

PROCESSES OF THE EFFECT OF WATER IN NATURE

Akhmedov Murodjon*

*Student,

Kokand State Pedagogical Institute,
UZBEKISTAN

Email id: murodjonakhmedov@mail.ru

DOI: 10.5958/2249-7137.2022.00570.5

ABSTRACT

In this article you can learn more about water erosion. The article provides information on how water erosion occurs, what factors and conditions are required for this, the processes that cause water erosion and what can happen as a result of erosion. Also the following types of water erosion are: Substrate, impact erosion, laminar water erosion, turbulent water erosion, Tunnel or underground erosion, Soil loss, Natural and social disasters, Accelerated erosion and anti-erosion barriers described in.

KEYWORDS: *Erosion, Exposure, Slope, Unstructured, Licking, Washing, Frequency, Intensity, Buffer, Infiltration, Kinetic Energy, Laminar, Turbulent, Cavernous Systems, Labgardon.*

INTRODUCTION

The purpose of our study of water erosion is that the beginning of many natural processes is water, which is a guiding force in society and nature. In the process of studying water erosion, it is clear that it has a permanent impact on lands, landscapes, mountains, and the role of water erosion in the formation of the relief of valleys is one of the main factors. Most of the agricultural land we use today is formed by water erosion, and on the contrary, due to this water erosion, the fertile layers of the soil are washed away from year to year. As we study the following data, we see its pros and cons, which mean that we need to combat the negative aspects of erosion without affecting the positive ones.

THE MAIN PART

Water erosion is the separation or loss of material that causes the physical and chemical effects of water on hard surfaces. This is due to the physical strength and diluting effect of the water when it moves hard on any surface.

The erosive action of water develops in three phases, beginning with the separation of the material, then its displacement, and finally sedimentation. The intensity and extent of this erosion effect depends on the aggregation of the particles that make up the surface exposed to water. Erosion is manifested in field and line views. The soil material (mass) that is the product of degradation is displaced by the flow and re-deposited in relatively large areas. As a result of field water erosion, the top layers of soil are washed away. In linear erosion, both the soil layer and the bedrock are washed away, resulting in crevices and cliffs.

In Uzbekistan, water erosion is mainly prevalent in the arable lands of mountainous regions, mainly in the brown-gray (typical dark, light-colored) soils. Due to water erosion in Uzbekistan 24109 tons per year. The fertile part of the soil is being washed away.¹

Water erosion is mainly distributed in mountainous and foothill and hilly areas, and is caused by heavy rains or rapid melting of snow and glaciers in the spring. Water erosion depends on the slope, length of the slope, exposure, mechanical composition of the soil, water-physical properties, fertility, vegetation cover and climatic conditions of the place.

Soil erosion is more likely to occur in areas with a slope greater than 0.01, in southern, southwestern, and southeastern exposures. This is because the land heats up under the influence of the sun, and the moisture evaporates quickly, which reduces the vegetation cover. Soil degradation depends on the speed and duration and amount of rainfall in the spring, as well as the mechanical composition of the soil. Erosion is slow in soils with light permeability of light sands and sands, while erosion is accelerated in soils with heavy mechanical structure and no structure.

Vegetation is covered with grass, various shrubs and forest trees. Water formed as a result of torrential rains or rapid melting of snow and glaciers affects the soil in two ways:

1. Licking 2. Washing

They cause the following soil erosions:

1. Smooth washing
2. Washing to form pits
3. Washing to form cracks.

When the soil is washed evenly, it is washed away imperceptibly under the influence of water. As the pits form and wash away, small crevices form on the surface. When ravines are formed and washed away, pits (5-10 m and deeper) and ravines are formed as a result of increased water flow.

Normally, a flat wash is a washout that forms pits, which in turn creates a washout that creates cracks.

In the process of licking and flushing, the soil is washed weak, medium and strong. Soil runoff is also divided into 3 types: low, medium and high leachate. As a result of erosion in Uzbekistan, 20-50 thousand t / ha of soil is washed away, as well as humus, nitrogen, phosphorus, potassium and other nutrients in the soil are washed away, the water-physical properties of the soil are degraded and it becomes barren. As a result, crop and pasture yields are declining. In addition, spilled soil can bury rivers, reservoirs and canals.²

Factors Contributing To the State Of Water Erosion:

Water erosion begins with the separation of particles from a surface that is eroded by the impact of water. These particles are then transported, where they settle or settle. This process is influenced by the properties of water and some of the factors that determine its impact. From the physical properties of water, its mass, motion, and velocity differ, as does its mechanical action on the surfaces it is exposed to. From a chemical point of view, the composition of water also plays an erosive role, depending on its acidity and the alkalinity of the surface on which it moves. Determinants of erosive effects include climate, vegetation, relief, and substrate.³

The climate of the region has a direct impact on the occurrence and intensity of water erosion, especially precipitation and humidity. Precipitation provides a means of water erosion (water) and determines its frequency and intensity.

