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Design of Drip Irrigation System by Renewable Energy

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Abstract: Drip irrigation, also known as micro irrigation or localized irrigation, is an irrigation method that saves water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, lateral, and drip. It is done through narrow tubes that deliver water directly to the base of the plant. Drip irrigation can help to use water efficiently. A well-designed drip irrigation system loses practically no water to run- off, deep 3"Solar Powered Drip irrigation system" especially designed for farmers, who do not have access to conventional power and has small land holding. The solar pumps have Brushless DC motors which receives power from the PV panels. This system does not have any batteries. Hence the solar pumps start early in the morning & continue to work till late evening. To analyze the impact of adoption of drip irrigation technology by farmers on productivity of fruits, sugarcane and vegetables by comparing it with conventional non-drip irrigated fields To assess the efficiency of water, electricity and fertilizer use under drip and non-drip irrigated fruit, sugarcane and vegetable crops cultivation To analyze the economic viability of drip system investment in fruit, sugarcane and vegetable crops To investigate the salinity and nitrate-N distribution in the soil profile under drip and conventional (non-drip) irrigated cropped farmers' fields To verify nitrate contamination in ground water sources from wells located in drip irrigated and conventional (non-drip) irrigated cropped fields The field study revealed that drip irrigation & fustigation has the, Potential to increase productivity in fruit, vegetable crops and Sugarcane significantly besides conserving resources such as water, Fertilizer, power, labour etc as compared to conventional irrigation The economic analysis revealed that drip irrigation was found to be a profitable and efficient technology for fruit, sugarcane and vegetable crops with positive customer Cost of capital. With reduced leaching losses and by maintaining the soil health the MI technology is proved to be an environment friendly technology.

I. INTRODUCTION

Drip irrigation, also known as micro irrigation or localized irrigation, is an irrigation method that saves water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, lateral, and drip. It is done through narrow tubes that deliver water directly to the base of the plant. Drip irrigation can help to use water efficiently. A well-designed drip irrigation system loses practically no water to run- off, deep 3"Solar Powered Drip irrigation system" especially designed for farmers, who do not have access to conventional power and has small land holding. The solar pumps have Brushless DC motors which receives power from the PV panels. This system does not have any batteries. Hence the solar pumps start early in the morning & continue to work till late evening.

II. LITRETURE REVIEW

Following are the research paper which are studied to assess the design of drip irrigation system by renewable energy (solar system).This research study was beneficial for find out the comparison of the drip irrigation and conventional water following reference are used Professor Rhonda Skaggs June 30 2000,ASST professor Er.Neha Sharma August 2012, Jenifer Burney 24 August 2009 , Karan sehgel (india) Nov2011,

In this case study of a solar powered drip irrigation system for women farmers in northern benin,west Africa it is important to note, increasing agricultural productivity and income for the majority of these farmers, most of who cultivate on less than two hectares of land, is a relatively untapped opportunity for finding practical solutions to improving agricultural yields and hence rural poverty(IDE,2002) although the expensive hardware components are not indebted onto women farmers, at the sometime, the project does not underestimate the possibility that somehow, women farmers are empowered with higher incomes and new market opportunitunities which ultimately benefits the entire community conclusion. have studied research paper on drip irrigation Management using wireless sensors conventional flood-type methods consume a large amount of water, but the area

between crop rows remains dry and receives moisture only from the incidental rainfall whereas the drip irrigation technique slowly applies a small amount of water to the plants root zone so by sensors drip irrigation technique, we can sensor there is no need of laborers Drip irrigation in the desert : Adoption, Implications, and obstacles Topic code:01-Production Economics, paper presented to the western agricultural economics association annual meeting, Vancouver, british Columbia June 30, 2000 from the beginning of survey instrument design and through the economic analysis reported here the primary objective of this research has been to provide information useful to Chile pepper research ,extension and industry, Numerous members of the inter disciplinary and inter industry group have expressed puzzlement over local farmers continued reliance on flood/furrow irrigation practices initial hypotheses revolved around irrigation system costs ,water rights, farmer lack of information and permission the logistic regression modeling effort reported here attempted to test these and other hypotheses using survey data obtained from the larger Chile pepper in the state the independent variables tested and rejected for inclusion in the final models had very weak explanatory powers.

