ABSTRAK

Ketahanan pangan merupakan aspek penting dalam menjamin ketersediaan dan akses pangan bagi masyarakat. Kabupaten Aceh Utara sebagai daerah dengan potensi pertanian yang besar masih menghadapi tantangan dalam pemerataan ketahanan pangan. Penelitian ini bertujuan untuk mengelompokkan wilayah berdasarkan tingkat ketahanan pangan menggunakan algoritma *K-Medoids* sehingga dapat memberikan gambaran kondisi ketahanan pangan serta mendukung pengambilan keputusan. Data yang digunakan merupakan data tahun 2023 dari Dinas Pertanian dan Pangan Kabupaten Aceh Utara yang mencakup 27 kecamatan dengan indikator rasio luas lahan pertanian terhadap jumlah penduduk, rasio sarana dan prasarana penyedia pangan terhadap jumlah rumah tangga, rasio penduduk dengan tingkat kesejahteraan terendah terhadap jumlah penduduk, akses penghubung desa melalui darat, air, atau udara, rasio rumah tangga tanpa akses air bersih, serta rasio jumlah penduduk terhadap tenaga kesehatan. Hasil penelitian menunjukkan algoritma *K-Medoids* berhasil mengelompokkan wilayah ke dalam 6 *cluster* yaitu C1 (sangat rentan pangan) sebanyak 59 desa, C2 (rentan pangan) sebanyak 81 desa, C3 (agak rentan pangan) sebanyak 179 desa, C4 (agak tahan pangan) sebanyak 58 desa, C5 (tahan pangan) sebanyak 48 desa, dan C6 (sangat tahan pangan) sebanyak 427 desa. Evaluasi hasil *clustering* menggunakan *Davies-Bouldin Index* (DBI) dan *Silhouette Coefficient* (SC). Nilai DBI sebesar 3,408 menunjukkan kualitas *clustering* yang masih moderat dan belum optimal, sedangkan nilai SC sebesar 13,14%, yang diperoleh dari rata-rata nilai *Silhouette* seluruh data, menunjukkan bahwa hasil pengelompokan masih memiliki kualitas yang rendah sehingga pemisahan antar *cluster* belum optimal dalam merepresentasikan kondisi ketahanan pangan.

Kata Kunci: Ketahanan Pangan, *Clustering*, *K-Medoids*, *Davies-Bouldin Index* (DBI), *Silhouette Coefficient* (SC)

ABSTRACT

Food security is an essential aspect of ensuring food availability and accessibility for the community. North Aceh Regency, as a region with significant agricultural potential, still faces challenges in achieving equitable food security. This study aims to classify regions based on their food security levels using the K-Medoids algorithm to provide an overview of food security conditions and support decision-making. The data used were obtained from the North Aceh Agriculture and Food Service for the year 2023, covering 27 sub-districts with indicators including the ratio of agricultural land area to population, the ratio of food supply facilities and infrastructure to the number of households, the ratio of the population with the lowest welfare level to the total population, access to villages through land, water, or air transportation, the ratio of households without access to clean water, and the ratio of population to health workers. The results show that the K-Medoids algorithm successfully grouped the regions into six clusters: C1 (very food insecure) consisting of 59 villages, C2 (food insecure) consisting of 81 villages, C3 (moderately food insecure) consisting of 179 villages, C4 (moderately food secure) consisting of 58 villages, C5 (food secure) consisting of 48 villages, and C6 (very food secure) consisting of 427 villages. The clustering results were evaluated using the Davies-Bouldin Index (DBI) and Silhouette Coefficient (SC). The DBI value of 3.408 indicates that the clustering quality is moderate and not yet optimal, while the SC value of 13.14%, obtained from the average Silhouette value of all data points, indicates that the clustering quality is still low, suggesting that the separation between clusters is not yet optimal in representing food security conditions.

Keywords: *Food security, K-Medoids, Clustering, Davies-Bouldin Index (DBI), Silhouette Coefficient (SC)*