



Adaptive water governance: Lessons learned from implementing an ecosystem-approach in Mesoamerica

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1 Introduction

The IPCC Report on Climate Change and Water concludes that freshwater resources are highly vulnerable to climate change.² Climate change impacts on the hydrological cycle include changes in the amount and quality of available freshwater resources and extremes like floods and droughts and are projected to intensify in the future.³ Hence, water is one of the resources that is going to be most seriously affected by climate change, and where climate change manifests its impacts more fully: Climate change is water change. Considering the importance of freshwater for both human and natural systems, this poses serious threats to life on earth and brings about the need for urgent solutions to sustainable water management on all scales. Accordingly, effective governance is needed to manage water resources sustainably. In this context, it is important to note that 276 river and lake basins are shared between two or more countries. Competing uses over these resources can lead to over-allocation, pollution and degradation of the ecosystems. Eventually, this can lead to tensions and conflicts between riparian states. Given the vital importance of freshwater, innovative approaches are needed that take into account these complexities.

Adaptive governance of water resources has evolved as a response to these challenges. The approach is still new and experiences are needed to supplement and give practical meaning to this concept. It is crucial to see whether and how water management and “water governance capacity”⁴ are transformed when building a robust governance framework and applying the principles of adaptive water governance on the ground.

IUCN is putting the principles of adaptive governance into practice by implementing an ecosystem approach in several pilot river and lake basins around the world. This paper presents some lessons learned from the implementation of adaptive water governance at the local level in Mesoamerica.

The paper is divided into two segments. The first segment introduces the concept of adaptive water governance and explains the principles it relies upon. Further, it analyses why International Water Law plays a crucial role in supplementing adaptive water governance. The second segment reports experiences from the application of the concept on the ground. It states challenges encountered and lessons learned during IUCN’s practical work in Mesoamerica. The paper concludes that adaptive governance is a good way to enhance both water governance and adaptive capacity on a local level as well as on a transnational one and promotes cooperation and trust building.

² Bates, B.C., Z.W. Kundzewicz, S. Wu and J.P. Palutikof (Eds.): *Climate Change and Water. Technical Paper of the Intergovernmental Panel on Climate Change* (IPCC Secretariat 2008).

³ *ibid.*

⁴ In their book “RULE – reforming water governance”, Iza and Stein define water governance capacity as “a society’s level of competence to implement effective water arrangements through policies, laws, institutions, regulations and compliance mechanisms”, Iza, A. and Stein, R. (Eds) RULE – Reforming water governance (IUCN 2009).

2 Water, climate change and ecosystems

Freshwater systems are complex, characterised by their own dynamics and organic processes, which are determined by on-going feedbacks and self-organisation.⁵ Generally, these systems are considered to possess the capacity to respond and adapt to different stressors,⁶ but constant human interactions present factors that are not easily borne.⁷ Freshwater therefore has the complex characteristics of a combined social-ecological system,⁸ through which greater variation within its organic processes results in increased unpredictability and declined capacity to adapt.⁹ Furthermore, climate change alters the hydrological cycle in a non-comparable fashion, posing an additional, significant amount of uncertainty.¹⁰ Population growth will add to this through a rising demand for food, freshwater and energy, and increases in agricultural and industrial pollution.¹¹ All of these unsupportive external forces result in a direct impact on the quantity and quality of the freshwater resources available.

Good water governance is a means to address these challenges by implementing effective water management through policies, laws and institutions.¹² It is intrinsic to health, food security and economic development of hydrological basins. Poor water governance results in over-allocation and pollution of water resources and in the degradation of essential ecosystem services people rely upon for water storage and management during periods of flood risks and droughts. Recently states have become increasingly aware of the scarcity of this vital resource: up to now, around 29 states suffer from more or less severe water shortages and according to the World Meteorological Organization, if conditions remain unchanged, the number will rise to 34 by 2025.¹³

So far, States have made major efforts in mitigating and adapting to climate variability, but the paradigm of stationarity¹⁴, where natural system fluctuations occur within a range of certainty, no longer applies. To achieve good water governance that responds to the demands and challenges posed by climate change it is central to accept and incorporate uncertainty into project plans, policies and laws related to water. Decision makers often lack the resources to conduct sound studies and regional modelling on the specific impacts of climate change on their national territory, so there is a need to develop governance frameworks that are functional and designed

⁵ Folke C. 'Resilience: The emergence of a perspective for social-ecological systems analyses' (2006) 16 *Global Environmental Change* 253.

⁶ Young K.R. and Lipton J. 'Adaptive Governance and Climate Change in the tropical Highlands of Western South America' (2006) 78 *Climatic Change* 63.

⁷ *ibid.*

⁸ Folke C. 'Resilience: The emergence of a perspective for social-ecological systems analyses' (2006) 16 *Global Environmental Change* 253.

⁹ Medema, W., B. S. McIntosh, and P. J. Jeffrey 'From premise to practice: a critical assessment of integrated water resources management and adaptive management approaches in the water sector' (2008) 13 *Ecology and Society* [online], available at: <http://www.ecologyandsociety.org>.

¹⁰ Bates, B.C., Z.W. Kundzewicz, S. Wu and J.P. Palutikof (Eds.): *Climate Change and Water. Technical Paper of the Intergovernmental Panel on Climate Change* (IPCC Secretariat 2008).

