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VARIOUS TYPES OF IRRIGATION SYSTEM AND ITS BENEFITS

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ABSTRACT

Generally the irrigation system is defined as the supplying the water to the agriculture land by naturally or artificially manner. Irrigation can also be used to deliver nutrients to the crops. Wells, ponds, lakes, canals, tube-wells, and even dams are some of the water sources for irrigation. Irrigation provides the necessary moisture for growth, development, germination, and other associated tasks. Irrigation frequency, pace, amount, and time vary depending on the crop and soil type, as well as the season. Summer crops, for example, require far more water than winter ones. The output and yield levels have been stabilized thanks to irrigation. Irrigation systems are the sole way to meet the various water requirements of various crops. We need to water crops at the correct time for them to grow well, yet rainfall in India are unpredictable, necessitating the need to irrigate the land. Monsoons only bring rain for three to four months out of the year, therefore crops need water to grow. India's rainfall is uneven and unequally distributed. Excess water produces floods in certain areas, while a lack of water causes starvation in others. Irrigation enhances the availability of water supply, which increases the farmers' revenue. For better production, Improve the food quality, increase the income of the farmers, and also for economy of the country it is necessary to improve the irrigation system.

KEYWORDS: *Agriculture, Better Irrigation, Canals, Sprinklers, Tube wells.*

1. INTRODUCTION

Life cycle of human beings or living things only dependent on the food, and it is necessary to maintain the food production as per requirement. Irrigation is the 1st method in agriculture sector in which plants or crops are fed through the water for their growth. It is necessary for rising crops with economic and efficient system. Basically in India major part of the agriculture dependents on monsoon, and due to uninform distribution of rainfall with include both space and time. It is necessary to introduce a different types of irrigation system[1], [2].Over time, many irrigation technologies have been created to satisfy the irrigation needs of certain crops in specific places. Surface irrigation, sprinkler irrigation, and drip/micro irrigation are the three basic types of irrigation. For surface irrigation, water flows over the soil by gravity. Sprinkler irrigation sprinkling or spraying water droplets from fixed or moving devices onto the soil. Micro irrigation uses dripping, bubbling, or spraying to make numerous, minute applications that only wet a section of the soil surface in the field. Sub irrigation, a fourth and minor irrigation method, involves raising or maintaining the water

table near the plant root zone by using ditches or subterranean drains to deliver the water[3]. Promotes soil solution and nutrient uptake: Irrigation water acts as a medium for dissolving soil nutrients (soil solution) and making nutrients available for plant uptake. Irrigation system enhances the plant's ability to maintain appropriate temperatures. Irrigation system include various types on the basis of how the water is supplied to the agriculture land or plants. The main goal is to supply the water uniformly to the crops, so each plants get the required amount of water. For better production and maintaining food quality need to be better irrigation system, if this system is not good then it impact on the economy and the income of the farmer.

1.1.Types of Irrigation system:

Various types of irrigation system which are mostly used as follows:

1.1.1. Sprinkler Irrigation

The sprinkler system is a method of irrigation system in which water is sprayed into the air and allowed to fall on the ground surface for better irrigation[4]. This sprayer consist of nozzle which increases the water pressure.Selecting the nozzle sizes, sprinkler spacing, and operating pressure of sprinkler suitable for uniform irrigation. This method of irrigation system is very useful for uneven land and on shallow soil. Generally all types of crops are suitable for sprinkler system accept the crops like jute, paddy, etc.

Benefits of the sprinkler system

- This irrigation method is Suitable to all types of soil only accept the heavy soil.
- This method of irrigation system used in India and also it’s a water saving methods.
- It is also helpful for fertilizers saving.
- This methods Reduces erosion.
- It protect the crops against frost and also high for high.
- Fertilizer is also spray through this system.
- Sprinkler system also beneficial for saving the land.

1.1.2. Drip Irrigation System:

This method uses emitters or drippers for irrigation process in which water is applied near the roots of the crop or below the surface of soil with low rate of water discharge. This method maintain the moisture of soil. The water is continuously fed drop by drop and moves into the soil. This method are efficiently used for large variety of crops, such as vegetable, flowers, orchard crops, etc[5], [6].

Benefits of drip irrigation system:

- Drip irrigation system is beneficial for saving the water.
- It save the power because it operates at lower pressure.
- Fertilizer and other chemicals are applied into the root of the plant so it is also known for fertilizer saving system.
- It reduces the man power or labor.
- This system is used in hilly area also.
- Drip irrigation system improve the yield and plant vigour.
- It also Improve the quality of plant produces

1.1.3. Well and Tube Well Irrigation:

Well irrigation system is mostly popular method used in India where sufficient sweet ground water is available. These methods are mainly used in Uttar Pradesh, Bihar, Tamil Nadu, etc. The various types of well is present such as Tube wells, deep wells, shallow wells, artesian wells, etc. In shallow wells water is not available all the time because water level goes down during dry month. In case of deep wells water is available all the time and it is most suitable for irrigation. At those place where ground water is available tube wells are installed near the agriculture field. This method is applied for irrigation process in wheat, paddy, mustard etc.

Benefits of tube wells irrigation system:

- This is simplest and cheapest method of irrigation and the framer can easily afford by the farmers.
- It is more reliable for that time when surface of water is dries up.
- By using this system irrigation time is saved.
- This is independent source of irrigation system used in now these days.

