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SAFE ENVIRONMENT – GUARANTY OF
THE POPULATION HEALTH
HIGHLANDERS.
CHALLENGES FOR ECOLOGICAL AND
TECHNOLOGICAL SAFETY OF THE
CARPATHIAN REGION

БЕЗПЕЧНЕ СЕРЕДОВИЩЕ – ЗАПОРУКА
ПОПУЛЯЦІЙНОГО ЗДОРОВ'Я ГОРЯН.
ВИКЛИКИ ДЛЯ ЕКОЛОГІЧНОЇ ТА
ТЕХНОГЕННОЇ БЕЗПЕКИ
КАРПАТСЬКОГО РЕГІОНУ

Ключевые слова: *горные территории,
гигиеническое качество среды,
эколого-техногенная безопасность.*

Масикевич Юрий, Мыслицкий Валентин,
Ткачук Светлана, Масикевич Андрей. **Безопасная среда – залог популяционного здоровья горян. Вызовы для экологической и техногенной безопасности карпатского региона.**

Целью выполненного исследования был анализ основных вызовов экологической и технической безопасности для жителей Покутско-Буковинского горного региона Карпат, для выяснения влияния качества окружающей среды на жителей горной местности. С помощью общепринятых методов лабораторного анализа изучили гидрохимические показатели воды, сравнивая концентрации загрязняющих веществ в ней со значениями ГДК.

Introduction. Diminution of the influence of the environment, caused by technological activities of people, on the person's health and state of natural ecosystems should be considered as a significant priority of ecological and technological security¹. As to opinion of a number of authors² the state of hydrological network and landscape occupies one the guiding tendencies among the means of the management of territory security.

As is generally known almost the third part of Chernivtsi region is represented by mountain and foothills territories that are particularly vulnerable from the standpoint of ecological and technological security.

Disastrous floods in 2008 and 2010 are the visual demonstration of it. The analysis of the present data in literature, carried out by us, certifies that 29 of 33 kinds of activities and objects are of increased ecological security on the territory of Pokuts'ka-Bukovinian Carpathians according to the list of CM of Ukraine of 2013. As to official statistics of the 01.01.2015 181.27 thousand of people, constituting 19.9% of the total population, lived in mountain and foothills parts of the Chernivtsi region. Reduction of

the average age of the population and growth of demographic burden in comparison with the index in the Chernivtsi region are typical for the mountain regions what can be explained by the growth of the rate index in the region.

Just therefore, substantiation of the principles of the balanced coexistence of technosphere and biosphere providing, as a result, safety environment and ability to self-restorability and self-control of ecosystem as a whole is urgent nowadays.

Part I Challenges of Ecological and Technological Security of the Carpathian Region. Mountain territories are extraordinarily vulnerable from the standpoint of ecological and technological security³. Disastrous floods in 2008 and 2010 became one more confirmation of the given axiom. The analysis, carried out by us, testifies to that at present 29 of 33 kinds of activity and objects are of increased ecological security according to the List of 2013⁴ on the territory of the Ukrainian Carpathians. Data in the context of the administrative and territorial units which make up the foothills and mountain part of the Chernivtsi region are cited in Table 1.

Table 1

Main statistical indices of the administrative-territorial arrangement of the foothills and mountain part of the Chernivtsi Region

№ п/п	Administrative territorial units	territory, thous. sof. ²	population, thous. persons	quantity of settlements	list of kinds of activity and objects that make up increased ecological security
1.	Storozhynets region	1,160	55,7	39	1, 2, 3, 4, 5, 6, 8, 9, 11
2.	Vyzhnytsia region	0,884	26,2	34	1-11
3.	Putyla region	0,897	99,3	51	1, 2, 3, 4, 5, 6, 8, 9, 10
In all:		2,941	181,2	124	1-11
% to the total in the region		36,3	19,9	29,7	

Note: 1- gathering and burying domestic wastes; 2 - woodworking industry; 3- stock-raising; 4 - production of foodstuffs; 5 - construction of sewerage systems and cleansing structures; 6 - construction of water intakes; 7 - petroleum production; 8 - generation of electricity and heat based on organic fuel; 9 - building materials industry; 10 - construction of hydropower and hydrotechnical structures; 11 - construction of the main lines and arterial roads.

