

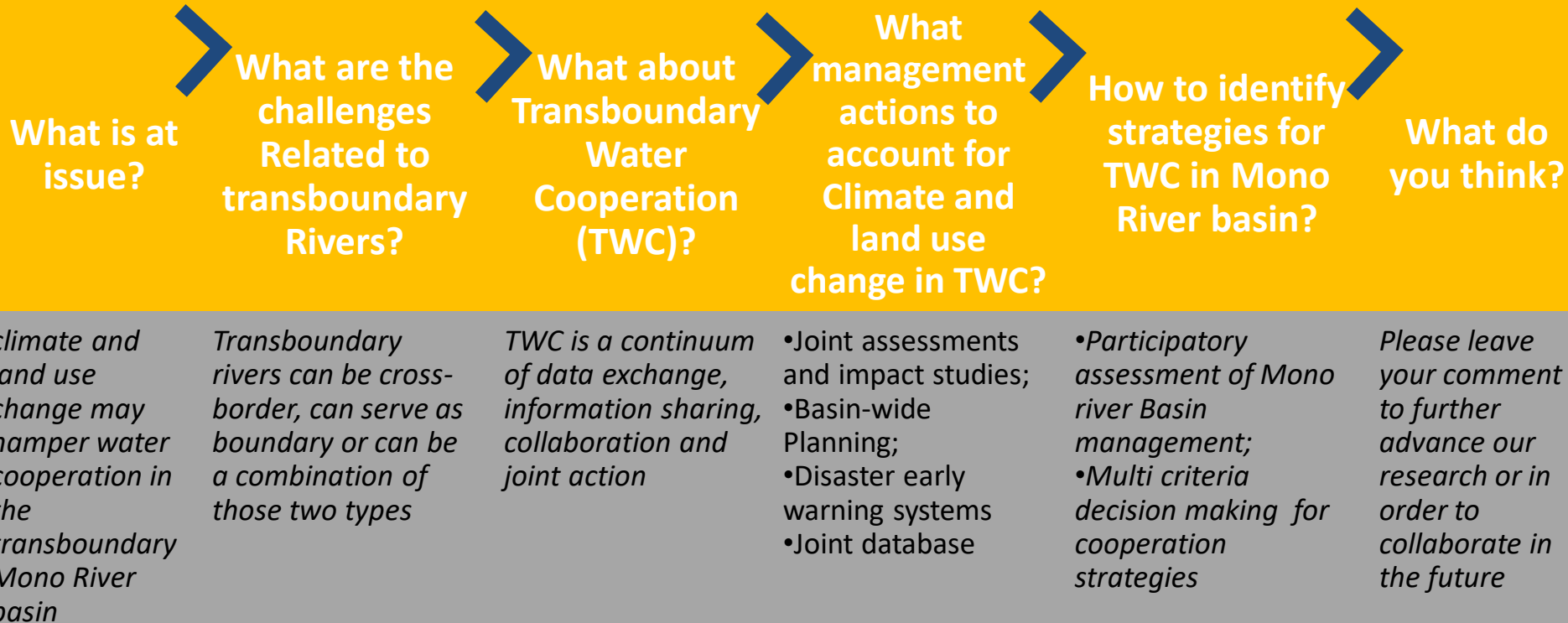
Impacts of Climate and Land Use Change in the Management of a Transboundary Basin- Case Study of Mono River catchment

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We would like to guide you through our display using the following questions



The **Mono River Catchment** covers an area of **23,752 km²** and crosses two countries: **Benin and Togo**.

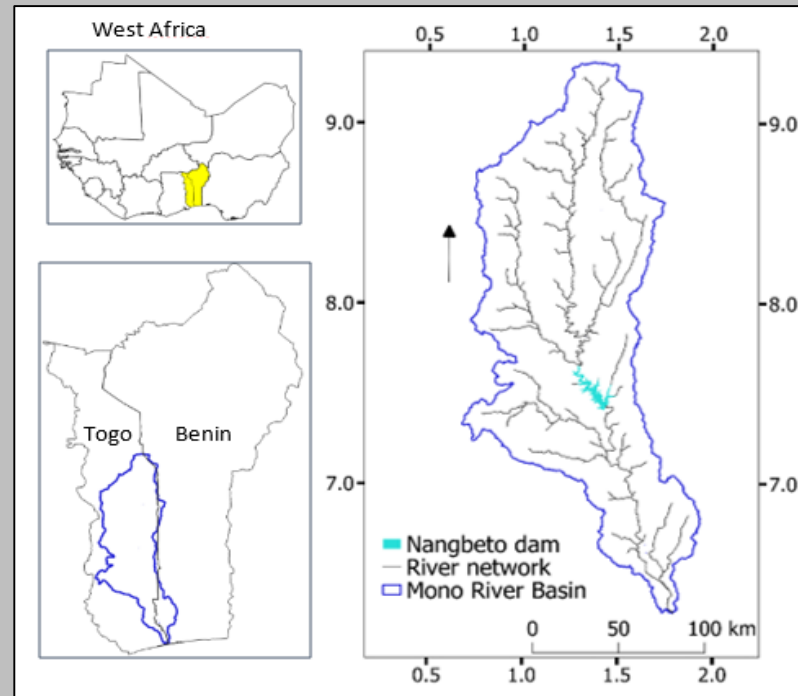
It hosts the Nangbéto hydropower dam built in 1987 and utilized by the two countries.

