Case Study on Ecosystem Biodiversity Conservation Using the Solutions Adopted by a Forest Management

Constantin Banu, Ciprian Fora, Carolina Ștefan, Sorin Stanciu*

Banat’s University of Agricultural Sciences and Veterinary Medicine “King Michael I” of Romania” from Timisoara, Calea Aradului, No. 119, 300645, Timisoara, Romania

Abstract
The paper analyzes the production unit U.P. X "Comarnic", which is located in the Western Carpathians, Banat Mountains, respectively Anina Mountains. In this forestry unit included in SUP E (Nature Reserves for full protection under the law) are not proposed any works, so that biodiversity conservation is 100% in the whole forestry unit. The actual composition of the forestry unit remains unchanged, being the same as the goal composition. There are no side effects on forest ecosystems and there is not any influence on the environment. This forestry unit is included in SUP M (Forest subject to special conservation; aim pursued: conservation goals), and the proposed works are logging hygiene, thus the desired effect is to maintain the same forest ecosystem without affecting in any way its biodiversity conservation. The actual composition is approximately the same goal composition. The main species remains the beech and only the hornbeam species mixture enters the group of various hardwood. Goal composition was set according to the type of resort and forest type, in order to do few interventions, limiting all such negative effects on the environment.

Keywords: composition, conservation, ecosystem biodiversity, hardwood

1. Introduction
The main component is the rural environment and within it, dominates forestry with agriculture. The first is the definition of rural areas as opposed to urban areas [1]. From this point of view is rural "area characterized by a popular and relatively low density and predominance of agricultural activity."
Defined rural compared to urban we states that village opposes town, village facts are rural facts and rural geography studies the village and not only the agriculture sector. Rural territory comprises the national territory minus the urbanized one, which contains urban and industrial activities [2]. Since ancient times all social forms that were developed were aimed at improving living conditions, primarily, for the members of society but also life generally. Life presents an extraordinary complexity, variability derived precisely from the forms it takes. It cannot be conceived life as perceived so far, no trees, especially with complex ecosystems that they create - forests. At the global level, forests cover an estimated FRA 2000, about one third of the land. The last time, the planet got a continuous decrease of global forest area. Basically, it decreased by 9.4 million hectares annually [3]. Currently the land covered by forest in our country occupies a much smaller proportion than the share of forests in Europe, due to massive deforestation due to population explosion and the industrial development of the nineteenth century and the twentieth century. Always rural development was strongly influenced by the mode of development of the forestry sector, which in turn depended on forest management.

* Corresponding author: Sorin Stanciu, Tel.0722482908, Email: sorinmstanciu@yahoo.com
Considerable development of industries in the past 4 decades of the twentieth century led to modern techniques of control and dominate terrestrial ecosystems with very serious consequences, such as climate change evident, soil pollution with various toxic compounds (nitrates, nitrites phosphorus, arsenic, acids, bases, aso.), groundwater pollution, loss of biodiversity, acid rain (causes air pollution with sulfur dioxide). By its nature, from the appearance, layout forests came to meet these international bodies have tried and tried to find solutions to preserve the environment in its more natural [3].

2. Materials and methods

The forest is compact, heavily concentrated in a single forest. Percentage of afforestation of the territory occupied by UP X “Comarnic” is approx. 95%, the difference being occupied by meadows, pastures and orchards.

<table>
<thead>
<tr>
<th>Cardinal Points</th>
<th>Neighbourhood</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>U.P. IX</td>
<td>natural Culmea Certej</td>
</tr>
<tr>
<td></td>
<td>Carașova</td>
<td>Culmea Certej, Culmea Beții, Culmea Rășpitei, Culmea Jecbanului</td>
</tr>
<tr>
<td>East</td>
<td>O. S. Văliug</td>
<td>natural Culmea Rusului</td>
</tr>
<tr>
<td>South</td>
<td>O.S. Anina O.S. Bozocici U.P. XI</td>
<td>natural V. Lupului, Pr. Râvniste, Cracul Toplița</td>
</tr>
<tr>
<td>West</td>
<td>Râvniste U.P. IX Carașova, Pasture</td>
<td>natural Culmea Rusului</td>
</tr>
</tbody>
</table>

