The effect of the linear erosion process on the local ecological environment in the accumulation zone of the Lankaran river basin

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Abstract.
The article talks about the process of erosion and its damage to the environment. It has been determined that as erosion develops, the natural processes within the soil are disturbed, and the upper fertile layer is destroyed. As a result of erosion, the upper fertile layer of the damaged soil weakens the rate of biomass formation and changes the direction of the soil formation process. This ultimately leads to the transformation of the ecological situation. It should also be noted that the soil is paraactive as a system. Diagnosis of the form, stage and degree of its development requires scientific research on a very large scale.

Keywords:
Surface erosion
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anthropogenic factor
**Introduction.** Due to its natural conditions, Lankaran province is located in the south-eastern corner of Azerbaijan, on the border with Iran, and is very favorable for the intensive development of agriculture. Due to the soil and climate conditions, as a humid subtropical zone, it is suitable for the establishment of citrus orchards, tea plantations, grapes, vegetables, rice, cereals and legumes. Development requires scientific The area of Lankaran province is 636380 hectares and administratively includes Astara, Lankaran, Lerik, Yardimli, Masalli and Jalilabad districts[1]. Since the districts included in the Lankaran province are located in different parts of the territory and differ from each other due to their climate and relief, the territory of individual administrative districts is used under different agricultural crops. As a result of improper and efficient use of the lands under agricultural crops, meadows and forests, these lands have been subjected to various degrees of erosion.

According to its orographic features, Lankaran province is divided into mountainous and plain parts. In the mountainous part, the erosion process proceeds violently, while in the plain part, the deposition of materials brought by the erosion process is observed. The plain part of the area forms the Lankaran plain, on one side it is bordered by the Caspian Sea coastline, and on the other side by the foothills through a very clearly visible stepped terrace. From Lankaran to the south, the plain gradually narrows. This part is located -20 m below sea level. The relief feature of the plain part does not create favorable conditions for the development of the erosion process here. The mountainous part consists of a high mountain range and is bordered by the foothills from the southeast (figure 1).

Located 10 m above sea level, this area mainly covers the eastern part of the territory and connects with the Caspian Sea coastline from the east and the low mountainous foothills from the west. Here retreats and the process of accumulation play an important role in the formation of the area. The flat part was formed as a result of the retreat of the Caspian Sea and the accumulation of accumulative materials brought as a result of the erosion process. While the inclination of the
mountainous part is in different directions, the general inclination of this part is to the east towards the Caspian Sea and it is sharply different from each other due to its geomorphological features. Thus, the plain part is divided into the foothill plain (high-surface marine terrace) and the plain part (low-surface marine terrace).

The accumulation zone of the Lankaranchay basin covers the foothill plains and lowlands of Lankaran region and is the humid subtropical region of Azerbaijan with the most precipitation. This region differs sharply from other regions of Azerbaijan due to its physical, geographical and climatic conditions. Thus, the average annual precipitation amount in Buta is 1402 mm (data from Lankaran-zonal meteorological station), and possible evaporation is 870 mm[2]. Precipitation is unevenly distributed. The summer is dry, the most precipitation falls in autumn, slightly less in winter. During the period of abundant precipitation (autumn and winter), the vegetation period of plants ends, plants cannot use the precipitation effectively, on the contrary, during the vegetation period of plants (spring and summer),
precipitation falls less, which shows its negative effect on the development of plants.

The dry summer makes the soil both dry and very dry. As a result, it is not possible to cut the land, nor to carry out any agrotechnical measures. In grazing areas, the grass cover dries up completely, and only sparsely thorny grasses can maintain their greenness. Only in the irrigated areas, forests and bushes, greenery is noticeable in swampy areas.

Plant formation is common in the foothill slopes and especially in the plain part of the region. The height of these areas varies from (-20) m to 50 m above sea level. Here, the natural vegetation consists of three-leaf clover, sedge, cat's tail, meadow (Cynodon pers), creeping sedge (Agropyrum repens p.B), bulagot (veronica L), sedge (Pobydonum L), sedge (Avena fatua), velamir (Avena L), fodder (Fragopos), single beard (scorzonera L) etc. herbaceous plants thrive[3,4]. Improper use of the sloping plain areas at the foot of the mountain in agriculture, unsystematic use for cattle grazing has caused the erosion process to occur, develop and spread here (figure 2).
Abundant autumn rains in the form of showers cannot soak into the compacted soil, and surface washing occurs at this time. This process is more intensive in areas that lack or have sparse vegetation. When the rains begin to fall continuously, the upper layer of the soil gradually gets wet and softens, its water permeability increases, as a result, the rainwater also wets the lower layers of the soil, the necessary moisture reserve is created in the soil, and the second life cycle of plants begins, causing pseudo podzolization[5].

