

# **Transboundary River Basins**

Status and Trends

**SUMMARY FOR POLICY MAKERS** 









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#### **Administrative Boundaries**

Source of administrative boundaries used throughout the assessment: The Global Administrative Unit Layers (GAUL) dataset, implemented by FAO within the CountrySTAT and Agricultural Market Information System (AMIS) projects.

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## **Summary for Policy Makers**

The *Transboundary River Basins Assessment* is a global, comparative, baseline assessment of 286 transboundary river basins, and the most comprehensive assessment of such river basins to date.

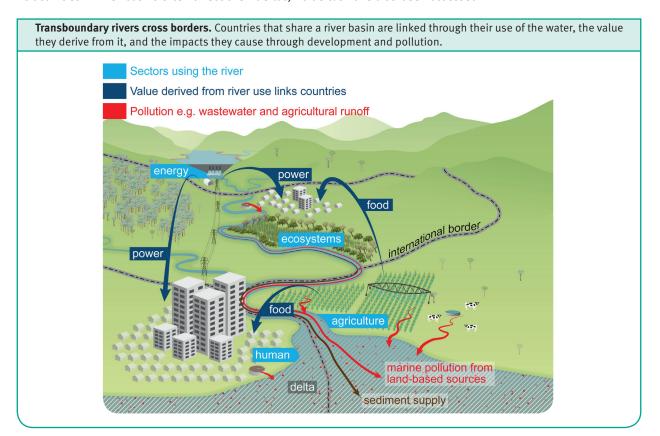
#### **Key Messages and Recommendations**

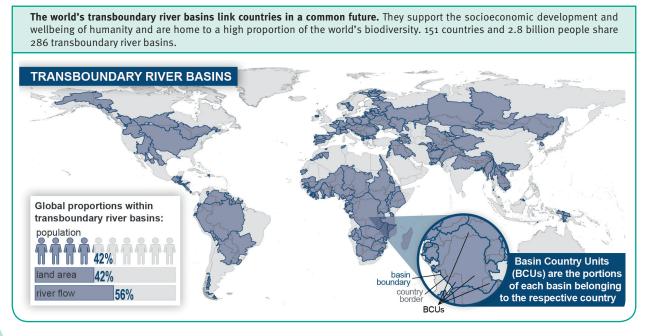
- Environmental, human and agricultural water stresses often occur in the same transboundary river basins, resulting in competition for water between sectors and between countries. Relative risk for any of these stresses is high or very high in 41 out of 286 basins. Actions to mitigate water stress need to be planned in an integrated, cooperative framework to take careful consideration of all sectors in each country sharing a basin.
- Pollution risks in many transboundary river basins are high and projected to increase. Relative risk for
  either nutrient pollution or wastewater pollution is high or very high in 218 out of 286 basins. Improved
  wastewater treatment and nutrient management in agriculture are needed in most basins.
- 3. The threat to freshwater biodiversity is global. Extinction risk is moderate to very high in 70% of the area of transboundary river basins. However, local-level, tailored solutions are needed to address species extinction risks.
- 4. The construction of dams and water diversions is in progress or planned in many transboundary river basins, sometimes without adequate international water cooperation instruments. While many transboundary agreements exist, more effort is needed to update them to reflect modern principles of transboundary water management, such as the obligation not to cause significant harm and the principles of cooperation and information exchange.
- 5. Continuing commitment is needed to improve guidelines for siting new dams, designing dams for multiple purposes, and optimising the operation of dams to maximise human benefits and minimise negative ecosystem impacts and sediment trapping. This is particularly relevant in transboundary river basins, where dams are often in upstream countries.
- 6. Transboundary river basins with high economic dependence on water resources, low levels of societal wellbeing and high exposure to floods and droughts have the highest climate-related risks. These include the Limpopo, Ganges-Brahmaputra-Meghna and Mekong basins. Governance capacity may need to be continually improved in basins with high climate-related risk.
- 7. Almost all deltas in transboundary river basins have moderate to very high risk for one or more indicator. Special attention should be paid to the impacts of upstream activities on deltas, in particular the reduction of sediment supply (resulting in sinking deltas) and of water flows due to dams and abstractions, and to pollution.
- 8. Four groups of transboundary river basins have been identified where the basins within each group have similar risk profiles. Opportunities for common management strategies within each of these groups should be explored. They offer scope for learning between regions.
- 9. Risks are projected to increase in the next 15-30 years, particularly for four hotspot regions: the Middle East, Central Asia, the Ganges-Brahmaputra-Meghna basin, and the Orange and Limpopo basins in Southern Africa. Action should be taken now to reduce future costs and impacts.