¹¹ *ibid.*

¹² Iza, A. and Stein, R. (Eds) *RULE – Reforming water governance* (IUCN 2009)

¹³ Aguilar Rojas G., Iza A. *Governance of Shared Waters: Legal and Institutional Issues* (IUCN 2011).

¹⁴ *ibid.*

flexibly enough to allow for periodic changes to the objectives, information, and rights in order to adjust appropriately.¹⁵ Still, most current legislations fail to address climate change adaptation in a holistic manner. This can be related to the fact that climate impacts are frequently seen as hypothetical events happening in the future¹⁶ and that it is seen as more convenient to *react* to them by applying technological measures as coping mechanisms, instead of anticipating and preventing them.

However, *preventive* and *proactive* action is needed to reduce vulnerability and engage successfully in the sustainable development of hydrological basins. In the context of climate change, vulnerability is described as the “state of susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt”.¹⁷ This means that vulnerability is the extent to which a community is able or unable to cope with adverse climate impacts. Generally, developing countries are considered more vulnerable since they do not possess sufficient social, financial and technological means to adapt¹⁸. On the other hand, adaptive capacity is the ability to respond to these challenges through learning how to manage them, developing new knowledge and being malleable enough to adopt new working methods and strategies.¹⁹ The more a community is resilient to changing circumstances - is able to adapt - the less it is vulnerable.

3 Adaptive Governance as an opportunity

In the light of this demand, adaptive governance has evolved as an approach to deal with the multiple challenges that have been associated with the governance of climate change. It is seen as an ongoing process for integrating uncertainty and insufficient knowledge into planning processes by continually reviewing management practices and learning from the outcomes. Decisions need to be informed in order to be prepared to act and to decide how to best modify current intervention strategies.²⁰ The concept is particularly suitable for water resources, due to their intrinsic biophysical processes, dynamics and feedbacks, as explained above.

Adaptive governance, in contrast to single adaptation measures or conventional resources management, is an integrated way of managing natural resources across relevant sectors, and

¹⁵ *ibid.*

¹⁶ International Union for Conservation of Nature *Climate Change and Governance: Ecosystem-based approach in Mesoamerica* (IUCN 2010).

¹⁷ Adger, W. N., ‘Vulnerability’ (2006) 16 *Global Environmental Change* 268.

¹⁸ International Union for Conservation of Nature *Climate Change and Governance: Ecosystem-based approach in Mesoamerica* (IUCN 2010).

¹⁹ Marshall N.A., Tamelander J., Obura D., Malleret-King D., Cinner J.E., *A Framework for Social Adaptation to Climate Change: Sustaining Tropical Coastal Communities and Industries* (IUCN 2009).

²⁰ International Union for Conservation of Nature Information Paper *Recovery from the Indian Ocean Tsunami: Guidance for Ecosystem Rehabilitation incorporating livelihoods concerns* (IUCN 2005).

places emphasis on flexibility of and learning from applied measures.²¹ The ecosystem approach becomes central to adaptive governance, as it favours biodiversity and ecosystem services over inflexible built structures. It promotes a holistic management of water, land and living resources, striving for sustainable management, conservation, and restoration of water resources in order for them to provide services that facilitate adaptation to climate change of the local population.²² The resilience of a resource to the adverse impacts of climate change is augmented if its ecological integrity is maintained.²³ The ecosystem approach includes the ideas of sustainability, interconnection of ecological and social systems, adaptive management and the precautionary approach. It proposes to enable people to adapt to climate change by preserving the structure, functions and services of ecosystems.²⁴

Ecosystems provide vital services to people: they are sources for food and freshwater and fulfil an essential role during extreme climate events such as droughts and floods in storing water and preventing soil erosion. In addition, they provide habitats for plants and animals and are of cultural, scientific and educational value.²⁵ The flexibility of the ecosystem approach allows it to account for the great uncertainties regarding the impacts of climate change on water resources. Enhancing the health of the ecosystem instead of installing purely technological measures is therefore a so called “no regret” or “win-win” strategy.

The cross-sectoral nature of vulnerabilities and adaptive responses further requires a multi-level approach.²⁶ Other sectors such as agriculture, energy, and health are also projected to be hit hard by climate change and since these are related to water, mutual feedbacks are in a position to enhance negative impacts. A horizontal integration and coordination across sectors and within single sectors will therefore be necessary.²⁷ Furthermore, vertical integration is necessary, since water management takes place at the local level, while decisions are taken at the national, regional or even global levels.²⁸

Governance is understood as a set of policies, laws, and institutions. As common pool resources, freshwater resources such as river basins are particularly complex to govern and require effective institutional arrangements to ensure their sustainable use.²⁹ The existence and effectiveness of institutions is therefore crucial, as well as the institutional design. The latter plays a critical role to ensure integration of all levels. For adaptive governance, the focus should be on the river basin

²¹ Medema, W., B. S. McIntosh, and P. J. Jeffrey ‘From premise to practice: a critical assessment of integrated water resources management and adaptive management approaches in the water sector’ (2008) 13 *Ecology and Society* [online], available at: <http://www.ecologyandsociety.org>.

²² A. Colls, N. Ash, and N. Ikkala *Ecosystem-based Adaptation: a natural response to climate* (IUCN 2009).

