EVAPOTRANSPIRATION (ET)-BASED IRRIGATION SYSTEM WITH INTERNET OF THINGS (IOT) INTEGRATION FOR SMART FARMING APPLICATION ADDRESSING THE ASEAN IMPENDING WATER CRISIS

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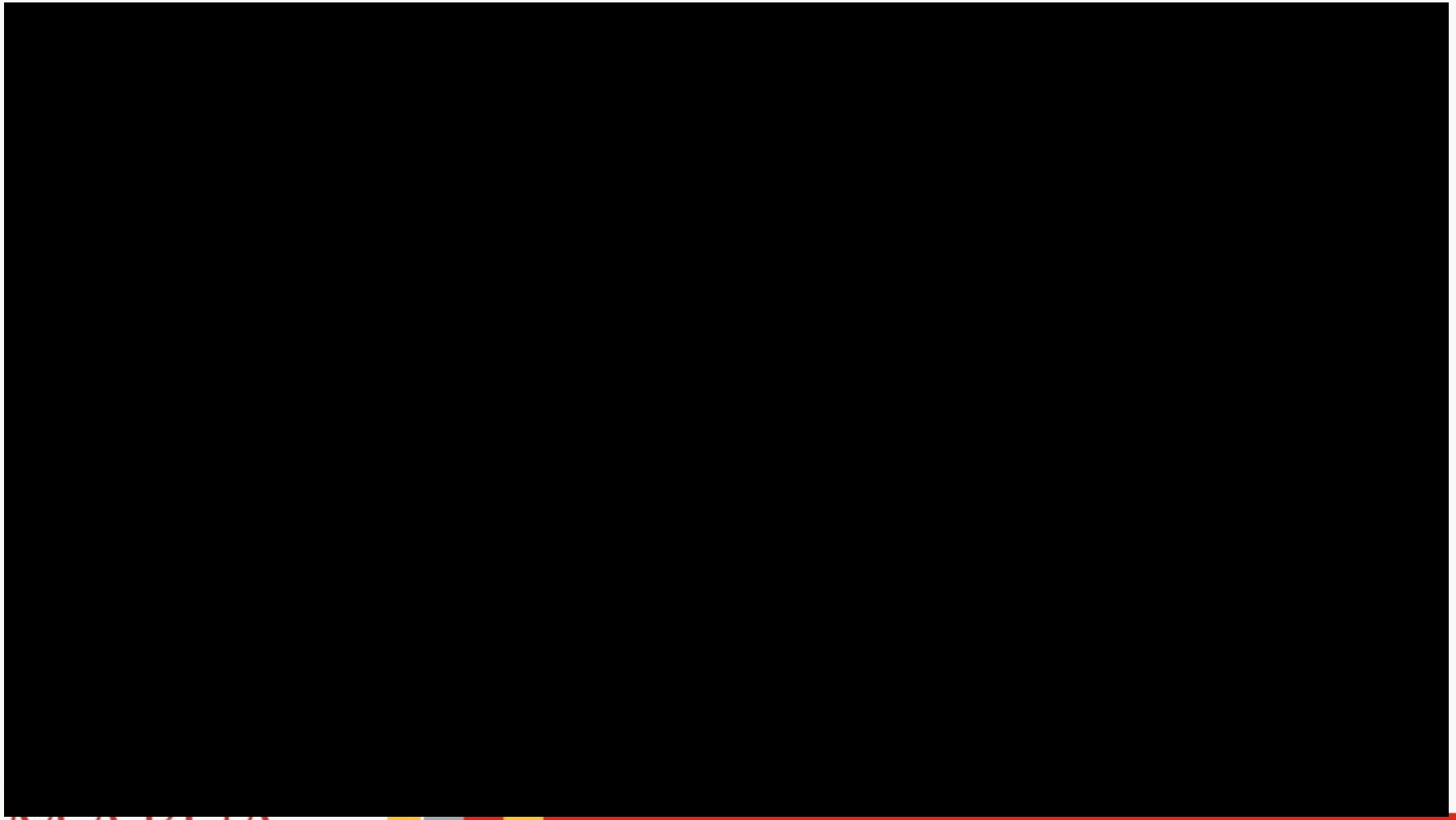
Overview

- Water required for crop growth is supplied by rainfall and/or irrigation. In Philippines, rainfall is characterized by high spatial and temporal variability, requiring agricultural producers to use irrigation to supplement rainfall during dry periods.
- Alternative Methods are needed to know the timing and amount of irrigation water applied to supplement rain water.
- With the growing interest in the field of Information and Communications Technology (ICT) particularly in the area of Internet of Things and sensor technology a lot of studies are being done in Precision Agriculture/Smart Agriculture.