The Transboundary Waters Assessment Programme (TWAP) was initiated by the Global Environment Facility (GEF) to create the first baseline assessment of all the planet's transboundary water resources. The *Transboundary River Basins Assessment* is one of five assessments of transboundary water systems (see <a href="https://www.geftwap.org">www.geftwap.org</a>).

The *Transboundary River Basins Assessment* is an indicator-based assessment, which identifies and classifies river basins at risk from a variety of issues, encourages knowledge exchange, and increases awareness of the importance and state of transboundary waters.

As activities in river basins often affect their deltas, 26 deltas have also been assessed.





15 core indicators across 5 thematic groups are assessed. Projections are made for five of these indicators, and linkage indicators cover lakes and deltas.

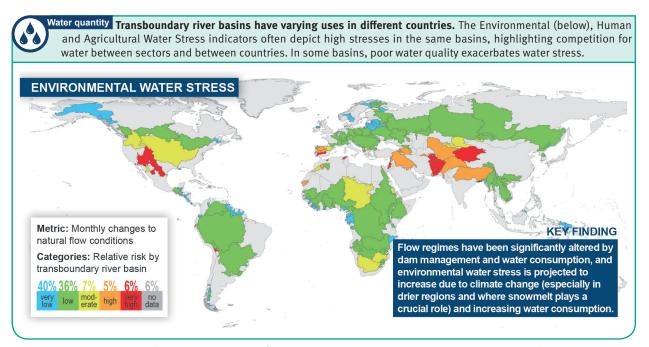
THEMATIC GROUPS		INDICATORS	
		Baseline (2010)	Projected (2030 & 2050)
Water quantity		Environmental water stress     Human water stress     Agricultural water stress	Environmental water stress     Human water stress
Water quality		Nutrient pollution     Wastewater pollution	Nutrient pollution
Ecosystems		6. Wetland disconnectivity 7. Ecosystem impacts from dams 8. Threat to fish 9. Extinction risk	• [Environmental water stress]
Governance		Legal framework     Hydropolitical tension     Enabling environment	Exacerbating factors to hydropolitical tension
Socioeconomics		<ul><li>13. Economic dependence on water resources</li><li>14. Societal wellbeing</li><li>15. Exposure to floods and droughts</li></ul>	Change in population density
Water systems links	Lakes	Lake influence	
	Deltas	<ul><li>Relative sea level rise</li><li>Wetland ecological threat</li><li>Population pressure</li><li>Delta governance</li></ul>	

This is the first assessment to look at transboundary river systems with this scope and on this scale. The analysis has been carried out for river basins and for the portions of each basin belonging to the respective country (referred to as Basin Country Units, see figure on previous page). The assessment, and the partnership of institutions established, can provide support to a broad variety of stakeholders, organizations and initiatives at multiple scales, from global to local. These include the UN Watercourses Convention (which came into force in 2014) and the UNECE Water Convention (open to all countries in 2015), the Sustainable Development Goals, regional economic commissions, donors, international organizations, basins, deltas and countries.

