



NATURE-BASED SOLUTIONS IN FORESTRY, WATER AND AGRICULTURE FOR RESTORATION OF UKRAINE AND CLIMATE CHANGE ADAPTATION

Summary for policymakers



Mission of WWF

To stop the degradation of the earth's natural environment and to build a future in which humans live in harmony with the nature by:

- ▶ conserving the world's biological diversity;
- ▶ ensuring that the use of renewable natural resources is sustainable;
- ▶ promoting the reduction of pollution and wasteful consumption.

ABOUT THE INSURE PROJECT

The project **INSURE stands for movIng Nature-baSed climate solutions into Ukraine's Reform agEnda.**

The long-term goal of the project is to achieve integration of nature-based climate solutions into Ukraine's policy reform agenda by establishing the necessary knowledge base and stakeholder support while building the capacity of key drivers of change.

WWF-Ukraine in cooperation with WWF Central and Eastern Europe, WWF-Sweden, and WWF-Poland, started project implementation in the summer 2021 with the financial support of Sweden.

After the onset of the war in Ukraine in February 2022, the project goals were extended and to embrace efficient nature-based solutions in the context of post-war recovery.

The project outcomes:

- ▶ the development of a "climate-smart" Vision for Ukraine and high-level policy recommendations to include nature-based solutions into the reform agenda;
- ▶ the development and launch of the first Ukrainian-language Nature-based solutions platform - a website that is a source of helpful information, methodologies, and best practices for those responsible for strategic planning and implementation of nature-based solutions in practice;
- ▶ the development of a youth-oriented leadership programme and an open training course aimed at inspiring and engaging youth and to equip them with knowledge, practical cases and frameworks for action;
- ▶ the delivery of a small grants programme, organised for knowledge sharing and bringing NGOs and local executive authorities together to introduce nature-based solutions into strategic development plans and local communities' restoration plans.

INTRODUCTION AND KEY ASPECTS

Ukraine is committed to the goals of greenhouse gas emission reduction by 65% by 2030 and climate neutrality by 2060. The identified pathways for achieving these goals include shifting to resource-saving land cultivation technologies; “climate-smart” agriculture and forestry; development of organic production; protection of water bodies; biodiversity conservation.

The country is also pressed to deal with the impact of a quickly changing climate.

Since the beginning of the war, climate goals have taken a backseat, while humanitarian and economic recovery call for urgent solutions. However, environmental recovery will be just as important. Large-scale destruction of settlements and their infrastructure, hundreds of thousands of hectares of burned forests and fields, water bodies and soils contaminated due to hostilities lead to economic losses, additional greenhouse gas emissions and decreased climate change resilience.

Nature-based climate solutions can help restore the damaged environment, sequester and store carbon, and provide the basis for sustainable

economic development. They are particularly relevant for forestry, water management and agriculture sectors, and there are good reasons for emphasising them in the country’s recovery strategy and donor programmes.

WWF-Ukraine calls for joining efforts in order to:

- ▶ restore Ukraine by working together with the nature and not against it;
- ▶ achieve climate objectives and sustainable development goals;
- ▶ reduce the negative impact of war on natural ecosystems amidst the climate change;
- ▶ create financial incentives for nature-friendly practices;
- ▶ support the development of human capital, Ukrainian science and education;
- ▶ build up a fair and inclusive society.

NATURE-BASED SOLUTIONS

“Nature-based solutions are actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits”. This definition was approved at the 5th session of the United Nations Environment Assembly (UNEA) in March, 2022, as a result of understanding the potential of nature-based solutions to achieve the goals of international conventions and treaties aimed at sustainable

development and nature protection. It was facilitated by the opinions of the international nature conservation agencies and organisations, including Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and Intergovernmental Panel on Climate Change (IPCC), which stress interdependence between the biodiversity loss, environmental pollution, climate change, desertification and soil degradation and human well-being and health.

Nature-based solutions have started entering the European Union policies and funding

programs. The European Commission defines nature-based solutions as “solutions inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more and

more diverse, nature and natural features and processes into cities, landscapes and seascapes through locally adapted, resource-efficient and systemic interventions. Nature-based solutions must benefit biodiversity and support the delivery of a range of ecosystem services”.



According to the standard developed by the International Union for the Conservation of Nature and Natural Resources (IUCN):

- ▶ Nature-based solutions (NbS) effectively address societal challenges;
- ▶ Design of NbS is informed by scale;
- ▶ NbS result in a net gain to biodiversity and ecosystem integrity;
- ▶ NbS are economically viable;
- ▶ NbS are based on inclusive, transparent and empowering governance processes;
- ▶ NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits;
- ▶ NbS are managed adaptively, based on evidence;
- ▶ NbS are sustainable and mainstreamed within an appropriate jurisdictional context.

Nature-based solutions is a new term for Ukraine, not mentioned in the national legislation, but in essence has already been included in certain policies and practices. For instance, river restoration, certain agro-ecological practices, the restoration of pastures and natural forests are already implemented and act as nature-based solutions e.g. toward drought mitigation, against soil degradation, or for carbon sequestration and mentioned in the legally approved list of environmental activities.

Nowadays, the businesses and the authorities do not pay sufficient attention to the measures, defined in the national legislation as ‘nature conservation measures’. This mainly happens due to the lack of awareness about the economic, human health and well-being gains, particularly by saving costs for control and recovery of damages caused by natural disasters. However, planning such activities as nature-based solutions under the above-mentioned criteria will show their economic and social benefits, and will drive more investment and promote funds allocation for their implementation.

NATURE-BASED FUTURE OF UKRAINE

Considering the meaning of “nature-based solutions” concept and international recognition of their potential for climate goals, Sustainable Development Goals and biodiversity preservation, as well as challenges related to the war in Ukraine, we are faced with the following question: “What policy changes are needed at all levels of Ukraine for successful implementation of nature-based solutions in forestry, water and agriculture sectors that make the country resilient to climate change?”.

The representatives of the authorities, sciences, public and business came together under the umbrella of a discussion platform to find the answer to this question and determined a climate-smart vision of Ukraine:

“In 2100 Ukraine is a thriving, nature-positive, carbon-neutral and climate-resilient society where natural resources are sustainably used, preserved and restored.”

Potential ways of vision implementation were explored from the standpoint of the forest, water and agriculture sector at workshops and thematic working groups that produced recommendations for nature-based solutions implementation.