Selective questioning of the dwellers of the foothills and mountain part of the region (table 2) carried out by us enabled to elucidate the attitude of

the local population to ecological problems of the region.

Table 2

Analysis of the results of studying opinion of the local population as to ecological problems of Bukovinian Carpathians (in % of the total number of respondents)

№ п/п	Administrative territorial units	Nonsupervised wood felling	Soil erosion and shifting processes	Gravel output	Throwing down of untreated waters	accumulation of domestic wastes
1.	Storozhynets region	42,0	24,0	15,0	11,0	8,0
2.	Vyzhnytsia region	40,0	20,0	17,0	13,0	10,0
3.	Putyla region	38,0	30,0	14,0	12,0	6,0
Note: questioning was carried out among the workers of general education establishments of the region.						

The results of the carried out selective questioning showed that among ecological problems the dwellers of the mountain and foothills part of the Chernivtsi region chose five, as to their opinion, the most important problems. On the basis of the obtained results we conducted ranging of ecological problems of the region. Uncontrolled wood felling takes first place in all three territorial-administrative units, and then soil erosion and shifting processes, gravel output, throwing down untreated waters and accumulation of domestic wastes products. Carpathians woods have a determinant influence upon the formation of hydrologic net upon topsoil of the region. Recently soil erosion and shifting processes have activated because of infringement of technologies

of the conducting agriculture, specifically forestry⁵. Significant economic losses occur in the process of solidity disturbance of mountain forest ecosystems, landscape and biological variety are broken. Burning down of withered vegetation in spring, breach of technology of wood stocking up and logging, drying up of fir-trees in mountain regions, unauthorized felling are the main threats for forest ecosystems of the region. Chemical (acid rains), physical (industrial discharges), pollution of the environment, chemical contamination of waterways with industrial, flows and from agricultural farms cause significant damage to gene pool of the biological species.

Ramified network of different assignment, ex-

cessive ploughing up in separate regions are the obstacle for the natural settling of flora and fauna species. Indicated challenges are universal for the whole Carpathian region.

Protected territories and creation of the objects of the natural-protected fund on them should be noted among the important methods of preservation of the mountain ecosystems. Thus, on the territory of the mountain part of the Carpathian region, according to the data of the State cadastre of the territories and objects of the natural-protected fund, on the 1st of January, 2013 1611 protected territories and objects (including 1 biosphere preserve, 2 natural reserves and 14 national parks) are concentrated here. Recreational zone of the objects of the natural-protected fund, in particular, national natural oaks, is a wonderful place for recreation. However, an excessive burden on these objects often leads to littering of the territory, water pollution, destruction of the Red Book species of the plants and animals.

A number of environmental security problems is connected with insufficiently considered and unfounded planning and construction of mine hydroelectric power stations on mountain water carriers of the Chernivtsi region. Regardless topicality of the questions of energetic independence of the state it is absolutely inadmissible construction of mini HEP stations without taking into consideration the requirements of ecological security.

Conglomeration of a significant part of timber industry waste products in the upper reaches to the mountain rivers, arrangement of livestock farms in the immediate proximity to reservoir leads to the worsening of sanitary-hygienic parameters of water and soil and is, in all probability, after-effect of worsening dwellers' health of the region. Investigations, carried out by us⁷, have shown that hygienic characteristics of the region may be an important indicator of the steady development of the region, in particular harmonic development of the relations of its social and natural components.

A lot of scientific works are dedicated to the mapping and studying general well-being⁶, level of morbidity as to the landscape complexes⁷. New direction of the scientific investigations – medical geology is being formed, that studies health and life of a person from the point of view of geological environment influence, as well as feedbacks. Challenges for ecological security of the Eastern Carpathians are a serious warning for the balanced development of the region and at the same time population health of the dwellers of the territory.

Mountain ecosystems of the Ukrainian or Eastern Carpathians extend from the northwest to the southeast almost for 280 thousand km, occupy the area over 24 thousand sq. kilometers and are divided into Outer, Central and Internal. Pokuts'ko-Bukovinian Carpathians (to the east from the Prut valley) are referred to Outer Chunk Carpathians, they are various as to orographic, climatic and biogeographical specific characteristics. Owing to the vertical zone Pokuts'ko-Bukovinian Carpathians

and other mountain ecosystems are characterized by a high biological diversity⁸. Thus, flora and fauna resources here are several times higher in comparison with adjacent flat territories. Considerable number of species- endemics occurs in composition of vegetable and animal world⁹.

