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# **Automatic Irrigation System using Recycled Water through Smart Tube**

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**Abstract:** Every person needs food to survive in this world. Agriculture is main source to cultivate food crops, is mainly depends on irrigation. At present due to water crisis the agriculture production is proceeding low. The reason behind the lack of water is mainly global warming, an even rain fall in atmospear. For the improvement of crop production it needs lots of water. If you can see in every year, so much of purified water is wasting un usually. Recycling is the only way to purify this un cleaned water, that has been there in lakes and seas. A device is developed, usually termed as smart tube used to recycle the water and automatically spreads water on agricultural fields.

This system runs mainly using solar panels with nano solar cells. These solar panels with nano cells draw solar power and stores in aluminium ion battery. The aluminium ion battery is able to charge within seconds and the efficiency is more than other batteries. This device is fully automatic that can take decisions by using microcontroller (AT89C2051). Programmed is done in microcontroller by using java language. Humidity sensors are used in this system to detect the humidity levels in the soil. The unclean water is collected in sewage tank. Submersible motor is placed in sewage tank. Motor pumps the water from the sewage tank and sends to smart tube that cleans the water. The cleaned water is irrigated to agricultural lands using drip irrigation system.

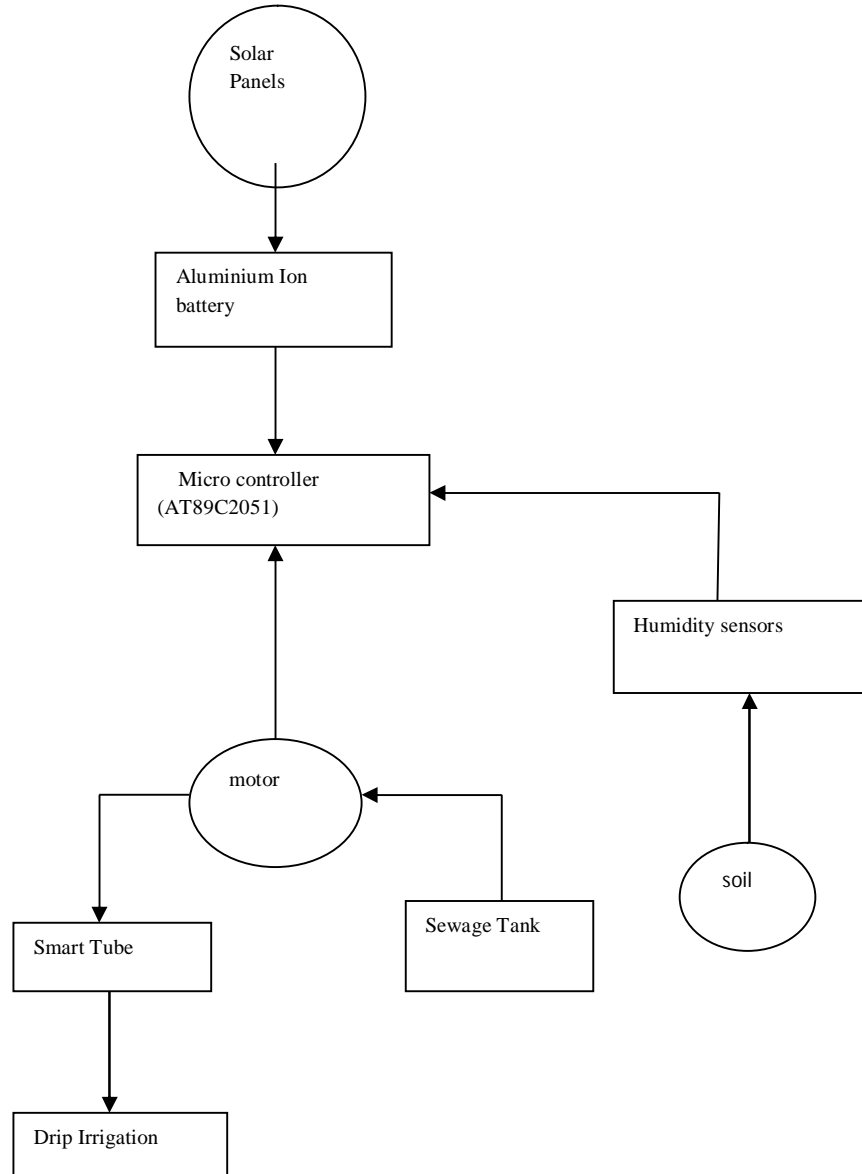
**Key Words:** Aluminium ion batteries, Drip irrigation, Smart tube, solar panels with nano solar cells, Submersible motor.

