

## **Transboundary Water Management, Biodiversity and Climate Change and their Impacts on Local, National and Regional Security: Examples from the Dniester River Basin Shared between the Republic of Moldova and Ukraine**

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Environmental degradation, the unsustainable use and/or the mismanagement of natural resources and waste disturb ecological systems and risk adversely affecting the stability and security of countries. Transforming threats and risks into opportunities for co-operation and joint engagement is an important focus for the Organization for Security and Co-operation in Europe (OSCE) in tackling environmental and security challenges in the region.

### **Introduction**

“The rate of environmental degradation puts life on Earth at risk” is a statement well-accepted in thematic and policy-related literature and features in a variety of environment-related articles and research across different fields. Similar factual statements and related concepts, such as for example the fact that the Earth’s Overshoot Day [that is the day when humanity has exhausted nature’s budget for a given year] has steadily shifted to earlier in the year or that humanity is using Earth’s natural resources at an unsustainable rate etc. seek to draw attention to the urgency of action in this regard.

While there are various ways to define ‘environmental degradation’, the term generally describes the deterioration of the environment, through depletion or pollution of resources (air, water and soil), the destruction of ecosystems and the extinction of wildlife.

Further to naturally occurring phenomena (e.g. tsunamis, volcanic eruptions, earthquakes), it is widely acknowledged that human actions, resulting in air and water pollution, soil erosion and desertification, habitat destruction, etc. contribute significantly to accelerating environmental degradation and the scarcity of natural resources. The adverse effects of climate change on human health, ecosystems, and natural resources, particularly water, will only exacerbate existing challenges.

In the context of an increased world population, which has doubled since 1970, and of a steep increase in the global Gross Domestic Product (GDP), which has grown fourfold, the above-described existing challenges are, even more so, to be carefully considered (Oberle et al., 2019). These developments resulted in a constant need for an accelerated exploitation of natural resources to sustain economic development and meet the increased demand for food. According to the International Resource Panel's (IRP) report "*Global Resources Outlook 2019*", the extent of human activities and their impacts is self-explanatory: The extraction and processing of natural resources is responsible for 90% of biodiversity loss and worldwide water stress (Oberle et al., 2019).

The Global Ecological Footprint reflects this trend. As presented in the World Wide Fund for Nature's (WWF) "*Living Planet Report 2022*", the world average footprint in 2020 amounted to 2.5 global hectares per person, compared to 1.6 global hectares of bio-capacity (Almond et al., 2022). In other words, we overused our planet's resources by at least 75%. While the scale of biodiversity loss and the extent of decline of wildlife populations varies around the globe, the same report finds wildlife populations have declined by an average 69% in the past 50 years (WWF, 2022). The future prospects are similarly alarming. An estimated 11% of existing species will become globally and irreversibly extinct due to global land use activities (Oberle et al., 2019). Wildlife trafficking further contributes to biodiversity loss and ecosystem collapse with significant implications for economic development and human health.

In economic terms, the above-mentioned report indicates that global resource extraction has tripled from 27 billion tonnes in 1970 to 92 billion tonnes in 2017 and continues to grow (Oberle et al., 2019). In the absence of drastic change, global resource consumption will double by 2060 (Oberle et al., 2019). The implications of biodiversity loss are as alarming for the economic sector as they are for other sectors. According to the World Economic Forum (WEF) report "*Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy*", \$44 trillion of economic value generation – over half the world's total GDP – is moderately or highly dependent on nature (WEF, 2020a). A further WEF report, "*The Future of Nature and Business*", identifies that a nature-positive economy could generate up to \$10.1 trillion in annual business value and create 395 million jobs by 2030 (WEF, 2020b).

The depletion and pollution of natural resources already pose and will continue to pose an even more significant stress for the agriculture sector. The Food and Agriculture Organization (FAO) indicates that, between now and 2050, with an estimated population of nine billion, increasingly more water will be required to produce the estimated 60% of extra food needed (FAO, n.d.). Simultaneously, the agricultural sector is the main water consumer in the global economy, accounting for approximately 85% of global water stress (Oberle et al., 2019). Increasing demands for food, water, and energy on a background of reduced or degraded natural resources are likely to contribute to social instability and can exacerbate political tensions or potentially spark new ones.

