

Способи природного відтворення дубових лісостанів Західного лісостепу України

Проведено аналіз впливу лісогосподарських заходів на плодоношення, появу та динаміку відпаду підросту дуба звичайного, зміну мікологічної структури та перерозподіл поживних речовин у профілі ґрунту. Досліджено особливості приростів підросту дуба звичайного на секціях експерименту з різною інтенсивністю розрідження. Визначено вплив інтенсивності освітленості на зміну біометричних показників підросту дуба.

Ключові слова: природне поновлення, мікологічна структура, ґрунтовий профіль, дуб, екологія, лісівництво.

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THREATS TO THE STABILITY AND SUSTAINABILITY OF FORESTS IN THE CARPATHIANS AND REASONS FOR LAW VIOLATIONS IN FOREST SECTOR IN THE CARPATHIAN REGION OF UKRAINE

Most significant threats for stability of forest ecosystems and significant factors leading to decrease of stability of Carpathian forests are determined on the basis of standard survey of experts. Major reasons of illegal cuts in the forests and law violations in forest economy in the Carpathian region of Ukraine are determined. Ecological, economic and social results of illegal wood cuts and law violations in Carpathians are highlighted.

Keywords: forest ecosystems, threats to stability of forests, factors for decrease of stability of forests, reasons for illegal wood cuts, reasons of law violations in the Carpathian forests.

Forest formations belong to the most common and most complex coenotic structure of plants. Today, one of the current problems faced by humans is protection of nature, its rational use and restoration of forests. Forest ecosystems play crucial role in preservation of biodiversity, establishment of favorable human environment, and ensuring the sustainable development of a country.

During the past decades the social importance of forests and approaches to economic and recreational use of forest ecosystems have changed significantly. Today, forest plantations are considered not only as source of wood for human needs, but also as ecosystems ensuring the spectrum of social, cultural and recreational services and supporting the environmental balance on the planet [1, 2, 3, 4, 5].

Because of the importance of forest ecosystems for ensuring the sustainability of living environment, detection of the threats for stability and sustainability of forest ecosystems as well as the reasons for illegal wood cuts in forestry and law violations in forest economy are very important topical issues. In the frames of ENPI-FLEG Program "Improvement of the system of legal application and management in forestry sector in the countries participating in European Neighborhood and Partnership Instrument and Russia" a survey on determination of most significant threats for stability and sustainability of forest ecosystems and reasons for law violations in the Carpathian forests has been held. The survey was held in three administrative districts of the Carpathian region in Ukraine (Kosivskyy District of Ivano-Frankivsk Region, Starosambirskyy District of

Lviv Region, and Khust District of Zakarpatya Region), which are characterized by high forest cover percent (square of forest lands makes 45 % of the whole area of the district) and relatively high volume of products, work and services of forest economy.

Methodology of research was based on 'face-to-face' questionnaire survey of experts at place of work (representatives of local authorities, business and forestry economy experts) and at place of residence (representatives of local communities). In general, there were 450 respondents (150 respondents in each of 3 districts) which allowed the correct and realistic evaluation of situation and determination of major threats for the state of forests and reasons for law violations in forest ecosystems or the Carpathian region. The results of sociological survey of population in the Carpathian region proved the crucial importance of forest and its resources for local communities.

To the question "For you personally, forest is ..." community representatives responded that the forest is, first of all, an important nature object which must be protected (88.7 % respondents). At the same time forest is location for gathering mushrooms, berries and medicinal plants (86.7 %), and a place for recreation (78.0 %). Lower percentage of population in the Carpathian region considers the forest as a source of wood for economic needs (59.3 %) and residential heating (52.0 % respondents). Most significant threats for the state of forests in the Carpathian region of Ukraine, according to representatives of communities of mountainous districts are (Table 1):

- illegal wood cuts by local residents (80.7 % respondents);
- abuse in exploitation of forest resources by business structures (83.3 %);
- corruption in timber provision (83.3 %);
- lease of forests for temporary users (78.0 % respondents).

