

## **WOOD EXPLOITATION AND PROCESSING - CONTRIBUTIONS, CONSENSE AND PARTICIPATION TO SUSTAINABLE FOREST MANAGEMENT CONCEPT**

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### **ABSTRACT**

The scientific research specific to wood exploitation and processing, is integrant part of sustainable forest management concept. Both the theoretical component and the applicative one related to the forest system complexity, substantiates and sustains it logical also from mentioned fields of activity, given being the direct and tangential connection with the factors which define this type of management.

The analysis of all the normative acts and amelioration programs, the increase and improvement of work performances in the wood exploitation and processing fields, elaborated in the last decades constitutes a capital factor for meeting the requirements and conditions within develops the concept of sustainable forest management.

The bringing up-to-date of leading roles and responsibilities of diverse involved parts, especially the conformity of rules and regulations, the qualitative improvement of forest products, the equitable trade and the rational consumption, can contribute significant to the actual forest situation and prospects.

The impartion of common knowledge of the experience and points of view in the promotion spirit of a constructive participation will be, also, favourable, beneficial for forest environment protection.

**Keywords:** sustainable management, wood exploitation and processing

### **THE SUSTAINABLE MANAGEMENT OF THE FOREST AND IT'S RESOURCES REVALUATION**

The forest sustainable development and management is one of the most complexes topics with social and economic responsibility for authorities, investors, owners and

forest managers, etc., and is a concept whose solving becomes the more complicate the more in general, the social-economic objectives are difficult to implement in the environmental connected issues. The systematic approach to solve these problems is the most promising method, but, in the same time, catches full dynamic, the development of these factors, allowing the objectives integration without creating lack of balance.

The preoccupation for sustainability isn't new. The continuity principle, that begun to make its way in the European forest management still from the end of the XVIII th century and the beginning of the XIX th one, includes the idea that "from the forest should harvest, yearly, wood quantities in steady, constant and equal manner".

Along the times, and, especially in the sound half of this century, the respective principle undergone significant adaptations and modifications.

They were determined on the one hand, by the steady increase of wood needs, and on the other hand, by the diversification and amplification of society requirements from the forest, especially from it's protective, environmental-friendly and social functions. Related to the mentioned desideratum and also to the expectation aspects regarding the promotion of sustainable management of forest, the wood exploitation and processing industry, to which the National Institute of Wood brings steady and constant important scientific and technological contribution, doesn't omit, no moment and circumstance the specific content of the sustainable management of forest, concept.

## **FOREST EXPLOITATION AND REGENERATION**

The rational management of the forest and at the same time the assurance of the conditions for it's regeneration and protection, intended for the actual and next generations, can be significant influenced also by wood exploitation.

The establishment of measures to take so that the protective functions of the forest remain efficient, included from economic point of view, is the much difficult the more these are related to a technological process that is one of the most complex and expensive in the forest life.

The wood exploitation lasts, as time interval, a relatively short period, in comparison with accumulation duration of forest biomass, so that also of a forest regeneration and development, but it can cause radically changes in the zonal forest ecosystem, with more or less lasting effects.

The exploitation technologies, work methods and utilized installations, play in this context, aside the work power training, a role more and more important regarding the environmental friendly exigencies enforced to the forest. Equally, they should be entirely suitable also as silvicultural operation of regeneration, integrated in the modern requirements for environment protection.

So that, both actually and in the future, the wood exploitation should to take to account all the technical, economic, forest management and social consequences. Hence, to embrace the exploitation, logging and primary processing of wood in the concept of sustainable and rational management of the forest, should, in the first row, to

renew the forest roads net development and indirectly, the actual technologies and operation methods, so that to diminish or even eliminate the elements conniving at forest environment injury.

As regard the requirements for wood exploitation technologies, it marks out the following specific conditions:

**Wood harvesting:** the utilization of mechanical saw types and sizes, adequate to work stages and cuttings that are performed; the creation of new systems for stands felling in the wished direction in order to avoid the unmarked trees hanging, breaking, seedling and remained trees damage; the avoidance of the biotic and abiotic agents spreading, that results at the trees felling, trimming, skidding on tractors.

**Logging on tractors:** the limitation of those use in the grounds with maximal declivity of 150÷180, to decrease the soil degradation, seedling and remained trees damage; the restriction of tractors use in the seasons with high moisture content of the soil; the implementation of protection systems for seedling, and remained trees in the near zones with the gathering tracks; the decrease of maximal distance of logs skidding using the tractors winch, to avoid soil and forest vegetation damage.

**The wood collection on ropeways:** the utilization of suspension systems with two carriages, which allow the ropeways installation in the narrow tracks; operations in the primary platforms (in the forest); the no more using the grading - loading systems, with the frontal forks loaders (type) IFRON or of other loaders type; the extension of loading systems with hydraulic crane, which allows the direct logs overtake from the forest road so that can be avoided the special primary platforms arrangement.