Візія України Майбутнього
В КОНТЕКСТІ АДАПТАЦІЇ ДО ЗМІНИ КЛІМАТУ

КИЇВ
27.01.22

У 2100 РОЦІ Україна процвітаюча, дружна до природи, вуглецево-нейтральна, стійка до змін клімату, де природні ресурси використовуються у збалансований спосіб, зберігаються та відновлюються

ЗБАЛАНСОВАНИЙ ЛАНДШАФТ
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СТАЛЕ СПОЖИВАННЯ
ПРОЗОРИСТІВ
РАЦІОНАЛЬНЕ ВИКОРИСТАННЯ ТА ВІДНОВЛЕННЯ РЕСУРСІВ
КЛІМАТИЧНА НЕЙТРАЛЬНОСТІ

Щвеція Sverige

INSURE | Запровадження природоорієнтованих рішень у Порядок денний реформ в Україні

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Key points

- ▶ Water is a natural resource we consume every day and use in all economic sectors.
- ▶ The state of water and wetland ecosystems is critical - pollution, human-made eutrophication, silting, river degradation, and peat fires are common in Ukraine.
- ▶ Water ecosystems are among those most sensitive to climate change with simultaneous effects on other ecosystems and economic sectors, such as food production.
- ▶ Wetlands, including peatlands absorb and store carbon up to 55 times quicker than tropical forests.
- ▶ Every hectare of wetland captures up to 14,2 mln liters of flood water, scaling down flood impacts and mitigating droughts.
- ▶ Hostilities Due to war in Ukraine led to water resources deterioration, such as pollution, damage to hydraulic facilities infrastructure and direct losses of water.
- ▶ Measures should be taken to restore water ecosystems (environment quality, habitat structure and biodiversity) and the related ecosystem services delivery.
- ▶ Nature-based solutions can address the majority of water-related challenges, however, their implementation will require a cross-sectoral approach, as well as institutional and financial support.

CONTEXT

The water bodies of Ukraine cover 4.0% of its total territory. In 2020, 9.6 cubic metres of freshwater were collected (90% from surface water bodies, 10% from underground sources), and the main consumers of water resources are industry and agriculture. The overexploitation of water resources and drainage of peatlands causes a decrease in water levels, fires on agricultural lands and degradation of natural ecosystems.

Water pollution was already an issue before the war. The war exacerbated the situation by the destruction of critical infrastructure of centralised water supply and drainage of cities, flood control structures, as well as irrigation



and drainage infrastructure. The aftermath of hostilities caused crisis situations in some places, with people losing access to drinking water and water supply - because of the war, more than 6 million Ukrainians have no or limited access to clean water.

The Water Code of Ukraine and environmental protection legislation contain a number of rules aimed at preserving the water discharge of rivers and protecting them from pollution, among which there are measures that can be interpreted as nature-based – restrictions on land use within riparian zones; implementation of conservation tillage with contour border irrigation within the catchment

NATURE-BASED SOLUTIONS IN WATER ECOSYSTEMS MANAGEMENT – WATER AND FOOD SAFETY, AND NATURAL DISASTERS MITIGATION

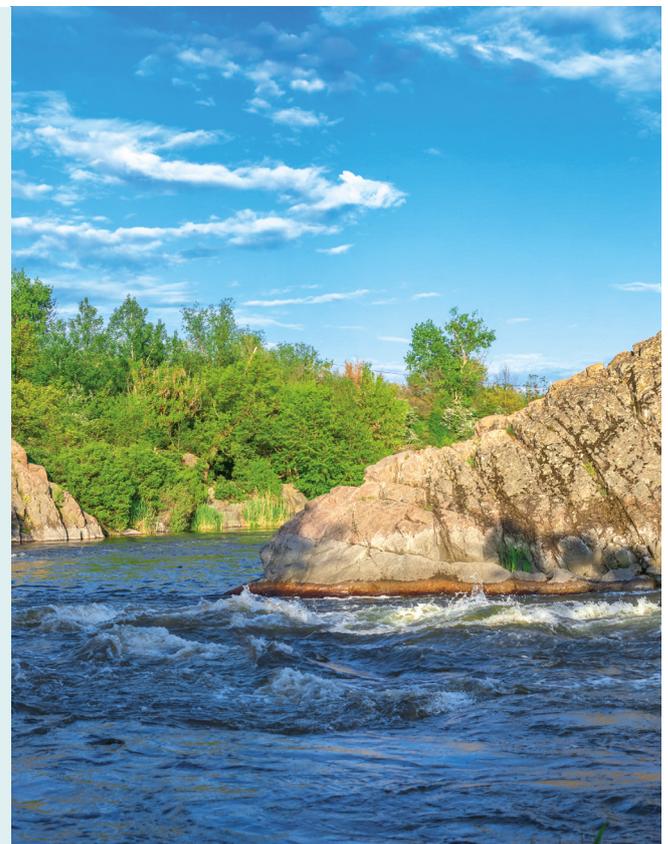
RESTORATION AND REGULATION OF SPRINGS AND RIVER SOURCES

The water discharge of small rivers can rise from 15 to 25 cubic metres per 24 hours due to restoration of springs and their headwaters.¹

The Water Code of Ukraine defines springs as water bodies, however, it does not specify their role and the role of headwaters of rivers for the river water discharge. Certain legislation provisions mention sources of drinking or medicinal waters, which are traditionally used in Ukraine. The lack of approved terminology

understandable for the ordinary citizens and the uncompleted State Water Cadaster are the reasons why sources of rivers and freshwater springs often disappear, remain unidentified, are ploughed up or littered. Nevertheless, the conservation of sources is considered a nature protection measure and there are about 100 sources that are annually managed by the local authorities and enthusiasts. Thus, to preserve places where rivers “are born” it is necessary:

- ▶ To consolidate and introduce data on all the springs and river sources into the State Water Cadastre, including those which are not sources of drinking or medicinal waters;
- ▶ To include activities on restoration and preservation of all the springs and river sources of the basin into river basin management plans;
- ▶ To initiate amendments to the Water Code of Ukraine regarding expanding the established water-conservation zones (primarily, riparian zones) and strengthening restrictions of economic activities there to preserve springs and river sources;
- ▶ To create financial mechanisms to ensure preservation of springs and headwaters of rivers at the community level.



¹Official page of the Regional Water Resources Office in Ternopil region
<https://www.facebook.com/vodgosp.te.ua/photos/a.606735009741505/965499513865051/?type=3>

FLOODPLAINS RESTORATION AND MANAGEMENT

An undisturbed floodplain is key to the “health” (natural functioning) of the river and a necessary condition for achieving a good ecological status of waters.

