низьких температур та опадів. Його можна стелити без попередньої підготовки поверхні, навіть якщо вона недосконало рівна. Догляд за штучним газоном включає періодичне розчісування та прибирання сміття, листя, тощо.

Натуральний газон – дуже дорогий тип покриття для ДМ, хоча добре утримує пил та знижує рівень шуму. Щоб отримати якісне та щільне покриття знадобиться кілька років, а в місцях, де експлуатаційне навантаження є найбільшим (під гойдалкою, перед гіркою, навколо пісочниці, тощо) доведеться використовувати інший матеріал.

Такі види покриття як асфальт, бетон або асфальтобетон на ДМ зустрічаються нечасто. У більшості випадків, з цих матеріалів утворено окремі невеликі ділянки на майданчиках.

За результатами аналізу різних типів покриття ДМ було виявлено їх основні переваги та недоліки які мають вплив на екологічну безпеку. Перспективним напрямом дослідження є аналіз покриття із гумової крихти на наявність токсичних речовин, дослідження шумозахисних та пилозатримуючих функцій трав'янистих рослин, оцінка запиленості повітря на ДМ з піщаним покриттям.

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Kyrylo Zvoryhin PhD student gr. 183A-19-1
Scientific supervisors: Oleksandr Kovrov professor
(Dnipro University of Technology)
Hermann Heilmeier professor
(Bergakademie Freiberg)

OVERVIEW OF THE ENVIRONMENTAL PROBLEMS OF UKRAINE CAUSED BY THE WAR, AND USING THE EXPERIENCE OF WORLD WAR II TO SOLVE THEM

Modern issues of ecology and environmental protection in Ukraine are becoming especially relevant since the beginning of the war in the Donetsk and Luhansk regions, and are most important after the full-scale invasion of the russian army on February 24, 2022. The conflict has caused enormous damage to the environment, including air and water pollution, deforestation and soil degradation, among other problems.

Protecting ecology and the environment during wartime is a challenging task due to the destructive nature of war. The war against Ukraine, the full-scale phase of which began on February 24, 2022, is the largest war in Europe after the Second World War, which makes it possible to explore similar experiences.

During World War II, there were several examples of environmental destruction that had

long-term effects. In Europe, the war led to widespread deforestation as forests were cut down to provide wood for military purposes, leading to soil erosion and habitat loss. Military activities have also caused air and water pollution, with the dumping of chemicals and waste into waterways causing long-term environmental damage. One of the challenges of protecting the environment during wartime is the need to divert resources to the war effort, making it difficult to prioritize environmental protection. In addition, lack of resources and access to war-torn areas can make environmental damage assessment and mitigation difficult.

Another challenge is the destruction of infrastructure and facilities needed to protect the environment, such as waste management facilities and sewage treatment plants. This can lead to the release of pollutants into the environment, increased damage to the environment and poses risks to the health of civilians.

Here are the main factors of the impact of war on the environment:

1. Contamination of soil and groundwater: explosives, munitions, and other military materials contain toxic chemicals, heavy metals, and other pollutants that can leach into soil and groundwater. This can pollute water sources and harm the health of plants and animals.

2. Air Pollution: the use of military aircraft and vehicles, as well as the detonation of explosives, can release harmful pollutants into the air. These pollutants can contribute to air pollution, which can have negative effects on human health, plant growth, and animal populations.

3. Habitat destruction: the use of military weapons and vehicles can cause significant damage to natural habitats, including forests, wetlands, and other ecosystems. This destruction can lead to the displacement or extinction of plant and animal species.

4. Climate Change: the production and use of military weapons and materials contributes to greenhouse gas emissions that contribute to climate change. Climate change can have significant negative impacts on the environment, including rising sea levels, more frequent and severe weather events, and loss of biodiversity.

5. Unexploded ordnance: unexploded ordnance is a significant threat to the environment and human health. Unexploded ordnance can remain active and dangerous for years after a conflict has ended, posing a risk to people, wildlife and natural resources.

The war against Ukraine led to significant damage to the environment, particularly in Donbas. The fighting resulted in massive destruction of infrastructure, including factories, power plants and mines, leading to air and water pollution. The burning of coal mines and chemical plants released toxic gases into the atmosphere, causing respiratory diseases and other health problems for local residents. You can also add to this accidental fires of territories due to military actions - forests, fields, nature reserves, peatlands and others.

