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Significance of water management and conservation in agriculture

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Abstract

Water is the utmost necessity for agriculture in the modern world. Water determines the efficient growth and development of the crops. The availability of water decides the type of vegetation that would prevail in a locality. Our globe is covered by 71% of water, but the fresh water availability is only less than one percent. The amount of fresh water in the world is enough to meet the requirement of the world, but fresh water is unevenly distributed making certain areas as water efficient and certain areas as water deficit. Thus about 80 countries in the world are water deficient affecting nearly 40% of the world population. So it is mandatory to use the water efficiently and manage the available water in a sustainable manner. It can be achieved by adapting many conservation techniques such as dams and rain water harvesting. Unprecedented climate change and the resultant global warming had a very diminishing effect on the available water and afforestation is one vital measure which could improve the deteriorating condition. Reuse of saline water, sequential strategies for crop production system and new techniques of irrigation are the need of hour. The present-day concept of efficient use of virtual water improves conservation of water in agriculture. There will be a competition for water for municipal requirement, industries and agriculture. Agriculture must be the focal area where conservation strategies should be applied effectively. Thus efficient use, management and conservation of the available fresh water resources can result in the sustainable development of our country.

Keywords: Virtual water, fresh water, conservation, sustainable, climate change

Introduction

Agriculture is that which feeds the world population and employs about two third of the population in India. In Tamil literature Thirukural, Thiruvalluvar remarked that “World spins around many industries but all industries spins around agriculture” which shows the importance of agriculture in our life. The driving force involved in crop production is obviously irrigation water which is essential in the overall development of any crop. “Irrigation is everything in India, water is even more valuable than land” remarked Sir Charles Trevelyan decades ago. It is very essential to manage water utility in a country like India. The problem in India is not the availability or storage of water but it is the poor management and over exploitation that have made water a scarce commodity (Chakkaravarthy and Balakrishnan, 2019) [2]. Poor management accounts negatively towards the factors such as, utilization, augmentation and conservation.

Water conservation

Water conservation may be defined as the reduction in the loss of water and make it available for future generations. It is important to conserve water to reduce the loss of water, waste or use. The main objectives of conservation are to reduce the surface run off, to increase groundwater storage, to bring awareness among the people about the water conservation and management methods and to improve the water management practices. National water management policies should take account of the impact of trade in water intensive goods on water availability and ecosystem integrity for a better understanding of the economy underlying.

For example, in water scarce regions people should grow crops with low water requirements or of high value compared to the water used. Options for improving the water balance by importing water intensive goods from water rich regions should be explored, which would be appropriate and cost effective. (Kumari and Singh, 2016) [4].

Water unavailability

The available water *i.e.*, the fresh water (2.5%) is available abundantly in some areas and in some regions, it is present as icecaps and glaciers. On account of various climatic changes such as, increasing temperature and decreasing rainfall, resulted in many unpredictable events which have hampered the field of agriculture, in terms of crop production. Global warming generally refers to the emission of CO₂ gas and other green-house gases which gets settled in the Earth's atmosphere and thereby heats the earth. This majorly affects the living organisms and the ecosystem. In the wake of unprecedented changes, the government policies supporting sustainability is also not stable. For example, climate change and variability impacts on inflows /recharge and water use which might affect overall seasoned or spatial patterns of sustainable use. (Wheeler, *et al.* 2015)^[5].

Potential use of virtual water

The volume of freshwater used to produce the economic products measured at the place where the product was actually produced is called virtual water. It refers to the sum of the water used in the various steps of the production chain (Allan, 1996)^[1]. Reduction in use of water and food security can be achieved by importing required food and other commodities from areas and countries where there is adequate availability of water (Allan, 1996)^[1]. By importing water intensive commodities and exporting goods that requires less water, the nation with less water resources achieve more sustainable gain. This phenomenon is important when the cost of production in water scarced areas is higher than the world prices of food commodities (Wichelns, 2001)^[6]. The concept of virtual water deals with many aspects of water supply and demand that are considered while determining its optimal use. This perspective is consistent with the concept of integrated water management.

Threats and opportunities

The foremost challenge in food and water front is climate change. This is mainly due to gradual increase in the earth temperature, resulted from increase in the amount of green-house gases. With the increase in human population, green-house gas increased manifold which has led to uncertainty in prediction of climate and availability of water.

The percentage increase in usage of water is double the time of population growth. The basic water requirement for human is 50 litres per person per day (Gleick, 1996)^[3]. Nowadays half of the available fresh water is used to meet our daily needs, twice of what is used 35 years ago (Young *et al.* 1994)^[7]. Increase in water usage resulted in decrease in groundwater table and it had diminishing effects on the ecosystem. At present, our government is mainly focused on rainwater harvesting. The rain water should be made available to the crops by adopting methods like deficit irrigation and supplementary irrigation. On farm water management techniques can also be used to reduce the water loss by evaporation and low-quality water can be effectively used for forest tree plantations.

Conclusion

Water is a vital component not only to produce a desirable economic output in crops, but also to maintain a sustainable development in agriculture sector. Proper planning and management of resources is the need of the hour. Efficiency or deficiency in farming is largely related to water, rainfall or

irrigation where creating appropriate infrastructures and adopting sustainable management practices will help us to augment the available water resources and improve the productivity of the facilities. In India, seventy percentages of crops sown are rain-fed, thus it is so crucial to harvest rain water which is one of the main renewable source of water. Hence, our government has implemented many water management techniques to raise productivity and is more focused around the idea of "more crop per drop".

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