Soil Properties and Fertility Management with Respect to Capsicum (Capsicum annuum L.) Production in Nairobi Peri-urban Counties

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Abstract

The study aimed at assessing the soil fertility status in the peri-urban counties of Nairobi (Kiambu, Kajiado, and Machakos) for Capsicum production. In these counties, the potential of producing Capsicum is not known as farmers continue to grow Capsicum without clear guidelines. Thus, there is a need to determine the nutrient distribution in the soils for optimal Capsicum production. Ninety (90) soil samples were collected randomly following a zigzag pattern and analyzed for both macronutrients and micronutrients, i.e., total nitrogen (TN), phosphorus (P), potassium (K), calcium (Ca), sulfur (S), magnesium (Mg), iron (Fe), manganese (Mn), boron (B), copper (Cu), and zinc (Zn). KoBoCollect application was used to collect soil sample information. Using the Quantum Geographic Information System (QGIS) software, the data was then used to generate a soil fertility map for the three counties. A fertilizer program for growing Capsicum was then produced and developed using the sufficiency approach. The soil nutrients differed significantly across the counties. Nitrogen and organic carbon were deficient in both Kajiado and Machakos counties while phosphorus was in adequate amounts in the soil but not sufficient enough to meet the requirements of the crop. Urea, manure, and triple superphosphate (TSP) were recommended at different rates to address the low nitrogen, organic carbon, and phosphorus in the soils. The study rated the fertility index of the soils of the study area at medium since most soil nutrients were optimal apart from nitrogen and organic carbon, which were deficient. Hence, to suit Capsicum production, a fertilizer program was produced to help farmers in their planning schedules.

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