

DAFTAR PUSTAKA

- [1] Z. A. Khmayr, "Memanfaatkan Bonus Demografi dengan Mempersiapkan Generasi Petani 4.0," 2019. <https://indonesiadevelopmentforum.com/2019/ideas/13413-memanfaatkan-bonus-demografi-dengan-mempersiapkan-generasi-petani-40> (accessed Nov. 06, 2020).
- [2] M. Fadhil, B. D. Argo, and Y. Hendrawan, "Rancang Bangun Prototype Alat Penyiram Otomatis dengan Sistem Timer RTC DS1307 Berbasis Mikrokontroler Atmega16 pada Tanaman Aeroponik Architecture of Prototype Automatic Sprinklers with a RTC DS1307 Timer System Based on Atmega16 Microcontroller in Aerop," *J. Keteknikan Pertan. Trop. dan Biosist.*, vol. 3, no. 1, pp. 37–43, 2015.
- [3] S. L. H. Siregar and M. Rivai, "Monitoring dan Kontrol Sistem Penyemprotan Air Untuk Budidaya Aeroponik Menggunakan NodeMCU ESP8266," *J. Tek. ITS*, vol. 7, no. 2, 2019, doi: 10.12962/j23373539.v7i2.31181.
- [4] Asniati, E. M. Hasiri, and R. Yanti, "Sistem Kontrol Otomatis Penyiraman Tanaman Dengan Metode Budidaya Tanaman Sistem Aeroponik Menggunakan Mikrokontroler Atmega 2560," *J. Inform.*, vol. 8, no. 1, pp. 38–44, 2019, [Online]. Available: <http://ejournal.unidayan.ac.id/index.php/JIU/article/view/112>.
- [5] DFROBOT, "PH meter SKU SEN0161," 2019. https://wiki.dfrobot.com/PH_meter_SKU__SEN0161_ (accessed Nov. 06, 2020).
- [6] Dfr. Gravity, "Analog Electrical Conductivity meter V2," 2019. https://wiki.dfrobot.com/Gravity__Analog_Electrical_Conductivity_Sensor__Meter_V2__K%3D1__SKU_DFR0300 (accessed Nov. 06, 2020).
- [7] Indoware, "Ultrasonic Ranging Module HC - SR04," *Datasheet*, pp. 1–4, 2013, [Online]. Available: <http://www.micropik.com/PDF/HCSR04.pdf>.
- [8] electronicoscaldas, "MG996R High Torque Metal Gear Dual Ball Bearing Servo," *datasheet*. 2019, [Online]. Available: https://www.electronicoscaldas.com/datasheet/MG996R_Tower-Pro.
- [9] FEC, "Relay modules 1-channel features," *Futur. Electron. Corp.*, no. 5 V, pp. 1–2, 2019, [Online]. Available: http://fecegypt.com/uploads/dataSheet/1522335719_relay module.pdf.
- [10] Maxim Integrated, "DS 3231 RTC General Description," *Data Sheet*, p. 20, 2015, [Online]. Available: <https://datasheets.maximintegrated.com/en/ds/DS3231.pdf>.