The Water Code of Ukraine refers to floodplains as riparian areas that may be flooded or inundated during a river flood (seasonal flood), but contains clear requirements only regarding preservation of small river floodplains. Preservation of floodplains

of medium and large rivers can be implemented through compliance with the regime of water protection zones and the implementation of river basin management plans. Intensive development of river valleys and catchment areas mostly does not allow to designate the entire floodplain as a water protection zone. It often prevents the designation of even much narrower riparian zones, where the protection regime is stricter. To preserve the floodplains, it is necessary:

- ▶ To take the location and functioning of floodplain into account when drafting the strategic and spatial development planning documents of the communities, land and urban development documentation, and flood management programmes;
- ▶ To ensure compliance with the legal requirements in terms of the prohibition of ploughing up the floodplains of small

rivers and the use of chemicals there, and to ensure that this legislative provision applies to the floodplains of medium-sized rivers;

- ▶ To provide for nature-based solutions aimed at restoration and preservation of floodplains natural complexes and establish procedures for their use in the river basin management plans.

RESTORATION AND PROTECTION OF RIPARIAN ZONES

The designated riparian zones along the rivers, lakes, reservoirs, water protection areas and the seas protect these surface water bodies from pollution and littering, and preserve the water quantity. The width of such zones varies from 25 metres along small rivers to 2 kilometres along the sea coast. The ploughing of land, as well as gardening and horticulture, storage and use of pesticides and

fertilisers, construction, including recreation centres, cottage, garage and parking lots construction, the arrangement of garbage dumps, the burning of dry vegetation are prohibited within these zones. However, in practice, the riparian zones rarely have the required width and there is a lack of control over prohibited activities. Therefore, for riparian zones to provide their services, it is necessary:

- ▶ To enforce the obligation of relevant organisations or local authorities to plot the boundaries of riparian zones and to enter them and respective use restrictions into the State Land Cadastre of Ukraine and land management documentation of communities and private owners;
- ▶ To amend the national legislation regarding the increase in the width of riparian and coastal zones and their differentiated

definition to ensure that they protect the water ecosystem from man-made activities, which are carried out on adjacent land plots and intensify every year;

- ▶ To enforce compliance and requirements for the use and protection of riparian and coastal zones, as well as proper monitoring of their status and trends, and to develop appropriate recommendations for the management of such areas.

RIVER RESTORATION

According to various data sources, the number of rivers in Ukraine ranges from 25,000 to 63,197.² There is no exact list of rivers less than 10 km long and with a catchment area of less than 10 square km. The current number of rivers that have a catchment area from 10 square km to 100 square km needs to be updated. At the same time, few of these rivers were unaffected by human activities and remained in their natural

state. Most of Ukraine's watercourses moved from the category of "rivers" to the category of "significantly changed bodies of surface water": they were straightened, channelized, regulated, etc. Presently, realisation that rivers can produce many ecosystem services prompts the state and communities to look for ways of preserving or restoring their natural state. To this end it is necessary:

- ▶ To update data on Ukrainian rivers in the State Water Cadastre and update or create, if absent, science-based "Passports" of the Rivers of Ukraine;
- ▶ To carry out evidence-based measures to restore and to maintain the hydrological regime of watercourses in a way that will facilitate natural processes or processes close to them (ensuring the continuity of the free flow of rivers to support the natural functions of the watercourse and migration of aquatic organisms);
- ▶ To restore and protect biodiversity (flora and fauna) both of the rivers and of the

floodplains through the restoration or conservation measures;

- ▶ To raise awareness of governmental institutions responsible for decision-making affecting the environment, about the interdependence of good river conditions and sustainable economic development, particularly in energy and agriculture sectors;
- ▶ To include river-related nature-based solutions into strategic documents on various levels and river basin management plans and develop state, local and investment programmes to provide funding.

RESTORATION AND REWETTING OF PEATLANDS

The developed peatlands in Ukraine currently cover the area of about 100,000 ha, and peat-burned areas amount to about 3,000 ha.³ 71% of peat-bog soils are concentrated in Polissya and the western regions of Ukraine. Peatlands and wetlands are traditionally of great importance for the preservation of biodiversity. They are places for the growth and picking of wild berries and medicinal plants, and serve as pastures and haylands. But the most important function of peatlands and wetlands is the accumulation of water and its slow release in dry periods. Due to their high capacity to sequester and store carbon and absorb excess water, these ecosystems minimise the risk of flooding and help mitigate the effects

of climate change. EU countries are gradually banning peat extraction and developing plans for the restoration and conservation of peatlands, which is consistent with the resolution adopted in 2019 at the 4th session of the UN Environment Assembly (UNEA) "Conservation and Sustainable Management of Peatlands". Conversely, peat extraction and peatland drainage continues in Ukraine, which from the political perspective increases the threat of the significant volumes of greenhouse gas emissions and non-fulfillment of climate obligations, and from the practical perspective threatens with the drop in river water levels, the destruction of rare habitats, and peat fires. To preserve peatlands and wetlands it is necessary:

²Grebin, V.V. & Khilchevskiy, Valentyn. (2016). The retrospective analysis of the study on Ukrainian river network and implementation of the rivers typology of water bodies according to the EU Water framework Directive on the current phase / Ретроспективний аналіз досліджень річкової мережі України та застосування типології річок Водної рамкової директиви ЄС на сучасному етапі. HYDROLOGY, HYDROCHEMISTRY AND HYDROECOLOGY. 2 (41). 32-47.

³Draft resolution of the Cabinet of Ministers of Ukraine "On Peculiarities of the Legal Regime of Using Peatlands and Potential Types of their Targeted Use" <https://www.me.gov.ua/Documents/Detail?lang=uk-UA&id=230df0df-b481-4c1a-b696-7d33b449cd03&title=ProektPostanoviKabinetuMinistrivUkrainiproOsoblivostiPravovogoRezhimuVikoristanniaZemelPidTorfovishchamiTaMozhliviVidiYikhTsilovogoPriznachennia>

- ▶ To agree on the meaning of marshes, peatlands and wetlands concepts for land, water, forestry and agriculture sectors, as well as on the methodology of identification, maintenance and enhancement of these natural objects;
- ▶ To ensure that the location data of the marshes, peatlands and wetlands are included in the strategic and spatial development plans of the communities, in the Water and Land Cadastres and urban planning documentation;
- ▶ To raise public awareness regarding the value of marshes and peatlands by spreading information on how these ecosystems function;
- ▶ To develop financial incentives, including carbon market mechanisms and mechanisms for local communities, where 50% of income or more is generated by peat extraction industry.



