

# UNECE

## Policy Brief : Increasing welfare in the Sava countries through a transboundary nexus approach



Coordination between the water, energy, food and environment sectors is fraught with difficulties at the national level whose complexity increases substantially in transboundary basins. The “nexus approach” to managing interlinked resources has emerged as a way to enhance water, energy and food security by increasing efficiency, reducing trade-offs, building synergies and improving governance, while protecting ecosystems.

**The natural resources of the Sava River Basin are key to the current and future development of the Sava countries.**

The main objective of the nexus assessments under the Convention on the Protection and Use of Transboundary Watercourses and International Lakes is to foster transboundary cooperation by identifying intersectoral synergies and determining measures that could alleviate tensions related to the multiple needs of riparian countries for shared resources.

The Sava River Basin is home to 8.1 million people covering a total area of 97,713 km<sup>2</sup> that includes considerable areas of Bosnia and Herzegovina, Croatia, Montenegro, Serbia and Slovenia, as well as a very small part of Albania. A significant share of water, hydropower, land area and economic activity in the Sava countries is based in or derived from the basin, for example electricity generation capacity amounts to 53 per cent or 76 per cent of thermal power plants.

The assessment of the water-food-energy-ecosystems nexus in the Sava River Basin aims to support the implementation of the Framework Agreement on the Sava River Basin (FASRB), particularly with regard to the further integration of water policy with other sectoral policies, as well as advancing dialogue with key sectoral stakeholders, notably in the sectors of energy and agriculture. The participatory assessment process included an intersectoral workshop that brought together sector authorities and other key stakeholders from the riparian countries to identify the main intersectoral issues and their possible solutions. This picture was enhanced by a subsequent analysis, followed by consultations among the various sectoral authorities concerned both in the form of meetings and in the gathering of comments. The main findings are briefly described below.

The Dinaric Karst Aquifer is a main source of drinking water. Water and land resources support significant agricultural production and navigation. Intact floodplains contribute towards flood mitigation and biodiversity conservation. Pristine natural ecosystems and recreational water-based modes of transport attract tourism. Forests and wetlands are interwoven with local culture and community livelihoods, providing foraged food, fuel and timber. And low carbon electricity production contributes to significant reductions in greenhouse gas emissions.



<sup>1</sup> United Nations administered territory under Security Council Resolution 1244 (1999)

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**The resources of the Sava River Basin are strongly inter-linked.**

The inter-linkages between water, energy, land, and ecosystem resources are strong in many basins and countries – this relationship is known as the “nexus”. For example, the energy sector in the Sava River Basin has proven dependent on the status of water resources — in dry spells, power generation from hydropower plants decreases while flooding results in the shutdown of thermal plants (as their cooling systems are compromised) and affects the operation of coal mines.