For example, in a region with a tropical rainfall climate, with more than 7000 mm of rainfall per year, water erosion is high.

The role of vegetation in soil water erosion is very important. This is because the plant layer acts as a buffer effect of rainwater on the soil and rocks, reducing leakage and preferring infiltration. If there is a lack of vegetation in the soil, the water will directly react with all its kinetic energy and separate the fragments. On the other hand, water in the soil flows freely, carrying particles. The shape of the land surface, especially the slope of the land, is essential for water erosion. This is because the greater the slope or inclination of the ground, the faster the flowing water will reach it. In areas with high slopes, such as the vegetation-free side of a mountain, water can reach great speeds.⁴

Soil Or Substrate:

The substrate undergoing the erosion effect is important because, depending on its properties, the erosion will be large or small. Compared to soils and rocks, their structure and composition make them more or less susceptible to water erosion. Thus, the lower the organic matter in the soil, the higher the amount of sand and calcium in it, the higher the probability of water erosion. This is because its aggregates are less resistant to the mechanical and chemical effects of water. Also, if limestone components are present, water with high acidity will dissolve them and make them easier to drag. Similarly, the effect of water on limestone or sandstone rocks is different from that on granite rocks, where resistance to erosion is better.⁵

Water Erosion As A Result Of Exposure:

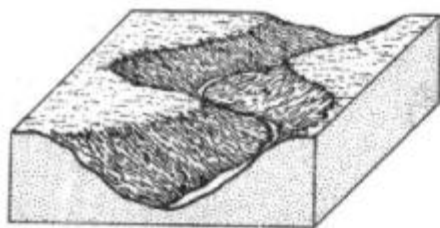
This is mainly due to the rotational motion affected by water droplets when they fall to the ground from a height. It's kinetic or kinetic energy is proportional to the amount of water, the size and frequency of the drops, and the duration of the rain. The periodic process of the force of these droplets on the surface is affected. Similarly, there is erosion as a result of direct exposure to waterfalls or waterfalls or the impact of sea waves on the shores.

Laminar Water Erosion:

Once water falls to the ground, it moves depending on its volume and the topography of the land. Laminar flow occurs when the slope or slope of the ground is low and the ground is flat (sheet-shaped displacement). This water erosion is the least visible, but it has a big impact on the soil because the water gradually removes organic matter and the best soil particles. Thus, coarse particles such as sand remain and the soil loses its ability to retain water and fertility.

Turbulent water erosion:

They are large bodies of water that disrupt the relief, moving turbulently through steep terrain. Therefore, ravines and canals are being created, its immediate impact and in geological periods this erosion leads to the formation of large valleys and rivers.⁶



Turbulent water erosion

Tunnel Or Underground Erosion:

This species occurs mainly in calcareous areas, where water enters the soil and melts the rock. Therefore, underground cavities are formed until they become large cavernous systems. They even have underground lakes and rivers, and sometimes the roofs of these caves collapse, creating gaps.

Soil Loss:

Water erosion is one of the main causes of soil loss in natural and agricultural environments, with serious consequences for food production. Due to the rate of soil loss and the slowness of its formation processes, the areas become desert (desertification process).

Socio-Natural Disasters:

Large landslides or mudflows at the base of water erosion have caused great tragedies leading to human and material losses. An example of this is the Vargas tragedy off the coast of Venezuela in 1999, which killed between 10 000 and 30 000 people.