Background and Motivation



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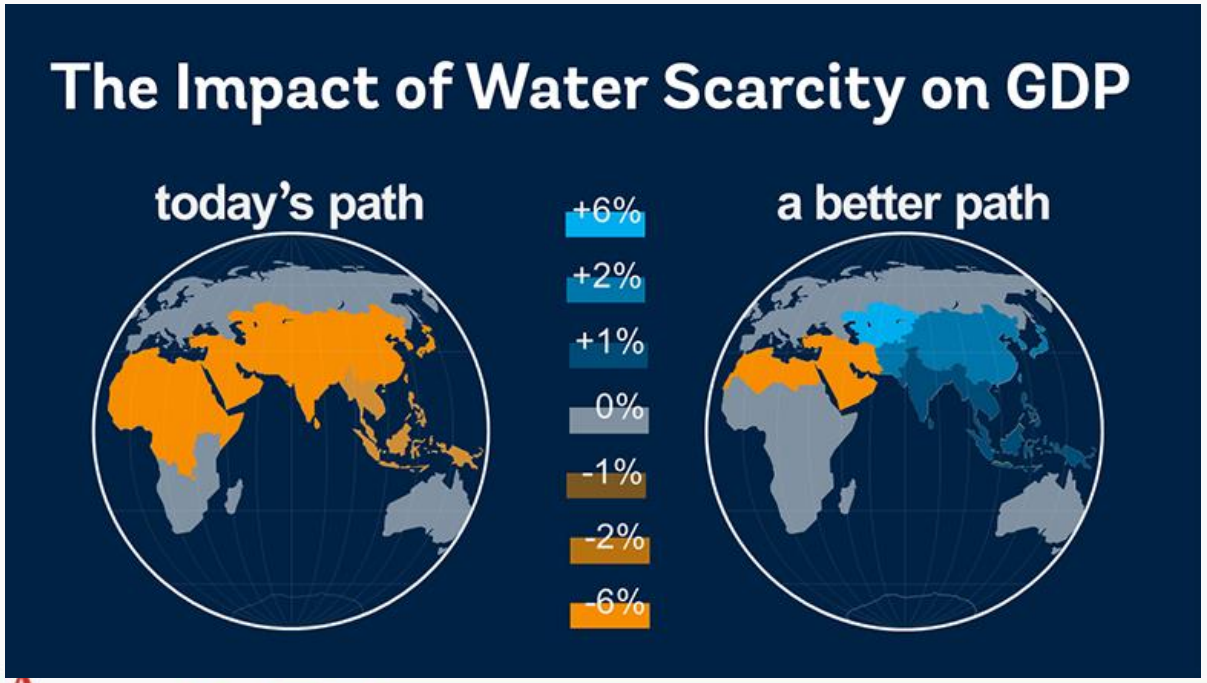
"We can't control how much rain falls, but we can control how water gets used, and move towards the world of resilience in a face of a changing climate"



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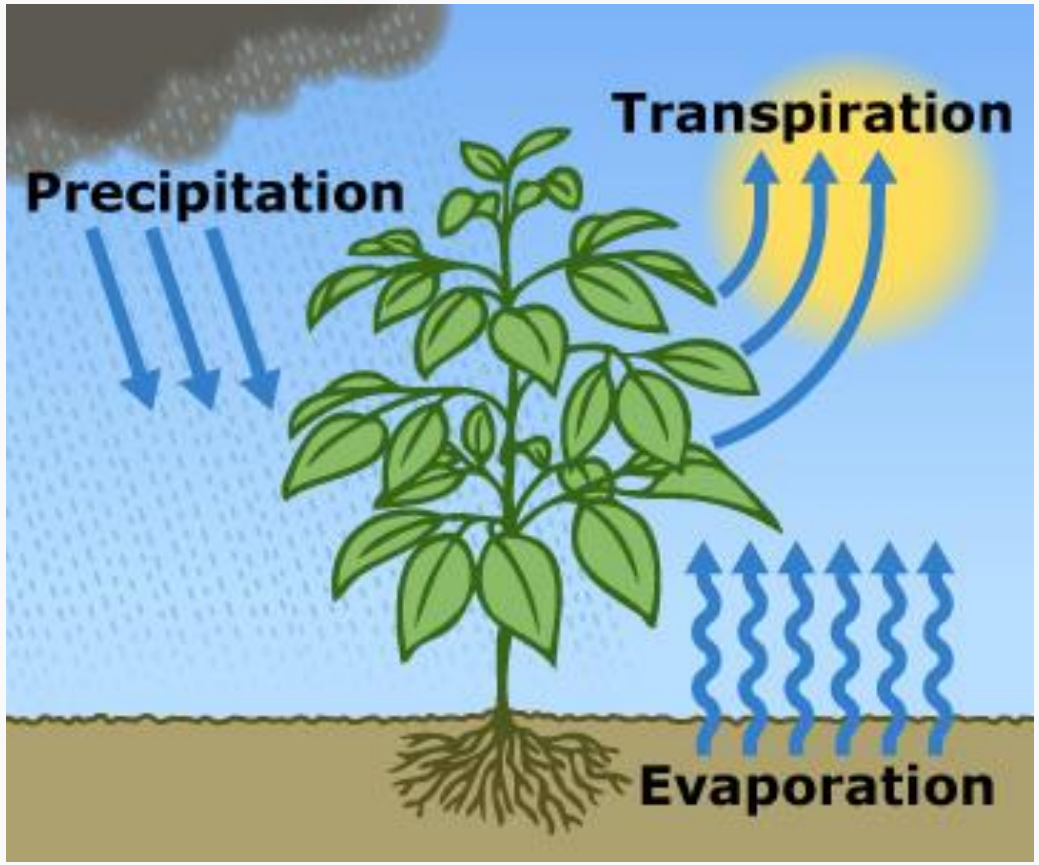
- Agricultural irrigation is the largest user of fresh water in Philippines accounting for 82% of the overall fresh water withdrawals [1]. In order to meet industrial water needs, reducing water used for irrigation is actually predominant not just in other countries but also here in the Philippines.
- The motivation for this type of water savings is usually not an absolute shortage of water but a desire to use the available water not for irrigation but for other purposes.

