# Drip Irrigation Technology through Wireless Sensor Network (WSN) using Message Queuing Telemetry Transport (MQTT) Protocol for Peanut (PN9) Production

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# INTRODUCTION

The adaptation of Precision Agriculture (PA) technology

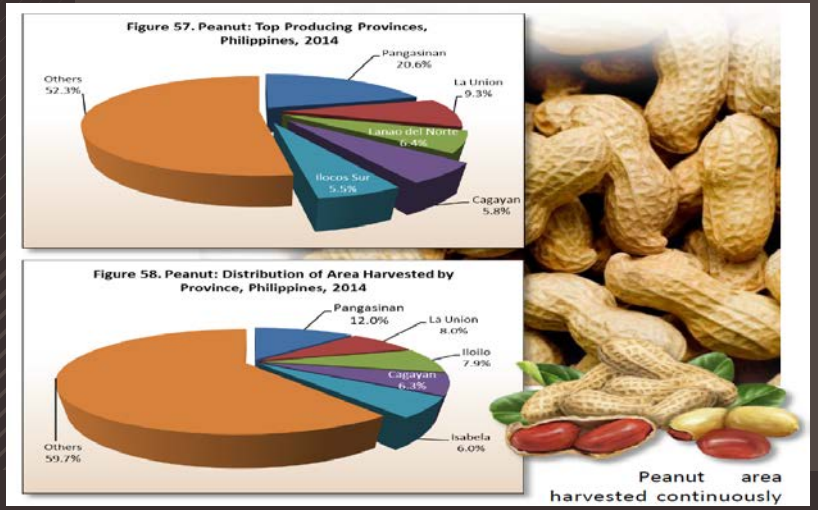
INCREASE PRODUCTION

UTILIZE RESOURCES

INCREASE QUALITY

INCREASE NET RETURN

# THE PROBLEM



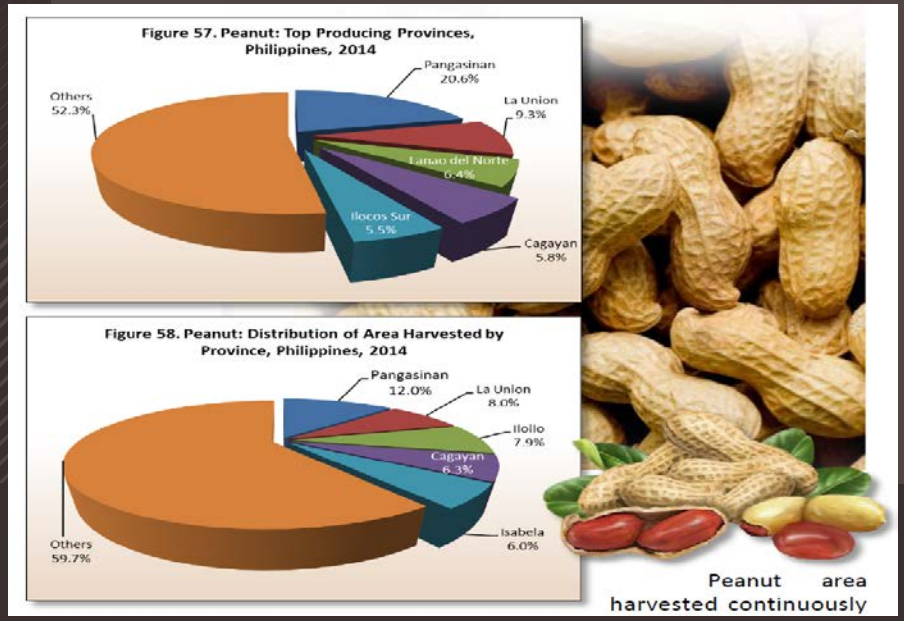

downward trend
average annual rate of

0.4%

harvested continuously
decreased average annual rate of

2%

# THE PROBLEM




Ilocos Norte produces the lowest volume.

it compose only of 7,439 hectares **15.03%** of area harvested out

# Statement of the problem

The main problem in growing peanut plant is the usual irrigation practice used by local farmers .

1

Schedule of irrigation and proper amount of water to irrigate are not being utilized

2

Soil parameters and other factors are not always being monitored.