Barriers to Water Erosion:

The installation of physical barriers can reduce or prevent water loss as a result of water transport. For example, planting anti-erosion barriers, such as “vetiver” plant rows, protects the soil from erosion; as such plants have a broad root system. At the same time, each farm should be specialized, taking into account the natural geographical conditions. It is necessary to develop perennial crops (horticulture, viticulture, etc.) in areas with strongly fragmented terrain, steep slopes, rivers and strong water erosion. In areas with intensive water erosion, it is necessary to cultivate grasslands. At the same time, perennial forage crops, especially alfalfa, are washed away from the soil, which is washed away. Driving steep slopes horizontally, sowing perennial crops gives good results. At the same time, when the lands with a slope of $5-10^0$ are plowed transversely to the slope, the rainwater does not form a ditch. When the slope of the slopes is $10-15^0$, plowing should be stopped, perennial grasses or stairs should be used, and fruit trees and vineyards should be established. Such work is now widely used in Uzbekistan.

This is done to immediately eliminate the effects of water erosion. They are carried out in conjunction with organizational, agro-technical and forest reclamation measures. Their function is to control the flow of water (stop or direct it in a safe direction). They are carried out with the help of hydraulic structures such as reservoirs, protective soil walls and dams, adjacent structures, dams. Hydrotechnical measures are important in the prevention of water erosion,

including measures to strengthen the banks of the river, which washes the shore, dams and dams that protect the shore in case of flooding; on the ground, catchments; canals that do not reduce the flow of water into the ravine; Reinforced concrete gutters instead of ditches in areas with soft, light soils that wash quickly in water; dams blocking the flow of water in ravines and streams; pools and reservoirs for flood control; construction of stepped ditches to prevent water erosion caused by precipitation, torrential downpours, etc.⁷

Measures to Combat Water Erosion:

The following measures will be taken to prevent and combat water erosion.

1. Agro-forest reclamation (establishment of reserve trees).
2. Agro-ameliorative measures (proper tillage, orderly grazing, protection, introduction of crop rotation).
3. Hydraulic measures (construction of terraces, mud and stone structures, drainage networks), construction of cliff protection structures.

Accelerated Erosion:

Artificial or accelerated soil erosion began to occur after the emergence of man on earth due to misuse of land. Under the influence of accelerated erosion, the topsoil is almost washed away. This erosion occurs a thousand times faster than natural geological erosion.

Accelerated erosion is a disaster for agriculture around the world. Because in a short time, under the influence of this erosion, millions of hectares of topsoil will be eroded and turned into barren lands. In the **last hundred years, 2 billion hectares** of fertile soils in the world have been eroded. Accelerated erosion during this period was particularly rapid in developed countries. According to American scientists T. Konke and A. Bertrand, since the arrival of the colonists on the American continent, due to the mistreatment of land, deforestation and improper irrigation have led to the loss of soil to barren lands. rotated. In fact, more than 300 million hectares of land have been affected by accelerated erosion in the United States, despite anti-erosion measures (according to L.I Kurakova). Of this, 100 million hectares are arable land. Currently, 2.7 billion tons of fertile soil is being eroded every year due to erosion from crop fields and pastures.⁸



These depths can be leveled during cultivation, but this does not restore soil fertility!

In conclusion, despite the fact that water erosion is a natural geological process, it is experiencing accelerated erosion due to anthropogenic influences, the effect of which is especially evident in irrigated lands. Irrigation erosion is occurring in many lands due to the fact that tillage and irrigation in irrigated lands are carried out coldly without a scientific approach. In the prevention and control of irrigation erosion, it is necessary to use mainly science-based irrigation techniques and technologies. The most important thing is to choose the right length of the slope and the amount of water supplied to the slope according to the slope of the land.

REFERENCES:

1. M.C Dias, J.M. Gasko. Methods of assessing water erosion. Agricola Espanola, Spain Madrid .: 1994.
2. Encyclopedia of Ecology and Environmental Management. T .: Fan, 2010.
3. Tarbuk E.J. and Lutgens, F.K. Earth sciences. Introduction to Physical Geology. 8th edition. Pearson Prentice Hall-2005.
4. M.R Bakiev, J. Majidov. Hydraulic structures. Volume 1 T .:, “Yangi asr avlodi”, 2008.
5. X. Shukurlaev, A. Mamataliev, R. Shukurlaeva. LAND REHABILITATION. Tashkent.
6. X. Shukurlaev, A. Mamataliev, R. Shukurlaeva. Agricultural Hydraulic Engineering. Tashkent 2007. 238 P.
7. Annual reports of the Department of Irrigation and Land Reclamation of Kokand. Kokand-2022
8. Isaqov V.Yu, Axmedov M.I, Maxmudov B. Land degradation and reclamation. Textbook - T.: 2022 B. 36-42.