LAMPIRAN A

SCRIPT SUB-SISTEM PENGKONDISIAN NUTRISI

```
#include <RTC_Semestr.h>
#include <LiquidCrystal_I2C.h>
#include<Servo.h>
#define ok 8 // button 1
#define dn 9 // button 2
#define ex 10 // button 3
#define ditekan LOW
#define jeda 50
#define sampling 5
RTC_DS3231 rtc;
Servo keranAIR;
int ec_VCC = 5; //relay ec vcc
int ec_GND = 6; // relay ec gnd
float v, ecValue;
int adc;
float voltage;
double pHValue, nilaiPH, nilaiEC;
int adcPH;
int echo_Pin = 39; //pin 30
int trig_Pin = 41; // pin32
long distance;
//-----//
int Relay_Pompa = 31;
int Relay_NutrisiA = 2; // relay kondisi nutrisi A
int Relay_NutrisiB = 3; // relay kondisi nutrisi B
int Relay_pH_Up = 33; // relay pH up// CH 2
int Relay_pH_Dw = 35;
int Relay_VCC = 5;
int Relay_GND = 6;
//-----//
int led1 = 22;
```

```
int led2 = 24 ;
int led3 = 26;
int led4 = 28;
LiquidCrystal_I2C lcd(0x27, 16, 2);
//-----//
void setup() {
    lcd.begin();
    rtc.begin();
    Serial.begin(115200);
    Serial1.begin(115200);

    lcd.setCursor(0, 0);
    lcd.print("Loading.");
    for (int i = 1; i <= 5; i++) {
        lcd.setCursor(i + 7, 0);
        lcd.print(".");
        delay(700);
    }
    pinMode(trig_Pin, OUTPUT);
    pinMode(echo_Pin, INPUT);
    keranAIR.attach(7);
    pinMode(Relay_Pompa, OUTPUT);
    pinMode(Relay_NutrisiA, OUTPUT); //
    mengaktifkan pompa nutrisi A
    pinMode(Relay_NutrisiB, OUTPUT);
    pinMode(Relay_pH_Up, OUTPUT);
    pinMode(Relay_pH_Dw, OUTPUT);
    pinMode(Relay_VCC, OUTPUT);
    pinMode(Relay_GND, OUTPUT);
    pinMode(dn, INPUT_PULLUP);
    pinMode(ok, INPUT_PULLUP);
```

```

pinMode(ex, INPUT_PULLUP);
pinMode(led1, OUTPUT);
pinMode(led2, OUTPUT);
pinMode(led3, OUTPUT);
pinMode(led4, OUTPUT);
digitalWrite (Relay_Pompa, HIGH);
digitalWrite(Relay_NutrisiA, HIGH);
digitalWrite(Relay_NutrisiB, HIGH);
digitalWrite(Relay_pH_Up, HIGH);
digitalWrite(Relay_pH_Dw, HIGH);
digitalWrite(Relay_VCC, HIGH);
digitalWrite(Relay_GND, HIGH);
lcd.clear();
lcd.setCursor(0, 0);
lcd.print(" Connecting ");
lcd.setCursor(0, 1);
lcd.print(" WIFI.");
for (int i = 1; i <= 5; i++) {
    lcd.setCursor(i + 4, 1);
    lcd.print(".");
    delay(700);
}
lcd.setCursor(2, 0);
lcd.print(" WIFI ");
lcd.setCursor(5, 1);
lcd.print(" Terhubung ");
delay(1000);
lcd.clear ();
lcd.setCursor(0, 0);
lcd.print("*---HELLO---*");
lcd.scrollDisplayRight ();
delay (1000);
lcd.clear ();
lcd.setCursor(0, 0);

```

```

lcd.print("T'm Aero-NOMOS ");
delay (1000);
if (rtc.lostPower()) {
    rtc.adjust(DateTime(F(__DATE__),
F(__TIME__))); }
}
void loop() {
    if (digitalRead(ok) == ditekan) {
        delay(jeda);
        while (digitalRead(ok) == ditekan)
            lcd.clear();
        awal();
    }
    lcd.setCursor(0, 0);
    lcd.print("T'M Aero-NOMOS ");
    lcd.setCursor(0, 1);
    lcd.print(" [==>] [MENU] ");
}
void awal() {
    //----- Menu 1 -----
    Menu1:
    if (digitalRead(ok) == ditekan) {
        delay(jeda);
        while (digitalRead(ok) == ditekan)
            lcd.clear();
        AwalTanam();
    }
    else if (digitalRead(dn) == ditekan) {
        delay(jeda);
        while (digitalRead(dn) == ditekan)
            lcd.clear();
        goto Menu2;}
    else if (digitalRead(ex) == ditekan) {
        delay(jeda);
        while (digitalRead(ex) == ditekan)

```

```

    lcd.clear();
    Exit();
}

lcd.setCursor(0, 0);
lcd.print(">1.Awal Tanam ");
lcd.setCursor(0, 1);
lcd.print("2.Sedang Menanam");
goto Menu1;

//-----
// ----- Menu 2-----
Menu2:
if (digitalRead(ok) == ditekan) {
    delay(jeda);
    while (digitalRead(ok) == ditekan)
        lcd.clear();
    SedangTanam();
}
else if (digitalRead(dn) == ditekan) {
    delay(jeda);
    while (digitalRead(dn) == ditekan)
        lcd.clear();
    goto Menu1;
}
else if (digitalRead(ex) == ditekan) {
    delay(jeda);
    while (digitalRead(ex) == ditekan)
        lcd.clear();
    Exit();
}

lcd.setCursor(0, 0);
lcd.print("1.Awal Tanam ");
lcd.setCursor(0, 1);
lcd.print(">2.Sedang Menanam");
goto Menu2;