3

Deprive of water during the growing season, it may reduce fruit development

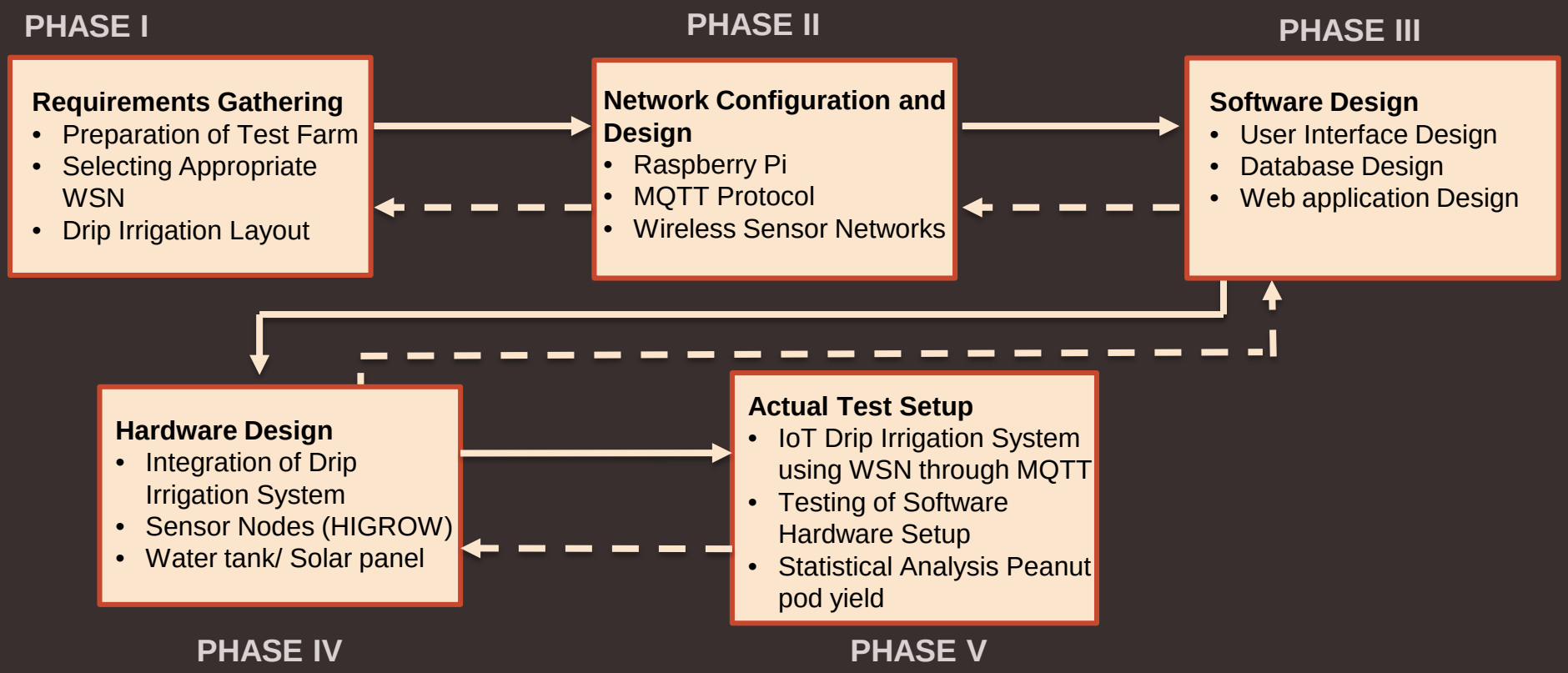
4

Excessive water can cause excessive growth and greater leaf area index

# Objectives

- design and develop an Internet of Things (IOT) based drip irrigation (DI) technology using Raspberry Pi
- control and monitor the sensor nodes using Message Queuing Telemetry Transport (MQTT) Protocol
- establish peanut pilot-test farm equipped with the developed system
- determine the pod yield of the drip system over manual farming

# PROCEDURE


PHASE I
Requirements Gathering
• Preparation of Test Farm
• Selecting Appropriate WSN
• Drip Irrigation Layout
PHASE II
Network Configuration and Design
• Raspberry Pi
• MQTT Protocol
• Wireless Sensor Networks
PHASE III
Software Design
• User Interface Design
• Database Design
• Web application Design
Hardware Design
• Integration of Drip Irrigation System
• Sensor Nodes (HIGROW)
• Water tank/ Solar panel
PHASE IV
Actual Test Setup
• IoT Drip Irrigation System using WSN through MQTT
• Testing of Software Hardware Setup
• Statistical Analysis Peanut pod yield
PHASE V