Mountain ecosystems of Pokuts'ko-Bukovinian Carpathians are also characterized by low stability to anthropogenic influence.

Destruction of the mountain landscapes, topsoil erosion take place, periodical flood phenomena are observed as a result of irrational conducting of forest economy, ploughing up and cutting slopes, pasture of domestic animals. Thus, heavy floods in 1927, 1941, 1947, 1957, 1969, 2008, 2010 were fixed in the documents specifically on the Prut river.

Adduced analysis testifies to that because of economic activities of a human being mountain ecosystems became rather vulnerable and require, if not complete, protection, but at least cautious attitude to the balanced use. Just because of it, a considerable part of the mountain systems of the USA, Switzerland, Austria (convention concerning protection of the Alps, Salzburg, 1991), Spain and other countries were recreated into national parks and protected wood lands. Weighty steps as to protection of the territories in Pokuts'ko-Bukovinian Carpathians were made during the last years. By the President Orders of Ukraine¹¹ protected territories of the national natural park "Vyshnytsky" (2007) were enlarged, national natural parks "Cheremos'ky" (2009), and "Verkhovynsky" (2010) were created.

However, the analysis and prediction of the ways of the balanced development according to the conditions of the present challenges are necessary to introduce the main regulations of the Carpathian convention and create ecological safety conditions.

Ecological state of the topsoil research in the region was estimated by such indices as: per cent of eroded areas, per cent of the areas covered with forests, ploughing up, availability of humus, pollution with pesticides, moisture supply. According to the data of the Central Statistical Office in the Chernivtsi region¹⁰ there has been precise tendency to decrease the per cent of areas covered by forests in the foothills and mountain part of the North Bukovyna for the last 10 years and there was a decrease of humus content and soil moisture in the region during the last three years. There were no abrupt changes in the picture pertaining to the presence of pesticides in soil, percentage of erode areas increased 1.5-2 times.

Ecological State of hydrosphere was evaluated according to indices of dynamics of the river flow, volume of gravel output from the riverbeds of mountainous waters, construction of dams of mini hydroelectric power stations, domestic and industrial water escapes.

Carpathians forests have determinant influence on the formation of hydrological net and topsoil.

Soil erosion and shifting process activated for the last years, as a result of technology infringement of conducting timber economy, especially forest economy.

The whole chain of problems of ecological security is concentrated with insufficiently considered and groundless planning and construction of mini hydroelectric power stations (HES) on mountain streams of Eastern Carpathians¹¹. Regardless of topicality of the questions of energetic independence of the state the construction of mini HES's without taking into account the requirements of ecological security, is absolutely inadmissible.

Conglomeration of considerable part of wastes of timber industry in upper reaches of the mountain rivers, arrangement of the livestock farms in immediate proximity to water drains results in worsening sanitary and hygienic indices of water and soil and is, in all probability, the after effect of worsening the dwellers health of the region. Investigations, carried out by us, have shown that hygienic description of the region may be an important indicator of the steady development of the region, in particular, harmonious development of the relations of its social and natural components.

Significant economic losses occur in the process of solidity disturbance of the mountain forest ecosystems, landscape and biological variety are broken.

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Ramified network of different assignment, excessive ploughing up in separate regions are obstacle for the natural settling of flora and fauna species. Indicated challenges are universal for the whole Carpathian region.

Part 2 Sanitary-Hygienic Aspects of Ecological Security of the Mountain region. According to the analysis of data of the Central Office of Statistics in the Chernivtsi region, population health of the mountain dweller is mainly determined by peculiarity of ecological situation, biogeochemical specification (endemicity) of microelements circulation of the mountain landscapes, socio-economical development of the region, etc.

Investigations by Neiko, Rud'ko Rud'ko, Adamenko; Jutsuliak¹²; Kiilinska are dedicated to cartographic analysis of the population morbidity, studying the level of health and morbidity as to the landscape complexes, New direction of the research - medical geology, studying health and life of a person from the point of view of geological environment influence on it, as well as feedbacks (technological impact of a person upon the environ-

ment) is being formed. However, the influence of indices of population health on stability and ecological security of the natural ecosystems is insufficiently studied.

