

For the Nature Based Solutions case studies collection

WISE-UP to Climate: Water Infrastructure Solutions for the Volta Basin

<i>What is the water management problem that was tackled with your case?</i>
<p>WISE-UP's work in West Africa has focused on the proposed Pwalugu multipurpose dam site on the White Volta river in Northern Ghana, close to the Burkina Faso border. The Pwalugu Multipurpose Dam project is seen as a major investment that will trigger wider economic development in the poorer northern regions of the country. The plans show hydro-electric power generation, irrigation development and flood management benefits as well as reservoir capture fisheries and tourism development. Although knowledge is available on current and proposed built infrastructure, less information is available on the services already delivered by natural infrastructure. The proposed Pwalugu multi-purpose dam will impact natural infrastructure benefits downstream. However, this could be positive or negative and at different magnitudes depending on which dam operating rules are adopted. Inadequate information on the services provided by nature stems from the complexity in recognising the functions of natural infrastructure, and then collecting and understanding the data. Building interdisciplinary teams to work on these issues helps to bring multiple skills and perspectives together in the search for solutions</p>
<i>What is your solution to this problem and how did it come to be?</i>
<p>The WISE-UP to Climate project approach combines multi-criteria and multi-sector assessment of benefits and costs with engagement of basin stakeholders to meet basin needs under various plausible climates. A multi-disciplinary approach bridging the natural and social sciences better reveals the value and role that natural infrastructure can play in sustainable development. Stakeholder engagement is initiated right from project start, helping to guide and validate results and build ownership and cooperation. Sensitising key stakeholders in the Volta Basin on the use of evidence-based data can support decision making. A key part of the WISE-UP research is to understand the political-economic context in which decisions about river basin development are made. The aim is to better understand the interests of different stakeholders and their influence over investment choices, as well as the constraints they face. This helps identify opportunities to support positive changes in policy and planning, for equitable, sustainable and climate-compatible solutions.</p>
<i>Why is your solution a Nature Based Solution?</i>
<p>Although knowledge is available on current and proposed built infrastructure, such as the Pwalugu dam in Northern Ghana, less information is available on the services already delivered by natural infrastructure. These natural services support local livelihoods and provide services to built infrastructure that often go unrecognised. WISE-UP to Climate demonstrates the application of natural infrastructure as a 'nature-based solution' for climate change adaptation and sustainable development. The project developed knowledge on how to use mixed portfolios of built water infrastructure (e.g. dams, levees, irrigation channels) and 'natural infrastructure' (e.g. wetlands, floodplains, watersheds) for poverty reduction, water-energy-food security, biodiversity conservation, and climate resilience. WISE-UP to Climate shows the application of optimal portfolios of built and natural infrastructure using dialogue with decision-makers to identify and agree trade-offs. The project has linked ecosystem services more directly into water infrastructure development in the Volta River Basin (Ghana principally, but also Burkina Faso) as well as the Tana River Basin in Kenya.</p>
<i>What is the gain of your solution above so-called grey solutions? Why is it better to solve the local water problem with a nature-based solution? Improving water management productivity, aesthetics, other co-benefits, etc.?</i>
<p>While benefits from river basins are generated by both built and natural infrastructure, decisions to endorse these benefits are often conflicting. These are complex trade-offs and decisions, often made in the absence of the full range of data and stakeholder voices needed. WISE-UP is working to untangle this complexity, but at the same time retain the integrity of the results and the details needed by decision-makers at different levels. It is not about choosing natural infrastructure over built options – as they both provide essential services to communities and nature. It is about understanding the natural system in place and how to work together within landscapes to build appropriate infrastructure that takes nature into account and harnesses its potential for optimal benefits.</p>
<i>What hydrological and socio-economic evidence did your case-study provide that the current and/or projected impacts have or will be established?</i>
<p>To better understand the multiple social and environmental benefits from flooding for example, WISE UP mapped the monthly extent of the area that flooded, and valued the different livelihood activities which were dependent on the river flow and the extent of different floods. Communities in the White Volta region rely on</p>

these constantly changing river flows for flood recession farming, floodplain cattle grazing, and fish catch, which translate into valuable incomes and food security for villages close to the river – and for trade beyond the river.

Compiling and interpreting this information allows WISE-UP researchers to determine how much value communities earn directly from river flow and at what time of the year. These findings help to understand what income and services would be affected if the proposed Pwalugu dam is built and operated that could restrict downstream river flow and reduce the different flood events.

