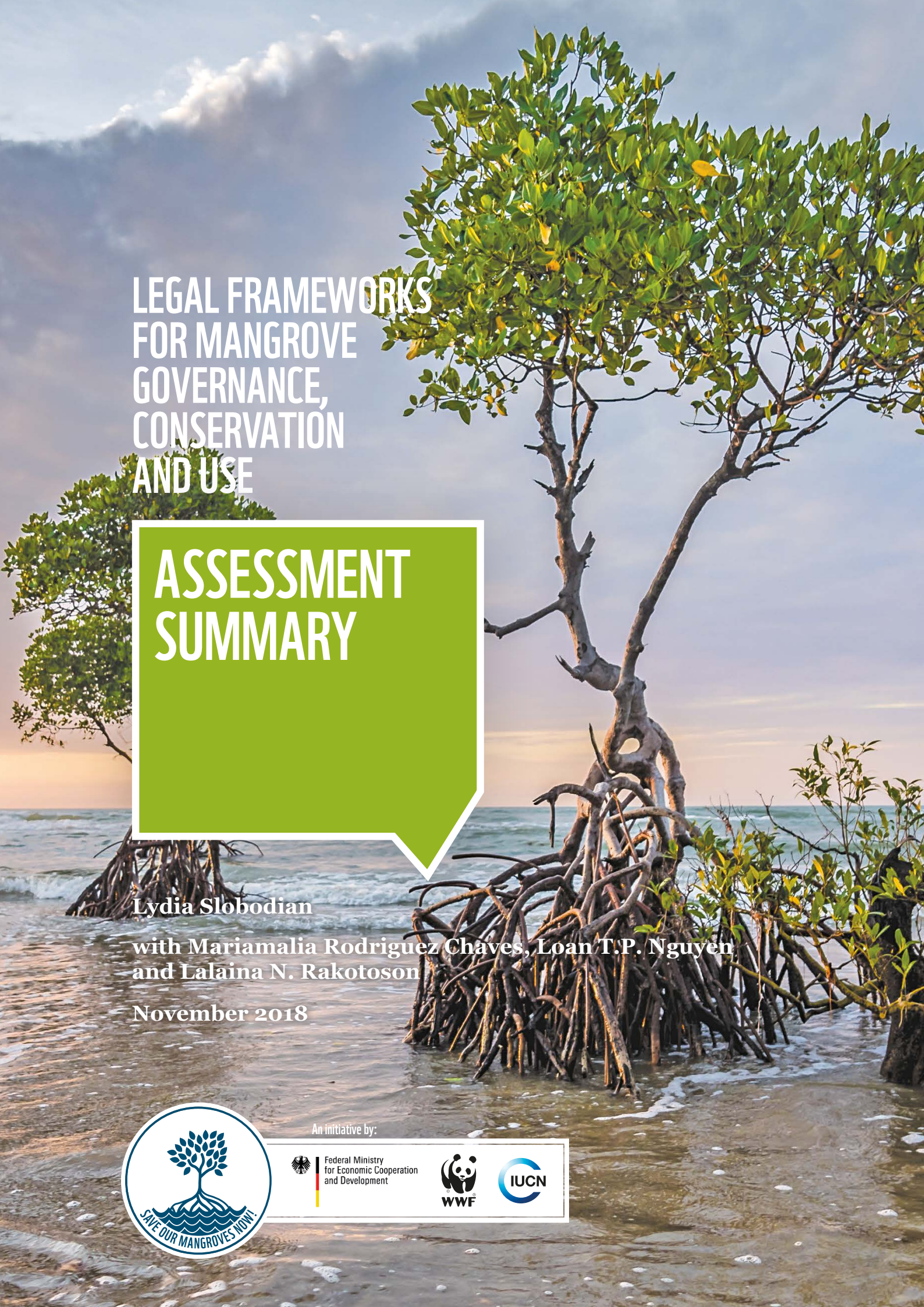

LEGAL FRAMEWORKS FOR MANGROVE GOVERNANCE, CONSERVATION AND USE

ASSESSMENT SUMMARY

Lydia Slobodian

with Mariamalia Rodriguez Chaves, Loan T.P. Nguyen and Lalaina N. Rakotoson

November 2018

SAVE OUR MANGROVES NOW!

An initiative by:

Federal Ministry for Economic Cooperation and Development

WWF

IUCN

Lydia Slobodian

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ABOUT THE SAVE OUR MANGROVES NOW! INITIATIVE

The German Federal Ministry for Economic Cooperation and Development (BMZ), World Wide Fund for Nature (WWF) and International Union for Conservation of Nature (IUCN) join forces in the international mangrove initiative "Save Our Mangroves Now!" to halt the global loss of mangroves.

"Save Our Mangroves Now!" is a joint commitment of the above named partners to intensify efforts in mangrove conservation. It aims to upscale and focus global efforts to stop and reverse the decrease and degradation of mangrove habitats, and supports the target of the Global Mangrove Alliance (GMA) to increase the global area of mangrove habitat by 20% over the current extent by 2030.

Backed by BMZ's strong bilateral portfolio and building on IUCN's and WWF's wide engagement and sound experience in mangrove conservation, this initiative has the ambition to create a variety of partnerships and cooperation with other mangrove organizations, initiatives and countries. "Save Our Mangroves Now!" – together with the GMA, provides a platform for knowledge sharing and the exchange of experience in order to encourage collaborations and to foster synergies.

"Save Our Mangroves Now!" acts on three fields of action:

1. Embedding ambitious objectives on mangrove protection and restoration in international and national political agendas such as the Sustainable Development Goals, the Aichi targets and the Nationally Determined Contributions under the Paris Agreement increasing awareness among decision makers about the importance of mangrove conservation as part of the global conservation, sustainable development and climate solutions.

2. Pooling leading expertise, enhancing knowledge-sharing and closing existing knowledge gaps on mangrove conservation and restoration.

3. Supporting innovative lighthouse projects, fostering the dissemination of best practices and mainstreaming of mangrove conservation into national development plans in the Western Indian Ocean.

"Save Our Mangroves Now!" is open for partnerships with countries, other initiatives and organizations in order to increase the momentum for mangrove conservation.

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ACKNOWLEDGEMENTS

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ABBREVIATIONS

B	
BMZ	German Federal Ministry for Economic Cooperation and Development
C	
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COP	Conference Of the Parties
E	
EIA	Environmental Impact Assessment
G	
GIS	Geographic Information System
I	
ICCA	Indigenous and Community Conserved Area
ICJ	International Court of Justice
ICZM	Integrated Coastal Zone Management
ISME	International Society for Mangrove Ecosystems
IUCN	International Union for Conservation of Nature
M	
MRV	Monitoring, Reporting and Verification
N	
NDC	Nationally Determined Contributionss
O	
OECD	Organisation for Economic Co-operation and Development
P	
PES	Payment for Ecosystem Services
R	
REDD	Reducing Emissions from Deforestation and Forest Degradation
S	
SDG	Sustainable Development Goal
U	
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
W	
WWF	World Wide Fund

1

INTRODUCTION

1.1. Mangrove conservation in the context of changing threats

Mangroves cover 150,000 km² globally and are found in more than 123 countries. There are 73 species and hybrids currently known, some of which are listed as endangered or critically endangered.[1]

Mangrove ecosystems provide a range of ecosystem services, including fisheries, fuel wood and tourism.[2] They provide coastal protection which is especially important for small low-lying developing states as storm surges, cyclones and typhoons are becoming more frequent due to climate change.[3] Their dense root systems sequester carbon and provide a habitat for a range of species.[4] Mangroves have significant cultural importance and provide income for many people across the world.[5] Due to the variety of functions that mangroves provide, their protection contributes to achieving many of the Sustainable Development Goals, including ending poverty and hunger, achieving gender equality, conserving the marine environment and mitigating and adapting to climate change.[6]

Mangrove ecosystems are under threat from a changing set of pressures. Historically, the primary threats to mangroves have come from conversion for aquaculture or agricultural use and cutting for timber.[7] While these remain significant, new threats are emerging, including pollution, diversion of upstream water sources, offshore mining and land reclamation for development (figure 2).

This study asked experts from around the world to identify the most significant threat to mangroves.[8] Figure 1 shows their responses. The main threat identified was agriculture, representing both land conversion for agriculture and agricultural pollution. Aquaculture remains a primary threat as perceived by experts. However, threats such as disruption of the water cycle and urban development received significant attention. Experts wrote about other threats including illegal charcoal harvesting, crab fishing, population growth and climate change as additional growing threats.

