Study on use of Treated Waste Water for Surface and Drip Irrigation

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Abstract:- **Drip irrigation refers to application of water in small quantity at the rate of mostly less than 12 lph as drops to the zone of the plants through a network of plastic pipes fitted with emitters. Drip/Trickle irrigation is comprised by low pressure networks of tubing that combine in to subsections of equal and conserved water flow. Less energy is required to transport water at lower pressures and velocities. Drip systems operate with high water use efficiency (90% as opposed to 45% for overhead) because they supply water directly to the parts of a plant where it is needed most. This allows drip irrigation systems to be designed specific to each and every farmer regardless of their farm operations or crop types. A large portion of farm energy is generally expended in the fields to power irrigation pumps (energy both by fuel and by grid). The cost of drip system depends on the type of crop, spacing, water requirements, proximity to water source etc. An attempt was made to prepare estimate of cost for installing drip irrigation system for all important crops by considering the cost of component supplied by the manufacturer for farmers having holdings of one acre. The cost estimation of drip system for Coconut, Amla, Banana, Tomato, Bhendi and Chilli crops are worked out and are as given below. The life of the system is about 6 to 10 years.**

INTRODUCTION

Water is the basic need of plants for all metabolic and production processes within. A crop is grown in different land situations, soil types, climatic conditions, seasons and water supply situations. Besides, crops differ in their structures and habits. Their water requirements thus vary widely. Water management pertains to optimum and efficient use of water for best possible crop production keeping water losses to the minimum. Serious water losses occur unless it is properly monitored while irrigating fields. Various methods are adopted to irrigate crops and the main aim is to store water in the effective root zone uniformly an in maximum quantity possible ensuring water losses to the minimum.

The crops like coconut, banana, vegetables, etc are grown in Karunya irrigation field. The supply of water for irrigation is about 8hours per day is excess use for crop production so there is need for implementing drip irrigation. There are many benefits involved in adoption of micro irrigation such as water saving, productivity gains, reducing energy requirement, weed problems, soil erosion and cost of cultivation.

OBJECTIVES

- The method of evaluating treated waste water.
- Design and layout of drip system in Karunya owned lands for raisin cy of the system.
- Comparing the benefit g agricultural crops.
- Evaluating the efficient
- From conventional and drip irrigation systems.

METHODOLOGY

- Literature review.
- Water quality test.
- Planning and layout of agricultural land
  a) Surface irrigation
  b) Drip irrigation
  c) Area to be ascertained, crop cultivated to be fixed, requirement of drip, lateral, distributors and modelto be worked out.
- Surface irrigation site to be selected for crops to be decided and estimate to be prepared.

EFFECTS OF DRIP IRRIGATION

Authors: J.Li, W. Zhao, J. Yin,
H. Zhang,Y. Li, J. Wen

The effects of drip irrigation system uniformity and nitrogen application rate on the distribution of water and nitrate in the soil were investigated through field experiments to modify the current design and evaluation standards for drip irrigation uniformity. The experiments were conducted in a solar-heated greenhouse in the 2009 and 2010 growing seasons of Chinese cabbage. Three statistical uniformity coefficients (Us = 55%, 73%, and 95%) and two nitrogen application rates (150 and 300 kg ha-1) were evaluated in 2009. In 2010, three Us values (53%, 65%, and 94%) and one nitrogen application rate (225 kg ha-1) were tested. Moreover, the system uniformity and nitrogen application rate had an insignificant effect on the uniformity of the nitrate content. The results of this study showed that uniformity values that are lower than those recommended by the current standards can be used in drip irrigation systems if sufficient irrigation and fertization events are conducted to approach a uniform distribution of water and nutrients in the soil.

IRRIGATION SYSTEM EVALUATION

Authors: Bak Griffiths and NlL ecler Evaluation of irrigation system performance facilitates objective analysis of the typical as opposed to the potential performance of various types of irrigation systems and the respective management criteria, appropriate for local conditions. This information can also help with the selection of one system over another given local constraints. The impact that the application uniformity of a system can have on crop yield and irrigation efficiency, is further motivation to undertake system evaluations. Rationale and summarised procedures for the evaluation of pumping plants, overhead sprinklers, sub- surface drip (SSD), centre pivot and furrow irrigation systems are presented. Growers will have a benchmark to measure their systems against in the future, and the repetitive nature of certain management and design variables which may be detrimental to system performance, may eventually be rendered obsolete.

