Available online at
www.agrospheresmagazine.com

ISSN: 2582 – 7022

Agrospheres:e-Newsletter, (2022) *3*(1), 22-24

Article ID: 338

Soil Erosion - Its Types and Consequences

Saurabh Thakur* and Aanchal Kapoor

Department of Soil Science, CSKHPKV, Palampur, H.P. (176 062), India

*Corresponding Author
Saurabh Thakur*

Article History
Received: 15. 01.2022
Revised: 22. 01.2022
Accepted: 28. 01.2022

INTRODUCTION

Soil is a non-renewable resource. Food, feed, fuel and fibre are all provided by soil. The primary purpose of soil has traditionally been as a medium for plant growth but now it also serves multiple purposes including environmental quality, global climate change and the storage of urban/industrial waste in addition to the emerging problems of food security. In essence, all life is dependent on the soil and there can be no life without soil. However, the importance of soil to human well-being is frequently not appreciated until the soil is badly eroded or deteriorated to the point where it loses its innate resilience and food production diminishes or is compromised. Productive lands are limited, accounting for only 11 percent of the total land area on the planet but they feed over six billion people and are growing at a rate of 1.3 percent per year (Eswaran *et al.*, 2001).

Soil erosion is a naturally occurring process that affects all landforms. In agriculture, soil erosion refers to the wearing away of topsoil by the action of water and wind. Because topsoil is the section of the soil with the most organic content and is most suited for farming and other fruitful activities as after the fertile topsoil has been eroded away, the remaining soil becomes less productive with the same amount of input. Soil erosion has consequences that go beyond the loss of agricultural land. It has resulted in a rise in pollutants and sedimentation in streams and rivers, blocking them and causing fish and other species to decline. While it cannot be totally eliminated but can be lowered to a manageable or tolerable level in order to reduce negative effects on productivity. Soil profile and horizonation, geography, soil management, and climate variables all influence the magnitude and impact of soil erosion on productivity.

TYPES OF SOIL EROSION

1) According to Origin: Soil erosion is divided into two categories-

a) Geological Erosion: It is a natural phenomenon and in this situation the rate of soil production is equal to the rate of soil loss. It is a slow process that is offset by the creation of soil as a result of natural weathering. In terms of agriculture, its consequences aren't really significant. Topographical features such as valleys, channels and other features are formed by this process.

b) Accelerated Erosion: It is also known as anthropogenic erosion or erosion caused by humans. In this instance, the rate of soil production is not equal to the rate of soil loss in general. In comparison to geological erosion, this is a quick process. Soil fertility on agricultural land is depleted as a result of accelerated erosion. Anthropogenic factors such as deforestation, slash-and-burn agriculture, extensive ploughing, etc. lead to this sort of erosion.

2) According to Erosion Agents: Soil erosion is categorized into different types based on the agent that triggers the erosion activity.

a) Water Erosion: It is a three step natural occurrence that involves soil particle dissociation, transport and deposition. The first two processes influence the amount of soil eroded, whereas the third phase defines how the eroded material is distributed across the landscape. There would be no deposition if there was no erosion. Soil detachment and transport can be caused by both raindrop impact and water runoff. A single raindrop starts the erosion process by weakening and dislodging an aggregate, which eventually leads to large-scale soil erosion during heavy rainstorms. When the rate of precipitation exceeds the rate of water infiltration, runoff occurs. Water erosion is the most common type of erosion in humid and sub-humid locations with frequent rainstorms. Water erosion is further categorised based on the wide-ranging actions of water that cause erosion into-Gully erosion, Splash erosion, Interrill erosion, Rill erosion, Tunnel erosion, Sheet erosion, Streambank erosion, Coastal erosion and Landslide erosion.

