The Dniester River: a transboundary lifeline for Ukraine and Moldova

Description

The Dniester River runs through Ukraine and Moldova, serving as a critical resource for agriculture, energy, industry, and biodiversity. The river has shaped centuries of history, fostering cultural exchange and relations between countries, and it has played a key role in sustaining the livelihoods of those living along its banks.



The Dniester River is one of the largest rivers in Eastern Europe and holds a key position in the region's geography and economy. The river, also named Nistru, takes its sources from the Carpathian Mountains in Ukraine and flows over 1,352 kilometers to the Black Sea near Odesa: 705km in Ukraine, 437km in Moldova, and 220km along the border. Its basin covers approximately 72,000 square kilometers and provides fresh water that supports agriculture and local economies for about 7 million people, including 5 million in Ukraine and 2.74 million in Moldova [1]. The river is a driving force behind the region's economic, social, and environmental landscape.

A river embedded in History and Culture

The Dniester River has had a profound impact on shaping the history and culture of the region throughout its history. During the Neolithic era, the river was a witness to the most advanced civilizations at the time, with important archaeological sites left behind by these civilizations as a testament to the river's significance for livelihood. In Antiquity, Greek geographers debated the sources of the river, and during the Middle Ages, the Dniester River served as a boundary for the Principality of Moldavia. Later, during the 18th and 19th centuries, as the Russian Empire expanded, populations migrated from east to west to the left bank of the river, fostering a cultural mixture of Romanian and Ukrainian-speaking communities. In the 20th century, the river became a political boundary, first between Romania and Ukraine, later between Romania and the Soviet Union, and then came under the influence of the Soviet Union, remaining so until 1991. After the end of the Soviet Union, the Dniester River became a transboundary waterway between the newly independent nations of the Republic of Moldova and Ukraine [2].

Over the centuries, the river has facilitated trade and connected people along its banks. It remains vital for biodiversity, transportation, agriculture, tourism, and energy production. It also holds deep cultural significance for Moldova and Ukraine. However, the river has also been at the center of regional conflicts. Following Moldova's independence, the eastern part of the Dniester River declared itself the Pridnestrovian Moldavian Republic (also known as Transnistria), with Tiraspol as its capital. This self-proclaimed republic is not internationally recognized, leading to ongoing geopolitical tensions in Moldova on both sides of the Dniester River, which affects the river's management.

Beyond its historical and cultural significance, the Dniester River is a crucial natural resource. It sustains ecosystems, communities, and economic activities, underscoring the importance of its careful preservation and management.

A primary water source for Moldova and Ukraine

The Dniester River is essential for supplying fresh water in Moldova and Ukraine. With 65 water reservoirs and a storage capacity of 2,156 million cubic meters, the river provides drinking water to around 7 million people, making it the most significant water supply for Moldova, with 70% of the population depending on it. The river is also a key supplier for Ukraine, the country's second longest river, and primarily supplies water to southern cities such as Odesa. The Dniester

River is used for drinking water and other vital sectors in both countries, such as agriculture, industry, and energy [3]. Its stream ensures that communities and cities across both nations have reliable access to freshwater resources.

A sanctuary for wildlife and biodiversity

The Dniester River is also home to various ecosystems, forests, wetlands, floodplains, and animals. Forests cover a small portion of the land, approximately 25% of the Dniester Basin in both Moldova and Ukraine. On the contrary, there are numerous wetlands in the Dniester basin, with large parks such as Putrino Lake, Tudorovo Lake, and Beloe Lake. These wetlands are essential for conserving biological diversity and ensuring a food base and habitat for migratory species such as birds, amphibians, and reptiles. The lower part of the Dniester River, representing 60,000 hectares, is recognized as the most biodiverse wetland of international importance in Moldova, supporting around 200 species of birds, 83 species of fish, and 1,000 species of plants[3]. Wetlands also help to maintain the quality of drinking water for cities, depending on the freshwater delivered by the river.

A natural guardian against climate change

The Dniester River's wetlands also play an essential part in climate regulation and natural flood control. Indeed, wetlands are among the most effective carbon sinks, sequestering critical amounts of carbon dioxide from the atmosphere. By storing carbon, wetlands help stabilize the climate. In addition, the floodplains and wetlands in the Dniester basin function as natural buffers when extreme weather events occur. When excess rainfall and river discharge occur, they absorb them to reduce the severity of floods and protect the surrounding population. With this water stored, in case of drought, wetlands can release this stored water to supply communities, ensuring a continuous supply of water for communities, agriculture, and industry[4].

The Dniester's role in powering nations through energy

Thanks to its water flow, the Dniester River is key to Ukraine's and Moldova's energy supply through energy generation. Hydropower plants on the river produce electricity by providing renewable energy for communities and industries. The total electricity generation capacity in the Dniester River basin is approximately 350MW, with 300MW from thermal power plants. On the Ukrainian bank, the Dniester hydropower complex (DHPC) is composed of two hydroelectric stations (HPP-1 & HPP-2), built in the 1990s, and a pumped storage Power Station (PSP) that is under construction, with 4 out 7 generators operational, with full completion expected by 2028[5]. The complex plays an important role in Ukraine's energy infrastructure, stabilizing the electricity grid by generating power during peak demand and storing energy when there is lower demand.

