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THIRST

The Hardware based Irrigation through Rainwater using Smart Tank

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***Abstract*-.The main aim of the project is to step towards making sure that no one is left thirsty, not even the EARTH.**
As the name suggests our project will quench the thirst of underground water as well as plants. Watering is the most cultural practice and most labor intensive task in daily gardening operation. Knowing when and how much water is needed, is the two most important aspects of the watering process.
This is a concept for smart cities. In this project we are installing a smart tank under the roads which will store rainwater which will be used to water the plantation over dividers .The motor pump will extract the water from our Smart reservoir and will work according to the soil condition to water our plantation, and also half of that water will be transferred underground to maintain ground water level.The main work of the project is to cope with the water clogging problem faced over the roads which then affects the traffic and causes different problems also the project aims to develop techniques in various aspects of plantation which helps to track the moisture of the soil and temperature in real time and allow water to the plant based on the detecting values.
Firstly we intend to harvest rain water using our smart tank. This smart tank will be connected to the dripping system as well as to the ground and an external reservoir. We are using ultrasonic sensors in order to determine water level in the reservoir .The Humidity sensor will help us to know whether a plantation needs water or not. When it will sense dryness in the soil, the water pump will start and thus will provide them with an adequate amount of water through a dripping system. In case of overflow, water will be sent to the nearby reservoir which may go through some filtration process and can be made suitable for human use. Half of the water will be automatically sent to the underground water table through a borehole which will help us to enhance ground water level.

***Keywords*— Smart tank, Sensors, Dripping System**

I. INTRODUCTION

THIRST stands for The Hardware based Irrigation through Rainwater using Smart Tank. Efficient rain water harvesting technique is the need of the hour.[3] As the name suggests our project will quench the thirst of underground water as well as the plants. Watering is the most cultural practice and most labour intensive task in daily gardening operation. Knowing when and how much water is to be sent are the two most important aspects of the watering process. We are developing a smart reservoir which will store water and the motor pump will extract the water from our Smart reservoir and will work according to the soil conditions to water our plantation and transfer water underground to maintain ground water level. In case water supply is not required in the plantation system, the water will be sent to the ground which will service in groundwater restoration.[9] The main aim of the project is to develop techniques in various aspects of plantation which helps to track the moisture of the soil and temperature in real time and allow water to the plant based on the detecting values.[6]

II. HISTORY

India has a long tradition of water harvesting. Many of the traditional water harvesting systems have either fallen to misuse due to a variety of physical, social, economic, cultural and political factors that have caused their deterioration, and due to the decline of institutions that have nurtured them , or have lost their relevance in the modern day context due to their inability to meet the desires of communities.[1]

The lack of willingness to appreciate the fact that different periods in history are marked by the genesis, rise and fall of new water harvesting traditions, is also very clear.[4]

III. EXISTING PROBLEMS IN RAIN WATER HARVESTING

One of the most important underlying values in rainwater harvesting is that it is a benign technology and cannot create desirable consequences.

Water harvesting initiatives are driven by firm beliefs and assumptions, some of which are:

1.There is a huge amount of monsoon flow, which remains un-captured and eventually ends up in the natural sinks, especially seas and oceans[2]

2. Local water needs are too small and as such exogenous water is not needed

3. Local water harvesting systems are always small and, therefore, are cost effective

4. Since the economic, social and environmental values of water are very high in regions hit by water shortages, water harvesting interventions are viable, supported by the assumption that cost- effective alternatives that can bring in the same amount of water, do not exist[3]

5. Incremental structures lead to incremental benefits

6. Being small with low water storage and diversion capacities, they do not pose negative consequences for downstream uses.

