

## Save Water, Secure Harvests: Role of Extension Education in Water Conservation

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### SUMMARY

Water conservation is crucial for sustainable agriculture as increasing water scarcity threatens food security. Indian agriculture, consuming 70% of freshwater, faces severe water stress due to climate change, inefficient irrigation, and groundwater depletion. Agricultural extension education plays a vital role in addressing this crisis by promoting water-saving practices like micro-irrigation, rainwater harvesting, and efficient irrigation techniques. Through training, demonstrations, and government schemes, extension services empower farmers to adopt sustainable water management. Success stories, such as the Saguna Rice Technique and KVK-led projects, highlight the impact of these initiatives. Collective efforts from farmers, extension officers, and institutions are essential for securing water resources for future generations.

### INTRODUCTION

“Did you know that agriculture consumes nearly 70 % of the world’s freshwater?” This striking fact underscores the critical role of water in global food security. Water supports crop growth, livestock health, and overall farm productivity. However, increasing water scarcity, climate change, and inefficient irrigation practices threaten sustainable agriculture. As populations grow and food demand rises, conserving water becomes crucial. Water is the essence of life and the most precious natural resource on Earth. It sustains all living beings, from humans to plants and animals. Without water, survival is impossible. This save water save life essay aims to highlight the importance of conserving water and the vital role it plays in maintaining balance in the ecosystem. Water plays a crucial role in daily life. It's used for drinking, bathing, farming, irrigation, industries, and more. It helps with blood circulation and metabolism in the human body. The aquatic ecosystem depends entirely on water, which is home to various aquatic animals. Water also plays an essential role in transporting goods after land and air. In the human body, water aids in producing saliva and delivering oxygen to cells. Extension education addresses these challenges by empowering farmers with knowledge, skills, and innovative technologies for efficient water management. Through demonstrations, training programs, and farmer field schools, extension services promote practices like micro-irrigation, rainwater harvesting, and soil moisture conservation. By fostering behavioral changes and encouraging the adoption of water-saving technologies, extension education ensures farmers can produce more with less water. World Water Day, observed annually on March 22nd, highlights the importance of water conservation and the role of extension education in promoting water-efficient practices among farming communities. In this article, we explore how extension education contributes to water conservation in agriculture,



### Current Scenario of Water Crisis in Agriculture

Water scarcity is a pressing challenge for Indian agriculture, severely impacting farmers and food production. India, home to 18% of the world's population but only 4% of its freshwater resources, faces acute water stress. Overexploitation of groundwater, inefficient irrigation practices, and erratic rainfall patterns due to climate change exacerbate the crisis. According to NITI Aayog, nearly 600 million people in India face high to extreme water stress, with agriculture being the largest consumer of water. Agriculture accounts for 70% of the world's freshwater use – far more than domestic and industrial use combined (FAO, 2011) – and rice cultivation alone accounts for 40% of the world's freshwater irrigation. Water resources as one of the three main ecosystem components are considered as vital for human beings. In this century, water conservation, which implies the achievement of the greater efficiency from each unit of consumed water, is a critical factor in preserving food security.

Several regions in India, such as Vidarbha in Maharashtra, Bundelkhand in Uttar Pradesh and Madhya Pradesh, and Marathwada in Maharashtra, are highly drought-prone. Farmers in these areas struggle with crop failures, leading to debt and distress migration. For example, in Maharashtra's Marathwada region, Pulses, wheat, oilseeds, jowar, and bajra, were the major crops over the past decades, which are now replaced with highly water-intensive crops such as cotton, maize/corn, sugarcane, and rice. Nowadays, it is observed that farmers throughout the region of study prefer to grow easy-to-grow and cash crops, e.g., wheat, rice, corn, soybean, sugarcane, and cotton to increase their income. In the Marathwada region, over the last three decades, groundwater withdrawal and drilling for agricultural activities have dried many of the freshwater sources and bore well recurring droughts have caused a significant decline in sugarcane and soybean yields, heavily impacting the livelihoods of small and marginal farmers. Increasing water scarcity and depleting groundwater levels have accentuated the agrarian crisis with an increased number of farmers committing suicide in this region.

The water crisis directly affects crop productivity, reduces income, and threatens food security. Declining water tables have made irrigation costly and unsustainable, forcing farmers to rely on unpredictable monsoons. This scenario highlights the urgent need for sustainable water management practices and effective extension education to promote efficient water use, ensuring resilience against future water crises in agriculture.

Thus, it is inferred that climate change has affected water resources by reducing water volume and drying up of rivers/ponds/lakes. Water quality was also affected especially salinity intrusion. Besides, the availability of water resources was also changed even with in a day.

### Groundwater Quality Issues in Akola and Yavatmal

A study found poor groundwater quality in Akola taluka, worsened by excessive fertilizer use and natural mineral weathering. Similarly, in Yavatmal district, talukas like Babhulgaon, Oigras, Kelapur, and Ner showed consistently poor water quality, mainly due to nitrate and fluoride contamination. These findings highlight the need for sustainable water management and responsible fertilizer use. (*Source: www.mpcb.gov.in*)

### Role of Agriculture Extension Education in Water Conservation

Agricultural extension education plays a vital role in promoting water conservation by empowering farmers with knowledge, skills, and technologies to use water efficiently. Through various educational approaches and field-level activities, extension services drive significant changes in farmers' behavior and agricultural practices.

