

Water Research for Local Recharging of Ground Water Table

Arun Francis G, Manikandan S, Mithya V, Gokul Prasath P, Guna Sekar S, Naveen S, Ragul S

Abstract: The proposed system, helps to increase ground water table level to decrease the water crisis encountered by the people. The rain water harvesting system implemented by the government was a good system by the way but very less monsoon and unpredictable rain has made it unreliable for water table recharging. But an average household of 4 uses nearly 220 litres for bathing and nearly 200 litres for cleaning clothes and utensils per day all the water goes down for the sewage. This project aims in segregating these 400 litres of used water. By collecting all the used water in house and finding out its turbidity using led and photo detector. If water is turbid contents it is discharged into the sewage if the water is not turbid then the water is filtered using corn cobs and then diverted into the rain water harvesting system. This way at least 30 % (120 litres) out of the 400 litres of the used water can be diverted into the rain water harvesting system. When calculated for a month nearly 3600 litres can be recharged into the ground. The water diversion can be done with the help of a valve controlled by a solenoid. These are connected to the microcontroller to control all the process and send to Wi-Fi module.

I. INTRODUCTION

Wastewater and sewage is the consequence of many uses of water. When it is mainly used by our society, it is badly contaminated with existing pollutants. If its left untreated

Revised Manuscript Received on May 29, 2019.

Arun Francis G, Assistant professor, Department of Electronics and Communication Engineering, Department of Electronics and Telecommunication Engineering, Karpagam College of Engineering, Coimbatore, Tamilnadu, India.
(email: ja.arunji@gmail.com)

Manikandan S, Assistant professor, Department of Electronics and Communication Engineering, Department of Electronics and Telecommunication Engineering, Karpagam College of Engineering, Coimbatore, Tamilnadu, India.
(email: mailingtomaini@gmail.com)

Mithya V, Assistant professor, Department of Electronics and Communication Engineering, Department of Electronics and Telecommunication Engineering, Karpagam College of Engineering, Coimbatore, Tamilnadu, India.
(email: mithya.v@gmail.com)

Gokul Prasath P, Student, Department of Electronics and Communication Engineering, Department of Electronics and Telecommunication Engineering, Karpagam College of Engineering, Coimbatore, Tamilnadu, India.
(email: gokul.prasath0108@gmail.com)

Guna Sekar S, Student, Department of Electronics and Communication Engineering, Department of Electronics and Telecommunication Engineering, Karpagam College of Engineering, Coimbatore, Tamilnadu, India.
(email: gunakce19@gmail.com)

Naveen S, Student, Department of Electronics and Communication Engineering, Department of Electronics and Telecommunication Engineering, Karpagam College of Engineering, Coimbatore, Tamilnadu, India.
(email: naveensivakumar98@gmail.com)

Ragul S, Student, Department of Electronics and Communication Engineering, Department of Electronics and Telecommunication Engineering, Karpagam College of Engineering, Coimbatore, Tamilnadu, India.
(email: ragulsr3@gmail.com)

as in many places, these pollutants tend to turn negatively infect major on our surrounding ecosystem. For example, the general organic matter can cause various facts like oxygen depletion in water bodies. Waterborne infections which can also be removed through proper sewage treatment. Additionally, the untreated water contains many pollutants that could unveil poisonous effects on surrounding environment. We use the pH probe, Photo detector stripe and led stripe to observe the turbidity value. If the turbidity is more in the water, it will directly divert to the sewage using solenoid valve.

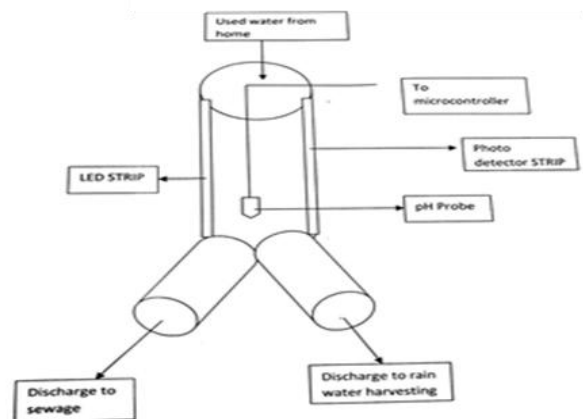
The open and close of solenoid valve is controlled by means of program which is embedded in Arduino. Otherwise, if the turbidity is neutral, it will direct to corn cobs filter. It will filter any wastes in water and after that the filtered water is diverted to the ground water for the purpose of recharging ground water or it can also be diverted to home usage like washing clothes, utensils etc.