²³ Troell J., Swason G. ‘Adaptive Water Governance and the Principles of International Law’ in Roberts J., Sanchez J.C., (eds.) *Transboundary Water Governance: Adaptation to Climate Change* (IUCN 2014).

²⁴ Aguilar Rojas G., Iza A. *Governance of Shared Waters: Legal and Institutional Issues* (IUCN 2011).

²⁵ *ibid.*

²⁶ Troell J., Swason G. ‘Adaptive Water Governance and the Principles of International Law’ in Roberts J., Sanchez J.C., (eds.) *Transboundary Water Governance: Adaptation to Climate Change* (IUCN 2014).

²⁷ *ibid.*

²⁸ *ibid.*

²⁹ Ostrom, E. *Governing the commons: the evolution of institutions for collective action* (Cambridge University Press 1990).

level as the scale of decision-making and management.³⁰ Adequate water legislation that regulates water management and promotes the establishment of water institutions, for example basin organisations at different levels, is crucial for effective governance. However, there is the need for sufficient capacity to translate national laws and regulations or even global agreements to the basin level.

Adaptive governance accounts for the uncertainties associated with the variations in water quantity and quality due to climate change, which will significantly differ in the short, medium, and long-term.³¹ This relates to the timing, intensity and the character of climate impacts, such as changes in precipitation patterns, droughts and floods.³² In contrast to conventional governance approaches, adaptive governance can account for these uncertainties in the sense that collaborative, flexible and learning-based approaches are at the core of the concept, including decision-makers and stakeholders from all societal levels.³³ The objective is to equip decision-makers and stakeholders with an understanding of the social-ecological system and the required skills to deal with variability and uncertainty.³⁴ Multi-level, broad-based stakeholder participation is therefore another critical aspect of this approach.

4 Water governance and the principles of International Water Law

To have a functional, flexible, and innovative governance framework in place that facilitates effective and sustainable adaptation of water resources requires policies, laws and institutions to be in place and operational. Results from the ground indicate that transboundary water cooperation in particular still shows significant governance gaps, despite the fact that 60 per cent of the global freshwater resources are shared between two or more States.³⁵ For these States, good water governance cannot be seen as a purely national matter: Even if States claim sovereign rights over the portions of rivers and lakes located within their territories, certain activities, projects and programmes can potentially affect all riparian States. Consequently, the idea of the hydrological unity of a river or lake basin and the community of interest of all riparian States are crucial elements for a sustainable management of shared resources. Only through cooperation in the management of the basin, overcoming the lack of confidence and the fear of losing

³⁰ Huitema, D., E. Mostert, W. Egas, S. Moellenkamp, C. Pahl-Wostl, and R. Yalcin 'Adaptive water governance: assessing the institutional prescriptions of adaptive (co-)management from a governance perspective and defining a research agenda' (2009) 14 Ecology and Society 26 [online], available at: <http://www.ecologyandsociety.org>.

³¹ Bradley, R. S., M. Vuille, H. F. Diaz, W. Vergara 'Threats to Water Supplies in the Tropical Andes' (2008) 312 Science 1755.

³² Troell J., Swason G. 'Adaptive Water Governance and the Principles of International Law' in Roberts J., Sanchez J.C., (eds.) *Transboundary Water Governance: Adaptation to Climate Change* (IUCN 2014).

³³ Pahl-Wostl, C., M. Craps, A. Dewulf, E. Mostert, D. Tabara, and T. Taillieu 'Social learning and water resources management' (2007) 12 Ecology and Society [online], available at: <http://www.ecologyandsociety.org>.

³⁴ *ibid.*

³⁵ Smith, M., and Cartin M. *Water Vision to Action: Catalysing Change through the IUCN Water and Nature Initiative*, (IUCN 2011).

sovereignty, it is possible to achieve effective risks prevention and reduction, water security, economic development and environmental protection on a basin-wide level.³⁶

International Water Law provides guidance on how to govern shared rivers and lakes, thus it supports sustainable and equitable use of the resources. Two major international instruments, the *Convention on the Protection and Use of Transboundary Watercourses and International Lakes* adopted in 1992 (Helsinki Convention) and the *UN Convention on Non-Navigable Uses of International Watercourses* adopted in 1997 (UN Convention)³⁷ set out a series of substantial and procedural obligations States should consider when discussing transboundary water governance.³⁸ The international community has recognized that these treaties contain a set of principles, most of which are already part of International Customary Law and can therefore be considered binding upon States. Despite being international instruments of multi-regional and global character, they are just as important for water governance at the local level. The following section describes briefly two principles of International Water Law that play a central role for invigorating adaptive water governance in a transboundary context.

Equitable and reasonable utilization

The principle of equitable and reasonable utilization is based upon the idea of the community of interest of all basin States and includes “both the right to utilize the watercourse and the duty to cooperate in the protection and development thereof...”³⁹. It requires States to use, develop and protect watercourses in an equitable and reasonable manner. The doctrine in question is flexible: what is considered an equitable apportionment may vary over time with changes in the circumstances of the States concerned. “Equality of rights” does not imply that every State is entitled to the same amount of water, rather it refers to the right to receive an equitable share of the benefits deriving therefrom. Article 6 of the UN Watercourse Convention provides a series of factors that need to be taken into account to determine when an apportionment is equitable and reasonable. However, none of the factors prevails over the others and each one needs to be weighted in comparison with the others: geographical and climatic factors, social and economic needs, effect of the use on other States, existing and potential uses, availability of alternatives of comparable value, etc.⁴⁰ Even if a state engages in an activity which causes harm to other riparians, this harm will be just one more factor to be taken into account in establishing equitable utilization. In addition, prior or existing uses do not entitle to an absolute protection of that activity,⁴¹ but old activities may give way to new uses to achieve an equitable allocation of

³⁶ Drieschove A., Eckstein G. ‘Cooperative Transboundary Mechanisms’ in Roberts J., Sanchez J.C., (eds.) *Transboundary Water Governance: Adaptation to Climate Change* (IUCN 2014).

