EFFECT OF CONVENTIONAL, ORGANIC AND NATURAL FARMING SYSTEM ON SOIL PROPERTIES AND PERFORMANCE OF COWPEA (*Vigna unguiculata*)

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ABSTRACT

Due to increasing rate of population the food availability is limited and farmers are adopting different farming systems to meet the demand. But sustainable and successful management of resources for agriculture to satisfy changing human needs, without degrading the environment or the natural resources is lacking. Therefore, this study was conducted at Agronomy farm, eastern university during October to December, 2017 to study the impact of organic, natural and conventional farming systems on physical and chemical properties of soil and also to evaluate the soil fertility status of the same.

Three different farming systems were practiced in randomized complete block design with five replications and fifteen plots were labelled. To find out the most suitable farming system, waruni variety of cowpea was selected and grown. Period from 2nd week to 5th week the growth parameters such as plant height, leaf number, branch number, days to fifty percentage flowering were observed and recorded. The yield parameters such as pod number and pod weight were observed and recorded. Initial and end (60 days after planting) soil samples were collected and soil properties such as bulk density, particle density, porosity, electrical conductivity, organic matter content, and microbial activity were analyzed. All the experimental data were analyzed statistically with Duncan Multiple Rang Test (DMRT) at 5% significant level by using SAS 9.1 application statistical package. Analyzed growth parameters and soil physical and chemical properties were compared among those three farming systems.

Natural farming had improved in growth performance, physical and chemical properties of soil compared to other two farming systems where the low level of bulk density and particle density were found as 1.1331 gcm^{-3}, 2.4715 $gcm^{-3}$and high level of plant height, leaf number, branch number, pod number, pod weight per plot, porosity,

electrical conductivity, organic matter content and microbial activity were found as 39.556cm, 23, 7, 261.4, 176.646g, 54.1503%, 67.2µs, 5.9871% and 87.3491 mg CO_2/ 1g soil respectively.

Moreover, natural farming system was found to have better improvement than organic and conventional farming system in above growth parameters, physical and chemical properties of soil. This study also showed that the natural farming system improves the soil properties with minimum negative impact on the environment.

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