The Management of Regional Biodiversity – Forest Potential

Mariana BRAN[1]
Claudia Elena PAICU
Iuliana DOBRE

Abstract

The considerations on the ability of forest to maintain ecological balance and numerous environmental protection functions require the exercise of a sensible management, consistent with regional development plans. This is the more necessary as, at this moment, we are situated well below the limit of a forestation, in terms of European woodland.

The management of the forest biodiversity, seen as an economic and environmental manner, permits, among other things, a sustainable exploitation of the potential through specific actions, scheduled actions of timber production, deadlines of contraction, territorial redistribution of quotas of timber, a forestation measures.

Keywords: *biodiversity, forest potential, management, durability*

JEL classification: Q26, Q34, Q57

1. Introduction

The biodiversity is the result of an evolutionary process, giving rise to a variety of living organisms, and the basis for life itself, in its many forms.

The notion, as such, has gained widespread since 1980, when it was defined as "the number of present species", and in 1988 it appeared in the bibliographic database BIOSIS (Biological Abstracts)[2].

The diversity of the natural conditions in Romania generated layout storey vegetation (about 3100 species, of which 60 species of trees) and together, these two form functional systems, complex organized (for ex.: in Romania, in the forests there have been identified 150 types of ecosystems) (APM Braşov, 2010). The structural changes are noticeable in time or, in the case of major pollution accidents, immediately; if the disturbing factor is eliminated, the environment can recover.

The forest is the essential component for maintaining ecological balance and fulfills numerous and well known functions for the environmental protection.

[1] **Mariana BRAN,** The Bucharest Academy of Economic Studies, Romania**,**
E-mail: mariana_bran2004@yahoo.com
Claudia Elena PAICU, The Bucharest Academy of Economic Studies, Romania
E-mail: claudiapaicu@yahoo.com
Iuliana DOBRE, The Bucharest Academy of Economic Studies, Romania
E-mail: iulya_dobre@yahoo.com

[2] Research databases - sources of life sciences information, including journals, conferences, patents, books, review articles, and more.

2. The forest and the biodiversity

In Romania interfere half of the biogeography regions of Europe; half of all habitat types and a quarter of biomes (temperate coniferous forests, temperate deciduous forests, grasslands, mixed mountain and lake systems) are also found in the Romanian space.

First of all, the forest is "a collective being (...), thrilled by a life of its own, mingled in turn in millions of individual lives as diverse as - fused into a harmonic and a natural unified spirit that impresses (...) in a unique way the Romanian spirit"; Acad. E. Pop personified in this way the ecological forestry system in "Our national forests and destiny" (Pop, 1943).

Under the current conditions, it is known that the anthropic factor, mainly, but not only, by its agricultural activity, contributed to the decrease of the natural plant species and of the wild animals. The literature points to the ecological imbalances resulting from a series of human actions, for example: the shares of draining the floodplains of the Danube floodplain; the actual destruction of habitats by building urban, industrial, recreational targets and by creating reservoirs, increasing the water pollution and soil; the generalize of the use of pesticides and chemical fertilizers, killing the wild animals, etc.

Also, the experts have warned about the climatic imbalances that may occur as a result of the increased pollution and the forest destruction, sustaining the idea of preserving the forests in the Romanian space structure: "the only method that the current science can provide, in this regard, to the human threat is increasing proportionally the photosynthesis (Pop, 1943).

But, by applying Law no. 18/1991 and by misunderstanding the process of the division of the forest and the desire to get rich, the human influence has advanced into the forest ecosystems, disturbing them, not only locally; the act of social justice was turned into a demolition process, with negative long-term consequences for rural areas (Giurgiu, 1993).

As such, since 1993 (Table 1) the need for forest restoration through reforestation and overcoming the gap between these actions has been revealed.

