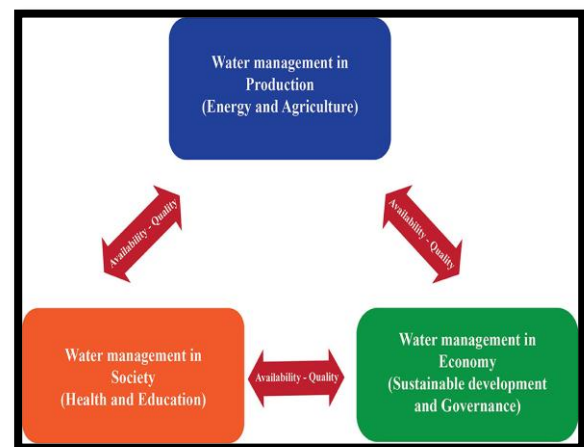
### Introduction

Water is a vital component of agricultural output essential to the nation's food security. The effects of urbanization, population growth, and climate change on agriculture lead to increased water use and anticipated increases in competition for water resources, resulting in an impact on agriculture. It is time for water conservation and the adoption of water management strategies for various field and fruit crops in order to address the problems of water scarcity and future requirements of water as well as bring about sustainable development. The only means to meet the future requirements is by reconsidering how water is currently managed in the agricultural sector.

**Agricultural water management (AWM)** means utilizing water in a manner that improves agricultural yield and protects the environment. For a variety of crops to yield properly, there must be an adequate supply of water. The water requirement in crops depends upon soil, climate, season, and different growth stage of crops.

### Benefits of Water Management

- Reduce damage from soil erosion.
- It acts as shield during less rainfall.
- Crop yield increases
- Aids in storing extra water from runoff.
- It aids farmers in increasing the financial value of their productive land.
- The year-round excess of water for livestock/domestic consumption as well as supplementary irrigation to crops.



Maria Aljendra Moreno Pizani (2021)

## WATER MANGEMENT TECHNIQUES

### 1. Crop planning:

Crop planning should be based on water requirement to different crops and

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availability of water for crop production. The research by Vasant Rao Naik Marathwada Agricultural University, Parbhani, suggests that cotton and summer groundnut cropping systems are more economical for farmers with 15-16 water shifts in summer, while hybrid sorghum-wheat/pearl millet systems are more economical for farmers with 3-5 water shifts during rabi season.

## 2. Irrigation of land on the basis of availability of water:

Maharashtra State has four regions (Konkan, Marathwada, West Maharashtra, Khandesh) for bringing maximum area under irrigation in future. There is a need to adopt irrigation technique based on land capacity, keeping in mind that all types of soil are not equally suitable for providing irrigation regularly.

**Ex.** Soils with deep sandy loam, silt loam is suitable for irrigation. However shallow, sandy, and crystalline soils is suitable for limited irrigation as such soil needs to be watered lightly but frequently and distance between irrigation systems is also reduced.

## 3. Management of Saline Water:

The low rainfall region experiences moderately saline ground water, with chloride, sulphate, sodium, and magnesium dissolved in highly saline water. Management practices can prevent adverse effects, and tolerant crops should be selected. Limited but frequent

watering of sandy loam soils improves crop growth. Also, less amount of salts accumulates in the soil if it is sprinkled instead of watering from the surface of the soil. If the saline water has high boron content and sodium carbonate content up to 600 mg per litre, after application of 20 tonnes of gypsum per hectare, saline water is used for irrigation without any harm to crops. Also, if green manure is used along with gypsum in the soil, it is very useful.

**Ex.** Sorghum, Cotton, Sorghum, Safflower, and Wheat.

## 4. Irrigation methods for crops

The land levelling is necessary for irrigating crops by stream system and distribution of water flow equally across to field.

**Here is a brief overview of prevailing irrigation systems.**

**a. Furrow Method:** For crops with close row-to-row space, prepare furrows at equal distances and turn off water before reaching the end of the sere on land with a slope of up to 0.3 per cent.

**Ex.** Sorghum, Groundnut, Safflower Wheat, Gram.

**b. Steam method:** This method is suitable if soil has low infiltration rate, uneven slope (heavy soil) and undulating slope. The crops onion, garlic, leafy vegetables, gram, and

wheat should grow and water with 4 to 6 meters wide steam.