**Awareness campaigns:** Extension education creates awareness about water conservation through Krishi Vigyan Kendra (KVK) programs, farmer field schools (FFS), and workshops. These platforms educate farmers on water-saving techniques like mulching, crop rotation, and organic farming. Demonstrations during KVK field days help farmers understand the impact of efficient irrigation and water management practices. Additionally, campaigns organized on occasions like *World Water Day* spread awareness about the importance of water conservation in agriculture.

**Technology Demonstration:** Extension services play a crucial role in demonstrating modern technologies that promote water conservation. Techniques such as micro-irrigation (drip and sprinkler systems), soil moisture sensors, and zero-tillage are introduced through on-farm trials. Farmers can observe the benefits of these technologies, such as reduced water usage and improved crop yields, encouraging wider adoption. Water-saving devices such as drip irrigation, green manuring and vermi-composting diversify crops from wheat to gram helping farmers to cope with water scarcity problem.

For instance, KVKs often conduct live demonstrations of drip irrigation systems, showing how they reduce water loss and improve efficiency.

**Government Scheme Promotion:** Extension personnel act as a bridge between farmers and government schemes designed for water conservation. They help farmers access and implement schemes like *Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)*, which promotes *Per Drop More Crop*, and *Jal Shakti Abhiyan*, which focuses on water resource management. Extension educators assist farmers with applications, documentation, and implementation, ensuring they benefit from subsidies and incentives for water-saving technologies.

**Community participation:** Promoting collective action is another key role of extension education. By forming *Water User Groups (WUGs)* and *Self-Help Groups (SHGs)*, extension services encourage farmers to manage water resources collectively. These groups often undertake community-based initiatives such as constructing check dams, repairing traditional water harvesting structures, and adopting group irrigation practices.

Agricultural extension education is a catalyst for change, driving sustainable water conservation practices and ensuring that farmers are equipped to secure their harvests while preserving water resources for future generations.

### **Capacity building for stakeholders:**

**Training programs:** Training programs for teachers, community leaders, and policymakers to equip them with the knowledge and skills to educate others about water conservation.

### **Call to Action for Farmers and Extension Officers**

In the face of climate change and increasing water scarcity, it is crucial for farmers and extension officers to work hand in hand to ensure sustainable agricultural practices. Together, we can build a resilient agricultural sector that not only meets the needs of today but also safeguards the future. Farmers are the backbone of our food system. By adopting water-efficient technologies, you can significantly reduce water usage and increase crop yields. Embrace practices such as drip irrigation and soil moisture sensors to optimize water use. Additionally, practicing crop rotation can improve soil health and reduce pest infestations, leading to better crop productivity. Harvesting rainwater is another vital step; it provides a supplementary water source during dry periods and reduces dependency on groundwater.

Extension Officers, Role is pivotal in bridging the gap between research and practical application. Conducting demonstrations on water-efficient technologies and sustainable farming practices can provide farmers with hands-on experience and confidence to adopt these methods. Utilize ICT tools to spread awareness and share knowledge widely, ensuring that even the most remote farmers have access to valuable information. Organize group discussions and workshops to foster a community of learning and support, where farmers can share their experiences and learn from each other.

Government and Institutions, support is essential in this collaborative effort. Providing incentives for farmers who adopt sustainable practices can encourage widespread adoption. Conducting research on innovative agricultural techniques and disseminating findings through extension services will keep our farming community informed and equipped with the latest advancements. Promoting participatory approaches ensures that farmers' voices are heard and their needs are addressed in policy-making. Together, by embracing these roles and responsibilities, we can create a sustainable and prosperous agricultural future. Let us unite in this mission to protect our resources, enhance productivity, and secure the livelihoods of our farming communities.

### **Success Stories**

#### **Progressive Farmer: Shrinivas Pande**

Shrinivas Pande, a progressive farmer from Khumari village in Maharashtra, adopted the Saguna Rice Technique (SRT) to conserve water and increase productivity. By switching to this innovative method, he managed to reduce water usage significantly while achieving a yield of 15 quintals per acre, compared to the conventional method's 12 quintals. His success has inspired many farmers in the region to adopt SRT, leading to better water management and higher crop yields.

#### **KVK-Led Water Conservation Project**

In Raigad, Maharashtra, the Krishi Vigyan Kendra (KVK) led a successful water conservation project focusing on rainwater harvesting and efficient irrigation techniques. The project involved constructing check dams and promoting drip irrigation among local farmers. As a result, water availability for irrigation improved, and crop productivity increased by 20%. This initiative not only conserved water but also enhanced the livelihoods of the farming community.

## CONCLUSION

Collective action for water conservation is vital to ensure the sustainability of our agricultural practices and the well-being of our communities. By working together, farmers, extension officers, and institutions can implement effective water-saving techniques and promote sustainable farming methods. Agriculture extension plays a crucial role as a bridge between research and farmers, facilitating the transfer of knowledge and innovative practices that enhance productivity and resource management. On this World Water Day, let's pledge to conserve every drop of water for a sustainable agricultural future. Together, we can make a significant impact and secure the livelihoods of our farming communities for generations to come. Agriculture extension would contribute to water management and governance by adopting some strategies such as selecting appropriate irrigation practices, pushing farmers towards new irrigation systems, replacing cultivation systems, extension of water conservation behaviors, making the agriculture extension experts familiar with issues on water management and irrigation, using varieties resistant to water scarcity and drought, creating irrigation cooperatives, developing cooperative activities,

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