III. METHODOLOGY

A. Case study
B. Analysis of water supply
C. Know about the system components
1) Analysis of water benefits
*2) Step-1 :*Quantify water flow and yield under baseline and project conditions baseline conditions
3) Baseline conditions
a) Total irrigation under the baseline activity (W_{IB}) over the entire growing season of the crop in m^3/hectare .
b) Return flow (W_{BRF}) the baseline activity over the entire growing season of the crop in m^3/hectare.
c) Crop yield achieved under baseline activity (Y_B),tones/hectare.

D. Project Conditions
1) Total irrigation under the project activity (W_{IP}) over the entire growing season of the crop in m^3/hectare .
2) Return flow (W_{PRF}) the project activity over the entire growing season of the crop in m^3/hectare.
3) Crop yield achieved under baseline activity (Y_P),tones/hectare.
4) Step-2:Calculate water requirement for baseline and project scenarios respectively

$W_B = W_{IB} - W_{BRF}$

$W_P = W_{IP} - W_{PRF}$

$W_{P,}Y_P = (Y_B/Y_P) * W_P$ ……..m^3/hectare

calculate the difference In water consumption between baseline activity and project activity (calculate under step 2)

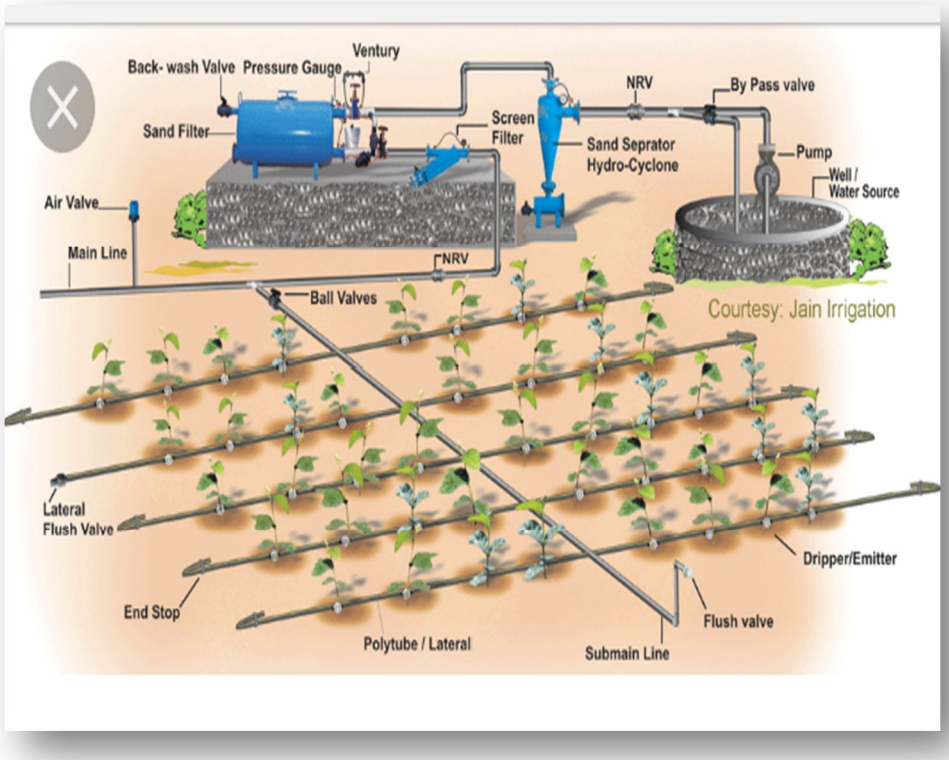
$(Delta)W = (W_B) - (W_{P,}Y_B)$ ……..W-Water saving m^3/hectare