## **I. INTRODUCTION**

India economic mainly depend up on the agriculture systems but now a days the agriculture systems is not so efficient. The main important reason is a lack of rain due to the global warming and scarcity of water in a reservoir. The previous projects or systems were used ground water and that water is used to irrigate agricultural lands. Due to lack of feeding of agricultural land can be proceeding by wasted water. Wastage water can be obtained in many places. Screening process is the way to clean the water by removing the dust particles in wasted water. That has been done by introduce a new system i.e. Automatic Irrigation System through Smart Tube using Recycled Water. In this system solar panels with nano solar cells are used to obtain maximum power from the sun rays. To store solar power (current generated by nano solar panels) aluminium ion batteries are used. This aluminium ion battery can be charged in seconds and the efficiency of the aluminium ion batteries are more than other batteries. Humidity sensors are used to know the humidity or moisture content in the soil. The moisture content of the soil is given to the microcontroller (AT89C2051). Microcontroller is programmed by using java language. Microcontroller gives the signal according to the moisture content in the soil. The signal from the microcontroller gives to the submersible motor that pumps the water from the sewage tank. The water pumped by the motor is irrigated to agricultural lands through Drip Irrigation by passing smart tube. Smart tube is mainly used to clean the sewage water which is pumped by the motor

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### II. FLOW CHART OF AUTOMATIC IRRIGATION SYSTEM USING RECYCLED WATER THROUGH SMART TUBE



### III. DESCRIPTION OF COMPONENTS

#### A. Solar Panels

Photovoltaic modules are called solar modules and these solar modules convert solar energy into electrical energy. The most common material used in solar panel is silicon crystal. The photons strike on the silicon crystal then the electricity can be generated. Sun Light passes to the middle semiconducting ink layer, which breaks up the electrons. The molybdenum on the fourth layer acts as an electrode, and as the end of the circuit. The second layer is a P/N junction, which conducts the electrons through to the top layer. The top layer conducts the electrons and work as the beginning of the circuit. Solar panels working is shown in below

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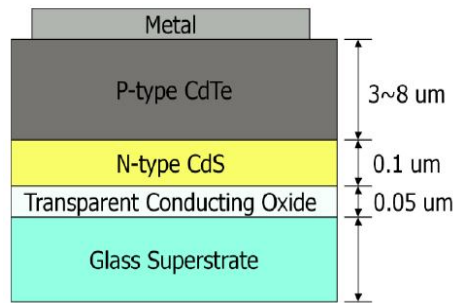


Figure 1

### B. Aluminium Ion Battery

Aluminium ion battery is one of the best type rechargeable batteries. The energy is generated by flowing aluminium ions from negative electrode of the battery (cathode) to the positive electrode of the battery (anode). The working of the this battery is shown in below figure 2.