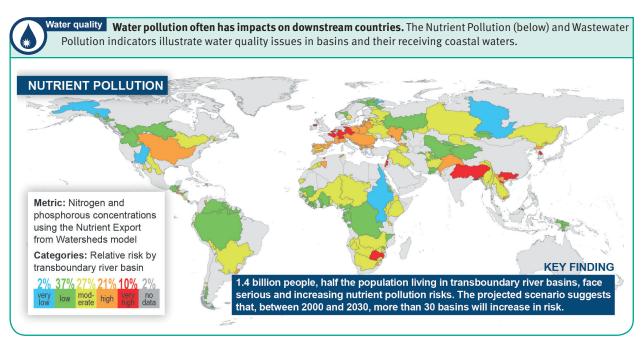


### Selected results

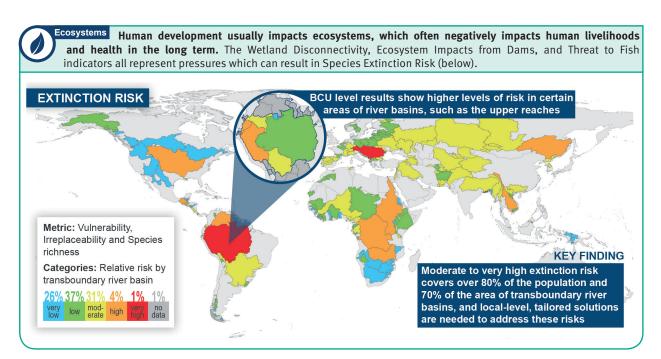
The results for all indicators are too many to show here. Examples of one indicator result map and key finding from each thematic group are provided below. The assessment paints a complex picture, and combining all indicators into a simple index to rank all basins fails to reflect the diversity of risks. The results and analysis in the report, and the tools available in an interactive data portal, allow users to examine a range of issues to obtain a more nuanced picture (http://twap-rivers.org/indicators).



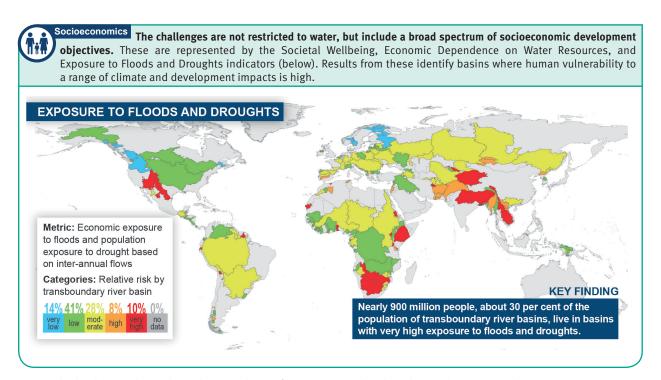
Very high relative risk transboundary river basins for Environmental Water Stress: Cancoso/Lauca, Colorado, Dasht, Guadiana, Hamun-i-Mashkel/ Rakshan, Hari/Harirud, Jordan, Kowl E Namaksar, Murgab, Rio Grande (North America), Tarim.



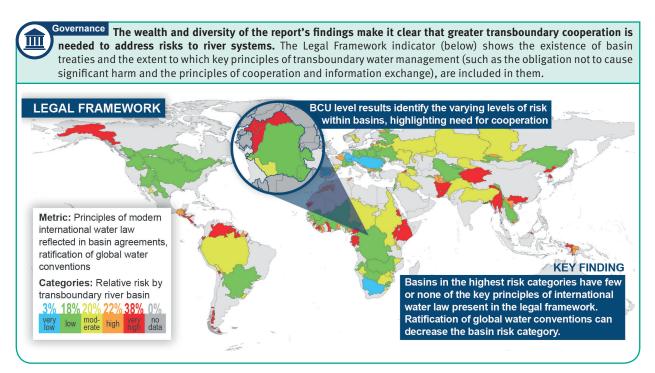
Very high relative risk transboundary river basins for Nutrient Pollution: Bei Jiang/Hsi, Elbe, Ganges-Brahmaputra-Meghna, Jordan, Limpopo, Ma, Rhine, Seine.



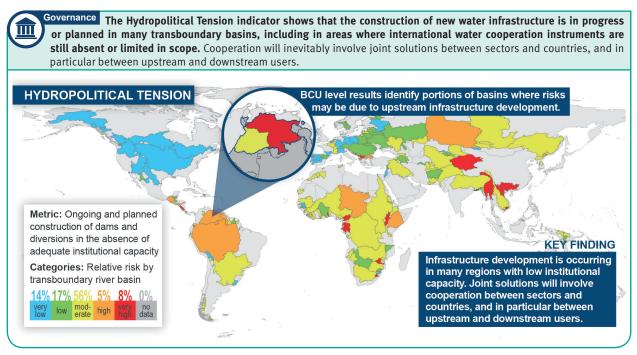
Very high relative risk transboundary river basins for Extinction Risk: Amazon, Danube. Very high relative risk BCUs include: Albania and Macedonia (Drin), China (Bei Jiang/His), Guatamala and Mexico (Grijalva), United States (Mississippi).