GENERAL SECTORAL RECOMMENDATIONS

- ▶ To develop terminology, tools, requirements and standards to implement nature-based solutions to ensure effective basin approach of water resources management.
- ▶ To adapt national legislation to prioritise the implementation of nature-based solutions (for example, to implement the river basin approach of water resources management through nature-based solutions).
- ▶ To assess the economic, social and environmental benefits from implementation of nature-based-solutions in the water sector.
- ▶ To shape a positive attitude to water bodies and phenomena related to them through outreach and awareness-raising campaigns, in particular, on nature-based solutions and the related benefits.
- ▶ To educate and run awareness events for the communities, water sector employees, civil servants and to design a relevant course for students majoring in hydrogeology, hydrology, environment, engineering, engineering geology etc.
- ▶ To develop and financially stimulate the land owners to implement nature-based solutions in the water sector and to encourage the implementation of nature-based practices.
- ▶ To strengthen control by State Ecoinspection and the local authorities with water basins over the maintenance of the water resources cadaster and to encourage them to recommend NbS as a tool for climate change risks prevention.



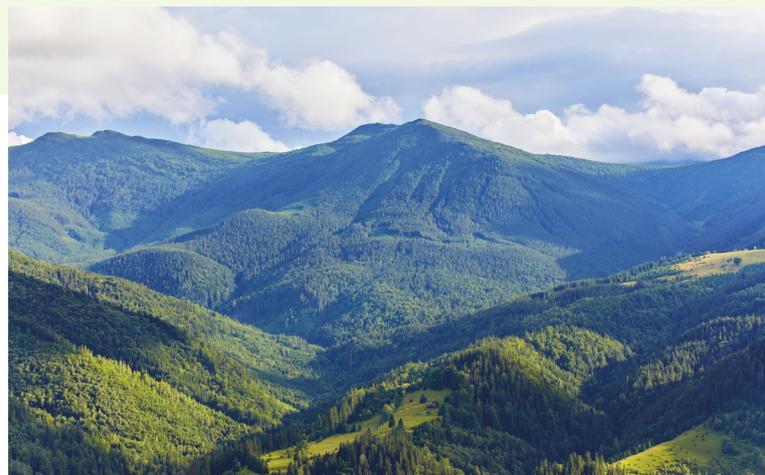
Key points

- ▶ Ukrainian Forests are unevenly distributed and cover only 15.9% of the country.
- ▶ In 2020, Ukrainian forests sequestered 30 Mt of CO₂e (10% of the country's gross greenhouse gas emissions). The planting of additional climate-resilient forests on 166,000 ha as part of "Green country" initiative allows for absorbing approximately 226,000 tons of carbon by 2030 and 2.5 million tons by 2050.
- ▶ Preserving of self-seeding forests, shelterbelts, floodplain forests as nature-based solutions require intersectoral engagement and constitute a tool for complying with Ukraine's commitments to stop the loss of forests by 2030.
- ▶ 20% of forest lands have been damaged as the result of hostilities, 50% of forests are artificial, mainly monocultural and vulnerable to climate change, forest fires, diseases and pests. Therefore, forests require sustainable forest management and restoration, considering adaptation to forecasted climate change.
- ▶ Consistent application of biodiversity-friendly forest management practices, for instance, close to nature forestry as a nature-based solution will ensure an increase in the quantity and quality of forest cover for decades to come.

CONTEXT

The forests of Ukraine cover the area of 9.6 mln ha, of which more than 80 % are state-owned, while 38% are production forests. The forest sector generates around 1% of Ukraine's GDP and creates jobs for 68,000 Ukrainians directly in forestry and logging. More than 30 tree species are involved, including pine, oak, beech, spruce, birch, alder, ash, hornbeam, and fir. However, the high share of monoculture forests reduces the overall resilience of Ukrainian forests to climate change, forest fires, diseases and pests outbreaks.

War has directly affected 3 mln ha of the forest ecosystem (30% of forest lands), as well as staffing in the male-dominated forest sector. Forestry is facing new challenges, such as managing forests contaminated with landmines and all other types of unexploded ordnance, meeting increased fuel wood demand, and completing the National Forest Inventory.



The 2035 State Forest Strategy of Ukraine sets the goals of raising the level of greenhouse gas absorption by Ukrainian forests up to 75.6 mln tons of CO₂-equivalent through the introduction of sustainable forest management, increasing the forest cover up to 18%, and transition to close to nature forestry approaches. The Forest Code of Ukraine and Ukrainian nature conservation legislation contain a number of norms aimed at the organisation of sustainable forest management and agroforestry practices that are of equal benefit both for the forest, and water and agricultural ecosystems.

THE FUTURE OF THE UKRAINIAN FORESTRY

As part of the national polylogue supported by the INSURE project, the representatives of the authorities, the public and the expert community have reached the following vision of the balanced forest sector of Ukraine of the future:



“Integrated landscape management in the forest, water and agricultural sectors, which is achieved through the application of best practices in close to nature forestry and expanded forest restoration, including agroforestry. The implementation of integration is supported by a new economic model based on ecosystem services. Decisions in the forest sector are made with the priority of biodiversity conservation and activities are accompanied by a transparent monitoring system with feedback.”

This vision has already acquired a new sense and has prospects for implementation on a bigger scale both in terms of nature-based solutions in the forest sector, and in terms of “forest nature-based solutions” in the water and agricultural sectors. This is manifested in accessibility and sustainability of green and grey-green infrastructure in contrast to purely engineering solutions that require considerable investment and ongoing energy costs.

NATURE-BASED SOLUTIONS FOR EFFECTIVE RESTORATION AND ENHANCING FOREST RESILIENCE TO CLIMATE CHANGE

CLOSE-TO-NATURE FORESTRY

Zero forest cover losses are ensured by close-to-nature forestry approaches determined by the 2035 State Forest Strategy of Ukraine as the methods of effective management and adaptation of forests to climate change due to selective cuttings,

intense carbon accumulation in biomass and minimally disturbed forest soils. The results of application of such methods can already be seen in the experimental sites in the Carpathian region. To disseminate the practice of close-to-nature forestry application, it is necessary:

- ▶ To encourage the synergy between science and practice in the close-to-nature forestry, to ensure wider integration into professional education and advanced training programmes for the forestry staff;
- ▶ To improve the regulatory and legal framework for the close-to-nature forestry transition, to achieve mixed and uneven-aged forests through management, to plant non-invasive species that are resilient to climate

change, to gradually withdraw from clear-cutting, to modernise equipment, first of all, of state-owned forestry enterprises and the relevant road network;

- ▶ To define forests that belong to the nature reserve fund (protected areas system) of Ukraine as a priority for the implementation of close-to-nature forestry.