What is Evapotranspiration

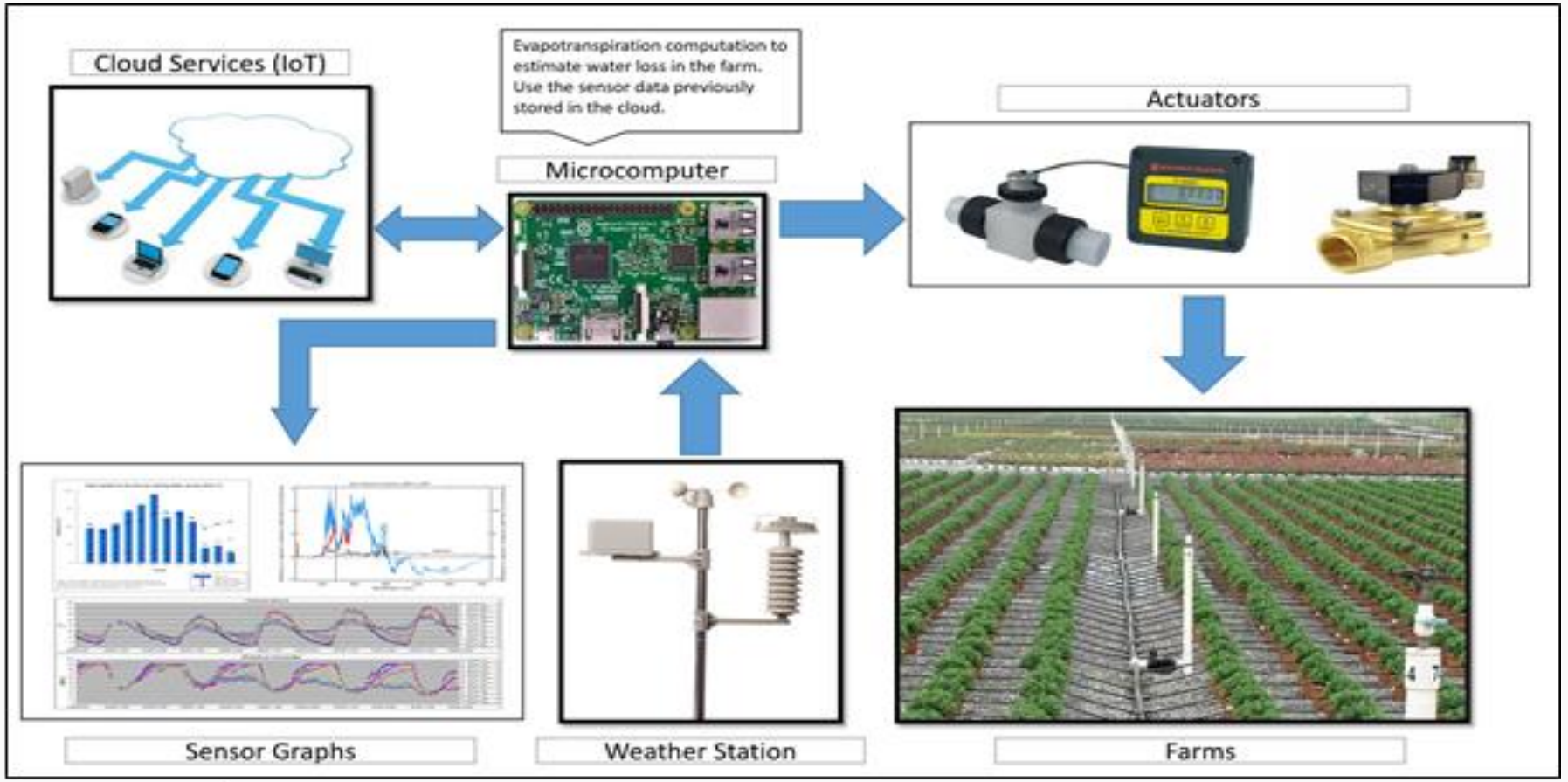
- Evapotranspiration is the sum of evaporation from the land surface plus transpiration from plants. Precipitation is the source of all water.



