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***Mala Moni Kalita, Asstt. Prof***

**SOIL AS A COMPONENT OF ENVIRONMENT**

Soil is the link between the air, water, rocks, and organisms, and is responsible for many different functions in the natural world that we call ecosystem services. These soil functions include: air quality and composition, temperature regulation, carbon and nutrient cycling, water cycling and quality, natural "waste" (decomposition) treatment and recycling, and habitat for most living things and their food. We could not survive without these soil functions.

**Habitat**

Soils are the environment in which seeds grow. They provide heat, nutrients, and water that are available for use to nurture plants to maturity. These plants form together with other plants and organisms to create ecosystems. Ecosystems depend on the soil, and soils can help determine where ecosystems are located. These plants then provide valuable habitat and food sources for animals, bacteria, and other things.

**Air Quality and Composition**

A well covered soil prevents erosion. During times like the great Dust Bowl, wind blows across soils, and suspended them in the air. These are easily inhaled and accumulate in lung tissues causing major respiratory problems. These particles can contain fungi and bacteria, which can cause infection and diseases. They are also important in military operations.

Dust can hide entire armies and tanks in large clouds. Approaching the enemy is much easier when entire armies are hidden in the dust, but all following vehicles tend to be blinded by dust. In dry regions, dust can also alert of an approaching enemy.  In very dry regions, every time a weapon is fired, it sends out a cloud of dust, and it is difficult to see if the target is hit. Tank engine’s life spans fell from an average of 7500 kilometres to 3500 kilometres in the desert; most of this is due to the damage that suspended sediment causes. In military operations in the desert, take off formations are messed up by high concentrations of dust.

**Temperature Regulation**

Soil temperature plays an important role in many processes, which take place in the soil such as chemical reactions and biological interactions. This includes important processes like seed germination, bugs and microbes that live in the environment, and how quickly plant and animals break down. In colder soils, there is less biological and chemical reactions compared to warmer ones, therefore, there may be more carbon stored in the soils.

**Carbon and Nutrient Cycling**

Soil contains large amounts of stored carbon, nearly 5 times more than the plants that grow in it. Natural processes are all cyclical. On a global level, the total [carbon cycle](https://www.soils4teachers.org/soil-and-environment/carbon-cycle) is more complex, and involves carbon stored in fossil fuels, soils, oceans, and rocks. Physical, biological, and chemical processes in the soil affect the balance in organic carbon compounds, and if they are released to the atmosphere as CO2, or stored in the soil. This same process occurs with [Nitrogen](https://www.soils4teachers.org/nitrogen-cycle), Phosphorus, and all other materials.

**Water Filtration**

Without soil and soil particles, water would be running on bare rocks. When it rains, the soil acts as a sponge, soaking water into the ground. From there a few things can happen to the water. The water can be taken up by plants, microbes, and other living things, or the water moves into the underground aquifers and lakes, and flows into streams before eventually making it to the ocean. If rainfall contains harmful pollutants, the soil acts as a filter; contaminants are captured by the soil particles, and the water comes out cleaner in the aquifers and rivers.

Soil filters water as it moves from the land surface into the groundwater.  This occurs through physical, chemical and biological process.  For example, septic systems rely on these processes to protect groundwater quality as well as maintain the quantity of our water supply.  When soils are not protected, soils and nutrients can pollute water, washing away into streams and oceans.

**Water Cycling and Quality**

Application of excess fertilizers, particularly nitrogen and phosphorus, can result in runoff to streams and rivers or contamination of groundwater.  In most freshwater systems, phosphorus is the major limiting nutrient for the growth of photosynthetic organisms (e.g., plants, algae, and some microorganisms like phytoplankton).  If a lake or pond receives excess phosphate, it can stimulate these organisms, especially if nitrates are present with it.  These organisms block out the light and consume oxygen in the water to the detriment of other organisms (e.g., other plants and fish).  Other symptoms include cloudy water that is typically green or yellow.  Dead plants and fish and cloudy green water make these water bodies uninviting for recreational activities.

**"Waste" Decomposition**

Soils are the stomach that converts these "waste" products into newer, better things that can be reused by other creatures. Everything that is living eats, and because of this, everything needs to expel waste products out of their bodies. Humans and other organisms use the soil to decompose these waste materials into new materials. These new materials are used by other living things. Once a living thing dies, it falls into the soil and the biological and chemical processes convert these dead materials into new materials and food for living things. This is nature's way of recycling.