EFFECT OF FLUCTUATION OF WETTING AND DRYING PHENOMENA ON SOIL FERTILITY STATUS UNDER RICE CULTIVATION IN WETLAND SOIL IN RWANDA

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Abstract

Since 1980, wetland s in Rwanda have been considered as important areas for agriculture intensification through improving food security and incomes to the farmers. However, changes in the soil nutrient status due to repeatedly wetting and drying phenomena may considerably affect soil fertility status thus leading to low crop productivity of the wetlands. This has consequently created fear to the wetland users especially the local farmers, extension workers and agronomists. The comparative study was conducted to assess the effect of drained and irrigated phenomena at Mamba, Rwasave and Rugeramigozi marshlands on soil fertility change under rice growing. 24 samples were taken with 12 samples under drained and 12 under irrigated areas. The samples were collected randomly from top soil (0- 20 cm). The following parameters were quantified; soil pH(H_2O) in soil water suspension with ratio 1:2.5; Al exchangeable (1N Kcl), organic carbon (walkely and black method in Sumner method modified (1984), Total nitrogen kjeldahl (TNK) in Bremner modified method, available phosphorus (bray 1). Bases exchangeable with 1 N ammonium acetate following AAS and CEC and available Fe, Zn, Cu and Mn (DTDA) diethylenetriaminepentaacetic acid. Data analyses were processed with GENSTAT version 3. The results showed that the fluctuation of wet and dry water have significantly affected soil fertility status at p=0,05. The phosphorus and potassium are in the low levels of deficiency 2.32 ppm and 47.72 ppm in irrigated area while crop requirement nutrients are 20 ppm and 200 ppm respectively. And Al is in toxic level conditions, 27.5% in drained area while rice tolerance is 20%. Fe was 641.51 ppm in irrigated area while requirement narrowed to 300 ppm. As conclusion, the soil fertility is low and toxic which constitutes a limitation. The wetland soil in Rwanda should offer opportunities for paddy growing (rice, etc), if soil fertility factors would be amended by lime for its acidity and gypsum for its exceeded Na.

Keys words: soil fertility; total nitrogen kjeldahl; wetland; gypsum; Rwanda.

КАРТЫ РАЗДЕЛА «КЛИМАТ» ДЛЯ НОВОГО ИЗДАНИЯ ЭКОЛОГИЧЕСКОГО АТЛАСА РОССИИ

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MAPS ALBUM «CLIMATE» FOR NEW EDITIONENVIRONMENTAL ATLAS RUSSIA

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