**International Journal of Engineering & Scientific Research**
Vol. 7 Issue 3, March 2019,
ISSN: 2347-6532 Impact Factor: 6.660
Journal Homepage: http://esrjournal.com, Email: esrjeditor@gmail.com Double-Blind
Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A

# SPATIAL ANALYSIS OF DATA ON THE BASIS OF THE DIGITAL MODEL OF RELIEF AND LOCALITY(example of Shemakha, Akhsu and Ismayilli districts).

**.Prof. Z.H.Aliyev**

Institute of Soil Science and Agrochemistry of NAS of Azerbaijan, Az 1073. Baku.str. M.Raqima 5.

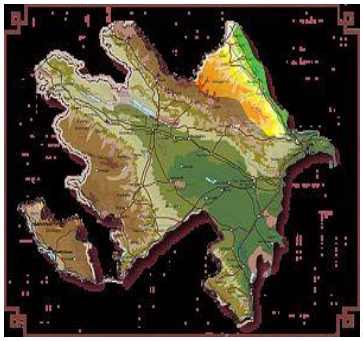
Corresponding Email Id: zakirakademik@mail.ru

**Article Received: 15th February, 2019 Article Revised: 20th February, 2019 Article Accepted: 28th February, 2019**

**Annotation**: The article examines the issues of studying the degree of susceptibility of sloping lands in Azerbaijan in the example of specific administrative-territorial units, flat areas with a slope of up to 6% (about 3.50) are concentrated in Akhsu district - 71%, and in Shemakha - almost 49%. The steepest slopes are observed in the Ismaili region, where almost 26% of the territory has a slope of 10-18%, 30% of its area slope is 18%.

**Key words:** sloping slopes, arable lands, a layer, a database, a gradient class, soil, forests, pastures, geese, cartographic materials

## Introduction



Spatial analysis includes operations performed on geographic data using available methods and techniques in GIS software, with a view to describing the relationships between elements of the geographical environment. The analysis can be carried out on the data, both in the vector and raster systems, and touch the geometry and attributes of the vector data.

## Search for information in the database

The main operation that can be performed based on the GIS database is information retrieval. This database has a relational nature and therefore, the object designation provokes the selection of the corresponding records from the corresponding attribute table, and vice versa.

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The first thematic layer in the database was the Digital Elevation Model in raster format. On its basis, as a result of the transformations and calculations, information on the height of the nos. and the slope of the terrain on the territory of Azerbaijan selected for analysis, which includes three regions: Shemakha, Akhsu and Ismayilli.

**Vertical position factor**

The major part of the study area is in the following ranges of heights: 1) from 0 to 300 mas-23.16%, from 300 to 600 m-19.84% and 3) 600-900 m-23, 75% of the total area. Above 900 m and up to 3400 m above sea level, about 30% of its area is located (Table 1).

Of the administrative units belonging to the study area, the most highly allocated land Ismaili region. In this area 90: it is at an altitude of more than 300 meters above sea level, and sometimes the altitude is even higher than 3400 m. In Akhsu region about 73% of the earth is at an altitude up to the sea level. Shemakha district is an intermediate region, its largest area is at an altitude of 900 m above sea level-about 75%. In this area there is also a territory located below sea level-31244.66 hectares.

**Classes of slope**

In the analyzed territory, the largest area is occupied by areas with a slope of up to 6-46%. Significant areas are also in the intervals from 6 to 10% -18% and from 18% to almost 23% of the total area (Table 2).

Against the backdrop of administrative-territorial units, gently sloping areas with a slope of up to 6% (about 3.50) are concentrated in the Akhsu district-71%, and in Shemakha - almost 49%. The steepest slopes are observed in the Ismaili region, where almost 26% of the territory has a slope of 10-18%, 30% of its area slope is 18%.

Table 1.The distribution of the study area (ha and%) over the altitude intervals

| Height, m.н.у.м. | | Regions | | | Togethe |
|---|---|---|---|---|---|
| | | Shemakha | Akhsuinsky | Ismailinskiy | |
| <0 | ha | 31 245 | 0 | 0 | 31245 |
| | % | 8,12 | 0,00 | 0,00 | 5 |
| 0-300 | ha | 69 737 | 73029 | 17334 | 160101 |
| | % | 18,13 | 72,99 | 8,39 | 23 |
| 300-600 | ha | 84924 | 11744 | 40470 | 137138 |
| | % | 22,08 | 11,74 | 19,58 | 20 |