Table 1 The comparative analysis of the plant systems of the climate and landforms areas in Romania

Zone	Characterizations	Afforestation %		Observations
		obtained	optimum	
Steppe	plains affected by drought - a consequence of global climate changes, for ex.: plains in the south, southeast, central Dobrogea and southern Moldova; there is a dryness process tends and also there are signs of desertification	3 -5	10 - 18	lack of natural forests, afforestation rate is extremely low compared to the level considered to be optimal
Plain forest and forest-steppe zone		5 - 10	20 - 25	low percentage of woodland; there are largely anthropogenic stepped as a result of

Zone	Characterizations	Afforestation %		Observations
		obtained	optimum	
				massive deforestation carried out over time
Hills	geomorphologic hazard occurs: intense processes of erosion and land slides, floods amplifying, silting of reservoirs, homes, roads are destroyed, etc, for ex.: Vrancea area, Vaslui, Barlad, Plateau of Transylvania, Oltenia.	20 - 35	40 - 50	½ afforestation compared to the level considered to be optimal
Mountain zone		50 - 65	65 - 70	deficiency compared to the level considered to be optimal
Conclusion: The analysis found large differences in the territorial profile				

Source: Processing after Giurgiu V., 1993, using average values

The shares of afforestation effort is compensated by the special functions of the forest (the protection of land, soil, water and climatic factors, the conservation of ecofond, the recreation function), outlined structural in Figure 1.

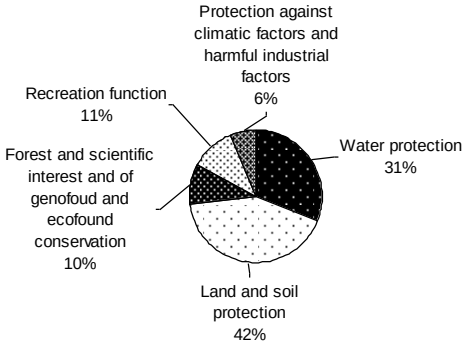

Figure 1: The forest structure, organized on functional groups
Source: RNP-Romsilva

There are authors that noted the positive value of the forest for both physical and moral health of people.

In the economic activity, the enthusiasts for a forest sustainability and a healthy nature militate for taking from nature as much as it can give back by regeneration; as a result, the devastation of forests is a loss not only for the present generation, and improving forest is the benefit of all.

In Romanian forest system there are many forest tree species, with ages even secular (Table 2; the trees aged between 20 and 80 years predominates in the structure).

Table 2: The structure, by age, of the trees from the Romanian forest system

The age of the trees, years	Structure, %
< 20	22,8
21-40	19,0
41-60	18,0
61-80	14,8
81-100	10,0
> 100	15,4

Source: RNP-Romsilva

Analyzing table 3, we can see the differentiation of the northern zones of South Muntenia Region, characterized by a greater number of species and the presence of conifers.

Table 3: Species of trees in the zones of South Muntenia Region and their destinations

Forestry Department	Species	Assortment of wood for sale
Arges	spruce, beech, fir, oak, cherry, flasks, poplar, locust, linden, elm, pedunculate oak, hornbeam, DT, DM, duglas	Wood for veneer, Pulpwood, Fuel wood, Logs for sawn timber, Wood for buildings
Dambovita	spruce, beech, fir, oak, cherry, maple, poplar, locust, linden, ash, pine, elm, pedunculate oak, alder, hornbeam, DT, DM, gray oak, birch, elm, maple,	Wood for veneer, Fuel wood, Wood for sawn timber, Wood for P.A.L. and P.F.L., Pulpwood
Giurgiu	flasks, poplar, linden, ash, poplar, spruce, pine, oak, gray oak, willow, hornbeam, DM, DT	Wood for veneer, Wood for esthetic veneer, Wood for sawn timber, Pulpwood, Fuel wood, Wood for sawn timber under STAS
Prahova	spruce, beech, fir, oak, cherry, maple, poplar, locust, linden, ash, poplar, oak, alder, hornbeam, DT, DM	Logs for esthetic veneer, Pulpwood, Fuel wood, Logs for sawn timber, Wood for sawn timber
Slobozia	locust, ash, poplar, alder, D.T., D.M.	Wood for veneer, Fuel wood, l Wood for sawn timber, Wood for buildings, Wood for sawn timber under STAS

Source: RNP-Romsilva

In addition to tree species, the forests are invaded by herbaceous plants and, together, protect many species of insects and of wildlife animals; the wildlife animals represent the hunting wildlife, the object of economic and sports actions and recreation. For example, in Giurgiu County, hunting is often enriched by flocks of roe deer population, wild bear, rabbit, pheasant, partridge and quail, specific to the plain.