A key issue according to experts is not just destruction but *degradation* of mangrove ecosystems, through pollution, siltation, changes in salinity, loss of biodiversity or unsustainable fishing around the roots of mangroves and unsustainable selective cutting. These aspects pose challenges for legal frameworks as well as assessment of outcomes, where it is easier to measure hectares than

1 Krauss, K. and Friess, W. (2011). World Atlas of Mangroves. *Wetlands* 31(5):1003-1005; Among mangrove species listed as critically endangered there are : *Amazilia boucardi*, *Clusia intertexta*, *Bruguiera hainesii*, *Geospiza heliobates*, *Phoenix paludosa*, *Pitta megarhyncha*. *Sonneratia griffithii* is listed as critically endangered and is also locally extinct in several areas throughout its range. IUCN 2018. *The IUCN Red List of Threatened Species. Version 2018-1*. Retrieved from http://www.iucnredlist.org. [Downloaded on 25 July 2018].

2 Mehvar,S. Filatova,T. Dastgheib, A. et al. (2018). Quantifying Economic Value of Coastal Ecosystem Services: A Review. *Journal of Marine Science and Engineering*.

3 Losada, I. J., Menéndez, P., Espejo, A., Torres, S., Díaz-Simal, P., Abad, S., Beck, M.W., Narayan, S., Trespalacios, D., Pfiegner, K., Mucke, P., Kirch, L. (2018). *The global value of mangroves for risk reduction*. Technical Report. The Nature Conservancy, Berlin; Mafi-Gholami D. (2017). *An Overview on Role of Mangroves in Mitigating Coastal Disasters (With Special Focus on Tsunamis, Floods and Cyclones)*, International Conference on Architecture, Urbanism, Civil Engineering, Art, Environment.

4 Robertson, A.I., Duke, N.C. (1987). Mangroves as nursery sites: comparisons of the abundance and species composition of fish and crustaceans in mangroves and other nearshore habitats in tropical Australia. *Marine Biology* 96: 193-205; Blum, J. Herr, D. (24 August 2017). *Mangroves: nurseries for the world's seafood supply*. Retrieved from https://www.iucn.org/news/forests/201708/mangroves-nurseries-world%E2%80%99s-seafood-supply

5 Van Bochove, J., Sullivan, E., Nakamura, T. (2014). *The Importance of Mangroves to People: A Call to Action*. United Nations Environment Programme World Conservation Monitoring Centre, Cambridge. 128 pp.

6 Blum, J. Herr, D. (16 March 2017). *Can restoring mangroves help achieve the Sustainable Development Goals?* Retrieved from https://www.iucn.org/news/forests/201703/can-restoring-mangroves-help-achieve-sustainable-development-goals.

7 *See, e.g.* López-Angarita, J., Roberts, C.M., Tilley, A., Hawkins, J.P. and Cooke, R.J. (2016). Mangroves and people: Lessons from a history of use and abuse in four Latin American countries. *Forest Ecology and Management* 368:151-162; Rotich, B., Mwangi, E. and Lawry, S. (2016). *Where land meets the sea - A global review of the governance and tenure dimensions of coastal mangrove forests*. CIFOR and USAID Tenure and Global Climate Change Program: Bogor, Indonesia and Washington, DC; Van Lavieren, H., Spalding, M., Alongi, D.M., Kainuma, M., Clüsener-Godt, M. and Adeel, Z. (2012). *Securing the future of mangroves*. UNU-INWEH, UNESCO-MAB with ISME, ITTO, FAO, UNEP-WCMC and TNC; Webber, M., Calumpong, H., Ferreira, B., Granek, E., Green, S., Ruwa, R. and Soares, M. (2016). *Mangroves*. Oceans & Law of the Sea: United Nations.