| | | | | | |
|---|---|---|---|---|---|
| 600-900 | ha | 101 678 | 13550 | 48965 | 164193 |
| | % | 26,44 | 13,54 | 23,69 | 24 |
| 900-1200 | ha | 46975 | 1562 | 15671 | 64208 |
| | % | 12,21 | 1,56 | 7,58 | 9 |
| 1200-1500 | ha | 23469 | 162 | 20529 | 44159 |
| | % | 6,10 | 0,16 | 9,93 | 6 |
| 1500-1800 | ha | 15775 | 0 | 22305 | 38080 |
| | % | 4,10 | 0,00 | 10,79 | 6 |
| 1800-2100 | ha | 7885 | 0 | 22460 | 30345 |
| | % | 2,05 | 0,00 | 10,87 | 4 |
| 2100-2400 | ha | 2279 | 0 | 10223 | 12502 |
| | % | 0,59 | 0,00 | 4,95 | 2 |
| 2400-2700 | ha | 572 | 0 | 4197 | 4769 |
| | % | 0,15 | 0,00 | 2,03 | 1 |
| 2700-3000 | ha | 42 | 0 | 2915 | 2967 |
| | % | 0,01 | 0,00 | 1,41 | 0 |
| 3000-3300 | ha | 0 | 0 | 1400 | 1400 |
| | % | 0,00 | 0,00 | 0,68 | 0 |
| >3400 | ha | 0 | 0 | 191 | 191 |
| | % | 0,00 | 0,00 | 0,09 | 0 |
| Together | ha | 384 582 | 100 047 | 206660 | 691289 |

**Classes of the slope of the terrain, depending on the altitude intervals**

Tables (3-5) contain data that allow analyzing the distribution of the slope of the terrain along altitude intervals. This distribution was prepared for all administrative units of the area under consideration.

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In the Shemakha region, a clear dependence is shown, an increase in the slope, along with an increase in altitude above sea level. Up to a height of 1200 m there are lands with a slight slope-up to 6% (3.50). They occupy 49% of the area. Territories here with a slope of 6-10% and 10-18% are located at an altitude of 400-1700 m. M.u.m.-about 23% of the area's area. Areas with a slope of more than 18% make up more than 5% of the total area and are located in the highlands. In the Aksuinsky area, the terrain with an insignificant slope of up to 6% (3.50) prevails and they are located mainly at an altitude of 300 m above sea level - this is 71% of the total area.

Areas with a slope of more than 6% are located at altitudes from 300 to 1400 m above sea level - about 29%. Clearly marked (17% of the total area) of land with a slope of 10-18% (6-100) (Table 4.).

| Height, m.н.у.м | | Regions | | | Together |
|---|---|---|---|---|---|
| | | Shemakha | Akhsuinsky | Ismailinskiy | |
| 0-6 | ha | 187157 | 71131 | 61504 | 319792 |
| | % | 48,67 | 71,10 | 29,76 | 46,26 |
| 6-10 | ha | 88830 | 7393 | 28770 | 124993 |
| | % | 23,10 | 7,39 | 13,92 | 18,08 |
| 10-18 | ha | 87641 | 17033 | 53425 | 158099 |
| | % | 22,79 | 17,02 | 25,85 | 22,87 |
| 18-27 | ha | 17782 | 4326 | 34060 | 56168 |
| | % | 4,62 | 4,32 | 16,48 | 8,13 |
| 27-35 | ha | 2855 | 164 | 20176 | 23195 |
| | % | 0,74 | 0,16 | 9,76 | 3,36 |
| >35 | ha | 317 | 0 | 8724 | 9041 |
| | % | 0,08 | 0,00 | 4,22 | 1,31 |
| Together | | **384582** | **100 047** | **206660** | **691289** |

Table 2.**The distribution of the study area (ha and%) over the slopes of the terrain**

In the Ismayilli region, most of the territory with a slope of <6 to 10% is located at an altitude of 300 to 900 m above sea level. Areas with a slope of 10 to 37% occur at an altitude of

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3000 meters above sea level. Locations with a slope of more than 37%% are located at the highest altitude, but make up only 4% of the total area of the area.

The second, from the thematic layers created in the database, is the land use of the study area. Due to the availability of cartographic materials, it was considered exclusively for the territory of the Akhsu district.

Analysis of the structure of land use in the Akhsu district showed that it is purely agricultural. The area is dominated by arable land, which makes up about 50% and tilled areas, which include pastures, meadows and degrees - more than 23% of the total area. Agricultural lands are supplemented with vegetable gardens, orchards and vineyards, occupying 3% of the area. There are few forests and shrubs, in general, about 12%.

There are also areas completely devoid of vegetation in the Akhsu district, about 4% of them. A small part is occupied by water reservoirs, wetlands and urban and rural areas, amounting to 6.9% of the total area.

Table 3.

