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RESEARCH ARTICLE OPEN ACCESS

Automatic Surface Drainage Using PCB

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Abstract:

Surface drainage is very useful in removing excess water from land to an artificial drainage system or natural watercourse in controlled manner and as quickly as possible. This must be done with no damage to the environment. Wet soil problems on dairy pasture are usually because of both excess surface and subsurface water. It is important to realize that surface drains will only remove surface water and, in most soil types, are almost useless for drainage the soil profile. In farming of agriculture land due consideration of drainage is a necessity to keep our crop efficiency satisfactory. In traditional method, ridge opening and using pipes to discharge the excess of water. In these project, automatic surface drainage system using PCB (Printed Circuit Board) to discharge excess of water.

Keywords **—removing excess water, no damage to environment, ridge opening and pipes, PCB (Printed Circuit Board), surface drainage.**

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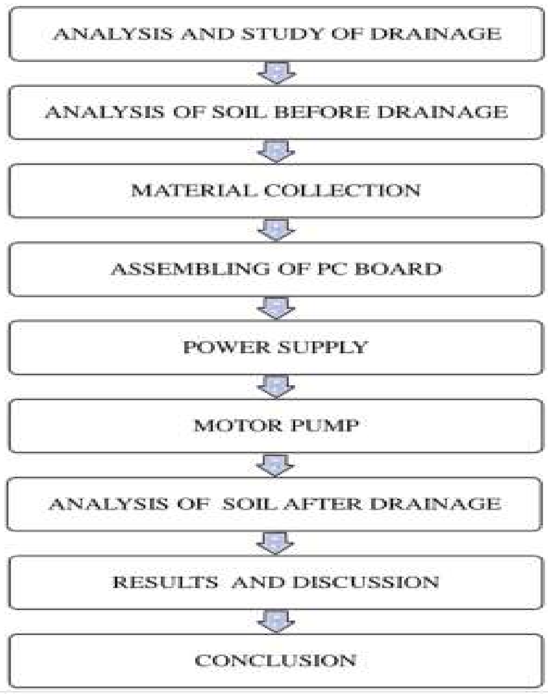
I. INTRODUCTION

Drainage is a reverse process of irrigation. It is broadly defined as the removal (disposal) of excess water from a land (usually agricultural land). The terms 'drainage', 'land drainage', 'agricultural drainage' and 'field drainage' are used as synonyms in practice. Since drainage (land drainage) is necessary not only for the removal of excess surface water or groundwater but also for removing salts from the soil, a precise definition of drainage has been given by the constitution of the International Commission on Irrigation and Drainage According to ICID, "Land drainage is the removal of excess surface and subsurface water from the land to enhance crop growth, including the removal of soluble salts from the soil."

Our main objectives are,

- To design a surface drainage system for farmland.
- To conserve and prevent the soil quality and soil from drainage.
- To remove the excess water.

II. METHODOLOGY



The purpose of the project is to automatically switching on and off of the motor by using Printed Circuit Board which drains the surface water. Based on the analysis over the project, the excess water has been removed and also conclude that the project reduces the water logging condition, soil alkalinity, soil physical condition. This project will be more useful forthe farmers who are facing water logging condition.

Analysis of the soil in the land before removal of excess water from the field and analysis the soil in the land after removal of excess water from the field.Soil analysis is used to determine the level of nutrients found in a soil. The most common soil analysis method is composite method.The automatic water level controller has been successfully designed in proto type. The submersible pump is turned off and on according to the water levels. Compared to other conventional methods, the automatic water level controller shows excellent performance with its reliable technology and it is cheaper and durable.The automatic water level controller is a promising controller in terms of system response in water level control with respect to the non-linearity introduced by pumps and sensors. The experimental model was made according to the circuit diagram and the results were as expected. The motor pump switched OFF when the OHL was about to go dry and switched ON when the OHL was about to wet.we have observed that the time taken by the control circuit to stop and start the motor when water reaches its predetermined level is about 0.5 sec.

III.FIELD LEVEL IMPLEMENT

The automatic water level controller has been successfully designed and developed in field level. The submersible pump is turned off and on according to the water levels. The motor pump switched OFF when the OHL was about to go dry and switched ON when the OHL was about to wet. During our project work session, we have observed that the time taken by the control circuit to stop and start the motor when water reaches its predetermined level is about 0.5 sec. our project involved designing and development of automatic water level control system had exposed to the better way of software and hardware architecture that blends together for the interfacing purposes.