```

```

//-----
}

void AwalTanam() {
    //---Jika Memilih Kangung :---
    lcd.setCursor(2, 0);
    lcd.print(" Pilih Tanaman ");
    lcd.setCursor(5, 1);
    lcd.print(" Anda ");
    delay(500);
    lcd.clear();
    setSubMenu1:
    if (digitalRead(ok) == ditekan) {
        delay(jeda);
        while (digitalRead(ok) == ditekan) {}
        lcd.clear();
        goto setPengisian;
    }
    else if (digitalRead(dn) == ditekan) {
        delay(jeda);
        while (digitalRead(dn) == ditekan) {}
        goto setSubMenu2;
        lcd.clear();
    }
    else if (digitalRead(ex) == ditekan) {
        delay(jeda);
        while (digitalRead(ex) == ditekan) {}
        lcd.clear();
        awal();
    }

    lcd.setCursor(0, 0);
    lcd.print("-> 1.Kangkung ");
    lcd.setCursor(0, 1);
    lcd.print(" 2.Selada ");
    goto setSubMenu1;
}

```

```

//-- Menu 2 ----
setSubMenu2:
if (digitalRead(ok) == ditekan) {
    delay(jeda);
    while (digitalRead(ok) == ditekan) {}
    lcd.clear();
    Selada();
}
else if (digitalRead(dn) == ditekan) {
    delay(jeda);
    while (digitalRead(dn) == ditekan) {}
    goto setSubMenu1;
    lcd.clear();
}

else if (digitalRead(ex) == ditekan) {
    delay(jeda);
    while (digitalRead(ex) == ditekan)
        lcd.clear();
    Exit();
}

lcd.setCursor(0, 0);
lcd.print(" 1.Kangkung ");
lcd.setCursor(0, 1);
lcd.print("-> 2.Selada ");
goto setSubMenu2;

// Pengisian Nutrisi Tanaman

setPengisian:
    pilihan = '1'; //-----
    -----pilihan KANGKUNG-----
    -----

    send_user();

```

```

keranAIR.write(90);
lcd.print("Sedang Mengisi");
lcd.setCursor(0, 1);
lcd.print("  Nutrisi  ");
delay(500);
digitalWrite(Relay_NutrisiA, LOW);//on
delay(5000);
digitalWrite(Relay_NutrisiA, HIGH);
digitalWrite(Relay_NutrisiB, LOW);//on
delay(5000);
digitalWrite(Relay_NutrisiB, HIGH);
delay(500);
lcd.clear();
jarak();
Serial.println (distance);
delay (500);
Serial.println ("Mulai pilih aksi");
lcd.setCursor(0, 0);
lcd.print("ISI AIR.....");
if (distance > 20) {
    while (distance >= 13) {
        Serial.println("distance besar : " );
        Serial.println (distance);
        keranAIR.write(0);
        jarak();
        delay(1000);
    }
}
else {
    Serial.println("air masih cukup : " );
}

keranAIR.write(90);
lcd.clear();
Serial.println("selesai");

```

```

lcd.print("Isi Air Selesai");

NyemprotKangkung();
}

//-- Perintah Penyemprotan Kangkug ---
void jarak () {
    long duration;
    digitalWrite(trig_Pin, LOW);
    delayMicroseconds(2);
    digitalWrite(trig_Pin, HIGH);
    delayMicroseconds(10);
    digitalWrite(trig_Pin, LOW);
    duration = pulseIn(echo_Pin, HIGH);
    distance = (duration / 2) / 29.1;
}

void NyemprotKangkung() {
    NyemprotB:
    DateTime now;
    now = rtc.now();

    //----- Pompa Hidup -----
    if ((now.menit >= 0) && (now.menit <= 10)) {
        digitalWrite(Relay_Pompa, LOW);
        Serial.println("POMPA HIDUP");

        z = 1;
        Serial.print("nilai Z : ");
        Serial.println(z);
        Serial.print("Menit Ke : ");
        Serial.println(now.menit);
        delay(500);
        lcd.setCursor(0, 0);
        lcd.print(" Sedang Proses");
        lcd.setCursor(1, 1);
        lcd.print(" Penyemprotan");
        delay(1000);
        lcd.clear();
    }
}

