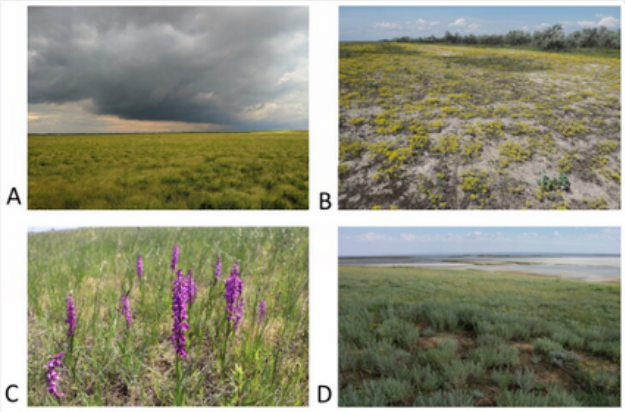
UKRAINE

Biodiversity

Ukraine is home to remarkable diversity and endemic flora and fauna, as well as extensive natural landscapes and unique biotopes (Skobel et al., 2023). Historically, vast stretches of the country were dominated by steppe ecosystems, which once covered around 40% of its total territory. Today, however, only about 1% of these steppes remain intact in their original form (Dembicz et al., 2016). Despite this dramatic reduction, the remaining grassland habitats continue to harbour exceptional biodiversity, including numerous endemic and rare species. Grassland habitats are extremely important, primarily as a source of numerous ecosystem services like soil formation, countering soil and water erosion, as well as increase the resilience of ecosystems to global climate change and of natural disasters (O.o.[1] et al., 2022). Severe threats such as habitat fragmentation, the spread of invasive plant species, land abandonment, unsustainable land use practices, overexploitation of natural resources, and physical destruction had already placed grassland habitats among the most endangered habitat types in all of Europe prior to the outbreak of war (Skobel et al., 2023).

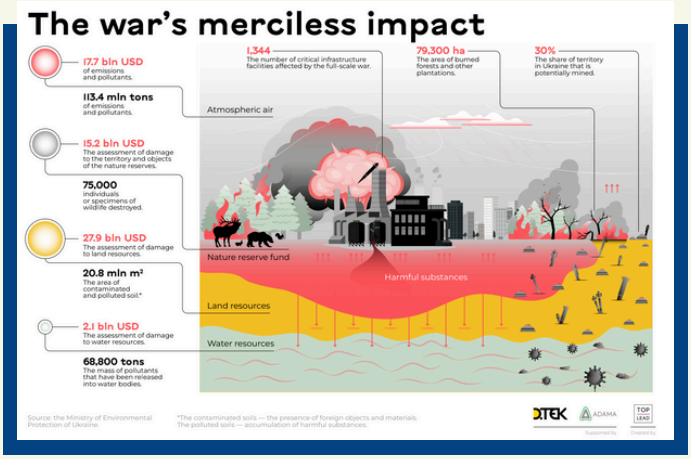
Grasslands and coastal habitats of southern Ukraine



A - steppe depression; B - grey dune;
C - sandy mesic grassland; D - desert steppes (Skobel et al., 2023)

Impact of the war

The ongoing war has transformed Ukraine's ecosystems, intensifying pre-existing ecological problems and creating new ones. Roughly one quarter of land is occupied, and ~30% of the territory is contaminated by mines, constraining land use and habitat connectivity (Toplead, n.d.). Combat traffic and explosions induce mechanical, physical, and chemical soil degradation; microbial biomass and process activity decline accordingly (Solokha et al., 2024). Social–ecological impacts are pronounced: war disrupts people–nature relationships; access to essential ecosystem services has been markedly reduced, while new disservices—flooding and contamination—have emerged (Elbakidze et al., 2025). Consistent with prior conflicts, damage spans air, water, and soils, with knock-on biodiversity loss and pressures on fisheries and forests (Elbakidze et al., 2025). Despite this, private gardens and urban greenspaces are proving vital for reconnection and psychological healing (Elbakidze et al., 2025).



Outlook

Despite these challenges, there is also hope. Following the mottos "build back better" and "build back greener," Ukrainians see the chance to steer post-war reconstruction toward a more sustainable, low-carbon, and biodiversity-positive future.

