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TRICKLE IRRIGATION

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INTRODUCTION

gricultural production is essential to human life. India is renowned for its support of and interest in agriculture. Water supplies have been more severely impacted by the high pace of population increase and the conversion of agricultural holdings into residential areas. In addition to these, farmers also face a number of other difficulties, such as soil erosion, crop types, land fertility, the quality of irrigation materials available, the availability of skilled labour in the agricultural sector, the dedication of the agencies involved in the irrigation process, etc. Given this circumstance, it becomes imperative for the farmers to develop a different irrigation technique in order to overcome the difficulty and utilise the water resources as effectively Aore. as possible.

TRICKLE IRRIGATION

A sort of micro-irrigation system called drip irrigation or trickling irrigation allows water to flow gently to plant roots from above the soil surface or from below the surface, potentially conserving water and nutrients. Water should be applied directly to the root zone in order to reduce evaporation. Water is distributed through drip irrigation systems using a series of emitters, pipelines, and valves. A drip irrigation system may be more effective than other types of irrigation systems, such as surface irrigation or sprinkler irrigation, depending on how effectively it is planned, installed, maintained, and managed.



WATER MANAGEMENT:

India's population growth will result in a 60% rise in grain consumption despite its restricted supply. The resources utilised in agriculture, such as land, water, etc., must be used in the best and most effective ways possible in the future to meet the growing demand. To guarantee that an effective product is produced, the use of inputs, especially water resources, must be properly scrutinised. dedicate Farmers must themselves to the most effective and efficient use of water since it has become a limited resource. Additionally, the international accords on water use will direct the scientific technique to use water for effective

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outcomes. It is possible to integrate the water management mechanism into the irrigation system in a considerate manner.

The method for managing water on farms has to be combined with other farming techniques. These are doable in the real world. It is predicted that the water shortage would be severe in the near future due to the global climate change. The effective system for managing water resources and irrigation techniques will be essential when we find ourselves in such a predicament. In order to establish an effective water management system in the future, it is essential to inform farmers about the most recent irrigation technology and to provide them the assistance they need in terms of initial investments and system sustainability.

The new generations of farmers' families have begun leaving agriculture and looking for work in cities as a result of rising industrialization and the development of information technology. Because of this, there were fewer workers available for agriculture. A drip irrigation system that is automated can be utilised to offset the negative effects of reduced labour.

According to the study, the automated drip irrigation system has a 50% lower water consumption rate than the conventional system, requires less monitoring, and increases production. India is responsible for 17% of the world's population. The issue India is currently facing, though, is the lack of fresh water supplies. India contributes to the world's fresh water resources at a rate of only 4%. India now falls under the label of a "water-stressed nation" due to the reduced per capita supply of water for use.

The efficiency of drip irrigation across all topographies is one of its key influencing characteristics. Drip irrigation is strongly advised to farmers for this reason. Soil erosion is the main issue that farmers with. By limiting water deal body contamination, drip irrigation also assists farmers in combating soil erosion. Despite being fully aware of the advantages of drip irrigation, farmers from middle-class and lower socioeconomic backgrounds are hesitant to use it because they lack the funds for the first expenditures. They anticipate further assistance from the government. A further reason why farmers are reluctant to use drip irrigation is a shortage of trained personnel.

OPERATIONS AND COMPONENTS

Following is a list of drip irrigation's components, starting with the water source:

- Pressurised water source or a pump.
- Sand separator, Fertigation systems (Venturi injector), and Chemigation apparatus are three examples of water filters or filtering systems (optional).
- Backwash regulator (Backflow prevention device).
- Pressure regulator.
- Lines of distribution (main larger diameter pipe, maybe secondary smaller, pipe fittings).
- Control values and safety values that are manually, electronically, or hydraulic.
- More compact polyethylene tubes (often called "laterals") .
- Poly accessories and fittings (to make connections).
- Emitting devices at plants (emitter or dripper, micro spray head, inline dripper or inline drip tube).

Pumps and valves in drip irrigation systems can be manually or automatically turned on and off by a controller.