8 See Section 1.4 for a description of survey methodology.

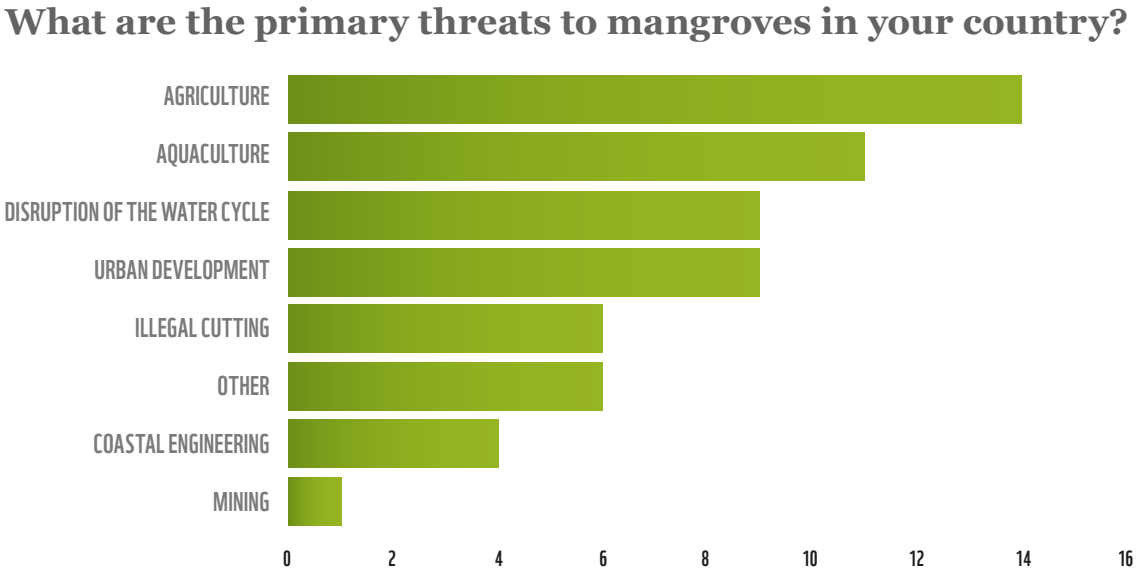


Figure 1. Survey responses on mangrove threats

health of mangrove ecosystems. Including measures of degradation can lead to a better understanding of the seriousness of the problem and recognition of a much greater area under threat.

Population growth and urban development lead to increased demand for mangrove products, such as seafood and charcoal, as well as diversion of water, increased agricultural load and municipal solid waste and sewage. In India, large coastal cities are turning tidal creeks and channels into disposal drains for large quantities of municipal sewage, much of which ends up in mangrove ecosystems.[9]

Many activities that affect mangroves do not take place within the mangrove area itself. In the case of pollution or interference with the hydrological cycle, the harmful activity may take place far upstream, even in a different country. In Vietnam, more than 60% of mangroves are found within the Mekong Delta. Major upstream hydropower projects, including projects in China, Thailand and Laos, pose significant threats to the mangroves in the delta.[10] An agreement among countries in the Mekong basin, as well as the United Nations Watercourses Convention to which many of the countries are signatories, provide some mechanisms to address these threats, but it requires international cooperation (See Section 2.1.5).

Countries are beginning to recognize changing threats through changing policies, laws and strategies. The National Biodiversity Policy of Costa Rica acknowledges pollution by erosion, sedimentation, nutrients and municipal solid waste, as well as infrastructure development and conversion for pineapple and palm oil plantations as drivers of loss of mangrove coverage and calls for measures such as improved waste management to prevent further degradation.[11]

1.2. Sectors and jurisdictions involved in mangrove governance

No single legal instrument is sufficient to address the range of threats to mangrove conservation from different sectors and places. Different legal tools can be used to address diversion of freshwater sources, pollution, conversion of

9 *See e.g.* Das Gupta, R. and Shaw, R. (2013). Changing Perspectives of Mangrove Management in India -- An analytical overview. *Ocean and Coastal management* 80:107-118.

10 Tran, T. (2016). Transboundary Mekong River Delta (Cambodia and Vietnam). In Finlayson, C. M., Everard, M., Irvine, K., McInnes, R. J., Middleton, B., van Dam, A. and Davidson, N. C. (Ed.s). (2017). *The Wetland Book, Volume I: Structure and Function, Management and Methods*. Springer, Netherlands.

11 Ministerio de Ambiente, Energía y Telecomunicaciones. (2015). Política nacional de biodiversidad 2015-2030 Costa Rica. PNUD, San José, Costa Rica.

