**Title Of Project:**

**“Smart Agriculture monitoring moisture by using a Moisture sensor”**

**Introduction**

**How a Moisture sensor does it work?**

Moisture is critical for plant growth, so a soil moisture meter sensor not only aids in keeping vegetables during periods of drought but also helps gardeners decide when to water, especially when climate change. Expensive professional meters use a variety of measurement methods, many requiring permanent probes wired together, but home meters are typically handheld devices utilizing electrical resistance or water pressure and a digital interface to measure moisture inside a soil.

In Agriculture Measuring soil moisture is important for [agricultural](https://en.wikipedia.org/wiki/Agriculture) applications to help farmers manage their [irrigation systems](https://en.wikipedia.org/wiki/Irrigation_system) in a splendid way which is very effective. Knowing the exact soil moisture conditions on their fields, not only are farmers able to generally use less water to grow a crop, they are also able to increase yields productions and the quality of the crop by improved management of soil moisture during critical plant growth stages.

In Research Soil moisture sensors are used in numerous research applications, e.g. in agriculture for the Scientifics  and other domain  including irrigation planning,  the [climate change research](https://en.wikipedia.org/wiki/Climatology), on [environmental science](https://en.wikipedia.org/wiki/Environmental_science)  and as auxiliary sensors for [soil respiration](https://en.wikipedia.org/wiki/Soil_respiration) measurements.

For our project of monitoring level of water in soil by detecting moisture, we will use capacitive moisture sensor and we will upload the datas we get on Ubidot cloud to visualise the change of different state of soil. The necessary information are shown in the slides below:

**Image of Capacitive Moisture Sensor**

Image1. Capacitive moisture sensor

**Material used to implement on Project**

* Node Mcu
* Capacitive moisture sensor
* Arduino software of running project
* Simple wires male and females for connections
* Platform of Ubidots cloud to visualise data

**Table of Connection on Node MCU Devices**

|  |  |
| --- | --- |
| Moisture Sensor | Node MCU |
| Ground | Ground |
| Aout | Ao(Analog pin) |
| Vcc | 3V |

**Codes to implement project to Ubidot cloud**

#include <ESP8266WiFi.h>

#include <PubSubClient.h>

int WET= 16; // Wet Indicator at Digital PIN D0

int DRY= 2; // Dry Indicator at Digital PIN D4

int sense\_Pin= A0; // Soil Sensor input at Analog PIN A0

int value= 0;

const char\* ssid = "ClementRegi4";

const char\* password = "44448888";

#define TOKEN "A1E-BgFDEzhAYKGbZJ1q1dpWDS5W36Fklw"

#define MQTT\_CLIENT\_NAME "Janvier"

#define Variable\_label "moisture"

#define device\_label "moisture-based-project"

const char\* mqttbroker = "things.ubidots.com";

char payload[100];

char topic[50];

WiFiClient espClient;

PubSubClient client(espClient);

//Set-Up WiFi

void setup\_wifi() {

Serial.print("Connecting to ");

Serial.println(ssid);

WiFi.begin(ssid, password);

while (WiFi.status() != WL\_CONNECTED)

{

delay(500);

Serial.print(".");

}

randomSeed(micros());

Serial.println("");

Serial.println("WiFi connected");

Serial.print("IP address: ");

Serial.println(WiFi.localIP());

}

void reconnect() {

// Loop until we're reconnected

while (!client.connected())

{

Serial.print("Attempting MQTT connection...");

if (client.connect(MQTT\_CLIENT\_NAME,TOKEN,""))

{

Serial.println("connected");

} else {

Serial.print("failed, rc=");

Serial.print(client.state());

Serial.println(" try again in 5 seconds");

// Wait 6 seconds before retrying

delay(1000);

}

}

}

void callback(char\* topic, byte\* payload, unsigned int length)

{

}

void setup() {

Serial.begin(9600);

pinMode(WET, OUTPUT);

pinMode(DRY, OUTPUT);

Serial.println("Moisture test!");

setup\_wifi();

client.setServer(mqttbroker, 1883);

reconnect();

}

void loop() {

client.setCallback(callback);

if (!client.connected()) {

reconnect();

}

client.loop();

Serial.print("MOISTURE LEVEL : ");

value= analogRead(sense\_Pin);

value= value/10;

Serial.println(value);

if(value<50)

{

digitalWrite(WET, HIGH);

}

else

{

digitalWrite(DRY,HIGH);

}

digitalWrite(WET,LOW);

digitalWrite(DRY, LOW);

Serial.print("Publish a message Moisture:");

int num=value;

char cm[16];

itoa(num,cm,10);

Serial.println(cm);

sprintf(topic,"%s%s","/V1.6/devices/",device\_label);

sprintf(payload,"%s","");

sprintf(payload,"{\"%s\":",Variable\_label);

