

ROLES OF SOIL BIOLOGICAL INTERACTIONS IN ENHANCING FOOD SECURITY

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ABSTRACT

In developed countries, continuous monocropping, high-disturbance tillage, and ready access to synthetic inputs have allowed farmers and researchers to obtain high crop yields with little regard for soil biology. An unrecognized “opportunity cost” associated with large-scale agriculture is the depletion of soil biological complexity, which may take many years to restore. The opportunity costs of biologically depleted soils, however, have not been incurred in much of the developing world because synthetic inputs have been much less accessible to the small landholder. Indeed, the developing world can ill afford to overlook the potential benefits of plant-microbe and microbe-microbe interactions which occur in soils when available nutrients are low. How then can farmers and researchers best take advantage of indigenous soil biological interactions which can enhance nutrient availability in agricultural systems? This overview describes ways by which soil biology can be “harnessed” more efficiently in agriculture through use of soil-specific inoculants, legume-based cropping systems, and incorporation of locally derived materials that would not otherwise be directed to livestock.

Key words: soil microorganisms, plant nutrients, rhizobacteria, mycorrhizae, soil disturbance, plant-microbe interactions.

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