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| Height, m.above sea level | slope classes% | | | | | | | | | | | | sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-6 | | 6-10 | | 10-18 | | 18-27 | | 27-37 | | 37-52 | | |
| | ha | % | ha | % | ha | % | ha | % | ha | % | ha | % | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| <0 | 31245 | 8.12 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 31245 |
| 0-100 | 37036 | 9,63 | 714 | 0,19 | 251 | 0,07 | 27 | 0,01 | 2 | 0,00 | 0 | 0,00 | 38030 |
| 100-200 | 13223 | 3,44 | 2852 | 0,74 | 1957 | 0,51 | 372 | 0,10 | 19 | 0,00 | 0 | 0,00 | 18422 |
| 200-300 | 4661 | 1,21 | 4076 | 1,06 | 3730 | 0,97 | 752 | 0,20 | 67 | 0,02 | 0 | 0,00 | 13285 |
| 300-400 | 7157 | 1,86 | 5037 | 1,31 | 5548 | 1,44 | 1159 | 0,30 | 73 | 0,02 | 0 | 0,00 | 18978 |
| 400-500 | 15741 | 4,09 | 7078 | 1,84 | 6609 | 1,72 | 1302 | 0,34 | 70 | 0,02 | 0 | 0,00 | 30800 |
| 500-600 | 16189 | 4,21 | 8845 | 2,30 | 8644 | 2,25 | 1420 | 0,37 | 52 | 0,01 | 0 | 0,00 | 35150 |
| 600-700 | 17033 | 4,43 | 11665 | 3,03 | 9814 | 2,55 | 1245 | 0,32 | 41 | 0,01 | 1 | 0,00 | 39799 |
| 700-800 | 16708 | 4,34 | 12164 | 3,16 | 8375 | 2,18 | 890 | 0,23 | 24 | 0,01 | 1 | 0,00 | 38162 |
| 800-900 | 7497 | 1,95 | 8050 | 2,09 | 7152 | 1,86 | 962 | 0,25 | 55 | 0,01 | 1 | 0,00 | 23717 |
| 900-1000 | 4810 | 1,25 | 6280 | 1,63 | 5615 | 1,46 | 786 | 0,20 | 100 | 0,03 | 5 | 0,00 | 17596 |
| 1000-1100 | 4415 | 1,15 | 4804 | 1,25 | 5480 | 1,43 | 658 | 0,17 | 97 | 0,03 | 11 | 0,00 | 15466 |
| 1100-1200 | 4078 | 1,06 | 4265 | 1,11 | 4780 | 1,24 | 637 | 0,17 | 128 | 0,03 | 25 | 0,01 | 13914 |
| 1200-1300 | 3402 | 0,88 | 3522 | 0,92 | 3348 | 0,84 | 424 | 0,11 | 101 | 0,03 | 18 | 0,00 | 10816 |
| 1300-1400 | 1625 | 0,42 | 2665 | 0,69 | 2605 | 0,68 | 287 | 0,07 | 79 | 0,02 | 25 | 0,01 | 7286 |
| 1400-1500 | 722 | 0,19 | 1880 | 0,49 | 2342 | 0,61 | 342 | 0,09 | 73 | 0,02 | 9 | 0,00 | 5368 |

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| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1500-1600 | 472 | 0,12 | 1765 | 0,46 | 2806 | 0,73 | 634 | 0,16 | 63 | 0,02 | 1 | 0,00 | 5741 |
| 1600-1700 | 497 | 0,13 | 1161 | 0,30 | 2885 | 0,75 | 833 | 0,22 | 58 | 0,02 | 2 | 0,00 | 5437 |
| 1700-1800 | 290 | 0,08 | 988 | 0,26 | 2183 | 0,57 | 1063 | 0,28 | 73 | 0,02 | 1 | 0,00 | 4597 |
| 1800-1900 | 230 | 0,06 | 650 | 0,17 | 1654 | 0,43 | 1040 | 0,27 | 133 | 0,03 | 1 | 0,00 | 3708 |
| 1900-2000 | 88 | 0,02 | 242 | 0,06 | 991 | 0,26 | 998 | 0,26 | 203 | 0,05 | 1 | 0,00 | 2523 |
| 2000-2100 | 32 | 0,01 | 69 | 0,02 | 439 | 0,11 | 741 | 0,19 | 357 | 0,09 | 17 | 0,00 | 1655 |
| 2100-2200 | 1 | 0,00 | 17 | 0,00 | 194 | 0,05 | 521 | 0,14 | 346 | 0,09 | 45 | 0,01 | 1124 |
| 2200-2300 | 2 | 0,00 | 16 | 0,00 | 102 | 0,03 | 353 | 0,09 | 264 | 0,07 | 46 | 0,01 | 782 |
| 2300-2400 | 5 | 0,00 | 4 | 0,00 | 28 | 0,01 | 132 | 0,03 | 156 | 0,04 | 49 | 0,01 | 373 |
| 1 | 20 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 2400-2500 | 0 | 0,00 | 11 | 0,00 | 42 | 0,01 | 92 | 0,02 | 111 | 0,03 | 27 | 0,01 | 282 |
| 2500-2600 | 0 | 0,00 | 7 | 0,00 | 27 | 0,01 | 75 | 0,02 | 62 | 0,02 | 24 | 0,01 | 197 |
| 2600-2700 | 0 | 0,00 | 3 | 0,00 | 20 | 0,01 | 25 | 0,01 | 41 | 0,01 | 5 | 0,00 | 94 |
| 2700-2800 | 0 | 0,00 | 1 | 0,00 | 14 | 0,00 | 12 | 0,00 | 7 | 0,00 | 2 | 0,00 | 35 |
| 2800-2900 | 0 | 0,00 | 1 | 0,00 | 3 | 0,00 | 2 | 0,00 | 0 | 0,00 | 0 | 0,00 | 7 |
| **sum** | **187 157** | **48,67** | **88830** | **23,10** | **87641** | **22,79** | **17782** | **4,62** | **2855** | **0,74** | **317** | **0,08** | **384582** |

