

STUDY TO LOCATE A FOREST SHELTER-BELT NETWORK IN FĂGET AREA

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Abstract. *This study is written to explore a modern geographic information (GIS) in the planning process of routing and aligning of the forest belt network. The necessity of implementing such forest corridors is well known not only nationally but also internationally for its benefits, considering the way are promoted terms as environment protection, long-living development, ecology and also the will to improve the conditionings imposed by natural factors in certain areas. This would be a significant ecosystem project for the area of implementing, not only because will have more green spaces but also because offers protection to the soil, animals from the forest, helps improve the environment in the area.*

Keywords: forest shelter-belt, GIS, erosion, factors of influence

INTRODUCTION

Forest shelter-belts are defined as a hedge or fence of trees which meet certain criteria of length and width that protects a area or contraction, or any other object that needs protected against harmful factors as wind, road heavy snow falls, pollution, erosion and so on.

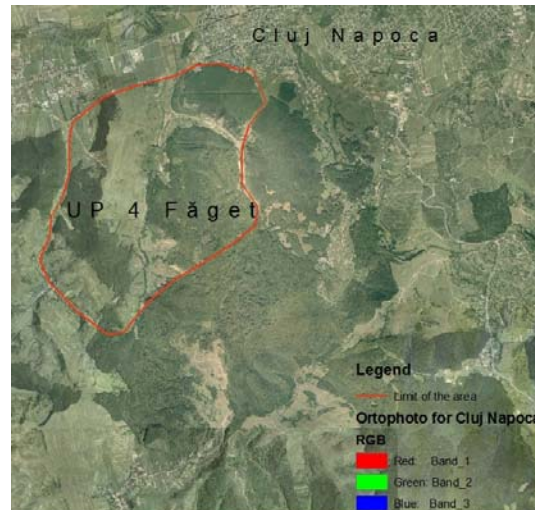


Fig. 1. Location on the map

According to several criteria forest belts can be classified first as belt for protecting agricultural areas (especially in the flat side of Romania), to protect soils and reduced erosion (in this way the negative effects of landslides and subsidence will be reduced), to protect roads and railways, of breakwaters and banks, and various constructions or constructed area as factories or farms etc.

From geographic point of view the study area is located in the west side of Transylvania Plateau on both slopes of the Someșul Mic River, in the hills area, on flat structures. Located in south side of Cluj-Napoca city, the area is included in the green space of the city. In forestry regime belongs to Cluj Forestry and is called Production Unity 4 (Abbreviation UP 4 Făget).

MATERIAL AND METHOD

In realizing such complex forest corridors many criteria must be taken in consideration so, a good management of information and data is necessary. The data sets are organised in geodatabase, feature classes, shapefiles, images using ArcCatalog application from ArcGis. It is a very efficient way to organize all maps you have and create new ones using the possibilities the software gives.

To find in this perimeter smaller areas where implementing of this belts is necessary and possible are used maps in Gauss-Kruger projection 1:25.000 (1961), spatial images (orthophoto), forest maps 1:20000 to delimitate the all forest units and SRTM data, using of land, geology maps and climate data.

After scanning and georeferencing maps we start extracting the main elements needed: contours, hidrography, roads, construction areas and limits of forest structures. From contours is generated the digital terrain model and also a terrain irregularated model (TIN) to visualise in 3D the area and slope, hillshade, orientation layers are created.

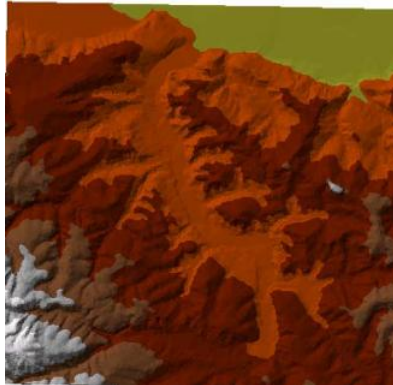


Fig. 2. TIN model for the area

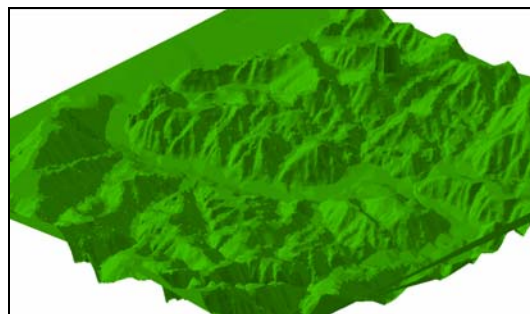


Fig. 3. 3D visualization of the area

Also separat layers are created for each other element from the map and by summing the layers and reclassifying them with the certain conditions that are needed to create the belt we obtain a map of possible areas where we can put them.

The design of belts meets the requirements of technical standards development of a forest shelter-belt.

RESULTS AND DISCUSSION

The studied area was completed in Eocene, with a specific geological formation from colluvial and eluvial deposits mostly sedimentary. Lithology is formed of types of clays, sandstones, sands and gypsum.

The morphology is characterized by the presence of hills and smaller broken hills, slopes are slight tilt and have a predominant curly configuration. Minimum height of the area is 380 meters and the maximum is 500 meters with shaded exposition.

Streams have small flow, but a quite high grade of turbidity during the torrential rainfall, all streams are collected by Somes River.

Thermal regime is characterized by medium high temperature, a favorable factor for the development of vegetation, and the time of first and last frost indicates that forest vegetation will not be harmed by early or late frost.

The atmospheric precipitation has uneven distribution, in summer months the quantity of rainfall is higher, when we also have higher medium temperatures and during winter snow is thin, without assuring a protective blanket of snow for the young plants.

Dominant wind has a NV-SE direction, which impose choosing strenght trees, even more because of spring winds.

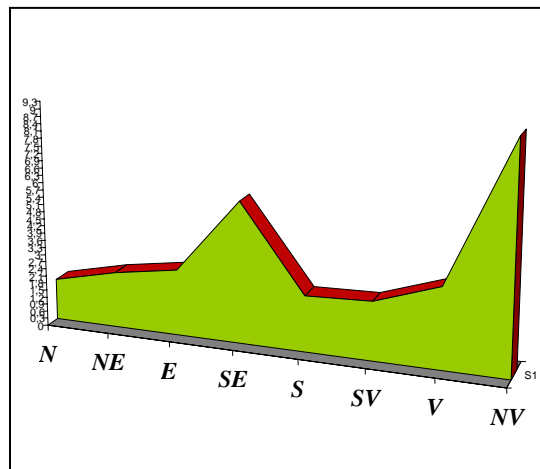


Fig. 4. Wind frequency in the studied area

All these factors are a criteria for developing a forest belt network and not only because juridic situation of terrain must be taken in consideration, presence of

erosion, the way trees will be projected and the species that are chosen. The species must be complementary with the ones already on the place, not to suffocate them at maturity but not to be suffocated by the others either.

In the area soils with different erosion stages had been found, so for these belts are needed to be developed and also for the blanks of Gârbău Stream.

CONCLUSIONS

In conclusion we propose to complete a feasibility study for the development of forest shelter-belts for minimizing the effects of surface erosion and protection of stream's blanks, considering that the impact on environment will be positive by the increase of green space and stabilize the terrain for possible extension of the city Cluj Napoca in this direction. Also the microclimate will favorize the grow of vegetation and will protect the agricultural terrain in the area.

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