

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
V. N. KARAZIN KHARKIV NATIONAL UNIVERSITY
KARAZIN INSTITUTE OF ENVIRONMENTAL SCIENCES, GREEN
ENERGY AND SUSTAINABLE DEVELOPMENT
SCHOOL OF FOREIGN LANGUAGES



Ecology is a priority

All-Ukrainian

with international participation student

English-speaking conference

March 11, 2026, Kharkiv, Ukraine

*Under the General Editorship of
N. V. Maksymenko, DrSc (Geography), Professor,
English Language Supervisor N. I. Cherkashyna*



Co-funded by
the European Union



Kharkiv – 2026

УДК 502/504(063)

E20

*Approved for distribution on the Internet by the decision of the Academic Council of Scientific and Methodological Council of the University:
(Protocol 5 dated 27rd of March, 2026)*

The publications contain the proceedings, which address the modern ecological problems and ways of their solution, applied ecological research and ecological consequences of the Russian-Ukrainian war.

E20 Ecology is a priority: coll. theses of the All-Ukrainian with international participation student English-speaking conference (Kharkiv, March 11, 2026). Kharkiv: V. N. Karazin KhNU, 2026. 77 p.

Editor: N. V. Maksymenko, DrSc (Geography), Professor
N. I. Cherkashyna, English Language Supervisor



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or Erasmus+ programme. Neither the European Union nor the granting authority can be held responsible for them.

CONTENTS

<i>Modern ecological problems and ways of their solution</i>	6
Balas K. O., Maksymenko N. V., Cherkashyna N. I. KEY ASPECTS OF THE NEED TO STUDY THE MECHANISMS OF URBAN HEAT ISLAND'S FORMATION.....	6
Bohun N. M., Yankovska L. V. ENVIRONMENTAL SITUATION AND WAYS OF SUSTAINABLE DEVELOPMENT OF THE TOWN OF VYSHNIVETS, TERNOPIL REGION (UKRAINE).....	7
Hnes O. V., Klieshch A. A., Cherkashyna N. I. PRIMITIVE AGRICULTURAL SYSTEMS AS THE FIRST STAGE OF ANTHROPOGENIC LANDSCAPE TRANSFORMATION.....	10
Hryhorieva A. R., Maksymenko N. V., Cherkashyna N. I. THE IMPORTANCE OF SURVEYS IN MEDICAL-ECOLOGICAL RESEARCH.....	13
Koshyl M. S., Klieshch A. A., Cherkashyna N. I. MAIN PATHWAYS OF MICROPLASTIC MIGRATION IN THE ENVIRONMENT: SYSTEMATIZATION OF CURRENT KNOWLEDGE.....	15
Nastarchuk D. V., Koval I. M., Cherkashyna N. I. JUSTIFICATION FOR THE USE OF DENDROCHRONOLOGY METHODS TO ASSESS THE STATE OF GREEN INFRASTRUCTURE IN KYIV CITY.....	18
Radchenko D. R., Hrechko A. A., Cherkashyna N. I. GREEN-BLUE INFRASTRUCTURE AS A BACKBONE FOR SUSTAINABLE POST-WAR URBAN RENEWAL IN KHARKIV.....	19
Shevchenko A. Y., Hrechko A. A., Cherkashyna N. I. URBAN FARMING: IMPLEMENTATION PERSPECTIVES IN UKRAINE.....	21
Tkachuk A.V., Masiuk O. M. USE OF ECOSYSTEM SERVICES IN GENERAL SECONDARY EDUCATION INSTITUTIONS.....	25
Uvarova S. D., Nekos A. N., Cherkashyna N. I. STUDYING FACTORS INFLUENCING FOREST ECOSYSTEMS IN ECOLOGICAL EDUCATION PRACTICES.....	27
<i>Applied ecological research</i>	30
Babicheva K. Y., Borysenko K. B. WATERFALLS OF THE UKRAINIAN CARPATHIANS AS OBJECTS OF RECREATIONAL USE: ENVIRONMENTAL IMPACTS OF TOURISM PRESSURE.....	30
Borovenskiy A. S., Titenko G.V. ENVIRONMENTAL INDICATORS IN THE CERTIFICATION OF AGRICULTURAL ENTERPRISES IN UKRAINE: SIGNIFICANCE AND RELEVANCE IN 2026.....	33
Gololobov V. V., Koval I. M. RADIAL GROWTH OF COMMON HORSE CHESTNUT IN GREEN STANDS OF KHARKIV CITY.....	36

Bohun N. M., student
Ternopil Volodymyr Hnatiuk National Pedagogical University
Yankovska L. V., PhD, Ass. Prof.