In the context of the COVID-19 pandemic, the linkage between biodiversity and human health has been discussed at length. In particular, the narrowed natural space between humans and wildlife, due to biodiversity loss, has been often cited as an enabling factor for the spread of pathogens and zoonotic diseases. Some of the causes of biodiversity loss include the unsustainable use of natural resources and of land, including habitat fragmentation, agricultural practices, and wildlife trafficking. These and other factors highlight the important role of biodiversity in sustaining security and well-being.

Environmental degradation can be both a driver as well as a consequence of disasters, including when resulting from armed conflicts. Military hostilities harm the environment and destroy or damage critical energy infrastructure and industrial facilities, leading to the deterioration of water access and water quality, chemical leaks, and growing risks of flooding in the affected territories. These threaten the environment, human health, and security not just in the military theatre, but also in neighbouring regions.

*“Sustainable development cannot be realized without peace and security; and peace and security will be at risk without sustainable development”* is at the core of the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDG). It describes the intrinsic relationship between the SDGs, particularly SDG 14 on “Life below Water” and SDG 15 on “Life on Land” (for the purpose of this paper), and peace and stability (UNDESA, n.d.).

Biodiversity loss represents not only one of the main impediments to attaining sustainable development, but, coupled with ecosystem collapse, is one of the fastest deteriorating global risks over the next decade, as per the WEF’s *“Global Risks Report 2023”* (WEF, 2023).

The report notes that...

“...without significant policy change or investment, the interplay between climate change impacts, biodiversity loss, food security and natural resource consumption will accelerate ecosystem collapse, threaten food supplies and livelihoods in climate-vulnerable economies, amplify the impacts of natural disasters, and limit further progress on climate mitigation”. (WEF, 2023, p.8)

As presented above, environmental degradation and its impact on biodiversity, leading to biodiversity loss and ecosystems collapse may impact security in various ways and halt or delay sustainable development. Therefore, an overall approach to ensuring security and safety should be one which integrates the interconnections between these sectors. At the same time, co-operation and collaboration in preventing potential security threats stemming from the degradation of the environment create avenues for bringing countries together and for building trust and confidence. An environment of trust and confidence can be considered as a key prerequisite for conflict prevention.

### **International frameworks**

In recent years, the international community has sent alarming signals about the triple planetary crisis of climate change, nature and biodiversity loss and pollution and waste, as described by the Executive Direction of the UN Environment Programme (UNEP) (UNEP, 2022). The call for a large-scale, international action with the involvement of all actors, at local, national, regional and global levels and across all sectors of society to avoid the worst-case scenario has been stressed on numerous occasions. This has also been enshrined in the *Sustainable Development Goals of the 2030 Agenda for Sustainable Development* through a dedicated Goal – *SDG 17 on Partnerships* (UNDP, n.d.).

In July 2022, in a historic step, the UN declared a healthy environment as a human right. Through the resolution “*The human right to a clean, healthy and sustainable environment*”, the UN General Assembly (UNGA) acknowledged that climate change and environmental degradation are some of the most pressing threats to humanity’s future (UNDL, 2022). It called on states to step up efforts to ensure their people have access to a “clean, healthy and sustainable environment”. While not legally binding, the instrument aims to act as a catalyst for action and to prompt countries to incorporate the right to a healthy environment in national constitutions and regional treaties.

Fortunately, this is not a singular action. In April 2022, the UN Human Rights Council declared access to a “*clean, healthy and sustainable environment*” a human right (A/HRC/RES/48/13) (UNHCR, 2021). This represented the first formal recognition, at a global level, for the right to a clean, healthy and sustainable environment as a human right, and acted as a founding step for the UNGA resolution.

Similarly, a number of international legal standards developed by the Council of Europe – including the European Convention on Human Rights, the European Social Charter and the Bern Convention on the conservation of European wildlife and natural habitats – have successfully been invoked to advance the environmental cause. In September 2021, the Parliamentary Assembly of the Council of Europe (PACE) adopted *Resolution 2400* which acknowledges that...

