

9: FUTURE WORKS

Crop predication plays a key role, it helps the farmer to decide future plan regarding the production of the crop, its storage, marketing techniques and risk management. To predict production rate of the crop artificial network use information collected by sensors from the farm. This information includes parameters such as soil, temperature, pressure, rainfall, and humidity. The farmers can get an accurate soil data either by the dashboard or a customized mobile application. Future work would be focused more on increasing sensors on this system to fetch more data especially with regard to Pest Control and by also integrating GPS module in this system to enhance this Agriculture IoT Technology to full-fledged Agriculture Precision ready product.

10 : APPENDIX

Source Code

```
#include <WiFi.h>
#include <PubSubClient.h>
#include "DHT.h"
#define DHTPIN 15
#define DHTTYPE DHT22
#define LED 2

DHT dht (DHTPIN, DHTTYPE);
void callback(char* subscribtopic, byte* payload, unsignedint payloadLength);
#define ORG "tu4jce"//IBM ORGANITION ID
#define DEVICE_TYPE "NodeMCU"//Device type
#define DEVICE_ID "12345"//Device ID
#define TOKEN "2W?*d5U83t+ICiNhyJ" //Token
String data3;
float h, t;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribtopic[] = "iot-2/cmd/command/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
// -----
WiFiClient wifiClient;
PubSubClient client(server, 1883, callback ,wifiClient);
void setup()
{
    Serial.begin(115200);dht.begin();
    pinMode(LED,OUTPUT); delay(10);
    Serial.println(); wificonnect();
    mqttconnect();
}
```

```

}void loop()
{

    h = dht.readHumidity();
    t = dht.readTemperature();
    Serial.print("temp:"); Serial.println(t);
    Serial.print("Humid:");
    Serial.println(h);

    PublishData(t, h);
    delay(1000);
    if (!client.loop()) {
        mqttconnect();
    }
}

void PublishData(float temp, float humid) {mqttconnect();
    String payload = "{\"temp\":";payload +=
    temp;
    payload += "," "\"Humid\":";payload +=
    humid;
    payload += "}";

    Serial.print("Sending payload: ");
    Serial.println(payload);

    if (client.publish(publishTopic, (char*) payload.c_str())) {
        Serial.println("Publish ok");
    } else {
        Serial.println("Publish failed");
    }
}

void mqttconnect() {
    if (!client.connected()) { Serial.print("Reconnecting client to
    ");Serial.println(server);
        while (!client.connect(clientId, authMethod, token)) {
            Serial.print(".");delay(500);
        }

        initManagedDevice();
        Serial.println();
    }
}

void wificonnect()
{
    Serial.println();
}

```

```

    Serial.print("Connecting to ");

    WiFi.begin("Wokwi-GUEST", "", 6);
    while (WiFi.status() != WL_CONNECTED) {
        delay(500);
        Serial.print(".");
    }
    Serial.println(""); Serial.println("WiFi
connected"); Serial.println("IP address: ");
    Serial.println(WiFi.localIP());
}

void initManagedDevice() {
    if (client.subscribe(subscribetopic)) { Serial.println((subscribetopic));
        Serial.println("subscribe to cmd OK");
    } else {
        Serial.println("subscribe to cmd FAILED");
    }
}

void callback(char* subscribetopic, byte* payload, unsignedint payloadLength)
{
    Serial.print("callback invoked for topic: ");
    Serial.println(subscribetopic);
    for (int i = 0; i < payloadLength; i++) {
        //Serial.print((char)payload[i]);data3 +=
        (char)payload[i];
    }
    Serial.println("data: "+ data3);
    if(data3=="lighton")
    {
        Serial.println(data3);
        digitalWrite(LED,HIGH);
    }
    else
    {
        Serial.println(data3);
        digitalWrite(LED,LOW);
    }
    data3="";
}
}

```