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Analysis on the Extent of Benefits of Drip Irrigation in Horticultural Crops

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Abstract – Agricultural productivity is winding up progressively imperative issue as the total populace keeps on developing. India, one of the world's most crowded countries, has made strides in the previous decades to build its land productivity. Agriculture still structures the foundation of Indian economy, in hate concerned endeavors towards industrialization in most recent three decades. Agriculture contributes a high offer of net domestic product by sectors in India. Access to water is a critical factor for the survival of Indian farmers in villages. Irrigation is one of the major arranged endeavors of any nation's expanded agricultural production. It around pairs the yield of the land contrasted with those depending just upon the downpours. Canal irrigation is increasingly broad and proficient when contrasted with well or tank irrigation systems. In this article, we considered the degree of advantages got from drip irrigation in horticultural crops and distinguish the requirements experienced by farmers in receiving the drip irrigation for horticultural crops. In this article we gave an overview of benefits of Drip Irrigation in Horticultural Crops.

Keywords: Irrigation, Drip/Micro Irrigation, Agriculture, Horticultural Crops.

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I. INTRODUCTION

Water is fundamental; there will be no perpetual supply of rainfall. The possibility of this couplet is clear since "downpour offers life to all creation resuscitates the diminishing vegetation reestablishes life to what appears to be dead" Thus water from downpours is as valuable as gold itself. For sure it is viewed as "fluid Gold" Agriculture is an expansive movement in India just as Maharashtra. The term 'Agriculture' is begun from the word 'Ager' which means there by a development. Increment in agriculture production and productivity depends, to a vast degree, on the accessibility of water, consequently the significance of irrigation. Be that as it may, the accessibility of irrigation offices in exceptionally lacking in India, for instance, in 1950-51, gross irrigation area as level of gross cropped area was just 17 percent. In spite of gigantic investments on irrigation extends over the time of arranging. Gross irrigated area as level of gross cropped area was just 44.6 percent in 2007-08 (87.26 million hector is out of 195.83 million hectors), right now 63 million ha, or 45 percent of net cropped area, is irrigated. Consequently, even now in excess of 55 percent of gross cropped area relies upon downpour that is the reason Indian agriculture is known as a bet in the monsoons (Dhawan, 2017).

II. AGRICULTURE IN INDIA

Agriculture in India has a noteworthy history. Today, India positions second on the planet in farm yield. Agriculture and associated sectors like forestry and fisheries represented 16.6% of the GDP and about half of the absolute workforce relies upon agriculture. Despite the fact that agriculture is consistently declining, it assumes a huge job in the general financial improvement of India. India is the world's biggest maker of a few crisp fruits and vegetables, milk, real spices, new meats, sinewy crops, for example, jute, staples, for example, millets and castor oil seed. India is the second biggest maker of wheat and rice, the world's real food staples. India is likewise the world's biggest maker of a few dry fruits, agri-based material crude materials, roots and tuber crops, pulses, farmed fish, poultry and eggs, coconut, sugarcane and a few vegetables. India is the fifth biggest maker of over 80% of agricultural products on the planet, including many money crops in particular espresso and cotton. India is additionally one of the world's five biggest makers of livestock and poultry meat, with one of the quickest development rates. India's populace is becoming extremely quick than its production of rice and wheat. Because of Green Revolution, India can create for domestic utilization and for worldwide fares. In 2011, India delivered 85.9 million tons of wheat (Singh S. 2008). Rice yield in India additionally hit another record at 95.3 million tons, a 7% expansion from the year sooner. Production of other food staples additionally expanded. These Indian farmers created around 71 kilograms of wheat and 80 kilograms of rice for each individual from Indian populace in 2011. The per capita supply of rice each year in India is presently

higher than the per capita utilization of rice each year in Japan.