```

```

}

//----- Pompa Hidup -----
else if ((now.menit >= 21) && (now.menit <=
30)) {
    digitalWrite(Relay_Pompa, LOW);
    Serial.println("POMPA HIDUP");

    z = 1;
    Serial.print("nilai Z : ");
    Serial.println(z);
    Serial.print("Menit Ke : ");
    Serial.println(now.menit);
    delay(500);
    lcd.setCursor(0, 0);
    lcd.print(" Sedang Proses");
    lcd.setCursor(1, 1);
    lcd.print(" Penyemprotan");
    delay(1000);
    lcd.clear();

    //----- Pompa Hidup-----
}

else if ((now.menit >= 41) && (now.menit <=
50)) {
    digitalWrite(Relay_Pompa, LOW);
    Serial.println("POMPA HIDUP");

    z = 1;
    Serial.print("nilai Z : ");
    Serial.println(z);
    Serial.print("Menit Ke : ");
    Serial.println(now.menit);
    delay(500);
    lcd.setCursor(0, 0);
    lcd.print(" Sedang Proses");
    lcd.setCursor(1, 1);
    lcd.print(" Penyemprotan");
}

```

```

delay(1000);
lcd.clear();
}
else {
    digitalWrite(Relay_Pompa, HIGH);
    Serial.println("POMPA MATI");
    monitoringKangkung();
}
goto NyemprotB;
}
//----- Monitoring Kangkung -----
void monitoringKangkung() {
    jarak();
    Serial.print(distance);
    if ( (distance > 18) && (distance <= 24) )
    {
        //Merah// 25%
        Serial.println("Menambahkan Air dan Nutrisi");
        digitalWrite(led1, LOW);
        digitalWrite(led2, LOW);
        digitalWrite(led3, LOW);
        digitalWrite(led4, HIGH);
        presentage = 25;
        digitalWrite(Relay_NutrisiA, LOW); //on
        delay(3000);
        digitalWrite(Relay_NutrisiA, HIGH);
        digitalWrite(Relay_NutrisiB, LOW); //on
        delay(3000);
        digitalWrite(Relay_NutrisiB, HIGH);
        keranAIR.write(0);
        Serial.println("ISI AIR dan Nutrisi ");
        Serial.print("Nutrisi Level : ");
        Serial.print(presentage);
    }
}

```

```

    } else if ( (distance > 15) && (distance <= 18) )
    { //Kuning// 50 %
        Serial.println("Peringatan Air dan Nutrisi Akan Habis !!!");
        digitalWrite(led1, LOW);
        digitalWrite(led2, LOW);
        digitalWrite(led3, HIGH);
        digitalWrite(led4, LOW);
        presentage = 50;
        Serial.print("Nutrisi Level : ");
        Serial.print(presentage);
    }

    else if ( (distance > 13) && (distance <= 15) )
    { //Hijau 75
        digitalWrite(led1, LOW);
        digitalWrite(led2, HIGH);
        digitalWrite(led3, LOW);
        digitalWrite(led4, LOW);
        presentage = 75;
        Serial.print("Nutrisi Level : ");
        Serial.print(presentage);
    }

    else if ( (distance <= 13) )
    { //Biru
        digitalWrite(led1, HIGH);
        digitalWrite(led2, LOW);
        digitalWrite(led3, LOW);
        digitalWrite(led4, LOW);
        presentage = 100;
        keranAIR.write(90);
        Serial.print("Nutrisi Level : ");
    }
}

```

```

Serial.print(presentage);

Serial.println("keran air penuh");

}

//-----Pembacaan pH dan EC -----
-----

nilaipH = 0;
nilaiEC = 0;
digitalWrite(ec_VCC, LOW);
digitalWrite(ec_GND, LOW);

delay(2000);

for (int i = 0; i < 30; i++) {

  for (int j = 0; j < sampling; j++) {

    adc += analogRead(A1);

  }

  adc = adc / sampling;

  v = (adc * 4.97) / 1023;

  ecValue = ( 4.1828 * v) + 0.2022;

  nilaiEC += ecValue;

  Serial.print(v);

  Serial.print(" V\t");

  Serial.print(ecValue);

  Serial.println(" ms/cm");

  delay(500);

}

nilaiEC = nilaiEC / 30;

delay(1000);

digitalWrite(ec_VCC, HIGH);

digitalWrite(ec_GND, HIGH);

delay(2000);

for (int x = 0; x < 30; x++) {

  // waktu2 = millis();

  adcPH = analogRead(A0); //menggunakan pin
A0 untuk membaca output sensor pH

  voltage = adcPH * 4.96 / 1023;

  pHValue = (6.338 * voltage) - 2.98; // gak
tambahin 0.1 nyoba