The Mono river serves as border between Benin and Togo.

Like other West African rivers, **impacts of climate and land use change on Mono River are uncertain**.

How will climate and land use change affect water management in the Mono River basin ?

How to identify effective transboundary water cooperation strategies for Mono River Basin.



Location map of Mono River basin

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What are the challenges related to transboundary Rivers? 1/2

Main types of transboundary rivers basins

- Cross-border basin: borders cross the river and divide the basin into two
- Border river basin: river serves as border between/among riparian
- Hybrid river basin: borders cross the river and river serves as border as well

The type of a transboundary river basin plays an important role in its management. In a cross-border river basin, water use by the upstream riparian may jeopardize the **quality and quantity of water, ecosystems, economic activities, and in a broad sense human security** at the downstream.

On the other hand, a border river basin may be subject to **inter-state conflicts related to a shift of the border and competitive uses**.

Transboundary rivers can induce conflicts within and between countries. However they can also be source of collaboration between riparian.

What are the challenges related to transboundary Rivers? 1/2

Global changes such as land use and land cover change, climate change and population growth induce

- more pressure on water resources at multiple scales
- higher risks of hydro-meteorological hazards such as floods
- development of infrastructures like dams
- substantial financial investment for development and adaptation

Therefore, there is a need to enhance basin management in a transboundary manner for more effective and sustainable actions.

Water cooperation refers to a voluntary arrangement in which two or more parties engage in a mutually beneficial exchange and a peaceful management at local, national, regional and international levels, instead of competing for the same water resources

TWC criteria:

- joint data collection and management
- treaties and agreements
- technical expertise sharing
- integrated basin-wide planning

While disasters like floods can instigate TWC, TWC contribute as well to the reduction and the management of disaster risks.

What management actions to account for Climate and land use change in TWC?

Actions to integrate climate and land use change in TWC

- **Joint assessments:** climate and land use change impact studies, water quantity and quality assessment, assessment of hydro-political tension, infrastructure development
- **Early warning systems:** basin-wide forecast and projection of hydro-meteorological events based on climate and land use scenarios
- **Joint database and defined mechanism for transparent data sharing** between riparian and national entities like those in charge of meteorology, agriculture, environment, health, and civil protection
- **Basin-wide planning** with respect to land use and climate change
- **Joint projects and funding seeking** based on basin assessments and adaptation plans

How to identify strategies for TWC in Mono River basin? 1/2

(1) Systematic literature review on TWC : Challenges, Benefits, Stakeholders, Tools and Experience of good practices from other catchments.

(2) Understanding the peculiarities and current management of Mono River basin

- **Analysis of Mono River basin management** documents, national adaptation and development plans, national reports on SDG indicator 6.5.2, Mandate of the Mono River Basin Authority (MRBA), disaster Early Warning Systems, existence of legal basin frameworks
- **Systematic online literature review** on water management in Mono River basin
- **Interview** with focus on the management of data, infrastructure development, flood risk, MRBA, perception of future climate and land use change, joint projects and stakeholders involvement at local, national and basin levels
- **Workshop**

(3) Multi Criteria Decision Making for cooperative management

What strategies for transboundary water cooperation in Mono River basin? 2/2

During the workshop

- presentation and discussion of the management of Mono River basin as derived from literature review and interviews
- Participatory computation of Water Cooperation Quotient with stakeholders
- Problem Tree Analysis with focus on the criteria of TWC and on scenarios of climate and land use change

Stakeholders to involve are those already part of the Mono River Basin Authority, at basin national and local levels.

What do you think?

We would like to know your opinion.

What is your expert view about our methods to assess transboundary water management and to identify cooperation strategies in the Mono River basin?

What other criteria to consider for evaluating water cooperation in a transboundary basin ?

How to integrate climate and land use change impacts on floods, into basin management?

For further questions or suggestion, Please leave a comment or contact me:

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Abstract 1/2

There are evidences that climate change as a result of both natural and anthropogenic processes has exacerbated the frequency and the severity of flood hazards over past decades across the world. Moreover, changes in the pattern of precipitation and temperature during the 21st century are expected to induce region-specific impacts on floods, especially increase in local floods in some catchments. However, the future is hard to predict as there are strong discrepancies in how climate change is expected to affect runoff and river discharge at different places. Many studies have proven that not only climate, socio-economic and physical factors such as elevation and soil type are determinant for flood risk characterisation. Anthropogenic activities and impacts through land use and land cover degradation have substantial implication for hydrological processes. Moreover, catchment management play an important role in sustainable flood management which is generally based on technical knowledge. But it must also be socially and politically meaningful. This is especially relevant for transboundary catchments where riparian countries might offer different economic, social and political environment, and hence have distinct approaches of flood risk reduction and management.

An effective cooperation between states sharing transboundary water resources must include a continuum comprised of data exchange, information sharing, collaboration and joint action. It is a search for cooperative management while respecting the sovereignty of each state. There is a variety of methods used for assessing transboundary management and identifying cooperative strategies. Among others, the following ones can be mentioned: the Water Cooperation Quotient, multiobjective analysis, hydropolicy simulation models, the Multiobjective Evolutionary Algorithms (MOEAs) and a combination of the two later. Hence this study aims at exploring various approaches of transboundary management and analyses experienced over the world. Lessons will afterward be drawn in the context of climate and land use change in the transboundary Mono River catchment shared by the Republics of Benin and Togo.

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