Quantifying and valuing the different benefits from natural infrastructure has helped WISE-UP to develop an overall basin wide White Volta model that combines natural and built infrastructure data with hydrological data. Using this approach has helped to identify the different trade-offs between natural and built infrastructure, and the services they provide. For example, prioritising energy production over flood recession farming.

The power of this approach is that it allows you to combine different options together, such as maintaining some natural river flow for flooding and building irrigation systems. This allows stakeholders to determine the best available blend of options, depending on their needs. These tools can help identify where possible 'tipping points' exist, where the increases in one benefit relative to another are too extreme. For example, where energy generation may severely impact fish catch. Decision-makers can then negotiate what they are willing to accept, based on different social, environmental, economic, and political priorities.

Why is this case a sustainable solution for the system – in other words: How does your case study add to the implementation of the SDGs and to water management as a benefit for people, ecosystems and values to the rest of the system as a whole.

WISE UP responds to SDG 6, supporting water management approaches by finding the optimal infrastructure solutions in an uncertain climate future. Healthy, well-functioning natural infrastructure such as watersheds, floodplains, wetlands and river habitat, help to optimise the long-term performance of engineered infrastructure, such as dams, reservoirs and irrigation systems. This can bring national and local economic benefits, help to sustain ecosystem functions, and contribute to storing carbon and broader landscape development.

IUCN's multi-partner programme, WISE-UP to Climate, has new tools to transform planning and investment in water infrastructure. Governments, financing institutions and project developers will now have capabilities for quantifying trade-offs between built and natural infrastructure across whole river basins. They will now be able to identify which combinations of investment in natural infrastructure and built infrastructure are the best bet for sustainable development and climate change resilience.

What was the enabling environment (policy makers, governance, financiers, and other stakeholders) that enabled and possibly improved possibilities to implement and manage the NBS? What were (if any) the bottle necks? And how is the return of investment (financial close) compared to financiers?

Discussions with decision makers to identify and agree trade-offs leads to conversations on more equitable and effective adaptation and development solutions that suit all stakeholders. But to get the most out of these conversations, and to learn from the experience in the room, you need the right tools and information. Bringing multi-disciplinary evidence and data together, and linking this with local and national level experience is key to build the adaptive capacity needed to integrate natural infrastructure into future river basin planning and investment choices.

WISE-UP operates right at the limit of current climate data in the Volta basin. Both built and natural infrastructure benefits will be sub-optimal unless climate impacts are included in river basin planning. The project engages basin stakeholders directly, allowing them to steer and actively guide the research based on their experience, needs, and understanding. Iterative learning and capacity building are critical to better understand how to make information and innovative tools practical, useful and trusted – taking science into policy circles and decision making processes. It helps us shape the future stages of WISE-UP research to continually evaluate the relevance of its work.

Additional information and requirements on the case-study

Please indicate in which of the following themes your case-study fits best:

- a) Climate resilient cities / c) water use / availability d) delta extremes (floods/droughts) - ALL

Please indicate where in the (imaginary) delta catchment your case-study is located (approximately):

a) Upper / b) middle / c) lower section - ALL

Please deliver the case-study information requested with inclusion of images, a vlog or video, infographics, etc. This will enable a wider public to engage into the topic and learn from your experiences.

WISE UP Econ-hydrograph:

http://www.waterandnature.org/sites/default/files/wise_up_econhydrograph_final_version.pdf

Since we will be working with an online environment, please also add web-links to locations where more information can be found on your case-study (papers, your own webpage, etc.)

https://social.shorthand.com/IUCN_Water/uCveSad9IT/wise-up-to-climate

WISE UP Blogs:

Local benefits highlight role of natural infrastructure in adaptive basin planning:

<http://www.waterandnature.org/blog/local-benefits-highlight-role-natural-infrastructure-adaptive-basin-planning>

Measuring livelihood dependency on river flow: an interdisciplinary approach:

<http://www.waterandnature.org/blog/measuring-livelihood-dependency-river-flow-interdisciplinary-approach>

Balancing complexity and simplicity: the challenges of (re)packaging science for decision-making and policy

relevance: <https://www.iucn.org/content/balancing-complexity-and-simplicity-challenge-repackaging-science-decision-making-and-policy>

Adapting to climate change through 'action learning': <http://www.waterandnature.org/blog/adapting-climate-change-through-%E2%80%98action-learning%E2%80%99>

Inclusive Water Development: experiences from the WISE-UP project:

<http://www.waterandnature.org/blog/inclusive-water-development-experiences-wise-project>

Contributors: