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Soil Health and Conservative Ideas

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Soil is the fundamental concept of agriculture, which is essential for carrying out life processes of plants and animals. The concept soil health aims to protect soil from degradation caused by erosion (wind & water), deforestation, salinization, overgrazing by livestocks, excessive tillage practices etc. A healthy soil is essential for sustaining plant growth and animal life, regulates water, and supports nutrient cycle and protection against soil erosion. It represents the ability of soil to support healthy and sustainable environmental conditions to meet the demands of present as well as future generations. In this article we shall focus upon the different methods and conservative ideas for supporting soil health and fertility.

Importance of Maintaining Good Soil Health

"Soil Health" and "Soil Quality" are the terms that are used interchangeably. The characteristic of healthy soil include fertility, water holding capacity, optimum ph conditions, presence of organic matter, presence of active microorganisms, and accumulation of all essential nutrients. All these aspects contribute to growth of healthy plants. A good quality soil must be fertile enough so that it has all the essential nutrients such as nitrogen, potassium, phosphorus, calcium, magnesium accumulations in the soil. Plants may take these nutrients any time from soil, without their extra addition in soil. A good quality soil must maintain neutral ph around 6.5 to 8 for better adsorption of these ions as well to supports the microbial activities. Deceases in ph to less than 5 may lead to growth of fungi which is the major cause of fungal soil borne diseases. E.g. nematodes.

Innovative Approaches For The Conservation Of Soil Health

Soil health management systems aims to protect the soil structure and make the soil more productive for plant growth. These include

Conservation Tillage or Zero-Till: Excessive tillage may lead to change in soil structure and soil aggregates. It may expose the fertile soil layers to the surface which may wipe out easily due to erosion. It may also leads to increased compactness of the soil thus reducing the macro-porosity and interfering plant growth. Reduced tillage practices may be beneficial for microbial activities in the undisturbed soil conditions and also help the farmers with increased profit due to low input of resources.

Use of Cover Crops: Cover crops play integral part in cropping system and provide soil cover in different seasons. These crops can be grown as annuals or biennials so that their crop residue can be used as mulching material for moisture retention. Growing of legume crops as cover crops helps in trapping excess nitrogen, and retains nitrate and other essential nutrients that are liable to leaching losses.

Organic Matter Management: Organic matter plays major role in integrating soil health. Organic matter is readily decomposed by micro-organisms and is the principle source of energy that acts as fuel in soil food web. It can be maintained, if the rate of addition of organic matter is greater than its utilization through decomposition. It can be maintained by incorporation of organic manures such as compost, green manures and animal wastes along with mulching.

Crop Rotation: Alteration of crops can lead to improvement of soil health and enhance the nutrient availability in the soil. Crop rotation helps in overcoming the soil borne disease cycles such as fungal diseases and also affects the life cycle of various pests. It also helps in management of weeds related to specific crops. Diversification of crops improves soil biodiversity and binding capacity of soil aggregates to plant roots thus preventing soil losses.

Nutrient management: Using diverse nutrient sources such as organic manures farm yard manure (FYM), poultry waste, bone meal, composts to soil with proper time and quantity management can improve the soil fertility and productivity. Maintaining proper soil ph improves the microbial activity and helps in improving the nutrient availability to plants as excess fertilizing may lead to toxic environmental conditions.

Reduced Pesticide Use: Excessive use of chemical fertilizers is the major cause of soil health deterioration. Overdose of nutrient fertilizers sprays leads to pest infestation which when controlled by chemical sprays infect the beneficial insects along with soil due to use of broad spectrum insecticides. These chemicals decrease the overall fertility of the soil.

Conclusion

Conserving soil health is essential for maintain agricultural productivity, ecological sustainability and overall planets health. Soil plays important role in regulating water systems, biodiversity, nutrient cycles, food production and mitigating climate changes. Therefore, challenges such as increasing population, urbanization, climate change, unstable agricultural practices are serious threats to the stability of soil. Implementing sustainable agricultural practices mentioned above may prevent the soil from further degradation. Protecting soil is not only agricultural issue but a combined global issue for sustaining life on Earth.

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