FLOODPLAIN AND WETLAND FORESTS

Floodplain forests sequester twice the amount of carbon compared to terrestrial forests. The floodplain forests area in Ukraine covers 600,000 ha, wetlands cover 550,000 ha. Appropriate management approaches for such

forests are only partially backed-up by the Water Code of Ukraine and by-laws related to logging and forest management. The following is required to preserve floodplain and wetland forests:

- ▶ To harmonise forestry, water and land legislation of Ukraine by including provisions for appropriate management regimes of floodplain forests and wetland forests;
- ▶ To include floodplain and wetland forests to the categories of protective forests or nature

conservation fund, as well as to ensure their differentiated management with the full restrictions of forest management activities or partial restrictions where it is impossible to implement any restrictions.

PRIMEVAL FORESTS AND OTHER OLD-GROWTH FORESTS

1,000 km² of primeval forests and other old-growth forests store sequestered carbon and support genetic diversity. Preservation of primeval forests in Ukraine is enshrined in the legislation, and already some 70,000 ha

have been given the status of primeval forests, quasi-primeval forests, and natural forests. But not all of them have been granted the nature conservation status, and the following is required to successfully preserve them:

- ▶ In order to identify primeval forests and other old-growth forests, it is necessary to establish the appropriate protection regime by changing the forest categories and allocating specially protected forest areas, as well as to provide the status of primeval “nature monuments” to these territories or to include them to the nature conservation areas of natural or biosphere reserves and national natural parks;
- ▶ To complete identification and mapping of primeval forests and other old-growth forests, to integrate them into the forest inventory and to prohibit forest management activities;
- ▶ To implement monitoring with appropriate funding for studying natural forest climate change adaptation mechanisms in order to apply this knowledge in managed forests.



SELF-SEEDING FORESTS

0.4-1.8 mln tons of CO₂-equivalent can be absorbed annually by 200,000 ha of self-seeding and non-registered forests. The recent legislative amendments determined the mechanism of self-seeding forest preservation and appropriate forest management practices

on those territories. They also introduced the right of the state to buy out self-seeding forests. The preservation of self-seeding forests (with the exception of forests with invasive species) is an important, but complex issue that requires:

- ▶ Awareness-raising campaigns with communities, users and owners of lands on which self-seeding forests are growing;
- ▶ Developing financial tools and tax incentives for self-seeding forest preservation;
- ▶ Transferring self-seeding forests located on the state-owned lands of agricultural designation to state forestry enterprises for permanent use;
- ▶ Simplifying and diversifying the possibility for the development of forest management plans for non-state-owned forests lands.

FOREST LANDSCAPE RESTORATION

166,000 ha of expanded reforestation during autumn 2021 - spring 2024 as part of “Green country” project create the capacity for forest landscape restoration as a new approach. This envisages the revival of functionality, landscape sustainability by both massive and mosaic expansion of forest cover and coincides with the tasks set out in the 2035 State Forest Strategy of Ukraine . The long-term process of regaining ecological functionality and enhancing human well-being across deforested and degraded forest landscapes though focusing on landscape, restoring ecosystem functionality and generating multiple benefits, forest landscapes restoration as a nature-based solution will be promoted by the following:

- ▶ Intersectoral engagement and coordination of forest landscape restoration measures considering sustainable use of land, water, and other natural resources and aiming to reach increased forest cover at the level of 18 %;
- ▶ Updating Forest Reforestation Rules by listing invasive tree species prohibited for use during forest restoration;
- ▶ Community involvement in the preservation of self-seeding and floodplain forests, agroforestry systems etc., as well as their inclusion into spatial development plans;
- ▶ The introduction of the mechanisms stimulating expanded forest restoration by private landowners.

GENERAL SECTORAL RECOMMENDATIONS

The forest sector requires:

- ▶ The introduction of the nature-based solutions concept in the Forest Strategy of Ukraine and the integration of NbS application regulations into the forestry policy of Ukraine, where adaptation to climate change and application of the best forestry practices (in particular, close-to-nature forestry) would determine decision-making priorities.
- ▶ Harmonising the regulatory framework of Ukraine with the Forest Strategy, with periodic updating in accordance with the EU requirements and aligning all actions related to the management of the forest sector with FS goals.
- ▶ An updated roadmap of Forest Strategy implementation that meets post-war recovery needs with use of NbS.
- ▶ Ensuring systematic and complex data collection and evidence-based application/ lack of application of NbS for the prevention or overcoming of the consequences of the natural and man-made disasters in the forest and the related sectors.
- ▶ The Coordination of the forest NbS implementation in the agricultural and water sectors, as well as in amalgamated territorial communities by the development of relevant by-laws.
- ▶ The integration of modern approaches to forestry into educational programmes of training and advanced training of the staff for the forest sector and civil servants (in particular, representatives of communities), taking climate change into account, including nature-based solutions.
- ▶ Communicating the achievements of the forest science and practice to the wider public using simple language, in particular, nature-based solutions implementation, since that would create opportunities for the development of sustainable forest bioeconomy both on domestic and on the international market.



Key points

- ▶ Transformation of agricultural sector is critically important for ensuring food safety, climate change mitigation, adaptation and preserving biodiversity of Ukraine.
- ▶ Financial incentives should aim at encouraging farmers to apply conservation agriculture and other agroecological practices, since that will enable them to increase income and reduce costs in the long-term, as well as to adopt more sustainable and nature-friendly production methods.
- ▶ Returning “nature” elements to agricultural landscapes by restoring steppe, forest, and wetland habitats in particular on marginal, war-impacted or low-productive land plots will contribute to the restoration of biodiversity, sustainable agricultural development, and food security through the preservation of soil fertility and climate change adaptation.
- ▶ Carbon farming (particularly, for restoration of eroded soil) has a huge potential for industry decarbonization and the improvement of soil condition. The latter will improve yield rate by up to 10%, according to different estimates.
- ▶ The development of the system of shelter forest belts and advanced methods of agroforestry that integrate trees into fields or pastures (alley cropping, silvopasture systems) will ensure soil protection, climate change mitigation and adaptation, and additional income.