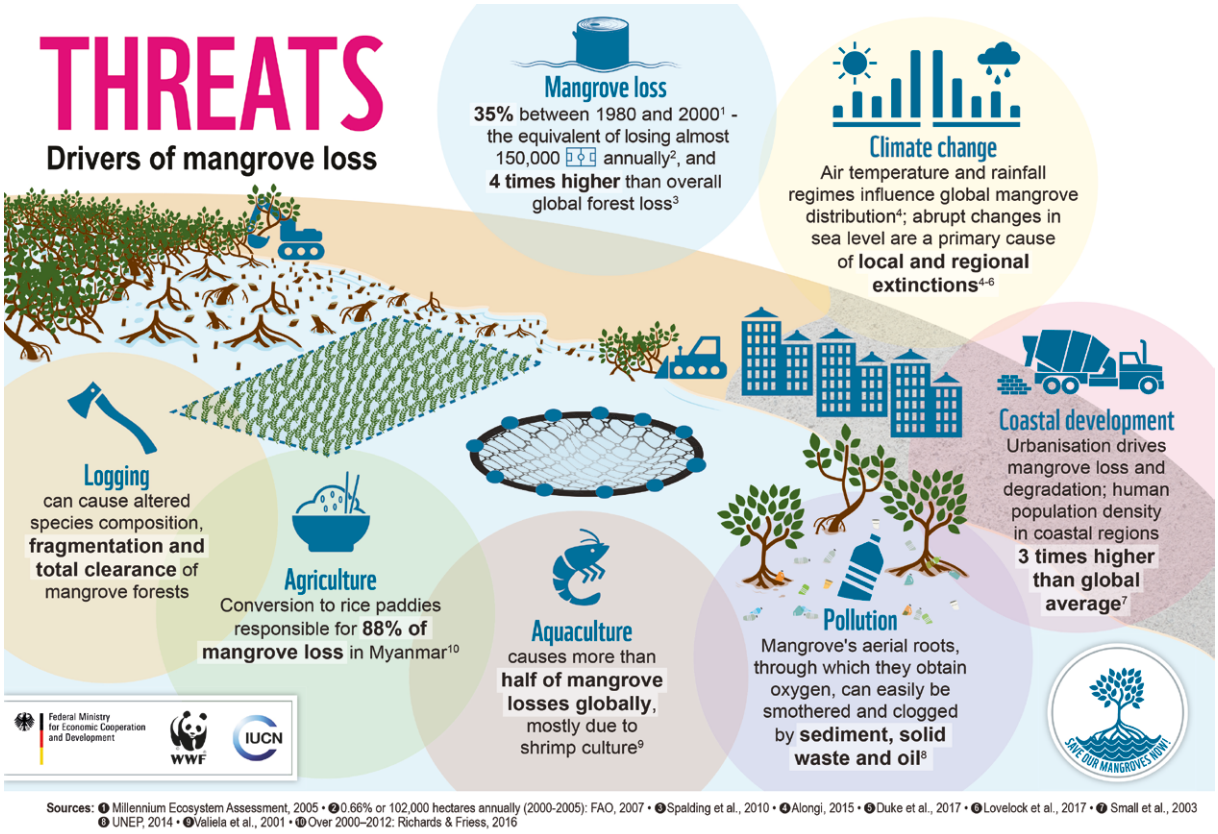


Figure 2. Drivers of mangrove loss

mangroves for aquaculture or farming and other threats. Understanding the range of options and needs for mangrove conservation requires examination of a multitude of sectors and areas of law, covering *inter alia* forest, marine, fisheries, land use, biodiversity, protected areas, climate change, industry and freshwater.

Substantive legal protections in the form of restrictions on what activities are allowed in or near mangrove areas and their connected ecosystems must be supported by frameworks for planning and permitting, as well as basic frameworks for governance, decision-making, land tenure and dispute resolution. Command-and-control measures are prevalent tools for conservation but can be augmented by market mechanisms and incentives.

Mangrove governance occurs at all levels, from the central government to state or regional governments to municipal or local councils. In many countries different legal regimes -- including statutory, customary and religious -- exist side by side, termed legal pluralism. In Madagascar, Fokonolona or communities of individuals govern sustainable use of natural resources within their territory through Dina, a code of customary norms. (See Section 3.2.5).

Even where there is no formal recognition of customary law, communities and indigenous groups may have traditional norms or practices that are relevant for mangrove governance. It is crucial to take these practices into account, as well as the perspectives and needs of local communities and mangrove users.

1.3. Purpose of this assessment

This review of legal frameworks relating to mangroves was designed to assess the ways in which legal frameworks can facilitate or impede mangrove conservation efforts, evaluate current gaps and opportunities, and identify possible legal tools and practices which could be used in different countries and sites looking to improve legal frameworks relating to mangroves.