3. The analysis of the forest potential

As a forestry resource, the forest has, together with other forest vegetation land, 6728.6 thousands ha (of which only 6309.3 thousands ha forest), representing, in 2008, 28.22% of the Romanian geographic area.

According to the FAO analysis (2009), the optimum rate of afforestation is 45%, for the geographic area of Romania. By comparison, the degree of afforestation of European countries with relatively close natural conditions of our country has exceeded the optimal level forecasted for Romania, namely: in Slovenia forests occupy 63% of total geographic area, Austria 47%, 43% in Bosnia, 41% in Slovakia, etc.(Paicu et al., 2010).

In this context, the knowledge and the sustainable use of the forest potential become very important, through a rigorous and correct assessment of information related to timber supply and demand.

Substantiation of timber supply. Whether they belong to the state, whether private ownership, the forests are considered by law as a national asset, belonging equally to today's generation and future ones.

National Forest Fund is divided into categories of ownership and landform, as shown in Figure 2.

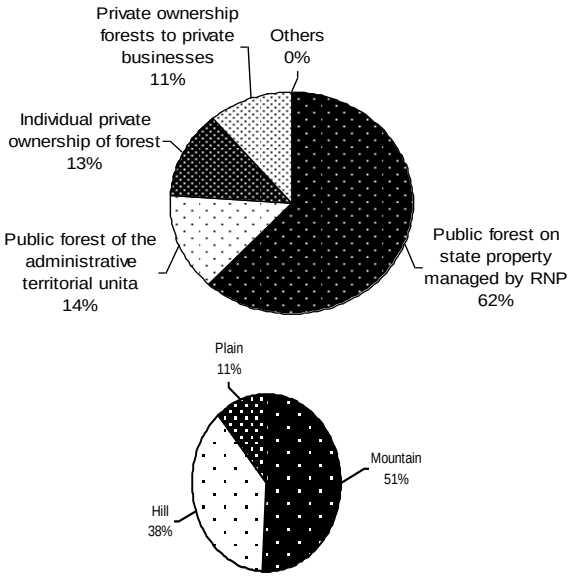

Figure 2: The structure of the Forest Fund (2007): a. by ownership; b. by landform
Source: M.A.D.R.

Under these conditions, the analysis of the total volume of harvested wood in the period of research is presented schematically in Figure 3.

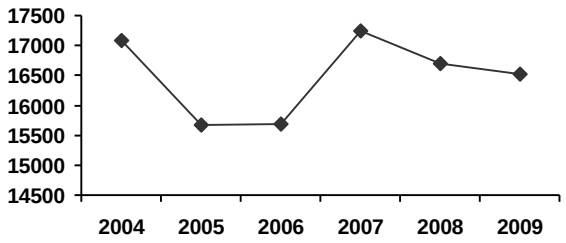

Figure 3: Total of harvested wood volume (thousands m^3) for 2004 - 2009
Source: INSSE – Statistic Databases

Regarding the structure of harvested timber species, conifers represent 41% (it is natural for conifers to prevail because mountain forest, where found, occupies the largest areas - Fig. 2b), followed by beech, with 33% (Figure 4).

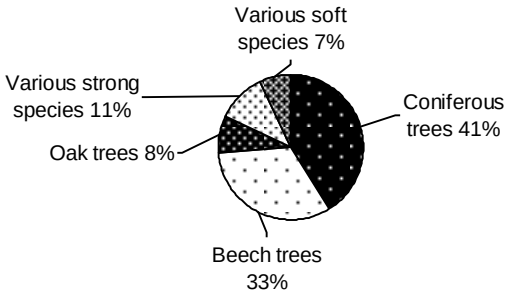

Figure 4: The structure of harvested wood, by species, for 2009
Source: INSSE – Statistic Databases

The forestry activity, highlighted in the total volume of wood exploited by economic operators, with forestry activity, for the period 2004 - 2009, indicates a sinusoidal variation, with a maximum in 2007 (14608 thousands m^3) - Figure 5.