³⁷ Aguilar Rojas G., Iza A. *Governance of Shared Waters: Legal and Institutional Issues* (IUCN 2011); United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses 1997 Art. 5.

³⁸ *ibid.*

³⁹ United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses 1997 Art. 5 Para. 2.

⁴⁰ Troell J., Swason G. ‘Adaptive Water Governance and the Principles of International Law’ in Roberts J., Sanchez J.C., (eds.) *Transboundary Water Governance: Adaptation to Climate Change* (IUCN 2014).

⁴¹ United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses 1997 Art. 10.

benefits. Ultimately, the implementation of this principle depends on good faith and cooperation between states.⁴²

Prevention of significant transboundary harm

This principle does not absolutely prohibit the causation of any harm to other riparian states, but rather it requires states to avoid significant harm in a way and to the extent that this is reasonable under given circumstances, recalling the principle of due diligence. The “no harm” rule refers to harm resulting from both activities directly affecting a watercourse, like building a dam, and activities not necessarily connected with the use of a watercourse, such as deforestation. As outlined by the UN Watercourse Convention, environmental pollution or harm is prohibited only if the harm is significant and unreasonable. The adjective “significant” is meant to be a threshold low enough to exclude trivial harm from the discussion and high enough to trigger before substantial or serious damage is done.⁴³ According to the ICJ in the *Pulp Mill Case*, a transboundary environmental impact assessment (TEIA) would put into practice numerous procedural requirements included in the principle of equitable and reasonable utilization and in the “no harm” rule.⁴⁴ Additionally, it should be noted that a strategic environmental assessment (SEA) might be a useful tool to integrate climate change concerns into basin-wide planning processes.⁴⁵ Strategic Environmental Assessments are Environmental Impact Assessments that have a broader scope and can therefore be used to evaluate vulnerabilities of projects to climate impacts, instead of focusing on the environmental impacts of the project only.⁴⁶

Procedural obligations

The duty to cooperate is a cornerstone of international environmental law. Under Article 8 the UN Watercourse Convention requires states to cooperate in good faith to adequately protect international watercourses.⁴⁷ Moreover, it encourages states to eventually establish joint management mechanisms and institutions. However, even if cooperation holds many beneficial outcomes for states, putting it into practice is a challenging undertaking. The primary obstacles to good cooperation are the lack of political will, shortages of institutional capacities and the asymmetries between national legislations of riparian states. Procedural obligations such as the obligation to regularly exchange data and information⁴⁸, the obligation of prior notification⁴⁹ and the duty to consult with other riparian states⁵⁰ are fundamental tools to overcome these challenges. Cooperation over technical issues like water quality or meteorological data enhances

⁴² McCaffrey S.C., *The Law of International Watercourses* (Oxford University Press 2007).

⁴³ *Ibid.*

⁴⁴ Troell J., Swason G. ‘Adaptive Water Governance and the Principles of International Law’ in Roberts J., Sanchez J.C., (eds.) *Transboundary Water Governance: Adaptation to Climate Change* (IUCN 2014).

⁴⁵ *ibid.*

⁴⁶ *ibid.*

⁴⁷ United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses 1997 Art. 6.

⁴⁸ *ibid.* Art. 9.

⁴⁹ *ibid.* Art. 11.

⁵⁰ *ibid.* Art. 17.

trust among riparian states and thus might make it possible for technical expertise to overcome political difficulties⁵¹ and foster basin-wide and regional stability.

At the transboundary level, these principles feed into the adaptive governance framework, supporting it via laying out guidance on transnational cooperation, which is crucial for the sustainable management of shared resources or those resources that are of strategic significance in a given region. Therefore, when talking about adaptive governance in transboundary basins, the referred principles need to be taken into account and adequately factored in national activities and projects as well as in transnational undertakings.

5 Testing adaptive water governance on the ground: experiences from implementing the ecosystem approach

5.1 Water governance in Mesoamerica

IUCN has been working on adaptive water governance by applying the ecosystem approach in Mesoamerica in the framework of two different projects. One of these projects is entitled *Building River Dialogue and Governance* (BRIDGE). The other project is known as *Climate Change Governance Capacity: Building regionally- and nationally- tailored ecosystem-based adaptation in Mesoamerica* (EbA).

BRIDGE works in four regions, Mesoamerica, the Andes, the lower Mekong and Africa, and aims to promote good water governance through consensus building, demonstration, leadership and learning in the context of transboundary river and lake basins. It endeavours to enhance water security and facilitate progress in ecosystem management using the ecosystem approach, water supply, sanitation and sustainable water management. The objective of BRIDGE is to achieve these goals by catalysing cooperation among riparian states, establishing or reinforcing transboundary institutional mechanisms and supporting basin wide planning and technical coordination.