II. EXISTING SYSTEM

The existing system of waste water segregation, we can collect the water from the house hold waste water and we can find only the turbidity value. And the filters used such as charcoal, wood and fly ash will not completely filter all the wastes and leave some wastes even after filtering [5].

In addition to that, the existing systems does not have water flow sensors to detect the water flow and the chemical sensors are also not there to find the chemical content values in the water before entering filter and after leaving filter.

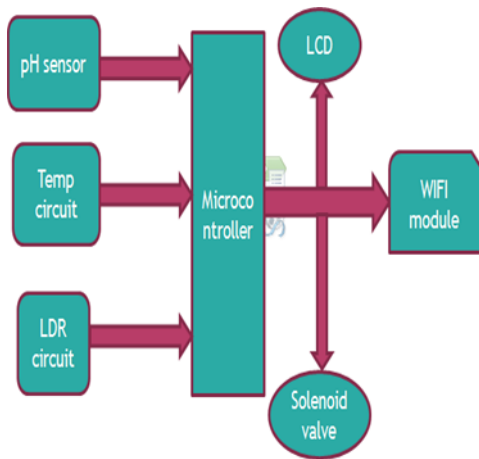
III. METHODOLOGY



IV. PROPOSED SYSTEM

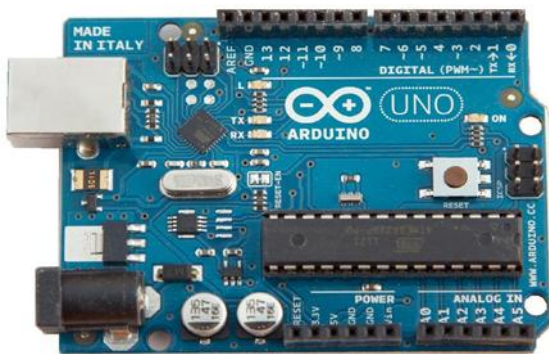
Our main aim is to collect the house hold waste water like water wasted from washing clothes, washing utensils, bathing via one pipe. After that we will find the turbidity using led and photo detector. Then by using pH sensor, measure the pH level of water. If the water contains more turbidity or more soapy content, it will be directly discharged to sewage using solenoid valve. The main role of the solenoid valve is to control the water diversion. If the water is neutral with less soapy content, the water is diverted to corn cob filter. The filter will filter all the waste even the oil, metal etc. in water via five layers of corn cobs. So, we can at last obtain filtered water as an output of corn cob filter. Led strip, photo detector and solenoid valve are controlled by microcontroller. Water flow sensor is also connected to microcontroller to measure the amount of water collected from household water wastes and the amount of water obtained as the output of corn cob filter. By this method of filtering, at least 30% of water is diverted into rain water harvesting system or can be utilized for domestic usage. The solenoid valve opening and closing programs are dumped in the microcontroller. The turbidity value, amount of water collected from the household water wastes and amount of water filtered by corn cobs filter are measured using LDR, Temperature are passed to the WiFi module [6].

V. BLOCK DIAGRAM



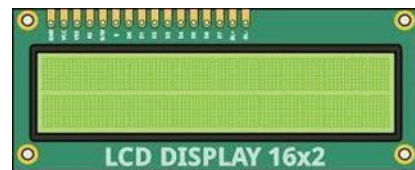
VI. HARDWARE COMPONENTS

A) Arduino:



Arduino is an board designs uses a range of the basic microprocessors and microcontrollers. These boards are facility with sets of digital and analog input/output pins that may be interfaced to numerous extension boards and other circuits[7]. The boards constituent of the most serial communications interfaces, which also tends to together with Universal Serial Bus (USB) within some models. The microcontrollers are typically programmed by means of using a acrolect of features from the basic programming languages. In accumulation to that using outdated compiler tools, this project gives rise to an integrated development environment (IDE) based on the project. Arduino microcontrollers are basically pre-programmed with a boot loader that disentangle uploading of programs to the on-chip flash memory. The levant bootloader of the Arduino UNO is the essential bootloader. Boards are stuffed with program code via a serial connection to another computer. Some consecutive Arduino boards comprise a level shifter circuit to convert between RS-232 logic steps and transistor-transistor logic (TTL) level signals. Current Arduino boards are encoded via Universal Serial Bus (USB), impose using USB-to-serial converter chips such as the FTDI FT232. Some boards, such as advanced-model UNO boards, alternative the FTDI chip with a distinct AVR chip comprehending USB-to-serial firmware, which is reproduced via its own ICSP header. Other variants, such as the Arduino Mini, use a hook-on USB-to-serial adapter board, Bluetooth or other methods, when used with traditional microcontroller tools rather of the Arduino IDE, standard AVR in-system programming (ISP) programming is used [8].