“...access to the fundamental right to a safe, clean and healthy environment was unequally shared between regions, countries and individuals, stressing that the effects of climate change impacted poor countries disproportionately, as well as disadvantaged groups, minorities, women and children”.  
(CoE, 2021)

In December 2022, governments around the globe came together for the UN Biodiversity Conference (COP15) to agree on a new set of goals by 2030 aiming at halting and reverting nature and biodiversity loss. A historic package of measures, forming the “*Kunming-Montreal Global Biodiversity Framework*” (GBF), was adopted in the conclusion of COP 15 (CBD, 2022). The Framework includes 4 goals and 23 targets to be reached by 2030 aimed at addressing the critical loss of biodiversity and supporting the restoration of natural ecosystems. Protecting 30% of Earth’s lands, oceans, coastal areas and inland water, reducing government subsidies that are harmful to biodiversity by \$500 billion annually and cutting food waste in half are among the key issues addressed in the GBF (CBD, 2023). The framework provides, however, a clear set of measures to set humanity in the direction of a sustainable relationship with nature, with clear indicators to measure progress. During the meeting a series of related agreements on the implementation of the GBF were approved, including planning, monitoring, reporting and review; resource mobilization; helping nations to build their capacity to meet the obligations; and digital sequence information on genetic resources.

At the EU level, the main objective to put Europe's biodiversity on the path to recovery by 2030 for the benefit of people, climate and the planet has been clearly stated at the top of the *EU Biodiversity Strategy for 2030* (European Commission, n.d.a). The Strategy, which was issued in 2020, recognizes the multiple benefits of biodiversity for society and, more broadly, for life on Earth and contains clear commitments and actions to be taken by 2030. Among others, a minimum of 30% of the EU's land area and 30% of the EU's sea area must be legally protected, as well as at least one-third of the EU's protected areas. Furthermore, all protected areas must be effectively managed and appropriately monitored by 2030.

As a key element of the above-mentioned EU Biodiversity Strategy for 2030, in July 2023 the European Parliament passed the *EU Nature Restoration Law* (European Commission, n.d.b). This is intended to bring a number of benefits, in particular by increasing biodiversity and thus restoring ecosystems and yielding the associated ecosystem services, restoring habitats and species both on land and at sea. Furthermore, it aims to contribute to limiting global warming to 1.5°C and, equally important, to build Europe's resilience by contributing to the prevention of natural disasters and reducing potential risks to food security (European Commission, n.d.b).

In support of these endeavours, €20 billion are assigned each year for biodiversity through various sources, including EU funds and national and private funding. In implementing these goals, the EU Commission aims to ensure that by 2050, "all of the world's ecosystems are restored, resilient, and adequately protected" (European Commission, n.d.a).

### **OSCE's engagement**

Economic and environmental matters have always been an integral part of the OSCE agenda. Established in 1975, through the Helsinki Final Act, the States participating in the Conference for Security and Co-operation in Europe, the foundation on which the OSCE was created, expressed the conviction that...

"...efforts to develop co-operation in the fields of trade, industry, science and technology, the environment and other areas of economic activity contribute to the reinforcement of peace and security in Europe, and in the world as a whole". (OSCE, 1975, p.17)

The OSCE has a comprehensive approach to security that encompasses politico-military, economic and environmental as well as human aspects and bases its work on inclusiveness. Within the OSCE, decisions are taken by consensus by its participating States during the annual Ministerial Council, the central decision-making body of the Organization, and form the guiding direction or the so-called mandate.

Based on its established mandate, the Organization assesses potential security risks stemming, wholly or in part, from environmental factors, and supports participating States to implement their relevant OSCE commitments in this field. In the environmental field, the main thematic areas of work include water management, particularly in a transboundary context, disaster risk reduction, hazardous waste, good environmental governance and climate change, all of which are impactful on biodiversity and highly relevant to aspects of security. Through its work, the OSCE provides a platform for political dialogue on risks associated with environment and security challenges, in particular by assessing the interlinkages between the two.

In the area of climate change, while a number of references have acknowledged climate change as a long-term challenge in various OSCE Ministerial Council decisions and documents, and have attracted attention to the fact that climate change may magnify environmental challenges, the foundation document of OSCE's mandate is represented by the Ministerial Council Decision (MC Dec) 3/21 on "Strengthening Co-operation to Address the Challenges Caused by Climate Change" (OSCE, 2021). MC Dec 3/21 calls on the OSCE participating States to intensify dialogue and co-operation towards climate resilience, adaptation, and mitigation including through climate risk analysis, early warning, joint research and investment as well as exchange of information and best practices in the area of technology and innovation. It, as well, calls on the OSCE participating States to promote the effective participation of women in decision-making process in the area of climate change prevention, mitigation and adaptation.