# CONCEPTUAL FRAMEWO

## INPUT

WIRELESS SENSOR NODE DATA INPUTS FROM PEANUT FARM & MANUAL CONTROL INPUT OF SOLENOID VALVE THROUGH MQTT

- SOIL MOISTURE
- SOLENOID VALVES

## PROCESS

COMPARE READINGS OF SOIL MOISTURE TO THE THRESHOLD VALUE

READ SOLENOID VALVE STATUS FROM PRESENT SOIL MOISTURE READING

DRIP WHEN MOISTURE IS BELOW THE SETPOINT

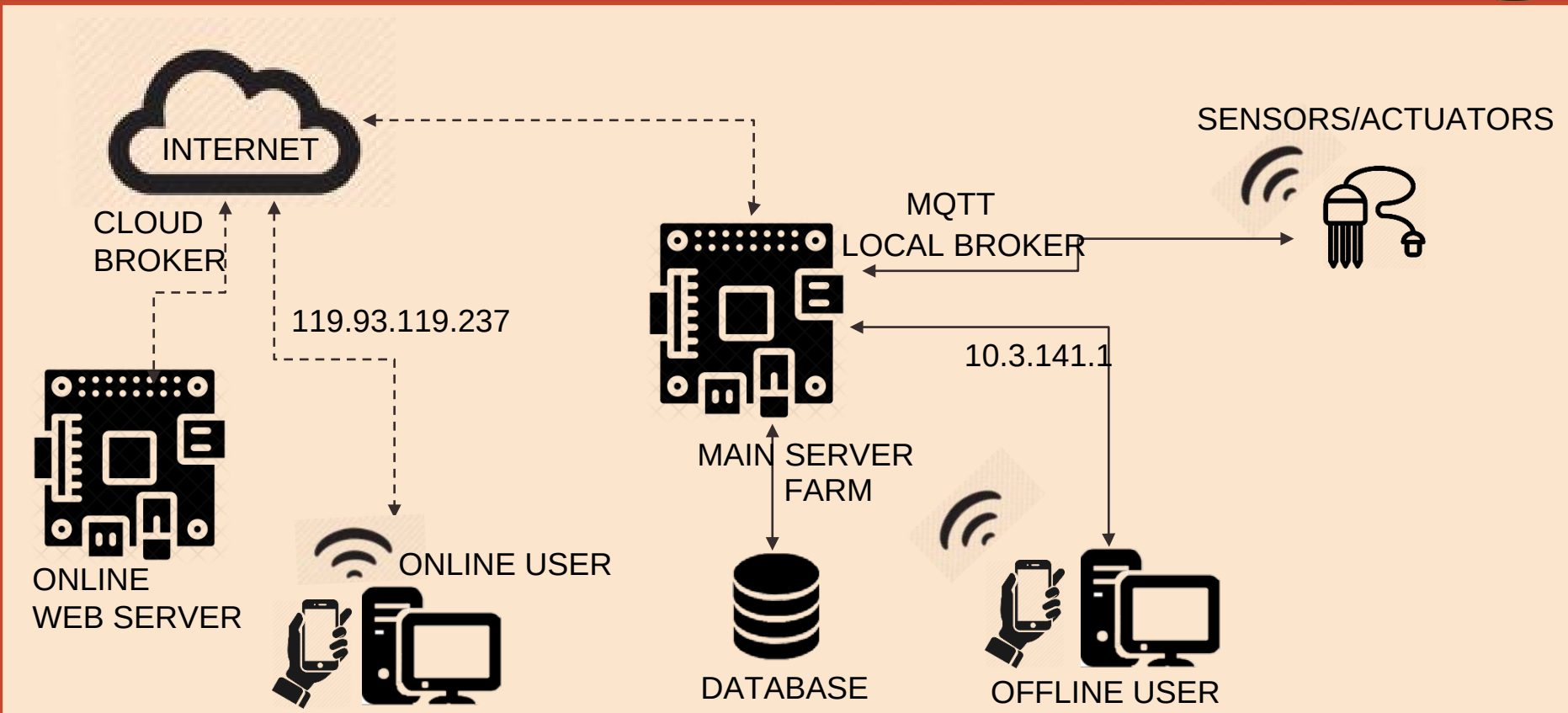
PAUSE DRIP WHEN MOISTURE IS EQUAL OR ABOVE THE SETPOINT