After going through the land, by taking measurements and observations were collected patchy data contained in the description. They were recorded in the field book coded system and were processed as described in force. Description was patchy nature Inspection depth features dendrometrical order, Silvio biologic and plant trees in each unit of landscape planners on which were established forestry measures and improvement in line with the specific requirements of ecological resort and forest species. The measurements and observations were determined for each element of stand characteristics on age, proportion, average diameter, average height, class production, blending, pruning, vitality, production goal percentage stands work, density index. Description resort was based on works of medium scale mapping Station [4]. Through these works was to obtain additional information necessary to base management plan as detailed work and harvesting, as well as laying the foundation for planning and knowledge of potential forestry-productive resorts. The exploitable stands were made based inventory of all or part of the stand and its surface condition. Inventories were carried out in full continental United States I framed the urgency of regeneration and were conducted by staff of the OS Resita and field staff of I.C.A.S. [5].

From field observations and study of geological maps it resulted that the forests of this unit are located on this unit following parental rocks:
- Lithographic limestone, dolomite and gneared;
- Conglomerates and sandstones;
- Gravel.

Limestone gave rise to brown soils, weak acid entropic rich in nutrients, often with very skeleton. At these soils formed on limestone their torpidity varies with soil moisture. Gravel deposits resulting from occupying a small extent in the production unit and gave rise to semi-skeleton brown soils of medium productivity [6]. It stands this U.P. butter situated on both sides of the river Caraș in the keys that are declared natural monuments. Predominant inclination slopes between 16G - 30G occupying 70% of the tilt stands, is well represented and slopes with inclination between 31G - 40G (22%) and those with higher inclination 40G (5%), while which slopes easy and natural inclination occupies only 3% of the extent UP.

Partly sunny dominant exposures are occupying (47%) of the land UP followed by the sunshine (31%) and the shade (22%). The heights are between 360 m and 1,020 m. Throughout UP predominant lands located at altitudes between 601-800 m (48%), followed by those with altitudes between 400-600 m (38%) and between 801-1000 m (14%), while the sum is 400 m 10%.
Within U.P. karsts and sinkholes are numerous, especially in the west of the road Reșița - Anina and in the Vale Sredneac - Ponigva, debris, boulders, rocks, slopes of 200-300 m and caves (among which the cave Comarnic), deposits boulders and cliffs of limestone (even on lower slopes and plateaus) that were installed many species of thermophiles (lilac, flowering ash, lime, hornbeam, aso.).

Caraș River Basin forests surrounding UP is permanent and constant flow, collecting other streams of contents UP. The main tributaries of the river Caraș, with catchment throughout this UP, are Toplița valleys, Comarnic, Sredneac, Ponigva (cave Comarnic) Jereanu Great Spring IOVI, Ogasul Lupu, a.s.o. Specifics climate that characterizes the region where the forests are located in this production unit is directly influenced by the Mediterranean climate, characterized by mild winters and cool summers average annual rainfall of about 850 mm [7].

Average annual temperatures oscillate around 9°C. The frequency of summer days is 32 days and the winter days to 35 days. It manifests late frosts can damage semi-skeleton species plantations. Number of day’s favorable forest vegetation is approx. 240.

Mediterranean climate influence is manifested by invasion of warm air from the Mediterranean vegetation which is felt here defending many Mediterranean elements: Fraxinus ornus, Syringa vulgaris, Celtis australis, Ribus catinus, a.s.o. Atmospheric humidity is relatively rich and appear only rarely prolonged drought.

The thermal parameters, is one of the limiting factors of forest vegetation. To characterize the territory U.P. of thermally were considered average annual temperature of + 9°C. Warm periods are in April-June and August-September and are hot during July and August.

The temperature varies in relation to the exhibition and altitude, so that the temperature is higher sunny slopes. It manifests late frosts that harm plantations of susceptible species in the following period: first day of frost before 1.X and last day of frost between 21.IV-1.V. Average annual rainfall is 850 mm. The distribution of rainfall in a year is very uneven from one month to another. The months with the most rainfall are June-July and the lowest amount of precipitation is in January [8].

Atmospheric humidity is relatively rich and appear only rarely prolonged drought. Heavy rains are quite common (at least one or two each year), but does not determine the transport of sediments than in few cases, because most slopes are forested. Therefore deforestation slopes and especially those with large slopes are completely unspecified.

