

**UNIVERSITI TEKNOLOGI MARA
CAWANGAN PULAU PINANG**

**DEVELOPMENT OF SOIL
MONITORING SYSTEM USING
ARDUINO TECHNOLOGY**

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ABSTRACT

Nowadays agriculture is an important sector in Malaysian since it provides food sources for the country and contributes raw material to the industrial sector. However, farmers experienced problems in controlling the process manually and also having extra work load especially during peak seasons such as harvesting and sowing. Therefore, the aim of this project is to develop a soil monitoring system in agriculture area using Arduino technology. In this project, three parameters are monitored for vineyard i.e. humidity, temperature and potential of hydrogen (pH) level. Besides, an Andriod application is developed as interface system that integrates Arduino microcontroller and related input/output (I/O) devices. An alert message will be sent to the user using Global System for Mobile Communication (GSM) when the soil parameters exceed some limitation values for normal soil condition. A set of data collection is taken from Ladang Anggur Jabatan Pertanian Negeri Perlis to evaluate the performance of the soil monitoring function. Experimented results shows that the normal condition for the vineyard soil parameters are respected to the theoretical values, which are 4.09-7.34, 25.53%-45.85% and 28.9°C-39.3°C for pH, humidity and temperature, respectively.

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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW OF STUDY

Agriculture is a cultivation of animal, plants, biofuel, medicinal plant and other products used to sustain and enhance human life. The agriculture is rapidly growing, however the other subsectors such as crops are declined [1]. In addition, agriculture is growing crops and yields for raising livestock for human consumption. Currently, agriculture can be categorized into two types namely industrial agriculture and subsistence agriculture. The industry used large quantities of crops that are produced by industrial technique for the sale purpose. The target of industrial agriculture is to increase the crop yield in order to produce for each unit of land. It is because the production of industrial agriculture is sold worldwide [2].

The subsistence agriculture purpose is to feed the growing human population. Mostly, the farmer lives on a small amount of land and need to produce enough food for the survival of the individual family. Basically, the crop yields are divided by three types such as herbs plant, root crops and food sustain i.e. vegetable and fruits. Examples of herbs plant are basil which is used to treat respiratory disease and curry leaves for anticancer agent and lowering cholesterol level. Moreover, ginger, onion, sweet potatoes are examples of root crops [3].

Malaysia is one of the countries that are exposed to urban agriculture that focuses on farm productions in an urban environment. It can be used as a socio-economic survival and livelihood enhancing strategy [4]. Urban agriculture can also be a good catalyst in providing food by developing agricultural areas. Urban population depends on their income to access food that meets their need. By 2025, 60-85% of human beings will be living in urban areas [5]. There are many advantages of urban agriculture. For one thing, it gives families and communities the opportunity to unite together. Working towards the same shared goals provides employment opportunities, helps people to generate income and educates people about the importance of urban agriculture [6].