CONSUMPTION

https://wallup.net/ukraine-field-wheat-crops/, last visit 11/08/2025

Food Security

The Ukraine is one of the world's most important export countries, for sunflower seeds/oil and wheat, and plays an important role for global food security. Due to intensified land use, environmental problems are reinforced, such as biodiversity and habitat loss, soil degradation, desertification and pollution (Burkowsky et al., 2022). The COVID-19 pandemic, climate crisis and Russian aggression war have had negative impacts on food security. Consequences of the war were increased prices (more than 30%), supply chain disruptions, labour shortages and a higher risk for water supply (Chowdhury et al., 2023, Leah Filho et al., 2023).

https://www.distribucionactualidad.com/los-datos-de-ucrania-el-granero-de-europa-y-su-potencial-en-el-orden-economico-mundial/, last visit 11/08/2025

Food Waste and Consumer Behaviour

Since the end of the Soviet Union, the culture of overconsumption has led to issues of high waste production. About 60% of waste per person were food waste. In 2014-17, the National Waste Management Strategy 2030 was developed which promotes the transition to comprehensive waste management systems. Challenges are lack of political prioritization, technical capacity and financial resources (FAO, 2021). Recently, there has been a shift towards green and ethical consumption (Galyna, 2023). Legislation and education on sustainable consumption are needed for a shift (FAO, 2021).

Pastoralism

Since the 1990s, pastoralism in the Carpathians has declined sharply due to economic pressure, land abandonment, depopulation, and competition from cheaper mass-produced dairy and meat products (Warchalska-Troll, 2014). This decline leads to the loss of biodiversity-rich grasslands, as abandoned pastures undergo reforestation (Warchalska-Troll, 2014). The war has intensified these pressures: shepherds leave the country to avoid conscription, flocks are sold or left unattended, and some herders face the prospect of slaughtering their animals if mobilized (Harbage et al., 2024). These disruptions threaten both ecological and cultural heritage.

Forestry and Logging

Illegal logging remains a major driver of biodiversity loss and habitat fragmentation for species such as the lynx in the Ukrainian Carpathians (Greenpeace, 2022). Forest conversion to monocultures and infrastructure development further degrade ecosystems, with some illegal timber linked to international supply chains, including IKEA (Business & Human Rights, 2020). While EU regulations had improved oversight, the war has reduced funding for forest protection, while fuelwood demand and the mobilization of forestry staff exacerbate pressures (International Climate Initiative, 2023).

Tourism

Before the war, tourism provided key income but also placed pressure on sensitive species and habitats (WWF, 2001). Initiatives in eco-tourism and cultural preservation sought to balance benefits and impacts. Since 2022, visitor numbers have dropped sharply (VisitUkraine, 2024), easing stress on overvisited sites but depriving parks and local businesses of vital revenue, potentially increasing reliance on extractive industries.

AGRICULTURE AND RURAL DEVELOPMENT

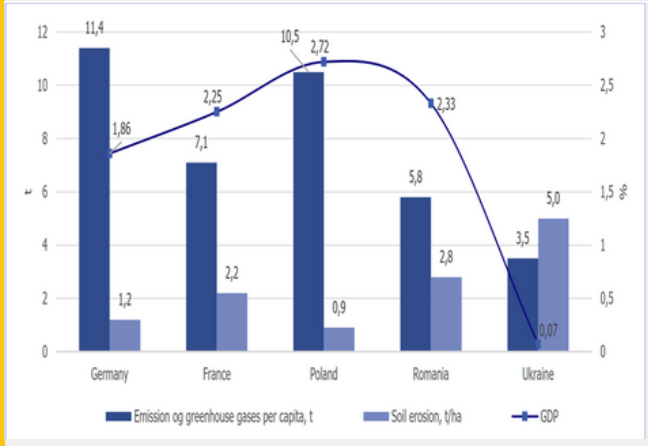
Overview over Agriculture and Biodiversity

Despite occupying less than 6% of Europe's territory, Ukraine is home to 35% of its biodiversity, ranking second only to France. Reasons for its rich biodiversity are its geographic location and diverse climatic zones, putting Ukraine in a position of high responsibility for biodiversity preservation (Петриченко et al., 2022). At the same time, Ukraine possesses one of the largest agricultural sectors in Europe, with nearly a third of the continent's black soil reserves and 27% of its arable land (Kovalenko et al., 2025).

Agricultural development

In the mid-1990s and early 2000s, Ukraine implemented major reforms, including land restructuring, privatization, market liberalization, state support measures, and rural social initiatives. These initially boosted investment and economic activity but left persistent issues such as production inefficiencies, outdated assets, underdeveloped rural infrastructure and reliance on household farming, with households to this day producing 34.8% of the total agricultural output. Joining the World Trade Organization in 2008 enhanced Ukraine's global standing though, making it a top exporter of barley, corn, wheat, sunflower seeds, and sunflower oil (Kovalenko et al., 2025).

