

Sustainable Forest Management: Case Study

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ABSTRACT

Forest management is an important issue at national level, especially in the current context of the Romanian economy and of the international challenges, like climate change. Natural and anthropogenic hazards, climate change, overexploitation of natural resources, environmental pollution, population growth, have led to a drawing alarm signals regarding the existence of humankind and of Earth. Based on these signals, is tried, in each country, to design strategies and policies in order to achieve the objectives of sustainable development concept and one of those is the sustainable forest management. In this research we made a secondary data analysis which had provided information about the current situation of Vrancea's forestry and about the importance of socio-ecological dimension in making economic decisions. The results could contribute on doing a more effective planning of forest management.

Keywords: *economic and social-ecological decisions, sustainable forest management, Vrancea forestry study case, secondary data analyses.*

INTRODUCTION

In the last century, the idea of protecting and conserving forests on the international scene was quickly propelled into one of the most important topics discussed and regulated worldwide. In this context, 2011 was declared by the UN as the International Year of Forests, wanting to draw attention to their central role in maintaining and protecting biodiversity and the role of humanity in sustainable forest management.

Forestry is to manage as efficiently and as rationally as possible the forest fund taking into account the objectives of sustainable development, which promotes a balance between economic, social and environmental aspects. (MMDR,2008). So, the sustainable forest management was first defined in 1993 and refers to a „*stewardship and use of forests and forest land in a way, and at a rate, that maintains their biodiversity, productivity, generation capacity, vitality, and their potential to fulfill now and in the future, relevant ecological, economic, and social functions at local, national, and global levels*”.(MCPFE,1993) As European Commission agrees, the importance of forests is huge for the local biodiversity, rural development, tourism, human recreation, human health, reducing unemployment, reducing the impacts of climate change and so on.(European Commission, 2013)

In the first part of the paper we made an overview of Vrancea County and in the second part we made an analysis of the structure and organization of forest fund. We followed that this overview to create an insight into the forest management at county level, in order to allow doing a comparison in future research with other counties in South-Eastern Romanian development region, which includes Vrancea, as well as analyzing the county in relation to

the information presented at the national level. In the third part of the study, we showed that forest conservation measures must not be inconsistent with economic development, but must be completed under the sustainable development objectives.

METHODOLOGY

This paper is a study case about the forestry in Vrancea county from Romania. This research is mainly based on data purchased from Vrancea Forestry Direction and the National Institute of Statistics of Romania, but also from other national and international databases. Also, we conducted personnel interviews with the Vrancea Forestry Direction employees for obtaining additional suggestions. With the data collected we chose to do a secondary data analysis which provides some explanations on forest management at the county level, given the opportunity of further studies.

RESULTS

General elements of Vrancea County

Vrancea County is located in the south-east of the country, at the curvature of the Eastern Carpathians. Relief is placed in steps from west to east and includes Vrancea Mountains, Hills Subcarpathian and Lower Siret Plain, bounded to the north-east by the Moldavian Plateau and,

to the southeast, by the Ramnic Plain. (Agenția Națională pentru Protecția Mediului, 2012)

The total area of Vrancea county is 4857 km² and has a population of 387 632 inhabitants, which is declining. County density is 79.8 inhabitants per km². (Agenția pentru Dezvoltarea Regională Sud-Est, 2013)