**Logging:** the utilization of vehicles with maximal allowed load on doubles bridges, in accordance with the provision in the norms (to diminish the forest roads passable damage and implicit of the forest environment); the rational organization of forest roads maintenance and reparation to avoid the collector ditches plugging land shattering and slides; gradual generalization of high capacity transport.

**Operations in the final yards:** the implementation of new technologies for sawdust, bark and other wooden wastes processing to avoid those discharge in the rivers or in other zones forbidden for those storage; the implementation of new technologies, non pollutant, for charcoal production, to restrict the mound utilization that generates toxic gases and substances;

Other general measures to take: the organization in the forest of primary platforms and in the final yards of collection gathering points for residues worn-out steel ropes tyres, packages, etc).

## THE WOOD EXPLOITATION AND PROCESSING - THEIR ROLE IN THE FUNCTIONAL EFFICIENCY INCREASE OF FOREST ECOSYSTEMS

The forest exploitation operations - the trees felling and skidding influence significantly the advanced growth tending and the forest soil modification.

The intensity of this influence depends on the season when are performed the exploitations, the utilized installations, the organization of technological process of forest exploitation and on other moments in the forest management.

When harvesting is performed in the winter (on snow) in the felling area it keeps untouched a higher percentage of seedling, especially yearly plants, in comparison when the harvesting is performed in summer. In the same time, the summer harvestings, causing the soil damage because the skidding, influence more the forest soil, which it modifies and hence the forest regeneration process.

The litter and soil shattering worsen the soil physical properties, contributes not only to the installation but also to a good growth of natural seedlings. When soil shattering is associated with a strong worsening of physical properties of the soil the natural seedling doesn't occur anymore or the growth is by 1,5-2 times slower than the advanced growth in the felling areas where the soil wasn't affected by skidding .

As regard the forest roads net development, can be affirmed that through auto-transport roads locating itself in the forest, represents an action with very significant environmental implications: the proper deforestation (about 0,6 % for the existent net) causes important lands shattering, the modification of superficial water regime, influence negatively also it's environment the location of the crossing and turning stations and also the installation of the social groups and technological attendance in the primary platforms (in the forest).

Outside the deforestation and land shattering, the forest roads net causes to the forest environment also by other harmful elements: noise emissions, vibrations and exhaust of gases produced by transport means, technological wastes, residues, etc.

Despite the all above mentioned troubles, the forest road net represents an objective need for forest management, for its products revaluation and for the stands tending.

The central problem that occurs, in the conditions of the sustainable forest management, is that of reconsidering, based on the above presented, the concept of OPTIMAL THICKET (optimal stand density).

In accordance with certain specialists, the main damages the environment can suffer because the wood harvesting are the following: the loss of some species that cannot regenerate anymore in natural manner, as consequence of soil characteristics worsening (for fir, stands, help species in mixed foliage forests, etc.) or the growth cessation of damaged saplings; the stability decrease of the stands caused by the gathering roads or other gaps in the stands; growth and value loss as consequence of ulterior fungi and insects attacks and because of the partial or entirely biodegradation of the trees; the decrease of nourishing substance presence, because the large biomass extraction than the station can supply, the gathering of trimmings (branches, leaves, needles and even

of the trees roots and collars); the reduction of productive areas by over - enlargement of forest roads and because of the significant interventions; the soil physical characteristics worsening, soil exhaustion and rivulets clogging because the skidding performed on tractors, cattle, etc.; worsening of hydrologic regime as consequence of soil shattering under heavy installations; the pollution of waters with sediments, oils or waster; the decrease of forest functions as noise absorbent; the loss of recreation function of the forests.

Also, if estimates that the shattering and track without settling are present on up to 5-7 % from the felling area and up to 3 % because the a settled tracks, it can be considered that the stand suffers logging operations. If these phenomena exceed the above-mentioned limits and are also associated with soil compaction, it estimates that the soil is strongly affected and the respective logging activity should be stopped.

### **THE SUSTAINABILITY OF FOREST PRODUCTION**

As regard the sustainability of forest production, the management plays the decisive role in the development, inclusive of eco-efficient production, because is fully aware of the correlation between the investments and the environment and accepts that environmental issues lead to the products services, technology development, in such a manner that they join with the coordinates and restrictions connected to economic, social, technical and environmental functions and objectives, settled by forest politics and strategy.

In accordance with the systems theory, each element of the forest is connected in an way or other to all the other elements and the number of complexes economic, social and environmental linkage are by far more numerous than the elements number.

What is interesting for us is the relationship between the forest environment and how is performed the wood exploitation, that influences the forest situation in a given moment, and also it's future performance and development.

Being available precise management rules, the forest can interacts actively with the market, not only through forest products supplying, but also performing an influence upon the requirements, that it modifies in a such manner that assure optimal relations.