Within Mesoamerica BRIDGE has been working in three basins: Coatán, Goascorán (Sumpul sub-basin), and Sixaola, which also served as intervention sites for the above mentioned EbA project. In these sites the ecosystem approach theory was put into practice through a three-component integrated methodology that included: water governance capacity building, conservation and restoration of ecosystems, and improving local livelihoods. The EbA project goal was primarily to enhance ecosystem resilience to climate change by catalysing enhanced governance arrangements and strengthening of capacities for developing and implementing legislation and policy development on climate change and water management.

⁵¹ Aguilar Rojas G., Iza A. *Governance of Shared Waters: Legal and Institutional Issues* (IUCN 2011).

Both projects are implemented in transboundary basins. A fundamental element to the project intervention therefore, is to apply hydro-diplomacy but integrating the principles of multi-level dialogues and broad-based stakeholder participation. The understanding is that diplomacy takes place under the authority of sovereign states, but – because water is a resource used by everyone and managed at multiple scales – for agreements to work effectively, they require the support of water users. Thus, different agreements are needed for effective water governance: These may include both international treaties and a wide range of formal and informal agreements between local authorities, technical agencies and the private sector.⁵² To achieve efficient long-term results, water management issues need to be addressed at the appropriate scales (local, national, regional). National authorities need to support local actions with comprehensive regulations to give them both clear guidance and the necessary policy backstopping.

However, participation of a broad range of stakeholders in planning, implementing and monitoring plans and strategies can be problematic because water users often lack both water governance capacity and formal and legitimate representation. Thus, it is essential to ensure that local stakeholder groups are given the opportunity to be equally represented and that they have the means to participate actively and meaningfully in planning processes. Public involvement calls for a strong commitment from local communities, to put into action water policies and plans that respect local capacities, needs, and vulnerabilities as well as national water management and development policies. Broad stakeholder participation helps people to understand climate science and to overcome popular misconceptions about the nature, degree and the consequences of climate change causes and impacts.⁵³

The following section explains the challenges faced and the lessons learned through applying the ecosystem approach on the ground in Mesoamerica. Using examples from the field it shows evidence that adaptive governance is an auspicious way to enhance both good water governance and adaptive capacity at the local as well as at the transnational level. Slowly it is being recognized that political goals such as economic growth, developing sustainable livelihoods and environmental protection can be realized through a more efficient management of water.⁵⁴

For the purpose of this paper, the three above mentioned basins in Mesoamerica where both BRIDGE and EbA interventions have taken place have been selected to illustrate the lessons that can be learned from testing adaptive governance on the ground.

⁵² *ibid.*

⁵³ *ibid.*

⁵⁴ IUCN Water and Nature Initiative, *What we've learned: Implementation Principle 7*, <http://www.waterandnature.org/en/results/what-weve-learned>, accessed 2 April 2014.

5.2 Presentation of the three River Basins

5.2.1 Sixaola Basin

The Sixaola is a contiguous river that establishes part of the boundary between Costa Rica and Panama, in the southern part of the Central American Isthmus. It originates in the Talamanca Range, and drains in the direction West-East into the Caribbean. The basin is especially rich in biodiversity, and a number of indigenous communities rely heavily on the basin's ecosystems for their livelihoods.

The basin is characterized by social and economic diversity, which have influenced its governance. While in the lower basin transnational companies manage large fruit plantations for consumption overseas, indigenous territories located in the middle and upper part rely heavily on their own production. The basin is adjacent to the International Park "La Amistad", a transboundary protected area of significant importance,⁵⁵ which has been a Biosphere Reserve since 1982 and was declared a World Heritage Site in 1983.⁵⁶ The river is used for navigation and communication between the different communities, as well as for irrigation and provision of drinking water. One major issue is poor water quality due to the use of pesticides, which have resulted in public health problems.⁵⁷

The primary impacts from climate change are projected to be heavy rainfalls, which will cause severe floods, damaging livelihood and resources.⁵⁸ Droughts will have a lesser impact.⁵⁹ Additionally to its high vulnerability to climate change, the Sixaola Basin faces significant power asymmetries among stakeholders, in particular, the agroindustry sector and the local communities, and this has a correlation with the improvement of water governance arrangements in the basin.⁶⁰

As far as the basin governance framework, in 1992, Costa Rica and Panama signed the *Treaty on cooperation for border development* which covers several areas, such as social, economic, commercial and environmental. The treaty sets out an institutional cooperative structure, the Costa Rica-Panama Permanent Binational Commission (PBC), which was, however, rather dormant during the first years of its existence. The following institutions were created under the treaty: the PBC, the primary decision-making body for the whole basin; two executive secretariats representing each country and monitoring the decisions made by the PBC; Ordinary and Special Binational Sectoral Technical Commissions (BSTCs) that provide technical assistance to particular sectors; and the Binational Executive Technical Units (BETUs) that serve

⁵⁵ The particular importance of the International Park "La Amistad" is further expressed by the fact that a Binational Sectoral Technical Commission was particularly established for "La Amistad" within the framework of the Border Treaty to ensure coherence in the governance of this jointly executed project.

