

## **Smart Irrigation Control System**

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### **Abstract**

This paper focuses on the effective irrigation and prevention of water wastage in uncontrolled irrigation. New irrigation electrical control technologies could improve irrigation efficiency, promoting water conservation and reducing the environmental impacts. The objectives of this project were to avoid wastage of water and increase irrigation efficiency by using a PLC based irrigation system with the help of soil moisture sensor, water level sensor, and GSM controller. It also improves the traditional irrigation system enabling the irrigation system to have high efficiency and low water usage. The existing irrigation system is tedious, time consuming and very wasteful in water usage. This PLC based sprinkler irrigation system gives the best feature than the traditional one.

### **1. Introduction**

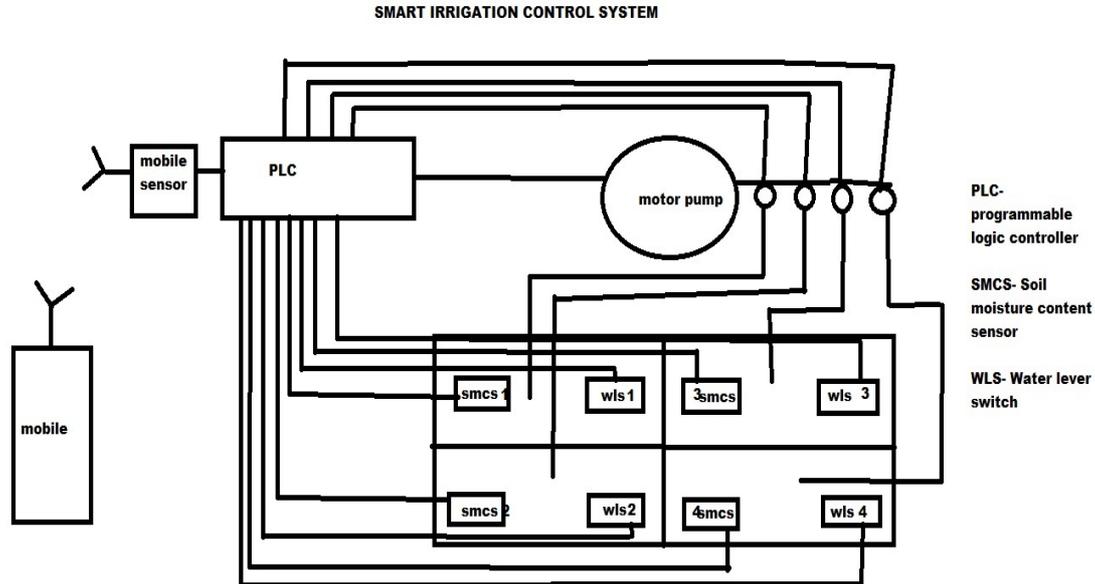
Today water has become one of the most precious resource on the Earth and one of the most important factors in agriculture is water availability. Water availability is also a critical variable for virtually every other economic activity, including industry, the energy sector, and public use. In recent years, water availability has become an issue. To schedule irrigation properly, a grower must know the environmental demand for surface water. Knowledge of exact amount of water required by different crop in a given set of climatological condition of a region is great help in planning of irrigation scheme, irrigation scheduling, effective design and management of irrigation system. This is achieved by use of irrigation controllers.

Many types of irrigation controllers have been developed for automatically controlling application of water to landscapes. Known irrigation controllers range from simple programmers are based upon fixed schedules. With respect to the simpler types of irrigation controllers, farmers, Municipalities and commercial owners of green areas typically set a watering schedule that involves specific run-times and

days, and the controller executes the same schedule regardless of the season or weather conditions. From time to time a technician may manually adjust the watering schedule, but such adjustments are usually only made a few times during the year, and are based upon the technicians perceptions rather than actual watering needs. One change is often made in the late Spring when a portion of the plants become brown due to a lack of water. Another change is often made in the late Fall when the homeowner assumes that the vegetation does not require as much watering. These changes to the watering schedule are typically insufficient to achieve efficient watering.

The purpose of this work is to develop autonomous irrigation systems that use every day climate criterion to adapt daily irrigation depths to plant needs. Criteria such as temperature, total radiation and total wind can be measured directly by PLCs which then adapt the irrigation schedule to the observed conditions, leading to a reasonable saving in the amount of irrigation water. Thus, this work intends to develop a cost-effective irrigation controller that is adaptive to daily climate conditions, without the need for expensive sensors and costly weather-stations. It must also be reliable and easily deployable in order to work under harsh outdoor conditions without the need for supervision or regular monitoring.

## 2. Block Diagram of Smart Irrigation Control System



## 3. Comparison between Existing Irrigation Technology and Smart Irrigation Control Technology:

- a. Existing irrigation controllers are based on fixed schedule. Farmers, Municipalities and commercial owners of green areas typically set a watering schedule that involves specific run-times and days, and the controller executes the same schedule regardless of the season or weather conditions. From time

to time a technician may manually adjust the watering schedule, but such adjustments are usually only made a few times during the year, and are based upon the technicians perceptions rather than actual watering needs. Smart irrigation control technology is based on everyday climate criterion and actual water need of plant. In this technology irrigation occurs when the water is required by plant. It supplies only that amount of water to the plant as plant needs.

- b. In conventional irrigation control technology, irrigation is done in the way in which large amount of underground or surface water is wasted. In smart irrigation control technology irrigation is done in a manner in which there is very little chance of water wastage.
- c. The simple irrigation control technology don't consider the plant productivity which is not based on efficient irrigation. It is based on perception of technician. The smart irrigation control technology consider all the aspects of plants related to water irrigation. It is based on efficient irrigation.
- d. Smart irrigation control technology is easily deployable and can be controlled manually or automatically without physical presence at the system or field. In existing technology these kind of facilities are not easily available.
- e. With respect to features and life of smart irrigation controller the cost is acceptable for every kind of farmers, municipalities and commercial green area authorities.

#### **4. Conclusion**

New irrigation electrical control technologies could improve irrigation efficiency, promoting water conservation and reducing the environmental impacts. The objectives of this project were to avoid wastage of water and increase irrigation efficiency by using a PLC based irrigation system with the help of soil moisture sensor. It also improves the traditional irrigation system enabling the irrigation system to have high efficiency and low water usage. The existing irrigation system being tedious, time consuming and very wasteful in water usage. The PLC based sprinkler irrigation system gives the best feature than the traditional one.

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