

SHORT COMMUNICATION

Impact of Organic Farming on Soil Health

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ABSTRACT

The most important challenge in India has been to produce enough food for the growing population. In the recent year soil fertility and productivity has been decline due to lower used of organic manures, intensive farming and higher used of fertilizer, pesticides, and other chemicals. The high-yielding varieties are being used with infusion of irrigation water, fertilizers, or pesticides. This helped the country develop a food surplus as well as contributing to concerns of soil health, environmental pollution, pesticide toxicity, and sustainability of agricultural production. Scientists and policy planners are, therefore, reassessing agricultural practices which relied more on biological inputs rather than heavy usage of chemical fertilizers and pesticides. Organic farming can provide quality food without adversely affecting the soil's health and the environment; however, a concern is whether large-scale organic farming will produce enough food for India's large population. Certified organic products including all varieties of food products including basmati rice, pulses, honey, tea, spices, coffee, oilseeds, fruits, cereals, herbal medicines, and their value-added products are produced in India. Non edible organic products include cotton, garments, cosmetics, functional food products, body care products, and similar products. The production of these organic crops and products is reviewed with regard to sustainable agriculture in northern India.

Keywords Impact, Organic Farming, Soil Health

Organic farming is a method in which encourages the sustainable agriculture by locally available resources to enhance the biological cycle in the nature. It seeks to avoid the use of chemical fertilizer, pesticides, herbicides. As of March 2014, India had 4.72 million ha under an organic certification process, including 0.6 million ha of cultivated agricultural land and 4.12 million ha of wild harvest collection forest area (National Horticulture Board 2016). The main aim of organic farming is the minimum use of off-farm resources, production of nutritious and quality food, control of soil and water pollution and management of soil health.

Nutrient management with different organic sources:

The main principles of organic farming is managing soil health, healthy soil lies healthy plant. Well balanced physical, chemical or biological property easily enhanced by organic farming. The chemical like fertilizer, pesticides, insecticides, growth regulators and herbicides are very harmful for soil biological property. There is wide range of nutrient supplement which are permitted in organic farming

that correct deficiency or imbalance of nutrient.

The supplement nutrient supply over period of time to enhance and maintenance of biological cycle. The nutrient supplement additives like FYM, compost, vermicompost, nadeb compost and also liquid formulation like biofertilizer, panch-gavya, jivamrit, amritpani, vermiwash. Mulching is a method of covering the soil with layer of biomass. Mulching materials like weeds, paddy straw or wheat straw, rice husk, groundnut husk, coconut coir, banana leaves, mulching suppress the weed growth, reduced evaporation and maintained soil moisture, humus formation and slowly release of nutrient, supply food for microorganism, increase biological activity, reduce crust formation, maintained soil temperature and increase earthworm activity.

Effect of Organic Nutrition on soil fertility

Incorporation of organic matters has been shown an a great effect to improve soil structure and water retention, increase infiltration rates and decrease bulk density. This kind of fertilization may improve the physical and biological properties of the soil and may serve as a source of mineral nutrients. Organic manure is generally applied to maintain soil health and sustainability in intense cropping systems. The organic matter after decomposition release macro and micronutrients to the soil solution, which becomes available to the plants, resulting in higher uptake. Organic farming was capable of sustaining higher crop productivity and improving soil quality and productivity by manipulating the soil properties on long term basis. The organic farming practices led to an increase in the organic carbon, soluble phosphorus, exchangeable potassium, and pH and also the reserve pool of stored nutrients and maintained relatively stable EC level.

Organic manure would have improved the soil physical condition and increased nutrient availability resulting in a better vegetative growth and increased yield. The better growth and development of plants with application of farm yard manure might be due to increased availability of nitrogen as well as other required nutrients to the plants throughout the fruiting season. This may be due to increased vegetative and reproductive growth of plant and better nutrient supply with the application of FYM. It not only adds organic matter and macro and micro nutrients to soil but also improves the physico-chemical properties of soil and hence provides better conditions for plant growth and development.

