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Soil Footprint

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CONCEPT

SOIL FOOTPRINT is the new indicator for measuring impact on a crop on agricultural soil loss. Basically it helps us to determine soil loss during the production of the crop.

SOIL FOOTPRINT is just like carbon footprint and water footprint which measures the environmental effect of producing goods and services. It help us to calculate how much soil was lost during the cultivation of crops.

It can be calculated by dividing erosion rate of a crop by its productivity. Concept of SOIL FOOTPRINT was introduced by researchers Andrès Peñuela, Vanesa Garcia Gamero and Tom Vanwalleghem at the University of Córdoba in Spain.

1.1 PURPOSE

SOIL FOOTPRINT indicator was introduced for people to spread awareness about soil erosion and soil health. Many of the agriculturist are unaware of the fact that soil health is equally important for good crops. They don't know the correct practice of sustainable agriculture to prevent degradation of soil health and quality.

Main purpose of SOIL FOOTPRINT is to aware agriculturists about healthy soil and to let them know that healthy soil is important for healthy future. It helps different policy makers to make policy related to soil management with ease. One can also learn land management with the help of same. We can also learn about the control measures that can be used in lands to save soil and its health.

Soil footprint helps in the measurement of agricultural impact of production in soil. It help us plan our land mapping accordingly.

1.2 BENEFITS

SOIL FOOTPRINT, helps us in raising awareness about soil erosion and impact on agriculture and food security. It encourages consumers and producers about sustainable farming and aware them to adopt

sustainable production models that may help in reducing soil lost.

Furthermore, SOIL FOOTPRINT teaches us about how to use soil correctly with proper measures without misusing it.

It works as a new frontier in sustainable farming as it tells about how essential soil is and tackling soil degredation might becomes tough in future so we can keep a track about soil activities and work on it accordingly.

It also ensures people to look forward to the essential nature of soil which was earlier overlooked by many. It allows agriculturist to work on field with more eco-friendly and natural methods so that soil quality is controlled.

2.1 HOW HUMAN ACTIVITIES IMPACT SOIL HEALTH

Agriculture can restore ecosystem or it can destroy the landscapes and ruins the economy and foundation of life. Soil play a vital role in human's life, thus to use it humans usually manupilate soil to utilize it. Land use practices can harm soil. Activities that exposes soil to wind and rain can lead to soil loss.

3.1 CONCEPT OF ECOLOGICAL FOOTPRINTS

Ecological Footprint determines the dependency of humans on natural resources. It indicates the amount of pressure that humans put on the natural resources available to them.

3.2 SOIL FOOTPRINT and BROADER ENVIRONMENTAL FOOTPRINTS

Soil footprint is a critical aspect of environmental sustainability, but is closely tied to other broader environmental footprints. These include the *carbon footprint*, *water footprint* and *biodiversity footprint*.

3.2.1 SOIL FOOTPRINT and THE CARBON FOOTPRINT

Healthy soils play vital role in capturing and strong carbon from atmosphere. When soil is degraded, its ability to store carbon decreases, contributing to higher levels of atmospheric CO2. Soil degradation (such as desertification or erosion) not only releases carbon but also reduces the soil's capacity to sequester future emissions, creating a negative feedback loop.

3.2.2 SOIL FOOTPRINT and THE WATER FOOTPRINT

Soil quality is directly linked to its ability to retain water. Healthy soils improve water infiltration and reduce runoff, benefiting both agricultural productivity and water conservation. Poor soil management, including overgrazing, deforestation, and poor agricultural practices, can lead to soil erosion, reducing the soil's capacity to store water. This increases the water footprint of irrigation systems, leading to greater water usage for crops that could otherwise thrive on less water.

The overuse of fertilizers and pesticides in agriculture often leads to soil contamination, which can affect groundwater and surface water quality, further increasing the environmental footprint.

3.2.3 SOIL FOOTPRINT and THE BIODIVERSITY FOOTPRINT

Soils are home to a rich diversity of organisms, including bacteria, fungi, insects, and earthworms. Soil health supports this biodiversity, which in turn contributes to ecosystem stability and resilience. Practices that degrade soil, such as deforestation, monocropping, and urbanization, often lead to the destruction of natural habitats, directly affecting species diversity.

Sustainable agricultural practices, like crop rotation and agro-ecology, help maintain soil health and preserve biodiversity by promoting habitat variety and reducing soil degradation.

3.2.4 INTEGRATED APPROACH TO ENVIRONMENTAL FOOTPRINTS

Addressing the soil footprint within the context of the broader environmental footprints emphasizes the interconnectedness of ecosystems. Protecting soil health requires a multi-faceted approach that considers energy use, water consumption, biodiversity, and land use change