ENVIRONMENTAL SITUATION AND WAYS OF SUSTAINABLE DEVELOPMENT OF THE TOWN OF VYSHNIVETS, TERNOPIL REGION (UKRAINE)

The aim of the study is to analyse the environmental problems of Vyshnivets and to justify ways of developing the town that are most consistent with the strategic goals of sustainable development.

Key words: pollution, land use, green spaces, household waste, Zero Waste, Sustainable Energy Positive and Zero Carbon Communities.

Vyshnivets is a town in the Kremenets District of the Ternopil Region (Ukraine). Its population is 3,179. The study of the environmental situation in the town of Vyshnivets was based on a systematic analysis, with the first stage being the collection of information, including the processing of scientific literature and cartographic sources, Google Earth aerospace satellite images; the collection of statistical information on the structure of land use in the town of Vyshnivets; field research, including the collection of information on sources of environmental pollution, the condition and structure of green spaces; laboratory studies of the ecological state of the Horyn River and other water bodies in terms of physical, chemical and hydrobiological indicators. The second stage is the processing and analysis of the information: researching the land use structure of Vyshnivets, determining its compliance with European standards, analysing the level of air pollution, assessing the ecological state of water bodies, identifying the main factors affecting the soil, and researching waste management issues in the settlement. Stage three – justification of sustainable development paths for the town of Vyshnivets, including recommendations on ensuring energy efficiency, opportunities for implementing the strategic directions of Sustainable Energy Positive and Zero Carbon Communities, optimisation of land use in the town, analysis of opportunities for implementing the Zero Waste initiative.

The analysis of statistical data on the land use structure of the town revealed that more than 40% of the territory of Vyshnivets is covered by natural vegetation, including forests (13.3%), perennial plantations (21.1%), hayfields and pastures (5.3%), and nature conservation areas (0.74%), while another 4.2% of the territory is covered by water bodies (the remaining 33.7% is arable land, 19.9% is built-up area, and 1.8% is other land).

The level of greening in the town is high (44.3 hectares/1,000 people), which is close to the optimal level (45 hectares/1,000 people).

The town of Vyshnivets has a kindergarten, a secondary school, a music school, and a vocational lyceum, where green spaces cover only 11.3% of the territory, which indicates an insufficient level of greening of educational institutions, since the level of greening of streets should be at least 25%, and green areas near schools should be 45-50% [1].

The area of green spaces for public use, including squares, boulevards, plantings on slopes, embankments and others, which are freely accessible for recreation, in Vyshnivets is 0.26 hectares. In addition, almost 8 hectares are occupied by Vyshnivets Park, a landmark of landscape architecture of national importance in Ukraine. Thus, green areas for public use amount to 24.7 m² per person, which corresponds to European standards.

The almost complete absence of special-purpose green spaces, namely green spaces along transport routes (along the M19 (E85) and T 2009 motorways), is a cause for concern.

The analysis of the state of the complex green zone of the town of Vyshnivets allows us to conclude that it is somewhat asymmetrical, namely, the main part of forests and other wooded areas is located in the western part of the settlement.

The condition of green spaces is mostly good, sometimes satisfactory, with almost no trees in poor condition. The town authorities are taking care of the reconstruction of green spaces. In the central part of the city, new trees and flowers were planted on the square, lawn grass was laid, and an irrigation and lighting system was installed. The town's biodiversity could also be enriched by planting exotic species in its central part: ginkgo (*Ginkgo biloba*), vinegar-trees (*Smooth sumac*), tulip trees (*Liriodendron*), and manna trees (*Fraxinus ornus*), magnolia, Manchurian walnut (*Juglans mandshurica*) and other exotic species.