In many cases the state of water resources of the Carpathian region is an important element, characterizing the level of ecological security and medico-social prosperity of the region. Investigations of the hygienic quality of water surroundings¹² carried out by a number of authors are indicative of a growth of XCY and BCK value indices from the river-head down the river-bed of the main water-carriers of the region. The mentioned tendency is significantly intensified during the period of winter-spring transition to summer season. It is stipulated by activation of biological processes in the basins during summer period on the one hand, and strengthening of timber industry activities on the other hand that in final result leads to oxygen deficiency in the mountain water-carriers.

Distinct seasonal dependence of oxidation index is also observed in outfall part of the stream. It is explained by rather intensive contamination of the river water with organic substances, in the first place wood wastes and domestic faults of the settlements, situated in Bily Cheremosh basin.

Accumulation of nitrogen and chroline compounds in the lower part of Bily Cheremosh Stream was shown to occur in summer-autumn period. Expeditionary-route inspections of the river Bily Cheremosh in 2012-2015 carried out by us enabled to reveal significant accumulations of timber wastes products, in particular, sawdust, in riverside strip in the area of the settlements Yablunytzia, Cheremoshna, Dovgopillia. The mentioned sawdust dumps are the main cause of the percent increase of the suspended substances in the basin of the river Bily Cheremosh from the river-heads to the outfall – the place of confluence with Chorny Cheremosh in the region of the village Usteriky (table). It is demonstrated by the weight and microscopic analysis of the suspended substances carried out by us.

Processes of chemical oxidation and sawdust decomposition occur in the presence of oxygen. Namely because of it later on we have carried out a comparative analyses of such indices as content of soluble oxygen, biochemical consumption of oxygen (BCO) and chemical consumption of oxygen (ChCO). BCO is the quantity of oxygen (in milligrams), necessary for biochemical oxidation of organic substances which are contained in 1 dm³ of water at temperature 20° C.

According to normative indices BCO content in the river water must be more than 3mg/dm³. The more river water is contaminated with organic substances, the more is its BCO. The results obtained by us are evidence of an increase of value of BCO indices from the river-heads to the outfall of the river Bily Cheremosh (table 3).

In the headwaters of Bily Cheremosh basin (the region of junction of the rivers Perkalaba and Sarata) the content of soluble oxygen made up 4.6mg/

dm³, but in the outfall area (place of trial taking in v. Usteriky) it decreased to 2.0mg/dm³. It is explained by the fact that contamination of the river water with washouts of organic nature from the riverside and water-protected zone, which are decayed using soluble oxygen in water. The mentioned tendency is essentially intensified in the period of transition from

winter-spring to summer season.

Water oxidation is one more index studied by us. Permanganate oxidation is amount of oxygen (in milligrams), that is used for chemical oxidation of organic and non-organic substances (hydrogen sulphide, ammonia salts, nitrates and others), contained in 1 dm³ of water.

Table 3

Main hygienic indices of water trials of the river basin Bily Cheremosh during spring-summer period 2012-2015

Date	Place of trial intake	hygienic indexes								
		Soluble oxygen (mg/dm ³)	BCO-5 (mg O ₂ /dm ³)	Oxidation (mgO ₂ /dm ³)	ChCO (mg O ₂ /dm ³)	Suspended substances (mg/dm ³)	pH	T ⁰ C water	Chlorides, mgr/dm ³	Nitrates, mg/dm ³
15.03. - 01.04	Junction rivers Perkalaba and Sarata	4,6	3,0	1,2	7,8	1,4	7,0	+7	0,4	1,0
15.08 -01.09	-/-/-	4,4	3,2	1,4	8,0	1,5	6,8	+16	0,6	1,2
15.03. - 01.04	Mouth of Yalovychera river (right tributary)	4,5	4,5	2,0	12,3	2,0	6,8	+8	0,7	1,3
15.08 -01.09	-/-/-	4,4	4,4	2,1	13,6	2,1	6,6	+17	0,8	1,6
15.03. - 01.04	Mouth of Probiina (left tributary)	3,5	6,5	9,3	20,8	2,4	6,6	+8	0,7	1,4
15.08 -01.09	-/-/-	3,0	6,9	9,5	22,5	2,5	6,5	+16	0,8	1,7
15.03. - 01.04	Mouth of Baly Cheremosh in the area of usterika river	2,2	8,2	12,4	25,0	4,8	6,0	+8	0,9	1,8
15.08 -01.09	-/-/-	2,0	8,8	14,7	28,5	5,0	5,8	+18	1,2	2,1
* - indices reliable at P≤0.05										

Oxidation increase in the river water is a direct index of its contamination. Water oxidation of the rivers in standard must be less than 5-6mg/dm³.

