UNIVERSITI TEKNOLOGI MARA

CROP PREDICTION USING FUZZY LOGIC

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CHAPTER 1: INTRODUCTION

This chapter provides the background and rationale of the study. It also gives the details
significance of crop prediction using fuzzy logic, issues, and problems that led to this research.

1.1 Background of Study

Agriculture is the art and science of soil planting, crop production, and livestock rearing. It involves preparing plant and animal products that can be used and sold to markets by humans. The development of agriculture has led to the rise of civilizations for centuries. Before agriculture was widespread, people spent most of their time searching for food, hunting wild animals, and collecting wild plants. Approximately 11,000 years ago people slowly learned how to grow cereals and root crops, and settled down to a farm-based life.

The main factor for agriculture to succeed depends on the choice of the right crop and fertilizer for the soil. When choosing a suitable crop for the soil, the soil type and soil nutrients are of primary importance. Therefore, a prediction model must be built to help farmers make their choices (Anushiya et al., 2020).

Today, major agricultural companies are investing in technology. This helps them to learn about crop production information, easier soil mapping by using GPS, fertilizer use by sensing technology, and weather information, all influenced by soil nutrient content. This knowledge will allow farmers to know the most productive crops in their region. Upon understanding the present soil state, this study also recommended which crops are most appropriate for planting based on a fuzzy logic model for crop recommendations (Martinez-Ojeda et al., 2019).

Generally, decision-making on agriculture is based on expert opinions and such assumptions may not apply to the assessment of soil suitability and can contribute to lower crop yields. The clear dataset management of data mining techniques and algorithms has an enormous analytical potential for accurate and reliable tests, which can help to simplify the classification process, based on the predefined parameters established by the Agriculture Research Centers (Arooj et al., 2018).

Farmer's decision on which crop to grow is usually clouded by opinion and other irrelevant factors such as making immediate profits, lack of knowledge of market demand, overestimating the ability of soil to sustain a particular crop, and many more. A very wrong decision on the part of the farmer could put a tremendous strain on the financial situation. The need to develop a system that would provide valuable insight to farmers, allowing them to make informed choices about which crop to produce. The system would consider environmental parameters and soil characteristics before recommending the most suitable crop to the user (Doshi et al., 2018).

Farmers prefer to select an unsuitable crop for their soil and this issue can be overcome by precision farming where soil characteristics such as soil type, texture, pH value, etc. are used to determine which crop is appropriate for cultivation in that soil. This minimizes the risk of growing incorrect crops which collectively result in better crop yields from a specific crop (Kumar et al., 2019).

The soil is an important part of agriculture. There are a variety of types of soil. Each type of soil can have different characteristics and different types of crops grown on different soil types. Farmers need to identify the characteristics and features of different soil types so that they can understand the crop is growing better in those soil types (Rahman et al., 2019).

In this project, a fuzzy logic model is used to predict a suitable crop for different soil types.