## **The water management – biodiversity linkage in the Dniester River basin and the impacts of climate change**

Situated in Eastern Europe, the Dniester River is one of the largest trans-boundary rivers in the region. It is the fourth largest river in Ukraine and the largest river in the Republic of Moldova and lies within the Black Sea basin. The total length of the river is 1,350 km and the basin area is more than 72,000 km<sup>2</sup>. Close to 8 million people live in its basin, more than 5 million live in Ukraine and 2.74 million live in the Republic of Moldova (DC, n.d.b). Furthermore, outside the basin, around 3.5 million people make use of the river's water resources, including the population in the city of Odesa.

The basin supports agriculture, aquaculture, water supply, recreation, hydro-power generation, production of building materials, woodworking industry, and mining. Today there are serious ecological challenges within the Dniester River basin associated with the conditions and character of the river's water; pollution from organic, biogenic, hazardous substances, plastic and other household waste; the spread of invasive species; as well as interrelated water quantity and quality issues, such as climate change, floods and inundations, drought and water scarcity. These problems exacerbate economic, social and environmental challenges in Moldova and Ukraine, as well as affect the environmental state of the Black Sea, as outlined in a number of analyses performed in the framework of various projects, which are outlined further below.

Throughout time, the management of the Dniester River has shifted a number of times. During the Soviet Union, it was administered as a united system, and once countries gained their independence it was managed separately by the two riparian countries. Later on, in 1994, the two countries signed a bilateral agreement on the use and protection of water resources in the basin. The agreement had, back then, certain limitations, as it focused mostly on water use in the boundary area and did not consider ecosystems or their biological resources.

Shortly after, aware of the importance of basin-wide management, the two countries requested the OSCE and the United Nations Economic Commission for Europe (UNECE) to facilitate transboundary co-operation in the basin. Since 2004, the OSCE has been engaged in facilitating transboundary



water management in the Dniester River basin. A number of successive projects have been implemented, aimed at addressing flood management, protection of biodiversity, transboundary monitoring, information and data sharing and public awareness raising. In implementing such projects, the OSCE joined efforts with some of its long-term partners, particularly the UNECE and the United Nations Development Programme (UNDP), with a view to provide a tailored response to existing challenges, by making use of the specialized but complementary mandates of the partner agencies.

The results of the joint work have included or contributed to materializing some milestone achievements and a number of important outcomes.

*The Treaty between the Government of the Republic of Moldova and the Cabinet of Ministers of Ukraine on Cooperation in the Field of Protection and Sustainable Development of the Dniester River Basin* was signed in November 2012 (UNECE, 2012). It was ratified in the same year by the Republic of Moldova and in 2017 by Ukraine. In 2015, the two countries endorsed the *Strategic Framework for Adaptation to Climate Change in the Dniester River Basin and its Implementation Plan* (OSCE, 2015). Alongside the Treaty, the Strategic Framework was a major step forward taken by the two countries as the document was one of the very first such comprehensive approaches to coordinating adaptation measures to climate change at the basin level, underlining, simultaneously, the role of all stakeholders in participating in adaptation measures at all levels. Furthermore, the document identifies the areas and regions within the Dniester River basin with the highest degree of biodiversity and carefully considers the impact of climate change on these areas.

In 2018, the *Commission on Sustainable Use and Protection of the Dniester River Basin* (the Dniester Commission) was established under the Treaty as a body for intergovernmental co-operation between the Republic of Moldova and Ukraine in the area of protection, sustainable use and development of the Dniester River basin (DC, n.d.d). This body provides the necessary platform for the two countries to constructively discuss issues that may be of concern and to timely raise any potential challenges before they turn into points of contention. In this context, it is important to note the Working Group (WG) on Ecosystems and Biodiversity was established under the Dniester Commission (DC, n.d.f). Among others, the WG aims at ensuring co-operation in the field of protection and sustainable use of aquatic ecosystems and bio-

logical resources of the Dniester River basin. Furthermore, it contributes to a joint monitoring of the habitat and status of aquatic biological resources and the development of recommendations aimed at reducing the factors leading to the degradation of biodiversity, wetlands, protected natural areas, and aquatic ecosystems.