## OUTPUT

DISPLAY THE CURRENT SENSOR READING AND GRAPH IN A WEB APPLICATION

POD YIELD OF PEANUT FROM BOTH DRIP SYSTEM AND MANUAL FARMING

# HOW DOES THE SYSTEM W



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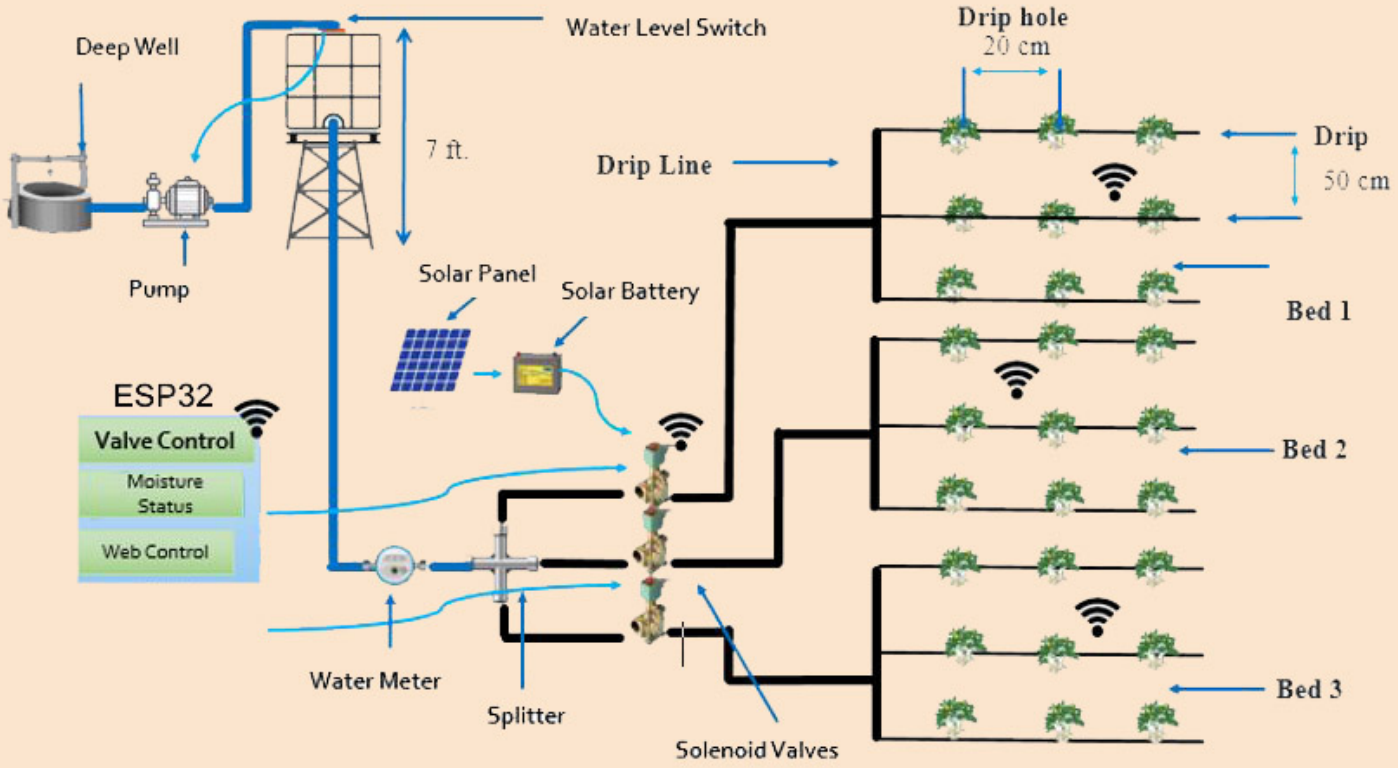
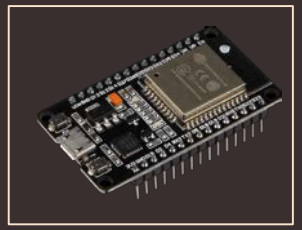