c. **Broad Bed Furrow Method:** If soil has a slope up to 0.3, on basis of crop

**Table No. 1. Water requirement to different field crops**

Sl. No.	Crop Name	Crop period	Total water period	Spacing between two irrigations, days	Required water. C/M	Yield (Q/Ha)
<b>For Lateritic soil</b>						
1.	Rice - Ratna	Jan - May	28	2-3	1994	50-55
2.	Groundnut - Phule Pragati	Dec. - April	11	10-12	660	22-24
3.	Mustard - Varuna	Nov. - Feb.	7	12-15	420	12-14
4.	Sunflower- E.C68414/ modern	Nov. - Feb.	10	7-8	600	10-12
5.	Cowpea - Konkan Sadabahar	Nov. - Feb.	9	10-12	540	10-12
6.	Moong - Pusa Vaishakhi	March - May	8	6-7	480	6-8
7.	Chilli - Konkan kirti	Dec. - May	23	5-6	1150	10-12
8.	Ghevda - Konkan Bhushan	Oct. - Feb	18	2-3	900	7-8
9.	Water melon - Sugar baby	Nov - Feb	29	6-7	1160	28-30
11.	Bhendi - Parbhani Kranti	Feb - May	12	4-5	600	10-12
12.	Kakadi - sheetal	Feb – April	13	4-5	520	24-26
13.	Banana - Basarai	July- Sep.	44	4- 5	2,200	48-50
<b>For medium black cotton soil</b>						
1.	Rice - Ratna	Jan – May	24	3-4	1440	55-60
2.	Groundnut - SB 11/ Phule Pragati	Dec.-April	9	12-15	540	25-29
3.	Rabbi Sorghum - CSH-8	Nov.- March	7	15-16	420	35-40

(Source: DBSKKV Krushi Daindin 2022)

requirement, 0.6- to 1-meter-wide swaths should be made with the help of ridged plough. While keeping water flow 3 to 4 litres/second in each Sari and kept this diameter 80 to 100 meter. This method is suitable for sugarcane, maize, cotton, vegetables etc. if land has deep slope, and equally sari should be made at equal distance.

**Drip Irrigation:** In this method we irrigate the field but, water is given drop by drop directly near roots of crops. This method is fully automated.

➔ The distance between water period is Jan - 15, Feb -15, March-10, April 7-8, May 6-7 days on basis of soil, climate and crop condition water requirement distance of crops may be change.

**Table No. 2. Commonly water requirement to different fruits crop**

Sl. No	Crop Name	Year	Crop Spacing		Water required to each plant (Litre)		
			Sq. Mt.	Sq. Ft	Summer	Rainfed	Winter
1.	Mango	1	10 x 10	33 x 33	36	15	21
2.	Sapota	2-3	-	-	52	25	32
3.	Orange	1	6 x 6	20 x 20	28	20	19
4.	Sweet lemon	2-3	-	-	52	29	32
5.	Guava	4	-	-	128	55	58
6.	Pomegranate	1	5 x 5	16 x 16	27	14	15
7.	Custard Apple	2-3	-	-	43	23	24
8.	Lemon	4	-	-	79	49	52
9.	Grape	1	3 x 1.6	10 x 5	14	6	13
10.	Banana	-	1.5 x 1.5	5 x 5	28	7	11

(Source: VNMKV Krushi Daindin 2022)

**d. Check Basin method:** This method is useful for fruit, leafy vegetables, and banana. This method saves water and only tree base area is irrigated and not entire soil. The citrus tree should be irrigated through ring method, so that trunk of tree does not come in direct contact with water, and it is protected from gum disease. Whereas in growing fruit trees, size of ring should be increased according to trees age.

**e. Modern Methods of Irrigation:**

## JAL SHAKTI ABHIYAN MOBILE APPLICATION



## STEPS TO USE APPLICATION

- Download the mobile application from Jal Shakti Portal or Google Play Store.
- To access the Jal Shakti Abhiyan mobile application, users must register by entering their registered mobile number and clicking 'Sign in'.
- Enter the one-time password (OTP) received on your registered mobile no. and click on 'verify OTP.'
- The profile screen will display relevant details after verifying OTP, allowing users to initiate site visit feedback and photographs by clicking on 'Capture activity'.
- Fill in the details and take geo-tagged photographs.
- To provide feedback, either general or activity-wise, use the drop-down screen on the side menu and click on submit.

## KVK, RATNAGIRI ACTIVITIES UNDER JAL SHAKTI ABHIYAN

The Krishi Vigyan Kendra, undertaking awareness mela and training programme for farmers/farm women/rural youth in each month. The important intervention covered under abhiyan is water conservation & rainwater harvesting, watershed development, reuse & bore well recharge structures, intensive afforestation.

The extension literature, news publication and radio talk activity is also undertaken by KVK.

## CONCLUSIONS

The renovation of traditional and other water bodies/tanks, water conservation & rainwater harvesting, watershed development, reuse & bore well recharge structures, intensive afforestation intervention are undertaken by Government of India under Jal Shakti Abhiyan to revive India back to a sustained system of water conservation and efficient irrigation.

The recommendation given by State Agricultural University for different field, horticultural, vegetables crops should be adopted by farmers for efficient utilization of water resources and bringing sustainable development.

The challenges of future requirements can resolve through water conservation, water harvesting and adoption of water management techniques which helps for achieving sustainable development goal on efficient use of water and eliminating hunger.

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