# AUTOMATION AGRO SYSTEM

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FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

**BORANG PENGESAHAN STATUS LAPORAN**
**PROJEK SARJANA MUDA II**

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Special dedication to my beloved parent, my supervisor Mr. Azman Awang Teh and also to my dearest friends. Thank you for the support.

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## ABSTRACT

As we know, agriculture is an important source to stable our country economy. Even thought our country agriculture product was increase year by year, but our product having less quality between other growing countries. This is because, most agriculture in our country was managed by human power that have limit. This can decrease the agriculture product and reduce the quality of the product. Also in our equator atmosphere, the agriculture is exposed to pest that can destroy the agriculture. Research had been made on how to reduce human power used in agriculture. We also do research about water and manure system and the factors that destroy the plant. After all the research, we both agree to create one system that can manage agriculture effective. This project contains 4 main parts namely watering system, manure system, safety system and automatic roof system. All these 4 parts will be controlled by PLC to function automatically without using any human assistant. Safety system is use to avoid the agriculture from intruders. It will generate signal and will activate the siren system. Timer will be use in both watering and manure system where it will generate a signal to the PLC and activate the system. This happen in certain time that have been set. Signal from timer will activate the PLC and relay will run both manure and watering system. In this project, 'FERTIGATION' system will be introduce where both manure and watering system been combine to function together. The heat detector is use in the automatic roof system. This detector will generate signal to move the roof to protect the plant from over heat. All 4 major parts will be combining together and will produce one system that we call "Automation Agro System". "Automation Agro System" were build to ensure that our country agriculture product have a good quality to increase our country economy.

# ABSTRAK

"SISTEM AUTOMASI AGRO" merupakan satu projek yang dilaksanakan bertujuan untuk memastikan agar hasil pertanian negara kita mencapai tahap kualiti yang memuaskan dan sekali gus dapat meningkatkan ekonomi negara kita. Seperti yang kita sedia maklum, pertanian adalah salah satu sumber ekonomi yang penting untuk menstabilkan ekonomi negara kita ini. Walaupun pengeluaran hasil tani negara kian meningkat dari tahun ke tahun, tetapi kualiti pengeluaran hasil tani negara adalah kurang bermutu jika dibandingkan dengan negara maju yang lain. Ini adalah disebabkan oleh pengurusan pertanian negara diuruskan oleh tenaga manusia yang terbatas. Masalah ini boleh merencatkan hasil keluaran pertanian dan mengurangkan mutu keluaran pertanian. Sehubungan dengan itu, kajian mengenai masalah ini telah dibuat dari akar umbinya dengan mengurangkan penggunaan tenaga manusia dalam menguruskan sesebuah pertanian negara. Bagaimana tanaman disiram dan dibaja mengikut jadual yang ditetapkan turut dikaji. Selain itu, faktor-faktor kerosakan tanaman dan kaedah mengatasi masalah ini telah dikenalpasti. Dengan itu, sebuah sistem automatik telah dicipta dimana sistem ini dapat menguruskan sebuah pertanian dengan berkesan. Sistem ini merangkumi kaedah penyiraman dan pembajaan secara automatik dengan mengikut jadual yang boleh ditetapkan. Di dalam projek ini, sebuah kaedah baru iaitu kaedah 'FERTIGASI' akan diperkenalkan di mana kaedah ini akan menggabungkan kedua-dua sistem iaitu sistem baja dan sistem pengairan. Selain itu, terdapat juga kaedah untuk mengesan pencerobohan dan kaedah melindungi hasil tanaman dari keadaan panas yang melampau dengan menggunakan bumbung automatik untuk perlindungan berkesan di dalam projek ini. Dengan ini terciptalah sistem yang diberi nama "SISTEM AUTOMASI AGRO".

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PLC - Programmable Logic Controller

CPU - Central Processing Unit

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# CHAPTER 1

# INTRODUCTION

## 1.1 Background Of Project

As we already know, agriculture is one of the economic sources to stabilize our country economy. Although the agriculture manufacture is increase year by year, but the quality of the agriculture manufacture in our country is less then good compare to the others developed countries. This is because of the usage of the human power that is limited in the agriculture management and also our weather condition that unexpected. The factors can cause a problem in agriculture product and lower the quality of it.

