

## **Design of a device for accurately measuring NPK,Humidity and temperature of the soil**

So far our team have surfed many devices but none of the device can measure all the above parameters simultaneously.

Hence we searched some sensors whose links are attached below with their details, specifications and documentations.

Firstly we decided to use blue pill (STM32F103C8T6) as a micro controller which is more faster and cheaper than arduino mini or uno. We can use Arduino IDE platform for the coding part which we all had gone through it and all the sensors can easily calibrated through it.

Link: <https://stm32-base.org/boards/STM32F103C8T6-Blue-Pill.html>

Then talking about the sensors which we've decided so far are as follows:

### **Temperature Sensor:**

We searched for Soil Temperature Sensor Probes because of the following features:

- Usable temperature range: -55 to 125°C (-67°F to +257°F)
- 9 to 12 bit selectable resolution
- Uses 1-Wire interface- requires only one digital pin for communication
- Unique 64 bit ID burned into chip
- Multiple sensors can share one pin
- $\pm 0.5^{\circ}\text{C}$  Accuracy from  $-10^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Temperature-limit alarm system
- Query time is less than 750ms
- Usable with 3.0V to 5.5V power/data
- Low cost

Link: [DS18B20 Water Proof Temperature Sensor Probe buy online at Low Price in India - ElectronicsComp.com](#)

### **Sensor for Humidity measurement:**

Nextly,because of the features seen in the attached links we decided FC-28 soil moisture sensor

Link: [Interface Capacitive Soil Moisture Sensor v1.2 with Arduino \(how2electronics.com\)](#)

### **Sensor for NPK measurement:**

This is the only available NPK sensor in the market . Its cost is very high.

We want your guidance regarding the same. We're stuck at this only

Link: <https://how2electronics.com/measure-soil-nutrient-using-arduino-soil-npk-sensor/>

Lastly we decided to wirelessly transfer the data of above parameters on the mobile phones and PC via GSM module because of the following description in the attacked link

LINK: <https://components101.com/wireless/sim900a-gsm-module>