⁵⁶ Peña Chacón M., Perez de Madrid M. 'Case Study: Up-scaling Adaptation in the Sixaola River Basin' in Roberts J., Sanchez J.C., (eds.) *Transboundary Water Governance: Adaptation to Climate Change* (IUCN 2014).

⁵⁷ *ibid.*

⁵⁸ *ibid.*

⁵⁹ *ibid.*

⁶⁰ *ibid.*

as implementation units.⁶¹ Within the framework of the BCTCs, the Binational Commission for the Sixaola River Basin (BCSRB) was established with a view of responding to environmental threats and climate change impacts. Its primary function was to oversee a binational project entitled Integrated Ecosystem Management of the Sixaola Binational River Basin, funded by the Interamerican Development Bank (IDB). As a binational body, it served as a platform for broad-based stakeholder participation, but had no formal decision-making authority. It is worth noting that while Costa Rica recently passed a new water bill, at the start of the BRIDGE and EbA project interventions, there was no law that regulated water management or the establishment of water institutions. Panama, on the contrary, has a water law in place which promotes the establishment of basin organisations.

The aim of IUCN's intervention in the Sixaola Basin was to create an enabling environment for deepening the cooperation between Costa Rica and Panama within the basin, promoting sensitization and awareness raising on climate change impacts as well as specific interventions to demonstrate EbA in practice, and embracing the governance arrangements within the basin through strategic and technical support to the BCSRB. Statutes were drafted which led to a formalization process of the Commission within the PBC, clarified the objectives and activities for the Sixaola Commission and elucidated the roles and responsibilities of its members (national agencies, local authorities, communities, and local stakeholders). Before this process took place, the lack of clarity coupled with national sensitivities relating to specific border issues compromised the cooperation process and led to the ineffectiveness of the Commission. The trainings (technical, legal, institutional) and the strategic support provided by IUCN to the wide array of basin stakeholders raised awareness about the environmental challenges and also resulted in strengthened water governance capacities to progressively establish the mechanism to manage the Sixaola Basin effectively and sustainably.

Alongside the institutional development, emphasis was given to increasing local capacities in natural resources governance and climate change adaptation strategies, as well as to public participation. The micro-basin Quebrada Rosa (within the Panamean territory) was selected to implement a micro-basin community management plan, as a result of which a water committee was established. Special trainings on ecosystem based adaptation measures and strategies were conducted which triggered agricultural diversification and reforestation within the micro-basin. A diversification of seeds was introduced with a view to motivating local communities to prioritize organic and local seeds instead of introduced ones. The example of the micro-basin Quebrada Rosa could be replicated along the basin and upscaled within the region to demonstrate the benefits of cooperative action to address climate change challenges.

5.2.2 *Coatán Basin*

The Coatán is a shared basin located in the Southwest of Mexico and Northwest of Guatemala. The river originates on the slopes of the Tacaná Volcano and drains into the Pacific Ocean. The

⁶¹ *ibid.*

basin is of strategic importance for both states due to the number of cities and intensive agricultural activities that depend on its waters and associated resources. Within Guatemala the waters are mostly used for small-scale irrigation and domestic consumption whereas in Mexico the main use is irrigation.⁶² The local economy primarily depends on agriculture, in particular coffee production and export.⁶³ An already existing challenge with major impacts for agricultural production is water scarcity in the middle and lower basin during the dry season.⁶⁴ A threatening issue across the region is the increase in floods and mudslides due to soil erosion from wide-ranging deforestation and unregulated land use changes.⁶⁵ Another challenge consists of the weak institutional framework in the basin: there is limited interrelation between the local and national levels, and consequently limited stakeholder participation.⁶⁶ With regards to water legislation, there is an asymmetry between the two basin states. Mexico passed a water law in 1992 and amended it in 2004. While Mexico's water law recognises basin institutions at different levels and promotes water management at basin level, Guatemala has not yet enacted a law that regulates water resources in particular or recognises institutional structures for water management.

Based on the local realities within the Coatlán basin, IUCN's efforts have been geared towards establishing an effective framework of local community governance. This model was implemented in the Mexican section of the basin, through the establishment of the micro-basin Committee of Buena Vista. This undertaking triggered the organisation of a first joint transboundary workshop on water management to provide a platform for having a dialogue and sharing experiences between the two countries. As a result of this, other communities responded by establishing micro-basin councils.

As a result of an initial lack of cooperation at the national level between Guatemala and Mexico, transboundary water governance was predominantly driven from the local level. With a view of promoting further dialogues on this matter, BRIDGE organised a network of local "water champions", promoting cooperation on matters related to integrated water management. This network took the lead in approaching local authorities and engaged one Mexican and two Guatemalan municipalities in a dialogue at local scale. In addition, trainings were delivered along the basin to raise further awareness and build capacities on ecosystem based adaptation as well as to strengthen water governance capacities of stakeholders and local governments. This process helped the newly established institutional arrangements implement new farming systems, introducing agroforestry and reforesting the basin.

⁶² Cartin M., Welling R., Córdoba R., Rivera O., Rosal C., Arrevillaga F., *Tacaná Watersheds: Guatemala and Mexico* (IUCN n.d.).