Base to the problems, a research have been made to at least less the effect and the damage to the agriculture. A research about how the plant been watered and manure base on the time set and the used of the human power in agriculture was made. Most of the country agriculture using human to do this two process where it can be done automatically and only need to be monitored by a single person. The weather condition especially the heat from hot weather can cause damage. From the research, the method to avoid the problems was studied.

From the research result, a project that combining some systems had been created to manage the agriculture to produce a quality agriculture product. This project basically divided to four parts that is watering system, manure system, safety system and roof system. All this systems will be combining and control by PLC to produce a project call "Automation Agro System".

"Automation Agro System" is focusing more on watering and manure system beside two simple systems to avoid intruders and factors that can damage the agriculture. For watering and manure system, timer will be use where timer program will be installing to the PLC to control those two systems. Timer will be set according to the need and plant condition. Every plant has the different level of moisture. Watering and manure system will be control fully by PLC. Timer inside the PLC will trigger the watering also the manure system.

Intruders divided in two categories and it is human and animal. As we know, big animal can be harmful to plants this includes human. Got certain humans taking advantage of farmer's hard work and gain money or profit with selling the stolen plant to somebody else or middle man between provider and market. Safety system in "Automation Agro System" was function to avoid intruders from human and animals. It controlled by PLC where the output from PLC will trigger the alarm to alert the owner of the intruders and this alarm also function to scare those intruders from entering the farm.

Roof system is control by the PLC base on output from heat detector where the output will triggered the PLC and the roof system will be drive. This roof will covered the whole farming area to protect the plant from the heat. As we know, overheat can damage the leaf and dry the plant, this make the agriculture product lost it qualities and the plant growth. This system will trigger the PLC to drive the motor and activate the roof. Net is used as a roof where certain amount of sun light can through the net for the plant needed.

## 1.2 Objective

With this system, the objective that I want to achieve is:

- To increase the country agriculture product.
- Produce a quality agriculture product.
- Perform an easy way to manage agriculture.
- To make sure that water and manure system are done in time.
- To avoid the agriculture from human and big animal.
- To protect the plant from overheat.

## 1.3 Problem Statement

Watering and manure is a routine process done by human in farm to maintain the quality of their agriculture product. Larger the farm or plant place more human power needed to do the process. Human is not always in a good shape where this affect their work and also could affect the quality of the agriculture. They expose to the emotion, environment, and their own nature.

Farm or plant always had been harm by animal or human intruders where they or it eat fruit or the leaf. Beside that, there is certain individual who intrude and stole the plant to sell in the market. Nowadays the value of agriculture product is increase in the market and this factor will be the actuation to the intruders to get the profit by stealing it from others.

Overheat can damage the plant where it will make the plant dry and this can rot the plant leaf. Our country situated on the equator of the earth and we only have two possible seasons that is rain and hot. In our current atmosphere now, the heat from the sun can stunt the agriculture growth.

## 1.4 Project Scope

Scope is important to achieve the objective of the project where it will be my reference point to create a success system. The scopes for this project are:

1. Creating a system to detect burglar and also big animal such as cows and goats from entering the farm. This system will activate the alarm system where this alarm can warn the burglar or scare the animal away from the farm and it also can give sign to owner that the farm been intruded.
2. Set the watering and manure system to function in the decided time by using timer system.
3. Covered the farm by roof when there is an overheat, automatically triggered by a system contain heat detector.
4. Program the PLC to control all the system to create one system that called 'Agro Automation System'

## 1.5 Short Statement Of Methodology

The methodology of this project is:

- Choose the project title
- Analysis the project scope and background
- Do the literature review, project objectives, problem statement, and methodology
- Design and drawing the model
- Prepare the hardware and software
- Troubleshooting and analysis
- Report Writing

There are several phases or methods to be used to achieve the objectives of the proposed project. The first method is literature review of the project. It is important to gain more information of the idea and concept of this project. The information that related to the project is found from journals, articles, books, internet,

lecture's note, etc. The information is all about the automation system, control system, PLC, dc motor, sensor, valve etc.

Then, the second method is design and drawing for the whole system. It is contained of mechanical drawing and electrical drawing that are determined in design process. The third stage is to construct the hardware for the project which is including electrical and mechanical parts. Then the software development and implementation which is used a Programmable Logic Controller (PLC) program been done. Lastly, the final report of the project will be construct.

