

## **ABSTRACT**

Sustainable agriculture is an important approach in addressing global challenges such as land degradation, climate change, and increasing food demand. The aimed of this research was to apply sustainable agriculture principles to areca nut cultivation and to determine the typology of sustainable agricultural land use for areca nut commodities spatially based on Geographic Information System (GIS) in the Krueng Simpo sub-watershed. This research was conducted in the Krueng Simpo sub-watershed, Bireuen District, based on Land Map Units (LMU). Soil analysis was conducted at the Soil Science Laboratory of Universitas Malikussaleh and the Soil and Plant Research Laboratory of Universitas Syiah Kuala. This research was conducted from December 2024 to March 2025. The survey methods used in this research consisted of four stages: preparation, preliminary survey, main survey, data analysis, and presentation of results. The results of the research showed that the principle of sustainable agriculture for areca nut crops in the Krueng Simpo sub-watershed can be applied through environmental management by reducing erosion, implementing conservation measures that are acceptable to the community, thereby increasing productivity and economic feasibility above the threshold for a decent standard of living. The typology spatial of land use in the Krueng Simpo Sub-Watershed has undergone changes from 2017 to 2022, particularly in the typology of agricultural land in the spatial patterns of dryland agriculture, production forests, and mixed gardens.

Keyword: Erosion, conservation, farming, productivity, survey.