⁶³ *ibid.*

⁶⁴ *ibid.*

⁶⁵ *ibid.*

⁶⁶ *ibid.*

5.2.3 Goascorán Basin

The Goascorán is a transboundary basin shared by Honduras and El Salvador. The Goascorán river originates in Honduras and drains into the Pacific Ocean, more precisely in the Gulf of Fonseca, shared by El Salvador, Honduras, and Nicaragua. The basin presents a diversified economy: the middle and lower parts depend mainly on agriculture, livestock, tourism and fishing, whereas the upper part has the potential for eco-tourism, silvopastoralism and agroforestry.⁶⁷ Honduras enacted a water law in 2009 that establishes different forms of basin organisations at different levels. El Salvador does not yet have a water law in place that regulates water management. In 2006 the EU funded a project for the development of the border between Honduras and El Salvador. Part of this project had the objective to promote the adoption of a basin management plan, as well as a plan for integrated water management. The project further laid out the establishment of a Binational Management Group (BMG) for the Goascorán basin with the intention to promote broad-based stakeholder participation in water management in the border areas. However, with the end of the previously mentioned EU funded project, the BMG stopped its operation, which happened before IUCN started its work in the area.

Having an institutional framework already in place (the BMG), IUCN's aim was to revitalize it and stimulate its operation. At the sub-regional level, work was undertaken with local institutions to ascertain stakeholder's challenges and expectations as well as widen the stakeholder base in order to include all interest groups. Emphasis was also given to those stakeholders not previously included in the BMG, such as local development agencies and national ministries from both basin countries dealing with planning, interior affairs, and agriculture. The existing management plan was revised with a view of matching the interests of all stakeholders and was used as a basis for developing various management actions at the local and transboundary levels. The BMG then served as a mechanism for cooperation in the basin and put into place a new transboundary committee, focusing particularly on economic, financial, and environmental issues. In the absence of a binational treaty to regulate the basin, the BMG concentrated on formalizing its establishment and strengthening its institutional base by setting up national basin institutions according to the national legislation of the two basin states. In Honduras a number of meetings took place with the objective of establishing sub-basin councils. However, in El Salvador, the process is more cumbersome in the absence of national water legislation providing for the establishment of basin institutions. Thus, an equivalent legal entity to the sub-basin councils in Honduras was to be identified for the Salvadoran part of the Goascorán Basin. For one of the sub-basins of the Goascorán, IUCN facilitated the establishment of the Sumpul Binational Committee, with representation from local organisations in Honduras. Trainings to strengthen the water management and ecosystem-based adaptation capacities have been a central point of departure for IUCN's collaboration with this institution. Capacity building efforts focused on matters relating to reforestation, monitoring of water quality, and pollution control. The

⁶⁷ MacQuarrie P., Welling R., Porras N., Córdoba R., *Goascorán Basin: Honduras and El Salvador* (IUCN 2013).

communities living in the Sumpul have started the process of shifting from monocrops to agro-diversification models as a means for reducing vulnerability to climate impacts.

5.3 Lessons Learned

From the IUCN project interventions in Mesoamerica it is possible to outline some experiences, and lessons learned deriving from on-the-ground implementation of adaptive governance and the ecosystem approach.

An overarching lesson has been that what appear to be intransigent situations may be dynamic underneath, or else the simple act of starting new dialogues can lead to unexpected shifts in transboundary arrangements. These can have unforeseen consequences that must be managed adaptively. Thus, it is clear that in the context of water-diplomacy initiatives, significant impacts cannot be expected in a short period of time. However, incremental steps within a broader influencing strategy can make a difference, especially if that strategy is agile and adaptive. The same is true with regard to uncertainty. Investing in natural instead of built infrastructure can be considered as no-regret measure, since healthy natural infrastructure can more easily adapt to unforeseen changes. Applying the ecosystem approach to water management, livelihoods could be improved and adaptive capacity fostered at the local level, for example by enhancing the resilience of local ecosystems through agroforestry, such as in the case of the Coatán Basin.

Institutions

Institutions are absolutely fundamental for an effective and sustainable management of water. While this idea has been already proposed within the concept of adaptive governance, IUCN's on-the-ground intervention unfolds other aspects. Legislation becomes particularly crucial for an understanding of mandates of different agencies, as well as roles and responsibilities of various stakeholders. For example, in the absence of a transboundary agreement between Honduras and El Salvador in the Goascorán Basin, national-level governance structures were conceived with a view to progressively developing a binational cooperation agreement (through adhering to the national level constructs). Honduras has a water law in place that provides for the establishment of basin organizations. In El Salvador, such a law does not exist. As a result, it was only possible for an institutional arrangement to be established straightforwardly for the Honduran part of the basin,⁶⁸ whereas for El Salvador there was a need to identify other legal settings, in particular local development councils comprising public and private actors. However, these settings do not provide explicit legal competences as far as water management is concerned, something which may compromise coherence of the transboundary water governance arrangements towards the future.

⁶⁸ The Honduran set-up explicitly calls for the integration of national authorities in the case of a transboundary watershed, which certainly fits the purpose of vertical integration and facilitates dialogue at the national level.

The very existence of institutions, however, is not enough. As shown in the case of the BCSRБ between Costa Rica and Panama, there was a need to articulate different institutional levels (that of the commission for the entire border area - PBC - with the transboundary basin commission - BCSRБ), to clarify their mandates and responsibilities, and provide for an effective dialogue between different institutions, agencies and stakeholders represented in both commissions in order to unlock cooperation. For example, enlarging the institutional basis for transboundary water management within the Costa Rica-Panama PBC led to uncertainty among some public and private actors on whether strengthening the Sixaola Basin Commission (BCSRБ) will dilute the importance of the PBC. Capacity building and training as part of water diplomacy helped to overcome misconceptions and foster trust.