```

```

nilaipH += pHValue;

Serial.print("voltage : ");

Serial.print(voltage, 2);

Serial.print("   pH Value : ");

Serial.println(pHValue, 2);

delay(500);

}

nilaipH = nilaipH / 30; //----- pH
HARUS Upload -----
-----

Serial.print("Nilai Akhri EC :");

Serial.println(nilaiEC);

Serial.print("Nilai Akhri pH :");

Serial.println(nilaipH);

delay(1000);

//----- Pengkondisian Nutrisi -----
-----//

if (z == 1) {

  Serial.println          ("MEMULAI
PENGKONDISIAN ");

  Serial.println (z);

  Serial.println ("masuk kedalam pengkondisian
");

  if (pHValue > 6.5) {

    Serial.println("");

    Serial.println("pH lebih dari 6.5");

    digitalWrite(Relay_pH_Dw, LOW);

    delay(800);

    digitalWrite(Relay_pH_Dw, HIGH);

    lcd.clear();

    lcd.setCursor(2, 0);

    lcd.print("pH > 6.5");

    lcd.setCursor(0, 1);

    lcd.print("pH Down aktif");

    delay(500);

    lcd.clear();

```



```

    z = 0;
}
else if (pHValue < 5.5) {
    Serial.println("pH < 5.5");
    digitalWrite(Relay_pH_Up, LOW);
    delay(800);
    digitalWrite(Relay_pH_Up, HIGH);
    lcd.clear();
    lcd.setCursor(2, 0);
    lcd.print("pH < 5.5");
    lcd.setCursor(0, 1);
    lcd.print("pH Up aktif");
    delay(500);
    lcd.clear();
    z = 0;
}
if (ecValue > 2) {
    Serial.println("Nutrisi > 2 mS/cm");
    keranAIR.write(0);
    delay(3000);
    keranAIR.write(90);
    lcd.clear();
    lcd.setCursor(2, 0);
    lcd.print("Nutrisi>2mS/cm");
    lcd.setCursor(2, 1);
    lcd.print("2 mS/cm ");
    delay(500);
    lcd.clear();
    z = 0;
}
else if (ecValue < 1.5) {
    Serial.println("Nutrisi < 1.5mS/cm");
    digitalWrite(Relay_NutrisiA, LOW);
    digitalWrite(Relay_NutrisiB, LOW);

```

```

    delay(600);
    digitalWrite(Relay_NutrisiA, HIGH);
    digitalWrite(Relay_NutrisiB, HIGH);
    lcd.clear();
    lcd.setCursor(2, 0);
    lcd.print("Nutrisi<1.5mS/cm");
    lcd.setCursor(0, 1);
    lcd.print("Tambah Nutrisi");
    delay(500);
    lcd.clear();
    z = 0;
}
}
lcd.setCursor(0, 0);
lcd.print("Kangkung Dipilih");
lcd.setCursor(0, 1);
lcd.print("pH:");
lcd.setCursor(3, 1);
lcd.print(nilaipH);
lcd.setCursor(9, 1);
lcd.print("EC:");
lcd.setCursor(12, 1);
lcd.print(nilaiEC);
Serial.println (nilaipH);
Serial.println (nilaiEC);
//--- Jika Memilih Selada ----
void Selada() {
    pilihan = '2'; //-----
    -----pilihan selada -----
    -----
    send_user();
    keranAIR.write(90);
    lcd.print("Sedang Mengisi");
    lcd.setCursor(0, 1);
    lcd.print("  Nutrisi  ");

```

```

delay(500);

digitalWrite(Relay_NutrisiA, LOW);//on

delay(3000);

digitalWrite(Relay_NutrisiA, HIGH);

digitalWrite(Relay_NutrisiB, LOW);//on

delay(3000);

digitalWrite(Relay_NutrisiB, HIGH);

delay(500);

lcd.clear();

jarak();

Serial.println (distance);

delay (500);

Serial.println ("Mulai pilih aksi");

lcd.setCursor(0, 0);

lcd.print("ISI AIR.....");

if (distance > 20) {

    while (distance >= 13) {

        Serial.println("distance besar : " );

        Serial.println (distance);

        keranAIR.write(0);

        jarak();

        delay(1000);

    }

}

else {

    Serial.println("air masih cukup : " );

}

keranAIR.write(90);

// 13 maka 100 %

presentage = 100;//-----
-----KONSTANTA    WATERLEVEL
(presentage)-----
---

lcd.clear();

Serial.println("selesai");

lcd.print("Isi Air Selesai");