Land Degradation Indicators

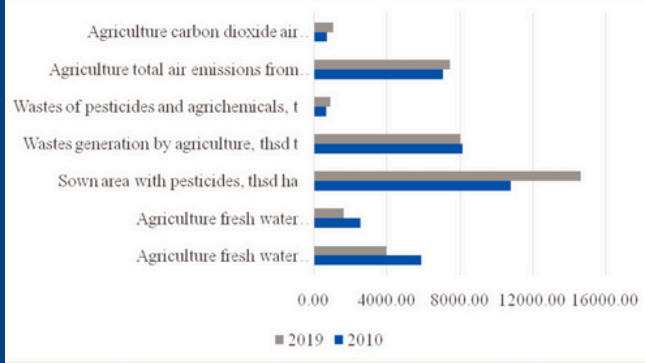


(Петриченко et al., 2022)

Structural and Environmental Challenges

Ukraine's agro-industrial complex lags behind global competitors due to low competitiveness, outdated technologies, and heavy state dependency. Rural areas face declining human capital, poor governance, and underused resources (Kovalenko et al., 2025). Soil fertility loss, erosion, land degradation, and water body depletion threaten both biodiversity and human well-being. The side effects of Urbanization additionally increase environmental degradation, pollution, and contribute to climate change. Over the past 25 years, over 10,000 small rivers have disappeared, worsening water shortages and lowering quality of life (Петриченко et al., 2022). Large agricultural enterprises are a significant part of the problem, as they pollute areas without compensating for the land degradation (Kovalenko et al., 2025).

Envionmental Impact of Ukrainian Agriculture



(Koblianska et al., 2021)

Impacts of the War

The ongoing war has reduced Ukraine's food self-sufficiency, destroyed storage and logistics, shrunk crop areas and displaced rural populations. It has stalled EU alignment efforts and aggravated existing weaknesses of the agriculture sector (Kovalenko et al., 2025). Regarding global biodiversity, disrupted Ukrainian exports could trigger cropland expansion in other nations, which would cause significant biodiversity losses for these areas (Chai et al., 2024).

EDUCATION FOR SUSTAINABLE DEVELOPMENT

What is ESD?

- It aims to empower people to develop a sustainabe lifestyle and consciously protect the environment (UNESCO, 2024)
- Through education in Schools and Universities are efforts made to understand and change the greatest challenges for biodiversity
- (e.g. teaching farmers about sustainable agriculture for food security, preservation of soil fertility, reforestation and waste prevention)

(Umweltbundesamt, 2024)

Man and the Biosphere Programm

- International cooperation with UNESCO
- The MAB Young
- Scientists awards can grant up to US$ 5,000 to young researchers in support of their research on ecosystems, natural resources and biodiversity

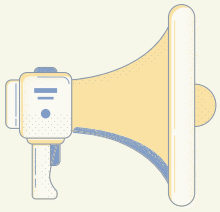
(UNESCO, 2024)

GAP

- Between 2010 and 2015 Global Action Plan International's partnership project with Teachers for Democracy and Partnership (TDP) trained over 5000 teachers in 1500 schools in Ukraine.
- The project, called 'Ukraine, Lessons for Sustainable Development' (ESD) engaged 200K+ pupils in a programme of integrated environmental education and provided 100K textbooks to schools across the country. The GAP International ESD project also worked with 60 teachers from 30 schools in Ukraine, representing 1000+ young people, who are all currently safe as they are in regions that have not been occupied by Putin's forces.

(GAP International, 2024)

Ukrainian Society for Nature Conservation



- UkrTOP promoted public awareness of recycling, environmental education and education about nature in schools, municipalities, public authorities, at its branches in all regions of Ukraine and in most districts, as well as in cities such as Kiev and Sevastopol.

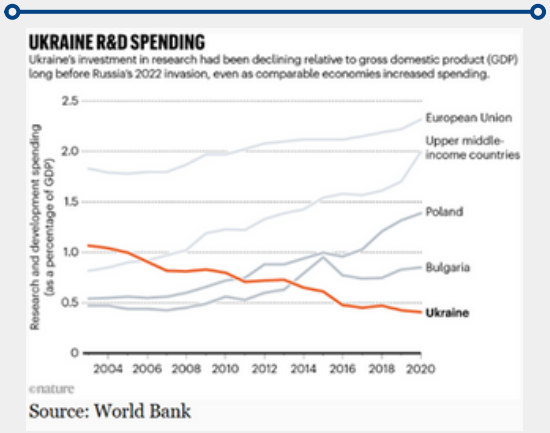
(Ukrainian Society for Nature Conservation)

SCIENCE-POLICY INTERFACE

University and Research System

Ukrainian scientific output excels mostly in areas such as engineering, planetary and environmental sciences (OECD, 2022). All these research areas are crucial for Ukraine's economic development (OECD, 2022). However, the scientific community still faces challenges due to Ukraine's isolation during its time in the USSR, which its scientific infrastructure has still not recovered from. To tackle the problems the former system left, a science-law reform was implemented in 2016 to raise the spendings and address systematic problems and raise spendings (Buisness Telegraph, 2021). However, research is still strongly under financed compared to other countries with similar economic growth (UNECE, 2025). On top of that, scientific trust has been consistently low in recent years, which also effected public policy decisions negatively (Karmadonova, 2024).