A significant part of population in forest regions in the country (over 70 %) considers that imperfect legislation, low ecological culture of the population and bad protection of forest by their users are major threats to the state of forests. According to the opinion of forestry specialists and scientists, most significant threats for the state of forests are:

- imperfect legislation (61.5 % respondents);
- illegal wood cuts by population (57.0 %);
- lease of forests to temporary users (55.0 %);
- low ecological culture of population (54.0 % respondents).

Residents of mountainous regions, forestry specialists and scientists mark illegal wood cuts by local population among to be the most significant threats for the state of forest ecosystems.

According to the opinion of forestry specialists, most common violations in forests of the Carpathian region are illegal wood cuts made by local population for their own needs, especially for residential heating (34.0 % respondents), and also wood cuts made for getting profit from selling or processing of wood (23.7 % respondents).

The thoughts of residents of local communities and forestry specialists on the reasons of illegal wood cuts either coincide or are very close. So, the main reasons for illegal wood cuts by local population according to community residents are:

- low level of social protection of population (81.3 % respondents);
- functioning of illegal private sawmills (79.3 %);
- insufficient measures to combat smuggling and corruption (76.0 %);
- high level of unemployment (73.3 %);
- presence of shadow economy (70.7 % respondents).

Table 1. Most significant threats for the state of forests, % of respondents

Threats for the state of forests	Not a threat or rather is not a threat	Threat or significant threat
Visits of recreants to forests	81.3	15.3
Abuse in exploitation of forest resources by local authorities	48.7	48.7
Irrational activity of forestry enterprises	30.7	64.7
Imperfect legislation	26.7	70.0
Low ecological culture of population	24.7	72.7
Bad forest protection	24.0	73.3
Lease of forests to temporary users	18.0	78.0
Illegal wood cuts by local residents	16.0	80.7
Corruption in logging	13.3	83.3
Abuse in exploitation of forest resources by business structures	12.0	83.3

Forestry specialists consider the following reasons for illegal wood cuts by local population:

- high level of the unemployment (58.0 % respondents);
- low level of social protection of population (58.0 %);
- functioning of illegal private sawmills (48.0 %);
- low legal culture of population (44.0 % respondents).

Also, according to the opinion of forestry specialists and scientists, the following drawbacks in forestry management can be considered as reasons for illegal wood cuts in forests of mountainous regions:

- violation of regulations and laws in the field of lumbering;
- abatement of the systems of general and environmental management;
- lack of progress in implementation of the concept of sustainable forestry management.

The value of the harm caused by illegal wood cuts, according to the opinion of the majority of forestry specialists, is medium – 42.5 % respondents. 25.0 % respondents consider illegal wood cuts as insignificant volume of harm, and 20.5 % consider it as very significant. There is no exact answer of forestry specialists about effectiveness of fines and compensation amounts for illegal wood cuts. Thus, 22.0 % respondents consider the amounts of fines for illegal wood cuts as low, 34.5 % – as relevant to harm caused, and 37.0 % respondents – as too high. Most significant harm to forest ecosystems, according to opinions of forestry specialists and scientists, are caused by the following types of activities (Table 2): continuous wood cuts in large areas (38.7 % respondents); excessive chopping of forests by permanent cutting of best trees (43.3 %); illegal wood cuts (46.7 %); wood cuts near the rivers (48.0 %); damage to soils by tractors while timbering the trees (52.0 %); wood cuts on erosion-dangerous areas (58.0 % respondents).

Table 2. Evaluation of harm to forest ecosystems, % respondents

Factors	No harm	Insignificant harm	Significant harm
High level of manual work	45.3	32.0	16.0
Insufficient attention to protection of flora and fauna biodiversity	21.3	39.3	29.3
Lack of control over the sanitary condition of forests	13.3	48.7	32.7
Extensive wood cuts on big areas	11.3	40.0	38.7
Excessive chopping of forests by permanent cutting of best trees	10.0	37.3	43.3
Illegal wood cuts	10.0	35.3	46.7
Wood cuts near the rivers	10.7	31.3	48.0
Damage to soils by tractors while timbering the trees	14.7	28.0	52.0
Wood cuts on erosion-dangerous areas	8.7	2.3	58.0

Forestry specialists and scientists consider the following reasons as most significant among the list of law violations in the forests of Carpathian region (Table 3):

- poverty of population (58.0 % respondents);
- high level of unemployment (68.0 %);
- insufficient funding of forestry enterprises (68.0 %);
- low wages of forestry enterprise employees (68.7 % respondents).

