



INDOCERT GLOBAL SERVICES Private Limited
5/75 C, INDOCERT, Kuttamassery,
Thottumugham. P.O., Aluva-683105,
Ernakulam Dt., Kerala, India.
CIN: U71200KL2023PTC083984
GST: 32AAHCI3508B1Z7
Ph: 0484 262 0908
E-mail:- info@indocert.earth
Web: www.indocert.earth

Transforming Agriculture with Soil Microbiome Analysis

Soil health is fundamental to agricultural productivity, ecological stability, and ultimately, human life. Existing soil testing has focused on chemical properties such as pH and nutrient levels. However, the biological aspect—particularly the soil microbiome—remains underexplored. Microorganisms in the soil are essential for nutrient cycling, organic matter decomposition, climate change-related stress resilience, carbon farming and supporting healthy plant growth. Yet, with Conventional culture plate methods, only 0.01% of microbial species are identified.

The Problem: Current testing methods do not provide a **comprehensive view of the soil's microbiome**, which is critical for improving crop health and soil fertility.

Solution: We are adopting advanced molecular sequencing technology to analyze the soil microbiome in detail. This technology will help us understand the vast diversity of bacteria, fungi, and other microorganisms in the soil. The data collected accompanied by information about soil characteristics, farming practices, and environmental conditions will be used to develop customized farm advisory.

How Farmers/ estates Will Benefit ?

- **Tailored Farm Advisories:** We offer customized farm and estate advisories through an integrated, data-driven approach that combines metagenomic analysis, GIS and remote sensing, soil physical properties, weather patterns, and field management records. This comprehensive strategy enables us to deliver precise, farm-specific recommendations. These will include crop selection, rotation schedules, and best farm management practices.
- **Lower Input Costs:** By reducing dependency on chemical fertilizers and pesticides, farmers/ estates can cut down costs while improving soil health.
- **Improved Yields:** Enhanced soil microbiology boosts plant growth, leading to better harvests.
- **Sustainability:** Our advice will align with regenerative agriculture principles, helping farmers/estates to maintain soil health for the long term.



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- **Pest and Disease Control:** With insights into beneficial microbes, we can offer biological solutions to control pests and diseases, reducing the need for chemical interventions.
- **Marketability:** Our clients will be able to showcase their regenerative practices and Carbon agriculture related steps to wider consumers in the future, thus, providing wider market access.

The steps:

1. **Soil Sample Collection:** We collect soil samples from farms/estates along with relevant metadata.
2. **Microbiome Analysis:** Using advanced molecular sequencing, we will extract DNA to identify microbial diversity (bacteria, fungi, archaea) and assess the soil's health.
3. **Data Integration:** Microbiome data along with GIS indices, soil physical & chemical parameters, weather data, and field management data will be analyzed with soil characteristics to create personalized advisories.
4. **Farm Advisory Services:** Farmers/Estates will receive actionable insights, including recommendations for biological amendments, nutrient management plans, pest and disease control.

Conclusion: Our aim is to provide farmers/ estates with tools to make data-driven decisions that lead to higher productivity, reduced costs, and sustainable farming practices. By focusing on the biological health of soil, we can help farms and estates to grow better crops, reduce chemical inputs, and build resilience in farming systems.