In the upper part of the river Bily Cheremosh, in the area of junction of Perkalaba and Sarata streams, oxidation was 1.2mg/dm³, while in the middle part this index increased to 9.3mg/dm³, and in the part of the mouth it reached 12.4mg/dm³. Distinct seasonal stipulation of oxidation index is also observed in the mouth part of Bily Cheremosh. It is explained by rather intensive contamination of riverine waters with organic substances, in the first place with timber waste products and domestic faults of the settlements situated in the basin of Bily Cheremosh. Oxidation increase in the river water is a direct index of its contamination. Water oxidation of the rivers in standard must be less than 5-6mg/

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Investigations, carried out earlier¹², pertaining to accumulation of timber waste products in the process of logging and timber industry in the Chernivtsi region may be the basis for the beginning of constantly acting of monitoring of ecological

condition of mountain territories and means of the operative reaction to the negative ecological security and provision of medico-social well-being of the population of the important timber industrial mountain area of the Chernivtsi region.

Influence of location of the livestock farms in immediate proximity to water carriers leads to worsening of sanitary-hygienic indices of water and soil and is, in all probability, an after effect of health worsening of the region's dwellers. Waste products of timber branch produce a significant negative influence on ecological state of mountain and foothills territories of the Chernivtsi region. Thus, about 21% of the stock of business timber falls to the share of timber waste products in the Chernivtsi region. Dissolution of timber waste products is accompanied by methane emissions into atmosphere, river contamination, flora and fauna destruction. Accumulation of the suspended organic substances, in particular, sawdust, in natural basins results in decomposition, accompanied by changes in oxidative processes, owing to which oxygen content in water decreases, biochemical requirement of it increases, organoleptic indices of water becomes worse, and as a result entirety of natural ecosystem and ecological security is violated.

As a whole, in the Chernivtsi region there is a general tendency to intensity increase of morbidity indices of the population from the southern west to the northern east. The lowest indices of morbidity were detected for mountain-forest and forest-planting districts of Bukovinian Carpathians and Pre-Carpathians. Exclusion of the given rule is tuberculosis morbidity of the mountain dwellers. Thus, according to the statistical data on 01.01.2015 tuberculosis morbidity index in the foothills and mountain locality is 46.4-66.4 cases on 100000 of the population (at 34.7 in the town of Chernivtsi). And this is in spite of the fact that a rather high per cent of the forests and areas, covered with forest, (47,7-67,8%) is typical for the given region. Forests are known to be the lungs of the planet. Treating the air from pollutants, discharge of plant phytoncydes occur due to leaves, forests serve as zones of recreation, rest and improvement of health of the population. That is to say, high level of morbidity of the dwellers of the mountain population on tuberculosis most likely is not caused by infringement of ecological security of the environment.

Thus, development of the conception of ecological security for the mountain part of the Chernivtsi region is a question of urgent importance at present. Hygienic characteristics of the region may be the indicator of the steady development of the region, in particular, harmonic development of the relations of its social and natural components.

Conclusions. The main challenges for ecological and technological security of Bukovinian Carpathians are: clear cutting of wood, soil erosion and shifting, excessive ploughing up of soil, contamination of the river network with timber waste prod-

ucts, chemical contamination of water arteries by domestic faults and liver-stock farms faults, risks of unconsidered constructions of mini HEP stations, insufficient development of the sphere of social services.

Conglomeration of timber waste products in the river network of Pokuts'ko-Bulovinian Carpathians results in severe worsening of hydrochemical regimen and main hygienic indices of the mountain hydroecosystem. Introduction of modern technologies of waste utilization of the cycle of timber processing may have significant ecological-economic efficiency and serve as the basis of ecological security increase of the mountain forest-industrial region.