Table 3. Reasons of law violations in forestry sector, % respondents

Reasons of violations in forestry	No or partial impact	Significant or crucial impact
Lack of control from forest guard	68.0	24.7
Bureaucratic complications for citizens in legal use of forests	56.7	32.0
Difficulty in getting the permits for use of forests	56.0	30.0
Urgent need for wood	51.3	42.0
Absence of effective penalties	57.3	30.0
Imperfectness of forestry legislation	42.7	44.0
Presence of shadow economy	36.7	46.0
Desire for high revenues of business entities	40.7	46.0
Desire for additional income of population	37.7	53.3
Poverty of population	33.3	58.0
High level of unemployment	23.3	68.0
Insufficient funding of forestry enterprises	24.7	68.0
Low wages of forestry enterprise employees	22.0	68.7

Significant part of employees of forestry enterprises and scientists consider the desire to get additional income by local population (53.3 % of respondents), desire to get high revenues by business structures (46.0 %), presence of shadow economy (46.0 %) and imperfect forestry legislation (44.0 %) as main reasons of law violations in forests of the region. Law violations in forests and illegal logging caused by various factors lead to the following negative, closely intertwined environmental, economic and social results:

- decrease in stability and sustainability of forest ecosystems;
- attenuation of ecological functions of forests;
- changes in species composition, structure and productivity of forest plantations;
- decrease in the biodiversity;
- decrease in level of recreation attractiveness of forest stands;
- increase of expenses to ensure the recovery of forest ecosystems;
- conflicts in the field of forest use.

Conclusions. The research and analysis done allow for the following conclusions:

- forest ecosystems which are the basis for conservation of biological and landscape diversity play an extremely important role in ensuring the sustainable development of territories and stability of the environment;
- according to the opinions of specialists and representatives of communities of the Carpathian region, the highest threats for stability and sustainability of forest ecosystems are the following: illegal wood cuts by local population; abuses in exploitation of forest resources; corruption in logging, and imperfect legislation;
- the most significant harm to forest ecosystems is caused by the following types of activity: extensive wood cuts on big areas, excessive chopping of forests by permanent cutting of best trees, and illegal wood cuts;
- the main reasons for illegal wood cuts in the forest of the Carpathians are as follow: low level of social protection of population and high level of unemployment, operation of illegal sawmills, insufficient measures in combat the smuggling and corruption, and presence of shadow economy;

• the scientists and forestry specialists consider the following as most significant reasons of law violations in forests of the Carpathian region: poverty of the population and high level of unemployment, low wages of forestry enterprise employees, insufficient funding for forestry enterprises.

Despite the various developments in increasing the effectiveness of forestry and sustainable development of forest economy, the problem of reducing the number of law violations in forestry and volumes of illegal logging in the Carpathian region remain topical. Today the efforts should be directed on improvements in forestry legislation, maintaining the criteria of sustainable forestry use, and increasing the level of social standards of living, environmental education and legal culture of population.

