

Effect of conservation agriculture on soil quality under climate change

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Soil quality needs to be based on its ability to provide certain functions. Soil quality can be divided into its essential ability as a substrate for crop growth and the dynamic part, which is influenced mainly by the users. Dynamic soil quality contains soil properties that can be changed in a short period of time and are affected by human activity. Soil quality can be divided mainly into physical, chemical and biological soil quality, although these components are in constant interaction with each other, which makes them difficult to separate. Until recently, the term “soil quality” was viewed in the context of plant production and crop productivity, as a result of physical, chemical and biological soil productivity. Soil productivity is the condition of the soil that indicates its ability to provide plants with accommodation under appropriate thermal conditions, favourable water-air relations and a sufficient supply of plants with essential nutrients. Soil productivity is affected by a number of factors such as climate, relief, soil type, soil organisms, weather and applied agricultural techniques. Intensive crop production can deplete the soil to the point that future production can be threatened. Healthy soils are key to developing sustainable crop production systems that they are resistant to the effects of climate change. Conservation agriculture is a concept in support of sustainable land management, environmental protection and climate change adaptation and mitigation. It is a farming system that promotes minimum soil disturbance (which reduces soil erosion and preserves soil organic matter), maintenance of a permanent soil cover (protective layer of vegetation on the soil surface suppresses weeds, protects the soil from the impact of extreme weather patterns, helps to preserve soil moisture, and prevent soils compaction), and diversification of plant species (crop rotation). Conservation agriculture enhances biodiversity and natural biological processes above and below the ground surface, which contribute to increased soil quality. Also, Conservation agriculture help to protect the environment and to reduce both the impacts of climate change on agricultural systems (adaptation) and the contribution of the agricultural practices to greenhouse gases. Increasing degradation of agricultural soils caused by a number of natural and anthropogenic factors puts the role of conservation agriculture, especially conservation soil tillage, as a measure that is able to cope with these problems, following the principles of sustainable soil management. Applying the conservation soil tillage principles, as a part of conservation agriculture, improves soil quality, optimizes crop yields and reduces investment costs in agricultural production. Adopting the conservation soil tillage principles agricultural activity can significantly reduce the negative impact on physical, chemical and biological complex of the soil, as well as other natural processes under climate change. Accordingly, the project “Assessment of conservation tillage as advanced methods for crop production and prevention of soil degradation” is underway, which aims to determine the possibility of implementing conservation tillage as a measure to improve soil quality, especially under climate change.

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