```

```

NyemprotSelada();

}

//-- Penyemprotan Selada ----

void NyemprotSelada() {

Nyemprot:

    DateTime now;

    now = rtc.now();

    //----- Pompa Hidup -----

    if ((now.menit >= 0) && (now.menit <= 10)) {

        digitalWrite(Relay_Pompa, LOW);

        Serial.println("POMPA HIDUP");

        y = 1;

        Serial.print("nilai y : ");

        Serial.println(y);

        Serial.print("Menit Ke : ");

        Serial.println(now.menit);

        delay(500);

        lcd.setCursor(0, 0);

        lcd.print(" Sedang Proses");

        lcd.setCursor(1, 1);

        lcd.print(" Penyemprotan");

        delay(1000);

        lcd.clear();

    }

    //----- Pompa Hidup -----

    else if ((now.menit >= 21) && (now.menit <= 30)) {

        digitalWrite(Relay_Pompa, LOW);

        Serial.println("POMPA HIDUP");

        y = 1;

        Serial.print("nilai y : ");

        Serial.println(y);

        Serial.print("Menit Ke : ");

        Serial.println(now.menit);

        delay(500);

```

```

lcd.setCursor(0, 0);

lcd.print(" Sedang Proses");

lcd.setCursor(1, 1);

lcd.print(" Penyemprotan");

delay(1000);

lcd.clear();

}

//----- Pompa Hidup-----

else if ((now.menit >= 41) && (now.menit <= 50)) {

    digitalWrite(Relay_Pompa, LOW);

    Serial.println("POMPA HIDUP");

    y = 1;

    Serial.print("nilai y : ");

    Serial.println(y);

    Serial.print("Menit Ke : ");

    Serial.println(now.menit);

    delay(500);

    lcd.setCursor(0, 0);

    lcd.print(" Sedang Proses");

    lcd.setCursor(1, 1);

    lcd.print(" Penyemprotan");

    delay(1000);

    lcd.clear();

}

else {

    digitalWrite(Relay_Pompa, HIGH);

    Serial.println("POMPA MATI");

    goto MonitoringSelada;

}

// Monitoring Selada

MonitoringSelada:

//--- Monitoring Selada-----

jarak();

Serial.print(distance);

```

```

if ( (distance > 18) && (distance <= 24) )

{

    //Merah// 25%

    digitalWrite(led1, LOW);

    digitalWrite(led2, LOW);

    digitalWrite(led3, LOW);

    digitalWrite(led4, HIGH);

    keranAIR.write(0);

} else if ( (distance > 15) && (distance <= 18) )

{

    //Kuning// 50 %

    digitalWrite(led1, LOW);

    digitalWrite(led2, LOW);

    digitalWrite(led3, HIGH);

    digitalWrite(led4, LOW);

    keranAIR.write(0);

    Serial.print("isi air dong");

}

else if ( (distance > 12) && (distance <= 15) )

{

    //Hijau 75

    digitalWrite(led1, LOW);

    digitalWrite(led2, HIGH);

    digitalWrite(led3, LOW);

    digitalWrite(led4, LOW);

}

else if ( (distance <= 12) )

{

    //Biru

    digitalWrite(led1, HIGH);

    digitalWrite(led2, LOW);

    digitalWrite(led3, LOW);

    digitalWrite(led4, LOW);

    for (int i = 0; i < sampling; i++) {

        adc += analogRead(A1);
    }
}

```

```

}

adc = adc / sampling;
v = (adc * 4.97) / 1023;
ecValue = ( 4.4087 * v) + 0.2165;
Serial.print(v);
Serial.print(" V\t");
Serial.print(ecValue);
Serial.println(" ms/cm");
delay(500);
}

digitalWrite(ec_VCC, HIGH);
digitalWrite(ec_GND, HIGH);
delay(1000); // delay menunggu pergantian relay
for (int i = 0; i < 30; i++) {

    adcPH = analogRead(A0); //menggunakan pin
    A0 untuk membaca output sensor pH

    voltage = adcPH * 4.80 / 1023;
    float ph = (5.9387 * voltage) - 2.98;
    pHValue += ph; // mencari nilai rata-rata

    Serial.print("voltage : ");
    Serial.print(voltage, 2);
    Serial.print("    pH Value : ");
    Serial.println(ph, 2);
    delay(500);
}

//pHValue membaca nilai rata-rata
pHValue = pHValue / 30;
Serial.print("Nilai Akhri EC :");
Serial.println(ecValue);
Serial.print("Nilai Akhri pH :");
Serial.println(pHValue);
delay(1000);

//----- Penambahan    Kondisi    Menunggu
menyerap-----