The major relief of Vrancea territory is very varied, both in terms of altitude and shape and in terms of the origin and his age. Geomorphologic units influence stationary conditions, meaning that the mountainsides storm water circulation is faster and the stagnation is very rare. This phenomenon is more obvious on plateaus, but especially in the Siret valley. (Direcția Silvică Vrancea, 2010a) Vrancea is characterized by the highest seismic sensitivity in the country and has a temperate climate, the hottest month, July, having an average temperature below 22°C and an average rainfall below 35 mm, and the coldest month, January, having an average temperature below 0°C and an average rainfall below 144 mm. (Agenția Națională pentru Protecția Mediului, 2012) Also, it is characterized by a well represented hydrographic network, whose main streams rivers are: Râmnicu Sărat, Putna, Milcov, Șușița and Siret. Except Siret, located at the eastern boundary of the county, Putna River is the main watercourse that crosses the territory over a distance of 144 km. Putna receives a large number of affluents including: Zăbala, Năruja, Milcov, Râmna. The county is dominant vegetation at lower altitudes beech forest mixed with conifers, while at great heights are predominated the spruce forests. Forest area in Vrancea County which includes forestry vegetation outside the forest is 184900 hectares, which represents 39% of the entire territory of the county. Thus, regarding the area, the county occupies the number twelfth in the country, with an area of 0.48 ha of forest per capita. In the same time, the forest fund falls mostly in the center of the Curvature Carpathians and Sub-Carpathians, characterized by a great variety of landforms (6% plains, 54% hills, 40% mountains). In terms of forests landforms' distribution, we note that the largest area of forest covers the mountain area (81913ha) and the lowest area is found in the Siret Valley, where the total area amounts to 3072 ha. (Direcția Silvică Vrancea, 2010b)

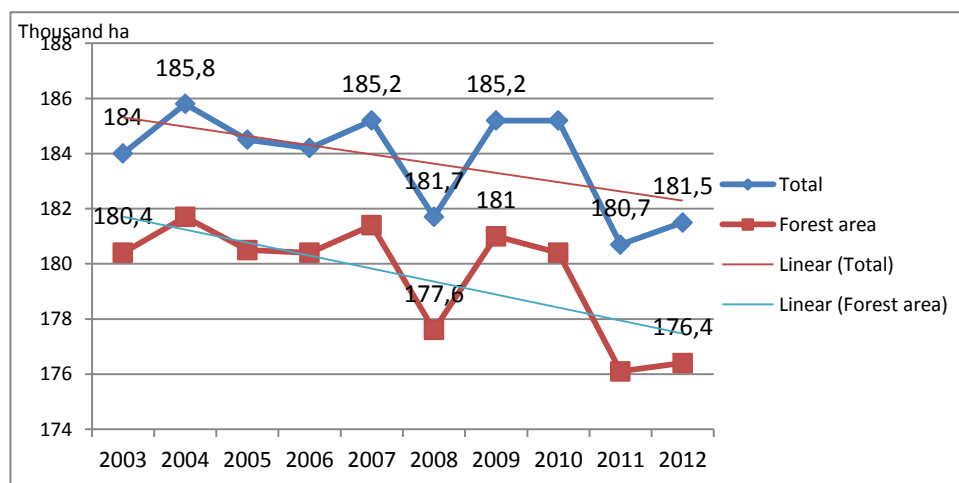
Forest fund organization and structure in Vrancea

Public property forest fund is ascribed to six forest districts with an area of between 5000 ha and 20000 ha. In 2004, Vrancea Forestry Direction took in custody from the Environmental Protection Agency of Vrancea the following protected areas: Cenaru forest (383.2 ha), Focul

Viu from Andreiașu (12 ha), Reghiu–Scruntaru forest (95.7 ha), Lunca Siretului (388.4 ha), Schitu– Dălăuți forest(188,2 ha), Râpa Roșie–Dealul Morii(49,6 ha), Cheile Nărujei II–Verdele forest (250 ha). To ensure appropriate planting material, Vrancea Forestry Direction has 40 seed reservations, covering 1421 ha and 51 ha seed orchards (24 ha acacia, 22 ha spruce, 5 ha fir) and 61 ha upgraded nursery. The transport network sums 937.7 km forest roads, which is 5.8 km / ha, of which over one third of the forest fund is inaccessible. Lack of accessible or difficult access makes annual not to exploit about 40 thousand cubic meters wood. Current density of 5.6 km / ha requires, as present and future strategy, gradually thickening forest road network. (Direcția Silvică Vrancea, 2010a)

In early 1990, Vrancea county forest fund, managed by Vrancea Forestry Direction, had an area of 168.8 thousand hectares and the one managed by ICA.S. Bucharest through O.S.E.Vidra had an area of 15.8 thousand hectares.(Direcția Silvică Vrancea, 2010b) Once the law enforcement applied concerning the reconstitution of private property forestry land, the surface managed by Vrancea Forestry Direction had a decreasing trend from 184 thousand ha in 2003 to 181.5 thousand ha in 2012, of which 176400 hectares of forest.