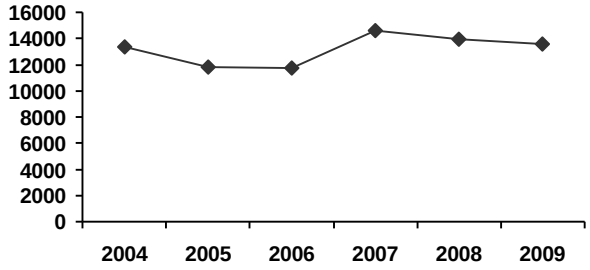

Figure 5: Total volume of wood exploited by economic operators with forestry activity (thousands m^3) for 2004 - 2009
Source: INSSE – Statistic Databases

Analyzing the situation in terms of structure, in 2009, the volume of round wood was dominated by the timber logs for processing sawn timber (58% of total) and fuel wood (32% of the total) - Figure 6.

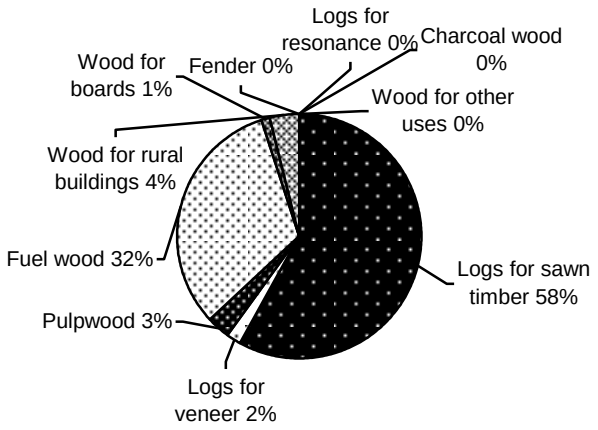

Figure 6: The Structure of round wood volume in 2009
Source: INSSE – Statistic Databases

In the competitive market economy, in forestry-related activities, the brush productivity gets a very important role, expressed as the average increase per year and hectare; but also the social productivity is very important, determined by the ratio of the maximum volume of production, the minimum cost, the minimum investment made and the maximum profit obtained (Machedon, 2005).

In this sense, the forest management act, with reference to the increased timber production (supply), along with the intervention of the policy makers in marketing, in order to market the wood-based products as timber demand, in the market.

Therefore, the main tasks for the forestry are represented by: the increasing of the production of wood and wood products marketing. These tasks are achieved by increasing sales (market penetration; product development, through new products and mixed firms; market development, through new domestic and foreign markets and attracting potential customers; market integration through long-term contracts) and by a growth of the profitability (growth of the prices and of the sales; reducing production costs).

Structuring the timber demand. The wood exploration, as an activity of wood harvesting and of valorification of forest resources, is an important and sometimes decisive factor in the sustainable forest management. For a normal development of this activity, there should be considered such aspects as: the brush condition to be put into value for timber harvesting; the accessibility of transport and collection means; ways and means of suitable mechanical work in the forest in maximum economic efficiency conditions and protection of the environment;

sorting and valorifiacation of the primary wood turning, according to internal and external market requirements, and maximizing the use of forest resources (Machedon, 2005).

For the correct use of the wood, the structure of the demand is very important; this is done according to the following criteria: category of applicants; category of assortments of timber; forest species category.

Generally, the applicants of wood are grouped into categories such as: - private economic agents that have engaged in operating and processing primary wood (timber); these agents must be licensed;

- private economic agents, with the main object the industrial wood processing (mainly furniture, pulp, paper, paperboard); these agents must be licensed;
- family associations, authorized in wood harvesting;
- individuals (especially the rural population);
- economic agents that build forest roads in return.

In this classification, the share of 75%, of total applicants is represented by private economic agents.

The timber that is required is divided into multiple types, as follows:

- industrial (the timber is transformed into sawn timber, furniture and other industrial transformations). The demand for this preponderant category is about. 63% (Fig. 7);
- pulpwood, required by the major pulp and paper factories;
- fender, required by mining companies and factories;
- wood for rural buildings;
- fuel wood (especially for the rural population demand).

