

Water Requirement and Management Techniques in Field and Fruit Crops

Dr. Murai Atul. M¹ and Dr. Shelke P. P.²

¹Subject Matter Specialist (Agricultural Extension), Krishi Vigyan Kendra, Tondapur Tal. Kalamnuri Dist. Hingoli. 431701 (M.S.)

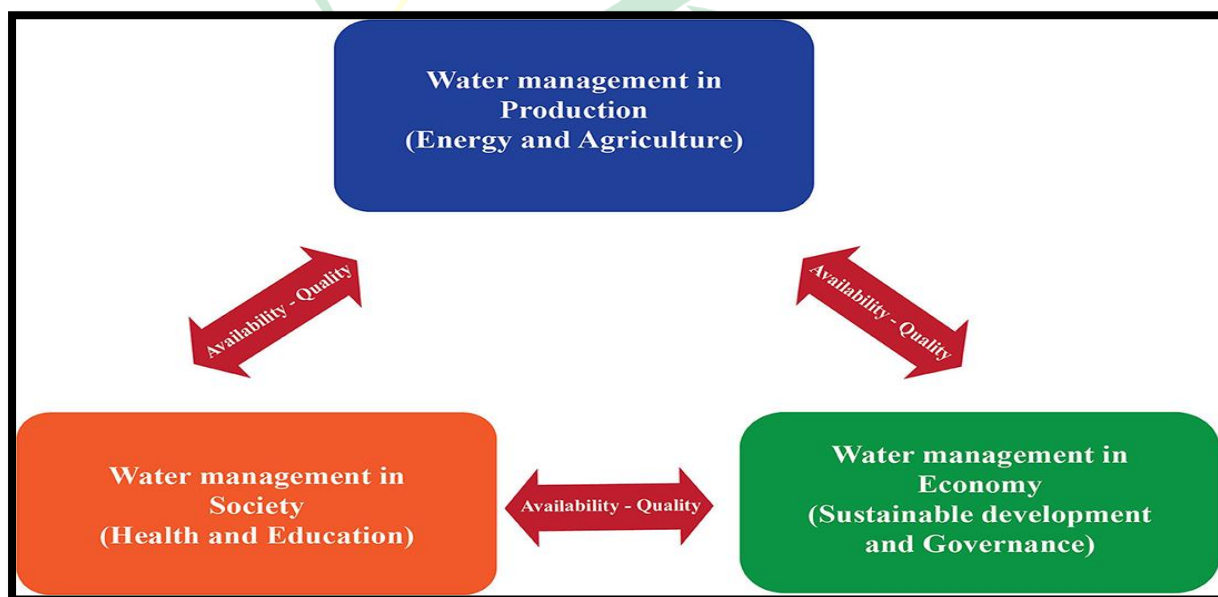
²Senior Scientist and Head, Krishi Vigyan Kendra, Tondapur Tal. Kalamnuri Dist. Hingoli. 431701 (M.S.)

ARTICLE ID: 68

Introduction

Water is an important input for agricultural production which plays a crucial role in food security of country. The urbanization, increasing population and climate change effect on agriculture result water utilization is more and competition for water resources is expected to increase which impact seen on agriculture. Resolving the challenges of future requirements through reconsideration of how water is managed in agricultural sector and for bringing sustainable development it is time for water conservation, adoption of water management techniques for different field and fruit crops.

Agricultural water management (AWM) means used water in such a way that provides to enhance crops productivity and conserve natural resources. The adequate amount of water is required for obtaining proper yield of various crops. The water requirement in crops depends upon soil, climate, season, and different growth stage of crops.



Benefits of Water Management

- Crop yield increases
- Reduce damage from soil erosion.
- Help to store excess runoff water.
- It is helping farmers for monetary increment of fertile lands.
- It acts as shield during less rainfall.
- The year-round excess of water for livestock/domestic consumption as well as supplementary irrigation to crops.