III. IRRIGATION

Irrigation is the most vital instrument of the advancement of agriculture. The agriculture of various areas and countries on the planet getting a charge out of high productivities in various crops are observed to be for the most part relied upon irrigation. Irrigation is an agrarian economy expect indistinguishable significance from blood in human body. In the prior occasions, when there was no weight of populace, water blowing in the streams, bolstered by the rainfall was sufficient to address the issues of human life and for development of the required crops. As the weight of populace expanded and standard of living of individuals raised, need have increment water resources has been left. This prompted the idea of putting away water through the development of dams and utilizing it through a canal framework (Kulkarni, 2005). Advancement in India is synonymous with rural improvement since over 60% at it populace lives in rural areas with almost 40 percent beneath the poverty line. Agriculture is the primary control of these individuals. Close around 70 percent of the populace are in agriculture, it draws in 60 percent of work drive. And it contributes around 26.8 percent in 1998-91.

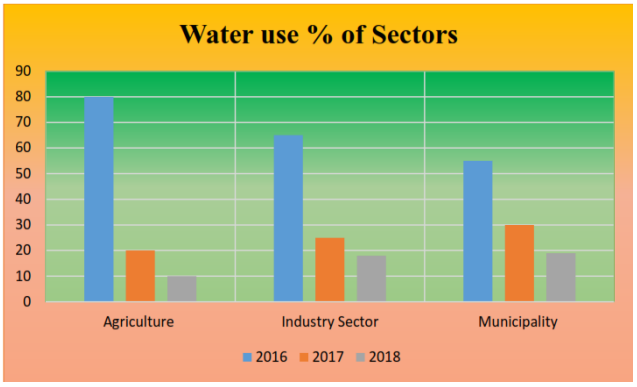

Figure 1: Water Use % of Agriculture, Industries and Municipalities

India has gained impressive ground in developing irrigation framework. Anyway irrigation proficiency is low for both surface and ground waters. So as to enable the downpour nourished farmers to enhance productivity and profitability, in situ soil and water protection rehearses are created for various agro-climatic areas with uncommon accentuation on successful rainwater the executives alongside a suite of area explicit advancements. Substantial irrigation potential has been made through major and medium irrigation plans. Irrigation is characterized as the artificial application of water to soil, to supply water fundamental to plant development. It is mean by which water is passed on to bone-dry areas from streams stores or wells to build the fruitfulness of the land. Scientific irrigation includes information of the accessible water supply its preservation and application to the land, the qualities and necessities of the distinctive sorts of the soil and prerequisites of different crops to be created. It is the investigation of bridling the wellspring of water and conveying the equivalent for agriculture.10 Irrigation has been an essential contribution to rural advancement. Irrigation is an apparatus by which land is made valuable in drought inclined areas by giving water to land.

3.1 Importance of Irrigation

Irrigation is a tremendous subject and the two its substance and effect change with the source on it is based. In the new arranging procedure currently being worked out, irrigation is being allocated a noteworthy job in rural improvement and business age. As over half of GNP originates from an agricultural sector in India, in this manner it is called as an agricultural nation. Over 70% of the number of inhabitants in the nation is locked in directly on agricultural acuities. No drought the agricultural sector stands as a spine of the economic improvement of the nation. As indicated by Simon Kuznets, there are three commitment of agriculture to economic development viz. (1) Product commitment (2) Market commitment and (3) factor commitments. As indicated by him "it Agriculture itself develops, it makes a product commitment, on the off chance that it exchanges with others. It renders market commitment; on the off chance that it changes resources to different sectors, these resources being productive variables it creator's factor commitment (Verma, et. al., 2016). Agricultural improvement prompts more elevated amounts of productions of food and other farm products, higher pay, better standard of living to the cultivators specifically and non-cultivators likewise draw the advantages with its spread impacts. To have steady and quick economic advancement of the nation, the agricultural sector which is the premise of a wide range of improvement, must be produced, in agricultural advancement water as soil-dampness assumes an overwhelming job.

