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Comparative assessment of soil quality in paddy and abandoned paddy lands for better land management

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Rice is the main source of food for more than half of the world's population and it is the staple food in Sri Lanka. Industrialization and urbanization combined with the population growth put a strain on available agricultural lands in urban areas. The focus of this study was to assess and compare the soil quality in paddy and abandoned paddy lands in selected five Grama Niladhari Divisions (GNDs) in Biyagama Divisional Secretariat Division (DSD). The GNDs were Pahala Biyanwila Central, Pahala Biyanwila East, Pahala Biyanwila West, Makola North Central, and Makola North Pahala. Among the selected five GNDs, ten sampling sites separately from paddy lands and abandoned paddy lands were selected based on judgmental sampling technique. Three soil samples were collected at a depth of 0–15 cm from each paddy site and abandoned paddy site during August and September 2020 (after rice harvest). The soil quality was examined through selected physicochemical parameters: temperature, color, particle density, pH, electrical conductivity, salinity, total nitrogen content, extractable phosphorous, organic matter and organic carbon content, and oil and grease content. The APHA and EPA standard procedures were followed for analyzing physicochemical parameters of soil quality. The results of physicochemical parameters were analyzed using MINITAB 14.0. One-way ANOVA was used to determine the variation among the sites, separately in paddy sites and abandoned paddy sites. Two sample t-test was used to compare each physicochemical parameter in paddy sites and abandoned paddy sites. When compared the soil quality in paddy and abandoned paddy lands, soil temperature, particle density, soil pH, electrical conductivity, salinity, total nitrogen, organic matter, and organic carbon are not significantly different with paddy and abandoned paddy lands (Two-sample t-test, $p > 0.05$). However, soil extractable phosphorous, as well as oil and grease content were significantly different between the paddy and abandoned paddy lands (Two-sample t-test, $p < 0.05$). It is concluded that low soil phosphorous and high oil and grease content have influenced the lands to be abandoned. Since clay particles are covered by oil and grease, it acts as a barrier to the adsorption of phosphorous. Suitable soil management strategies should be applied to reduce oil and grease to improve the soil quality in abandoned paddy lands.

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