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"Resilience of agricultural systems against crises"

The Challenges of Maintaining Soil Productivity and Food Security in Sudan

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Abstract

The Republic of Sudan is the largest Arab country in terms of area (with more than 250 M ha total area). While 16.7 M ha is already used for farm production (irrigated and rain fed systems), potential arable area is much larger. Furthermore, Sudan has substantial surface water resources, especially in the Blue and White Nile which have been partly developed for irrigation purposes. In spite of these natural resources, Sudan suffers from food shortages in many years and lacks the resources to cover the needs of over 32 million inhabitants, 10 % of them was classified as living in severely food insecure households. In order to evaluate soil productivity and food security challenges, a survey was conducted where interviews were held with Agricultural Ministry officials along with data collection from field visits , sampling and analysis of 80 soil samples from irrigated and rain fed schemes during the summer season between May and July 2011. The results of the survey revealed that Sudan suffers from a range of environmental threats that have affected the productivity of soils and crops. Increases in temperature and reduction in rainfall, especially between the years 1930–1990, have increased the dry areas up to 51 % of total area. The availability and prices of crop commodities was also affected. Sorghum, wheat and millet production was reduced to 45 % and the prices of sorghum, millet and groundnut were doubled compared to February 2012 prices. Results of the soil survey showed generally poor soil fertility; in the irrigated schemes the organic matter was often < 1 %; low total nitrogen; neutral pH 7.8; extremely low plant available $p < 0.08$ ppm (Bray) and CEC 54 $cmol\,kg^{-1}$. In the rain fed areas the organic matter ranged between 1.14 to 2.3 %; N <0.05 %; pH neutral to alkaline and low plant available P and CEC comparable to the results of the irrigated survey. While inherently low soil fertility is a feature of much of the agricultural lands of Sudan, a shortage of rains, the lack of proper fertilisation management and agricultural plans exacerbated the effects on agricultural output.

Keywords: Soil management, food security, Sudanese soil quality

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