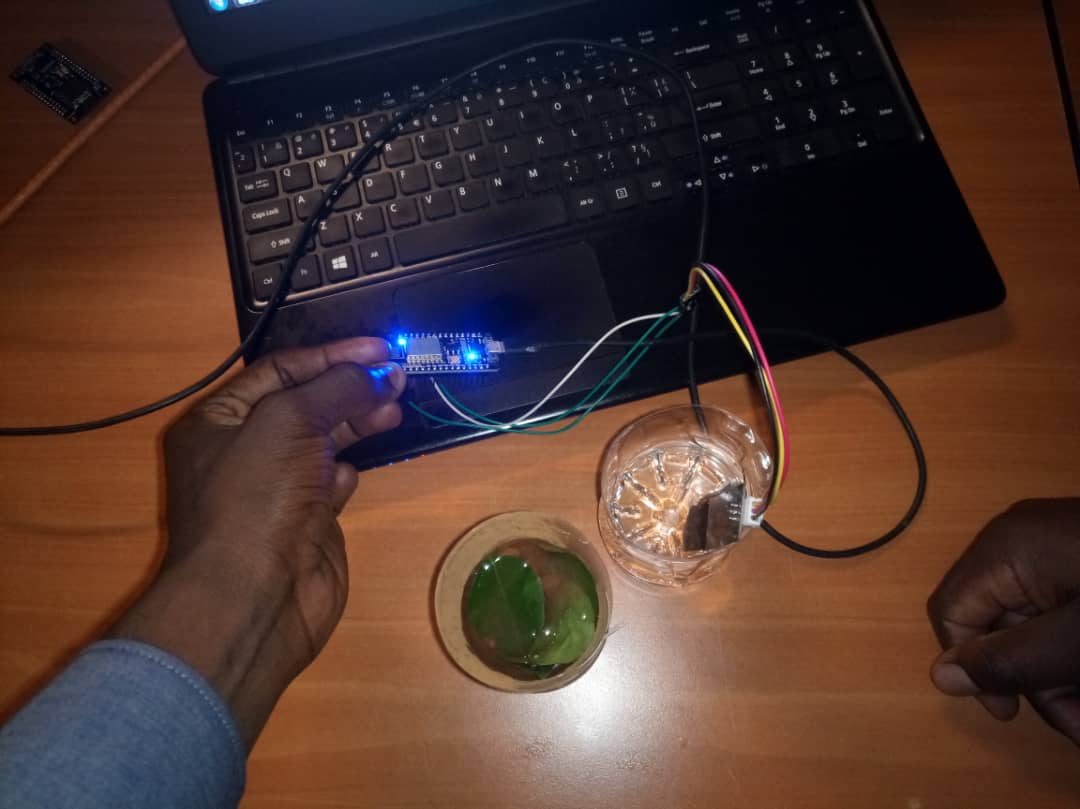
sprintf(payload,"%s{\"value\":%s}}",payload,cm);

client.publish(topic, payload);

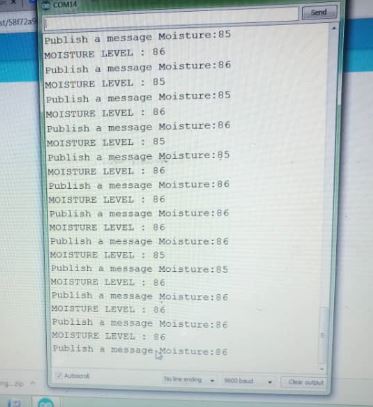
delay(3000);

}

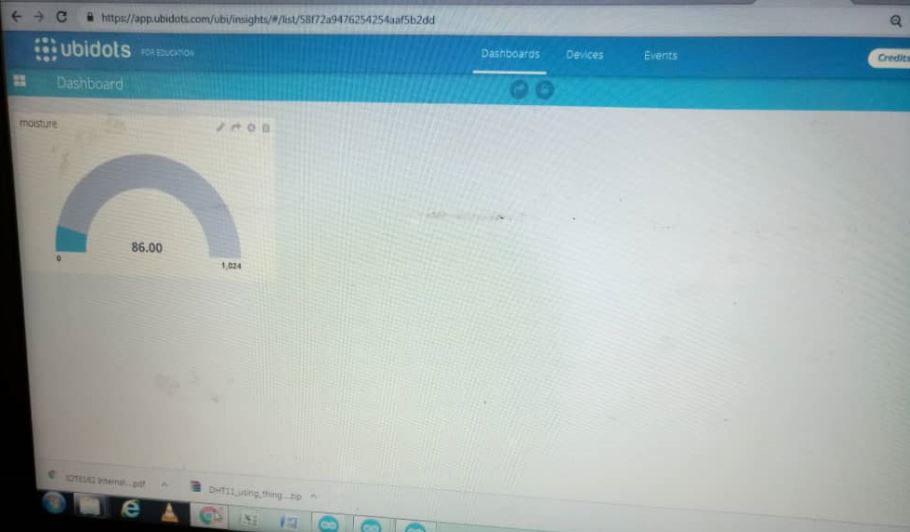
**Image photo of Project during Implementation**



**Data on serial monitor**



**Platform result on Connection of Devices to Ubidots Cloud**

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**For more info follow:**

# YouTube channel: IOT soil Moisture Monitoring

**Git hub name:** IotSoilMoistureMonitoring

**References**

1. <https://www.hunker.com/13401403/how-do-moisture-sensors-work>

2. <https://www.amazon.com/Kreema-Capacitive-Corrosion-Resistant-Raspberry/dp/B07DPLWHVP>

3. <https://en.wikipedia.org/wiki/Soil_moisture_sensor>

4.<https://www.youtube.com/watch?v=N_mHE9axA9U>

5. <https://github.com/IoTSoilMoistureMonitoring/Soil_moisture_monitoring_Project_Code/>