IV. PREVIOUS HARVESTING CALCULATIONS

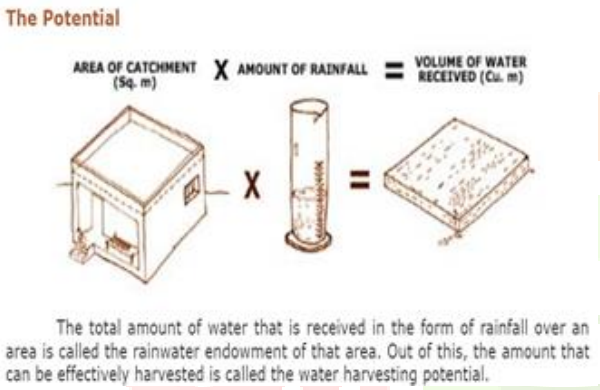


Fig 1 :Previous methods

V. RAINWATER HARVESTING AS SOLUTION

Since the Rainfall distribution in India mainly lies between the moderate to high rainfall .Capturing the rainwater can help recharge local aquifers, reduce urban flooding and most importantly ensure water availability in water-scarce zones. Some ancient rainwater harvesting methods followed in India include madakas, ahar pynes, surangas, taankas and many more.[1]

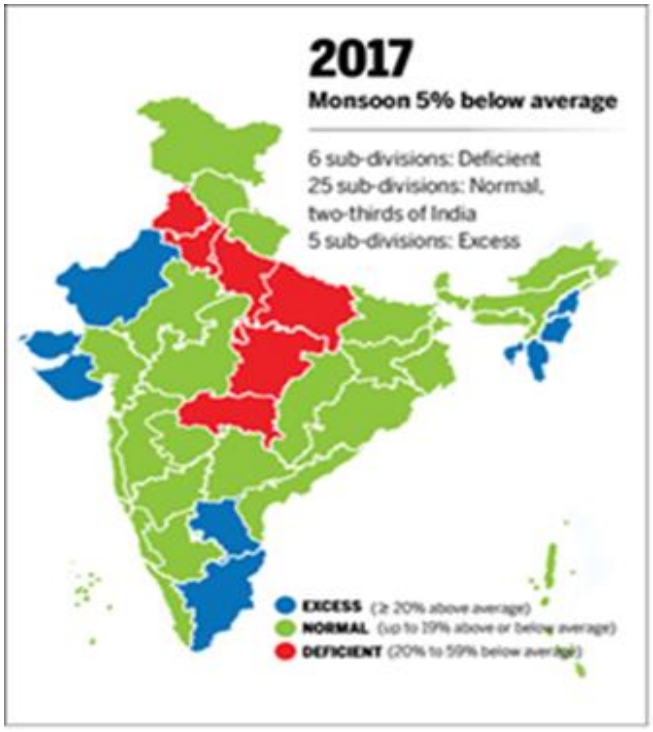


Fig 2: Rainfall chart

VI. PROCEDURE

As we all know water is being wasted on an alarming level for different purposes of daily life. Also the greenery is going out of hand due to lack of proper care. So to solve these problems we are building a smart system named **THIRST** i.e. The Hardware based Irrigation through Reservoir using Sensor Technology[6].

Firstly we intend to harvest rain water using our smart reservoir. This smart reservoir will be connected to the dripping system as well as to the ground and nearby buildings. We are using ultrasonic sensors in order to determine the water level in the reservoir. A warning to refill the reservoir will be sent to the concerned authorities in case the water level goes below a certain threshold[7].

The Humidity sensor will help us to know whether a plantation needs water or not. When it will sense dryness in plants , the dripping system will start and thus will provide them with an adequate amount of water. If the water supply is not required in the plants, the water will be used by nearby buildings to fulfill daily needs which will undergo a filtration process in our smart reservoir in order to make it suitable for household use . In case of overflow, water will be sent to the ground. This will help us to enhance ground water level. We are using the raindrop sensor to detect whether it's raining or not.