```

```

if (y == 1) {

    Serial.println                ("MEMULAI
    PENGKONDISIAN ");

    Serial.println (y);

    Serial.println ("masuk kedalam pengkondisian
    ");

    if (pHValue > 7) {

        digitalWrite(Relay_pH_Dw, LOW);
        delay(600);
        digitalWrite(Relay_pH_Dw, HIGH);

        y = 0;
    }

    else if (pHValue < 6) {

        digitalWrite(Relay_pH_Up, LOW);
        delay(600);
        digitalWrite(Relay_pH_Dw, HIGH);

        y = 0;
    }

    if (ecValue > 1.2) {

        keranAIR.write(0);
        delay(3000);
        keranAIR.write(90);

        y = 0;
    }

    else if (ecValue < 0.8) {

        digitalWrite(Relay_NutrisiA, LOW);
        digitalWrite(Relay_NutrisiB, LOW);
        delay(600);
        digitalWrite(Relay_NutrisiA, HIGH);
        digitalWrite(Relay_NutrisiB, HIGH);

        y = 0;
    }

}

}

lcd.setCursor(0, 0);
lcd.print("Selada Dipilih");

```

```

lcd.setCursor(0, 1);
lcd.print("pH:");
lcd.setCursor(3, 1);
lcd.print(phValue);
lcd.setCursor(9, 1);
lcd.print("ecValue:");
lcd.setCursor(12, 1);
lcd.print(ecValue);
Serial.println (phValue);
Serial.println (ecValue);
send_data_kondisiair();
//Serial1.println("AT+CIPCLOSE=4");
delay(5000);

Serial.println ("SELESAI MENYIMPAN NILAI
KE DATABASE");
NyemprotSelada();

}

//----- Ketika Padam Listrik -----

void SedangTanam() {
  lcd.setCursor(3, 0);
  lcd.print("Anda Sedang");
  lcd.setCursor(1, 1);
  lcd.print("Menanam Apa ??");
  delay(1000);
  lcd.clear();
Menu3:
  if (digitalRead(ok) == ditekan) {
    delay(jeda);
    while (digitalRead(ok) == ditekan) {}
    lcd.clear();
    NyemprotKangkung();
  }
  else if (digitalRead(dn) == ditekan) {
    delay(jeda);

```

```

while (digitalRead(dn) == ditekan) {}

lcd.clear();
goto Menu4;
}

else if (digitalRead(ex) == ditekan) {
  delay(jeda);
  while (digitalRead(ex) == ditekan)
    lcd.clear();
  awal();
}

lcd.setCursor(0, 0);
lcd.print("=> 1.Kangkung ");
lcd.setCursor(0, 1);
lcd.print(" 2.Selada ");
goto Menu3;

Menu4:
if (digitalRead(ok) == ditekan) {
  delay(jeda);
  while (digitalRead(ok) == ditekan) {}
  lcd.clear();
  NyemprotSelada();
}

else if (digitalRead(ex) == ditekan) {
  delay(jeda);
  while (digitalRead(dn) == ditekan) {}
  lcd.clear();
  goto Menu3;
}

else if (digitalRead(ex) == ditekan) {
  delay(jeda);
  while (digitalRead(ex) == ditekan)
    lcd.clear();

```

```
goto Menu3;
```

```
}
```

```
lcd.setCursor(0, 0);
```

```
lcd.print(" 1.Kangkung ");
```

```
lcd.setCursor(0, 1);
```

```
lcd.print("=>2.Selada ");
```

```
goto Menu4;
```

```
}
```