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Загрози стабільності та стійкості лісів Карпат і причини правопорушень у лісовому секторі Карпатського регіону України

Дослідження виконані в рамках Програми ENPI-FLEG „Удосконалення систем правозастосування й управління в лісовому секторі у країнах-учасницях Європейської політики добросусідства та Росії” та проведені в трьох пілотних районах Карпатського регіону України (Косівський район Івано-Франківської області, Старосамбірський район Львівської області та Хустський район Закарпатської області) дозволили встановити на основі стандартного опитування експертів „обличчям до обличчя” (450 респондентів – фахівці лісового господарства, науковці, лідери місцевих громад, представники органів місцевого самоврядування та бізнес-структур) найбільш вагомі загрози стабільності лісових екосистем та вагомі чинники, що призводять до зниження стійкості лісів Карпат. Найбільш вагомими загрозами для стану лісових екосистем експерти називають: самовільне вирубування лісів місцевими жителями, зловживання при експлуатації лісових ресурсів бізнес структурами, передача лісу в оренду тимчасовим лісокористувачам, корупційні схеми заготівлі деревини та недосконалу законодавчу базу. Проведені дослідження виявили основні причини самовільних рубань деревини у лісових масивах Карпат, першочерговими серед яких на думку мешканців громад та фахівців лісового господарства є: низький рівень соціального забезпечення населення та високий рівень безробіття, функціонування нелегальних приватних пилорам, наявність в економіці тіньового сектору та низька правова культура населення. За результатами досліджень встановлені основні причини правопорушень у лісовому господарстві та лісовій галузі Карпатського регіону України, першочерговими серед яких фахівці лісового господарства та науковці називають: високий рівень безробіття та бідність місцевого населення, недостатнє фінансування лісгосподарських підприємств, існування

тіньової економіки та недосконалість лісового законодавства. Правопорушення в лісових масивах та незаконні лісозаготівлі деревини, спричинені різними чинниками, призводять до низки негативних, тісно переплєтених між собою екологічних, економічних та соціальних наслідків, основними серед яких є: зниження стабільності та стійкості лісових екосистем; зміна видового складу, структури та продуктивності лісових насаджень; значне збільшення витрат на забезпечення відновлення лісових екосистем; виникнення конфліктів у сфері лісокористування.

Ключові слова: лісові екосистеми, загрози стабільності лісів, чинники зниження стійкості лісів, причини самовільних рубань деревини, причини правопорушень в лісах Карпат.

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EXPERT INVESTIGATIONS OF OCCUPATIONAL RISKS AT FORESTRY ENTERPRISES

The paper presents and analysis of the experience of qualified specialists – experts with the aim of danger identification and determination of occupational risks at workplaces by the rank correlation method. The results obtained will be used for the development of optimal planning methods for labour protection at forestry enterprises with the purpose of reducing occupational risks to a minimum.

Keywords: occupational risk, expert assessment, rank correlation, concordance coefficient, Pearson's criterion, histogram.

Main theoretical material. The necessity of identification, estimation and development of methods for eliminating and reducing the occupational risks at each workplace are required by the standard OHSAS 18001.

There are statistical, analogue and expert calculation methods of occupational risks. Statistical and analogue methods are employed when corresponding statistics is provided, but it is not always available. That's why expert methods for identification and calculation of occupational risks based on the survey carried out among the specialists are applicable. It is important to use the information provided by the specialists-experts especially when for its selection, processing and analysis, special procedures and mathematical methods (called the methods of expert reviews) are employed. Rational use of information provided by the experts is possible under the conditions of converting it into a form convenient for further analysis directed toward preparation and taking decisions. The purpose of the rank correlation method is link evaluation among the objects of investigation. The ranks are used for arranging the significance of the objects. The target is to make a project using the available measures, arranged by the experts. The concordance coefficient ranging from zero (absence of agreement) to one (full agreement) is used for estimating agreements of the experts' opinions.

Given data. The objects X_1, X_2, X_n are estimated. The specialists thoroughly acquainted with the objects under investigation arrange them according to the descending level of their influence on any index. Each j -object (factor) is given a rank of significance r_{ij} . The experts are provided with ranking maps of the objects under investigation.

On them they mark the ranks of significance of factors, which influence the index under investigation. On the base of these maps the reduced matrix $[r_{ij}]$ of dimension $m \times n$ is made. Natural series of numbers is presented in the matrix lines. The arithmetical average value is equal to:

$$1/n(1+2+\dots+n)=(n+1)/2, \quad (1)$$