

# Study of Soil Properties in Cultivated Areas to Develop a Web Application Used to Analyze Soil Quality Suitable for Growing Local Crops



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## Abstract

Currently, Thailand has a lot of problems with soil management. Whether it is soil deficiencies, nutrient deficiencies, water deficiencies, and also salts in many areas, the soil conditions have changed, causing problems in cultivation in all regions. The Northeastern region is the region with the most problems with soil resources. Because it is a region with a dry climate that is not suitable for planting crops. In addition to making cultivation more difficult. Farmers' incomes have also declined. When incomes declined, there was no funding for farming. Kalasin Province is another province that faces such problems, in order to be useful to farmers who have problems with soil in cultivation. Therefore, he is interested in doing a project on the study of soil properties in cultivated areas for the development of a Web Application to analyze the soil quality that is useful in growing local crops.

By comparing the pH of the soil and the plants that could be grown in the soil pH, the yield was perfect. Rice thrived at pH 5.75±0.92, cassava 6.75±0.72, para rubber 5.80±0.92, sugarcane 5.70±0.82, and oil palm 6.75±0.72. The other crops thrived in suitable saline (EC) soil, namely Charoen rice. It grows well at EC 2.85±0.75 us/cm, cassava 2.50±0.53 us/cm, rubber 3.50 ±1.18us/cm, sugarcane 4.40±0.52 us/cm, and oil palm 1.90±0.21 us/cm. The water is sufficient for the growth of various crops, namely rice 100.00±0.00 %, cassava 38.50±2.42 %, para rubber 28.30±2.91%, sugarcane 27.00±2.58 % and oil palm 28.00±2.58 % and the Web Application test. Benefits in growing crops, found that just entering the soil pH salinity (EC) and soil moisture in the Web Application, can display information for farmers who are facing problems in planting crops and can't produce results immediately. Suggest improvement of soil quality to have appropriate soil properties as well.

## Background / Concept / Inspiration for creating works

Thailand is the world's major exporter of agricultural commodities and generates a lot of income for farmers. Thailand has an agricultural area of up to 149.25 million rai. The Northeastern region is the most agricultural region and is considered the source of many economic crops in the country. At present, Thailand faces many problems with soil management, whether it is soil deficiencies, nutrient deficiencies, and water deficiencies. And there are still soils in many areas where the land has changed. This makes it a problem in cultivation, whether in the North, the Central, the Northeast and the South. The Northeastern region is the region with the most problems with soil resources, because it is a region with a dry climate not suitable for cultivation. In addition to making cultivation more difficult, Farmers' incomes have also declined. When incomes declined, there was no funding to do farming. Kalasin Province is another province that faces such problems. Due to the fact that most of the soil is not suitable for growing vegetables and the current outbreak of the coronavirus, known as Covid-19 (Covid-19), has made farming many times more difficult. Due to the aforementioned problems, the organizers came up with an idea to apply scientific and technological knowledge to create a web application. Soil quality check as well as methods for solving soil problems that are suitable for that plant, with the information being updated and developed to increase the ease of use for easy access to information in order to be useful to farmers who have problems with soil in cultivation

## Research questions

1. What does the soil properties of the local plantation area look like?
2. Can a web application analyze soil quality that is useful for growing plants?

## Hypothesis

1. The properties of the soil in the cultivated area have different characteristics.
2. The web application can analyze the soil quality that is useful for growing plants.

## Experimental method

### Part 1 A comparative study of soil properties in plant plots

#### experimental method

1. Determine the points to be studied and collect 10 general soil data by measuring the soil properties. Designing and collecting random samples for soil sampling representing the area by selecting plants that are healthy compared to those that are not perfect and stunted at 10 points.
2. Analyze the data to find the relationship between plant growing sites and soil properties.
3. Compare complete plant data, and incomplete trees to use the data to design a Web Application



### Part 2 Develop a Web Application to analyze the soil quality that is useful in growing plants.

#### website system

- Writing a website so that users can easily access information by the authors can choose the following languages:
  - JavaScript is a computer language for programming on the Internet.
  - HTML is a form of computer language used to create web pages (Web Pages) that have properties.
  - Can link one web page to other web pages.
  - PHP is a Script language, the workflow will translate every time someone call script.
  - SQL is a standard language for accessing databases. We can use the SQL language from the program.
  - Various things that need to be done with the database system, such as using SQL to retrieve data (Retrieve Data) from the database
  - CSS is a language used to decorate HTML/XHTML documents to have a look, color, spacing, background, lines.



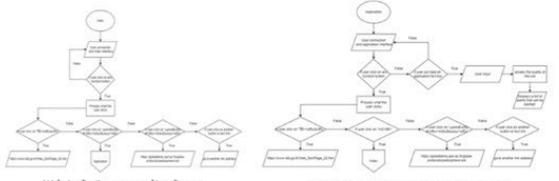
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## Experimental method (continue)

### Diagram and working principle

Develop Web Application to analyze good quality that is useful in growing plants.

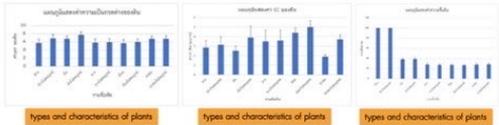


Web Application page working diagram

Work Chart Web Application Soil Quality Analysis

## Experimental Results

Soil properties of each measurement point where each plant was grown, especially those of the same type but complete and imperfect plants. There are different soil properties, so compare them with the following chart.



## Develop a Web Application to analyze soil quality that is useful in growing plants.

Once the soil properties have been measured in the local planting plot and can enter the information into the system as follows

1. Web Application home page
2. Fill in soil properties from the examination.
3. A list of plants that can be planted will appear.
4. Clicking on a list of plants will also include details about that plant.
5. There is a button in the upper right corner for information on improving soil quality before planting and a button indicating how to measure the soil.
6. Soil management information website link

From the soil quality analysis test that is useful for planting, it can provide information for farmers who are experiencing problems with cropping and not yielding, as well as suggesting improvements in soil quality to have appropriate soil properties.

## References

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