Calm period is only 25% compared to the winds which are 75%. The dominant winds in the region are: Coșava with the NE, NW and Fohn Austria who beat SV and sometimes cause uprooting of trees. After Koppen's climate zoning, UPX territory Azuga is located in the region Cfbx C - average temperature of the hottest month is greater than 10°C. b - average temperature of the warmest month below 22°C, but at least for 4 months it exceeds 10°C. f - sufficient rainfall throughout the year;

The aridity index is the mean anal Martonne 40.

The soil is the physical, chemical and biological dynamic that provides all the necessary conditions forest vegetation growth. In the work of middle-scale mapping Station executed concurrently with the description patchy, were placed in each door control profiles route, which were analyzed at the laboratory samples of main profiles.

In this production facility we encountered the following soil types and subtypes

a) soil typical brown soils

This type of soil is Ao-Bv-profile C (R), conglomerate, exhibitions and slopes with different slopes: moderately acid to slightly acid pH from 5.00 to 6.38, moderate to intense humus humus-rich soil with a high base saturation V = 58-82; very well stocked total nitrogen (0.20% - 0.56%) Ao horizon: sandy-loamy to litos, upper and middle creditworthiness for spruce, fir, beech. Creditworthiness is determined by the volume edaphic Middle East useful due to the presence of the skeletal profile semi schematic level (25-50%).

On the ground brown soils of high reliability (high edaphic volume) can promote afforestation various compositions.

b) ground brown soils rendzinas

- Profile: Ao-Bv-Rtz

c) soil brown soils lithic

But is similar to the typical C horizon limit is below 50 cm.
The profile is: Ao-Bv-C (R)

c) typical litho

This type of soil has the profile: A-Ao-R or AOU-R or Au-R Horizon, 5-10 cm thick, can be of different types depending on the physio-climatic and rock (Ao, Aom, AOU) and is often composed of a mixture of humus, organic debris being humification fragments rock.

From the physical point of view because of the presence of hard rock on the surface or near the surface, litho is characterized by the values of the smallest in terms of useful water capacity, permeability, porosity of aeration, a.s.o. Microbiological activity in the soil is very small and has a low content of nutrients. On these soils to install stands of low productivity, classes IV and V of production, or glades, maintained ornamental purposes.

Stationary conditions, the creditworthiness medium, provenance trees, average age, are elements that help define plant health of the forest alongside destabilizing factors and limiting [9,10,11,12]. Status of tree vegetation is characterized by a normal vitality. Present as isolated phenomenon affects not alarming drying plant health of the forest. The area affected by drying stands is 1.9 ha. U.P. area is distributed in two floors physic-climatic

Lower Mountain and piedmont floor of pure beech (FM1 + FD4) is represented in the content UP through superior reliability resorts, middle and bottom. Higher productivity forests represent 81% of the lower mountain and piedmont floor of pure beech forests (FM1 + FD4) - with an area of 2209.6 ha (61% of the UP). Floor high hills and beech or oak-wood floor (FD3) occupies an area of 1378.9 ha (38% of the UP). This floor is represented in the content U.P. through superior reliability resorts, middle and bottom [13-15].

Regarding creditworthiness contained in UPX Azuga resorts, resorts lower creditworthiness is 723.0 ha (20%). These resorts are characterized mainly by climatic and edaphic conditions therefore unsuitable forest forests contained in these resorts are lower productivity (production class 4-5) at most medium (production class 3). Creditworthiness resorts middle is 922.7 ha (25%) and higher reliability resorts are 1942.8 ha (54%). Middle and high reliability resorts are favorable forest development, and these resorts are generally covered forests of upper-middle class productivity (production class 2-3) [16].

The diversity of the stationary District conditions is reflected in the 16 forest types exist, the most common are 411.1 - Făget mull normal flora (s) - 1792.4 ha (50%), 421.3. - Făget su hilly limestone bedrock surface soils (i) - 639.7 ha (18%), and 421.2. - Făget hill on skeletal soils with mull flora (m) - 554.6 ha (15%).

Other forest types identified occupy smaller areas, geomorphological and soil conditions suitable special. Forest types resorts located in extreme conditions are very important, especially under ecologically and their protective effect, less in terms of yield.