Table 3. The distribution of the territory of the Shemakha district according to the grades of the terrain according to the altitude intervals

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**Table 4.Distribution of the territory of the Akhsu region according to the grade of the terrain depending on the altitude intervals**

| Height, m. above sea level | Slope classes% | | | | | | | | | | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-6 | | 6-10 | | 10-18 | | 18-27 | | 27-35 | | |
| | га | % | га | % | га | % | га | % | га | % | |
| <100 | 52626 | 52,60 | 16 | 0,02 | 13 | 0,01 | 0 | 0,00 | 0 | 0,00 | 52656 |
| 100-200 | 12380 | 12,37 | 817 | 0,82 | 485 | 0,49 | 74 | 0,07 | 0 | 0,00 | 13757 |
| 200-300 | 3315 | 3,31 | 1150 | 1,15 | 1830 | 1,83 | 317 | 0,32 | 5 | 0,01 | 6617 |
| 300-400 | 418 | 0,42 | 693 | 0,69 | 2051 | 2,05 | 507 | 0,51 | 19 | 0,02 | 3687 |
| 400-500 | 215 | 0,21 | 390 | 0,39 | 2220 | 2,22 | 834 | 0,83 | 13 | 0,01 | 3672 |
| 500-600 | 273 | 0,27 | 538 | 0,54 | 2594 | 2,59 | 974 | 0,97 | 5 | 0,01 | 4384 |
| 600-700 | 327 | 0,33 | 575 | 0,76 | 3338 | 3,34 | 846 | 0,88 | 20 | 0,02 | 5318 |
| 700-800 | 690 | 0,69 | 1516 | 1,52 | 2689 | 2,69 | 406 | 0,41 | 22 | 0,02 | 5324 |
| 800-900 | 681 | 0,68 | 988 | 0,99 | 1060 | 1,06 | 166 | 0,17 | 13 | 0,01 | 2909 |
| 900-1000 | 154 | 0,15 | 254 | 0,28 | 241 | 0,24 | 79 | 0,08 | 16 | 0,02 | 775 |
| 1000-1100 | 29 | 0,03 | 198 | 0,20 | 281 | 0,28 | 27 | 0,03 | 16 | 0,02 | 551 |
| 1100-1200 | 23 | 0,02 | 36 | 0,04 | 127 | 0,13 | 32 | 0,03 | 17 | 0,02 | 236 |
| 1200-1300 | 0 | 0,00 | 7 | 0,01 | 82 | 0,08 | 29 | 0,03 | 13 | 0,01 | 131 |
| 1300-1400 | 0 | 0,00 | 4 | 0,00 | 20 | 0,02 | 5 | 0,00 | 3 | 0,00 | 31 |
| **Sum** | **71131** | **71,1** | **7393** | **7,39** | **17033** | **17,02** | **4326** | **4,32** | **164** | **0,16** | **100 047** |

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**Table 5.The distribution of the territory of the Ismayilli region according to the grades of the terrain according to the altitude intervals**

