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Spatial Analysis of Soil Cover by Definition of Soil Stability Indicators for Flushing in the Upper Shirvan Zone of Azerbaijan

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Abstract

The results of the research prove that the "soil layer" created in the database contains information on the types of soils, as well as their groups in the southern slopes of the foothills of Azerbaijan. Given the availability of cartographic materials, an analysis was also carried out for the Akhsu district as a research facility. The results are given in Tables 1 & 2, which provide information on the area of specific types of soils according to altitude intervals and grades of terrain slopes.

Keywords: Light; Brown, meadow-gray; Hazard; Flushing; Carbonate; Mountain-forest; Unstable; Gray-meadow, etc

Introduction

In Aksuinsky district the largest area is occupied by bright meadow-gray soils-more than 26% of the total area. Significant area is occupied also by meadow-gray soils-12% and gray-brown-almost 11%.Analyzing the distribution of soils along altitude intervals, it is established that at light up to 300 m above sea level, light meadow gray soils occupy 26% of the area, meadow-gray-12.3%, and gray-brown and light gray-meadow soils - 10 %.At an altitude of 300-600 m, mountain gray-brown soils occupy 4%, at an altitude of 600-900 m - washed mountain-brown almost 7% of the total area (Table 1). Depending on the humus content of the soil and its mineral composition, the soil stability index for flushing was calculated, which was subsequently used to determine the degree of erosion threat [1-14].

Table 1: Distribution of soil types by altitude intervals, meters above sea level.

Types of soil	Altitude intervals, m above sea level									Together		
	0-300		300-600		600-900		900-1200		1200-1500			
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
Typical mountain forest brown	0	0,00	67	0,07	682	0,68	388	0,39	104	0,10	1241	1,24
Carbonate mountain forest brown	14	0,01	743	0,74	1510	1,51	66	0,07	0	0,00	2332	2,33
Emerged from under the forest, washed away mountain brown	36	0,04	369	0,37	1900	1,90	578	0,58	123	0,12	3006	3,00
Emerged from under the forest, carbonate mountain brown	663	0,66	1024	4,02	6710	6,71	379	0,38	0	0,00	11776	11,77
Cultivated from under forests, cultivated mountain- (garden) brown	0	0,00	0	0,00	288	0,29	89	0,09	8	0,01	385	0,38
Steppe mountain brown	13	0,01	927	0,93	1256	1,26	5	0,01	0	0,00	2201	2,20
Mountain gray-brown	2292	2,29	4066	4,06	337	0,34	0	0,00	0	0,00	6696	6,69
Gray-brown	9855	9,85	781	0,78	0	0,00	0	0,00	0	0,00	10636	10,63
Light chestnut	1092	1,09	0	0,00	0	0,00	0	0,00	0	0,00	1092	1,09

Light meadow gray	26433	26,42	48	0,05	94	0,09	0	0,00	0	0,00	26575	26,65
Meadow - gray	12308	12,30	0	0,00	0	0,00	0	0,00	0	0,00	12308	12,30
Light gray-meadow	9983	9,98	0	0,00	0	0,00	0	0,00	0	0,00	9983	9,98
Gray meadow	3311	3,31	0	0,00	72	0,07	0	0,00	0	0,00	3383	3,38
Insufficiently developed alluvial-meadow	1967	1,97	10	0,01	33	0,03	0	0,00	0	0,00	2011	2,01
Swamp-meadow	555	0,55	0	0,00	0	0,00	0	0,00	0	0,00	555	0,55
Salted	907	0,91	0	0,00	0	0,00	0	0,00	0	0,00	907	0,91
Rest	3543	3,54	809	0,81	571	0,57	37	0,04	0	0,00	4960	4,96
Together	72973	72,94	11844	11,84	13452	13,45	1542	1,54	236	0,24	100047	100,00

This indicator includes five degrees, where the 1-st stands for soils that are resistant to flushing, and the 5th is very weakly resistant. Based on the analysis of the data in the Akhsu region, it was found that the largest area is occupied by the soils resistant to flushing (1 degree of danger) -58% of the area as a whole. Very unstable to wash away the soil in the region is only 1.6%. The largest area of soils resistant to flushing (1 degree) is in the altitude range from 0 to 300 m. on slopes with a slope of 0-6%. Soils are 2 degrees of stability, i.e. well resistant to flushing, concentrated at an altitude of 300-800 m. with an incline of 10-18%. A significant area of land belonging to this degree of stability is also at an altitude of 100-200 maslong, with a slope of 0-6%. Most of the medium-resistant soils (grade 3) are in the altitude range of 100-300 m. with a slope of the terrain of 0-6% (Tables 2-7).

Table 2: Distribution of soil types by grade of grade, %.