B) LCD Display:



LCD (Liquid Crystal Display) screen is an electronic display component and find in a several scale of applications. A 16x2 LCD display is very fundamental part and is very usually used in countless devices and circuits. These sections are favour over seven slices and other multi fragment LEDs [9].

C) TURBIDITY:

An LED Strip is an tensile circuit board occupied by external attached light-emitting diodes and other essentials that typically comes with an bonding agent assistance. Amplified incandescent value and greater-power SMDs have sanction LED strip lights to be used in applications such as high brightness instruction lighting, fluorescent and halogen lighting fixture replacements, indirect lighting

applications, Ultra Violet inspection during manufacturing processes, set and costume design, and also growing plants [10].

D) SOLENOID VALVE:



A solenoid valve is an electromechanically employed valve. The valve is operated by an electric current through a solenoid.

These valves are frequently used in fluid fields. Their duty is to direct the way of solutions. They are found in multiple application zones. Solenoids proffer mostly faster and safer switching between instructions, which is also high reliability to its durability, for long life, good standard compatibility of the provisions used, low governor power and condensed design.

In our project two solenoid valves were used. One is to allow the good water which is eligible for filtering. Another valve is for discharge the water into sewage. Solenoid valve have two polarities positive and negative and the operating voltage will be 12volts.

E) TRANSFORMER:



Transformer is a general purpose chassis mounted by many copper windings. Transformer has mainly has 240V primary and secondary windings. The transformer has colored insulated material tends to connecting leads. The transformer act as step down transformer by means of reducing AC(240V to 12V). The Power supplies which related for all kinds of project and circuit boards.

This Transformer is normally a basic step down transformer in which the secondary winding is more than that of the primary winding. Due to this windings it capable to step down the voltage. A transformer which converts fundamental electricity from high to low voltage using the basic electricity properties.

F) WIFI MODULE:



The ESP8266 is kind of tried and tested WiFi Module which is also an self delimited SOC with is integrated to an TCP/IP protocol associated stack that can tend to any

microcontroller related permission to access your WiFi network. The ESP8266 which kind of wifi is available of either deal with accommodating an use or by means free from all Wi-Fi networking roles related to applications. This defined ESP8266 WIFI module which is an cost efficient board [11].

This WIFI segment has a very powerful adequate on-board device treating and storage proficiency that it allows to be combined with the module sensors and many other uses specific devices through its special GPIOs with negligible field of expansion up-front and negligible area of packing during runtime.