In 2021, the two countries signed the *Strategic Action Programme (SAP) for the Dniester River Basin for 2021 - 2035*, as one of the key strategic documents of the work of the Dniester River Basin Commission (DC, n.d.a). The document is based on the findings of the *Transboundary Diagnostic Analysis for the Dniester River Basin (TDA)* and, together with it, they form the basis for the two countries' future management plans (DC, n.d.e). These guiding documents have been developed based on the methodologies of the *Water Framework Directive of the European Parliament (2000/60 / EC)*, in light of the two countries signing the *EU Association Agreement in 2014* (EUR-Lex, 2020; EUR-Lex, 2014; EUR-Lex, 2023). Through their nature, beyond the objective of restoring the river ecosystem and ensuring sustainable development of its natural resources, they support the implementation of international commitments in the area of water management, such as those under the United Nations Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention).

Finally, yet importantly, based on the understanding that water is a strategic resource crucial to local, national and regional security and peace, dedicated attention has been paid by the project to mainstreaming gender considerations in water governance as an additional contributing factor to stability and security by leading to more effective policies and reducing social imbalances and tension. Furthermore, an inclusive approach to water management issues also increases transparency and can contribute to reducing corruption. In this context, the importance of ensuring equal rights and opportunities for men and women in transboundary water resources management at all levels as well as to promoting a gender-balanced approach to water governance/management has been an integral part of the project, throughout its implementation.

These are just some of the most notable results achieved over time that contributed significantly to shaping the joint management of water resources of the Dniester River, and, in a broader form, to enhance trust between the two countries and contribute to good neighbourly relations.

Beyond a political and policy framework, a number of activities of a more practical nature have been implemented aimed at addressing immediate challenges in the basin.

In the most recently completed project funded by the Global Environment Facility (GEF) “Enabling Transboundary Co-operation and Integrated Water Resources Management in the Dniester River Basin” (2017 - 2021) one of the three components aimed at strengthening water resources and biodiversity monitoring and conservation, and information exchange in the Dniester River basin. A number of demonstration projects were implemented within this framework, addressing the issue of degradation of small rivers, loss of biological diversity and invasive species, as follows:

- Ecological restoration of the transboundary river Yahorlyk (the Dniester basin);
- Improving knowledge and improving bilateral co-operation on fish in the Lower Dniester.

*Supporting nature-based solutions:*

*the ecological restoration of the small transboundary Yahorlyk River*

Further to the more “traditional” understanding that rivers provide water for domestic supplies, agriculture/irrigation, power generation and industry, one significant aspect, often overlooked, is that rivers provide important benefits in terms of ecosystem goods and services. According to the Intergovernmental Panel on Climate Change (IPCC), ecosystem goods and services include supporting, provisioning, regulating and cultural services (IPCC, 2007). Primary and secondary production, including biodiversity (a resource that is increasingly recognized to sustain many of the goods and services that humans enjoy from ecosystems), are the main supporting services. Products, food, fibre and medical cosmetic products are provisioning services, while the regulating services refer mostly to those services of paramount importance for the human society such as (a) carbon sequestration, (b) climate and water regulation, (c) protection from natural hazards such as floods, avalanches or rock-fall, (d) water and air purification, and (e) disease and pest regulation. Finally, yet equally important, cultural services (and recreational ones) satisfy human spiritual and aesthetic appreciation of ecosystems and of their components (IPCC, 2007).

The international community strives towards achieving good surface and groundwater conditions with a view to enabling rivers to keep providing ecosystem services. This, in turn, contributes to reducing environmental stress on the river basin. Under the conditions of environmental degradation, exacerbated by the effects of a changing climate, the ecosystems and their services can only be preserved if there is an ecologically sound regime for the management of the river, and even more so, of the basin as a whole. This is where the concept of Integrated Water Resources Management (IWRM) comes into play,

“which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems”. (Hassing et al., 2009)

In the Dniester River basin, the sectors of biodiversity and wetlands are some of the most affected by climate change. The decline in biodiversity, the shrinking of the geographical range of native species as a result of the drying of habitats as well as the appearance of invasive species or the reduction of the number of species are just some of the consequences that are already noticeable and that are expected to become even more relevant in the near and long-term future (OSCE, 2015). A decline in the water levels or in the quality of surface and groundwater will only increase the vulnerability of these sectors.