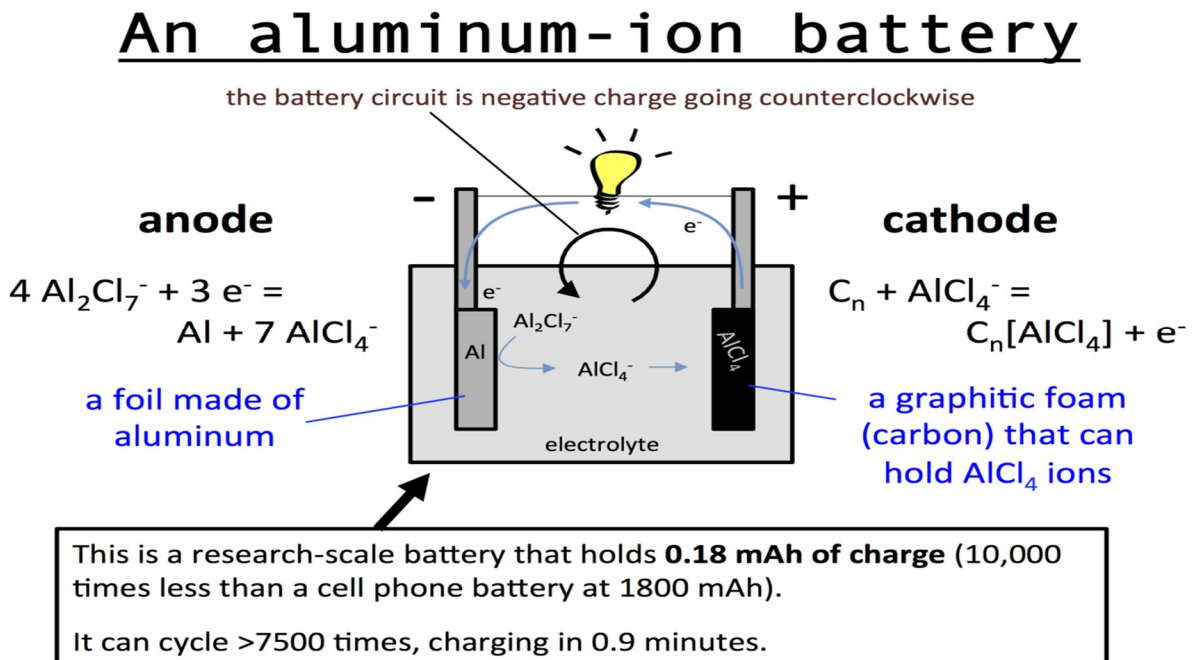


Figure 2

### C. Microcontroller

Micro controller is the main part of the Automatic Irrigation System using recycled water through smart tube. Microcontroller (AT89C2051) has 20 pins and 2.4MHZ 8bit microcontroller. The characteristics of this microcontroller is given below

- 1) 1.2k bytes of reprogrammable flash memory.
- 2) 2.7 to 6 V operating range.
- 3) Full static operation 0HZ to 24HZ
- 4) 128\*8 internal RAM.

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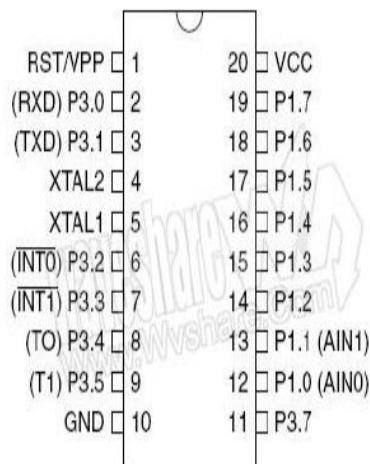


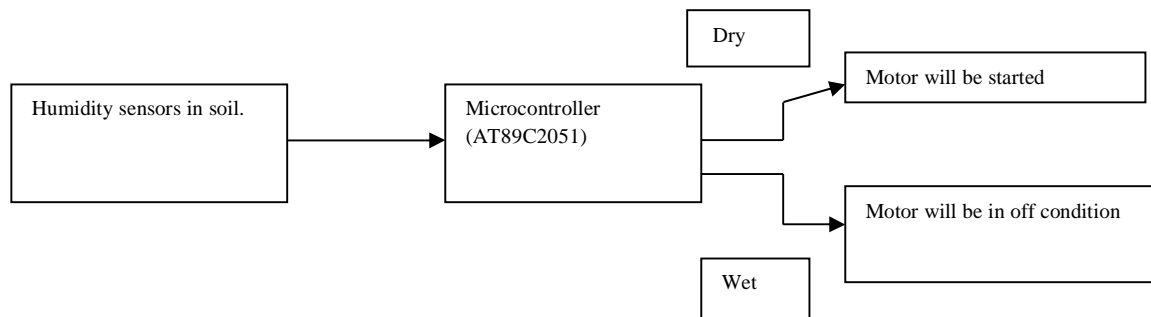
Figure 3 shows the block diagram of the microcontroller.

### D. Humidity Sensors

Humidity is the presence of water in air. Humidity sensors are placed in the soil. These humidity sensors detect the moisture content in the soil. Humidity sensors detects the moisture levels in the soil and gives instructions to the microcontroller and the starting or stopping the motor is based on the moisture levels The working of the moisture levels are given below flowchart . Humidity sensors are shown in figure 4.



Figure 4



### E. Submersible Motor

Submersible motor which place vertically under the water and the electrical input drive. It connects the pump body and motor at on the rating of a submersible motor is a 12v, 200rpm and 2.24A. Submersible motor is shown in below figure 5.