CONTEXT

Agriculture is important both for the Ukrainian economy and for global food security, since Ukraine is one of top 5 world exporters of wheat, corn, barley and sunflower oil. At the same time, the agricultural sector in Ukraine accounts for for 99 mln tons of CO₂-eq. (or about a third of total GHG emissions). The main sources are the loss of soil organic carbon by croplands and nitrogen oxide emission. High productivity and higher than average yield rates have been achieved at the expense of the Ukrainian nature: arable lands cover 56% of Ukrainian land and shows an upward trend, reducing biodiversity-rich areas. The percentage of arable land plots with eroded soils, according to different estimates, ranges from 20% to 40%, while 25% of pesticides on the market are illegal, and there has been a fivefold increase in the use of fertilisers per hectare over the past 20 years.

The war has seriously disrupted supply and production chains related to agricultural products in Ukraine, causing the losses of agricultural areas and their pollution by mines, unexploded ordnance and toxic materials. Climate change keeps affecting the producers, with air temperature rising and decreasing soil humidity, extreme heat and droughts, which are increasingly causing restrictions in the use of water resources and yield losses. Returning to the old agricultural production model characterised by high agrochemicals application, monocultural growing, poor soil management practices and increasing cropland will not help in providing the Ukrainian and the global population with healthy food or solve the problem of climate change and biodiversity loss.

Securing sustainable “climate-smart” agricultural production has been identified as the path for achieving the objectives of the 2030 National

⁴[Періодична доповідь про стан ґрунтів на землях сільськогосподарського призначення України за результатами X \(2011-2015 рр.\) туру агрохімічного обстеження земель](#), Державна установа “Інститут охорони ґрунтів України”, 2020

⁵Fake pesticides, real problems: addressing Ukraine’s illegal and counterfeit pesticides problem, United Nations Environmental Program (UNEP), 21 December 2018

⁶BCG analysis. Source: [World Food and Agriculture: Statistical Yearbook 2021](#), Food and Agriculture Organization (FAO), 2021

Economic Strategy, and respective approaches are mentioned in other strategic documents on the environmental policy and on combating land degradation and desertification, as well as in climate and land legislation. But the actual implementation of environmentally friendly practices will depend on the adoption of respective programmes and financial support. For example, the Ukraine Recovery Plan presented in Lugano in July 2022 declares

sustainability as one of the seven recovery principles, but only 4% of all the finance in the agricultural package is allocated for the “green transition”. The analysis of the Recovery Plan and the agricultural legislation testifies to the prevalence of the limited vision of the agricultural and food sector as the source of economic growth, not as an activity aimed at providing people with healthy and nutritious food and decent existence in harmony with nature.

AGRICULTURE IN UKRAINE OF THE FUTURE

As part of the INSURE project the representatives of executive authorities, the public, the businesses, and expert community have agreed on the following vision for the agricultural and food sector of Ukraine of the future:



“The agricultural landscape of Ukraine is close to nature – with a well-balanced ratio of agricultural lands, forests, forest belts, steppes, and other natural elements. Such balance is achieved by the application of nature-based practices, environmentally conscious consumption and effective cooperation of the state, communities and businesses, science and education. The agricultural and food sector in general is climate-neutral, where greenhouse gas emissions do not exceed the absorption. An effective architecture of climate governance is in place and sustainable supply chains with strong ties between the elements have been built.”

NATURE-BASED SOLUTIONS IN AGRICULTURE FOR EFFECTIVE RESTORATION OF SUSTAINABLE AGRICULTURAL PRODUCTION, CARBON-NEUTRAL FUTURE AND BIODIVERSITY RESTORATION CARBON FARMING

CARBON FARMING

Up to 6.6 mln tons of CO₂-eq. of carbon can be sequestered per year⁷ thanks to the restoration of strongly or moderately eroded soils using carbon storage management practices. Increased carbon absorption and retention through the application of the best climate-smart agricultural practices are mentioned in the Action Plan for the implementation of the Updated Nationally Determined Contribution of Ukraine to the Paris Agreement until 2030. But these practices may not just help agriculture to adapt to climate change, but also reduce greenhouse gas emissions and achieve carbon neutrality in case the mechanism of carbon farming is introduced. In addition, farmers can get money by selling carbon units. With this in view, it is necessary:



- ▶ To develop the national mechanism for supporting carbon farming (for example, within the system of state support of agriculture or a special climate fund);
- ▶ To ensure access to available international mechanisms of voluntary projects aimed at reduction of greenhouse gas emissions;
- ▶ To consider opportunities for supporting carbon farming within international cooperation following the market mechanisms of Article 6 of the Paris Agreement;
- ▶ To develop a guidance on monitoring, reporting and verification of greenhouse gas emission reduction in agriculture, in particular, the methodology of carbon absorption assessment and emission by soils;
- ▶ To approve the national soil fertility protection programme, to create an effective and transparent system of soil monitoring and control, and to ensure data accessibility.

⁷Achasova, Alla, Andrii Achasov, Ganna Titenko, and Vladimir Krivtsov. "Some Approaches to Measuring Soil's Carbon Sequestration Potential in Ukraine:" In Proceedings of the 5th International Scientific Congress Society of Ambient Intelligence, 40–50. Kryvyi Rih, Ukraine: SCITEPRESS - Science and Technology Publications, 2022. <https://doi.org/10.5220/0011341000003350>.

CONSERVATION AGRICULTURE AND OTHER AGROECOLOGICAL PRACTICES

An additional capture of up to 2.4-7.5 mln tons of carbon a year⁸ is possible if conservation or agroecological practices are applied to at least 30% of arable land. The conservation agriculture practices are mentioned in the 2030 Strategy of Environmental Safety and Adaptation to Climate Change and the Action Plan on the implementation of the Updated Nationally

Determined Contribution of Ukraine to the Paris Agreement until 2030. However, the Plan mainly supports domestic producers of machinery, instead of direct subsidies to be paid to farmers for transition to nature-based practices, regardless of the equipment origin. To achieve a wide-scale application of conservation agriculture practices, it is necessary:

- ▶ To re-direct available state subsidies to support the implementation of conservation agriculture and agroecological practices (as one of the priorities);
- ▶ To make agricultural business lending dependent on appropriately assessing social and environmental risks associated with production and to increase insurance rates for high-risk businesses;
- ▶ To create tax incentives for encouraging the producers of environmentally clean and environmentally safe products;
- ▶ To define conservation and other agroecological practices (cover crops, crop rotation, minimum disturbance of soil, mulching, composting) and to develop an effective monitoring system;
- ▶ To promote sales and consumption of environmentally clean and environmentally safe products by public awareness raising on the benefits of sustainable consumption, setting rules for green public procurement, as well as supporting local consumption and markets.