b) Wind Erosion: The removal, movement, and redeposition of soil particles by wind is known as wind erosion. It is particularly common in dry locations, where strong winds brush against various landforms, tearing them open and freeing soil particles, which are then lifted and moved in the direction of the wind. Wind erosion reduces root zone depth and water-holding capacity in shallow soils and soils with a hardpan layer. Such changes might happen slowly and go unnoticed for years, especially if the impacts are masked by tillage. Wind erosion influences not just the qualities and processes of the eroding soil, but also the nearby soils and landscapes where deposition may occur. Wind, unlike water, has the power to carry soil particles up and down slope polluting both the air and the water. Wind erosion rates rise in the following order: arid>semiarid>dry subhumid areas>humid places. Sand dunes and mushroom rock structures which are common in deserts are the best examples of wind erosion.

c) Glacial Erosion: Glacial erosion also known as glacier erosion is widespread in cold, high-altitude environments. Soil adheres to the glacier's base when it comes into contact with huge moving glaciers. This is eventually moved with the glaciers and as they begin to melt it is deposited in the flowing ice pieces.

d) Gravitational Erosion: Despite the fact that gravity erosion is not as widespread as water erosion it can inflict significant damage to both natural and man-made buildings. It is the mass movement of soil as a result of gravitational force. Landslides and slumps are the best illustrations of this. While landslides and slumps happen in a matter of seconds, phenomena like soil creep take longer to manifest.

CONSEQUENCES

a) Sandblasting of young seedlings or transplants, burial of plants or seed and seed

exposure are all examples of how wind erosion harms crops. Wind erosion can also wreak havoc on field operations thereby hindering timely field activities.

b) The dust particles clump together in the air, causing pollution. When inhaled, some toxic compounds such as insecticides and pesticide can be exceedingly dangerous. Dust plumes from dry and semi-arid regions generate extensive pollution.

c) Pesticides, insecticides, fertilisers, and other chemicals are found in agricultural soil. This pollutes the waterways through which the dirt runs. Sediments build up in the water, raising the water level and causing flooding.

d) Soil erosion is also a factor in the global climate change that is expected. Large volumes of carbon are rapidly oxidised during erosion, increasing CO_2 and CH_4 emissions into the atmosphere.

e) Clay particles tend to gather below the topsoil due to leaching. The loss of organic matter in eroded topsoil can change the physical properties of the soil particularly its density. Higher clay concentration at the surface can impede topsoil infiltration, reducing soil recharging and hence reducing plant water availability.

f) Soil erosion leads to thinning of topsoil that has less organic matter, reduced water holding capacity and shallower rooting depth. Erosion in extremely fertile soils, whether naturally or through fertiliser addition, will result in higher fertility losses.

g) According to the law of conservation of matter, erosion losses in one location are offset by gains in another however, the issue is that eroded soil can end up in places where no crops can be produced or where it buries and inundates crops in valleys.

i) The removal of smaller particles or entire layers of soil or organic matter as well as the breakup of aggregates can weaken the structure and potentially affect the texture. Textural changes can decrease the soil's water-holding capacity, making it more vulnerable to harsh weather like drought.

j) Soil erosion can have a negative impact on infrastructure projects including dams, drainage systems and embankments. The deposition of soil sediments in dams/drainages and along embankments can affect the lifetime and efficiency of these structures.

CONCLUSION

Soil erosion is still a major issue in agriculture in a number of countries and is regarded as one of the world's most important natural resource depletions. Management of soil erosion is necessary as its benefits go beyond agriculture field such as pollution control, global climate change etc. Long-term agricultural productivity depends on proper management of this valuable resource as it removes the topsoil which is the most fertile portion of soil enriched with nutrients and organic matter. Farmers can utilise soil conservation methods to reduce soil erosion and increase organic matter levels.

REFERENCES

Eswaran H, Lal R and Reich PF. 2001. Land degradation: an overview. In: Bridges EM, Hannam ID, Oldeman LR *et al.* (eds) Responses to land degradation. Proc. 2nd. International Conference on land degradation and desertification, Khon Kaen, Thailand. Oxford, New Delhi