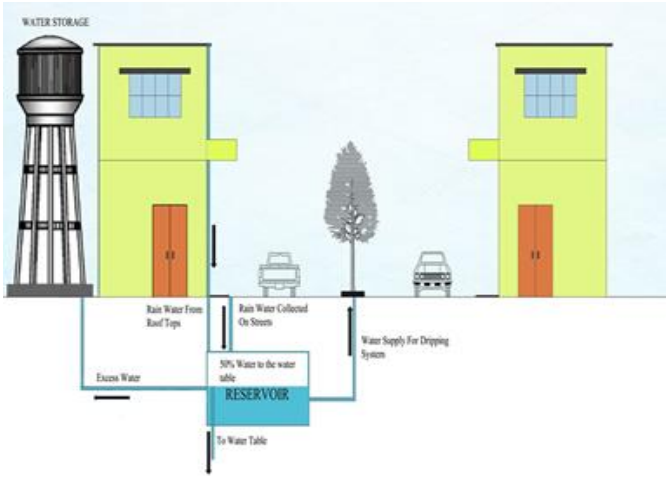
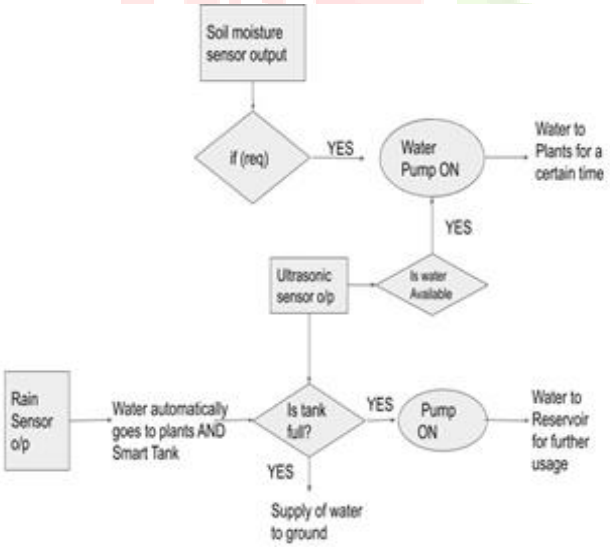


Fig 3: Basic Idea (Blue print)

VII. TECHNOLOGY

- Sensors - Ultrasonic sensor, Raindrop sensor, Soil moisture sensor.
- Actuators - Water pumps
- Microcontroller - Arduino UNO
- Embedded C language.
- Fritzing - For Circuit simulation.
- Tinker cad - For making 3D image of the project.
- Arduino IDE - For programming the microcontroller.

VIII. FLOW CHART DIAGRAM



IX. CONCLUSION

India is the largest user of groundwater in the world. It uses an estimated **230 cubic kilometers** of groundwater per year - over a quarter of the global total.[1]

More than 60% of irrigated agriculture and 85% of drinking water supplies are dependent on groundwater. Urban residents increasingly rely on groundwater due to unreliable and inadequate municipal water supplies.

Some 90% of rural **India's** drinking **water** comes from **groundwater** and75% of agriculture is **groundwater** based. In urban **India**, 50% of the **water** supply is **groundwater** based.

So in short there is a serious need to manage the water usage.

The project aims to maximize the rain water harvesting by collecting the rainwater from the streets as well as rooftops, and to make use of it in the most efficient way.

In case of **Moradabad** ,it experiences the average annual rainfall of **976mm** which is considered to be more than enough for the natural plantation and crops. A huge amount of water gets evaporated or gets collected over streets . The water is being wasted in both ways.[5]

X. OUTCOME OF THE PROJECT

1. The roads that suffer from water clogging will be clear and the traffic will be able to flow easily.
2. The water that generally evaporates or gets run off will be collected and can be used for different purposes.
3. One of the major problems faced after water clogging is the growth of mosquitos which will be avoided.
4. Plantation on the dividers which is generally left unattended will receive water whenever required, through the dripping system.
5. for ground water recharge, all the excess water will be sent to the ground which will help in maintaining the ground water level.[7]

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