Types of soil	Incline ,%											Together		
	0-6		06-Oct		Oct-18		18-27		27-35		35-74			
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
Typical mountain forest brown	114	8,51	265	19,72	691	51,42	197	14,43	80	5,93	0	0,00	13,44	1,34
Carbonate mountain forest brown	138	5,85	379	16,12	1330	56,57	475	20,20	25	1,08	4	0,18	2352	2,35
Emerged from under the forest, washed away mountain brown	499	16,90	1049	35,54	1291	43,74	112	3,79	1	0,03	0	0,00	2952	2,95
Emerged from under the forest, carbonate mountain brown	1395	11,70	2313	19,41	6495	54,50	1688	14,16	26	0,22	0	0,00	11916	11,91
Cultivated from under forests, cultivated mountain- (garden) brown	78	20,14	163	42,21	133	34,47	12	3,18	0	0,00	0	0,00	385	0,38
Steppe mountain brown	52	2,37	207	9,42	1261	57,40	675	30,75	1	0,05	0	0,00	2196	2,20
Mountain gray-brown	439	6,75	1384	21,28	3976	61,11	689	10,60	17	0,00	0	0,00	6506	6,50
Gray-brown	7897	74,11	1074	10,08	1342	12,60	337	3,16	6	0,00	0	0,00	10656	10,65
Light chestnut	1018	93,21	42	3,82	32	2,97	0	0,00	0	0,00	0	0,00	1092	1,09
Light meadow gray	26232	99,08	99	0,37	139	0,53	5	0,02	0	0,00	0	0,00	26475	26,49
Meadow - gray	12366	99,98	3	0,02	0	0,00	0	0,00	0	0,00	0	0,00	12368	12,36
Light gray-meadow	99561	99,67	14	0,14	18	0,18	0	0,00	0	0,00	0	0,00	9983	9,98
Gray meadow	3320	98,15	40	1,20	22	0,65	0	0,00	0	0,00	0	0,00	3383	3,38

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Insufficiently developed alluvial-meadow	1950	96,99	8	0,42	41	2,02	12	0,57	0	0,00	0	0,00	2011	2,10
Swamp-meadow	555	100,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	555	0,55
Salted	907	100,0	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	907	0,91
Rest	4035	81,35	374	7,53	421	8,49	126	2,54	0	0,00	0	0,00	4960	4,96
Together	70944	70,92	7413	7,41	17193	17,19	4326	4,32	160	0,16	4	0,00	100040	100,00

Table 3: Area (ha and %) of soils belonging to 1 degree of resistance to flushing.

Height m.	Slope,%										Together	
	0-6		6-10		10-18		18-27		27-37			
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
0-100	25103	42,32	16	0,03	13	0,02	0	0,00	0	0,00	25133	42,37
100-200	7790	13,13	337	0,57	129	0,22	18	0,03	0	0,00	8274	13,95
200-300	7790	13,13	337	0,57	129	0,22	18	0,03	0	0,00	8274	13,95
300-400	869	1,47	624	1,05	619	1,04	74	0,12	0	0,00	2187	3,69
400-500	56	0,09	236	0,40	1217	2,05	483	0,81	5	0,01	1997	3,37
500-600	68	0,11	317	0,53	1532	2,58	572	0,96	4	0,01	2492	4,20
600-700	176	0,30	533	0,90	2210	3,73	479	0,81	19	0,03	3418	5,76
700-800	514	0,87	1215	2,05	1946	3,28	203	0,34	16	0,03	3893	6,56
800-900	547	0,92	801	1,35	811	1,37	91	0,15	9	0,02	2259	3,81
900-1000	122	0,21	247	0,42	200	0,34	41	0,07	8	0,01	618	1,04
1000-1100	20	0,03	174	0,29	236	0,40	19	0,03	7	0,01	456	0,77
1100-1200	19	0,03	31	0,05	111	0,19	27	0,04	3	0,00	190	0,32
1200-1300	0	0,00	6	0,01	60	0,10	27	0,05	2	0,00	94	0,16
1300-1400	0	0,00	3	0,01	16	0,03	4	0,01	1	0,00	24	0,04
Together	**43074**	**72,63**	**4878**	**8,22**	**9229**	**15,56**	**2055**	**3,46**	**75**	**0,13**	**59310**	**100,00**

Table 4 : Area (ha and %) of soils belonging to the 2nd degree of resistance to flushing.

Height m.	Slope,%										Together	
	0-6		06-10		10-18		18-27		27-37			
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
0-100	2	0,02	0	0,00	0	0,00	0	0,00	0	0,00	2	0,02
100-200	710	8,43	148	1,76	123	1,47	10	0,12	0	0,00	992	11,78
200-300	239	2,84	243	2,89	683	8,11	69	0,82	2	0,02	1237	14,68
300-400	61	0,73	232	2,75	775	9,20	183	2,18	11	0,13	1263	14,99
400-500	39	0,46	84	0,99	689	8,18	256	3,04	8	0,09	1075	12,76
500-600	38	0,45	119	1,41	732	8,69	321	3,81	2	0,02	1211	14,37
600-700	21	0,24	146	1,74	863	10,23	331	3,92	0	0,00	1360	16,14
700-800	52	0,61	155	1,84	538	6,39	169	2,01	6	0,07	920	10,92
800-900	31	0,36	59	0,70	150	1,78	55	0,65	3	0,04	297	3,53

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900-1000	3	0,04	11	0,13	27	0,32	19	0,23	4	0,05	64	0,76
1000-1100	0	0,00	0	0,00	4	0,04	1	0,01	0	0,00	4	0,05
Together	**1194**	**14,18**	**1197**	**14,21**	**4583**	**54,40**	**1414**	**16,79**	**36**	**0,43**	**8425**	**100,00**

Table 5: Area (ha and %) of soils belonging to the 3 degree of resistance to flushing.

