Smart Irrigation Technique

Prof. Shishira Kanta Behera[1], Prof. G.M. Gulathi[2], Er Kishore Chandra Senapati[3]
[1,2.3]Department of Agriculture, Siksha 'O' Anusandhan (Deemed to be University),
Bhubaneswar, Odisha
kishoresenapati@soa.ac.in[3]

Abstract

Lower availability of water resources can limit the production of additional food. As irrigated agricultural production is the highly demanding water market, intense pressure to ensure food production and improved water quality has been exerted in the irrigated sector. The study was designed to quantify the losses in percolation and to develop water efficiency of the use of banana trees using Time Domain Reflector (TDR) technology with Micatin irrigation systems. The sample consisted of three systems: 1 micro-sprinkler for 4 plants, with 32 L h−1; ii) 4 plants with 60 L h−1 micro-sprinkler and 2 plants with 60 L h−1 micro-sprinkler. The most successful water replacement systems with the lowest variance in the water depth invaded by the pseudo-spring. The micro-sprinkler irrigation system efficiency was 85%, respectively 80 and 90 per cent, using the micro sprinkler I (ii) and (iii) methods. The smart irrigation system for adaptive plants and cultures has been built by our Team. All crops are intended to have sufficient water for their healthy growth to reduce irrigation water consumption and to minimize the economic costs for consumers to plan for water supplies to crops. To reduce irrigation costs. This structure will include in real time information on the viscosity of the plant as its input argument, incorporate it with other parameters including water costs and crop precipitation, and regularly implement the planned linear calculating model with the most efficient amount of water available for crops.

Key words: Linear Computation, Musa spp., Root Distribution, TDR, Variables

Introduction

Continued deforestation and excessive water use in the industrial sector provide increased population growth with rising natural resources. Increased water efficiency has been critical for the production of food because agriculture has the highest water demand and is the competitive field. Studies involving maximum efficacy of water use in agriculture must be addressed, giving priority to the growth of aquatic crops that are susceptible to stress. The banana crop needs an adequate supply of water throughout the crop cycle. The traditional irrigation system is displayed in fig. 1. [1].

Fig.1: Traditional Irrigation

In the estimation of crop nutrient intake, the use of freshwater balance under evaporation of the root zone was also very complicated. Percolation loss knowledge is also important for the industry when it comes to distribution of groundwater ions. The ground water equilibrium is based on a functional equation of Darcy-Buckingham in which unsaturated hydraulic conduction is related to an average level of energy between intervals of time. The soil's hydraulic conversion was unsaturated and was a flow calculation cap. [2].

California's agricultural output makes up 12% of total US agricultural income. Farming in California uses 80 per cent of the state's water, and this does not include other outdoor activities, such as underwater mining, which can raise this number to a higher standard. The drive has taken four years in California, with a significant economic loss in this industry. The smart irrigation system is displayed in fig 2. [3]

Fig.2: Advance Irrigation System

Ranchers have in particular altered crop types which eat less water to maintain their enterprises. Even if California has not provided an ultimate answer to develop drainage systems, there will be no humanitarian disaster. In addition, this smart irrigation system has been built by our Group, all possible civil engineering, to protect water conservation for the region, maintain environmental friendly beer bays by preventing floods and dry land and land and, more importantly, maximize cost savings for farmers and the market in general. [4].

Although several genetic factors play an important role in agricultural production, this project focuses solely on aspects of agricultural energy consumption. Many strategies and protocols have already been introduced for California's water, which is now a key priority. There is increasing irrigation of the dropping system and drought-resistant plants are now beginning to replace plants with excessive water consumption. However, after a study by the Pacific Institute, the way to save more water is by means of intelligent irrigation systems as shown in the chart. [5]

Management Measure For Irrigation Water

The conservation program aims to prevent the transition from groundwater to air and surface water to irrigation activities for contaminants. This chapter examines and discusses the following elements of the drainage system. This goal is attained by:

- "Irrigation scheduling"
- "Efficient application of irrigation water"
- "Efficient transport of irrigation water"
- "Use of runoff or tail-water"
- "Management of drainage water"

