

GIS IN USE OF AGRICULTURE LAND DYNAMICS

SIG ÎN DINAMICA UTILIZĂRII TERENURILOR AGRICOLE

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Abstract. *The purpose of this article is to present the fact that today, Geographical Information Systems offers a tool available to address various problems to the wind erosion risk areas. To create the maps presented has been used topographic map and Corine Land Coverdata. The analysis of the maps can draw conclusions about the land use area in the future. Dabuleni area was chosen because is the only desert of Europe.*

Key words: *GIS, hidrologie, risc, zonă*

Rezumat. *Scopul acestui articol este de a pune în evidență faptul că azi, Sistemele Informatice Geografice oferă un instrument accesibil pentru a aborda diferitele probleme legate de zonele de risc la eroziune eoliană. Pentru a crea hărțile prezentate s-au utilizat hărți topografice și date Corine Land Cover. Din analiza hărților se pot trage concluzii cu privire la modul de utilizare al terenurilor zonei în viitor. Zona Dăbuleni a fost aleasă deoarece se prezintă ca fiind sigurul deșert al Europei.*

Cuvinte cheie: *GIS, hidrologie, risc, zonă*

INTRODUCTION

In the twentieth century the world there was an increase in global temperature unprecedented for the past 1,000 years. Increasing of this trend is seen by experts as a critical moment for the future evolution of the Earth.

The problem of global warming is considered as a challenge to contemporary society. Problems caused by global climate change are: the accumulation of greenhouse gases, pollutants accumulating and irrational human activity (deforestation, land-use change).

The most important greenhouse emitted by the human activities is carbon dioxide (CO₂). Carbon dioxide is responsible for 60-70% of global warming effect. After burning fossil resulting combustion carbon dioxide (43% coal, 38% oil and 19% of natural gas combustion).

Agriculture is responsible for 6% of total carbon dioxide emissions.

The Intergovernmental Panel on Climate Change in the his third report highlights that in the last century there was a temperature rise of 0.6 + -0.2 °C. This planetary temperature rise occurred in two phases: between 1910 - 1945 and 1976-2000.

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Highest temperature increases have been registered in Central Europe, the average annual temperature has increased by 0.8 C⁰, the most important increases were registered in the first and last decades of the XXth century (Busuioc, 2003). Along with global warming manifests an increasing trend of extreme temperatures lowered.

Global temperatures in 2014 have reached a high record and Japan's Meteorological Agency said that this year is the warmest in the history of weather records from 1880 to the present.

Drought is a dangerous phenomenon which leads to aridization and desertification. Installation of permanent phenomenon initially produce dry climate, desertification that occurs after the drastically reduce water availability, lower productivity of crops, decreased areas under forests and the last stage, expansion of sandy soils areas, one quarter of the Earth's surface is affected by this process. (Bălțeanu and Șerban, 2005)

In 1931 Acad. Gheorghe Ionescu - Sisești realized the first study on the drought in Romania - timings with at least 10 days when no rainfall in summer and at least 14 days when not in rainfall in winter.

In Romania, most 220,000 hectares of sand dunes covered with 80000 hectares are located in the area, Dăbuleni form a land covered by sand. The Dăbuleni is the driest area of the country, is considered a desert, Europe's single desert.

United Nations Conference on Environment and Development in Rio de Janeiro in 1992 addressed the problem of desertification. Following this conference, was elaborated Convention to Combat Desertification adopted in Paris on 17 June 1994 and took effect on 26 December 1994. Romania signed the Convention in 1997 by Law 629/1997.

The day of June 17 is dedicated to desertification control, drought and land degradation.

MATERIAL AND METHOD

To studying effects of the drought on agricultural areas it was chosen Dăbuleni - Potelu Corabia. In these areas it began a process of desertification which is a consequence of the droughts recorded, being also the warmest area of Romania. Dăbuleni - Potelu precinct is characterized by the presence of several lowland areas in the terrace area and the landscape of dunes, in its western part.

This system has a surface of 14.450 ha, which are equipped with embankment, construction drainage works.

The territory is located in the Danube Valley, between primary and lower terrace bed that rises above the meadow with 5-20m. Part of the area is the bottom Potelu Swamp and depressions Potelu Lișteava and Valcov.

Dăbuleni – Potelu- Corabia is part of Olt District. In this district is manifested a temperate continental climate with a wetland area in the north and a arid area in the south. Rainfall amounts for a year are 300 mm in the north and 350 mm in the south. The highest average annual air temperature was recorded at Corabia Station (13.3 °C), and the highest annual amplitude value Caracal Station is recorded.