Step-5: Estimate water benefit resulting from project activity

$Q = (delta)W * A_P$ ……..Q=quantity of water required

…….A_P=crop production area

E. To know about system components



A) byepass B) Ventury

C) sand filter D)Drippers and Emitters

IV. RESULTS AND DISCUSSION

Table No.1: Only drip irrigation calculation

Sr.NO	Name of item	Qty	Rate	Per Unit	Amount Rs
1.	Lateral	760.92M	650.00	M	4945.98
2.	Dripper	624 Nos	3.00	Nos	1872.00
3.	End plug	12 Nos	1.50	Nos	22.50
4.	Connector	15 Nos	1.50	Nos	22.50

5.	Main pipeline	17 Nos	350.00	Nos	5950.00
6.	Sub Main pipeline	9 Nos	260.00	Nos	2610.00
7.	N.V.R Valve	1 Nos	900.00	Nos	900.00
8.	Air Valve	1 Nos	40.00	Nos	40.00
9.	Flush Valve	2 Nos	340.00	Nos	700.00
10.	Bypass Valve	1 Nos	400.00	Nos	400.00
11.	Pressure Gauge	1 Nos	330.00	Nos	330.00
12.	Screen filter	1 Nos	7325.00	Nos	7500.00
13.	Sand filter	1 Nos	12500.00	Nos	12500.00
14.	Ventury	1 Nos	2350.00	Nos	2350.00
15.	Pump	1Nos	10000.00	Nos	10000.00
			Total		44,602.98

Total cost of drip irrigation is 44,602 -/ is without added solar system energy.

Table No.2:Calculations with provide solar system

Sr.No	Name of item	Qty	Rate	Per Unit	Amount Rs
1.	Lateral	795.69 M	7.50	M	5967.00
2.	Dripper	648 Nos.	3.40	Nos	2203.3
3.	End plug	18 Nos.	1.90	Nos	34.2
4.	Flash valve	2 Nos.	360.00	Nos	720.00
5.	Main pipeline	7 Nos.	380.00	Nos	2667.00
6.	Sub Main pipeline	8 Nos.	290.00	Nos	2320.00
7.	N.V.R Valve	1Nos.	925.00	Nos	925.00
8.	Air Valve	1 Nos.	55.00	Nos	55.00
9.	Bypass Valve	1 Nos.	425.00	Nos	425.00
10.	Pressure Gauge	1 Nos.	360.00	Nos	360.00
11.	Screen filter	1 Nos.	7525.00	Nos	7525.00
12.	Sand filter	1 Nos.	12512.00	Nos	12513.00
13.	Ventury	1 Nos.	2500.00	Nos	2500.00
14.	Maintenance			Approx	1000.00
				Only drip installation cost	39214.00
15.	Electricity pump	1 Nos.	10000	Nos.	49214.00
16.	Solar water pump	1 Nos.	180000	Nos.	180000.00
				Total cost(with solar pump)	2,19,214.00

Total cost of drip irrigation with provide solar energy system and electric pump. Price of solar panel is 1,80,000-/ added in total irrigation cost with only use pump. There total cost off irrigation is 2,19,214-/.