| Height, m. above sea level | Slope classes% | | | | | | | | | | | | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <6 | | 6-10 | | 10-18 | | 18-27 | | 27-37 | | 37-68 | | |
| | Га | % | га | % | га | % | га | % | га | % | га | % | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| <100 | 1849 | 0,89 | 321 | 0,16 | 92 | 04 | 0 | 0.00 | 0 | 0,00 | 0 | 0,00 | 2262 |
| 100-200 | 624 | 0,30 | 376 | 0,18 | 484 | 0.23 | 51 | 0.02 | 10 | 0.01 | 0 | 0,00 | 1546 |
| 200-300 | 10302 | 4,98 | 1937 | 0,94 | 1065 | 0.52 | 194 | 0.09 | 29 | 0.01 | 0 | 0,00 | 13,527 |
| 300-400 | 3303 | 1,60 | 2322 | 1,12 | 2564 | 1.24 | 288 | 0.14 | 26 | 0,01 | 3 | 0,00 | 8507 |
| 400-500 | 4112 | 1,99 | 2019 | 0,98 | 3240 | 1.57 | 569 | 0.29 | 30 | 0,01 | 2 | 0,00 | 9999 |
| 500-600 | 13759 | 6,66 | 28668 | 1,39 | 4220 | 2..04 | 1090 | 0.53 | 26 | 0,01 | 1 | 0,00 | 21964 |
| 600-700 | 13807 | 6,68 | 4012 | 1,94 | 4640 | 2.25 | 982 | 0.48 | 32 | 0,02 | 3 | 0,00 | 23476 |
| 700-800 | 8587 | 4,15 | 4068 | 1,97 | 3569 | 1.73 | 841 | 0.41 | 82 | 0,04 | 7 | 0,00 | 17154 |
| 800-900 | 2114 | 1,02 | 2386 | 1,15 | 2679 | 1.30 | 985 | 0.48 | 147 | 0,07 | 25 | 0,01 | 8336 |
| 900-1000 | 872 | 0,42 | 1190 | 0,58 | 2029 | 0.98 | 1130 | 0.55 | 349 | 0,17 | 48 | 0,02 | 5617 |
| 1000-1100 | 414 | 0,20 | 740 | 0,36 | 1699 | 0.82 | 1446 | 0.70 | 492 | 0,24 | 96 | 0,05 | 4887 |
| 1100-1200 | 194 | 0,09 | 552 | 0,27 | 1713 | 0.83 | 1776 | 0.86 | 776 | 0,38 | 158 | 0,08 | 5167 |
| 1200-1300 | 212 | 0,10 | 621 | 0,30 | 2015 | 0.98 | 2117 | 1.02 | 1025 | 0,50 | 191 | 0,09 | 6181 |
| 1300-1400 | 182 | 0,09 | 720 | 0,35 | 2553 | 1.24 | 2269 | 1.10 | 1154 | 0,56 | 237 | 0,11 | 7114 |
| 1400-1500 | 177 | 0,09 | 695 | 0,32 | 2440 | 1.18 | 2325 | 1.13 | 1359 | 0,66 | 276 | 0,13 | 7233 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1500-1600 | 119 | 0,6 | 547 | 0,26 | 2499 | 1.21 | 2275 | 1.10 | 1429 | 0,69 | 376 | 0,18 | 7244 |
| 1600-1700 | 152 | 0,7 | 558 | 0,27 | 2440 | 1.18 | 2394 | 1.16 | 1527 | 0,74 | 455 | 0,22 | 7527 |
| 1700-1800 | 154 | 0,07 | 520 | 0,25 | 2490 | 1.21 | 2339 | 1.12 | 1561 | 0,76 | 448 | 0,24 | 7534 |
| 1800-1900 | 153 | 0,07 | 610 | 0,30 | 2743 | 1.32 | 2440 | 1.18 | 1522 | 0,74 | 533 | 0,26 | 7991 |
| 1900-2000 | 174 | 0,08 | 638 | 0,31 | 2682 | 1.30 | 2112 | 1.18 | 1268 | 0,61 | 604 | 0,29 | 7806 |
| 2000-2100 | 86 | 0,04 | 405 | 0,20 | 2355 | 1.14 | 1439 | 1.02 | 1130 | 0,55 | 573 | 0,28 | 6662 |
| 2100-2200 | 81 | 0,04 | 359 | 0,17 | 1723 | 0.83 | 661 | 0.70 | 1057 | 0,51 | 572 | 0,28 | 5231 |
| 2200-2300 | 59 | 0,03 | 246 | 0,12 | 769 | 0.37 | 2439 | 0.32 | 794 | 0,38 | 619 | 0,30 | 3148 |
| 2300-2400 | 7 | 0,00 | 30 | 0,01 | 156 | 0.08 | 373 | 0.18 | 682 | 0.33 | 596 | 0.29 | 1844 |
| 2400-2500 | 2 | 0,00 | 9 | 0,00 | 53 | 0.03 | 217 | 0.10 | 674 | 0.33 | 569 | 0.28 | 1523 |
| 1 | 20 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 2500-2600 | 0 | 0,00 | 2 | 0,00 | 52 | 0,02 | 232 | 0,11 | 603 | 0,29 | 562 | 0,27 | 1451 |
| 2600-2700 | 2 | 0,00 | 6 | 0,00 | 42 | 0,02 | 172 | 0,08 | 557 | 0,27 | 446 | 0,22 | 1223 |
| 2700-2800 | 1 | 0,00 | 5 | 0,00 | 65 | 0,03 | 168 | 0,08 | 509 | 0,25 | 394 | 0,19 | 1141 |
| 2800-2900 | 0 | 0,00 | 10 | 0,00 | 66 | 0,03 | 141 | 0,07 | 382 | 0,18 | 317 | 0,15 | 916 |
| 2900-3000 | 6 | 0,00 | 7 | 0,00 | 77 | 0,04 | 173 | 0,08 | 329 | 0,16 | 267 | 0,13 | 858 |
| 3000-3100 | 1 | 0,00 | 21 | 0,00 | 84 | 0,04 | 183 | 0,09 | 292 | 0,14 | 174 | 0,08 | 754 |
| 3100-3200 | 2 | 0,00 | 2 | 0,00 | 59 | 0,03 | 110 | 0,05 | 177 | 0,09 | 98 | 0,05 | 448 |
| 3200-3300 | 0 | 0,00 | 3 | 0,00 | 34 | 0,02 | 59 | 0,03 | 76 | 0,04 | 26 | 0,01 | 198 |
| 3300-3400 | 0 | 0,00 | 3 | 0,00 | 35 | 0,02 | 38 | 0,02 | 42 | 0,02 | 4 | 0,00 | 122 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3400-3500 | 0 | 0,00 | 0 | 0,00 | 3 | 0,00 | 16 | 0,01 | 21 | 0,01 | 2 | 0,00 | 42 |
| 3500-3600 | 0 | 0,00 | 2 | 0,00 | 4 | 0,00 | 11 | 0,01 | 11 | 0,01 | 0 | 0,00 | 28 |
| **Sum** | **61504** | **29,76** | **28,770** | **13,92** | **53425** | **25,85** | **34060** | **16,48** | **20176** | **9,76** | **8724** | **4,22** | **206660** |