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The majority of large drip irrigation systems use some sort of filter to stop small waterborne particles from clogging the small emitter flow path. There are currently new technologies available that reduce clogging. Traditional surface applications of timedrelease fertilizer are sometimes unsuccessful in drip irrigation systems because of the manner the water is administered, thus liquid fertilizer is frequently mixed with irrigation water. Application of insecticides and other chemicals using water is known as fertigation or chemigation. Recent university field testing employing drip fertigation and gradual water delivery as opposed to timedrelease and irrigation by micro spray heads have shown fertilizer savings of up to 95%. In comparison to other irrigation methods like flood irrigation or overhead sprinklers since water can be distributed more precisely to the plant roots, drip irrigation may assist accomplish water conservation by lowering evaporation and deep drainage. Additionally, drip irrigation helps get rid of a lot of illnesses that are contracted through water contact with vegetation.

BENEFITS AND DRAWBACKS:

The benefits of drip irrigation are as follows:

- A targeted application and lessened leaching help to prevent fertiliser and nutrient loss.
- If handled properly, water application efficiency is great.
- Field grading is not required.
- Fields with asymmetrical forms may be accommodated with ease.
- You can utilise recycled non-potable water without risk.
- The root zone's moisture content may be kept at a field-capable level.

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- The frequency of irrigation is less affected by soil type.
- Erosion of the soil is reduced.
- Growth of weeds is slowed.
- Highly consistent water distribution is managed by the output of each nozzle.
- Compared to alternative irrigation technologies, labour costs are lower.
- The valves and drippers can be adjusted to control supply variation.
- Fertigation may be simply added with little fertiliser waste.
- The danger of illness is lower since the foliage is still dry.
- Reduced energy costs since it is often run at lower pressure than other methods of pressured irrigation.

THEDRAWBACKSOFDRIPIRRIGATION INCLUDE:

- Initial expenses may exceed those of overhead systems.
- The lifespan of drip irrigation tubes may be shortened by exposure to the sun.
- The dangers of decomposing plastic on the quality of the soil and food crops.
- Clogging or bioclogging may occur if the equipment is not adequately maintained and the water is not properly filtered.
- The irrigator cannot see the water that is applied using subsurface drip. This can cause the farmer to either apply too much water (poor efficiency) or not enough water at all; individuals who are new to drip irrigation are more likely to encounter this.
- Inadequate installation might result in a waste of time, water, and yield.
- Subsurface drip may not be able to moisten the soil's surface sufficiently for germination in lighter soils.
- The majority of drip systems have little or no leaching percentage since they are



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high efficiency systems. Salts added to irrigation water without sufficient leaching may accumulate in the root zone, often near the periphery of the wetting pattern.

- The PVC pipes frequently experience rat damage, necessitating tube replacement and raising costs.
- Night frost damage management cannot be accomplished using drip irrigation systems.

There are several sorts of irrigation techniques. The typical irrigation techniques include:

- Surface irrigation.
- Localized irrigation.
- Drip irrigation.
- Sprinkler irrigation.
- Center pivot irrigation.
- Lateral move irrigation.
- Sub-irrigation.
- Manual irrigation.

Not all types of crops can be frequently irrigated using all irrigation techniques. For some crops, certain techniques are beneficial, while others are detrimental to other crops. The crop, the physical resources available for farming, and the amount of water available for irrigation should all be taken into consideration when selecting the best irrigation techniques.

CONCLUSION

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Every crop requires a unique watering technique. Every farmer must do a thorough investigation of the environment and the water resources available to determine the viability of any irrigation system due to conditions like water shortage and changing water quality. Since water is a need for everyone, water waste must be reduced as much as possible. In order to meet the needs of the moment, new technologies must be embraced. Farmers should accept modern solutions to today's problems with open arms. Additionally, it is recommended that farmers band together to raise money for irrigation investments, resulting in shared benefits and the sharing of associated marketing.

It is advised that financial services companies, drip irrigation companies, and material suppliers team together and provide the farmers who are installing drip irrigation with the best possible services. The existing situation may be improved with extensive farmer participation in the form of co-farmer education and training. Those who have received training in the drip irrigation technology ought should volunteer to instruct other farmers, cooperating rather than competing. More training in the area of water management may also be developed by the government.

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