The assessment aims to cover not just what laws look like on paper, but how they are perceived and implemented in practice and ultimately how effective they can be in promoting mangrove conservation and sustainable use. It is impossible to create a model for mangrove governance that will work for all jurisdictions, but this assessment aims to describe an array of legal tools and practices as well as lessons from their implementation in different contexts that can help inform policymakers and decisionmakers in designing and implementing legal frameworks.

1.4. Methodology

The assessment includes a global review of literature and legal information on international and national law and policy, a desk assessment of mangrove-related legal instruments in India, Kenya and Mexico, and an in-depth evaluation of effectiveness of mangrove-related law in Costa Rica, Madagascar and Vietnam.

For the six case study countries, a matrix was developed for collection and analysis of mangrove-related law. The national legal analysis covered legislation, regulations, decrees, rules and other legal instruments, as well as significant policy documents and judicial decisions. The completed matrices for the case study countries are available on the IUCN website.[12] The legislation analyzed can be found on ECOLEX (www.ecolex.org).

To gain a broader understanding of legal instruments in practice, researchers conducted in-person and Skype interviews with experts at the global level and in case study countries. A survey was conducted in three languages to assess implementation and effectiveness of mangrove-related legal frameworks. Twenty experts took part in the survey, including six from Vietnam, one from Kenya, four from Madagascar and nine from Costa Rica. Experts included representatives of government, civil society and academia.

In Madagascar, Costa Rica and Vietnam, experts from each country conducted in-depth 4-level effectiveness assessments to understand how mangrove laws are implemented in practice.[13] The assessments cover:

1. Instrumental Level: How do national and sub-national legal instruments address or implicate mangroves and activities related to mangrove conservation, use, restoration and exploitation, directly or indirectly?

2. Institutional Level: How are the institutions structured and how well do they operate in practice in relation to issues that may affect mangroves, directly or indirectly?

3. Behavioral Level: How do instruments and institutions affect behavior of users, government officials, regulated entities, communities, civil society, and other stakeholders connected to mangroves?

4. Outcome Level: How do legal instruments, institutions and behavior of relevant actors impact the health of mangrove ecosystems?[14]

Information to answer these questions was gathered through surveys, site visits and interviews with government, community representatives and civil society. These assessments inform the following chapters.

12 All the matrices can be downloaded on the following webpage: https://www.iucn.org/theme/environmental-law/our-work/oceans-and-coasts/mangrove-governance-conservation-and-use.

13 From Costa Rica: Mariamalia Rodriguez Chaves; from Vietnam: Nguyen Thi Phuong Loan; from Madagascar: Lalaina R.Rakotoson, Tahiana Andriaharimalala, Romeo Tsioritolotra, and Norotiana Mananjean.

14 The methodology for this assessment is based on the framework developed for the legal component of the IUCN Natural Resource Governance Framework. Martin, P., Boer, B. and Slobodian, L. (Ed.s). (2016). *Framework for Assessing and Improving Law for Sustainability*. IUCN, Gland, Switzerland. xii + 126 pp.

2

INTERNATIONAL LEGAL FRAMEWORKS RELEVANT TO MANGROVE CONSERVATION

Mangroves face international threats. Mangroves and their connected ecosystems often cross national boundaries. Significant mangrove forests stretch all along the Eastern Coast of Africa, both coasts of Central America, and throughout Southeast Asia, creating a need to consider transboundary connectivity. Activities affecting mangroves can also be transboundary in nature. Activities along the full course of transboundary watercourses can affect mangroves located in or around the river's mouth. International demand for products deriving from or produced in mangroves, such as prawns or timber products, are significant drivers of mangrove destruction.[15] One of the most serious threats to mangroves, climate change, is inherently global in nature.

Mangroves are also recognized as an internationally important resource. Mangroves are a vital source of carbon storage.[16] They provide important habitats for globally valued biodiversity, including species with unique genetic properties that could have important applications.[17] For these reasons, the international community has a legitimate interest in mangrove conservation as well as a responsibility to support conservation efforts.

International law contains standards, frameworks and principles that can apply to mangroves and the activities that affect them. The first part of this chapter outlines foundational international principles and concepts that should inform mangrove conservation and use at the national and transboundary level. The second part outlines some of the key conventions that apply to mangroves and related ecosystems and activities.