1.1.4. Canal Irrigation system:

An irrigation canal is a man-made waterway that transports irrigation water from a water source to the area to be irrigated. Canals can be a good source of irrigation in low-lying places with deep fertile soils, a constant supply of water, and a large command area. The water is drawn from a river, a tank, or a reservoir. The canals can be built out of concrete, stone, brick, or any type of flexible membrane that can withstand seepage and erosion. The water will distributed for cultivation purpose from the source point and suitable valve can control the flow of water from the source point to the crop field. As a result, canal irrigation is concentrated mostly in India's northern plains, particularly in Uttar Pradesh, Haryana, and Punjab. This system id effective for most of the crops[7], [8].

Benefits of canals irrigation system:

- *This irrigation system provides the crop from drought condition and it is also responsible for increasing the crop production.*
- *It helps to increase the level of ground water.*
- *The cost of maintenance is low.*
- *Electricity and drinking of water both can be obtain by this methods.*

1.1.5. Tank Irrigation System:

A tank is created by erecting a modest earthen or stone embankment across a stream. The bund's water is used for irrigation as well as other reasons. In the Karnataka Plateau, MP, Maharashtra, Odisha, Kerala, the Bundelkhand area of Uttar Pradesh, Rajasthan, and Gujarat, tanks provide a significant source of irrigation[9]. Most of the tank are natural and they don't have heavy cost for the construction and have longer life. In many tanks, fishing is also carried on which increase both the food production and income of the farmers.

1.1.6. Surface Irrigation system:

Basin, border, and furrow systems are the most common types of surface irrigation. It is a frequently used and thus well-known system that does not require any high-tech programmes to work. It requires more effort than other irrigation methods in general. Generally it can be defined as a technique in which water is distributed over the surface of the water[10]. This system of irrigation easy to use by farmers in India and most of the agriculture sector used this technique.

Benefits of Surface Irrigation system:

- Because the system is so widely used, most local irrigators have a basic understanding of how to operate and maintain it.
- Minimal capital investment is required to build surface irrigation systems at the farm level.
- The critical structural elements are situated near the field's margins, making operation and maintenance easier.
- Gravity is the source of energy for surface irrigation systems.
- Climate and water quality variables have less of an impact on surface irrigation systems
- The gravity flow system is a very adaptable and manageable Irrigation system.

2. LITERATURE REVIEW

HA Omran et al. discussed the Evaluation the operation of a drip irrigation system in different types of soil[11]. Because of its good and high uniformity, the drip irrigation method is the best method that has been employed in the world among the other irrigation systems. This system uses a pipe network to deliver water to the field, which is then transformed by emitters and delivered to the plant.To meet the aims of employing a drip irrigation system, it must be properly built and operated, with rates and locations of water delivery to the root zone that are appropriate for crop needs.

DL Bjorneberg et al. discussed the methods of irrigation. In this paper author discussed about the Methods or techniques used in irrigation system for improve the production and income of the farmer etc[12]. Irrigation is the application of water to soil with the purpose of meeting the water requirements of growing plants. Water is pumped or flows by gravity through pipelines, canals, ditches, or even natural streams from rivers, reservoirs, lakes, or aquifers. Watering fields improves crop yields in terms of quantity, quality, and consistency.

Gary l et al. explained the various types of irrigation system. Irrigation is the backbone of the agriculture and its play an important role[4]. These day many types of irrigation which are used mostly such as Deep irrigation, surface irrigation system, tank irrigation, sprinkler irrigation etc. which are used for irrigation purpose. In this paper author explain all about the irrigation methods.

3. DISCUSSION

In agriculture sector Irrigation are very important aspects and income of the farmer totally dependent on the crop production, if the irrigation is better than it is beneficial for the agriculture sector. Irrigation is when rainwater is replaced or supplemented with water from another source in order to grow crops or plants. Dry land farming or rain fed agriculture, on the other hand, is agriculture that relies solely on direct rainfall. The primary impediment to farmers adopting drip irrigation systems is the significant initial expenditure required. However, it's important to remember that the system will quickly pay for itself due to higher agricultural yields, lower pumping costs, and lower water usage. Irrigation is the process of applying water to the soil artificially using tubes, pumps, and sprays. Irrigation is commonly employed in locations where rainfall is unpredictable, or where dry spells or drought are predicted. There are a variety of irrigation systems in which water is evenly distributed across the entire field. Irrigation water can come from a variety of sources, including groundwater, springs, and wells, surface water, rivers, lakes, and reservoirs, and even treated wastewater or desalinated water.

4. CONCLUSION

Various types of irrigation system which are used in irrigation of plants. Irrigation-induced salinity is a problem that deserves more attention than it now receives. The technology exist

to mitigate or remove the problem, and delaying action will simply increase the expense of correcting the economic, social, and environmental harm.Because of the nature of the agricultural industry and most irrigation projects in underdeveloped nations, it is frequently the small farmer that bears the brunt of the cost associated with salinity.Improvement in irrigation system is also necessary so need to introduce new technology such as automatic irrigation system.Depending on the intricacy of the scenario, we can utilize simulation models based on soil indicators or water balance approaches, or we can use remote sensing techniques.A particular amount of water is essential for good crop nutrition. There will be a deficiency in meeting water requirements if rainfall is insufficient. Irrigation attempts to address the shortfall created by insufficient rainfall. In drought years, irrigation comes to the rescue.Irrigation contributes to the country's wealth in two ways. For starters, because bumper harvests are generated as a result of irrigation, the country becomes food self-sufficient. Second, because irrigation water is taxed when delivered to growers, it contributes to revenue.

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