Figure 1: Forestry fund and forest area evolution for 2003-2012



In 2010, in addition to the state forest fund area under management, the Vrancea Forestry Direction provided forestry services for an area of 44.9 thousand hectares of private forests (belonging to individuals, businesses, religious establishments, educational and administrative-territorial).(Direcția Silvică Vrancea, 2010b)

Except plain regions, the county vegetation belongs entirely to the forest area. In terms of forest structure we can speak by several distribution criteria. Further, we presented these criteria.

By landforms, it is noted that most of the forest is located in the mountain area(52%), followed by hills region by 41%, and then at long distance the plains(5%) and valleys(2%). The distribution of forest species in the territory shows that their requirements are met towards environmental factors and climatic conditions.

In the county there are two major groups of species: resinous trees with 21.5% (10% spruce, 5.6% fir, 5.9% pine) and broad-leaved trees with 78.5% (40.8% beech, 13.8% oak, 15.5% various hardwood and 8.4% various softwood).

In terms of age class, the forest fund is characterized by a surplus of unexploited trees (located in the first three age classes and that hold a total of 53%) and by a deficiency of exploitable trees (last two classes that have 35% overall):

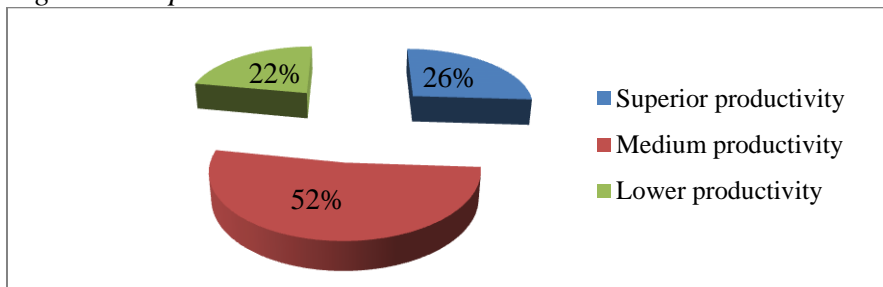
Table 1: The distribution of forest fund by age classes:

The age class	I (1-20 ani)	II (21-40 ani)	III (41-60 ani)	IV (61-80 ani)	V (81-100 ani)	VI (peste 100 ani)
% of forest fund	20	15	18	12	12	23

Source: Direcția Silvică Vrancea, 2010a

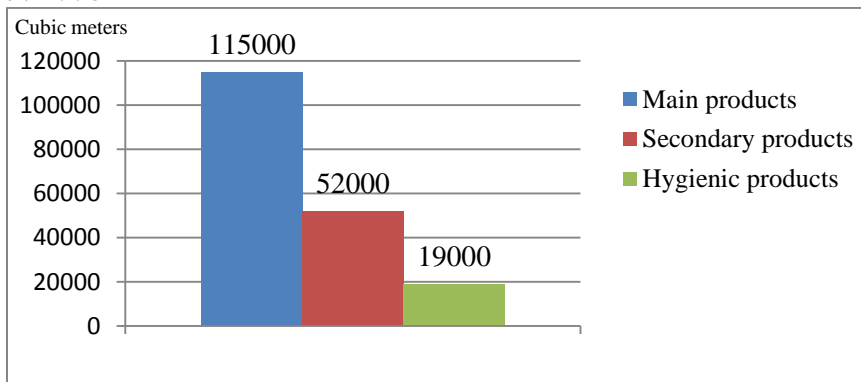
The structure by productivity of exploitable trees is:

Figure 2: Exploitable trees in Vrancea



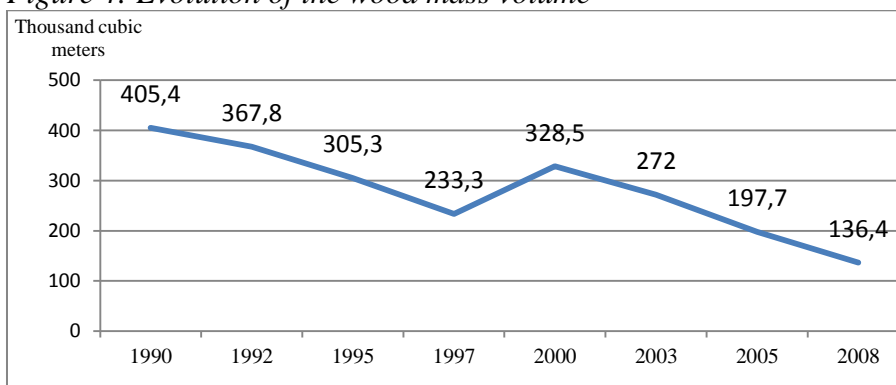
Also, the forest fund area is divided according to existing forestry arrangements, namely: I group (75%)-forests with a protective role and II group (25%)-forests with production and protection role. The total wood mass is 13.2 million cubic meters, returning an average of 236 cubic meters per hectare. Current annual growth by total species is 5.7 cubic meters per year per hectare. The current annual opportunity for the public property forests is 186000 cubic meters, of which:

Figure 3: Annual possibility for the public property forests in Vrancea, by types of products, in 2008



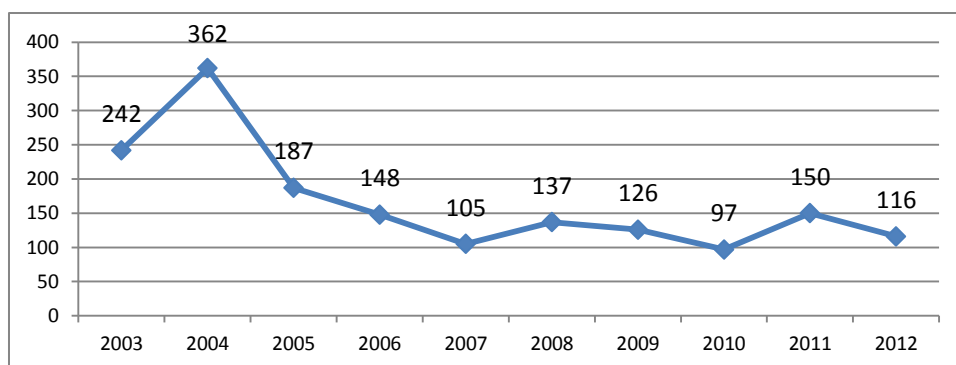
The annual possibility of cuttings for care and management of young trees is 2453 ha, of which 139 undercuts ha, 595 ha sanitary cleaning and 1719 ha thinning operations. In fig.4, we noted, that during 1990-2008, the volume of wood mass had a decreasing trend,

Figure 4: Evolution of the wood mass volume



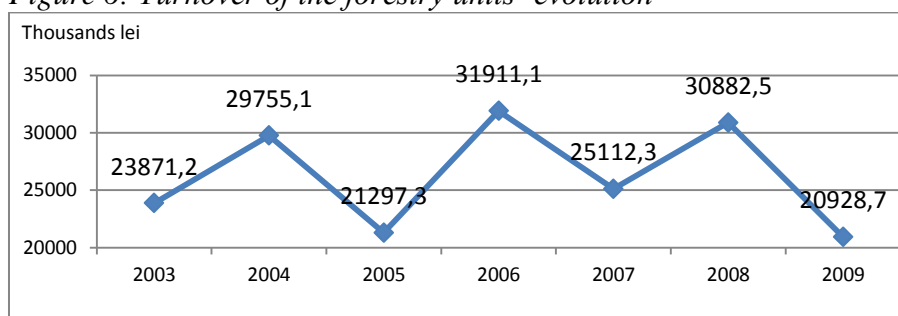
Also, the artificial regeneration, that implies to plant or seed a surface of land in order to create new trees, was also diminishing and, making a comparison between that and the cuttings, we can say that the total of cuttings is much higher than the artificial regeneration, which leads to forestry fund decrease.