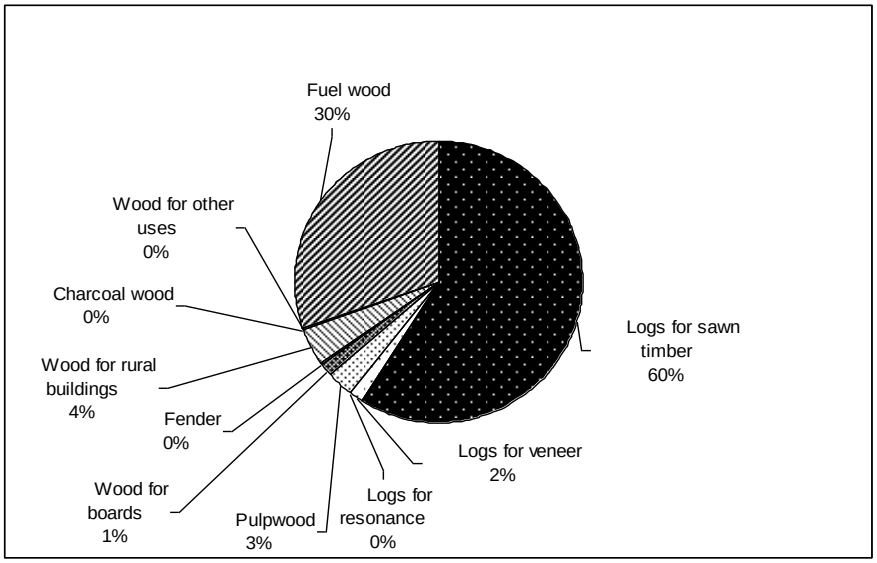

Figure 7: Type of exploited wood from the round timber volume, in 2008
Source: INSSE – Statistic Databases

The demand for certain categories of forest species (softwoods, hardwoods, etc.) is justified by the economic importance and by some forestry criteria. Thus, the softwood species are required for housing, furniture industry and wood processing, timber (and for export). Among the deciduous species; the beech is used in the manufacture of furniture and for pulpwood industry; the pulp for pulpwood industry; the oak for furniture and floor getting.

Several factors have an impact over the demand of timber, such as:

- the development of the wood processing industry and its degree of diversification;
- the population's purchasing power;
- the financial strength of the licensed agents which have as the object of activity the exploitation of wood and the wood processing;
- the structure of the forests in forest species. For example, if, at some point, the request goes to a specific forest tree species that do not exist or is low weight, the application can not be satisfied;
- the global trends.

4. Results and discussion

The relationship between the demand and the supply of timber generally involves three situations:

- the volume of the exploited timber is greater than the possibility of the forest. This situation can lead to diminishing or even exhausting the fund of timber production, culminating with the imbalance of biodiversity;
- the volume of the exploited timber is lower than the possibility of the forest. During the period of 1990 - 2004 this situation has been identified (over 22 million cubic meters of timber not harvested have accumulated), which produced, besides the negative economic effects, negative foretry effects (failure to timely care and regeneration cutting). But a positive effect also was felt by the steadily increasing, in recent years, of the volume of timber that can be drawn, with respect to the forestry conditions, as the board of Regia Naţională a Pădurilor – Romsilva claimed
- the volume of the exploited timber is equal with the possibility of the forest. In this way it depicts the normal situation, both economically and forestry. It is necessary to harvest only the forest products - the trees that reached the age of exploitation (in the arranged woods this is called the "possibility of the forest").

The demand and the supply of timber represent particularly useful tools in the market economy and in the forest management.

Knowing their characteristics, studying their elasticity, represent ways of making relevant background in the field. Therefore, Regia Naţională a Pădurilor – Romsilva is the only one able to focus its efforts on strategies of exploiting the forest potential in conditions of sustainable forestry, such as: it intervenes with its own forces or by hiring service providers, for all the cases in which the economic agents have contracted the wood mass in deadlines, according to the instructions;

it redistributes the timber quotas territorially and moves their labor and their equipment to areas that require increased operating capacity, as stated by Corduneanu C., Director of the Land Fund, Regia Naţională a Pădurilor-Romsilva, for the year 2004.

