Device to measure NPK, temperature and humidity of soil

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Summary

The soil NPK sensor is suitable for detecting the content of nitrogen, phosphorus, and potassium in the soil. It helps in determining the fertility of the soil thereby facilitating the systematic assessment of the soil condition. The sensor can be buried in the soil for a long time.

DS18B20 is a programmable single-wire temperature sensor. Its main applications include temperature measurement in harsh environments such as mines and soil. The temperature sensor can measure a wide temperature range with an accuracy of ±5°C.

A capacitive soil moisture sensor works by measuring the change in capacitance. In simple terms, capacitance measures the amount of electrical charge that can be stored across an electrical potential. It is use to measure moisture content of soil.

Project objective

- Measure NPK value of soil
- Measure temperature of soil
- Measure moisture content of soil
- Display the measured values of soil using thingspeak

Methodology

The soil nutrient content can be easily measured using NPK Soil Sensor. Measurement of soil content N (nitrogen), P (phosphorus), and K (potassium) is necessary to determine how much additional nutrient content is to be added to soil to increase crop fertility. The soil fertility is detected using NPK sensors. During test we will ensure that the steel needle does not touch hard objects, throw away the surface soil according to the required measurement depth, and maintain the original tightness of the soil below. Test can be performed by holding the sensor vertically and insert it into the soil.

During measurement of moisture content of soil, we will use capacitive soil moisture sensor which take some time to equalize and give a steady reading, so be sure to wait approximately 1 minute after the sensor settles to a given value. It should settle in 1-5 minutes, depending on the saturation level of the soil. Under the assumption of a successful calibration, we can take the data and analyse it.

We can measure the temperature of soil by putting temperature inside soil and get the result on thingspeak server.

References

- Literature review
- Google
- YouTube