References:

¹Masikevych Iu.H. Hihienichna yakist vody v richkakh Bukovynskykh Karpat yak pokaznyk ekolohichnoi bezpeky rehionu / Iu.H. Masikevych, A.Iu. Masikevych // Liudyna ta dovkillia. Problemy neoekolohii.- 2014.- № 3-4. – S. 104-108.

²Masikevych Iu.H. Zdorov'ia naseleння - indykator ekolohichnoho stanu Bukovynskykh Karpat / Iu.H. Masikevych, V.D. Solodkyi, V.F. Myslytskyi // Klinichna ta eksperymentalna patolohiia. – 2012. – Tom KhI, № 1(39). – S. 199-203.

³Hadach E., Shymon T., Mykhalyk S.]. – Lviv: Svit, 1991.- 248 s.

⁴Pro zatverdzhennia pereliku vydiv diialnosti ta ob'iektiv, shcho stanovliat pidvyshchenu ekolohichnu nebezpeku // Postanova Kabinetu Ministriv Ukrainy vid 28.08.2013, № 808.

⁵Materialy do Natsionalnoi dopovidi Ukrainy pro stan navkolyshnoho pryrodnoho seredovyscha u 2012 rotsi «Rehionalna dopovid pro stan navkolyshnoho pryrodnoho seredovyscha u Lvivskii oblasti v 2012 rotsi».- [Elektronnyi resurs]. – Rezhym dostupu do resursu: <http://www.menr.gov.ua/docs/activity-dopovidi/re>

⁶Vstup do medychnoi heolohii / za redaktsiieiu H.I. Rudka, O.M. Adamenka. – K.: Akadempres, 2010. – T.1. – 736 s.

⁷Hutsuliak V.M. Medyko-ekolohichna otsinka landshaftiv Chernivetskoj oblasti : monohrafiia / V.M. Hutsuliak, K.P. Nakonechnyi. – Chernivtsi : Chernivetskyi nats. un-t, 2010. – 200 s.

⁸Zapovidni ekosystemy Karpat / [Stoiko S., Hadach E., Shymon T., Mykhalyk S.]. – Lviv: Svit, 1991.- 248 s.

⁹Konspekt fauny Pivnichnoi Bukovyny (sudynni roslyny) / [Termena B.K., Stefanyk V.I., Serpokrylova L.S.ta in.]. –Chernivtsi: ChNU, 1992.-226 s.

¹⁰Dovkillia Chernivetskoj oblasti u 2014 rotsi: statystychnyi zbirnyk./ Za red. Petrovoi H.I.. - Chernivtsi: Holovne upravlinnia statystyky u Chernivetskii oblasti, 2015.- 155 s.

¹¹Berezhnyj Ie. Small Hydro Power Stations Development in the Carpathians as a likely Threat: IA and SEA Aspects/ Berezhnyj Ie., Havryliuk R., Masikevych Iu., Movchan Ia., Parchuk G., Tarasova O., Bolot K. // Symposium Abstracts of the 17th International Symposium on Landscape Ecology: Land-

¹²Sozofity luchnykh ekosystem Ukrainykh Karpat / [Chorney I.I., Budzhak V.V., Tokariuk A.I. ta in.]. – Chernivtsi: DrukArt, 2010.- 252 s.

¹³Pravove rehulivannia zapovidnoi spravy v Ukraini (spetsialne zibrannia zakonodavchykh dokumentiv) [Chernovskyi O.K., Masikevych Iu.H., Molvchan Ia.I. ta in.]. – Chernivtsi: Knyhy – KhKhI, 2013. – 800 s.

Масікевич Юрій, Мислицький Валентин, Ткачук Світлана, Масікевич Андрій. Безпечне середовище - запорука популяційного здоров'я горян. Виклики для екологічної та техногенної безпеки карпатського регіону. Метою виконаного дослідження був аналіз основних викликів екологічної та технічної безпеки для жителів Покутсько-Буковинського гірського регіону Карпат. Для з'ясування впливу якості оточуючого середовища на жителів гірської місцевості і за допомогою загальноприйнятих методів лабораторного аналізу дослідили гідрохімічні показники води, порівнюючи концентрації забруднюючих речовин у ній зі значеннями ГДК.

Ключові слова: гірські території, гігієнічна якість середовища, еколого-техногенна безпека.

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