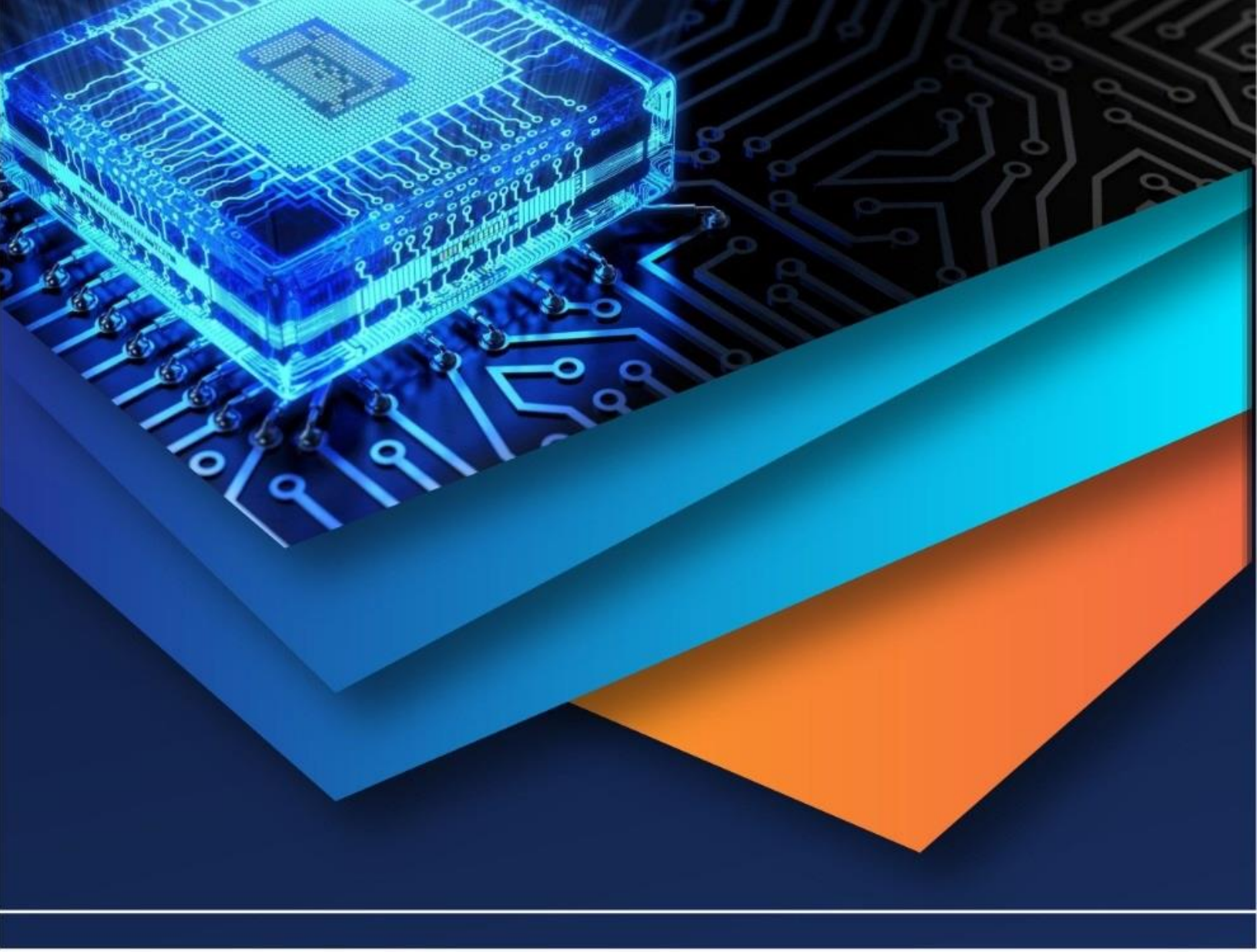
V. CONCLUSION

A. The field study revealed that drip irrigation & fustigation has the, Potential to increase productivity in fruit, vegetable crops and Sugarcane significantly besides conserving resources such as water, Fertilizer, power, labour etc as compared to conventional irrigation

B. The economic analysis revealed that drip irrigation was found to be a profitable and efficient technology for fruit, sugarcane and vegetable crops with positive customer Cost of capital. With reduced leaching losses and by maintaining the soil health the MI technology is proved to be an environment friendly technology.

REFERENCES

[1] Agriculture Water Management (Bainbridge David, June 2001).
[2] Management of drip or micro irrigation (Goyal Megha, 2012).
[3] Irrigation text book. (V. K. Kumawat).
[4] Public health text book. (Mrs. Pooja Pawar).
[5] Sadguru irrigation material supplier Pvt. Ltd. (Tal: Shirur, Dist. Pune).
[6] www.dripirrigation.com
[7] www.jainirrigation.com
[8] http://www.ijcnwc.org/papers/vol2no42012/6vol2no4.pdf
[9] http://ageconsearch.umn.edu/bitstream/36412/1/sp00sk01.pdf
[10] http://www.self.org/PNAS_Article_Solar_Market_Garden.pdf
[11] https://thesis.eur.nl/pub/10708/Research_Paper_Karan_Sehgal.pdf



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