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Commentary

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Brief note on soil fertility

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DESCRIPTION

Soil fertility states the ability of soil to sustain agricultural plant growth, i.e. to provide plant habitation and result in sustained and regular yields of high quality. A fertile soil has the capability to supply vital plant nutrients and water in sufficient amounts and quantities for plant growth and reproduction; and the absence of toxic substances which may inhibit plant growth. The properties contribute to soil fertility are sufficient soil depth for adequate root growth and water withholding; Good internal drainage, allowing sufficient aeration for optimal root growth (although some plants, such as rice, tolerate waterlogging); Topsoil or horizon O is with sufficient soil organic matter for healthy soil structure and soil moisture retention; Soil pH in the range 5.5 to 7.0 (suitable for most plants but some prefer or tolerate more acid or alkaline conditions); Ample concentrations of essential plant nutrients in plant-available forms; Presence of a range of microorganisms that support plant growth. In lands used for agriculture and other human activities, upkeep of soil fertility typically requires the use of soil conservation practices. This is because soil erosion and other forms of soil scarcity generally result in a decline in quality with respect to one or more of the aspects indicated above. Soil fertility is an intricate process that involves the constant cycling of nutrients among organic and inorganic forms. As plant material and animal wastes are decomposed by micro-organisms, they release inorganic nutrients to the soil solution, a process referred to as mineralization. Those nutrients may then undertake further transformations which may be aided or enabled by soil micro-organisms. Like plants, many micro-organisms require or specially use inorganic forms of nitrogen, phosphorus or potassium and will compete with plants for these nutrients, tying up the nutrients in microbial biomass, a process often called immobilization.

Soil fertility can be severely confronted when land-use changes rapidly. For example, in Colonial New England, colonists made a number of choices that depleted the soils, including: allowing herd animals to amble freely, not replenishing soils with compost, and a system of events that led to erosion.

The quality of irrigation water is very significant to maintain soil fertility and tilt, and for using more soil depth by the plants. When soil is irrigated with high alkaline water, unwanted sodium salts build up in the soil which would make soil draining capability very poor. So plant roots cannot penetrate deep into the soil for optimal growth in Alkali soils. When soil is irrigated with low pH / acidic water, the useful salts (Ca, Mg, K, P, S, etc.) are removed by draining water from the acidic soil and in addition unsolicited aluminium and manganese salts to the plants are dissolved from the soil hampering plant growth. When soil is irrigated with high salinity water or appropriate water is not draining out from the irrigated soil, the soil would convert into brine soil or lose its fertility. Saline water enhances the turgor pressure or osmotic pressure necessity which hampers the off take of water and nutrients by the plant roots. Top soil damage takes place in alkali soils due to erosion by rain water surface flows or drainage as they form colloids (fine mud) in contact with water. Plants absorb water-soluble inorganic salts only from the soil for their growth. Soil as such does not lose fertility just by growing crops but it lose its fertility due to accretion of unwanted and depletion of wanted inorganic salts from the soil by inappropriate irrigation and acid rain water (quantity and quality of water). The fertility of many soils which are not suitable for plant growth can be enriched many times gradually by providing sufficient irrigation water of suitable quality and good drainage from the soil.

CONCLUSION

Soil fertility and plant nutrition incorporates the management of essential elements necessary for

plant growth, typically to attain selected management objectives. Although soil fertility plays a vital role in natural systems, an element is considered vital if it is required for plant metabolism and for accomplishment of the plant's life cycle.