In this context, we consider that the forest bio-economic analysis in order to elaborate its sustainable management and an eco-efficient production, should run through following stages: resources estimate from quantitative and qualitative point of view; consumption inventory; the time prevision for the situation when the resources and consumption are balanced; the technologies analysis in order to use the most improved installations and work methods; the social impact estimate generated by wood exploitation; the implementation of some programs that can create the necessary social and economic balance and allows to meet the wished environment indicators.

### **FOREST ACCESSIBILITY AND ITS PRODUCTIVE FUNCTION**

All the forests, independent from the functions group in which are classified (I-a the first or the second or II-a), play an important role in the environment protection.

The rational, sustainable forest management, so that their functions could be fully performed, supposes a permanent forest roads net construction.

The reduction of impact on the environment, when are constructed forest roads, is especially important, in order to make accessible the approx. 2 millions ha forest difficult to be accessed in the mounting area, and their inclusion in a profitable technical and economic circuit.

Due to intensive exploitation, should be taken measures regarding the adequate access into the forest, constructing a forest road net that meets the protection requirement of the environment.

The forest road construction, after the second world war, had an increasing dynamic, with an average rate that exceeds for some periods, 1300 km/year. This rate was required by the need of the great forest areas accessibility, the replacement of the forest rail - ways within the areas with hydro- electrical developments and especially to reduce the distance for logs skidding, and the activity the most fuel consuming and with highest production costs in wood exploitation process.

In this rhythm, the preoccupation for environment protection when constructing the forest roads was limited, in general, at the location conditions. It were avoided the areas with land slide risk, the easy flooded zones. The future for this field includes a measures set with high degree of exigencies, technical conditions and even restrictions.

It is obvious that for forest ecosystems protection and it's protective function should, both, take protection measures connected to the proper exploitation activity and to the application methods of intervention and, especially, to assure the accessibility of the forest.

### **INVESTMENT - DEVELOPMENT**

The decrease of wooden mass exploited in the last years, within the limits established by forest management, the structure and legislation modifications, required by market economy, led at a given moment, to severe production decrease of all the products.

The privatisation in this sector, almost concluded, has led to a new configuration of the sector where perform over 8.000 companies, in majority SMM-es, but also great companies grounded by foreign investors, with significant impact on new products development with high degree of processing.

The proper investment in the forestry, exploitation and game economy swigged in the last years between 0.20 % and 0.30 % from the total amount of investments in the national economy, despite the forest sector contributes with 0.43 % - 0.48 % to GDP; at

the same time the raw wood, sawn - timber, multi - layer wood products provide 3.1 % from export value and the furniture another 6.7 % from this value.

The industrial politic and generally the legislative frame, should favour further the access to financing sources and to attract investors.

For all the sub-sector of wood working industry, inclusive the exploitation one, the estimated value of necessary investments for the period till the year 2010, amounts up to 970 million USD.

The development of wood revaluation field, will show oneself inclusive in the general process of sustainable natural environment management, and creates the durability of economic and social activities specific to forest areas, including itself in the environmental - friendly programs concerning the wastes treatment and recycling, cleaning, etc.

### **SOCIAL - ECONOMIC AND LEGISLATIVE ASPECTS**

Knowing the pan - European criteria for the sustainable forest management, these briefly consist in: the adequate preservation and melioration of forest resources and their contribution to global carbon cycle; the preservation of forest eco-systems health and vitality; the preservation and adequate increase of forest biodiversity; the preservation and adequate improvement of protective functions in the sustainable forest management (special soil and waters protection); the preservation of the other functions and social-economic conditions;

For the presented topic, there are necessary the following: adaptations and modifications through adequate management as principal regulation tool, in order to match the wood exploitation with the actual content of the sustainable forest management concept; beside the specific regulation of the silvicultural regime connected to the problematic of private forests, are necessary new institutional measures that include precise informational functions and competences.

Special implications could have also: a) new relationship on the market; b) the investments volume increase in the forestry; c) the creation of a forest conscience; d) the change of population attitude towards the forest.

Another component of the politics in the wood field represents the alignment at European Legislation - the Directive 68 / 89 EEC, Directive 89 / 106 EEC, Directive 88 / 378 EEC and also the adoption or harmonization of over 85 % from the European Standard regarding the wood and wood - based products.

### **OBJECTIVES AND STRATEGIC ACTIONS**

In the general frame of the objective intended to assure the stability and increase of functional efficiency of forest ecosystems, the wood exploitation is involved in following actions: the increase of natural regeneration share in the intensive treatment application using adequate procedures and work means; the preservation of stands stability and quality, by tending and light felling, performed in due time and in protective con-

ditions; the quality protection of forest soils, using the most little harmful methods; as regards the improvement of forest areas accessibility, the experts and the management staff in the forestry field, will undertake on short and middle term, the following actions; the modernization and reinforcement of existent forest roads; the increase of forest roads net density; the development of accessibility net within the stands.

The utilization in all the fields of forestry activity of certain pragmatic and preventive solutions for preservation and protection, will lead to an of honesty attitude toward the forest and on long term, to a conciliation of the general aspirations and interests for the condition and health of the natural environment.