**International Journal of Engineering & Scientific Research**
Vol. 7 Issue 3, March 2019,
ISSN: 2347-6532 Impact Factor: 6.660
Journal Homepage: http://esrjournal.com, Email: esrjeditor@gmail.com Double-Blind
Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A

**Table 6.**

**Land use in Ahsuinsky district**

| **Land use** | **ha** | **%** |
|---|---|---|
| The Cities | 1237 | 1,24 |
| Pshchenitsa | 49979 | 49,96 |
| Gardens | 1123 | 1,12 |
| Vineyards | 528 | 0,53 |
| Arable land | 52868 | 52,84 |
| Pastures | 12394 | 12,39 |
| Green grounds | 6511 | 6,51 |
| Power | 4708 | 4,71 |
| Dry dried valleys | 673 | 0,67 |
| Coniferous forests | 535 | 0,53 |
| Deciduous forests | 8451 | 8,45 |
| Mixed forests | 216 | 0,22 |
| Marshes | 844 | 0,84 |
| Reservoirs | 27 | 0,03 |
| Stavy | 25 | 0,02 |
| Piece of lake | 80 | 0,08 |
| Bays | 1137 | 1,14 |
| Shrubs | 2668 | 2,67 |
| Soil without vegetation | 248 | 0,25 |
| Rocks | 3827 | 3,38 |
| Rural low construction | 527 | 0,53 |
| City low building | 3919 | 3,92 |
| High Urban Construction | 147 | 0,15 |

| | | |
|---|---|---|
| Rockstones, mines | 241 | 0,24 |
| **Together** | **100 047** | **100 00** |

Tables 7 and 8 provide information on the distribution of land use patterns over altitudinal intervals and grades of terrain slopes. Most agricultural land is located at a height of up to 400 m above sea level. Only pastures are located up to an altitude of 1400 meters above sea level. forest territories are in all altitude intervals. The remaining forms of land use are located at lower altitudes (table 7.).

Considering the slope of the slopes, most of the territories are in the gradient class 0-6% - almost 71%. Only pastures, green lands, as well as deciduous forests, are located on slopes with a higher slope (Table 8.).

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## Table 7.Land use by altitude intervals