Water Management Techniques

- 1. Crop planning:** Based on water requirement to different crops and availability of water for crop production. The crop planning research conducted by Vasant Rao Naik Marathwada Agricultural University, Parbhani shows that if farmer having facility of providing 15-16 water shifts in summer season, then cotton & summer groundnut cropping system is economical for farmers. If only 3-5 water shifts available during rabi season, hybrid sorghum -wheat/pearl millet system instead of sorghum-safflower cropping system found economical for farmers as black gram and rabi sorghum system.
- 2. Irrigation of land on basis of availability of water:** The Maharashtra State has four regions for bringing maximum area under irrigation in future need to adopt irrigation technique based on land capacity. Whereas 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 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 found ground water moderately saline, and chloride, sulphate, sodium, and magnesium dissolved in highly saline water. In areas, where wells having saline water, certain management practices can used to prevent adverse effects of saline water. When, saline water using for irrigation purpose saline water tolerant crop should select.
Ex. Cotton, Sorghum, Safflower, Sorghum and Wheat.
- 4. Management of waterlogged, saline, and choppy land:** The land levelling with suitable slope for reducing number of soluble salts in soil. To be carried out for removal of excess

water from waterlogged land, horizontal drains should be made on slope of land at inward distance, main drainage drain should take towards that slope and connect it, so excess water remove from field without accumulating in field.

5. **Irrigation methods for crops:** The land levelling is necessary for irrigating crops by stream system and distribution of water flow equally across to field. As a result, crops growth found good, soil not eroded, and water wastage avoided.

Here is a brief overview of prevailing irrigation systems.

- a. **Furrow Method:** If land has a slope of up to 0.3 percent. Then, prepare furrows at equal distance and turned off water before reaching at end of sari. These methods useful for crop which having close row to row space.
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 having a slope up to 0.3 on basis of crop requirement 0.6- to 1-meter-wide swaths should be made with the help of a r, while keeping water flow 3 to 4 litres/second in each Sari and kept its diameter 80 to 100 meter. This method is suitable for sugarcane, maize, cotton, vegetables etc if land has steep slope, and equally sari should be made at equal distance.
- d. **Check Basin method:** This method is useful for fruit, leafy vegetables, and banana. This method saved water and only tree base area is irrigated not entire soil. The citrus tree should irrigate through ring method, so that trunk of tree 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:**
Drip Irrigation: In this method we irrigate the field but, water drop by drop is given directly near roots of crops. This method is fully automated also.

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

Sl. No.	Crop Name	Water given through irrigation C/M	Total water period	Spacing between two irrigations, days	Required water. C/M	Total water C/M

1.	Kharif Cotton	24-30	4-5	15-18	40-50	65-80
2.	Hybrid Sorghum	6-12	1-2	Dry Spell	30-40	36-42
3.	Pearl Millet	6-12	1-2	Dry Spell	30-40	35-40
4.	Red gram	12-18	2-3	Dry Spell	40-50	50-60
5.	Rabi Sorghum	18-24	3-4	20-25	10-15	30-40
6.	Wheat	30-36	5-6	18-21	10-15	40-50
7.	Rabi Sunflower	18-24	3-4	24-30	15-20	35-40
8.	Safflower	12-18	2-3	30-35	10-15	25-30
9.	Chickpea	12-18	2-3	20-25	10-15	25-30
10.	Rabi Groundnut	36-42	6-7	15-20	10-12	45-55
11.	S. Groundnut	90-96	15-16	-	-	90-95
12.	Sugarcane	210-214	30-32	8-12	30-45	220-235

(Source: VNMKV Krushi Daindin 2022)

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)

JAL SHAKTI ABHIYAN MOBILE APPLICATION

Steps To Use Application

- Download the mobile application from Jal Shakti Portal or Google Play Store.
- The users for accessing the Jal Shakti Abhiyan mobile application needs to be registered before performing any login to the app. Firstly Enter your registered mobile number and click 'Sign in.
- Enter the one-time password (OTP) received on your registered mobile no. and click on 'verify OTP.'
- A profile screen with relevant details will open after verification of OTP. On the profile screen please click on 'Capture activity' to initiate the site visit feedback and photographs.
- Fill in the details and take geo-tagged photographs.
- Provide general feedback or activity wise feedback through the side menu drop down screen and click on submit.

KVK, Hingoli 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 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 was 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 adopt 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.

References

Maria Aljendra Moreno Pizani (2021) Review Article on water management in agricultural production, the economy, and Venezuelan Society. *Front. Sustain. Food System* 4.

Report of Jal Shakti Abhiyan: A water conservation campaign. Department of Drinking Water and Sanitation, Ministry of Jal Shakti.

<https://www.worldbank.org/en/topic/water-in-agriculture>.