Height m.	Slope,%										Together	
	0-6		06-Oct		Oct-18		18-27		27-37			
	ra	%	ra	%	ra	%	ra	%	ra	%	ra	%
0-100	23051	78,78	0	0,00	0	0,00	0	0,00	0	0,00	23052	78,78
100-200	2100	7,18	261	0,89	158	0,54	30	0,10	0	0,00	2549	8,71
200-300	1557	5,32	195	0,67	379	1,30	136	0,46	1	0,00	2268	7,75
300-400	34	0,12	42	0,14	165	0,56	41	0,14	4	0,01	287	0,98
400-500	7	0,02	44	0,15	278	0,95	85	0,29	1	0,00	414	1,41
500-600	13	0,04	53	,18	273	0,93	74	0,25	0	0,00	413	1,41
600-700	3	0,01	23	0,08	141	0,48	41	0,14	0	0,00	209	0,71
700-800	4	0,01	28	0,10	23	0,08	3	0,01	0	0,00	58	0,20
800-900	0	0,00	10	0,03	1	0,00	0	0,00	0	0,00	10	0,04
Together	26770	91,49	658	2,25	1417	4,84	409	0,40	5	0,02	29259	100,00

Table 6: Area (ha and%) of soils belonging to the 4 degree of resistance to flushing .

Height m.	Slope,%										Together	
	0-6		6-10		10-18		18-27		27-37			
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
0-100	2285	57,36	0	0,00	0	0,00	0	0,00	0	0,00	2285	57,36
100-200	54	13,55	27	0,69	60	1,51	2	0,05	0	0,00	630	15,80
200-300	61	1,52	32	0,82	93	2,34	20	0,51	0	0,,0	207	5,19
300-400	0	0,01	3	0,7	17	0,42	9	0,24	0	0,00	29	0,74
400-500	0	0,00	0	0,00	0	0,00	5	0,12	0	0,00	5	0,12
500-600	0	0,00	3	0,07	28	0,71	5	0,11	0	0,00	36	0,89
600-700	5	0,13	6	0,14	78	1,95	22	0,56	0	0,00	111	2,79
700-800	24	0,60	73	1,83	131	3,30	29	0,74	1	0,02	258	6,48
800-900	17	0,43	80	2,00	74	1,83	17	0,42	1	0,03	189	4,74
900-1000	22	0,55	10	0,24	8	0,21	20	0,49	3	0,09	63	1,58
1000-1100	8	0,21	20	0,25	39	0,97	8	0,19	9	0,22	83	2,09
1100-1200	4	0,10	5	0,12	16	0,40	6	0,14	15	0,37	46	1,14
1200-1300	0	0,00	1	0,02	22	0,56	2	0,06	11	0,27	36	0,91
1300-1400	0	0,00	1	0,01	4	0,10	1	0,02	2	0,04	7	0,17
Together	**2966**	**74,45**	**260**	**6,53**	**571**	**14,34**	**145**	**3,65**	**41**	**1,03**	**3984**	**100,00**

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Table 7: Area (ha and %) of soils belonging to the 5 degree of resistance to flushing.

Height m.	Slope,%										Together	
	0-6		06-Oct		Oct-18		18-27		27-37			
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
0-100	199	12,03	0	0,00	0	0,00	0	0,00	0	0,00	199	1203
100-200	113	6,82	7	0,41	10	0,59	15	0,88	0	0,00	144	8,70
200-300	351	21,19	21	1,26	44	2,69	17	1,03	2	0,13	436	26,30
300-400	105	6,35	27	1,61	48	2,88	33	2,02	2	0,09	214	12,94
400-500	113	6,84	26	1,59	37	2,22	5	0,29	0	0,00	181	10,95
500-600	154	9,28	46	2,79	30	1,78	3	0,19	0	0,00	233	14,04
600-700	113	6,85	41	2,47	43	2,62	1	0,06	0	0,01	199	12,01
700-800	45	2,70	3	0,17	3	0,15	0	0,00	0	0,00	50	3,02
Together	1194	72,05	171	10,30	214	12,94	74	4,48	4	0,23	1657	100,00

Weakly resistant soils to flushing (4th degree) occupy almost 71% of the area in the altitude range from 100 to 200 m. with a slope of 0-6%. Most of the soils are very unstable to flushing (grade 5) - more than 69%, are located on slopes with a slight slope of 0-6% and a height of 100 to 700 m.

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