LAMPIRAN B

HASIL GAMBAR PERBANDINGAN SENSOR DAN ALAT UKUR

1. Hasil Perbandingan pH Sensor dengan pH Meter



Gambar 1. Hasil Pembacaan pH meter

COM5	
voltage : 1.35	pH Value : 6.15
voltage : 1.36	pH Value : 6.21
voltage : 1.36	pH Value : 6.24
voltage : 1.35	pH Value : 6.15
voltage : 1.35	pH Value : 6.15
voltage : 1.37	pH Value : 6.27
voltage : 1.33	pH Value : 6.04
voltage : 1.37	pH Value : 6.27
voltage : 1.38	pH Value : 6.36
voltage : 1.35	pH Value : 6.15
voltage : 1.36	pH Value : 6.24
voltage : 1.37	pH Value : 6.33
voltage : 1.34	pH Value : 6.13
voltage : 1.35	pH Value : 6.18
voltage : 1.35	pH Value : 6.18
voltage : 1.36	pH Value : 6.24
voltage : 1.34	pH Value : 6.13
voltage : 1.37	pH Value : 6.33
voltage : 1.35	pH Value : 6.18
voltage : 1.33	pH Value : 6.07
voltage : 1.35	pH Value : 6.18
voltage : 1.41	pH Value : 6.57
voltage : 1.36	pH Value : 6.21
voltage : 1.35	pH Value : 6.18
voltage : 1.36	pH Value : 6.21
voltage : 1.36	pH Value : 6.24
voltage : 1.36	pH Value : 6.21
voltage : 1.36	pH Value : 6.21
voltage : 1.37	pH Value : 6.30
voltage : 1.36	pH Value : 6.21
Nilai Akhir EC :2.09	
Nilai Akhir pH :6.22	

Gambar 2. Hasil Serial Monitor Pembacaan Sensor



Gambar 3. Hasil Pembacaan pH meter

voltage : 1.27	pH Value : 5.65
voltage : 1.24	pH Value : 5.47
voltage : 1.25	pH Value : 5.53
voltage : 1.25	pH Value : 5.56
voltage : 1.25	pH Value : 5.53
voltage : 1.22	pH Value : 5.35
voltage : 1.22	pH Value : 5.35
voltage : 1.24	pH Value : 5.50
voltage : 1.23	pH Value : 5.41
voltage : 1.23	pH Value : 5.41
voltage : 1.23	pH Value : 5.44
voltage : 1.23	pH Value : 5.44
voltage : 1.23	pH Value : 5.44
voltage : 1.24	pH Value : 5.50
voltage : 1.22	pH Value : 5.38
voltage : 1.24	pH Value : 5.47
voltage : 1.26	pH Value : 5.59
voltage : 1.23	pH Value : 5.44
voltage : 1.29	pH Value : 5.80
voltage : 1.24	pH Value : 5.50
voltage : 1.25	pH Value : 5.56
voltage : 1.25	pH Value : 5.53
voltage : 1.24	pH Value : 5.47
voltage : 1.23	pH Value : 5.41
voltage : 1.24	pH Value : 5.47
voltage : 1.25	pH Value : 5.56
voltage : 1.25	pH Value : 5.53
voltage : 1.23	pH Value : 5.44
voltage : 1.24	pH Value : 5.50
voltage : 1.26	pH Value : 5.62
Nilai Akhir EC :2.11	
Nilai Akhir pH :5.50	

Gambar 4. Hasil Serial Monitor Pembacaan Sensor

2. Lampiran Hasil Perbandingan Pengukuran Sensor Ec Dan Ec Meter



Gambar 3. Hasil Pembacaan EC Meter

0.44 V	2.03 ms/cm
0.44 V	2.03 ms/cm
0.43 V	2.01 ms/cm
0.43 V	1.99 ms/cm
0.43 V	1.99 ms/cm
0.44 V	2.03 ms/cm
0.44 V	2.05 ms/cm
0.45 V	2.09 ms/cm
0.43 V	2.01 ms/cm
0.44 V	2.03 ms/cm
0.44 V	2.05 ms/cm
0.44 V	2.05 ms/cm
0.44 V	2.03 ms/cm
0.48 V	2.19 ms/cm
0.44 V	2.03 ms/cm
0.43 V	1.99 ms/cm
0.45 V	2.07 ms/cm
0.44 V	2.03 ms/cm
0.43 V	1.99 ms/cm
0.43 V	1.99 ms/cm
0.43 V	1.99 ms/cm
0.44 V	2.03 ms/cm
0.43 V	2.01 ms/cm
0.42 V	1.97 ms/cm
0.45 V	2.07 ms/cm
0.44 V	2.05 ms/cm
0.44 V	2.03 ms/cm
0.49 V	2.23 ms/cm
0.44 V	2.03 ms/cm
0.42 V	1.97 ms/cm

Gambar 5. Hasil Serial Monitor Sensor EC