Chapter 7
Crop Rotation Enhances Pest, Disease, Agroecosystem Resilience, and Sustainability in Crop Production

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ABSTRACT

Ensuring food security with limited farm resources under a climate change scenario is a major challenge for agricultural scientists. Conventional farming uses ample fertilizers and pesticides for crop production, which badly impacts the environment. The key to sustainable agriculture is finding ways to boost productivity with sustainability. This chapter focuses on the importance of crop rotations for achieving the said goal by highlighted several benefits of implementing diversified crop rotations, including the conversion of atmospheric CO2 into plant biomass, improving system (pests, diseases, weed infestations, and abiotic and biotic stress) resilience, and enhancing water and fertilizer use efficiencies. Furthermore, legume-based crop rotations also benefit a significant reduction in the use of synthetic fertilizers and augment the sustainability of the agricultural production system. Thus, cropping rotation has become indispensable to transform agriculture and pave the way for a more sustainable future.

INTRODUCTION

Increasing food demand on global scale is a significant challenge due to inadequate availability of food crops. Increasing populations have boosted the industrialization and decreasing agricultural lands, making the farm sector crucial in addressing the food security issues (Renard & Tilman, 2019). The attributes of soil texture and fertility are essential factors in maintaining a sustainability in agricultural productivity. This highlight the significance of increasing soil quality and crop productivity (Tahat et al., 2020). Agricultural researchers are more conscious about human induced soil erosion and unsustainable agricultural methods. This has led to a pragmatic approach to managing agricultural land in effective and innovative ways. Since the 1950s, researchers have identified farming methods as the primary factor that contributes to around 60% of soil degradation associated with varying degrees of soil biological activity (Amoah-Antwi et al., 2020; Lal, 2015). The researchers directed to enhance