

**UNIVERSITI TEKNOLOGI MARA**

**TEMPERATURE AND HUMIDITY  
TREND ANALYSIS OF HARUMANIS  
MANGO USING IN-SITU AND UAV  
MULTISPECTRAL IMAGE DATA**

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## **ABSTRACT**

Harumanis is a mango cultivar grown in parts of Indonesia and Malaysia. In Malaysia, because it is very sensitive to climate, Mango only grows in the state of Perlis and is an iconic fruit of Perlis. Mango is one of the best tropical fruits because of its aroma and sweetness. Compared to varieties from Indonesia, those grown in Perlis are often highly valued for export and therefore attract high foreign income. There are two conditions required for the tree to produce good flowers: hot, dry weather during the day and a chilly, windy night for three months. The aim of this study is to assess the rainfall and temperature trend analysis of Harumanis mango using tiny-tag data logger and field data collection. To achieve the aim, the objectives of this study are to: i) establish the tree data collection of several parameters (Tree height, DBH, temperature and humidity). ii) identify the relationship between the climatic trend of the Harumanis mango of the study area during vegetation, flowering, and fruiting stage data. iii) produce the graph of the climatic trend and NDVI map. The study area is carried out at Harumanis mango plantation in UiTM Arau, Perlis. Five variables such as temperature, humidity, height of tree and diameter at breast height (DBH) data will be used. This study can help obtain the method of cultivation of Harumanis mango based on temperature moisture and rainfall received by Harumanis trees to get the best crop yields. Besides, the UAV Multispectral image was used to determine the NDVI value of vegetation, flowering and fruiting stage which had been processed using ArcMap software. Therefore, it also can show that different of NDVI map for each stage.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Introduction

This chapter explained the research background, problem statement, significance of the study, aim, and objectives, research questions, scope and limitations of the study for this research work.

### 1.2 Research Background

The Harumanis mango has been one of the most commercially successful and widely recognised varieties of mango in Malaysia for the past 15 years. Demand for this type has increased year after year because of its great quality and favorable eating preferences, and most of its production is concentrated in the northern region. Each year, the demand for this kind grows, and the majority of the production is concentrated in the northern portion of Peninsular Malaysia, specifically in the state of Perlis. Demand for Harumanis mango increased dramatically, prompting the company to expand its production land into the neighbouring state. (Attia, 2017). Although fruits are so popular, the supply has never equaled the demand. Japan is one of Perlis' primary export markets, and the company has set its sights on increasing its mango exports every year since 2009. Mango trees bear fruit only once a year, from January to almost the end of June, depending on the climate. This mango variety is quite vulnerable to the weather. In order to begin flowering, the plant needs a long period of dry weather. Mangoes' growth is strongly influenced by the climate, particularly the relative humidity. As a result of knowing the weather conditions, mangoes can be predicted to begin blossoming. (Nooriman et al., 2018). Figure 1.1 shows a fully ripe Harumanis mango.

Furthermore, climate is one of the major components in the earth's system. There are many variables such as temperature, rainfall, atmospheric pressure, humidity that make up the weather and climate. Climate is usually defined as average weather. Climate variability, especially annual air temperatures and rainfall, has received a lot of attention

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