Small rivers are key parts of the river networks. For example, in Ukraine, there are currently 63,000 rivers and 90% of them are small rivers with a basin area of each up to two thousand km<sup>2</sup>. Thousands of such rivers have disappeared in the last 30 years in the country due to various reasons, including insufficient water management, the effects of climate change, etc. Activities such as farming in the riparian zone, overregulation of rivers, and illegal or improper constructions along the riverside are just some of the activities that contribute to river runoff reduction, siltation and overall deterioration of the water resources. In the long run, this leads to the river dying off and, thus, to the discontinuation of the many benefits brought by ecosystems goods and services.

The Yahorlyk River is one of the small transboundary rivers and the left tributary of the Dniester River that flows through Podilskyi and Oknianskyi District of Odesa Region (Ukraine) and in Transdnistria. It flows into the

Dniester on the territory between the cities of Ribnitsa and Dubosary in Transdnistria. Its total length is 73 km.

The Yahorlyk River suffers from regulated water flow with culverts and unauthorized artificial barriers, water bloom and stench of nutrient-loaded stagnant water, waterlogged pastures and significant reed overgrowth, as well as ploughing and fertilization in the floodplain areas and the riparian protection strips. Achieving the goal of restoring the river flow, improving water quality, and tackling associated challenges linked to the threat multiplier effect of climate change, and the arid conditions in the Odesa Region (where the pilot site is located) was one of the top priorities for the local community.

In the framework of the above-mentioned GEF-funded project “Enabling Transboundary Cooperation and Integrated Water Management in the Dniester River Basin”, the issue of disappearing small rivers due to inadequate agricultural practices, climate change, redistribution of the water flow caused by ponds, etc. was addressed. More specifically, in 2021 the ecological restoration of the Yahorlyk River flow was performed. To this end, a range of restoration and channel clearing activities on the Yahorlyk River were performed focused on restoring the hydromorphological characteristics of a section of the Yahorlyk River channel - from the Dolzhanka to Rozivka villages in Ukraine. The overall goal was to improve the water quality of the river, restore meadows, pastures and hayfields and to create better conditions for recreation and improve the area’s green tourism potential. To this aim, artificial obstacles, such as embankments, were removed, a culvert in the dam under the roadway was constructed, and the channel was cleared from siltation materials and reed rhizomes. This resulted in revitalizing the flow and improving the water quality in the river, preserving and restoring its biodiversity and eliminating the negative impact of waterlogging and reed overgrowth in the channel and floodplain.

Further to the practical measures, one of the main outputs of the demonstration project was the development of a methodology for the restoration of small rivers that could be replicated in both riparian countries of the Dniester River basin, as well as in other regions. Such materials were aimed at building an understanding of the importance of keeping the natural flow of the small river and preventing further artificial barriers from altering its watercourse and the overall ecosystem. That included information about the importance of restraining from prohibited activities, including expansion of

the arable land at the expense of riparian buffer strips, ploughing, the use of fertilizers, construction works, setting up of garbage dumps, etc.

The demonstration project also had an awareness-raising component, with a number of visibility and information materials being developed and placed on the riverbanks. An outreach activity was conducted in the Dovzhanka village, with representatives from four nearby communities (Dovzhanka, Artyrivka, Rozivka and the neighbouring Malayivtsi villages). The awareness-raising campaigns included also detailed information about the cause-effect mechanisms influencing the water quality and underlined that the responsibility for the river health lies, primarily, in the hands of the local community.

#### *Improving knowledge and bilateral co-operation on fish in the Lower Dniester*

Another set of practical activities aimed at contributing to improving ecosystem restoration and halting biodiversity loss referred to changing the attitude and approach of riparian states in the Dniester River basin on fish resources and to establishing co-operation based on the values of biodiversity conservation and long-term sustainable interests of local communities in fisheries resources.

The “*Living Planet Report 2022*” of the World Wide Fund for Nature sent an alarming signal that “monitored freshwater populations have seen an alarming decline of 83% since 1970, more than any other species groups. Habitat loss and barriers to migration routes account for around half the threats to these populations” (WWF, 2022).