Hydroelectric facilities have become strategic military targets since 2022 and the beginning of the full scale invasion of Ukraine. The intensification of Russian airstrikes has damaged several infrastructures along the Dnipro and Dniester Rivers, leaving millions of people without electricity[6]. Although the facilities located in the west of the country, on the Dniester, have been relatively spared, this significant vulnerability of Ukraine's energy system has increased concerns about the security of the energy supply.

On the other part of the basin, Moldova also relies on the Dniester River for hydropower production, particularly through the Dubasari Hydroelectric power plant built in 1954 and located in the self-proclaimed region of Transnistria[7]. Although its role in the national electricity grid remains modest and is disrupted by the region's uncertain status, the Dubasari plant contributes to Moldova's energy diversification, as the country still relies heavily on coal and gas. It is the first step to achieving the nation's targets of having renewable energy accounting for 30% of final consumption by 2030 [8].

Fueling economies

The Dniester River is a resource for energy production and supports agriculture, which is essential for the Ukrainian and Moldovan economies. The river irrigates crops, ensuring food production and food security for the rural population. In Ukraine, approximately 67% of the Dniester basin is used for agriculture. In Moldova, the Dniester basin accounts for

about 59% of the country's territory (including Transnistria), with around 76% of that area used for agricultural activities, contributing 7% to the national GDP as of 2023.

The Dniester River is also integral to the tourism sector. Around 29,000 foreign visitors in Moldova came in 2022, leading to a 21% increase from 2021 due to recreational tourism. Attractions along the river, such as the Soroca Fortress, promote cultural tourism. In Ukraine, the river is navigable for around 1,200 kilometers, supporting river cruises and tourism activities. The Dniester Canyon, located between Halych and Khotyn, was recognized in 2008 as one of Ukraine's natural wonders, making it a popular destination for adventure tourism (Rafting, etc.)[9]. The Dniester River also features important floodplains, which led to the establishment of national parks such as Nistru de Jos in Moldova. These areas are also decisive for biodiversity conservation and have become a pivotal point for eco-tourism, promoting sustainable travel initiatives.

More than a river, a shared legacy

The Dniester River is more than just a waterway; it symbolizes cultural and historical interconnectedness between Ukraine and Moldova. It reflects years of economic cooperation and environmental dependence.

As one of Eastern Europe's most vital rivers, the Dniester has provided water, food, and energy, supporting millions of people for centuries. However, while the Dniester River is a central source of life for Ukraine and Moldova, it has faced growing environmental and geopolitical challenges in recent decades. The level of pollution in the water has increased due to industrial waste, unsustainable agricultural practices, and inadequate wastewater treatment, threatening biodiversity and water quality. Climate change has worsened these issues, contributing to unpredictable floods. At the same time, governance and management of the river remain critical, with both countries struggling to find common ground solutions to implement cross-border management strategies. Since 2022, the large-scale war in Ukraine has further complicated cooperation between the two countries. Government priorities have shifted towards security concerns, slowing down negotiations on the bilateral management of the river. Hydraulic infrastructures, which are strategic for electricity and water supply, have become potential targets of the conflict. Moreover, the complex relationship between Chisinau and Transnistria weighs heavily on the governance of the Dniester. The Moldovan breakaway territory on the river's left bank controls several key hydraulic infrastructures, including the Dubasari plant. This situation further complicates negotiations, increasing the risks of mismanagement, uncontrolled pollution, and basin degradation. The river's future will be a crucial test of its ability to balance economic needs, environmental sustainability, and regional stability.

Notes:

(1) Safwan Rubio, « Dniester River Basin – Shaping Lives Across Three Nations, » *Dniester Commission*, 1 February 2024.

(2) *Treaty on sustainable management of the transboundary Dniester River Basin can enter into force*, UNECE, 5 July 2017.

(3) *Austria's beneficial support for biodiversity conservation in Moldova*, OCDE, 21 November 2023.

(4) *Wetlands sustain life and our collective future*, Wetlands international, 2 February 2025.

(5) Ilie Gulca, « Moldova and the Dniester River – Dammed by Ukraine, » *Balkan Insight*, 4 November 2021.

(6) Pavel Polityuk, « Ukraine counts heavy cost of Russian attacks on hydropower plants, » *Reuters,* 27March 2023.

(7) Ilya Trombitskiy, « Dniester River – Evolution of transboundary river basin management in the post-Soviet space, » *Ukraine War Environmental Consequences Work Group*, 17May 2023.

(8) *Moldova's NECP: a step towards decarbonisation and accelerated European integration*, Energy Community, 4 March 2025.

(9) *About the Dniester River*, Travel Dniester.

Thumbnail: The Dniester River (© Clay Gilliland/Wikimedia Commons).

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