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RESEARCH ARTICLE

Impact of Erosion Process to Fertility of Mountain – Chernozem Situating in South-East Slope of Great Caucasian (In the Example of Shemakha District)

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ABSTRACT

The complexity, sharp change in the relief condition, the tension of the anthropogenic factors in the Shamakhi region, where we have investigated, has intensified the erosion process. Because of the lack of agrotechnical measures on the slopes, the erosion process has been intensified, the soil is flooded with soil, the physical and chemical properties of the soil have deteriorated, the nutritional elements have declined, and the vegetation has been degraded and reached the limit of destruction. For some reason, the object of research was Shamakhi two land cuts were set up to determine the degree of actual erosion of the soil in the village of melam, which will result in preventive measures to prevent erosion intensities and to develop and implement appropriate preventive measures.

Key words: Erosion, forest, meadow, mountain chernozem, mountain, silver-black-brown earth

INTRODUCTION

Shamakhi region, situating in southeast slope of Great Caucasian has 393, 3 thousand hectare area. The area of region is situated in 200–2500 m height above sea level.

As in all regions of Great Caucasian, this region is belonged to low mountainous zone, from geological and geomorphologic point of view. In the soil formation process, rocks play a great role in the formation of their fertility.

When the rocks, rich with mineral elements are weathered in the region, absorbs into the soil a great number of nourishment elements.

A lot of potassium and other elements are absorbed into the structure of soils, of which hydromica arises from feldspar, mica, and slates. In the mountainous part of the region, soil former rocks mainly consist of slates, marls, and sandy.

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However, in watersheds, basalt, marble, and granites are met.

In the middle mountainous part, the rocks mainly consist of clayey slates, clay with lime mixture, and sandy.

As it is known, climate plays a very great role in the soil formation process. Dokuchaev,[1] Gerasimov,[2] Vsky,[3] Shikhlinski,[4] and others have informed about a great role of climate in the erosion formation process.[5-7]

The climate of Shamakhi region corresponds to the climate of Middle Europe. Here, the minimum temperature is observed between 10 days of December 3 and 10 days of February 2.

Moreover, the maximum temperature is observed in February, July–August months.

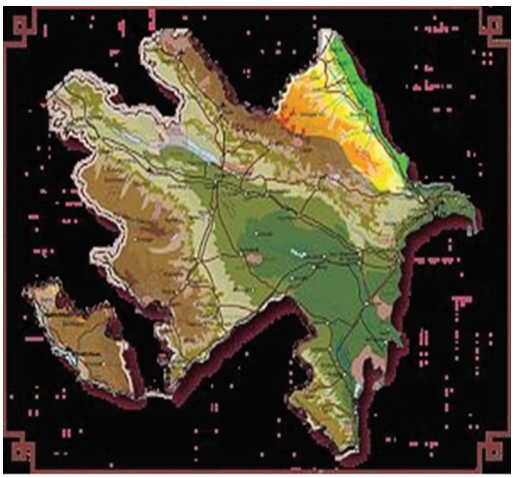
The average yearly quantity of rains is about 460–600 mm.

Mountain and meadow, mountain and forest, mountain-chernozem, mountain, and grey-dark brown soils have spread in region area.

Because of our investigation covers mountain-chernozem, we dwell on their main character.

Akimtsev,[8] Salayev,[9] Salamov,[10] Shakuri,[11] and others have noted on spreading of chernozem in mountain zone of Azerbaijan. Chernozems have spread in a limited area in Great Caucasian and are strongly used under agriculture plants.

They have mainly developed in the middle mountainous area of Shamakhi and Ismayilli regions.



THE COURSE OF RESEARCH AND DISCUSSION OF MATERIALS

We have investigated mountain-chernozems in Shamakhi region. The morphological description of soil types, flushed in average degree, and subjected to erosion is indicated below [Table 1].

Section 1: Divided in the region of Jawani village, gentle east Bakharli slope.

(A) 0–17 cm chernozem clayey, heap, hard, dry, plant roots, rootlets, worm ways, small stones, and boils for the impact of chlorine acid, the passage is clear. (B) 17–39 cm-chernozem, upper layer is relatively light, clayey, heap a little hard, root and rootlets, small stones, spots in brown vein form, worm ways, damp, and boils for the impact of chlorine acid, passage is gradual.

B/C-39–65 cm – color is more lighter, clayey, heap, solid, root, rootlets as weak vessel carbonate spots, stone, and rocks boils from HCL effect.

Morphological description shows that the soil, we have investigated, is the carbonated half type of mountain black soil.

The area where these types of soil are situated has the compound physical condition. In the result of complexity of physical condition and mutual effect of anthropogenic factors erosion process has developed.

Taking into consideration the damages, which erosion process inflicted to soil fertility, there was put sections in this type of soil. Morphological description of such sections is given below.