The same trend is noticeable, unfortunately, also in the Lower Dniester. The fish resources degradation has been ongoing in the Lower Dniester due to, at times weak coordination among riparian countries, as well as due to a strong impact of negative factors, including the deterioration of the hydrologic river regime, destruction of spawning grounds and flourishing poaching. During the last 10-15 years alone, five fish species have disappeared from commercial fishing. At the same time, other factors like the impact of amateur fishing remain unclear and further research is required in order to have a comprehensive and well-informed overview of the existing challenges. On the background of the lack of available data on this topic – i.e. up to 50% of the fish species in the Dniester have become rarely recorded in the recent 25 years – the separation of research in fisheries by national borders is an addi-

tional obstacle in the evaluation process and, thus, for any attempts at protection of the resource.

Furthermore, identifying solutions to the above-mentioned challenge can only be completed in relation to a thorough analysis of potential scenarios of spring ecological reproductive release from the Dniester reservoir servicing the Dniester Hydropower Plants based on the hydrological and hydrobiological data. These include analysing various parameters such as flooding of the Dniester Delta floodplain to create and maintain favourable environmental conditions there, as well as flooding of spawning grounds in the Dniester Delta to create breeding conditions for fish. Such an analysis of the goals, limitations and opportunities for optimizing the regime of spring ecological reproductive releases from the Dniester reservoir has been produced in the framework of the project and a set of conclusions and recommendations has been produced (DC, n.d.c).

Each state applies different fisheries policies, which creates further challenges. While certain bans on commercial fisheries have been introduced by countries at some point in time, the respective acts have not been simultaneously supported by all parties involved. Therefore, the expected results could not be obtained. In this respect, the main challenges remain the degradation and the decline of the fish resources as well as the lack of transboundary co-operation on this issue, provoking inefficient management of resources by both countries. Efforts, be it in relation to developing and implementing the necessary legislation or attempts to multiply the fish resources and ensure their protection should be taken by all concerned parties, preferably at the same time.

In the framework of the above-mentioned project, activities were aimed at supporting bilateral meetings and field studies, assessing the impact of amateur fishery on fish resources, as well as at developing and testing a methodology for in-situ reproduction of valuable and endangered species. Without adequate measures, the degradation of fish resources in Dniester would continue to be accentuated, due also to the flourishing of fish-related poaching and related illegal fish markets.

The project facilitated a closer co-operation of Moldovan and Ukrainian fish authorities, academics, fishermen communities and civil society organizations and resulted in a positive effect on shaping and application of the unique river basin policies of the states and restoring fish resources. Further

to contributing to the restoration of ecosystem services, to the extent possible, such activities help to provide initial responses to the challenges dealing with the current ecosystem status and to improve the inter-state co-operation of the riparians, as well as in complying with their international commitments taken through the various Multilateral Environmental Agreements.

## **Future Outlook**

Building on the above-outlined achievements, the OSCE is currently developing a follow-up project aimed at “Advancing transboundary co-operation and Integrated Water Resources Management in the Dniester River basin through implementation of the Strategic Action Programme (SAP)”. This project, which, if approved, will be financed again by the Global Environment Facility (GEF) and implemented by the OSCE in co-operation with UNDP and with the support of UNECE, will aim at advancing Integrated Water Resources Management (IWRM) in the Dniester River basin contributing to sustainable development by supporting the implementation of the Strategic Action Programme (SAP) priority actions.

The project, which has been designed to follow the strategic directions of action as identified in the SAP, will also address, among others, issues related to adaptation to climate change and increasing preparedness for and resilience to natural disasters. The objective is to increase the resilience of the water ecosystem, enhance the provision of ecosystem services in spite of the climate change impacts, and reduce flood risk through improved river basin management. Activities will focus on demonstrating how the damage caused by climate change on the sectors of the economy most vulnerable to climate change in the Dniester basin can be reduced.

The project activities will also support the riparian countries in implementing their commitments taken at international level, including the OSCE commitments, as outlined in the above-mentioned MC Decision 3/21 “Strengthening Co-operation to Address the Challenges Caused by Climate Change” which, *inter alia*, “encourages the participating States to identify, raise awareness of, mitigate and adapt to climate-related challenges and to intensify their dialogue and co-operation in this regard with a view to minimizing the economic, social and environmental impacts of climate change” (OSCE, 2021, p.2).



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