WORKING PRINCIPLE

STEP I (Operation of regulated power supply)

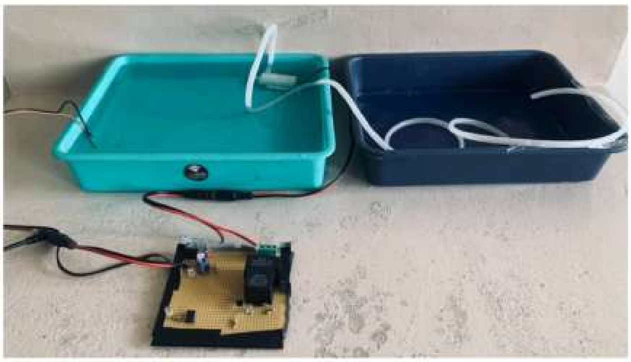
Firstly, 230V AC is given to the input of step-down transformer (l2V). This 12V AC fed to bridge circuit such as it gives the output 12V DC. Now this DC gives to the input of voltage regulated IC555 which Provide 5V as output.

STEP 2 (Operation of control circuit)

We know the property of 555 timer its outputgoes HIGH when voltage at the 2nd pin (trigger pin) is less than 1/3 Vcc.

Also, we can reset back the IC by applying a Low voltage at the 4th pin (Reset pin).

Here 2 wires are dipped in field. Let us define one for Top (High) level. Other for thewire or probe is from Vcc.



Prototype

Field Level Implement

On a final note, the conventional controllers in market mostly use capacitive sensors and microcontrollers. These increase the cost as well as the complexity of the system. We have developed a rather simpler but efficient model of a water level controller.

Analysis of the soil in the land before removal of excess water from the field and analysis the soil in the land after removal of excess water from the field.Soil analysis is used to determine the level of nutrients found in a soil. The most common soil analysis method is composite method.

The DSMs created from high resolution optical data such as ALOS are suitable for hydrological analysis. It is remarkable that ALOS can provide very accurate spatial data. The editing and processing of the DSM in order to ameliorate its vertical accuracy may lead to the worst result in automatic drainage. It gives a worst result and depends on satellite. So, we use Printed Circuit Board (PCB) to overcome this problem

RESULT

PARTICULARS	BEFORE DRAINAGE	AFTER DRAINAGE
Soil pH	7.16	7.63
EC (dS 1m)	0.459	0.083
Organic carbon (%)	0.39	0.52
Available Nitrogen (kg/ha)	263	276
Available Phosphorous (kg/ha)	25.65	11.24
Available Potassium (mg/kg)	142	177
Available Sulphur (kg/ha)	12.36	15.21

From this table, we found that the soil parameters are changed due to water-logging Condition. Also, found that the soil is conserved by draining the excess water from the field. As we discussed that the project is very useful to maintain the nature of the soil profile, soil quality, soil fertility.

The automatic water level controller has been successfully designed and developed. The submersible pump is turned off and on according to the water levels. Compared to other conventional methods, the automatic water level controller shows excellent performancewith its reliable technology and it is cheaper and durable. The automatic water level controller is a promising controller in terms of system response in water level control with respect to the non-linearity introduced by pumps and sensors. The experimental model was made according to the circuit diagram and the results were as expected. The motor pump switched OFF when the OHL was about to go dry and switched ON when the OHL was about to wet. During our project work session, we have observed that the time taken by the control circuit to stop and start the motor when water reaches its predetermined level is about 0.5 sec.

The purpose of our project is automatically switching on and off of the motor by using Printed Circuit Board which drains the surface water. Based on the analysis over our project, the excess water has been removed and also conclude that the project reduces the water logging condition, soil alkalinity, soil physical condition. This project will be more useful for the farmers.

This project has achieved the main objectives. Moreover, our project involved designing and development of automatic water level control system had exposed to the better way of software and hardware architecture that blends together for the interfacing purposes. The system employs the use of advance sensing technology to detect the water level.

This system is very beneficial in rural as well as urban areas. It helps in the efficient utilization of available water sources. If used on a large scale, it can provide a major contribution in the conservation of water for us and the future generations. Automatic water level monitoring system has a good scope in future especially for agriculture sector. There are any areas where we need water level controller. It could be useful for agricultural fields.

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