

ABSTRACT

Fertilization is a crucial factor in melon cultivation, as it is sensitive to nutrient availability and environmental conditions such as soil pH, temperature, humidity, and soil conductivity. Mistakes in fertilization, particularly in timing, can disrupt plant growth and reduce crop yields. This study aims to determine the optimal fertilization schedule based on timing and soil quality using the Analytical Hierarchy Process (AHP) method and the CRISP-DM approach. Data were obtained from interviews and questionnaires with experts at the Food Crops and Horticulture Agribusiness Development Unit (UPT), also known as Puspa Lebo. The analysis results show that the dominant nutrients differ in each growth phase: nitrogen (N) in the vegetative phase, phosphorus (P) in the generative phase, and potassium (K) in the fruit ripening phase, each with a global priority weight of 0.136. From an environmental perspective, temperature is the most dominant factor during the day (priority 0.15), while pH and temperature are equally important in the morning and evening (each 0.083). The final analysis showed that midday was the most optimal fertilization time, with the highest priority weight of 0.548, followed by morning (0.241) and afternoon (0.211). These results were visualized in an interactive dashboard using Power BI as a decision support system to help farmers schedule fertilization efficiently and timely.

Keywords: *Analytical Hierarchy Process, Cross-Industry Standard Process for Data Mining, Melon Plant, Power BI, Puspa Lebo*