The war also led to deforestation in Donbas, as trees were cut down to make way for military operations and to provide fuel for heating and cooking. This had a significant impact on the region's biodiversity, as many species lost their habitat and food sources. Another important problem is soil degradation, which has been caused by the widespread use of heavy military equipment and the detonation of explosives of almost all existing types. This has led to soil erosion and loss of fertility, which has made it difficult or impossible for farmers due to shelling of their crop growing areas and has led to food shortages that even other countries in the world are experiencing.

In response to these environmental problems, the Ukrainian government took a number of measures aimed at protecting the environment. One of the most significant measures is the creation of the National Ecological Network, which aims to protect the country's biodiversity and natural resources by creating protected areas, wildlife corridors, and ecological corridors.

The government has also launched a program to restore damaged ecosystems, which includes reforestation and rehabilitation of contaminated soil and water sources. In addition, the government introduced regulations aimed at reducing pollution, including restrictions on the use of coal-fired power plants and enforcement of environmental standards for industrial

and agricultural activities.

Non-governmental organizations (NGOs) also play a crucial role in environmental protection efforts in Ukraine. For example, the Ukrainian public organization "Ekodiya" has been working for many years to promote sustainable development and protection of the country's natural resources. They have launched campaigns to promote renewable energy, reduce waste and protect endangered species.

Despite these efforts, the ongoing war against Ukraine continues to pose significant environmental challenges in the country. Lack of access to war-torn regions makes it difficult to fully assess environmental damage, and many environmental programs are hindered by ongoing hostilities. A fairly simple soil sampling process becomes life-threatening due to unexploded ordnance and projectiles. In addition, the economic effects of the war made it difficult for the government and NGOs to fully fund environmental initiatives.

The country's energy needs have also complicated the transition to cleaner energy, as Ukraine is heavily dependent on coal, which has been hit by missile and drone attacks from fall 2022 to spring 2023.

In conclusion, it should be noted that the ongoing war against Ukraine has caused incredible damage to the environment and created significant challenges for environmental protection in the country. Conservation of the natural environment and protection of the environment during wartime is a complex task that requires the concerted efforts of governments, civil society organizations and individuals.

Lessons learned from World War II and other conflicts can inform current efforts to reduce environmental damage caused by conflict and promote environmental sustainability. It is important to prioritize environmental protection in wartime to ensure the long-term health and well-being of both people and the environment.

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Фірсова В.Е. аспірантка спеціальності 183 Технології захисту навколишнього середовища
Сітало А.В. здобувач вищої освіти спеціальності 101 Екологія
Науковий керівник: Миронова І.Г., к.т.н., доцент кафедри екології та технологій захисту навколишнього середовища
(*Національний технічний університет «Дніпровська політехніка», м. Дніпро, Україна*)

ОЦІНКА СТАНУ ҐРУНТІВ КРАЇН ЄВРОПИ ТА РОЗРОБКА ЗАХОДІВ ЩОДО ПІДВИЩЕННЯ ЇХ РОДЮЧОСТІ

Актуальною екологічною проблемою є забруднення ґрунтів антропогенними факторами. Через викиди хімічних сполук, а саме, важких металів в атмосферу, спостерігається підвищення кислотності ґрунтів. Внаслідок антропогенної діяльності, зокрема сільськогосподарських операцій, відбувається засолення ґрунтів. А це дуже негативно впливає на якість гумусу: знижується поглинальна здатність, виникає ерозія, погіршується родючість, порушуються хімічні, фізичні та біологічні властивості ґрунту.

На території України сформувалися ґрунти різних типів. Їх поширення на рівнинній частині підпорядковане закону широтної зональності, тобто ґрунти змінюються з півночі на південь. Чорноземні ґрунти сформувалися в умовах недостатньої зволоженості під степовою рослинністю. Великий вміст гумусу (до 9%) та зерниста й грудкувата структура роблять їх найродючішими не тільки в Україні, а й у всьому світі. Гумусний шар у чорноземах має значну потужність – від 0,4 до 1 м і більше. Ці ґрунти, що вкривають майже 60% території України, є її національним багатством.