The issue of scale

Any project seeking to enhance water governance capacities needs the support of water users to be operational at the local level. Without stakeholder participation, plans and institutions will lack legitimacy and most likely basin communities will not support them genuinely. In order to move forward towards achieving concrete solutions and tangible livelihood improvements, it is indispensable to pay particular attention to stakeholders' priority issues and matters of concern. In other words, when states decide to engage in transboundary cooperation, community actors need to be involved in the process making sure that they "own" the agreements and that their priority issues are truly addressed.⁶⁹

Against the background of restricted cooperation between Guatemala and Mexico at the national level, a bottom-up approach to hydro diplomacy enabled the establishment of a space for local communities in the Coatán Basin to collaborate with their neighbours living across the international border. At the local level, micro-basin councils were established and started to implement a number of projects such as the rehabilitation of water systems in the Department of San Marcos, Guatemala, and fostering exchange of experiences with the State of Chiapas, Mexico.

The establishment of networks of "water champions" has been one of the fundamental ingredients for supporting the establishment of governance arrangements in the context of transboundary basins and catalyzing local actions to address climate change adaptation. A multiplicity of stakeholders are part of these networks, including municipal leaders, which are particularly engaged in the promotion of actions relating to climate change and water governance. The network members have received a number of trainings on water cooperation, governance, EbA, as well as on leadership skills development. A concrete result of the "water champions" network engagement was the establishment of the Buena Vista Micro-basin Committee in Mexico in 2011. In dialogues and workshops the networks have begun to establish local committees and design workplans and advocacy strategies to implement them. While support of

⁶⁹ International Union for Conservation of Nature *Water Diplomacy* (n.d.).

micro-basin councils is gaining traction at the national level, interactions with adjacent groups and communities within and beyond national boundaries is starting to increase transboundary cooperation. These types of local level interventions have the ability to move across scales once demonstrations are given and a positive enabling environment is built.

Broad-based stakeholder participation

As the example of the Goascorán Basin illustrates, for water governance to be effective at the transboundary level it requires fostering dialogues between institutions and a broad base of basin stakeholders. The Binational Management Group established by the previously mentioned EU funded project was too narrowly focused and participation and decision-making were limited to municipal stakeholders. In a negotiated process which included stakeholders from beyond the water sector, the BMG was revitalized, adopting a new Management Plan in coordination with national and regional plans. The outcome was that several new stakeholders such as NGOs, local development associations, and national ministries joined the BMG, increasing its legitimacy and broadening its base and objectives. The key to success for reforming the BMG was to expand its stakeholder platform.⁷⁰

For effective and adaptive water governance, it is important that all stakeholders, public and private actors, are able to participate. All need to be aware of expected climate change repercussions, vulnerabilities, and other impacts their basin will face in the future to allow for the identification of common needs and search for solutions like the preparation of joint management plans. Finally, the facilitation of spaces where different actors can come together could range from formal round-table dialogue sessions to informal training workshops on technical issues or events like seminars, conferences or symposia.⁷¹

6 Conclusion

Adaptive water governance is a promising approach that aims for promoting sustainable water governance, in particular under the impacts of climate variability and change. The approach is propitious to serve specific local conditions and account for flexibility. However, certain elements are crucial to its practical implementation. As explained in detail above, these key elements are primarily flexibility and the integration of uncertainties, which are accounted for through the application of the ecosystem approach; effective institutions including legislation; vertical and horizontal integration and the incorporation of different scales, encompassing broad-based stakeholder participation.

This paper has investigated if and how the principle of adaptive governance implemented on the ground as part of two IUCN led projects can facilitate the effective and sustainable management

⁷⁰ International Union for Conservation of Nature *Water Diplomacy* (n.d.).

⁷¹ International Union for Conservation of Nature *Water Diplomacy* (n.d.).

of water resources at multiple scales, taking into consideration the various challenges ahead related to the uncertainty imposed by climate change. To substantiate the argument, on-the-ground experiences were presented and the related lessons learned carved out.

Evidence from the practical experiences in Mesoamerica makes clear that building and/or strengthening governance arrangements requires capacity building and establishment of local level structures such as micro-basin councils to ensure informed participation and decision-making, transparency and legitimacy. Furthermore, transboundary structures and settings for integrated water management must be flexible enough to identify the appropriate legal formats that would be recognized in each individual basin state both in case of existence and non-existence of a basin wide agreement. However, this is particularly needed when there are no formal transboundary agreements in place, like treaties. National level governance structures can then evolve into transboundary platforms.

The identification and operationalization of all possible synergies (local-national-international; public-private, etc.) should also be a requirement for an effective joint management of a transboundary basin. It maximizes the effects of the interventions, allows for more efficient investments, and ensures that proposed strategies are sustainable.

In summary, the experience so far shows that the principles of adaptive water governance can be a useful way to enhance both good water management and adaptive capacity to climate change on a local level as well as on a transnational one, and lead to a more robust and effective governance framework which accounts for different stakeholder priorities. Finally, adaptive water governance is in line with and facilitates collaboration among states, and could also be a good starting point for broader regional cooperation and trust building.

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