Other well-built and attempted outbuilding eliminates water loss, profound filtration and cycling, and water erosion. The maintenance program will decrease drinking water pollution, enhance water quality and reduce the overall greenhouse gas irrigation system. The focus is on the timing, quantity, and location of water used to satisfy plant water requirements and the implementation of specific actions (e.g. leakage control, runoff and depth filtration control) when used for mass migration. [6]

Storage and Availability of Soil Water:

As the soil supplies the water reservoir the plant uses for production, the water amount of soil and the capacity of water conservation are a major factor in the planning and development of irrigation. Water is spread around every molecule of the earth as a film and between the pores of the soil as a film. The abundant earth, water and air are retained in pores of soil. The irrigated are in India is displayed in fig 3.

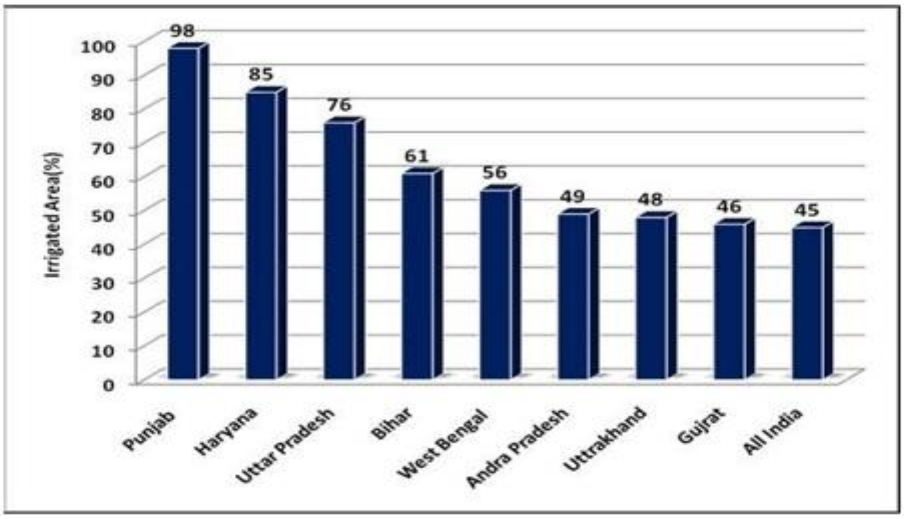

Fig.3: Water saving in different areas

The texture and structure of the soil influences the efficiency, size and amount of pores in the soil, and therefore money available to air or water. For instance, the volume of water available in ground sand varies by 0.1 to 0.4 inches (in / ft) of ground depth and in / ft of silt by 1.9–2.2 and 1.7–1.9in/ ft of clay. Some volcanic ash soils contain extremely high water at field capacity, however pumice and chicken fragments may contain water that is not accessible to plants.[7]

Temperature drives increasing agricultural output. Just about 50% of plants are used for agricultural purposes and the surfactant supplies are disposed of as a depth heat exchange or as a rainfall. The excess irrigation frequently causes environmental risks such as water extraction or salinity, instead of increasing crop production and destroying soil fertility. Water consumption has become important to industries with its efficient water use and increasing scarcity. Only modern irrigation and better storage of water are possible. [8]

Method For Using Minimum Water For Irrigation

1. Sprinkler Method:

Sprinkler irrigation is applied by spraying of water on the ground surface through air to the ground. A main pipeline, mostly buried so it does not interfere with the planting, pushes water into the sprinkler system and fills it with it. Three main types of sprinkler irrigation systems are the solid-set, relocations and shifting structures. A water sprinkler for a wide variety of crops, trees, fruits, vegetables, virgates, lawns and pastures is used. Sprinkler systems for wastewater use, plant protection from frozen frost and dust management are also built in enclosed animal facilities. [9]

2. Traditional Irrigation System:

Agriculture is one of many people's main occupations in India. Sugarcane is the most important commercial crop in many parts of India. There are also many issues in areas with ample water as well as areas of water scarcity. The traditional mechanism used to irrigate the field of sugarcane results in more water wastage, fertilizers, manpower, electricity etc. The farmers usually spend a lot of water, power, time and energy irrigating their fields. They need to visit the field personally, and they supply water to farm according to soil moisture. They need to turn ON motor, and then turn off the motor after irrigating the area. This whole cycle takes time and farmers cannot do any other activities.