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### F. Smart Tube

Smart tube mainly consists of low pressure mercury vapor lamps. Low pressure mercury vapor lamp usually have quartz bulb to allow the short wavelength light. To clean the waste water we have to use synthetic quartz because the transparency of the quartz is increased and an emission line at 185nm is observed. The 185nm line will create ozone in oxygen, which helps in the cleaning process. Before entering in the tube the unclean water is screened and it is shown in below figure 6.

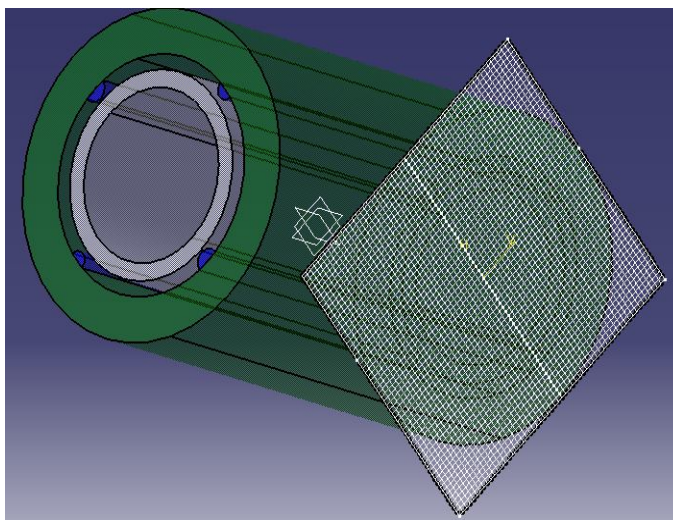


Figure 5

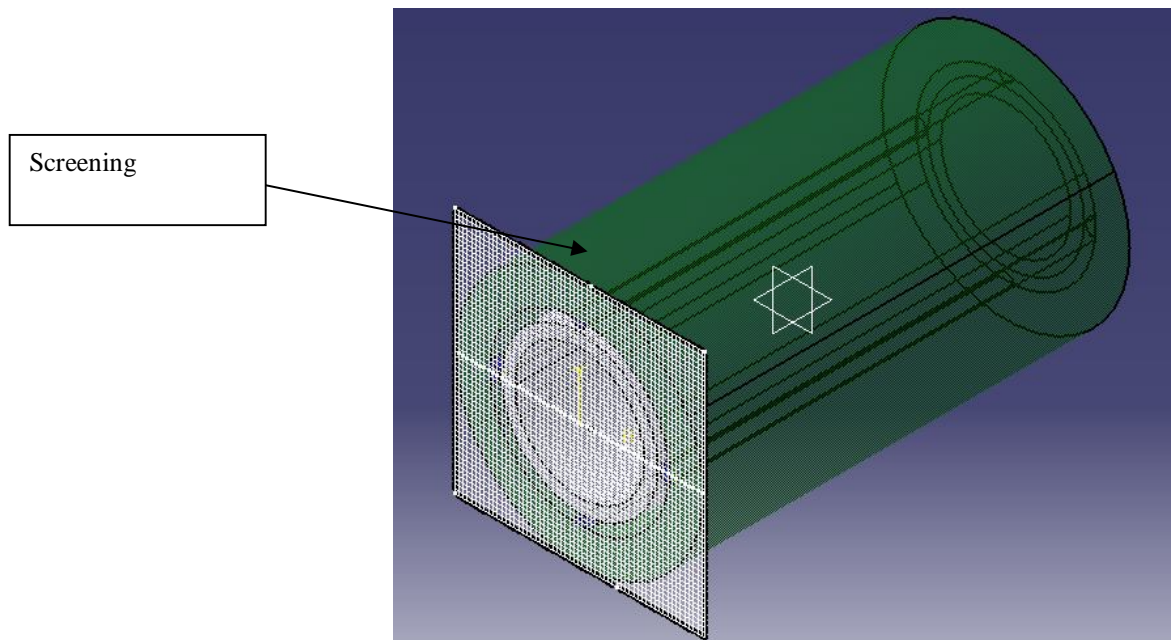


Figure 6

After screening process the water enters in to tube and in the tube the low pressure mercury vapor lamps are used to remove the bacteria from the water. The florescent tube is used below the low pressure mercury vapor lamp and florescent tube allows the uv-

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rays in to the water, so that ultraviolet rays removes the bacteria from the water. It is shown in below figure 7.