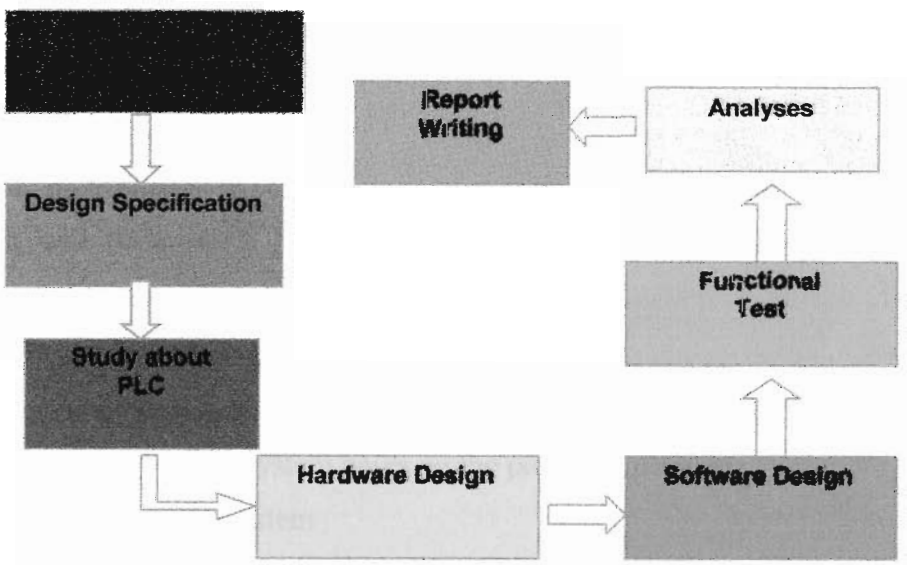


Figure 1.1: Methodology Block Diagram

# CHAPTER 2

# LITERATURE REVIEW

For the success of the project, a review about agriculture and certain equipment will be studied and understand. The theories that connected to the "Automation Agro System" are:

1. Programmable Logic Controller or 'PLC' that will be the heart of this project where it controls all system bases on the program installed.
2. 'FERTIGATION' System
3. Effect of heat to Agriculture.
4. Sensors and Circuits

As stated, all the theory had been studied and understands to support this project. Those theories are important to create the system of this project and the system wiring.

## 2.1 Programmable Logic Controller (PLC)

A programmable logic controller (PLC) or programmable controller is a digital computer used for automation of industrial processes, such as control of machinery on factory assembly lines. PLC's are used in many "real world" applications. If there is industry present, chances are good that there is a plc present. If you are involved in machining, packaging, material handling, automated assembly, or countless other industries you are probably already using them. If you are not, you are wasting money and time. Almost any application that needs some type of electrical control has a need for a plc. [11]

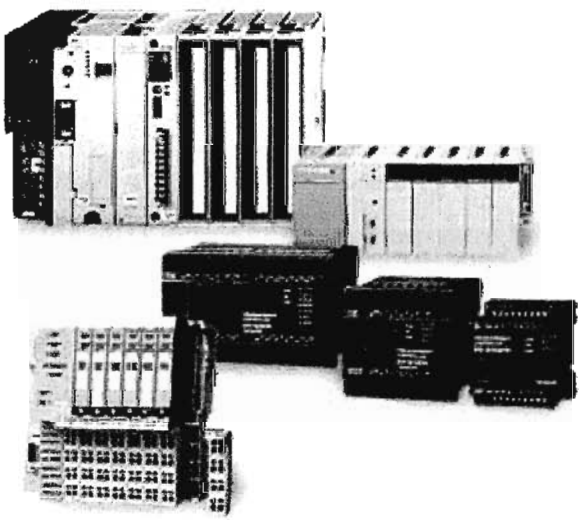

Figure 2.1: Typical PLC

A PLC (i.e. Programmable Logic Controller) is a device that was invented to replace the necessary sequential relay circuits for machine control. The PLC works by looking at its inputs and depending upon their state, turning on/off its outputs. The user enters a program, usually via software, that gives the desired results. [11] Certain application or circuits like timer, counter and relay can easily been replaced with just enter the program into the PLC. With this technology, a multiple application can be control with just only one PLC.