

# Management Appropriate Strategies to Reduce Water Consumption in Agriculture

Asiye Karamali

MSc in Public Administration, Development Branch, Islamic Azad University, Malayer Branch

## Abstract

Iran has been placed in one of the most arid regions of the world and the water shortage is considered as the most important development bottleneck in agriculture, So according to the International Water Management Institute (IWMI), Iran should be able to increase the recoverable water resources to 112 percent for maintaining its current position until 2025. This is very difficult and even impossible due to the potential and daily-growing needs of agriculture, domestic, industrial sections and protection in other biological resources. Therefore, in such condition, one of the most effective and practical solutions is the efficient use and storage in water consumption. In the meantime, the water consumption management in agriculture that includes the bulk of water consumption in Iran and the world also can be very effective and helpful. The use of resistant plants, irrigation at night, risk management, changes in the irrigation systems, use of the ground cover, noticing to cropping patterns and conservation tillage can be the ways that effectively reduce the water consumption in the agriculture section. So mentioned items has been evaluated in this study.

**Key words:** Water consumption, Risk management, Resistant species, Irrigation system

## INTRODUCTION

Water as the origin of life and foundation of the development growth is lost in vain and unknowingly despite its value and importance in many cases and however the growing population, demands the proper use of water resources, because the water shortage is the biggest obstacle to development. According to that our country is located in the world arid belt and its rainfall amount is one-third of the global average and drought periods frequently happen based on records, therefore, based on these features demand to take effective steps in the efficient use of water by accepting this situation and it is natural that the appropriate actions, prevent extensive and notable damage. The utilization of agricultural modern methods and the efficient use of water are critical factors for achieving the goal of feeding the world's growing population. According to estimates, the world will need 60 percent more food

in the next 30 years. A significant part of this increase in production will be the result of dense planting (using less land to produce more) that requires irrigation (6).

In many parts of the country, almost all the water needed for agriculture are provided by irrigation and this has caused the country water resources, and particularly groundwater has drained quickly and has reached critical stage and because due to the resources constraints, providing more water for agriculture usually is difficult or is not possible, the most appropriate way is that with appropriate technologies in irrigation background the maximum use of available water resources is used and it would not be possible without the implementation of efficient and effective methods on farms area.

Among the prevention important cases of the waste of water resources include changes in irrigation method, use of recycled water, water productivity increase, irrigation at night, water losses reduction through the agricultural waste decrease, drought-resistant plant species choice and salinity in urban green space, irrigation efficiency improvement, appropriate cultivation pattern, use of the absorbent materials such as hydrogels, compost, pumice and perlite in the roots areas of plants, agricultural waste use in animal nutrition, evaporation and transpiration reduction

Access this article online



www.ijss-sn.com

Month of Submission : 03-2017  
Month of Peer Review : 04-2017  
Month of Acceptance : 05-2017  
Month of Publishing : 06-2017

**Corresponding Author:** Asiye Karamali, MSc in Public Administration, Development Branch, Islamic Azad University, Malayer Branch

by cropping products in environments with a cover, water resources protection against pollution, use of the purified wastewater, efficient use of consuming water in industry via recirculation water, household consumptions optimization that are ways to deal with water waste (2). In the following are expressed a number of effective methods in reducing water consumption in agriculture section.

### **Change in Irrigation Method**

Agricultural development is one of the important problems in country agriculture through the expansion of irrigated agriculture area instead of production increase in per area unit, and low efficiency of irrigation in the agricultural section lead to waste of water resources in the country due to problems such as lack of awareness, lack of proper technical knowledge, traditional methods of cultivation, lack of proper irrigation networks and lack of water consumption management, so that the water use efficiency in agriculture section is less than 30% on average (5). In the traditional irrigation can partially prevent from wasting water when watering by eliminating the maze of water channels and dredging streams and wiping the factors of speed slowing down, such as thorns and weeds and also dredging the water supply network. But the fundamental solution is using the modern methods of irrigation to reduce water consumption in agriculture section and to protect of underground water resources (1).

In the irrigation new methods which are known as the pressurized irrigation, can use both of surface water such as river water and also irrigate the land with wells water. 2 types of the pressurized irrigation are more conventional from other methods which include the Drip irrigation and the Sprinkler irrigation (4). In both methods of the pressurized irrigation, water is drawn by the pump tubes to the plant root, and the plants are watered in the pipeline. In the Drip irrigation, the water is poured in the pipeline by the droppers to the foot of a tree or plant. In this type of irrigation water loss is only 10%, and irrigation efficiency is 90 percent. In the Sprinkler irrigation, irrigation is done by the sprinklers that make the water in the form of raindrops that are placed in the pipelines. This type of irrigation efficiency is about 70%. By replacing the modern irrigation methods instead of the traditional methods, try in protection of the underground water resources and allow future generations to benefit from these treasures (9).