RETURNING THE ELEMENTS OF NATURE INTO AGRICULTURAL LANDSCAPES AND REWILDING

Up to 50,000 ha of agricultural lands damaged as the result of the war, as well as other lands polluted due to man-made causes and low-productive lands (~ 0.6 mln ha) can be used for nature restoration, and that may promote sequestration of about 1 mln tons of CO₂-eq. of carbon per annum.

The Concept of the General State Target Program of Land Use and Protection reduces the percentage of arable land to 44% through conservation of degraded, low-productivity lands and polluted lands⁹. To achieve the balanced arable land ratio and to get additional benefits from nature restoration, it is required:

⁸On the basis of the average sequestration figure in [0.25–0.78](#) tons of carbon per 1 ha a year for resource-saving farming, calculated by the Project Drawdown organization, and the area of arable lands in Ukraine

⁹The Concept of the General State Target Program of Land Use and Protection, approved by Resolution of the Cabinet of Ministers of Ukraine as of January 19, 2022 No. 70-p

- ▶ To set the goal of allocating up to 10% of agricultural lands for natural and semi-natural ecosystems (flower strips, forest belts, hedges, wetlands, meadows and steppe areas etc.), as well as to introduce the integrated landscape approach to spatial planning;
- ▶ To identify degraded, polluted or low-productive lands and to assess economic, social, environmental and cultural benefits (ecosystem services) of restoring native ecosystems through large-scale restoration projects and to envisage such projects through the development of land management schemes and feasibility studies for land protection by the local self-government;
- ▶ To develop financial compensation mechanisms, in particular, for land owners/land users, in the form of carbon credits, pay for ecosystem services, preferential taxation, subsidies or direct investment opportunities;
- ▶ To ensure the preservation of self-seeded forests, shelter forest belts, riparian buffers and coastal protection zones, meadows and natural fodder areas by introducing adequate control of compliance with the Ukrainian legislation and targeted support for such measures.

AGROFORESTRY

474-869,000 tons of carbon per year¹⁰ could be sequestered, if the area of shelter forest belts were increased to 790,000 ha. In 2020 the rules for maintenance and preservation of shelter forest belts located in the lands of agricultural designation were adopted. They enable farmers

and local communities to create forest belts and to take care of them. Along with that, to ensure successful conservation of currently available forest belts and further development of agroforestry, it is necessary:

- ▶ To ensure further evidence-based development of the shelter forest belts system to reach the area of 790,000 ha by 2030 (current area is 350-440,000 ha);
- ▶ To promote application of new agroforestry practices in Ukraine (alley cropping, silvopasture systems, contour-amelioration systems);
- ▶ To reduce the level of tax load on owners/user of land plots of agricultural designation covered by shelter forest belts and other ameliorative plantations, as well as to simplify the mechanism of land plot allocation for such plantations;
- ▶ To introduce the requirements on field protection with forest strips into the Ukrainian legislation and to ensure their compliance.

¹⁰Петрович О. З. Полезахисні лісосмуги в контексті впровадження концепції екосистемних послуг / О. З. Петрович // Екосистеми, їх оптимізація і охорона. - 2014. - Вип. 11. - С. 42-49. - Режим доступу: http://nbuv.gov.ua/UJRN/eco00_2014_11_6 [Petrovych O. Z. Shelter forest belts in the context of implementation of the concept of eco-system services / O. Z. Petrovych // Ecosistemy, Ikh Optimizatsiya i Okhrana. - 2014. - Issue 11. - Pp. 42-49. - Access mode: http://nbuv.gov.ua/UJRN/eco00_2014_11_6]