Research object and methodology. The eroded lands of Lankaran region were taken as the research object. The degree of soil erosion in the research object was determined based on the comparative geographical methodology proposed by K. A. Alekperov, and the determination of morphogenetic features by Sh. G. Hasanov.

Analysis of results. In 2013, we carried out measurements on the largest ravine in Lankaran region. The active ravine is located in the grazing area. The grazing area is covered with dense grass plants. Areas with only ravines are devoid of vegetation. Blackberry bushes are found in certain areas. Sparse willow trees planted by people are also encountered. It is no coincidence that pseudo-podzolic-yellow soils are most widespread in the accumulation zone of the Lankaranchay basin. Pseudo-podzol-yellow soils belong to the type of sour soils. Acidic soils are very suitable for planting citrus orchards, tea plantations, planting vegetables, rice, cereals and legumes.

In the accumulation zone of the Lankaranchay basin, all types of erosion occur - surface, linear (gully), irrigation, wind (deflation) and pasture erosion[6]. In this article, as a result of the improper economic activity of the people, we will describe the ditches (depth 80-100 cm, depth 80-100 cm) dug for the discharge of rainwater from settlements (Lenkoran city and Sutemurdov village) on the left and right banks of the river in the part of the Lankaran river passing through the territory of Lankaran city municipality and Sutemurdov village municipality. 70-80 cm wide) we will investigate the development dynamics of ravines of anthropogenic origin, which were form.
According to S.Z. Mammadova, the total area of land suitable for agriculture in Lankaran province is 280418 hectares. Of this, 237,156.7 ha were not washed, 17,591 ha were weakly washed, 16,951.3 ha were moderately washed, and 8,719 ha were heavily washed. In general, 43,261.3 ha or 15.4% of the land suitable for agriculture has been eroded to varying degrees as a result of deep and wide washing by rainwater[7].

We came across three ravines of anthropogenic origin on the first terrace of the Lankaran river in the territory of the mentioned municipalities (Lenkoran, Sütamurdov). Yarganlar is on the right side of the bridge over the river in the direction of Astara on the Lankaran-Astara highway. Two of the ravines are located on the right bank of the river (in the territory of Sutamurdov municipality), and one is located on the left bank (in the territory of Lankaran city municipality). The largest ravine in the territory of Sutamurdov municipality was created due to the canal built to drain the rainwater collected in the stadium built for "Khazar-Lankaran" football club in the village at one time into the river. The stadium is located on the second terrace of the Lankaran river, 60 meters from the river, on the right side of the section of the Lankaran-Astara highway passing through the village of Sütamurdov.

The length of the ravine is 65 m, the average width is 3.06 m, and the average depth is 0.6 m. The area of the gully is 198.9 m², the amount of washed soil is 119.34 m³. In the 50 m section of the gully, on which we are measuring, the process of natural recovery is also underway. A thick blackberry bush is spread in the beginning. Sparse grass plants have grown both on the bottom and on the slopes of the ravine. In the 15 m section near the river, the ravine is developing, landslides occur on its slopes, and it is devoid of vegetation. A thin stream of water flows from the bottom of the ravine and pours into the river. The other two ravines are in full development.

To prevent gully erosion, it is necessary to drain rainwater not through open ditches, but by digging special pipes and burying them in the ground. After laying the pipes in dug pits and covering them with soil, the degraded area
should be sown with grass seeds suitable for local conditions, and fenced around it, it should be protected from outdoor exposure until the grass cover is restored. After the grass cover is restored, it can be included in the general pasture rotation.

**The result.** Based on the analysis and discussion of the analytical information given in the article, it can be concluded that the plant-covered area of Lankaran region is 32830 ha. As a result of the anthropogenic influence here, the pasture area has been overburdened and became unusable and eroded. Taking into account that the grazing area is slightly eroded, it is necessary to divide the grazing area into 5-6 parts with one head of cattle or 7-8 head of small cattle per hectare, and graze it in parts by drawing a fence around it with an iron net. After grazing each part for 5-6 days, it is moved to the next part, and when the parts are grazed alternately, the first part is left to rest for about a month, and the grass cover is completely restored.

**References:**