There are two types of drip irrigation systems viz., surface and subsurface systems. In the surface system, both the laterals and emitters are laid above the soil surface and the emitters are fixed on the laterals at desired intervals. In surface system, water is usually applied at the soil surface, and there is a possibility of water loss through evaporation from the surface. In the sub surface drip irrigation system, laterals are buried in the soil at desired depth along the crop rows. In this system, the possibility of water loss through surface evaporation is very less. Pump or pressurized water source.

Season		Period
1		January-febuary
2	March –September	135
3	October - december	328.2
4	January - december	647.2

LOCATION

The Karunya University is located 25 km away from Coimbatore is the very bosom of nature. It is surrounded by an ,scoping mountains of the western Ghats. It lies between north latitudes 10▫12’00’’ and east longitudes 76º39’00’’ to 77º30’00’’.The length 320m and breadth 122 m are dimensions of the study area.

CLIMATE

Generally sub-tropical climatic condition prevails throughout the district there is no sharp variation in climate. During summer 33▫ C to 40▫C and winter 15▫C to 36▫C.

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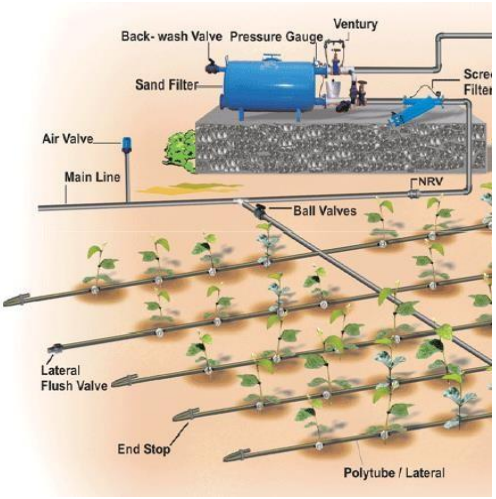
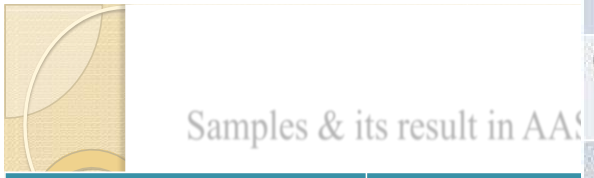


- Backwash controller
- Water filters- sand separator like Hydro – Cyclone , Gravel / sand filters, Screen filters and Disc filters
- Fertigation units / chemigation equipments – fertilizer tank, venturi injector and pump
- Pressure control valve (pressure regulator)
- Hand – operated or hydraulic control valves and safety valves.

Main line (larger diameter pipe and pipe fittings and sub main lines

- ✓ Smaller diameter poly tube (laterals)
- ✓ Poly fittings and accessories

Crops	Spacing(m)	Estimated Cost(Rs/ha)
Coconut	7.5*7.5	25000
Grapes	3*3	40000
Mango	10*10	24000
Guava	5*5	34000
Sapota	10*10	24000
Banana	2*2	5000
Vegetables	0.3*0.6	70000



TABLE

ESTIMATION

Samples & its result in AA

S:-

S1		Bethany
s2		FDR
s3		Old
s4		new
S1		Bethany
S2		FDR
s3	Old	**0.873**
s4	new	

0.012ppm
0.010ppm
0.028ppm
0.006ppm

0.95ppm

End 12mm	3.1	100	310
Screen filter HF 3	3140	1	3140
Fertilizer tank	12000	1	12000
Pvc pipe 20m	25.30	120	3036
Pvc pipe 50mm	35	370	12950
Pvc pipe 88mm	75	240	18000
Pump	6000	1	6000
Total			1,07,476

CONCLUSION

The present project work was aimed at finding suitable methods of irrigation using drip and surface and how it differs between both. Water and nutrients are delivered directly to the plant roots. Less water is required when irrigating with drip systems than with spray systems or other surface irrigation methods. Human contact and associated health risks are minimized. Earlier crop harvest is possible. Fewer odors, ponding, and runoff problems occur. Absorption of nitrogen by plants is increased and pollution of ground water is reduced because nitrogen is applied directly to the root zone. Pretreatment requirements are lower. Operation and maintenance requirements are reduced.