Figure 5: Area of the land used for artificial regeneration schemes



In what concerns the turnover of the forestry units in Vrancea, we have noted also an decrease in the 2003-2009 period, decrease that can be attributed to the reduction of wood and goods sold.

Figure 6: Turnover of the forestry units' evolution



We conclude that these indicators shows a reduction in the income of the forestry units, based on the reduction of wood mass volume, on the big percentage of unexploited trees, on the non efficient report of cutting and regeneration wood.

Substantiation of the economic decision in relation with the socio-ecological decisions

„In general, the decision is the action which seeks realization in a given direction, of a future perspective, of contradictions that may arise, setting in each case practical ways of solving them effectively.”(Bran,2002) Substantiation of decisions requires assuming sustainable and feasible decisions so that they have a practical basis and so that can be implemented successfully. Decisions should be taken after performing a series of economic, social and environmental studies, which are designed to achieve different scenarios decisions implementation's effects.

The importance of the forestry sector can be evidenced by its contribution to the achievement of GDP and regional commodity trade.

Table 2– Forestry sector contribution to GDP and trade in goods (continents)

No.	Continent	Contribution to GDP (%)	Contribution to trade in goods (%)
1.	Africa	6	2
2.	America de Sud	3	3
3.	Asia	2	2
4.	America de Nord și Centrală	2	5
5.	Europa	1	3
6.	Oceania	2	3

Source: Bran, 2002, p.227

It may be noted that Africa is the continent with the largest contribution to GDP in the forestry sector and North and Central America has the largest contribution to the trade in goods. In the future, if we want to continue exploiting forest resources, it is necessary to apply the sustainable development principales.

The Vrancea Forestry Direction should take into account the need for correlation with the economic component the social-ecological one for several reasons, namely: environmental problems due to deforestation and poor forest management, generally, could not be separated from economic processes that should be considered rational and efficient use of forestry resources, that should be considered an existence of a healthy environment for people and an important recreation space and so on. In this regard, within the Vrancea Forestry Direction is a compartment named Environment Protection, which aims to achieve and to implement its environmental objectives in the management and exploitation of forests.

The extent of corruption, deforestation, uncontrolled exploitation for trade, forest degradation through activities with a high degree of delinquency in forests considered "without an owner" means imbalance, poverty and starvation. Neither Vrancea is removed from the appearance of these negative phenomena, although in recent years they have begun to diminish.

If the main cause of forest degradation is mainly the human and those who manage it, then the solutions must take into account the training of human resources, of population. For starters, it is necessary that Vrancea Forestry Department to employ personnel or invest in existing human resources, to educate them regarding the practice of combining three concepts: economic-social-ecologic. However, it should be conducted campaigns to inform and educate the population in the county and the tourists about the activities threats with a negative role on the forest sector and beyond.

If appears, the environmental problems involve much higher costs for their control than if they had been predicted and resolved at an early stage when their effect would have not yet made an appearance. Also, the period of time is much slower to recover, for example, a forest area than if it were to protect and care in the appropriate time. The Forestry Direction should adopt eco-economic decisions because its decisions can have multiple effects since the economy and the environment interact as a complex, integrated system.

For a long time have been neglected environmental costs and damages caused to natural capital and human health, therefore have begun to appear forest degradation, for which, if not taken based socio-economic and environmental measures in the future on a long-term, things will get worse(will no longer be growth) and people's needs are becoming less satisfied. In this way, it would no more be achieved the sustainable development and the future of the next generations will be uncertain.

CONCLUSION

This research paper aims to throw more light on some topics related to the sustainable management of forests and encourage further debate on the adoption of realistic and achievable decisions that stimulate progress. In Romania and thus in Vrancea, the green dimension had begun to have an increasingly larger role in developing strategies and policies, as well as in most economic activities performed by people. This also applies to the forestry sector in the county.

But the current situation is not good because the forestry fund is diminishing due to the more higher exploitation of wood then the regeneration of wood.

Therefore, the substantiation of the economic decision in relation with the socio-ecological decisions regarding the forestry management is imperative since forest resources are limited and the role of the forest, determined by its functions, it is very important for the sustainable development of Vrancea.

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