

Soil and Water: A Source of Life

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Abstract

World Soil Day (WSD) is observed annually on December 5th to raise awareness about the critical importance of healthy soil and encourage responsible and sustainable soil use. WSD 2023 aims to raise consciousness of the soil-water relationship as a source of life. The existence of our planet largely depends on the symbiotic relationship between soil and water. These two fundamental resources are the source of over 95% of our food. Soil water is essential for the absorption of nutrients by plants and helps to bind our ecosystems together. Soil and water are the base of our agricultural organisations and are crucial to our daily lives. Despite their importance, the value of these natural resources often goes unnoticed. Sustaining life would be a challenging task without the presence of soil and water.

Keywords- World Soil Day, Soil, Water, Soil and Soul

Introduction

The International Union of Soil Sciences proposed a worldwide day to celebrate soil in 2002. FAO has supported the establishment of WSD as a global awareness-raising platform under the headship of the Kingdom of Thailand and within the framework of the Global Soil Partnership. The FAO Conference unanimously approved the WSD initiative in June 2013 and requested its official acceptance at the 68th UN General Assembly. The UN General Assembly designated 5 December 2014 as the first authorized WSD in response to this request. The theme for WSD 2023 is "Soil and Water A Source of Life." Our planet's ecosystem relies on the intricate relationship between soil and water, which sustains all life. Soil and water are crucial for human survival, yet they are often overlooked. This initiative aims to raise awareness and promote a better understanding of the critical role that soil and water play in supporting ecosystems and sustaining life on our earth. WSD is a worldwide platform that not only reveals soils but also encourages and engages people all over the world to act to improve the state of the soil. The soil, also known as 'Bhumi' or 'Mrida', is often referred to as the "soul of infinite lives". The soul is a divine thought that explains an individual's



connection with their surroundings. Every creature, including humans, possesses a soul that drives and controls the routine of life, such as the influence of considering, listening, thoughtful, creating, cultivating, and ploughing. If we were to interpret the thought of the soul into a physical arena, we would realize that soil fulfils the basic principle of a soul. Soil is the foundation for all life on earth. Soil plays an important role in providing nutrients to plants and acting as a natural filter to remove harmful contaminants from water. The human body is predominantly composed of 11 elements, which are categorized into main and slight elements. The four main elements namely Hydrogen, Oxygen, Carbon, and Nitrogen make up nearly 99% of the human body. The remaining 0.9% is made up of seven slight elements, Sodium, Potassium, Calcium, Magnesium, Phosphorus, Sulfur, and Chlorine (Brevik and Burgess 2012). Additionally, around 18 trace elements are considered essential for maintaining human life. Out of those, only 29 elements are crucial for human life, 18 of which are either important or helpful to plants and are obtained from soil (Combs 2005). Plants require several other elements besides the basic ones to grow properly can also be attained from soil. The combination of soil and water is indeed fundamental to life on Earth. These two elements work together to create and sustain diverse ecosystems. Water, like soil, is a necessary component of life; without it, a person could not survive for a longer period. It provides lives for plants and animals that humans rely on for subsistence. The idea of development, whether it's on a family or national level, has become focused on economic growth, ultimately leading to a race for achieving profitable production. Unfortunately, our soils and water have been exploited in this race without considering sustainability. Indeed, human existence wouldn't be possible without soil and water, but our interference with them has resulted in negative impacts on their quality and characteristics. These impacts are of vital concern, as they occur in multiple directions.

Life on Earth

Soil and water are fundamental assets that support life on the planet. They provide the substance for food production, ecology, and human happiness. It is important to recognize their precious roles and take proactive measures to protect these assets for upcoming generations. Plants rely on soil and water as the foundation for their growth and to obtain vital nutrients. Healthy soil acts as a natural filter, cleansing and storing water as it penetrates the ground. Integrated soil and water management practices provide crucial ecosystem services that support all life on Earth and enhance ecosystem flexibility.