These measures affect forestry activities, in normal operating schedules of wood, more precissly, determine the volume of the exploited timber to be equal with the possibility of the forest.

As the necessaty of increasing the national forest area was found, at present 50.000.000 Euro euros from European funds are available through *Measure 221* "First afforestation of agricultural land."

Thus, for example, in the plains area, the types of payments granted to finance a project (February 2011) are:

- compensatory payment, 1330 euros per hectare (1520 euros / hectare in disadvantaged areas + Natura 2000);
- annual bonuses for plantation maintenance: first year 270 euros per year and hectare; in the second year 616 euros per year and hectare; in the third year 180 euros per year and hectare; in the fourth year 180 euros per year and hectare and in the fifth year 90 euro per year and hectare;
- compensatory prime for loss of income: 215 euros per year and hectare for the farmers and 110 euros per year and hectare for non-farmers.

The timber harvest planning (the possibility) is the leading way for the process of normalizing of fund forest production. In this regard it is important to consider the *plan indicators*: year of planning, the possibility of main products (cm / year), the possibility of secondary products (cleanings - ha / year, cm / year; thinning - ha/year, cm/year), releases (ha), hygienic cutting (ha; cm/year), conservation cutting (ha; cm / year).

Conclusions

• The forest, a good of national interest, is an invaluable source - a tree helps four people to breathe - and also an economic basis of the production of timber and of other specific forest products.

• The increased consumption of wood requires a system of rules and regulations on forest protection and conservation, and also the recovery and the improving of the products and services that are derived from their existence.

• The viable solution is represented by the sustainable management of existing forests and the afforestation of the degraded land. The afforestation created by culture should not represent monocultures because they are instable and fall prey to low and stable weather (storms, snow) diseases and pests.

• At the national / regional level it should exist a long educational process, in order to shape the public opinion about the forest / the environment, to curb the illegal tendencies of some, to impart respect for the law and the work of others.

• The awareness campaigns of the population and of the policy makers are the support of the protection measures, in all aspects.

• A civilized behavior, by protecting all the components that belong to this national asset - the forest - reflects the understanding of the role and of the functions of the forests within their social life.

Acknowledgment

This work was cofinanced from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project number POSDRU/89/1.5/S/63258 *"Postdoctoral school for zootechnical biodiversity and food biotehnology based on the eco-economy and the bio-economy required by eco-san-genesys".*

REFERENCES

1. Corduneanu, C., (2004). *Priorităţi ale RNP-Romsilva în valorificarea maseilemnoase*; tab:http://arhiva2004.informatia.ro/Prioritati_ale_RNP_-Romsilva_in_valorificarea_masei_lemnoase-67140
2. Hristache, D., Popescu (Iacob) A., et al., (2010). An approach of sustainable development from the perspective of the communicational paradigm, *Metalurgia International Review*, Volume XV, Special Issue 1, pp. 58-60
3. Machedon, I., (2005). *Ameliorarea si managementul ecosistemelor forestiere*, ASE Publishing House, Bucharest
4. Machedon, I., (2005). *Istorie şi actualitate în managementul silvic românesc*, Editura Economică, Bucharest
5. Paicu, C.E., Hristache, D., et al., (2010). Producţia de masă lemnoasă – instrument de valorificare a fondului forestier, *Calitatea – Acces la Succes Journal*, Issue 111; Bucharest
6. * * * FAO, (2009). *Situation des forêts du monde 2009*, Rome
7. * * * INSSE – Baze de date statistice. Rapoarte anuale
8. * * * M.A.D.R., (2007). *Raport privind starea padurilor Romaniei in anul 2007,* elaborat în conformitate cu prevederile art. 126 din Legea 46/2008 - Codul Silvic
9. * * * M.A.D.R., (2001). *Documentul de poziţie al României, capitolul 7 – agricultura*
10. * * * M.M.P., (2006). Ordin nr. 805 din 22.12.2006
11. * * * RNP – Romsilva. Rapoarte anuale