2.1. International legal concepts and principles

International law provides both general and specific obligations, deriving from binding treaties as well as international judicial decisions, declarations, resolutions, legal opinions and other instruments that can serve as evidence of acceptance by the international community. Certain legal principles have evolved over time to be regarded as binding customary international law and provide a cross-sectoral baseline for environmental policy. These principles are highly relevant for mangrove conservation as they can shape national and international decision-making and inform specific legal frameworks at the international and national level.

The development of international environmental law has been shaped and tracked by a series of global conferences which lay out key principles and concepts. The United Nations Conference on the Human Environment in 1972 resulted in the Stockholm Declaration, which laid out 26 principles, many of which are now recognized as internationally binding.[18] Twenty years later, the United Nations Conference on Environment and Development in Rio de Janeiro adopted the Rio Declaration and Agenda 21, a comprehensive plan for sustainable development in the 21st Century.[19] In 2012, the United Nations Conference on Sustainable Development, or Rio+20, resulted in adoption of the outcome document "The Future We Want", and set in motion the process resulting in the adoption of the Sustainable Development Goals (SDGs) in 2015.[20] These documents constitute major markers for understanding and interpreting concepts and principles in international environmental law.

15 Thomas, N., Lucas, R., Bunting, P., Hardy, A., Rosenqvist, A., Simard, M. (2017). Distribution and drivers of global mangrove forest change, 1996–2010. Joseph S, ed. *PLoS ONE*.

16 Donato, D., Kauffman, J., Murdiyarso, D., Kurnianto, S., Stidham, M. and Kanninen, M. (2011). Mangroves among the most carbon-rich forests in the tropics. *Nature geoscience* 4: 293–297.

17 Macintosh, D. J. and Ashton, E. C. (2002). *A Review of Mangrove Biodiversity Conservation and Management*. Centre for Tropical Ecosystems Research, University of Aarhus, Denmark ; Deshmukh S. and Balaji V. (Ed.s). (1994). *Conservation of Mangrove Forest Genetic Resources: A Training Manual*. JTTO-CRSARD Project, M.S. Swaminathan Research Foundation, Madras, India.

18 Declaration of the United Nations Conference on the Human Environment (Stockholm, 16 June 1972).

19 United Nations Conference on Environment and Development: Agenda 21 (Rio de Janeiro, 3-14 June 1992).

20 General Assembly resolution 66/288. The Future We Want. A/RES/66/288 (27 July 2012).

2.1.1 State sovereignty and responsibility for transnational harm

The modern international legal system is built around the concept of State sovereignty. States have the sovereign right to make decisions regarding their own territories and other matters within their jurisdiction. However, this right is far from absolute. One of the oldest principles of international environmental law tempers this right with an obligation not to cause transboundary harm. As articulated in Principle 21 of the Stockholm Declaration:

> States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.[21]

This obligation was reiterated twenty years later in the Rio Declaration.[22] However, the principle itself is much older. In 1941, the Arbitral Tribunal considering the Trail Smelter case found that Canada was responsible for activities of a smelter operation that was causing damage in the United States, based on principles of national and international law. This principle was articulated and developed in a series of cases before the International Court of Justice (ICJ).[23] It is included as Article 3 in the Convention on Biological Diversity (CBD).[24]

A key mechanic for implementing the principle of responsibility for transboundary harm is the environmental impact assessment (EIA). The requirement to assess environmental impacts of planned activities and share the results of those assessments in circumstances where there a likelihood of significant adverse transboundary environmental impacts has itself attained the status of customary international law. In 2010, the ICJ stated in the case *Pulp Mills on the River Uruguay*:

> ...the obligation to protect and preserve ... has to be interpreted in accordance with a practice, which in recent years has gained so much acceptance among States that it may now be considered a requirement under general international law to undertake an environmental impact assessment where there is a risk that the proposed industrial activity may have a significant adverse impact in a transboundary context ...[25]

It goes on to state that failure to undertake an EIA in this case would constitute a failure to exercise due diligence.[26] The required scope and content of the EIA is a matter for national legislation.[27] The UNECE Convention on EIA in a Transboundary Context (ESPOO) provides guidance around this obligation.[28]

The requirement to conduct EIAs as part of State responsibility to prevent transboundary environmental harm has been included, *inter alia* in the UN Watercourses Convention, the UN Convention on the Law of the Sea, and the CBD, and stated as Principle 17 of the Rio Declaration.[29] It is also contained in the United Nations Framework Convention on Climate

21 Declaration of the United Nations Conference on the Human Environment (Stockholm, 16 June 1972) Principle 21.

22 The Rio Declaration on Environment and Development (Rio de Janeiro, 12 August 1992), Principle 2.

23 *E.g. Corfu Channel Case* (United Kingdom of Great Britain and Northern Ireland v. Albania) [1949] ICJ Rep 244; *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ.Rep 226; *Pulp Mills on the River Uruguay* (Argentina v. Uruguay) [2010] ICJ Rep 113. Para. 204.