3.2 Importance of Irrigation in Agrarian Economy

Irrigation is a basic contribution for agriculture. In India, the significance of irrigation radiates from the pervasive character of its effect on the agricultural economy. As conventional defensive information, it guarantees a safe reap, goes about as a protection against insufficient and conflicting storm and such establishes a sine-qua-non for agricultural soundness. Be that as it may, the appearance of new crop innovation, prevalently known as 'green revolution,' has extensively improved the essentialness of irrigation as fundamental productive information. Irrigation has huge 'area effect, 'crop pattern effect' and 'yield effect'. It builds the net area developed' and all the more essentially, the gross cropped area', by improving the crop power through twofold or numerous cropping. It differentiates and changes the crop pattern with such helpful effects as the substitution of second rate and low value crops by superior and high value ones that demonstrate progressively profitable to the farmers. Since the

minor productivity of irrigated land is higher than that of unirrigated land, it is economically more beneficial to develop an irrigated as opposed to a unirrigated hectare of land. As a result of such positive connection that exists between arrangement of irrigation and expanded agricultural production, broad improvement of irrigation is, truth be told, a fundamental and vital pre-condition for a quickened agricultural advancement.

All the more as of late, the great effect of irrigation on making of extra rural work for agricultural workers and independently employed family specialists of the cultivating families is being featured. While irrigation operation itself needs work, its accessibility creates on farm work through expanded cropping force and appropriation of enhanced and work concentrated social practices like transplantation, line sowing, application of excrements, fertilizers and pesticides. Bigger volume of exchange of agricultural and their preparing may likewise build the off-farm work openings. Hence in a bounteously work surplus rural economy, irrigation diminishes the rigors of joblessness, underemployment and regular joblessness by upgrading man long stretches of business (Ali, 2014).

IV. DRIP/MICRO IRRIGATION

Drip/micro irrigation alludes to an assortment of irrigation strategies in which water is conveyed to directly to little areas through producers or tools set along a water conveyance line (commonly a polyethylene hose). In a plantation or vineyard there will ordinarily be at least one emission devices per tree. For column crops (broccoli, lettuce, tomato, peppers, and so on.) the emission devices are dispersed firmly enough with the goal that the slender activity of the soil gives water to each plant root zone. Stream rates per "drip" emission gadget are normally little (1.5 - 8 LPH), albeit some micro shower systems have such vast sprayer stream rates (40 - 60 LPH) that they may likewise be delegated little stream rate, permanent, strong set sprinklers. Since drip/micro irrigation systems are "strong set," they have the potential for automation. Be that as it may, most of these systems are operated physically, with an extensive percentage having programmed channel back flush operations (Narayanamoorthy, 2017).

Figure 2: Drip/Micro Irrigation System

Irrigation water is commonly connected to a plant day by day or a few times each week. A few systems beat the stream on a hourly premise to expand aeration or capillary development. For a few crops, for example, lettuce, it has been discovered that exceptionally visit irrigation may not create the most noteworthy quality yield. These systems require clean water to abstain from stopping of the emission devices. Filtration segments speak to a noteworthy part of the cost and upkeep of drip/micro irrigation. Moreover, chemigation is commonly required to abstain from stopping because of bacterial development and/or substance precipitation in the laterals and emission devices (Kandaswamy, 2017).

4.1 Effect of Micro-Irrigation on Crop Yield and Water Saving

Irrigation water prerequisites in micro-irrigation can be littler when contrasted with the other irrigation strategies. This is because of diminished wetted area; less water is lost to dissipation. These systems are additionally no surface overflow (Patil, 2015).

Micro irrigation gives a consistent supply of water in the crop zone and has been demonstrated to give a higher crop yield and expanded water use effectiveness over traditional irrigation strategies. Drip irrigation can possibly finally twofold crop yield per unit water in numerous applications, including irrigation of most vegetables, cotton, sugar stick and plantation and vineyard crops. A gathering of research results from different Indian research foundations shows run of the mill water use decreases with drip irrigation of 30-60% and run of the mill yield increments of 20-half for an assortment crops, including cotton, sugarcane, grapes, tomatoes, and bananas. It announced that "Moving from traditional surface irrigation to drip irrigation in India has expanded by and large water productivity by 42-255% for crops as assorted as banana, cotton, sugar stick and sweet potato" (Shivakumar, et. al., 2016). Because of its high water use effectiveness, micro-irrigation is progressively being utilized as a procedure to address water shortage and poverty. Researchers, have indicated the water reserve funds and yield increments because of micro-irrigation (Table 1). Notwithstanding farm productivity (crop yield and yield), farmer pay and food security are likewise expanded. With prior harvests, work costs are diminished. Enhancements in drip irrigated crop quality have likewise been watched.