The addition of carbonaceous materials such as straw, wood, bark, sawdust, or corn cobs helped the composting characteristics of manure. These materials reduced water

content and raised the C: N ratio. However, under Indian conditions, joint composting of the manure slurries with plant residues was more viable and profitable than its separate composting. Use of FYM and green manure maintained high levels of Zn, Fe, Cu, and Mn in rice-wheat rotation. Organic farming improved organic matter content and labile status of nutrients and also soil physicochemical properties. The decline in soil reaction might be due to organic compounds added to the soil in the form of green as well as root biomass which produced more humus and organic acids on decomposition.

Application of organic matter improves soil health by improving the physico-chemical and biological activities and biofertilizer was found to enhance the rate of mineralization and availability of the nutrients, further enhancing plant growth.

Effect of organic matter on nutrient supplying power of soil:

The FYM is capable of supplying adequate macro and micro plant nutrients to the crop during whole crop period and make available more nutrients to the plant from soil with solubilization effect of plant nutrients leads to increased uptake of nutrients. Many researchers reported that in an organically managed field activity of earth worm is higher than in inorganic agriculture. In the biodegradation process earthworms and microbes work together and produce vermicompost, which is the worm fecal matter with worm casts. Vermicompost provided macro elements such as N, P, K, Ca, and Mg and microelements such as Fe, Mo, Zn, and Cu.

Due to narrower range of C/N ratios of organic manure, application of organic manure hastens the mineralization rate, which in turn increases the mineralizable N content in soil. Solubilization of phosphorus to make it available to plants is the most important aspects of fertilizer management in fruit trees. Due to low initial fertility status of orchard soils of semiarid regions, application of organic manure may be fruitful as it releases phosphate ions from soil ion exchange sites and increases their concentration in soil solution. Organic manure is also rich in several microorganisms that produce a number of organic acids especially humic acid and oxalic acid, which facilitates the solubilization of bound phosphorus and potassium in soil.

The contribution of non-symbiotic nitrogen fixing microorganisms to the supply of fixed nitrogen in agricultural soils and natural ecosystems is well recognized. Microorganisms including *Azotobacter* as non-symbiotic nitrogen fixers and other bacteria are continuously being isolated from various ecosystems and their performance in the laboratory and field conditions are assessed. Many

experiments in greenhouses and in field conditions have shown that several crops respond positively to microbial inoculation. Enhancement and maintenance of soil fertility through microorganisms will be an important issue in future agriculture. Hence, several beneficial microorganisms can effectively be used as a chemical fertilizer alternative to minimize the application of inorganic fertilizers.

Effect of Organic Nutrition on Soil Biological Properties:

Compost contains bacterial, actinomycetes, and fungi; hence, a fresh supply of humic material not only added microorganisms but also stimulated them. Besides, compost played an important role in control of plant nematodes and in mitigating the effect of pesticides through sorption. Sorption is the most important interaction between soil/organic matter and pesticides and limits degradation as well as transport in soil.

Transformation of nutrients in soil is an enzyme mediated biochemical process facilitated by a group of microorganisms. Application of organic matter increases nutrient content enhances soil respiration and different enzymatic activities and activates microorganisms in soil demonstrated that the presence of several enzymes in organic matter ultimately lead to improvement in health of the soil. Composting material added plenty of carbon and thus increased heterotrophic bacteria and fungi in soil and further increased the activity of soil enzymes responsible for the conversion of unavailable to available form of nutrients.

Microbial communities are important for the functioning of the ecosystem both in relation to direct interactions with plants and with regard to nutrient and organic matter cycling. Application of microbial inoculants contributes significantly to the soil surface ecosystem by their organic acid secretions in decomposing soil organic matter, nutrient chelation, fixation and hormonal action. Agricultural practices have had an impact on soil biophysicochemical properties. Densities of bacteria, protozoa, nematodes, and arthropods in soils under organic farming were higher than under conventional farming.

CONCLUSIONS

The present study reveals that application of organic and biofertilizer are more beneficial for quality production and improve soil properties and soil health. Therefore, this approach can be spread among farmers to improve the soil health and production.

LITERATURE CITED

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