| Land use | Height, m. above sea level | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <100 | | 100-200 | | 200-300 | | 300-400 | | 400-500 | | 500-600 | | 600-700 | | 700-800 | |
| | ha | % | ha | % | ha | % | ha | % | ha | % | ha | % | ha | % | ha | % |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| The Cities | 231 | 0,23 | 953 | 0,95 | 53 | 0,05 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 |
| Pshchenitsa | 42825 | 42,81 | 5607 | 5,60 | 690 | 0,69 | 235 | 0,23 | 0 | 0,00 | 0 | 0,00 | 7 | 0,01 | 142 | 0,14 |
| Gardens | 339 | 0,34 | 701 | 0,70 | 42 | 0,04 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 1 | 0,00 | 41 | 0,04 |
| Vineyards | 19 | 0,02 | 113 | 0,11 | 306 | 0,31 | 40 | 0,04 | 11 | 0,01 | 0 | 0,00 | 0 | 0,00 | 35 | 0,04 |
| Pastures | 438 | 0,44 | 1635 | 1,63 | 461 | 0,46 | 511 | 0,51 | 691 | 0,69 | 1392 | 1,39 | 2385 | 2,38 | 2623 | 2,62 |
| Green grounds | 42 | 0,04 | 596 | 0,60 | 1345 | 1,34 | 1418 | 1,42 | 1239 | 1,24 | 873 | 0,87 | 495 | 0,49 | 31 | 0,31 |
| Power | 3188 | 3,19 | 1459 | 1,46 | 61 | 0,06 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 |
| DryDriedLoose Valleys | 223 | 0,22 | 242 | 0,24 | 201 | 0,20 | 6 | 0,01 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 |
| Coniferous forests | 535 | 0,53 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 |
| Deciduous forests | 0 | 0,00 | 93 | 0,09 | 62 | 0,06 | 421 | 0,42 | 1018 | 1,02 | 1546 | 1,55 | 1928 | 1,93 | 1901 | 1,90 |
| Mixed forests | 33 | 0,03 | 76 | ,08 | 104 | 0,10 | 0 | 0,00 | 0 | 0,00 | 3 | 0,00 | 0 | 0,00 | 0 | 0,00 |
| Marshes | 844 | 0,84 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 |
| Reservoirs | 0 | 0,00 | 27 | 0,03 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 |
| Stavy | 23 | 0,02 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 2 | 0,00 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Piece of lake** | 0 | 0,00 | 80 | 0,08 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 |
| **Bays** | 0 | 0,00 | 82 | 0,08 | 289 | 0,29 | 165 | 0,16 | 96 | 0,10 | 196 | 0,20 | 230 | 0,23 | 78 | 0,08 |
| **Shrubs** | 1110 | 1,11 | 312 | 0,31 | 1244 | 1,24 | 2 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 |
| **Thesoillayer without vegetation** | 138 | 0,14 | 56 | 0,06 | 53 | 0,05 | 1 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 |
| **Rocks** | 1 | 0,00 | 414 | 0,41 | 1114 | 1,11 | 904 | 0,90 | 627 | 0,63 | 372 | 0,37 | 273 | 0,24 | 136 | 0,14 |
| **Rural low construction** | 0 | 0,00 | 219 | 0,22 | 45 | 0,04 | 8 | 0,01 | 0 | 0,00 | 0 | 0,00 | 16 | 0,02 | 38 | 0,04 |
| **Citylowbuilding** | 2383 | 2,38 | 905 | 0,90 | 541 | 0,54 | 2 | 0,00 | 12 | 0,01 | 25 | 0,03 | 23 | 0,02 | 28 | 0,03 |
| **HighUrbanConstruction** | 147 | 0,15 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 |
| **Rockstones, mines** | 0 | 0,00 | 217 | 0,22 | 24 | 0,02 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 |
| **Together** | **52521** | **52,50** | **13786** | **13,78** | **6636** | **6,60** | **3713** | **3,71** | **3696** | **3,69** | **4408** | **4,41** | **5322** | **5,32** | **5333** | **5,33** |

| **Land use** | **Height, m. above sea level** | | | | | | | | | | | | **Вместе** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **800-900** | | **900-1000** | | **1000-1100** | | **1100-1200** | | **1200-1300** | | **1300-1400** | | | |
| | **ha** | **%** | **ha** | **%** | **ha** | **%** | **ha** | **%** | **ha** | **%** | **ha** | **%** | **ha** | **%** |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **16** | **17** |
| **The Cities** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 1237 | 1,24 |
| **Pshchenitsa** | 367 | 0,37 | 105 | 0,11 | 1 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 49979 | 49,96 |
| **Gardens** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 1123 | 1,12 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Vineyards** | 4 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 528 | 0,53 |
| **Pastures** | 1530 | 1,53 | 384 | 0,38 | 217 | 0,22 | 98 | 0,10 | 28 | 0,03 | 1 | 0,00 | 12394 | 12,39 |
| **Green grounds** | 189 | 0,19 | 3 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 6511 | 6,51 |
| **Power** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 4708 | 4,71 |
| **DryDriedLoose Valleys** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 673 | 0,67 |
| **Coniferous forests** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 535 | 0,53 |
| **Deciduous forests** | 617 | 0,62 | 260 | 0,26 | 334 | 0,33 | 137 | 0,14 | 103 | 0,10 | 30 | 0,03 | 8451 | 8,45 |
| **Mixed forests** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 216 | 0,22 |
| **Marshes** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 844 | 0,84 |
| **Reservoirs** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 27 | 0,03 |
| **Stavy** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 25 | 0,02 |
| **Piece of lake** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 80 | 0,08 |
| **Bays** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 1137 | 1,14 |
| **Shrubs** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 2668 | 2,67 |
| **The soil layer without vegetation** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 248 | 0,25 |
| **Rocks** | 21 | 0,02 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 3827 | 3,83 |
| **Rural low construction** | 180 | 0,18 | 22 | 0,02 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 527 | 0,53 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Citylowbuilding** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 3919 | 3,92 |
| **HighUrbanConstruction** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 147 | 0,15 |
| **Rockstones, mines** | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 241 | 0,24 |
| **Together** | **2909** | **2,91** | **775** | **0,77** | **551** | **0,55** | **236** | **0,24** | **131** | **0,13** | **31** | **0,03** | **100047** | **100,0** |