Table 1. Drip and surface irrigation- water saving and increase in yield

Crop	Yield (kg ha^{-1})			Irrigation		
	Surface	Drip	Increase (%)	Surface	Drip	Saving (%)
Banana	57 500	87 500	52	176	97	45
Grapes	26 400	32 500	23	53	28	47
Bitter gourd	3 200	4 300	34	76	33	57
Chili	17 100	27 400	60	27	18	33
Broccoli	14 000	19 500	39	70	60	14
Tomato	6 180	8 870	44	50	11	79
Cucumber	4 230	6 090	44	109	42	62
Okra	15 500	22 500	45	54	24	56
Potato	17 200	29 100	69	60	28	54
Onion	28 400	34 200	20	52	26	50
Beet root	570	880	54	86	18	79
Sweet potato	4 240	5 890	39	63	25	60
Pomegranate	3 400	6 700	97	21	16	24
Watermelon	8 210	50 400	514	72	25	65

V. OBJECTIVE

Keeping all these in view, the present investigation was intended to contemplate the degree of advantages got from drip irrigation in horticultural crops and to recognize the imperatives experienced by farmers in receiving the drip irrigation for horticultural crops.

VI. METHODOLOGY

The present investigation was directed Bhiwani area of Haryana. The expost - facto research configuration was utilized for the investigation. An example comprising of 30 drip irrigation farmers were chosen randomly from the purposively chosen three villages, where in greatest area of horticultural crops is irrigated by drip strategy. The survey was created keeping the destinations of the examination out of sight, exhibited in non - inspecting area and then utilized for gathering the required information from the respondents.

VII. RESULTS AND DISCUSSION:

Gathered data were dissected and results are introduced in the accompanying table.

Table 2. Benefits of drip irrigation

S. No.	Benefits of Drip irrigation farmers	No. expressing the advantages	
		Number (n= 30)	Per cent (%)
1.	Saving of water	28	93.34
2.	Saving of labor cost for irrigation	22	73.34
3.	Uniform application	27	90.01
4.	Improved quality of produce	20	66.68
5.	Easy method of irrigation	26	86.68
6.	Decreased weed growth	21	70.01
7.	Increased crop yield	23	76.68

The above table uncovered that larger part of the respondents opined that sparing of water (93.34 %) is real advantage of drip irrigation and pursued by Uniform application (90.01 %), Easy technique for irrigation (86.68 %), Increased crop yield(76.68 %), Saving of work cost for irrigation(73.34 %), Decreased weed growth(70.01%) and Improved quality of produce (66.68%).

7.1 Constraints encountered by the drip irrigation growers

The imperatives experienced by the farmers had the issue of non-accessibility of quality material, no subsequent administrations by drip organizations, high beginning investment cost, absence of capital to cover most extreme holding under drip irrigation and postponement in approval of credit, spillage in the present drip framework

VIII. CONCLUSION

In the drip irrigation strategy, the water is given to the root zone of herb drip by drip in view of which the substantial measure of water can be spared. Right now, the farmers utilize the irrigation method in nation physically in which the farmers must water the lands at each standard interims. The Benefits experienced by the farmers are sparing of water, uniform application and simple strategy for irrigation and the imperatives are issue of non-accessibility of quality material and no subsequent administrations by drip organizations. It is obvious from the examination that the drip irrigation offices, financing foundations and others to supply sufficient standard extra parts and other fitting measures to guarantee the agreeable circumstance for proper reception of drip irrigation strategy.

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