3. Results and discussion

In this paper on ecosystem biodiversity conservation through forest management solutions adopted, we studied 2 u.a. sites:

1. The u.a. 4 E: area = 2.23 ha
   - SUP E (Reserves for full protection of nature under the law. The goal pursued: Eco fund forest protection and Genetic Resources)
   - GF 1-5a National Parks, which include areas of land and water in the forest that keeps unchanged the natural flora and fauna, to conserve Eco fund and Genetic Resources, scientific research, recreation and tourism, constituted according to the "Law on Environmental Protection friendly "(TI).
   - Nature Reserves 5C, which include areas of land and water (in the forest) stretching various specialized for scientific research and the preservation of indigenous genetic constituted according to the "Law on Environmental Protection" (TI).
   - 5L Forest protection areas established (buffer) of reserves in national parks and other reserves (T.III).
   - TE: 4116 Făget high and medium productive, mull, brown soils and soils luvic monobasic Euro- and balanced Hydra Asperula - Asarum - Stellaria.
   - TP: 4212 Făget mull flora hill
   - TS: 5222 Pm hilly beech, edaphic medium brown with Asperula - Asarum
   - SOL 1401 moli organic soils, typical chernozem argiluvial
   - Versant lower corrugated southern exposition, inclination 10 G, altitude 560 m
- Litter continues - thin type flora Asperula - Asarum
- Stand artificially high productivity; stand structure relative - even aged trees
- The actual composition 8 PI 2 Make
- Composition goal 8 PI 2 Make
- Undergrowth: Pad. Mcs. / 0.3 PE intimate 0,2S
- Age: 100 years;
- Diameter: PI = 46 cm, FA = 32 cm;
- Height: PI = 27 m, FA = 26 m;
- Class Production: PI - 2 FA - 3;
- Country of origin: PI - NEC FA - RN;
- Consistency: PI - 0.64, FA - 0.16;
- Volume m³ / ha: PI = 382, FA = 75;
- Volume mc / u: PI = 852, FA = 167;
- Annual increases: PI = 4.1, FA = 1.1;

2. The u.a. 5 C: area = 0.59 ha
- SUP M (Forest subject to special conservation; aim pursued: conservation goals)
- GF 1 - 5L Forest protection areas established (buffer) of reserves in national parks and other reserves (T.III).
- 2A Forest located on rocks, on scree terrain with deep erosion on land with slope greater than 35 degrees, and those situated on the substrate flysch, sand or gravel, with steeper than 30 degrees (T .II)
- TE: 3374 Făget middle and low productive with mull (mull-modер) calcium, soils and humic calcareous rendzinas carbonate eubazice, Hydra with Asperula - Asarum
- TP: 4213 Făget hill on shallow soils with limestone bedrock
- TS: 5221 Pi hilly beech, edaphic rendzinas small and very small with Asperula - Asarum
- SOL 1401 moli organic soils, typical chernozem argil vial
- Higher Versant corrugated Southeastern exhibition, inclination 15 G, altitude 750 m
- Litter lost - thin type flora Asperula - Asarum
- Fundamental natural stands of lower productivity; stand structure relative - even aged trees
- The actual composition 8 Fa 2 That
- Composition goal 9 Do one DT
- Age: 40 years;
- Diameter: FA = 14 cm, AC = 12 cm;
- Height: FA = 9 m, CA = 11 m;
- Class production: FA - 5 CA - 5;
- Country of origin: FA - RN, CA - RN;
- Consistency: FA - 0.56, CA - 0.14;
- Volume m³ / ha: FA = 50, CA = 14;
- Volume mc / u: FA = 30, CA = 8;
- Annual increases: FA = 2.9, Ca = 0.9;
- Proposed works: Cuts hygiene

4. Conclusions

- Because forest regime does not remain only a concept requires that the system of rules forestry technical, economic and legal to be designed in such a way as to impose solutions to sustainable forest management solutions aimed largely as mentioned in previous parts of this study, conserve and enhance biodiversity.
- If technical standards for forest planning are well prepared and are respected for how data management solutions forest will be in accordance with the provisions of the concept of sustainable development of forests and thus biodiversity conservation and improvement.
- Forest regime is applied only when put into practice the provisions of forest developed based on specific technical standards forestry sector.
- Failure forestry regime actually means observing the provisions of forest and so conserve and enhance biodiversity remain arrangement promoted to the status of theory.
- This led and leads to dismantle stands on a large scale negative effect on the entire economy in forestry and especially the environment.
- Great pressure on forests makes the measures monitor the implementation of the provisions of the Arrangement to be of particular importance.

References