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Impact of Drip Irrigation and Fertigation under Protected Cultivation

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Abstract

One of the most promising agriculture most at this moment is protected cultivation. It is a new and alternative style of production that uses high-tech and intensive techniques primarily to meet urban export demands and water saving horticultural and ornamental crops for food, nutrition, and economic security. Agriculture production is being negatively impacted by a growing population, fragmented land ownership, the depletion of natural resources, and destruction of the environment. The basic goal of protected agriculture is to establish an environment that is conducive to the crop's continued growth so that it can reach its full potential even in unfavourable environmental conditions. Protected agriculture technology, which uses various structures, offers a number of benefits for producing high-quality vegetables, flowers, hybrid seeds, and plants while minimising risks associated with weather ambiguity and maintaining efficiency. Higher returns, year-round farming, improved crop quality off-season production, assured output, self-employment for educated rural youth in the agriculture sectors, lower pesticide residues, managed pollination, weather vagaries, easier plant conservation, and unrestricted cultivation of weeds are all dependent on it. As markets become more global, land becomes more scarce, and the environment changes, protected cultivation of high-value crops has become the most important technique to guarantee high production, enhanced quality, and financially feasible returns.

Keyword: Drip irrigation, Greenhouse, Fertigation, Fertilizers

Introduction

One of the more sophisticated irrigation techniques is drip irrigation, which allows the delivery of only the necessary amount of water to the soil's root zone. Thus, it is possible to maintain the ideal soil-water-air ratio for improved plant growth, yield, and fruit quality.

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Trickle irrigation is another name for drip irrigation. One of the most recent irrigation techniques is drip or trickle irrigation. With this technique, only 2 to 20 litres of water are applied to the soil per hour. Designing a drip irrigation system plan that is both technically and financially practical is essential for its successful adoption. For accurate drip irrigation monitoring as needed, the parameters relating to agro-climatic conditions, such as soil, crop, water, and climate, should be taken into consideration when constructing the system. To prevent any lateral pressure damage, these are buried at least 60 cm below the surface of the earth. Additionally, the underground pipelines are protected from degradation brought on by ultra-voilet radiation.

Components of Drip Irrigation system

The drip irrigation system is composed of a system of pipes and an appropriate emitting mechanism. The following elements make up a typical big drip irrigation system.

- Water emitting device
- Distribution Lines
- Fillings
- Controls head system
- Filter system
- Other accessories

Capacity of drip system:

The water requirement, daily operation hours, irrigation interval, number of drippers, and effectiveness of water application all affect the drip irrigation system's capacity. It is not advised to run a drip irrigation system continuously for longer than 1.5 to 2.0 hours to prevent water loss from leaching. On the other hand, to prevent moisture stress on plants, irrigation intervals are often limited to three days. For the same type of crop, more emitters will be needed in light soil than in heavy soil. Due to its reduced water storage capacity, drip irrigation is used every day in light soil.

Fertigation

Fertigation refers to the application of fertilisers using pressured systems to create the correct concentration of nutrient-containing irrigation water for the crop. It is a regulated method that delivers soluble plant nutrients to the root zone of an irrigated greenhouse vegetable crop. Fertigation enables the optimization of nutrient delivery tailored to the

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distinct needs of the crops at various growth and development phases. In order to produce high-quality, productive vegetables in greenhouses, the correct amount of water and fertiliser are essential. Fertilizer application in greenhouses via fertigation has become the norm in the majority of developed nations.

Need of fertigation

After appreciating the value of drip irrigation, fertiliser is the next most crucial input to increase vegetable production. The productivity of greenhouse crops can be increased through the use of balanced fertilisation at the right time and in the right quantity. At the moment, however, farmers are using conventional fertilisers of various grades that are not completely soluble in water and are therefore unsuitable for fertigation.

Method of Fertigation

The suitable equipment can be chosen from a large selection of available pumps, valves, venturies, etc. to add fertilisers to drip irrigation systems. The concentration, grade, and frequency of application all affect the addition system's size and capacity. Normal requirements call for smaller, less expensive units when applying less fertiliser solution more frequently. The following is a description of the fertiliser application equipment:

Ventury: It is simple and inexpensive method of fertilizer application.

Fertilizer tank: This causes dilution and flow of diluted fertilizers into the irrigation stream.

Fertilizer injector: This is the method of fertilizer dosing for most situations. Special care during Fertigation

- Fertilizer tank may be used to inject water soluble fertilizer solution.
- For precise placement of both water and fertilizer, it is necessary to you pressure compensating drippers instead of micro- tubes.
- If it is not possible to apply doses daily in that case an alternate day, dose must be insured.

Conclusion

Drip fertigation boosts agricultural output, reduces labour costs, and aids in the effective use of fertilisers. In addition to a higher yield and more efficient use of resources, drip fertigation also results in a higher benefit-cost ratio. Due to greater nutrient uptake, drip irrigation combined with fertigation increases yield and thus more effectively uses fertiliser

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and water. Through drip irrigation, you might ultimately save between 25 and 50 percent on fertiliser.

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