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Soil fertility

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DESCRIPTION

In the agricultural science, soil fertility and plant nutrition have played a big role during the 20th century in increasing crop yields. Within the 21st century, importance of this field remains expanding thanks to the restrictions of natural resources (land and water), sustainable agriculture, and concern about environmental pollution. During this context, increasing crop yields are associated with rational use of chemical fertilizers, increasing use of organic sources of nutrients, recycling of plant available nutrients, and exploiting genetic potential of crop species or cultivars within species in efficient use of nutrients. Hence, within the future, increasing crop yields are a challenge for agricultural and soil scientists. Conducting fertilizer field trials for adequate sources, methods, rates, timing of application along with crop species or genotypes within species, under different agroecological regions are necessary to induce data and their use for achieving maximum economic crop yields. The target of this text is to present basic concepts and discuss methodology of soil fertility and plant nutrition research under field conditions.

The primary use of fireside to flush out wild game and to clear forested land provided the first major anthropogenic influence on the environment. By burning native vegetation, early humans were ready to gain access to herbivores grazing on the savanna and in nearby woodlands, and to suppress the expansion of less desirable plant species for those easier to forage and eat (Pyne 2001, Wrangham 2009). These and other factors (e.g., population pressures, global natural action, encouraging/protecting desirable plants), help to induce the groundwork for the Agricultural Revolution and caused a dramatic shift within the interactions between humans and thus the world. The shift from hunter-gatherer societies to an agrarian way of life drastically changed the course of human history and irreversibly altered natural nutrient cycling within soils.

When humans sowed the first crop seeds at the dawn of the Neolithic Period, the soil provided plant-essential nutrients and served because the muse for human agriculture. While soil is sometimes stated because the "fertile substrate", not all soils are suitable for growing crops. Ideal soils for agriculture are balanced in contributions from mineral components (sand: 0.05–2 mm, silt: 0.002–0.05 mm, clay: <0.002 mm), soil organic matter (SOM), air, and water. The balanced contributions of these components yield water retention and drainage, oxygen within the premise zone, nutrients to facilitate crop growth; which they supply physical support for plants. The distribution of these soil components in an exceedingly particular soil is influenced by the five factors of soil formation: parent material, time, climate, organisms, and topography (Jenny 1941). All of these factors plays an on the spot and overlapping role in influencing the suitability of a soil for agriculture.