**The Sava River Basin’s resources are under increasing pressure.**

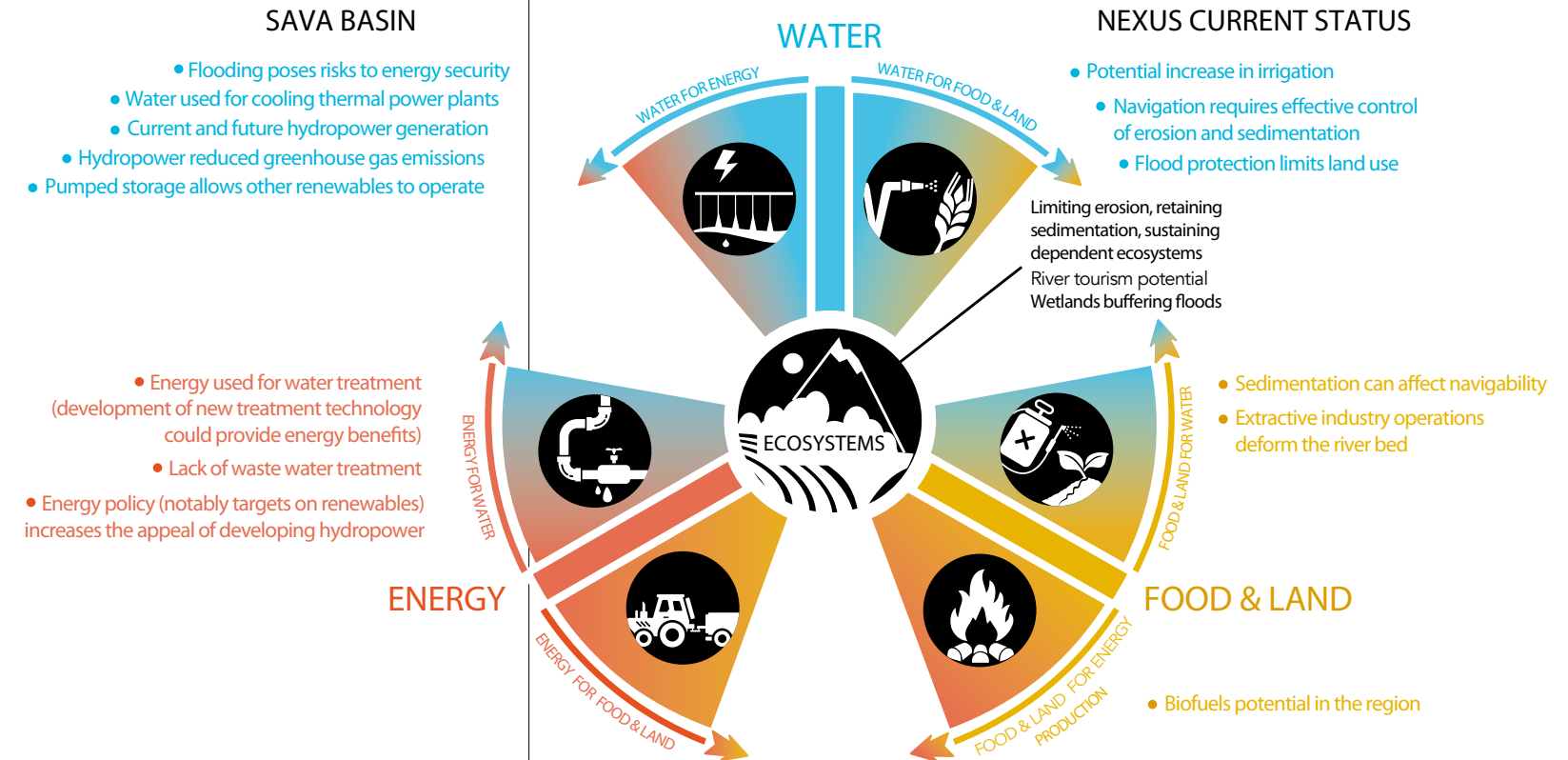
Economic activity in the Western Balkans is expected to grow faster than the EU average driving a more intense use of water, land and energy resources over the next 15 years. Pressure to develop hydropower (a low cost domestic resource with greenhouse gas emissions-reduction potential) is increasing, and while water use for irrigation is currently small, expected agricultural expansion (for example, optimal irrigation could increase average maize yield by 74 per cent) will result in a greater need for irrigation and thus energy demand. The use of the Sava Basin’s river network for transport will also intensify with economic growth, but in order maintain the transport routes, sedimentation and river levels need to be maintained. Climate change will also add pressure both in terms of hydropower development, to meet climate mitigation policy targets, and as a result of lower rainfall patterns, which will lead to a substantial increase in low-flow conditions in the lower Sava (exacerbated by agricultural expansion) with attendant consequences for navigation, drinking water intake, groundwater resources use, and on the environment.

**A transboundary nexus approach enabling cross-sectoral and cross-country intervention is needed to address current challenges.**

For example, lower impact floods, which can often last for up to four days, can be better contained if natural floodplains are complemented by spare reservoir capacity, in which case a centennial flood (with levels of about 6,000 m³/s) hitting the Sava River Basin could be delayed by at least four hours if current water storage infrastructure (with a capacity of 1,752 km³) are half full. Efficient irrigation measures would also reduce the total volume of water that would need to be pumped, reducing energy demand, with a more pronounced effect when water is scarce (when energy costs are higher).

**A transboundary nexus approach in the Sava can be built on existing processes.**

The FASRB and the International Sava River Basin Commission (ISRBC) provide a legal and institutional framework for cooperation at international and inter-sectoral scales. The ISRBC supports the establishment of joint objectives that can be implemented by countries at different stages of development. It serves as a forum where different interests (such as recreation and tourism, industry, agriculture or navigation) are represented and where issues of common concern can be discussed, and it coordinates the development of various intersectoral plans and the establishment of integrated systems (e.g. information and data exchange, forecasting and warning systems). While the involvement of the energy and agricultural sectors in basin level coordination is still at an early stage, the Strategy on Implementation of the FASRB envisages further integration of water policies with other sector policies. EU policies and processes represent both a driver and an opportunity to improve nexus management; an example is the EU initiative to improve resource efficiency beyond sectoral mandates.