Objectives

- General Objective
  - The main objective of this project is to evaluate the suitability of evapotranspiration (ET)-based irrigation scheduling technologies for agricultural applications
- Specific Objectives
  - specifically, the ability of the technologies to:
    - apply the appropriate amount of water at the appropriate time, using the estimated reference ET (ETo) in a particular field.
    - Development of the main controller of the system which serves as the heart and brain of the system. It controls the storage of sensor data from the sensor module to the cloud storage.
    - Development of the sensor module for the monitoring of the environmental data will then be used in the estimation of water loss in the farm by the computation of the evapotranspiration and will then be the basis for control of the actuators to irrigate the farm based on the computed amount of water loss.

System Block Diagram



Significance

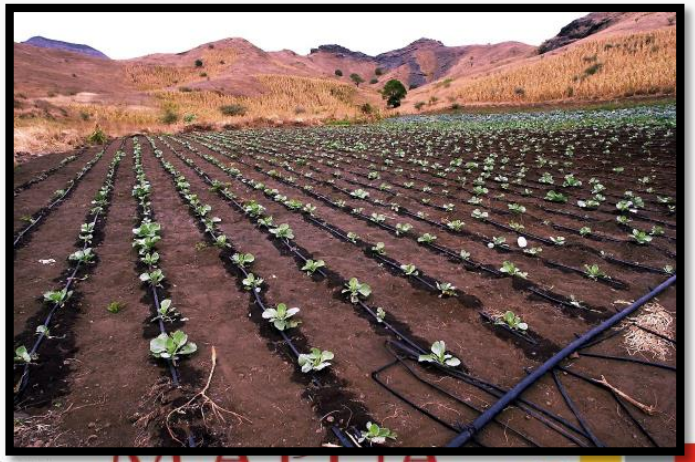
- With the implementation of the ET-based Irrigation System, it can be an alternative way of scheduling irrigation which can lead to optimal irrigation water use. With this, it is expected to save significant amount of water in irrigation.
- This information can be used by growers and their advisers to understand daily crop water use for scheduling irrigations and to determine the amount of water to apply to replenish soil water depletion.
- Also, this information can be utilize in the design and implementation of an ET-based Irrigation Scheduling Controller that farmers and Growers need not to understand the underlying concept about ET.

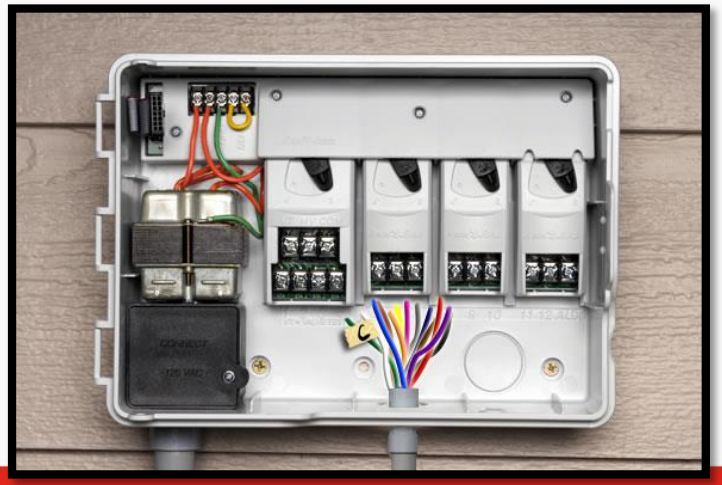
WorkPlan

1st Year Work Plan

Materials and Equipment

List of Materials (Partial)





The Team

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Site Visit (Central Luzon State University)

- A Visit in Central Luzon State University , CLSU (June 30, 2017)

Conference Call (Meeting)

August 8, 2017

Kick off Meeting, JB Malaysia (Oct. 16, 2017)

Site Visit (UTM Malaysia)

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Photo/Image Resources

- https://www.growingyourbaby.com/teaching-kids-to-conserve-for-world-water-day/world-water-day/
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