3. Dripping System for Irrigation:

Drip irrigation systems as displayed in fig 4 are often pre-installed into a thermoplastic tube, or transmitters are placed outside the tube at the correct locations. Pollution flow rates typically range from 2 to 7.5 L. Pressure to mitigate pollution maintains a constant flow rate, as pressure ranges from about 70 and 200 k Pa. This type of system is popular in wine-growing or other above-ground installations.

Fig.4: Drip Irrigation

Often for irrigation of plants, bubbles and Nano sprays are used. For a small area of flooding, bubbles release low-energies water. Dispersible in water up to 4 m diameter areas at flow rates of 100 l h depending on the shape, type and pressure of the object. During dry periods, water is pumped into the drainage system to increase the water table and to provide the plant production with extra water. [10].

Drip Irrigation systems directly water individual plants at their root region, preventing many fungal problems and wasting water. Drip irrigation system lets you save time by watering large plant areas all at once. It helps farmers to increase productivity and the resource usage, resulting in a substantially higher rate of incentives (ROI) compared to any other irrigation system in terms of quality and quantity. Drip irrigation systems can help water hard areas, such as slopes where it runs off and other watering methods may cause erosion. Drip irrigation can be set to give these areas a slow penetrating soak, or it can be set to supply water in bursts that can be consumed before the next burst.

a) Proposed Automatic Drip Irrigation System:

The proposed automatic drip irrigation system provides all kinds of different approaches to problems with drip irrigation.

- It has timers that can be set so even if the user is gone anywhere, the process of watering plants will be done.
- It has different nozzles that can regulate water flow so that plants with sugar cane can get less water, while plants with higher water needs can get more.
- It has sensors which tell the system if it rains so it won't run.

Using a smart irrigation system, all problems in the conventional drip irrigation system can be avoided, as its emphasis is on automation. By sitting at home, the farmer can supply the water to the field through an android phone. The current valve will turn OFF automatically, the next valve will be ON and so on, depending on the level of water or fertilizers. That way the water is distributed to the field. Finally the motor will automatically turn OFF depending on the speed. All this can be achieved using an application focused on smart cell phones. The farmer can do other works or activities at the same time.

4. Salinity Hazards:

The irrigation system can however boost problems with salinity and more carefully affect the management of alkaline than the irrigation system type. When soil salts are continuously removed, irrigation at drainage and boundary systemic can drain. Sprinkler irrigation also allows for a continuous salt leaching, but due to the high salt water that is applied to the sprinkler, sensitive plants can be affected.

The spring of watering water leaks salt from the soil below the spring as salt levels rise in the surface. Tilling helps, by adding soil salts, to reduce salinity issues before crops are grown. The pressure of the salt appears to radially increase through a drop emitter or line source such as the drip tap [11].

Conclusion

As illustrated in the summary, multiple options exist for improving the water consumption of crops. Since we have chosen the smart irrigation solution of a cyber physical system, some plant requirements have been ignored in order to simplify the scheme and allow calculation. The downside is that we rely heavily on human understanding in our system to determine the constraints required to fulfill crop conditions. In order to determine the water supply to the farm, preferably, the sensors must provide information without further conditions. The focus of this method is strongly on a connected network, which only a well-defined meeting can understand. To order to adapt them to strict environmental standards, this can be done to various fields. While numerous irrigation system participants are obviously helpful, our program has proven to be important for irrigation. It also reduces water prices for agriculture and water wastes all day long and reduces the essential demands on facilities, which are indicated by peaks of demand.

The use of drip irrigation has shown that it can dramatically reduce water, electricity, and manpower. However, due to the hard labor that is involved in the actual farm, only a few farmers use the drip irrigation. The automatic drip irrigation system based on the smart mobile phone will allow many more farmers to build and use the drip irrigation system to increase their productivity at lower costs.

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