Expenses for Research



The impact of war on science research

The largest impact the Ukrainian Science Infrastructure is currently facing, are the consequences of the Russian led war. Ukraine massively suffers under the phenomenon of "brain drain", due to scientists either enlisting in the army or fleeing the country (UNECSO, 2025). The war also led to a massive loss in material resources and data due to many power outages (Buisness Telegraph, 2021). By 2023, around 120 research institutions were damaged or had to be removed. The financial loss was estimated at around 500 million US $.

Current policies also mostly financially support research into areas of new technologies, mostly drone development to support the current war efforts (Friedrich Ebert Stiftung, 2025). All this has led to a significant decline in publications, mostly in areas of natural and social sciences and hindered international collaborations (Ganguli&Waldinger, 2023). The latter has starkly shifted from frequent interactions with Russia-based scientists to Polish-based scientists (OECD, 2022). Projects like EU horizon and #ScienceforUkraine plan and already actively try to reconstruct Ukraine's educational system.

Nature Conservation on the EU level

In 2022 at G20, Wolodymyr Selenskyj presented the Ukraine's Peace Formula which is supposed to be implemented when the war is terminated (Tyushka & German, 2024). Point 8 strongly emphasizes the importance of biodiversity by posing the point: immediate protection of the environment [in face of] ecocide. Its aims are to tackle massive destruction of Ukraine's flora and fauna (millions of hectars of forest burned, thousands of hectares contaminated with harmful substances). The destruction of the Kakhovka Hydroelectric Power Plant (HPP) Dam in June 2023 led to huge land loss and many water tretment facilities have issues with mines.
In June 2024, the Council of the EU approved the Nature Restoration law with the plan to restore Europe's ecosystems by 2050 (UNDP Ukraine, 2024). Since the Ukraine holds a great natural heritage, it has been closely monitored by the international science community.

National Conservation approaches

Ukraine maintains a large genebank system that conserves thousands of unique plant varieties (FAO, 2024). At the same time same, there is a growing engagement of multiple stakeholder conferences which leads to a more inclusive approach.The UNDP focuses on finding more nature-based solutions to tackle biodiversity challenges (UNDP Ukraine, 2024). This trend is further supported by nature restoration initiatives and projects promoting forest science education (Malyshchyc, 2025; Kraxner, 2024).

POLICY RECOMMENDATIONS

Education for Sustainable Development

A state-funded, nationwide biodiversity workshop program represents a practical and cost-effective strategy for strengthening environmental literacy in Ukraine. By combining hands-on learning experiences with digital access to continued education, the initiative ensures long-term impact and helps guide Ukraine toward a more sustainable and ecologically responsible future.

Agricultural and rural development

Short-term measures (Kovalenko et al., 2025):

- Restore logistics for product and resource delivery to help farmers remain financially stable and ensure stable production;
- Continue state procurement of essential foodstuffs during the war to cover population needs
- Conduct demining and clear land for safe agricultural use
- Establish a fund to support farmers who have suffered major losses due to the war

Long-term development goals (Kovalenko et al., 2025):

- promote sustainable socio-economic rural development
- rebuild and modernise Ukraine's agricultural sector, focusing on resilience, sustainability, and self-sufficiency to secure long-term stability in the post-war period
- implement EU standards and practices in sustainable land use, biodiversity, and rural socio-economic stability
- restore and Ukraine’s vast agricultural land resources and manage them sustainably

Consumption

Transformations:

- promote sustainable food systems & agriculture
- foster strategic resource management
- integrated strategies for food security and ecosystems restoration (Chowdhury et al. 2023)
- legislation and education on sustainable waste management and recycling
- promote a shift circular economy
- Pilot projects (Kyiv, Lviv): network-building between food businesses and retailers; food is redistributed to homeless shelters (FAO, 2021)

Science-Policy Interface

In order to rebuild Ukraine’s science potential, incentives for scientists to return post war must be provided (Ganguli&Waldinger, 2023). Until scientists are able to return, brain circulation can be promoted by providing the proper resources for scholars abroad. Digital tools, open access to scientific materials and fostering long-term partnerships with international, as well as Ukrainian institutions, can provide a sustainable basis for scientists (Ganguli et al., 2023, Maryl et al., 2022) . Most of all funding is needed for domestic institutions so they can support returning scientists and build back up human as well as physical capital (UNESCO, 2025). International financial support will play a crucial role here (UNESCO, 2025).

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