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Soil Fertility Management: An Overview

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SUMMARY

Such soil fertility management practices include the use of fertilizers, organic inputs, crop rotation with legumes and the use of improved germplasm, combined with the knowledge on how to adapt these practices to local conditions. This concept of integrated soil fertility management emphasizes the maximization of nutrient use efficiency, the enhanced access of soil nutrients to plant roots, the response of soil as a living ecosystem and the role of sound locally adapted soil management practices enhancing ecosystem functions and services leading to improved soil fertility.

INTRODUCTION

Soils feed the plants which in turn feed the animals that feed us. Including soil in this important chain will help guarantee its success. Soil provides the support or foundation for plants and most of the nutrients. Soil is accumulated decomposing plant and animal matter with aging parent material. The concept acknowledges that neither practices based solely on mineral fertilizers nor solely on soil ecosystems services are sufficient for sustainable crop production, especially during the transition years after starting with CA on degraded soils. It also requires well-adapted, disease- and pest-resistant germplasm, as well as other good agricultural practices. The critical soil ecosystem processes involved are transformations of carbon, cycling of nutrients, maintenance of the structure and fabric of the soil and biological regulation of soil populations. •Improved crop quality •Increased yields •Save money on unnecessary fertilizer •Accurate year to year record keeping •Better environmental stewardship

What is soil fertility?

Soil fertility is the ability of soil to sustain plant growth and optimize crop yield. This can be enhanced through organic and inorganic fertilizers to the soil. Nuclear techniques provide data that enhances soil fertility and crop production while minimizing the environmental impact.

Crop productivity improvements are accomplished through the application of inorganic fertilizers and raising high yielding varieties of crops during the era of green revolution. This intensification of agriculture resulted in deterioration of soil fertility as proper nutrient management strategies were not adopted. It is estimated that different agricultural crops in India remove about 4.27 million tones of nitrogen, 2.13 million tones of phosphorus, 7.42 million tones of potash and 4.88 million tones of lime per year. About 8.34 million tones of nutrients are lost through erosion per year which includes macro and micro nutrients. These nutrients are uptake by crops and loss of nutrients through erosion leads to depletion of nutrients in the soil. The depletion occurs when the factors which contribute to soil fertility are removed and not replaced and the conditions which support soil fertility are not maintained.

Soils in India are low in available N, medium in available P, and either medium or high in available K. among the micronutrients; Zn, Fe, S, Ca, and Mg are deficient in these soils. The soil survey on fertility status evinced that N deficiency is quite common in all the soils, P deficiency occurs in red and laterite soils, K deficiency occurs in red sandy loam soil, and Fe deficiency occurs in calcareous soils.

Factors affecting soil fertility management:

There are various factors that define and contribute to soil fertility.

Mineral composition – Knowing the mineral composition of the soil, we can predict its ability to retain plant nutrients. This is determined by the source rock, the climate, biological and chemical processes. When referring to the soil mineral nutrients, there's a wide gap between the total amount of mineral nutrients in the soil and their availability to the plant. In fact, only a small fraction of the minerals composing the soil will be available for the plant. Applying fertilizers and soil amendments, is a key element in enhancing and preserving the mineral content of the soil and therefore, a proper fertilizing program is one of the most influencing factor on the soil fertility.

Soil pH – Soil pH is important in maintaining proper soil fertility. It affects the nutrient availability in the soil. A pH range of 5.5-7 is considered to be adequate for most plants.

Soil Texture – Different sized minerals particles give the soil its structure - sand, silt clay. In comparison to sandy soils, clay soils are capable to retain more nutrients and so act as a bigger nutrient reservoir.

The CEC (Cation Exchange Capacity) of the soil can be used as an indication to the soil fertility. Higher CEC means higher capacity of the soil to hold nutrients. Clayey soils will have a higher CEC than sandy soils and therefore, will usually be more fertile. (A – Clay. B – Sand):

Organic Matter – The organic matter is considered to be a source of nitrogen and phosphorus. Nitrogen and phosphorous can be mineralized and become available for plant uptake. The organic matter also increases soil fertility, as it improves the soil structure while increasing the CEC.

Maintenance of soil fertility:

Soil fertility is the basis for better growth and development of any crop and no technology will enhance yield without soil fertility. Nutrients are continuously removed from the soil by crops in addition to losses by leaching and erosion. Hence, sound soil and crop management strategies should be adopted to improve and maintain soil fertility for achieving sustainable crop production.

- Application of organic source of nutrients
- Bulky and concentrated organic manures

- Biofertilizers

Green manuring and green leaf manuring

Green manuring is a method of soil fertility restoration in which fresh plant material either in situ or brought from a long distance is turned under to maintain soil carbon pool (Kumar *et al* 2014). The main function of a green manure crop is to prepare the soil for succeeding crops. Green manures work by drawing the nutrients from soil & storing them in their bodies. These crops are not harvested & taken away from the land as this will take away the nutrients, but are tilled into the soil while they are still green. When turn back into the soil, plants gradually decompose and slowly release all these nutrients to the next crop. Simultaneously green manure serves as a source of food for several soil microbes and organisms. The abundance of soil fauna is very important for soil health. Their movement & activity helps build a good soil structure & by feeding on the organic matter, they allow for its distribution in soils. Green manuring is a practice that can be easily applied on large farming plots and small vegetable gardens.

Mulching

Mulch is a layer of material that is applied to the surface of soil. Reasons for applying mulch are conservation of soil moisture, improving fertility & health of the soil, decreasing weed growth and enhancing the visual appeal of the area. Mulch is generally, but not exclusively, organic in nature. It can be permanent as well as temporary. Mulches, apart from regulating nutrient levels, it had been shown to hamper weed emergence particularly at the beginning of season (Bhardwaj 2013). It may be applied to bare soil or around existing plants. Mulches of manure or compost will be incorporated naturally into the soil by the activity of worms & other organisms. The procedure is used both in commercial crop production as well as in gardening and if applied correctly, can radically improve soil productivity.

Mixed cropping

A lesser-known method to improve soil fertility is to sow different crops in the same field in order to avert soil erosion and control the spread of soil-borne plant disease. And doing this

with the legumes will have the benefit of putting nitrate to the soil. Always try to use deep rooted vegetables that will enhance soil fertility naturally.

Application of inorganic source of nutrients:

Nitrogenous fertilizers, Phosphatic fertilizers, Potassic fertilizers, Complex fertilizers Mixed fertilizers

Proper method of application of fertilizers

- Application of soil amendment
- Adoption of integrated nutrient management

Strategies

Proper soil and water conservation
Agronomic measures
Mechanical measures
Agrostological measures

CONCLUSION

The maintenance of soil organic matter levels and the optimization of nutrient cycling are essential to the sustained productivity of agricultural systems. ... Crop production worldwide has generally resulted in a decline in soil organic matter levels and, consequently, in a decline of soil fertility. Soil fertility is the ability of soil to sustain plant growth and optimize crop yield. This can be enhanced through organic and inorganic fertilizers to the soil. Integrated soil fertility management which recognizes the use of improved germplasm, mineral fertilizers, organic materials sourced in cognizance of the local environment and management practices may be a viable option for controlling weed and diseases as well as sustaining fertility, environment and production of crops.

REFERENCES

Bhardwaj, R. L. (2013). Effect of mulching on crop production under rainfed condition: A Review. Agric. Reviews, 34:188-197.

Kumar, R., G. Mahajan, S. Srivastava and A. Sinha (2014). Green Manuring: A Boon for sustainable Agriculture and Pest Management: A Review, Agri. Review, 35: 196-206.