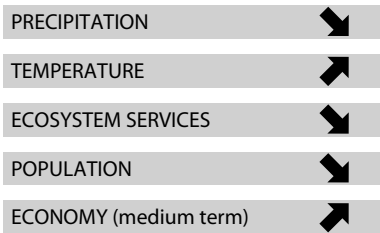


**The Sava nexus assessment has identified a menu of solutions to address specific inter-sectoral challenges in the Sava River Basin.**

Institutional solutions include further improving the relatively well developed governance architecture by clarifying roles and responsibilities, particularly in the monitoring of basin resources and in the support of the application of sustainable development principles in economic and sectoral planning and decision-making. Information solutions in the Sava River Basin should be aimed at developing a shared knowledge base by investing in monitoring and forecasting, but also in terms of access to information and in developing guidelines that synthesize good experience and help harmonize approaches (several of which are already available in the areas of navigation, hydropower or ecotourism). A mix of regulatory, economic and information policy

instruments is needed to exploit the high potential in the basin to increase resource efficiency, for example, by promoting the use of low-flow appliances in households, as well as water and energy efficient technologies, industries and utilities, and the adoption of more efficient irrigation practices. Infrastructure solutions include promoting the multiple and flexible use of infrastructure, in particular dams, irrigation and drainage systems; investing in expanding and upgrading water infrastructure, such as wastewater treatment; coordinating infrastructure investments, such as in hydropower and other renewable energy sources; and protecting natural infrastructure assets, such as floodplains and wetlands.

**BASIN TRENDS**



**NEXUS FUTURE IN THE SAVA BASIN**



NATIONAL TRENDS	Slovenia	Croatia	Bosnia and Herzegovina	Montenegro	Serbia
WATER FOR FOOD & LAND Irrigation needs	↑↑	↑↑	↑	↑	↑↑
WATER FOR ENERGY Electricity generation needs, cooling	↑↑	↑	↑↑	↑	↑↑
ENERGY FOR WATER Treat, move and store water	↑	↑	↑	↑	↑
ENERGY FOR FOOD & LAND Grow, store, process and move food	↑	↑	↑	↑	↓
FOOD & LAND FOR ENERGY Food-energy competition for water, biofuel production	↑	↑	↑	↑	↑
IMPACT OF FOOD & LAND ON WATER RESOURCE Water pollution, agricultural use	↑	↑	↑	↑	↑

**Benefits of implementing a transboundary nexus approach in the Sava basin**

	On economic activities	Beyond economic activities
<b>From improved management of basin resources</b>	<b>Economic benefits</b> <ul style="list-style-type: none"> <li>Increased viability of economic activities relying on basin resources</li> <li>Development of agricultural sector and its value added</li> <li>Development of sustainable river tourism</li> <li>Reduced economic costs of water-related hazards (floods and droughts)</li> <li>Reduction of transport costs or increased volume of traffic (thanks to increased capacity and use of better maintained waterways)</li> <li>Reduction of energy costs (thanks to optimisation of potential energy sources)</li> <li>Reduction of water infrastructure costs (thanks to avoidance of duplication and sub-optimal location)</li> </ul>	<b>Social and environmental benefits</b> <ul style="list-style-type: none"> <li>Employment creation (e.g. in agriculture and tourism sectors)</li> <li>Reduced human costs of water-related hazards (e.g. floods)</li> <li>Health benefits from improved water quality</li> <li>Improved water services for users</li> <li>Improved recreational opportunities from improved water quality and healthier ecosystems</li> </ul>
<b>From increased trust among Sava countries</b>	<b>Regional economic cooperation benefits</b> <ul style="list-style-type: none"> <li>Increased trade through waterways</li> <li>Development of regional markets for goods, services and labour</li> <li>Increased cross-border investments</li> </ul>	<b>Regional economic cooperation benefits</b> <ul style="list-style-type: none"> <li>Increased trade through waterways</li> <li>Development of regional markets for goods, services and labour</li> <li>Increased cross-border investments</li> </ul>

**International coordination and cooperation at basin and regional level offers opportunities to “manage the nexus” beyond what is possible at national level.**

These include the development and implementation of legal instruments, in particular the FASRB and its protocols, but also EU Directives, as well as transboundary planning processes such as the Sava River Basin Management Plan and the Flood Risk Management Plan for the Sava River Basin, and further regional integration and harmonization, in particular around EU accession and approximation.

**There are many benefits of adopting a transboundary nexus approach in the Sava River Basin.**

For example, given that the value of water varies across the basin (‘upstream water’ has a high value as it can pass through a greater number of hydropower plants), investments in irrigation efficiency in the upstream parts of the basin would become economically attractive even if conditions for agriculture are more favourable downstream. The Sava nexus assessment identifies a number of benefits both related to and independent of economic activities that are generated by improvements in the management of the basin’s resources as well as by the enhanced trust between the Sava countries. It is hoped that this work informs, guides and spurs further action by Governments, the International Sava River Basin Commission, international organizations and civil society to address the identified intersectoral challenges.

The assessment of the Sava River Basin, carried out in cooperation with the International Sava River Basin Commission, is part of series of intersectoral (nexus) assessments in transboundary basins using a specifically designed methodology.  
 Website: <http://www.unece.org/env/water/nexus.html>  
 Nexus assessment methodology:  
<http://www.unece.org/index.php?id=41427>

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