**S.A.R.I.B.O.**

***(Systematic and Automated Regulation of Irrigation systems for***

***Backyard farming Operations)***

An Arduino-based Internet-of-Things Irrigation System designed for Backyard Farming

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**Background:**

Nowadays, technology has grown widely. No doubt that we are actually living in the age of technology. Technology had become an important part of our life. It increases the task an individual does in a way that a certain individual can perform various task simultaneously. The continuous increased in automation also increases the flexibility regarding work times. These inventions widely affect and changes the lives of many, it takes everyone to a new level of living.

According to House Bill No. 1718 introduced by Hon. Rozzano Rufino B. Biazon, agriculture is the traditional backbone of Philippine economy and is the principal source of employment employing almost half of the total labor force. It has been considered as a major industry source of the Philippines. However, the farmers were observed to use the traditional way of farming instead of adapting new agricultural technologies which made the agribusiness farms productive and profitable, the bill states.

Furthermore, in order for the Philippines to become a progressive, industrialized nation, it should have strong and highly productive agricultural sector. Its strength and productivity, however lies on the empowerment of the majority of the farmers and the promotion of the development of the cutting-edge agriculture technologies which enables the country to become highly competitive in the international market.

This bill is in response to the strongly felt need to integrate research and development and technology generation and transfer into a single coherent and harmonious national system dedicated to the socio-economic well-being of the farmers and to the development of the nation. It aims to transform traditional peasant agriculture to modern highly productive agriculture through generation and transfer of more productive and useful technologies of farming and rural living.

A sustained expansion of the national economy requires growth in the agricultural sector. We must transform our farmers into resource of renewed national vigor and creativity in our drive for global competitiveness.

Consequently, there is an urgent need to create strategies based on science and technology for sustainable use of water. Industrialist and researchers are working to build efficient and economic automatic systems to control water usage in order to reduces much of the wastage. Irrigation is an artificial application of watering the land for agricultural production. The requirement of water to the soil depends on soil properties such as soil moisture and soil temperature. Effective irrigation can influence the entire growth process and automation in irrigation system using modern technology can be used to provide better irrigation management. In general, most of the irrigation systems are manually operated. These traditional techniques can be replaced with automated techniques of irrigation in order to use the:

Internet of Things: Usage and Application of water efficiently and effectively. Conventionally, farmers will present in their fields to do irrigation process. Nevertheless, nowadays farmers need to manage their agricultural activity along with other occupations.

Due to the various task a person needs to do in a daily basis, monitoring and watering of plants too exhausting. Whenever we go out of town for a few days, we always used to worry about our plants as they need to be watered on regular basis. It is for the reason that we all know that plants need to be watered in order for it to thrive.

The researchers came up with a solution to automate the watering process so that farmers, gardeners, hobbyists, plant collectors will not worry about watering or getting up early in bed to just to water his/her plants. This will promote backyard farming or gardening for easy monitoring and maintenance of the plot and the plants planted on it. This could lessen the effort and time of the user to maintain and water the plants.

A system will be developed and implanted that will automatically manages and controls the watering process. The system includes a reservoir or a tank where water is being stored when main source of water is unavailable. The user will be notified based from his/her preferences and interaction with the system.

**Problem Analysis:**

Farming has been one of the major sources of income among various towns. Wherein Philippines is considered to be an agricultural country, considering the fact that our country relays heavily in agriculture.

According to the House Bill No. 1718, It has been said that, agriculture is the traditional backbone of Philippine economy. And it is said that, it is a principal source of employment, employing almost half of the total labor force. It has been considered as a major industry source of the Philippines.

However, the farmers were observed to use the traditional way of farming instead of adapting new agricultural technologies, which made the agribusiness farms productive and profitable.

So, farmers can use the inventions of agricultural technology in order for it to maintain the growth of its crops and even in maintaining the supply of the water whenever there are weather interruptions or any other occurrence might come along.

After identifying the problems, opportunities, objectives, and constraints throughout the making of the study, a matrix has been made.

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| **Project:** | Hydra: Automated Plant Watering System | | **Project Manager:** | Roy Joseph B. Argumido | |
| **Created by:** | Jemaima D. Depanzo | | **Last Updated by:** | Rica S. Bohol | |
| **Date Created:** | February 26, 2020 | | **Date Last Updated:** | March 3, 2020 | |
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| **CAUSE-AND-EFFECT ANALYSIS** | | | **SYSTEM IMPROVEMENT OBJECTIVES** | | |
| **Problem or Opportunity** | | **Causes and Effects** | **System Objectives** | | **System Constraints** |
| Fetching water from the source requires too much effort. | | Farmers well be exhausted, and it would cause them to work lesser than the average due to the fact that they were already tired from fetching water to the field. | Eliminate or reduce the throughput or the amount of work being performed in fetching water. | | The availability of the water source in terms of the distance of the water source to the site. |
| Storing and refilling of water to the water tank requires too much effort. | | Farmers will extend too much effort in refilling their tank and storing water which may lead them to some type of illnesses and as a result they couldn't take good care of their plants. | Eliminate or reduce the throughput or the amount of work being performed in storing water. | | The availability of the water source in terms of weather conditions especially during dry seasons. |
| Watering the plants requires too much effort. | | Farmers will be tired in a way that they need to water the plants one by one each day and they may not be able to do other things aside from focusing on the plants. | Eliminate or reduce the throughput or the amount of work being performed in watering the plants. | | The amount of work needed in watering the plants are considerably higher. |
| Farmers, gardeners, plant hobbyists or people that had a backyard farm or garden needs to constantly go to the site to check for the dryness of the soil. | | Farmers cannot do any other thing aside from taking care of their plants, wherein as a person we all have different obligations or task to do aside from focusing on plants. | Eliminate or reduce the throughput or the amount of work being performed in measuring or detecting the dryness of the soil. | | Failure to detect the accurate dryness of the soil when watering the plants. |

Update User

Add user

Notification

Data Logger

Time Management

Relay

Water flow Rate

Network Reading

Data Logger

Network

Time Management

Power Management

Water flow Rate

Soil Moisture Checking

fill

efill

Tank Refill

Drain

Overflow

Tank Refill

fill

efill

Tank Refill

Distribution Discharge

**Hydra: Automated Plant Watering System**

Root Management

Leaf Management

Tank Management

Account Management