Effects of Soil Fertility and Crop Management on Selected Soil properties and their Relationship with Yield and Water Use Efficiency

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The research was carried out at the agricultural field of the faculty of Agriculture, Gifu university, Japan (Lat 35^{o} 27'N, 136^{o} 46'E) to investigate the effects of soil fertility and crop management on selected soil properties and their relationship with yield and water use efficiency.

The design used for the experiment was randomized complete block design with five treatments and three blocks. The treatments comprised control (no fertilizer application). Treatment two inorganic fertilizer only (80Nkg/ha, $130P_2O$ kg/ha and $80KO_2$kg/ha), treatment three cow dung only at 20t/ha, treatment four (75% NPK supplemented with 5t/ha cow dung) and treatment five (50% NPK supplemented with 10t/ha cow dung).

Data were collected on the growth and yield components, water use efficiency and soil chemical and physical properties. Other data collected were on soil moisture content and weather parameters.

The growth and yield results showed the fertilizer treated plots (T2, T3, T4 and T5) recording higher values than the control (T1).The performance of the inorganic fertilizer treatment only (T2) and the supplemented inorganic treatment with cow dung at 10t/ha (T5) were at par in terms of significance. Application of fertilizer did improve the water use efficiency of the crop compared to the control. There was no significant effect of the fertilizer on the soil chemical properties measured, but positively it did affect the physical properties measured.

The overall results of the experiment shows that it is possible to supplement inorganic fertilizer with an organic fertilizer like cow dung at the same nutrient level and still maintain the growth and yield of crops and also improve the physical properties of the soil gradually over time.