### **Risk Management**

In countries that have extreme climate changes, it has been accepted as the basic method of coping with drought. This managing method has obliged people to use methods and programs that make bearable the climatic fluctuations. It referred to this point that each technology and planning that improves the little supplies of the fresh water or

makes desirable the water poor quality, is considered as the fighting with drought that is referred to some of the most important of them (8).

## **WATER PRODUCTIVITY INCREASE**

Water productivity in the agricultural crops production is one of the important issue in the country economic development and the water optimized consumption on its own also is included the savings in the consumption, so the water allocation has the high priorities to the cultivations with the maximum economic productivity of water. The conducted researches results showed that the corn cultivation has a high priority in terms of the water consumption efficiency and the economic than wheat, sunflower and sugar beet within the catchment of Barkhoar and Meymeh. The faculty has brought in this report, in areas where there is no water shortage also to reduce water consumption and the efficient use of water, it is necessary to introduce early cultivars that require less water. Also the produced crop value can be increased for per unit of consuming water by introducing potential cultivars that have high water use efficiency (10 and 11).

### **Attention to Cultivation Pattern Appropriate to Each Region**

An important and basic discussion is proposed the need for the cultivation pattern in the agricultural section for many years and in previous years we have been witnessed the cultivation development and promotion of that crop the following year, and more productive of that crop in addition to society's need with making expensive or cheapen a price of an agricultural and horticultural crop, and never the supply and demand value, or the area under cultivation and the crop value does not meet the needs of the day. In recent years the serious problem of water shortage contributed to the problem and while pundits and experts even agricultural section managers were aware of the necessity of determining the cultivation pattern for the agricultural section but this was only for the sake of argument and nothing else. However, it is essential that by implementing the agricultural crops cultivation pattern project should pay attention to the following items.

1. Prioritize the autumn plants to use autumn, winter and spring rainfalls annually
2. Increase in cultivation area in the controlled environments such as greenhouses, crops under plastic and.
3. Use of the plants that have short grow periods and are more in tune with rainfall distribution region in the spring cultivation.
4. The establishment of conservation tillage systems

5. The establishment of the laser alignment in the surface irrigation lands.
6. The establishment of the irrigation lands under pressure particularly drop irrigation in the farm and garden lands
7. The water consumption reduction and the economic productivity increase and the base resources conserve
8. The modest plants cultivation and the high yielding early plants cultivars

Due to the different climatic conditions in different regions of the country is not scientific to apply the same cultivation pattern for all countries and will not have efficiency. Therefore in the Development Application, the implementation of the separate cultivation pattern is considered for each province according to the climatic and spatial ecological conditions of the region.

### **Irrigation at Night**

Soil moisture is essential for germination and growth of seedlings. For planting seedlings and young plants, choose evenings and cloudy days. Time of the plant irrigation depends on its type, after the plant seedlings period ended. For example the corn plant requires a lot of irrigation after the formation of its tassel and silk yarn. Tomatoes, cucumbers and zucchini always need water when they flower and their fruits begin to grow. In exchange for growing plants such as vegetables you should cut or reduce the irrigation at times. In these kinds of crops, the irrigation cut 7 to 10 days before harvesting, will increase their quality. In the case of onions also the irrigation should be cut when the growth is complete. In this case the durability and quality of the onion will be further.

The point that you should keep in mind is that if you are forced to curtail the irrigation, certain plants survive better in the face of these constraints. Melon is resistant against the water shortage because of its deep root, as well beets and asparagus. Tomato has moderate resistance in front of this restriction. But cabbage, strawberries, cucumbers, squash and peppers are very vulnerable against the water shortage.

Mornings and evenings are appropriate times for watering the plants. In contrast you should not choose the time of day for irrigation that because of the warm air, the water quickly evaporates and wastes. If cultivate or planted crops in the wet weather regions that are susceptible to the foliar pests, choose the morning for watering; if you water them in the afternoon, plant and soil will be wet for most of the night and this causes to the pests improvements. Especially if you use the irrigation methods in which the plants leaves directly exposed to water.

When watering should be done at night that:

1. There are no pests in your land.
2. You are in the area of dry weather.
3. You use only the type of irrigation that water is in contact with the soil and not the leaves of plants.

### **The Use of Mulch (Mulch) in the Evaporation Reduction**

Often mulch is used to reduce the surface evaporation amount on soil. Mulch is used to increase soil temperature, reduce soil erosion and help to weed control. When using the mulch, is prevented the evaporation on the soil surface due to the lack of contact of dry air on soil surface and the sunlight shine to its surface. Mulch may be made of two ways that means from plant material or artificially from plastic sheets.

