KLASTERISASI PRODUKTIVITAS PERTANIAN DI KABUPATEN BATANG BERDASARKAN LUAS LAHAN, HASIL PANEN, DAN PENGGUNAAN PUPUK MENGGUNAKAN *K-MEDOIDS* BERBASIS *WEBSITE*

ABSTRAK

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Produktivitas pertanian padi merupakan aspek penting dalam mendukung ketahanan pangan dan pembangunan daerah, namun di Kabupaten Batang, khususnya Kecamatan Tersono, masih terdapat perbedaan produktivitas antar desa yang dipengaruhi oleh luas lahan, hasil panen, penggunaan pupuk, varietas padi, dan jenis irigasi. Pengelolaan data pertanian yang belum terstruktur dan belum terintegrasi dalam sistem berbasis digital menyulitkan proses analisis dan pengambilan keputusan oleh Dinas Pangan dan Pertanian. Untuk mengatasi permasalahan tersebut, penelitian ini mengembangkan sistem klasterisasi produktivitas pertanian berbasis website menggunakan algoritma *K-Medoids* dengan pendekatan *Knowledge Discovery in Database* (KDD). Data yang digunakan merupakan data primer dari Dinas Pangan dan Pertanian Kabupaten Batang yang melalui tahapan data selection, preprocessing, transformasi, dan proses klasterisasi. Penentuan jumlah klaster optimal dan evaluasi kualitas klaster dilakukan menggunakan metode *Silhouette Coefficient*. Sistem dikembangkan menggunakan bahasa pemrograman Python dengan framework Streamlit serta database MySQL, dan dilengkapi fitur pengelolaan data, proses klasterisasi, evaluasi, visualisasi hasil klaster, dan ringkasan karakteristik klaster. Pengujian sistem dilakukan menggunakan metode *Black Box Testing* dan menunjukkan seluruh fungsi sistem berjalan sesuai kebutuhan. Implementasi sistem ini diharapkan dapat membantu pemerintah daerah dalam menganalisis persebaran produktivitas pertanian, mendukung pengambilan keputusan strategis berbasis data, serta meningkatkan efektivitas pengelolaan sektor pertanian di Kabupaten Batang.

Kata Kunci: Produktivitas pertanian, Klasterisasi, *K-Medoids*, *Silhouette Coefficient, Knowledge Discovery in Database* (KDD), Website, Streamlit.

CLUSTERING OF AGRICULTURAL PRODUCTIVITY IN BATANG REGENCY BASED ON LAND AREA, CROP YIELD, AND FERTILIZER USE USING A WEBSITE-BASED K-MEDOIDS

ABSTRACT

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Rice agricultural productivity is an important aspect in supporting food security and regional development; however, in Batang Regency, particularly in Tersono District, there are significant differences in productivity among villages influenced by land area, crop yield, fertilizer usage, rice varieties, and irrigation types. The management of agricultural data that is not yet well-structured and not integrated into a digital-based system makes data analysis and decision-making processes more difficult for the Department of Food and Agriculture. To address these issues, this study develops a website-based agricultural productivity clustering system using the K-Medoids algorithm with the Knowledge Discovery in Database (KDD) approach. The data used in this study are primary data obtained from the Department of Food and Agriculture of Batang Regency, which undergo data selection, preprocessing, transformation, and clustering stages. The determination of the optimal number of clusters and the evaluation of clustering quality are conducted using the Silhouette Coefficient method. The system is developed using the Python programming language with the Streamlit framework and MySQL database, and is equipped with features for data management, clustering processes, evaluation, visualization of clustering results, and cluster characteristic summaries. System testing is carried out using the Black Box Testing method and shows that all system functions operate according to requirements. The implementation of this system is expected to assist local governments in analyzing the distribution of agricultural productivity, support data-driven strategic decision-making, and improve the effectiveness of agricultural sector management in Batang Regency.

Keywords*: Agricultural productivity, Clustering, K-Medoids, Silhouette Coefficient, Knowledge Discovery in Database (KDD), Website, Streamlit.*