The main source of air pollution in the town of Vyshnivets is motor vehicles. The traffic load along the highway is over 20,000 vehicles per day, on the road to the town of Lanivtsi – about 16,000 vehicles per day, on the largest streets in the central and western parts of the town – it varies between 8,000 and 10,000 vehicles per day and 4,000 to 6,000 vehicles per day, respectively. In total, 230 tonnes of CO₂ are emitted annually from motor vehicles.

Other sources of atmospheric pollution are industrial enterprises (with a total area of 15.28 hectares, 1.4% of the territory), among which the largest are the Vyshnivets Building Materials Plant and the Vyshnivets Loam Quarry (total emissions of pollutants into the atmosphere is 63.98 tonnes/year). The greatest impact on the geological environment occurs at the Vyshnivets loam deposit, where the mineral is extracted using an open-pit method (quarry) with a motor transport system and temporary external waste disposal.

Today, 33.7% (365.2 hectares) of land in the town of Vyshnivets is under plough. Land degradation occurs in some places as a result of prolonged use of agrochemicals, depletion of nutrients, monoculture cultivation, soil contamination, and erosion due to the use of agricultural machinery.

Another source of soil pollution is household waste, especially in and around the Kryvchikiv landfill [2].

There are 45.6 hectares of water bodies in the town of Vyshnivets, including 2 hectares of natural watercourses (rivers and streams) and 43.6 hectares of ponds. The Vyshnivets pond is the largest (26.5 hectares) and is in good ecological condition. According to our research, the intensity of the smell of water in the pond does not exceed 2 points (weak), and is fishy in nature; the transparency of the water at the ring

is considered acceptable (35 cm); the turbidity of the water is also acceptable (26.1), and the colour is satisfactory (30⁰). Therefore, the analysis of the physical parameters of the water proves that they are acceptable for the use of this water body for recreational purposes. The ecological state of the Horyn River within the boundaries of the town of Vyshnivets is satisfactory. The banks of the river, especially the left bank, are covered with trees and shrubs. The right bank consists mainly of pastures and hayfields.

In order for the town of Vyshnivets to best meet the strategic goals of sustainable development and become an environmentally friendly, optimally landscaped town, the following action plan is proposed: improving air quality; developing a sustainable mobility system; improving procedures for the collection, reuse and disposal of household waste; changes in the field of energy efficiency and the use of renewable energy sources; development of comfortable and functional buildings with maximum energy efficiency and minimum CO₂ emissions; expansion of green spaces near educational institutions and along transport routes and introduction of new ecological elements throughout the settlement in order to improve living conditions for residents and increase the diversity of flora and fauna. Priority in the development of bicycle transport. Create efficient, comfortable and environmentally friendly public transport; optimise motor vehicle traffic in the town; make bicycles a more attractive means of transport for a larger number of residents; form a "short-distance town".

We propose transforming Vyshnivets into an energy-independent town that covers its own energy needs and produces more energy than it consumes annually. With regard to the implementation of the PED (energy-positive district) concept in Vyshnivets, we must strive to achieve climate neutrality and energy independence within the framework of the Sustainable Energy Positive and Zero Carbon Communities strategy. Methods for achieving PED: using more energy-efficient technologies in buildings; using renewable, carbon-free energy sources to meet demand; using cascading local energy flows with surplus energy. The town's residents are positive about the installation of solar panels, and many are installing alternative energy sources on or near their buildings at their own expense.

To transition the community to a zero-waste system, the following steps can be taken. Adopt organic waste management programmes (including for food waste). Introduce recycling programmes in residential areas and/or financial incentive and reimbursement systems. Plan the gradual introduction of a "pay-as-you-throw" tariff structure or other financial incentives for the population to encourage them to throw away less and recycle more. Thus, it is necessary to improve the waste management system and promote waste minimisation.

References:

1. GBN B.2.2-12:2019 Planning and development of the territory. State Enterprise Ukrainian State Research Institute of Urban Design "Dipromisto" named after Yu.M. Bilokon. Kyiv: Minregion, 2019. 177 p.
2. Yankovs'ka L.V., Novyts'ka S. R. Problems and prospects of solid waste management in Ternopil region. Scientific notes of the V. Hnatyuk Ternopil National University. Series: geography. No. 1. 2020. P. 156-162.