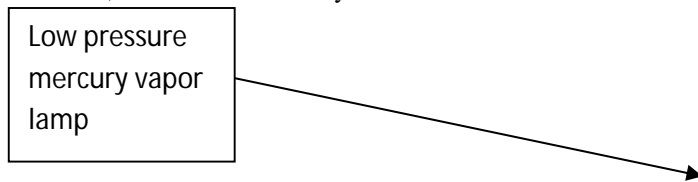
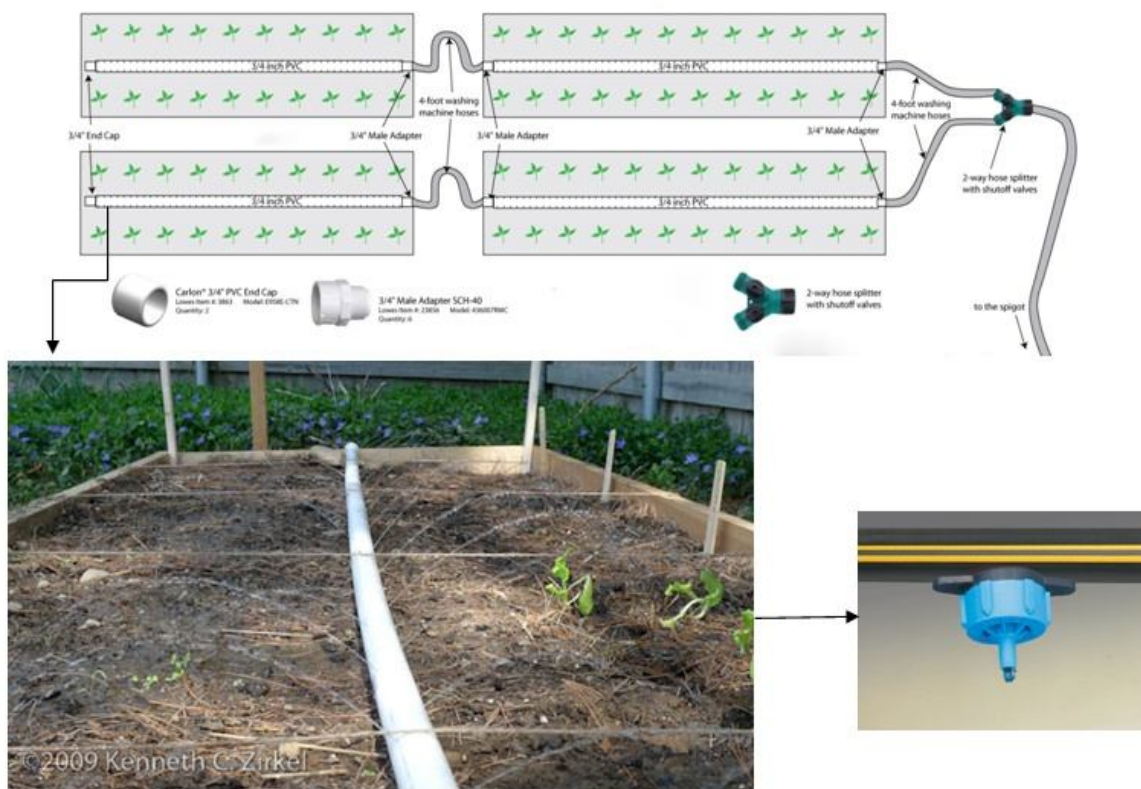


Figure 7

**3.7 Drip Irrigation:** It is one of the types of irrigation. drip irrigation method that saves water by allowing water into drip slowly to the roots of plants. This process is done through a network of valves, pipes, narrow tubes and emitters. The emitters are places internally in equal space holes made along the line. Drip irrigation is shown in below figure 8.



### IV. CONCLUSION

Irrigation is main important to the agriculture. In present days farmers are suffering due to lack of water. Due to lack of water the production of the agriculture is decreased and quality of the food also decreased. To solve these only way is using wastage water to irrigate agriculture lands, by using this technique Automatic Irrigation system using to recycled water through smart tube. In this system conventional power is used to remove power cuts. Humidity sensors are used in this system to use sufficient water to the plant. Drip irrigation is used to use only sufficient water to the plant. To clean wastage water by using UV rays in smart tube. According to the humidity levels (wet or dry), the motor will runs or not. So that there is no need for the farmer manually operations and the farmer can do the other activity also.

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