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Surface Drip Irrigation Water Use Efficiency in Semi-Arid Zones

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Editorial

The most common and oldest type of irrigation system is surface irrigation. The water then runs across the surface, covering the entire area that needs to be irrigated. When water is halted from being administered, it forms ponds on the field's surface and subsequently drains or infiltrates into the soil. Irrigation water use efficiency is critical in semiarid countries where water resources are low. Although subsurface drip irrigation is a highly efficient irrigation system, it has seen limited adoption due to a number of drawbacks, including emitter blockage and the difficulty of finding and correcting leaks. In southern Spain, an innovative underground irrigation technology that avoids most of the aforementioned problems was recently adopted. The goal of this study is to evaluate the method's performance and compare it to a surface drip irrigation system. A three-year field experiment was conducted on an organic olive orchard in the province of Almera, Spain, to achieve this goal. Under three different irrigation water supplies, the water-use efficiency of both irrigation techniques was investigated. The results reveal that the alternative subsurface irrigation approach outperforms drip irrigation because the yield and irrigation water consumption efficiency of the first one were higher. The Mediterranean climate is characterized by scarce and variable precipitation. The average annual rainfall in some areas in southeaster Spain is less than 300 mm per year. Proper management of the irrigation systems is essential for achieving maximum efficiency of irrigation water use. The use of subsurface drip irrigation (SDI) systems may provide an improvement in irrigation water use efficiency.

Instead of applying irrigation water on the surface, these methods inject it straight into the ground. Because the soil surface is not wetted, this approach lowers soil water evaporation losses from wet bulbs, especially in low-density crops. For surface drip-irrigated olive orchards, the soil-direct evaporation from the moist bulb was measured. They calculated that this evaporation accounted for 4 to 12 percent of seasonal orchard evapotranspiration in mature orchards and 18 to 43 percent in immature orchards, depending mostly on the fraction of soil surface wetted. Camp went over the findings of various prior studies that compared crop yields in subsurface and other surface irrigation technologies. In all situations, encompassing varied crops, soils, and cropping conditions, he concluded that crop yields for subsurface drip systems were equivalent to or better than those for other systems. Water and fertilisers are used more efficiently, resulting in higher yields and better product quality.

Other benefits of subterranean irrigation include an increase in the system's working life due to the absence of vandalism and solar radiation damage, the ease of ploughing and other farming activities, and a reduction in the development of weeds and fungal infections. Because of these benefits, this approach is being employed in a variety of crops, including fruits, citrus, tobacco, and, most notably, olive orchards. Olives are one of the Mediterranean basin's most widely grown crops. Traditionally, olives have been grown under rainfed conditions; however, several studies have demonstrated that irrigation water increases output and reduces the problem of alternate bearing. As a result, the area of irrigated olive land utilising drip-irrigation systems has increased dramatically in recent years. Subsurface irrigation technologies have been utilised since ancient times, but despite their great water efficiency and multiple benefits, their application is still limited. This is mostly due to the fact that present subsurface drip-irrigation systems, which include burying both the laterals and emitters, have significant disadvantages. The increased expense of the system, problems with emitters clogging and breaking due to the entrance of roots or the suction of solid particles from the soil matrix, and the difficulty of detecting and rectifying possible leakage problems are just a few of the flaws.

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