Section 2

B_1 0–15 cm – light black, heavy clayey, heap, little stones, root and rootlets boiled weakly, boils from HCL effect, passage is clear.

B_2 15–33 cm – light black, clayey, heap, very solid, small and flat stones, sparse root and rootlets, and limestone boils from HCL effect, passage is clear.

B/C 33–48 cm – light black, clayey, heap, very solid, flat white stones, weak carbonate vessels sparse root, and rootlets boils from HCL effect.

Cover in these regions is sparse. As indicated in morphological description of section "A," layer structure was disordered and other physical factors have subject to deformation. Some chemical factors of mountain – black soil were indicated in schedule No. 1 and No. 3.

As indicated in schedule No. 1 amount of waterproof aggregates in middle flushed soil than in non-flushed soil was decreased, and this shows the disorder of such soil structure. Amount of physical clay in the type of flushed mountain-black soil has decreased and mechanical composition has become lighter. (Schedule No. 1 and 2).

Amount of humus in non-flushed type of mountain-black soil was 5.35–1.94%, common nitrogen is 0.26–0.10%.

The soil is carbonated, carbonates ($CaCO_3$) was 3.57–2.73%.

This soil is saturated with alkali.

Hence, total of absorbed ground was 28.2–29.2 m ekv (100 g soil) along profile. Calcium has priority in cations.

Mounting chernozem soils are well provided by nutrients.

As evident from figures of schedule No. 3, quantity of phosphorus (PiOs) solved in profile alkali was 33.3–27.2 mg (1 kg. soil), exchanged potassium (K^O) was 442.0–335.0 mg/kg.

As can be seen from figures of the table, mounting chernozem soils have a good potential of prolificacy.

Table 1: Structural aggregate composition of carbonated mountain-black soil

Section 1	Erosion degree	Depth with sm	For 100 g soil			Fractions with %				
			7	7–5	5–3	3–1	1–0, 5	0,5–0,25	0,25	
1	Unwashed	0–17	62,60	2,65	11,60	11,80	1,50	1,20	1,65	-
			10,10	8,60	36,80	21,20	4,40	5,80	13,1	
		17–39	43,50	10,20	20,10	19,40	3,30	1,60	1,90	-
			3,80	6,10	26,70	24,80	9,20	7,50	21,9	
		39–65	52,60	8,80	15,00	16,80	4,20	1,40	1,20	-
			2,80	4,20	16,60	12,40	17,80	18,40	27,8	
2	Medium unwashed	0–15	56,50	11,80	10,70	12,40	3,40	1,70	3,50	-
			3,40	2,20	15,60	32,40	16,80	7,60	22,0	
		15–33	54,40	5,90	12,40	12,50	6,20	2,80	5,80	-
			2,80	9,20	26,40	17,20	11,80	6,60	26,0	
		33–48	57,10	10,20	12,60	11,80	3,10	1,20	4,10	-
			2,40	8,60	24,20	18,80	8,60	5,80	31,6	

Section 1	Erosion degree	Depth with sm	Hygroscopic humidity	Fractions' measure with mm, quantity with %						
				1–0,25	0,25–0,05	0,05–0,01	0,01–0,005	0,005–0,001	<0,001	<0,001
1	Unwashed	0–17	5,74	4,63	6,17	29,20	15,20	15,20	15,20	60,00
		17–39	6,41	0,32	10,88	24,40	19,60	19,60	18,40	64,40
		39–65	6,71	2,40	9,20	19,20	18,40	18,40	18,40	69,28
2	Medium washed	0–15	5,28	0,30	9,82	32,40	14,84	14,84	22,40	57,48
		15–33	5,65	0,40	12,76	24,08	12,96	12,96	25,60	62,76
		33–48	6,24	4,58	6,62	22,40	16,80	16,80	14,40	66,40

As erosive process changed morphological characters of the soils, it has influence on its prolificacy parameters.

Results of my investigations also show it. It is possible to see it from the numerals of schedule No. 2.

As we see, the amount of humus was 3,48–1,36% general nitrogen in the profile of carbonate mountain chernozem subject to erosion in middle degree, and as a result it has decreased in compare of unwashed soils.

In the profile of those soils was $CaCO_3$ 2,18–1,77%, and sum of absorbed bases was 31, 5025,5 m ekv (in 100 g soil).

Here, the amount of phosphor dissolved in alkali is between 27,3 and 23,9 mg/kg and changeable potassium is between 305,0 and 246,0.

We can come into the following conclusions from the investigation we held:

CONCLUSION

1. Mountain chernozems include to the soil groups situating in the vertical direction of southeast slope of great Caucasus.
2. Mountain chernozems have high fertile potential.
3. Erosion process decreases more the fertile potential of mountain chernozems.

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