# THE MQTT PROTOCOL

MQTT

MQTT



PUBLISH

PUBLISH/SUBSCRIBE

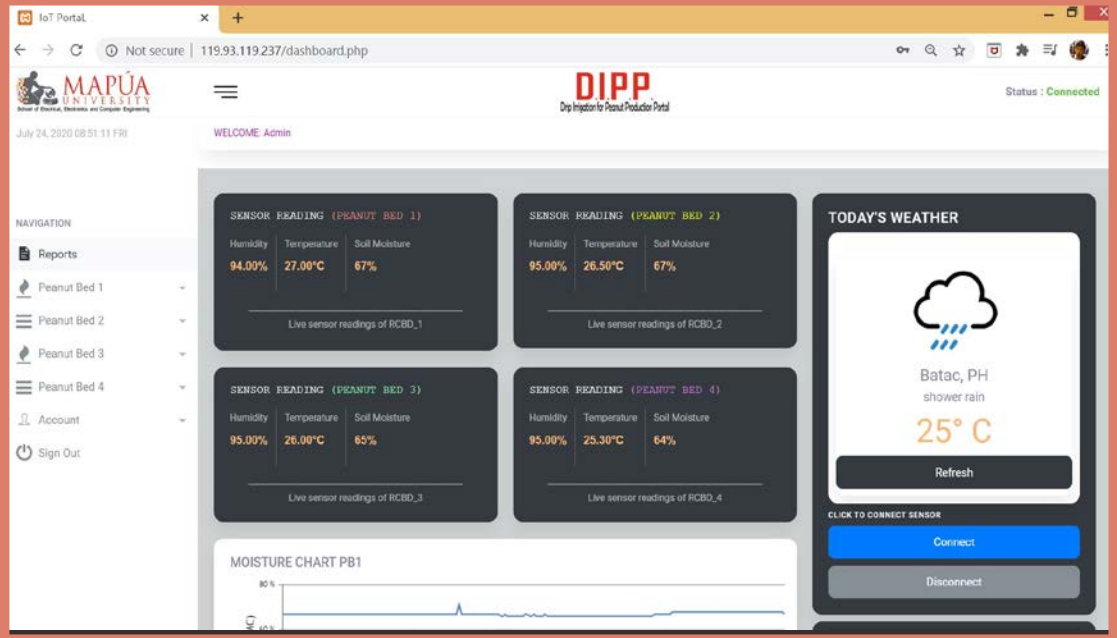
SUBSCRIBE

DRIP VALVE

WEBSOCKET PORT: 33191

SAMPLE TOPIC: ‘DLSU/UTIL/MOIST1/SENTMSG’

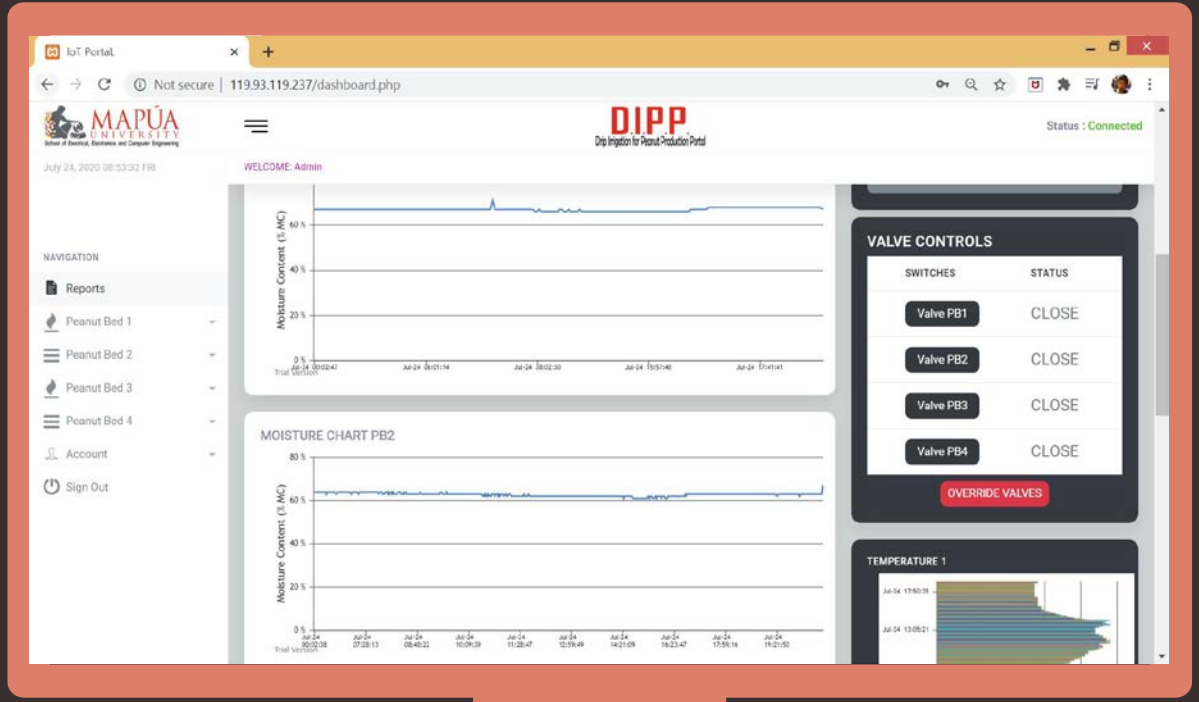
# WEB APPLICATION




FEATURES:

- VIEW CURRENT DATA
- DOWNLOAD REPORTS
- CONTROL VALVES
- DISPLAY GRAPH
- WEATHER FORECAST

# WEB APPLICATION

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# Initial setup

# Thank you & God bless

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