This can be explained by the geographical location of the meteorologically station interior and marginal by the Caracal Station (Olt and Danube valleys) as the river Danube main influence especially in the Corabia Station. The highest temperature was recorded in August 1976 and 1980, 24.6 °C and 20.2 °C in 1985 This .absolute values show the influence of tropical air masses from the South and the influence of arctic air masses from the North. (Achim *et al.*, 2012)

Winds reveal the presence of zones of interference between the eastern part of the Romanian Plain, with dominant winds from the eastern and western part of the same region with dominants winds from the eastern, northern wind in the first case the wind is _Crivațul- and the other is - Austrul. Annual average rainfall is 540 mm, ranging between 300 and 730 mm rainfall in 1-2-3-5 days reached values between 100-140 mm.

The soil has a sandy texture that does not allow water retention and is also subject to wind erosion.

The unfavorable situation which amplifies each year desertification phenomena is the result of massive deforestation and intensive agriculture.

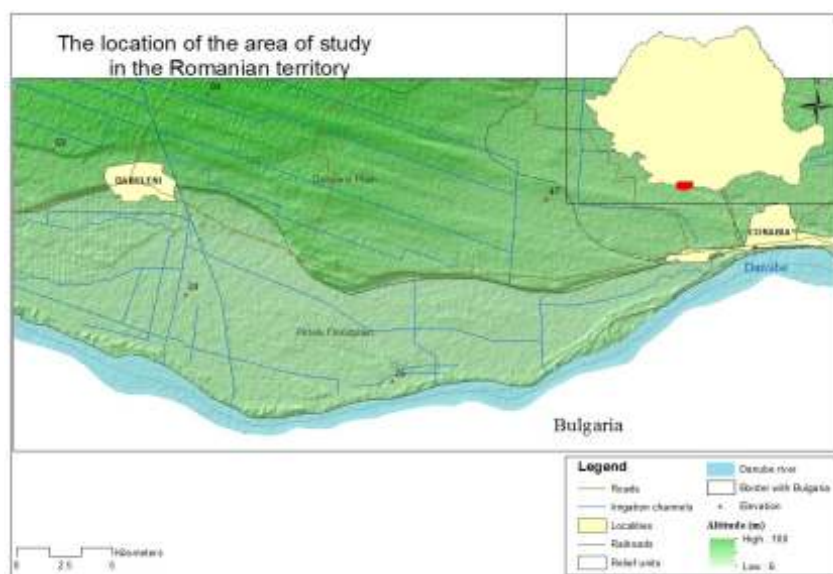


Fig. 1- The location of the area of study

RESULTS AND DISCUSSIONS

To achieve the study goal was used by digital model elevation data which was downloaded free from the geoportal CGIAR-CSI with spatial resolution of 90 m, these data were interpolated to obtain a 30 m resolution. The software ArcGIS 10.1 was used to vectorized map terrain on scale 1: 25000. And also the Romanian soil map on scale 1: 200,000. Corine Land Cover data were downloaded free on the site of the European Environment Agency, CLC has 44 different classes.

At a global level has been made researches for land and land use blanket, this has been achieved within the project Land Use and Land Cover Changes. The project desired to produce a better understanding of the processes of degradation, desertification and the biodiversity reduction.

In the project we have investigated the relationship between changes in quality and land use, and processes relevant to global environmental changes, urbanization, coastal zone management, water resources and quality. In Figure 2 is the Corine Land Cover map for the Dăbuleni

The map was made with ArcGIS 10.1 program in June of 2105 using data from 2012. By analyzing the map has resulted occupied surface percentages of different uses, as follows: 25% waterways, forests bushes 0.45% berry plantations 0.3%, 0.2% deciduous forests, remaining below 0.1% is occupied by pastures cultivated land occupied by agriculture, natural vegetation areas, and industrial or commercial dune sands.