### **Decrease of Water Losses with Waste Reduction**

Now 91.4 percent of the country water resources is used in agriculture section and on the other hand the growing population is required to produce more food. So finding the ways is always the priority of the research that is followed to reduce the consumption and efficient use of water in this section, to produce agricultural crops for this growing population. The agricultural waste reduction is considered one of the most important strategies to avoid wasting water; now 720 thousand tons of crops are wasted from 7.4 million tons of the farm and garden crops produced in country.

So 15.3 percent of total produced agricultural crops are wasted, the water use efficiency of the produced crops is calculated according to the macro calculations of the water consumption and the country agricultural product is calculated on average about 860 grams per cubic meter. The value of water waste through crops waste is calculated 0.84 billion cubic meters, by considering the value of the water use efficiency of the produced crops (figure 0.86 kg per cubic meter).

### **LOW IRRIGATION**

Low-irrigation is one way of saving and efficient use of water. The main purpose of low-irrigation is the water use efficiency increase with reducing the need of the plant for watering and removing that part of the irrigation water that does not have a significant effect on yield increase. Low-Irrigation is different and the farmer may reduce the amount of irrigation water at a certain point of time of the product development cycle and apply irrigation completely in other growth stages. Or may use less water in each rotation to use of the existed water efficiently (3). The low-irrigation practical methods are different also. Low-irrigation can be through reducing the volume of water applied in each

irrigation, removal of some irrigation shifts, increase of faraway irrigation, alternative irrigation (fixed and variable), planting method and planting density and so on.

## TOTAL CONCLUSION

Attention to the planning subject is very important for optimizing the water use in the agricultural, industrial and urban sections and also in green space. It is necessary to do proper planning to withdraw less water from sources in addition to trying in order to prevent water waste and to raise the efficiency of water use in different sections. Actions to be taken too seriously are including: pattern reform of agricultural activities in these areas, prevention of crops production that require a lot of water and not using of the irrigation methods that their water waste is high, direct the production of agricultural crops through the greenhouse productions, design of green space in a way that requires less water, wastewater purification and use of it in green space, etc.

## REFERENCES

1. Asil Manesh, Compare and evaluation of the irrigation systems for leaks and center pivot. Master's thesis. Tehran University.1995.
2. Bordbar, m. Solooki, m. Bordbar, b. Solutions and Practical Methods for the optimized use of water in agricultural section, Disaster Management National Conference. Islamic Azad University of Shiraz.2009.
3. Tavakkoli, A. R. Presentation of some research - practical recommendations on low irrigation. Overall Seventh Seminar of irrigation and evaporation reduction, Kerman, Iran. 1999. 189-196.
4. Rahim Zadegan. Sprinkler Irrigation Book. Isfahan University Press.1992.
5. Abdollahi Ezzat Abadi, m. and A. A. Javanshah. An economic analysis of the possible use of modern methods of water supply and demand in the agricultural section: Case Study pistachio producing regions in Rafsanjan city. Research and development in agriculture and horticulture. 1997. (75) 20, 126-113.
6. Marid, Saeed Hadi Mir Abolghasemi and Hooshang Ghaemi. A proposal for a comprehensive management of dealing with drought. Paper presented to the first national conference examining ways of dealing with the water crisis. 2001.
7. Adary A, Hachum A, Oweis T, Pala M. Wheat productivity under supplemental irrigation in northern Iraq. ICARDA, Aleppo, Syria. 2002.
8. Iglesias A., Garrote L., Cubillo F., Cancelliere A. and Wilhite D. Assessment of Drought Risk in Water Supply Systems. Coping with Drought in Agriculture and Water Supply Systems (Chapter 8).ISBN 9788-9044-4020-1-. 2009.
9. <http://mohamadkasraie.blogfa.com/post>
10. Oweis T, Hachum A. Water harvesting and supplemental irrigation for improved water productivity of dry farming systems in West Asia and North Africa. In: Proceeding of 4<sup>th</sup> International Crop Science Congress, 26<sup>th</sup> September to 1<sup>st</sup> October 2004, Queensland, Australia. 2004.
11. Oweis T, Hachum A. Improving water productivity in the dry areas of West Asia and North Africa, In: Kijne JW, Barker R, Molden D (eds.), Water Productivity in Agriculture, Limits and Opportunities for Improvement, International Water Management Institute (IWMI), Colombo, Sri Lanka, pp. 179-198. 2003.

**How to cite this article:** Karamali A. Management Appropriate Strategies to Reduce Water Consumption in Agriculture. Int J Sci Stud 2017;5(3):65-68.

**Source of Support:** Nil, **Conflict of Interest:** None declared.