GENERAL SECTORAL RECOMMENDATIONS

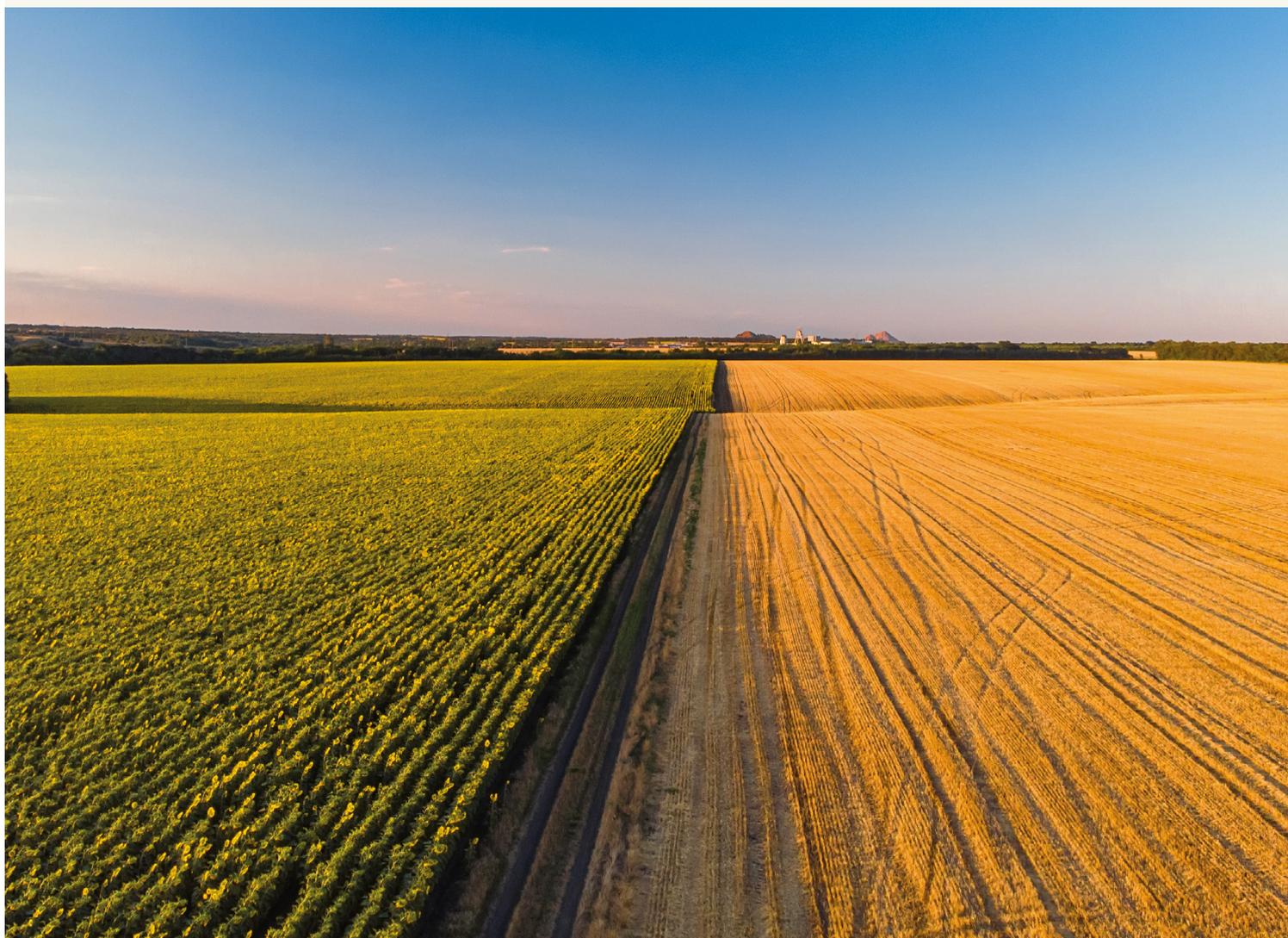
Education and promotion

- ▶ To supplement the legally defined list of socially-desired advisory services (that are funded by budgets) with the consultations on agricultural nature-based solutions, to organise training sessions for the providers of advisory services and to improve access to advisory services.
- ▶ To introduce educational programmes on nature-based solutions, landscape planning, protection, and regulation, climate technologies and consultancy in agriculture into the curricula of universities and technical schools.

- ▶ To disseminate information on nature-based solutions among farmers through farming schools, training workshops, exchange programs, web resources and to improve farmer's capacity to use digital technologies and state digital services.

Participation, transparency, inclusivity

- ▶ To develop agricultural policy and plans for the post-war recovery l with the adequate involvement of all relevant stakeholders, including small and medium-sized farmers, owners of individual peasant farms, youth, women, communities, and water resource users.



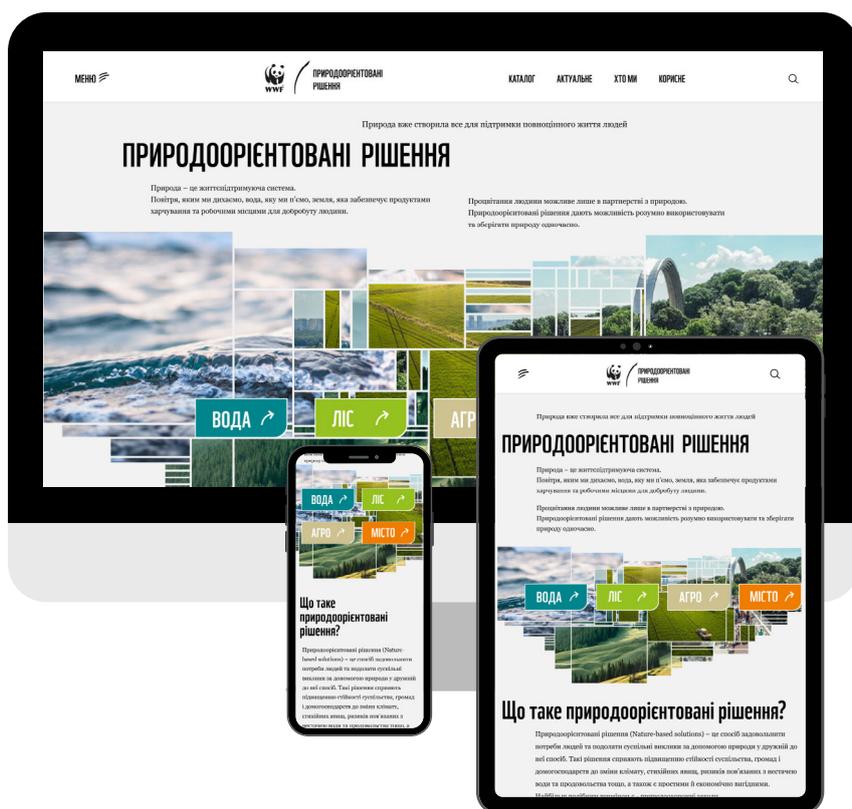
GENERAL POLICY RECOMMENDATIONS

- 1.** To incorporate the concept of nature-based solutions in the environmental policy of Ukraine and to determine conceptual grounds for their implementation in line with the definition approved by the UNEP/EA.5/Res.5 Resolution.
- 2.** To amend the legislation (at the level of codes, laws and by-laws) for ensuring the introduction and implementation of nature-based solutions in all sectors of Ukrainian economy for the sake of sustainable use, protection and restoration of the environment, compliance with nature conservation requirements and achieving the Sustainable Development Goals.
- 3.** To develop financial and fiscal mechanisms for stimulating implementation and scaling nature-based solutions practices, as well as other tools aimed at investment attraction and state funding.
- 4.** To develop the legal acts related to the introduction of carbon certificates that would enable agricultural producers and forestry enterprises to get payments thanks to the application of the practices aimed at carbon management and storage.
- 5.** To establish legislative requirements on including nature-based solutions into the strategic, programming and planning documents of the national, regional and local levels (both conceptually and with indication of specific types of nature-based solutions).
- 6.** To develop standards, methodology, recommendations, instructions, scientific description, etc. for the nature-based solutions in different fields of economy, taking account of the best practices and relevant procedures of national and international environmental legislation.
- 7.** To ensure monitoring of the environment and its components (including biodiversity), greenhouse gas emissions and carbon sequestration and ecosystem services assessments as a mandatory requirement for relevant political and management decision making, as well as the evaluation of their efficiency, referring implementation of nature-based solutions and performance of environmental protection measures.
- 8.** To support scientific research via different tools and to ensure their development, as well as to introduce international programmes and projects related to nature-based solutions in different climate and geographical zones and landscapes of Ukraine and economic sectors.
- 9.** To ensure an advanced level of professional knowledge and increase the general awareness about ecosystem-based approach and nature-based solutions for climate change adaptation.
- 10.** To promote the establishment and support activity of civil society organisations and professional associations focusing on implementation of nature-based solutions.



ПРИРОДООРІЄНТОВАНІ РІШЕННЯ

WWF-Ukraine invites you to learn more and to expand your own experience related to nature-based solutions in forest, water, and agricultural economy and inhabited settlements via the online platform nbs.wwf.ua



ONLINE PLATFORM OF NATURE-BASED SOLUTIONS IN



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