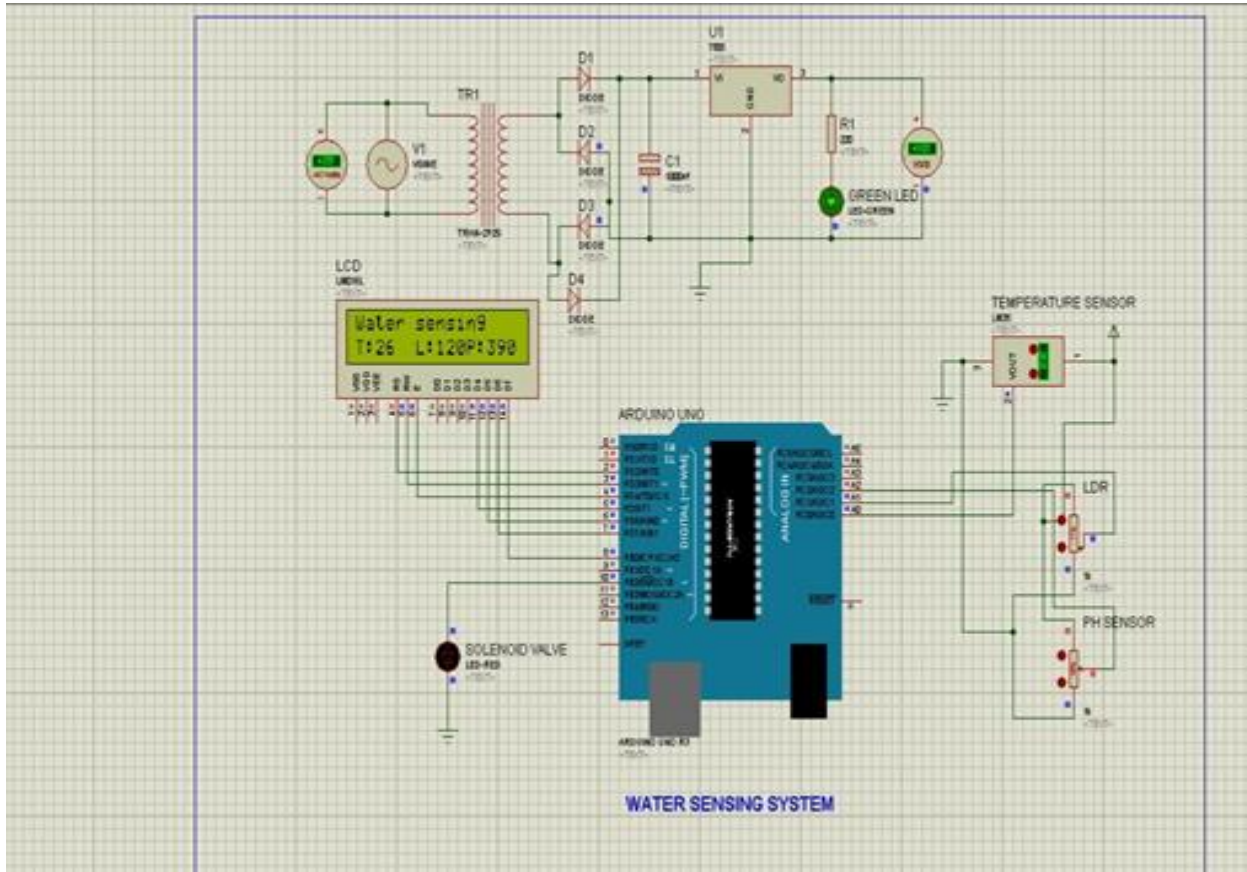
VII. WORKING PROCEDURE

Many advanced techniques has been introduced in agriculture automation to flourish and produce its full potential. This system designed by using arduino microcontroller to overcome the limitations of agriculture farming about supplying of water to plants by water analyser to usage of sewage water to enable ground water recharge.

VIII. EXPERIMENTAL SET UP



IX. SIMULATION OUTPUT & RESULTS



X. CONCLUSION

Irrigation has been the back bone of human civilization since man has started agriculture. As the generation evolved, many methods of irrigation to the land has been developed by the man. In the present world on conservation of water of high importance. Present work is attempts to save the natural resources available for human kind. Flow of the water can be controlled by monitoring the status of the soil. Water flow can be controlled by using the water analyser.

REFERENCES

1. United Nations. Global Sustainable Development Report – Executive Summary: Building the Common Future We Want. New York: United Nations Department of Economic and Social Affairs, Division for Sustainable Development. 2013. <http://sustainabledevelopment.un.org/globalsreport/>, last viewed November 2014.
2. HollandTrade, homepage: <http://www.hollandtrade.com/>, last viewed November 2014.
3. Association of Water Technologies, homepage: <http://www.awt.org/>, last viewed November 2014, 2014.
4. EU Water Framework Directive (Directive 2000/60/EC), 2000.
5. TRAGSA group home page: <http://www.tragsa.es/en/>, last viewed November 2014.
6. Arun Francis G, Dharani S K, Manikandan P, Monica R J and Vaishahi S K, “IoT Based Accident Identification

- and Alerting System”, International Journal of Pure and Applied Mathematics, vol.118, No.20, pp.547-551, 2018.
7. Arun Francis G, Sumanth M, Joy Priyadarshan R, Vimal S A, Vineeth K, “An IOT Based Monitoring and Control System For Environmental conditions and Safety in Home”, International Journal of Pure and Applied Mathematics, vol.118, No.20, pp.553-558, 2018.
8. Arun Francis G, V.Mithya, Balaji Venkatraman.S, Dhinesh Raja A.K, Masanadhurai.E, “Solution to Environment Disturbances using IoT (Making Alive)”, International Journal of Innovative Technology and Exploring Engineering (IJITEE), vol.8, Issue.5S, pp.406-409, April 2019.
9. G.Arun Francis, M.Dhinesh, J.Arok Lijo, P.Hariprasad, K.Balasubramanian, “IoT Based Vehicle Emission Monitoring System”, International Journal of Innovative Technology and Exploring Engineering (IJITEE), vol.8, Issue.5S, pp.410-412, April 2019.
10. Arun Francis G, Arulselvan M, Elangkumaran P, Keerthivarman S, Vijaya Kumar J, “Object Detection Using Ultrasonic Sensor”, International Journal of Innovative Technology and Exploring Engineering (IJITEE), vol.8, Issue.6S, pp.207-209, April 2019.
11. G.Arun Francis, M.Wilson Wilfred, R.Sekar, “Health Monitoring with Alcohol Detection and Ignition Control System using IoT”, International Journal of Innovative Technology and Exploring Engineering (IJITEE), vol.8, Issue.6S, pp.203-206, April 2019.