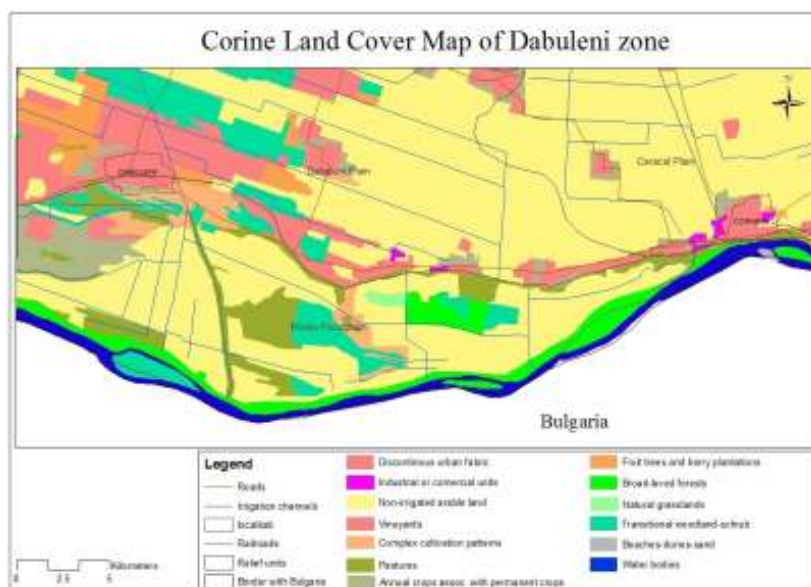


Fig. 2 - Corine Land Cover Map of Dabuleni zone

Soil map of the area is presented in Figure 3 and was obtained from Romanian soil map scale of 1: 200,000 over the overlapped Corine Land Cover data. Analysis following map shows the soils areas: soils are poor young formations evolved - protosols and alluvial soils. In the sandbank fluvial have evolved poor soils and sandy texture textured sandy-loam with a low humus content, or slightly saline gleyzation in the soil profile. In the central area are alluvial soils with medium texture and slightly saline non gleyzation the soil profile. Former swamp areas show alluvial hydromorphic soils with high fertility.

General Soil Map of Dabuleni zone

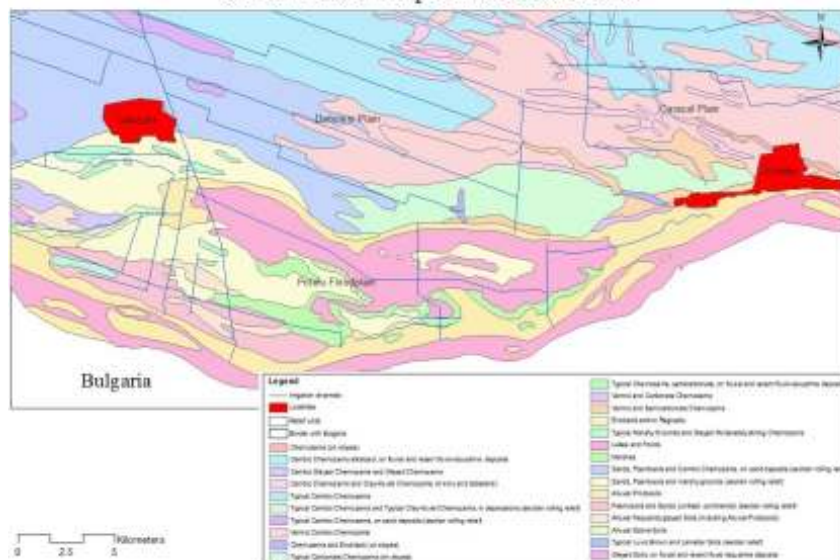


Fig. 3 - General Soil Map of Dabuleni

Erosion map of Dabuleni zone

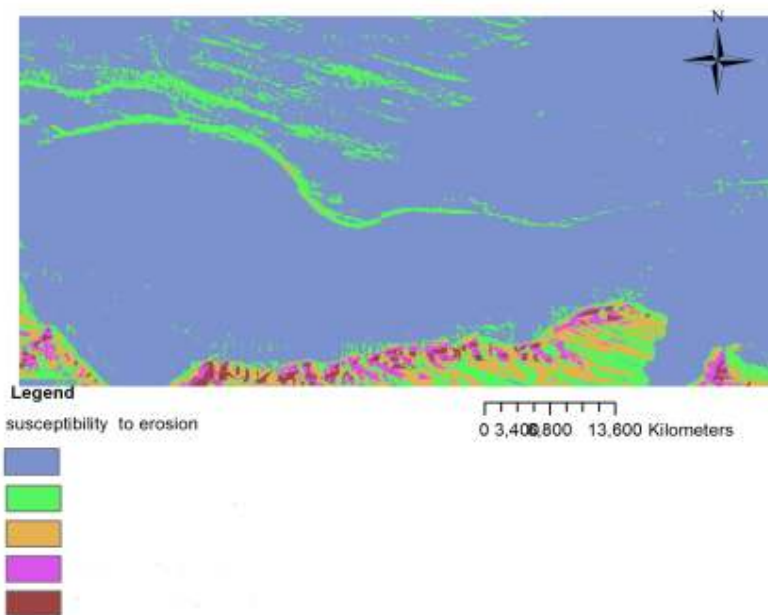


Fig. 4 - Erosion Map of Dabuleni

In the figure no 4 is present the map susceptibility to erosion. The map was made using slopes map, slope orientation, relief energy and soils map. Analysis of this map reveals that in the area are five classes of wind erosion risk. The blue colour is high risk, medium risk following the small, insignificant and zero risk.

CONCLUSIONS

1. Studied area is necessary to reduce the intensity of tillage for soil water retention and to decrease water loss from the soil.
2. Covered areas with vegetal residues on the soil surface, this leads to reduced water loss by evaporation, water is retained in the soil for use by plants.
3. Reduce ground work associated with water conservation in soil mulching ensure losses were reduced and reduce weeds.
4. Curtain forest protection to protect agricultural areas, contribute to reducing dominant wind speed, relative humidity increases, creates a favorable environment for crops, retains moisture in the soil and increase the water supply.
5. The mapping of susceptibility to erosion leads to knowing the accuracy of the areas worst.

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