

Emerging trend for Start-ups in Soil health management

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Abstract

Since the late 2000s, there has been a boom in the number of agricultural start-ups and entrepreneurship careers. Hundreds of new services are available for producers and agricultural professionals to take advantage of, but learning about all of these new companies can be confusing and consider as risk. In each part of agriculture profession, there are many start-ups still not undertaken. One among is Soil health management. Many were concern about the productivity and sustainability of farming practices. But without knowing the base for this cultivation which is none other than Soil. It acts as a basement for cultivation of crops. Ensuring the fertility status and condition of present situation, it is necessary to make some start-ups for soil health management.

Introduction

India is a country with diversified crop and animal species. In India, 55% of the soil has always been low in nitrogen. And then, 42% are deficient in phosphorus, and 44% are deficient in organic carbon. This improper management can cause further deterioration in soil health.

Importance of soil health

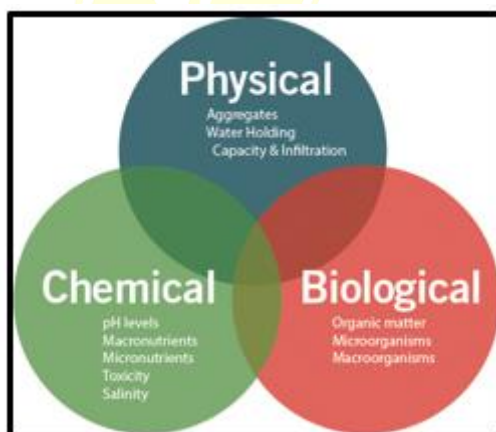
Food production is an essential criterion for healthy soil. Healthy soil is the foundation of agriculture and is essential for growing nutritious crops. Healthy soils can lead to higher crop yields and quality. With regards to environmental quality, Healthy soil can help filter pollutants and sustain the environment. Unhealthy soils can release carbon into the atmosphere, contributing to greenhouse gas emissions. To gain Economic profitability, Healthy soil can lead to higher productivity and profitability. Governing for Public Health, it is essential that Healthy soils provide healthy nutritious food and unhealthy soils cause human diseases. And most important thing is National Resource and Natural Resource conservation which acts as a Source for food, water, minerals, biodiversity.

Major concerns for Soil deterioration in India

Low productive soils, Poor Soil Organic Carbon content, Poor Soil Aggregation, More Compaction, Poor Porosity, Soil Salinity, Poor soil biology, Erosion, Nutrient leaching and Top soil loss



Indicators of soil health



Parameters to measure soil health

- **Soil Texture:** Soil texture refers to the relative properties of clay, silt and sand in a soil. Soil texture cannot be altered but is important to understand as it impacts on soil structure, aggregate stability, the amount of carbon present and the soil's ability to sequester more carbon. Soil texture will help to identify the risk factors that impact on your soil texture, and allow you to develop mitigation options to avoid adverse effects (like compaction, water logging and erosion).
- **Soil Structure:** Good soil structure is vital for crop productivity and soil health. It supports and regulates biological activity, water movement and storage, soil



temperature, gas exchanges and nutrient cycling. The structure of soil should allow for an even distribution of air, water, mineral particles and soil organic matter.

- **Bulk Density:** Bulk density is the mass of soil in a given volume. Bulk density can be used as an indicator of pore space, soil compaction and will normally increase with soil depth. Bulk density is also a critical part of being able to calculate the carbon stock within a field. Lighter, sandier soils will have a higher bulk density than clay soils.
- **Soil Organic Matter (SOM):** SOM is the organic component of soil, made up of materials such as plant residues, living organisms and decomposing organic matter. Soil organic matter contributes to healthy soil function and crop productivity in many ways including enhancing soil aggregation and the soil's water holding capacity, allowing optimal nutrient cycling and providing food for the living organisms which inhabit the soil.
- **Aggregate Stability:** Soil aggregates are the building blocks that make up soil. How stable these aggregates are is an important factor in long term soil health and the development of a resilient soil ecosystem that will deliver on-farm benefits. Soil aggregation is also considered a good indicator of soil organic matter levels.
- **Infiltration:** Soil water infiltration is a good indicator of soil structure which can highlight areas of compaction. A short infiltration time can indicate that the soil is healthy due to the high number of pore spaces allowing the water to infiltrate. Pore spaces are important for root development, soil aeration and water retention.
- **Earthworm Counts:** Earthworms are one of the indicators for soil biology and soil health. They are important soil engineers, redistributing and mobilizing nutrients, cycling organic matter and carbon throughout the soil profile, and improving water infiltration.
- **Nutrient Analysis & pH:** Collection of soil samples and sending it for macro and micro nutrients and soil PH.

Soil testing facilities

Through soil testing, we can identify nutrient-deficient soils so farmers can enhance agricultural productivity and ensure a more reliable and diverse food supply by cultivating crops in nutrient-dense soil. Central Govt schemes of Soil Health cards, Mridaparakshak (mini testing lab), State Govt labs, Krishi Vignana Kendras, NGOs, Private Labs, Portable Testing

kits, Startups for soil testing-Spectral analysis, Reagent based titration, AI sensors etc., Scope for innovations and startups in the soil health measurement. Hence it can be decided that performing lab analysis and interpretation with nutrient values could change some positive aspects in developing scenario.



Achieve the soil health: A Phenomenon

Agroecology, Regen Agriculture, Natural farming, organic farming, conservation agriculture and other sustainable agriculture practices support in achieving healthy soils. It includes Adding FYM, organic manures, composts, Bio fertilizers, Cow based elixers-Jeevamrutha, Recycling of biomass, Use of Bio stimulants, microbial consortia, liquid fertilizers, Seaweed extracts, Biochar, Supplementation of mineral based soil inputs, Poly cropping systems, Crop rotations, Mulching, Green manure crops, 365 days green cover, cover crops, Minimal tillage or zero tillage, Agro-forestry, layered models, bund plantations and Integration of livestock can be enhanced and practiced.

Scope for Start - up

Some of the scope involved in entering soil health management aspects were listed below. They are,

1. AI supported Knowledge Management and decision making, mobile apps
2. Recycling of municipal waste and agriculture waste
3. Bioreactors for making biofertilizers and Bio stimulants
4. Composting units
5. Goshala linking for Jeevamrutha and other cow based bio products

6. Oil cakes, linking with expeller units
7. Biochars–bioactivation with microbial biostimulants
8. Soil testing mobile labs, portable kits, AI supported apps.
9. Innovations in micro irrigation, fertigation
10. Innovation in land preparation, soil and water conservation
11. Bio-degradable mulching –scope
12. Scope for AI based Agritechstart-ups Ex: Bangalore based Agritechstartup
NiqoRobotics

Start – ups in Agriculture

Some of the leading developed Agriculture Start – ups were listed below;

- ❖ Biome Technologies
- ❖ Krishitantra
- ❖ De Haat
- ❖ Fasal
- ❖ Gramophone
- ❖ iPage
- ❖ Agrostar
- ❖ BigHaat
- ❖ Agrevolution
- ❖ Agrihub
- ❖ Farmguru



Conclusion

Agricultural start-ups have increasingly important practical implications for rural property professionals, presenting both opportunities and challenges. We argue that farm managers, rural appraisers, and agricultural consultants should be more aware of relevant technological developments, even though initial services provided by start-up companies may seem piecemeal and inaccurate. With the aid of big data and artificial intelligence, these new start-ups pose challenges or provide alternatives to some of the services regularly provided by rural property professionals. Hence it can strongly belief that soil start – ups will have more impact on other upcoming startups. Save Soil; save future.



Reference

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