Academic Year 2020/2021

BEng (Hons) Renewable Energy Engineering

REUSE OF RESERVOIR WATERS FOR IRRIGATION AND ENERGY PRODUCTION

SOLENT UNIVERSITY SOUTHAMPTON

Introduction

- The absence of adequate precipitation levels can reduce soil moisture or ground water, diminished steam flow, crop damage and general water shortage.
- The Southern part of Portugal has a lot of irrigation problems and periods of drought due to low precipitation in the area in the planting season.
- In agriculture water is essential for crops to grow. When does not exists enough precipitation falling naturally to the crops an irrigation system must be installed.
- In the specific area of Montargil exists a dam with potential to fight back the problem.

To meet the average requirements of water needed every day it would take around 7h18 minutes.

How it works?

Extract the water from the basin reservoir.

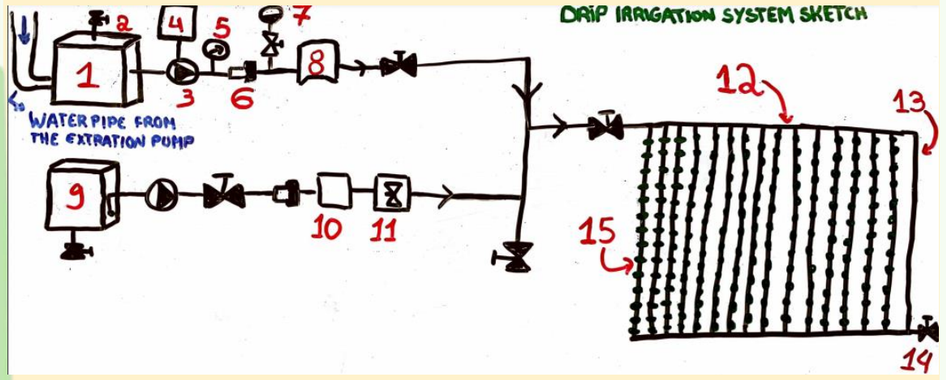
The water fill the water tank next to the field.

This process will take around 1h50 minutes.

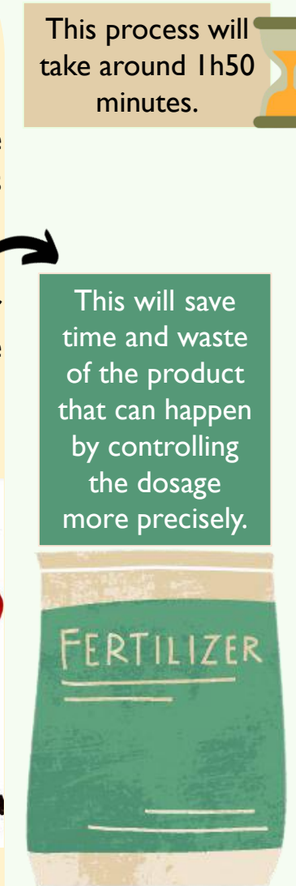
A circulation pump connected to the reservoir will circulate the water through a filter tank and then distribute it across the field.

Connected to the pipe system is a fertilizer tank. The fertilizer will circulate firstly through a filter and then mixed with the water in the same pipes directly to the roots of the plant.

This will save time and waste of the product that can happen by controlling the dosage more precisely.

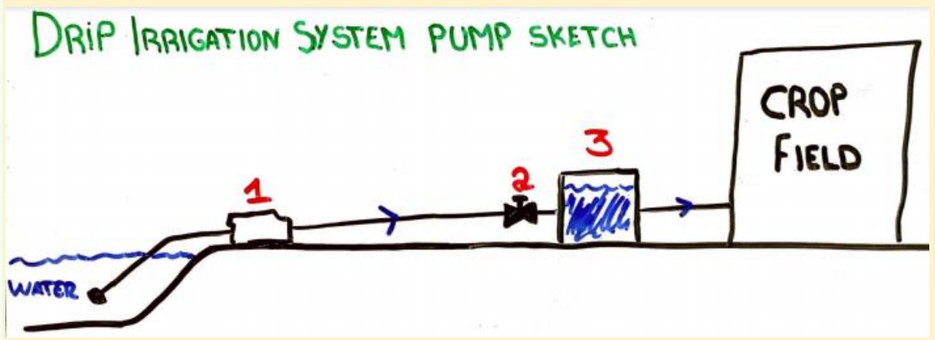


1- Water Reservoir
2- Valve
3- Circulation Pump
4- Controller
5- Pressure Gauge
6- Backflow Preventer
7- Air Valve
8- Filtration Tank
9- Fertilizer Tank
10- Fertilizer Filter
11- Dosing Unit
12- Distribution Line
13- Dripper Line
14- Flushing Valve
15- Emitters



Is there a solution?

Aim: Use the available resources to increase agricultural ability through an irrigation system (drip irrigation), powered by the dam and using water from the reservoir for the irrigation.



1- Water Pump
2- Valve
3- Water Reservoir

Results

Irrigation System Efficiency

Irrigation System	Efficiency
Surface Irrigation	60%
Sprinkler Irrigation	75%
Drip Irrigation	90%

Conclusion

The drip irrigation being the most water save system of the ones studied, is the preference option to a solution of the Montargil problems of droughts.

This project apart from being a solution to the mention problem, it contributes to the reduction of water consume.

Being powered by a renewable source it contributes aswell for the reduction of pollution produced by a fossil fuel energy generator.

SCAN ME

See my final report about this project!

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