Int. J. Agricult. Stat. Sci. Vol. 19, Supplement 1, pp. 1251-1265, 2023 www.connectjournals.com/ijass
DOI: https://doi.org/10.59467/IJASS.2023.19.1251 ISSN : 0973-1903, e-ISSN : 0976-3392

ORIGINAL ARTICLE

SIGNIFICANCE OF TILLAGE TECHNIQUES ON AMELIORATION OF SOME SOIL PROPERTIES AND MAIZE PRODUCTION: A REVIEW

M.N. Ramadhan

Department of Agric. Machines and Equipment, College of Agriculture, University of Basrah, 61001, Iraq.
E-mail: marwan.ramadhan@uobasrah.edu.iq

Abstract: Selection of appropriate tillage practices is crucial for better seed placement, resulting in better emergence and a more prosperous crop. Conventional tillage practice changes the characteristics of soils such as bulk density (BD) and moisture. In this context, conventional tillage can cause soil organic matter to rapidly mineralize and lead to the loss of soil carbon (C) and nitrogen (N). Conservation tillage is an agronomic practice that maintains soil properties such as soil structure, aggregation, aggregate stability, and porosity. However, conservation tillage CST methods could result in a reduction in pore space and an increase in soil strength and need time before reaping the desired benefits. No-tillage (NT) as a type of CST practice allows for an earlier seeding procedure compared to traditional tillage, since direct seeding does not require tillage prior to seeding, furthermore can reduce planting costs. No-till farming can severely impact soil in multiple ways, including increased nutrient stratification and increased (BD). No-till adoption may result in the layering of inorganic N and other nutrients. Through periodic soil disturbances, those nutrients will be redistributed. Researchers have shown great changeability in maize yield response to various tillage treatments, which are often determined by preceding crops and physical soil drainage characteristics. Maize growers, however, are still concerned about yield variability with tillage methods. The purpose of this paper is to summarize literature concerning tillage practices and their interaction effects on the soil environment. Additionally, to describe how different tillage practices affect yield and identify areas that require further study.

***Key words*:** Conventional tillage, Grain yield of maize, No-tillage, Soil chemical properties, Soil properties.

Cite this article

M.N. Ramadhan (2023). Significance of Tillage Techniques on Amelioration of some Soil Properties and Maize Production: A Review. *International Journal of Agricultural and Statistical Sciences.* DOI: https://doi.org/10.59467/IJASS.2023.19.1251

1. Introduction

With the increase in global population, intensive farming systems have imposed stresses on soils and water resources. To maintain sustainable agricultural production systems, a comprehensive and integrated approach to managing soil properties is necessary to deal with the most complex, dynamic and interconnected soil properties [Alam *et al.* (2014)]. Changing the heterogeneous body of soil can result in positive or negative consequences. Inappropriate management practices may affect soil health, loss of organic matter and nutrients in addition to a decrease in crop productivity [Foley *et al.* (2011)].

In order to improve and achieve the sustainable yield, the production technologies must be continually evaluated in order to determine the best combination of inputs, which will optimize yield for a particular situation. Tillage is the most important practice in agriculture, as it modifies the soil structure by changing its physical properties, by mixing it with organic residues and fertilizer. It is performed predominantly to mix the soil with organic residues and fertilizer. This operation is also performed to loosen the top layer of soil, control weeds, and create a seedbed that is appropriate for seed germination and growth [Khan *et al.* (2017)]. Changing soil properties such as moisture, (BD) and root distribution are influenced by tillage practices. These changes in soil properties can have a substantial impact on plant emergence, plant density, root distribution, and crop yield [Bramdeo and Rátonyi (2020)]. In addition,

Received *August 17, 2022* ***Revised*** *December 14, 2022* ***Accepted*** *January 28, 2023*