Very high relative risk transboundary river basins for Exposure to Floods and Droughts: Atui, Baraka, Cancoso/Lauca, Colorado, Ganges-Brahmaputra-Meghna, Juba-Shibeli, Kowl E Namaksar, Lake Natron, Limpopo, Lotagipi Swamp, Maroni, Mekong, Okavango, Orange, Oueme, Rio Grande (North America), Saigon, Shu/Chu, Tarim.

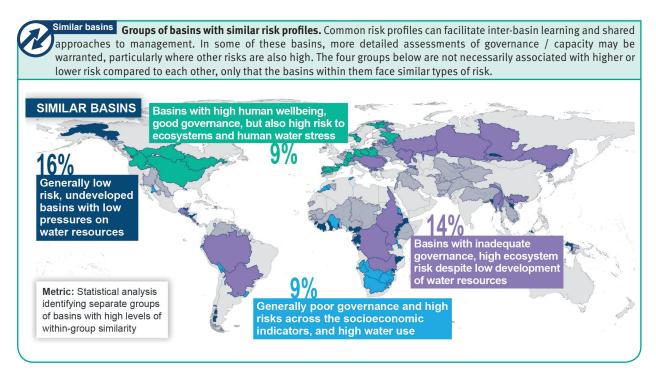


Very high relative risk transboundary river basins for Legal Framework: Alsek, Atui, Awash, BahuKalat/Rudkhanehye, Baker, Baraka, Bei Jiang/Hsi, Benito/Ntem, Cancoso/Lauca, Catatumbo, Coco/Segovia, Corantijn/Courantyne, Coruh, Dasht, Digul, Essequibo, Gash, Hamun-i-Mashkel/Rakshan, Han, Helmand, Irrawaddy, Juba-Shibeli, Kaladan, Komoe, Kowl E Namaksar, Nyanga, Ogooue, Oiapoque/Oyupock, Orinoco, Patia, Salween, San Juan, Sanaga, St. Paul, Stikine, Tami, Tarim, Tumen, Yalu, Yukon.

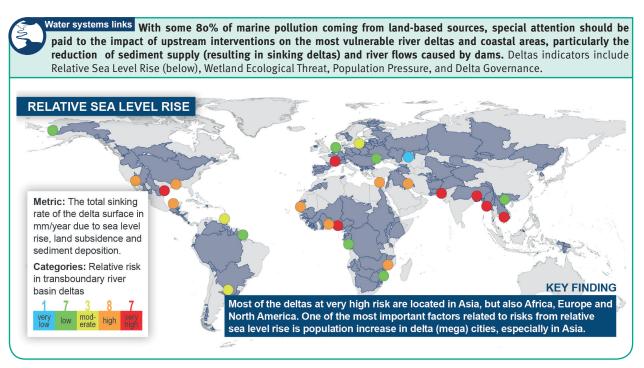


Very high relative risk transboundary river basins for Hydropolitical Tension: Bei Jiang/Hsi, Benito/Ntem, Ca/Song-Koi, Drin, Irrawaddy, Lake Turkana, Ma, Mira, Mono, Ogooue, Red/Song Hong, Sabi, Saigon, Salween, San Juan, Sanaga, Tarim, Thukela, Vardar.

Governance capacity at the national level underpins the ability to respond to risks at the transboundary level, as assessed by the Enabling Environment indicator.

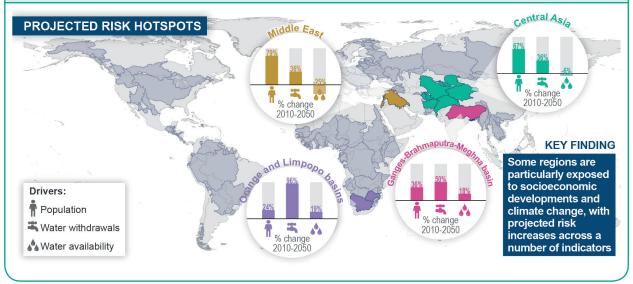


For a list of transboundary river basins in each group, see Transboundary River Basins: Status and Trends (UNEP-DHI and UNEP 2016).



Very high relative risk deltas for Relative Sea Level Rise: Ganges-Brahmaputra-Meghna, Indus, Irrawaddy, Mekong, Niger, Rhone, Rio Grande.