Integrated management



Integrated management of soil and water resources is crucial. The quality and availability of water are deeply connected to the health of the soil. By applying sustainable soil management performs, we can enhance water accessibility for agriculture. Healthful soils improved with organic matter show a vital role in controlling water holding and convenience. It's essential to use quality water efficiently, promote supportable use of fertilizers and pesticides, employ proper irrigation methods, improve drainage systems, control pumping, and monitor soil and groundwater salinity levels to maintain sustainable agricultural performance. Improving water efficiency in irrigated systems heavily relies on sustainable soil management.

Nutrient Cycling

Nutrient cycling is the process of exchanging and moving essential elements and compounds, known as nutrients, within an ecosystem. Living organisms and the environment take up, use and recycle these nutrients. It is a fundamental ecological process that ensures the availability of nutrients for the growth and development of organisms in an ecosystem. Soil provides essential nutrients as a medium for plant growth, while water helps transport these nutrients from the soil to plant roots. When plants grow and die, they contribute organic matter back to the soil, forming a cycle of nutrient exchange that is crucial for the health of the ecosystem.

Plant Growth and Productivity

The growth and productivity of plants are essential processes in their life cycle, as they play a crucial role in sustaining ecosystems, providing food for organisms, and contributing to the overall health of the planet. Soil provides physical support to plants by anchoring their roots and providing a platform for their growth. Water, along with nutrients in the soil, is engaged by the plant roots and used in photosynthesis, which is the method through which plants yield food. This process is vital for the energy flow within ecosystems.

Biodiversity Support

Biodiversity refers to the variety of species, genetic variability within species, and diversity of ecosystems. Both soil and water contribute to the incredible biodiversity found on Earth. Soil acts as a habitat for various microorganisms, insects, and plant life, while water bodies, ranging from rivers to oceans, host a diverse range of aquatic life. The interplay between terrestrial and aquatic ecosystems plays a vital role in enhancing overall biodiversity.



Proper management of soil and water is crucial to prevent erosion, maintain soil biodiversity and fertility, and preserve water quality.

Conservation

Soil and water conservation are essential for mitigating and adapting to climate change. By implementing better soil and water management techniques, we can increase the land's ability to withstand dangerous climate events such as droughts and floods. Rainfed agriculture accounts for 80% of croplands and contributes to 60% of global food production. These systems heavily rely on the effective management of soil moisture. Irrigated agriculture systems use 70% of the world's freshwater and occupy 20% of croplands. Healthy soils function as a carbon sink, absorbing carbon from the atmosphere. This process contributes to both climate change variation variations and justification efforts.

Habitat Formation

Habitat formation refers to the process through which specific environments or areas provide suitable conditions for the survival, growth, and reproduction of various species. Habitats are the natural homes or environments of organisms, which include both biotic (living) and abiotic (non-living) factors that create a unique ecological niche. Soil and water interact to create different types of habitats, such as forests, wetlands, grasslands, and aquatic ecosystems. These habitats support a wide range of organisms that are adapted to specific conditions, contributing to the overall richness of life on Earth.

Climate Regulation and Carbon Sequestration

Climate regulation refers to the various processes and mechanisms that play a key role in stabilizing and controlling Earth's climate system. These processes involve a complex interplay between the atmosphere, oceans, land surfaces and living organisms. The regulation of climate is critical in maintaining the planet's temperature, weather patterns, and overall environmental stability. Carbon sequestration is the process of capturing and storing carbon dioxide (CO₂) in the atmosphere, oceans, or terrestrial ecosystems. The main objective of carbon sequestration is to reduce the concentration of greenhouse gases in the atmosphere, particularly CO₂, which contributes to the greenhouse effect and global warming. Soil can sequester carbon by decomposing organic matter, while oceans can absorb and store large amounts of carbon dioxide, which helps to control the Earth's climate. Additionally, water bodies like oceans have a significant impact on climate regulation by influencing temperature

and precipitation patterns. Both soil and water play a crucial role in shaping local and regional climate patterns through their interaction with vegetation.

Conclusion

The combination of fertile soil and reliable water sources is essential for agriculture. These factors determine the productivity of crops and the sustainability of farming practices, which are critical for feeding the global population. In essence, the dynamic interplay between soil and water forms the establishment of the intricate web of life on Earth. The health and balance of ecosystems, as well as the survival of countless species, are intricately tied to the availability and quality of both soil and water resources.

References

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