**Table 8.Land use according to grades of the slope of the terrain**

| **Land use** | **Classes slopes%** | | | | | | | | | | **Together** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **0-6** | | **6-10** | | **10-18** | | **18-27** | | **27-37** | | | |
| | **ha** | **%** | **ha** | **%** | **ha** | **%** | **ha** | **%** | **ha** | **%** | **ha** | **%** |
| **The Cities** | 49085 | 49,06 | 533,2 | 0,53 | 348 | 0,35 | 13 | 0,01 | 1 | 0,00 | 49979 | 49,96 |
| **Pshchenitsa** | 1113 | 1,11 | 105,3 | 0,11 | 19 | 0,02 | 0 | 0,00 | 0 | 0,00 | 1237 | 1,24 |
| **Gardens** | 1083 | 1,08 | 32,8 | 0,03 | 8 | 0,01 | 0 | 0,00 | 0 | 0,00 | 1123 | 1,12 |
| **Vineyards** | 371 | 0,37 | 51,2 | 0,05 | 90 | 0,09 | 16 | 0,02 | 0 | 0,00 | 528 | 0,53 |
| **Pastures** | 2895 | 2,89 | 2602,5 | 2,60 | 5956 | 5,95 | 932 | 0,93 | 8 | 0,01 | 12394 | 12,39 |
| **Green grounds** | 658 | 0,66 | 1462,2 | 1,46 | 3486 | 3,48 | 893 | 0,89 | 12 | 0,01 | 6511 | 6,51 |
| **Power** | 4632 | 4,63 | 53,8 | 0,05 | 19 | 0,02 | 3 | 0,00 | 0 | 0,00 | 4708 | 4,71 |
| **DryDriedLoose Valleys** | 642 | 0,64 | 5,8 | 0,01 | 12 | 0,01 | 12 | 0,01 | 0 | 0,00 | 673 | 0,67 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Coniferous forests** | 535 | 0,53 | 0,0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 535 | 0,53 |
| **Deciduous forests** | 595 | 0,60 | 1565,0 | 1,56 | 4655 | 4,65 | 1501 | 1,50 | 134 | 0,13 | 8451 | 8,45 |
| **Mixed forests** | 208 | 0,21 | 1,7 | 0,00 | 6 | 0,01 | 11 | 0,00 | 0 | 0,00 | 216 | 0,22 |
| **Marshes** | 844 | 0,84 | 0,0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 844 | 0,84 |
| **Reservoirs** | 27 | 0,03 | 0,0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 27 | 0,03 |
| **Stavy** | 25 | 0,02 | 0,4 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 25 | 0,02 |
| **Piece of lake** | 78 | 0,08 | 1,9 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 80 | 0,08 |
| **Bays** | 735 | 0,74 | 146,5 | 0,15 | 179 | 0,18 | 74 | 0,07 | 2 | 0,00 | 1137 | 1,14 |
| **Shrubs** | 2550 | 2,55 | 25,3 | 0,03 | 62 | 0,06 | 31 | 0,03 | 0 | 0,00 | 2668 | 2,67 |
| **The soil layer without vegetation** | 196 | 0,20 | 16,8 | 0,02 | 24 | 0,02 | 11 | 0,01 | 0 | 0,00 | 248 | 0,25 |
| **Rocks** | 310 | 0,31 | 585,5 | 0,59 | 2051 | 2,05 | 872 | 0,87 | 8 | 0,01 | 3827 | 3,83 |
| **Rural low construction** | 354 | 0,35 | 117,1 | 0,12 | 55 | 0,05 | 1 | 0,00 | 0 | 0,00 | 527 | 0,53 |
| **Citylowbuilding** | 3723 | 3,72 | 87,9 | 0,09 | 98 | 0,10 | 1 | ,01 | 0 | 0,00 | 3919 | 3,92 |
| **HighUrbanConstruction** | 147 | 0,15 | 0,0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 0 | 0,00 | 147 | 0,15 |
| **Rockstones, mines** | 217 | 0,22 | 8,1 | 0,01 | 16 | 0,02 | 0 | 0,00 | 0 | 0,00 | 241 | 0,24 |
| **Together** | **71026** | **70,99** | **7403,2** | **7,40** | **17084** | **17,08** | **4369** | **4,37** | **165** | **0,17** | **100047** | **100,00** |

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