

# Water Quality, Irrigation, and Filtration Analysis

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Experts opine that the survival of irrigated crops requires adequate water availability. Nonetheless, there is also a critical need for precise timing and application of the water into the soil to increase the quantity and quality of production. It is common knowledge that a drip irrigation system is ideal for doing the job since it uses between 30 and 50 per cent less water to provide moisture in comparison to conventional irrigation systems. Besides, this method reduces plant disease potential and loss of water through evaporation and weed pressures, which are common problems when using other conventional irrigation means. Drip irrigation allows for the application of low-cost, smaller pumps and pipes to supply water to the plants at low pressure. However, this system requires consistent maintenance to ensure its effectiveness. This paper will thus explore some of the issues relating to the maintenance of drip irrigation systems to solve the problems that can undermine their operating efficiency.

## Water Quality Analysis

Before the start of a season, one of the critical activities should be testing the quality of the water to be used for irrigation. The system can use water from a variety of sources, such as streams, lakes, ponds, rivers, wells and municipal water. There is a wide variation in the quality of water from these sources, with the cleanest being water from the municipal and wells. However, even though water might be clean, it is necessary to carry out an analysis of water quality to determine the presence of contaminants or whether they precipitate since these could influence the functioning of the irrigation system. Testing water quality is critical in identifying inorganic solids, silt, and sand. It will also help to determine whether the water has organic solids. In totality, organic and inorganic components are likely to cause plugging in the drip irrigation system. Therefore, in a scenario where the tests indicate aspects that will possibly cause plugging in the system, it would then be essential to practice special care that would be beneficial in the maintenance of the drip irrigation system.

## Water Supply Capacity and Pressure

Measuring water capacity is quite essential when determining the number of emitters to be used in a drip irrigation system at the same time. In fact, it is a special consideration when households share water sources for irrigation. Due to uneven rainfall, extended dry weather is likely to complicate the available quality and quantity of wells as a result of the drop in the level of the underground water table. Low water capacity will have a negative influence on the efficiency and effectiveness of drip

irrigation systems. Therefore, it is necessary to determine the level of water supply before designing this system.

## Selecting a Filter System

Filters enhance the efficient operation of the system. A selected filter should be able to remove large sediment particles that cannot pass through the emitters. There are three types of filters: screens, cartridges and sand filters. Cartridge filters are made of spun fibre or paper and can thus be washable or disposable. They are effective for smaller systems with a low amount of sediments. However, the other filters can be used in municipal or well water. Selecting an appropriate filter will be critical in preventing emitters from plugging due to a discharge of heavy sediment particles.

## Flush Physical Contaminants

Filters need regular checking and cleaning across the entire period of operation. Determination of cleaning frequency may be possible through the installation of the pressure gauge on the filter's inlet and outlet sides. In a scenario where the filter pressure loses more than seven psi, then it signifies the need to clean it. Clogged cartridges need replacement, while in the case of a disc filter or a clogged screen, soaking in water or using a stiff-bristle brush can help in cleaning and removing clogs. The fine clay particles and silt that enter the system should be flushed out to prevent buildup that can end up clogging the emitters. The drip irrigation system is also susceptible to leaking. Therefore, it is essential to check the lines regularly for excessive leaking. The presence of a large wet area in the field would signify a defective emitter or leaking tube, thus requiring immediate replacement.

## Animal Damage

This is one of the greatest challenges faced by drip irrigation system users. There is a significant number of evidence indicating damage to drip pipes by animals such as rabbits, mice, raccoons, and deer. These animals often sense the water moving through the tubes and chew through to drink. The most susceptible pipes to chewing are the polyethylene and thin-walled hoses with a diameter of up to 3/8. Therefore, one of the primary means to prevent or minimize the damage is switching to heavy-walled pipes. (World Health Organization, 2022)

Nonetheless, a drip system is one of the most effective irrigation techniques. Analysis of water quality is critical in identifying some of the biological, physical and chemical characteristics that might impede the efficient operations of the system. Determining the capacity of the water supply is necessary for ensuring sufficient availability of water during dry seasons. Appropriate maintenance practices such as regular flushing and prevention of damages caused by animals are critical in reducing downtime and other associated costs, thus assisting in deriving maximum value from the investment. (Ayers & Westcot, 1985) (U.S. Environmental Protection Agency, n.d.)

## References

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