Projections Results from the 'business-as-usual' projections analysis show that many of the risks to transboundary river basins are projected to increase in the next 15-30 years with a changing climate, socioeconomic development, and increasing populations. Four hotspots are identified, based on the combined projected impacts for five indicators: Environmental Water Stress, Human Water Stress, Nutrient Pollution, Exacerbating Factors to Hydropolitical Tension, and Change in Population Density. The figure also shows the percentage change in three key drivers (population, water withdrawals, and water availability) from 2010 to 2050. Despite projected increases in water availability in the Ganges-Brahmaputra-Meghna basin and the Orange and Limpopo basins, water withdrawals are projected to increase by a greater amount. Water demand reduction strategies are part of the solution in all four hotspots, but particularly in these two, where water withdrawals are projected to exceed population increases.



Middle East transboundary river basins: Aral Sea, Hari, Helmand, Ili, Indus, Murgab, Shu, Talas and Tarim. Central Asia transboundary river basins: Jordan, Euphrates, Orontes and Tigris-Euphrates/Shatt al Arab.

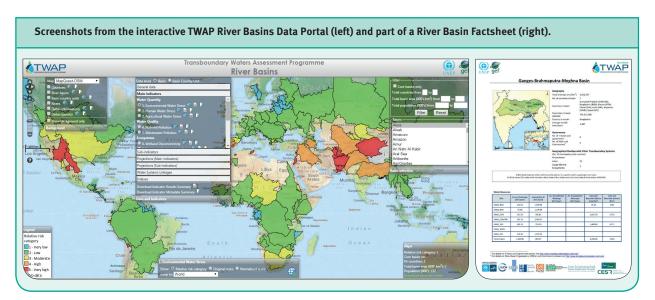
The transboundary river basins of the world provide vital resources for nearly half of the world's population. This assessment shows existing and increasing risks in the majority of these basins. Establishing political will and transboundary cooperation frameworks, as well as improving economic and technical capacity at both the national and transboundary level, will be crucial in managing these risks and maintaining healthy rivers and deltas for the future.



# Online resources to learn more about your rivers, regions and interests

If you want to learn more about your country, a particular transboundary river basin or issue such as water scarcity, you can conduct your own data searches, undertake analysis such as creating indices, and download River Basin Factsheets in the interactive Data Portal, accessible from the website <a href="http://twap-rivers.org/">http://twap-rivers.org/</a>.

Also available on the website is a briefing document, titled the *Transboundary River Basins Technical Summary*, the full length *Transboundary River Basins Report*, and the *TWAP River Basins Sustaining Mechanisms Report* 



TWAP programme level website and data portal www.geftwap.org

#### **Acknowledgements**

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The water systems of the world — aquifers, lakes, rivers, large marine ecosystems, and open ocean — sustain the biosphere and underpin the health and socioeconomic wellbeing of the world's population. Many of these systems are shared by two or more nations. These transboundary waters, stretching over 71% of the planet's surface, in addition to the subsurface aquifers, comprise humanity's water heritage.

Recognizing the value of transboundary water systems, and the reality that many of them continue to be overexploited and degraded, and managed in fragmented ways, the Global Environment Facility (GEF) initiated the Transboundary Waters Assessment Programme (TWAP). The Programme aims to provide a baseline assessment to identify and evaluate changes in these water systems caused by human activities and natural processes, as well as the consequences these changes may have on the human populations dependent upon them. The institutional partnerships forged in this assessment are also envisioned to seed future transboundary assessments.

The final results of the GEF TWAP are presented in the following six volumes:

 $Volume \ 1-Transboundary \ Aquifers \ and \ Groundwater \ Systems \ of \ Small \ Island \ Developing \ States: \ Status \ and \ Trends$ 

Volume 2 - Transboundary Lakes and Reservoirs: Status and Trends

Volume 3 – Transboundary River Basins: Status and Trends

Volume 4 – Large Marine Ecosystems: Status and Trends

Volume 5 – *The Open Ocean: Status and Trends* 

Volume 6 – Transboundary Water Systems: Crosscutting Status and Trends

A Summary for Policy Makers accompanies each volume.

This document — Volume 3 Summary for Policy Makers — showcases the first truly global baseline assessment of the world's 286 transboundary river basins that include 151 countries, and in which more than 40% of the earth's population live.

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