24 Convention on Biological Diversity (Rio de Janeiro, 5 July 1992) Article 3.

25 *Pulp Mills on the River Uruguay* (Argentina v. Uruguay) [2010] ICJ Rep 113. Para. 204.

26 *Ibid.*

27 *Ibid.* Para. 205.

28 Convention on Environmental Impact Assessment in a Transboundary Context (ESPOO Convention) (Finland, 25 February 1991). In 2014 the Convention was opened to accession by all UN Member States.

29 Convention on the Law of the Non-navigational Uses of International Watercourses (UN Watercourses Convention) (New York, 21 May 1997) Article 7, 11-12; The United Nations Convention on the Law of the Sea (Montego Bay, 10 December 1982) Article 206; Convention on Biological Diversity (Rio de Janeiro, 5 July 1992) Article 14; Rio Declaration, Principle 17.

Change (UNFCCC).[30] Failure to comply with this obligation could in some cases give rise to international liability or obligation to provide compensation.[31]

State responsibility for international harm and the obligation to undertake an EIA have been clearly applied in the context of transboundary watercourses. It is applicable in cases of water pollution and interference with hydrological flows, two significant threats to mangrove ecosystems. It may be relevant in other types of harm, such as marine pollution or coastal damage originating from a transboundary source.[32]

2.1.2 The precautionary principle/ approach

Damage to mangroves can be difficult or close to impossible to remediate and can create extensive knock-on effects on connected ecosystems and the global environment. Destruction of mangroves can contribute to potentially irreversible coastal erosion and represents significant carbon emissions. The seriousness of these consequences implicates the precautionary principle.

The precautionary principle is defined in Principle 15 of the 1992 Rio Declaration as:

> Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.[33]

There has been discussion regarding the binding nature of the precautionary principle.[34] In some cases it is referred to as the precautionary approach, implying that it is not itself a legally binding principle; instead it has been characterized as a logical measure to ensure environmental protection and compliance with accepted legal obligations.[35] It has been incorporated in the Preamble of the CBD rather than the text itself.[36] The ICJ has stated that:

> In the field of environmental protection, vigilance and prevention are required on account of the often irreversible character of damage to the environment and of the limitations inherent in the very mechanism of reparation of this type of damage.[37]

Some binding international instruments explicitly incorporate the precautionary principle. These include two instruments that are significant for mangroves: The UNFCCC and the UNECE Water Convention.[38]

The precautionary principle or approach is a tool for decision making in the face of uncertainty or risk. It can inform use and interpretation of EIAs. Applied to mangrove conservation, it suggests that even uncertain harm should be considered in decision-making. Measures to conserve and restore mangroves should not be dismissed because the harm they seek to address is uncertain, while activities that potentially harm mangroves should be regulated even where there is not complete certainty around their impact. The precautionary principle is particularly relevant in the context of climate change; there may not be certainty around the effects of destruction of mangroves on the global climate and associated global conditions on

30 United Nations Framework Convention on Climate Change (New York, 4 June 1992) Article 4(1)(f).

31 *E.g. Pulp Mills on the River Uruguay* (Argentina v. Uruguay) [2010] ICJ Rep 113; Convention on the Law of the Non-navigational Uses of International Watercourses (UN Watercourses Convention) (New York, 21 May 1997) Article 7; "States shall also co-operate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction". The Rio Declaration on Environment and Development (Rio de Janeiro, 12 August 1992) Article 13.

32 Maiti, S.K. and Chowdhury, A. (2013). Effects of Anthropogenic Pollution on Mangrove Biodiversity: A Review. *Journal of Environmental Protection* 4(12):1428-1434.

33 The Rio Declaration on Environment and Development (Rio de Janeiro, 12 August 1992) Principle 15.

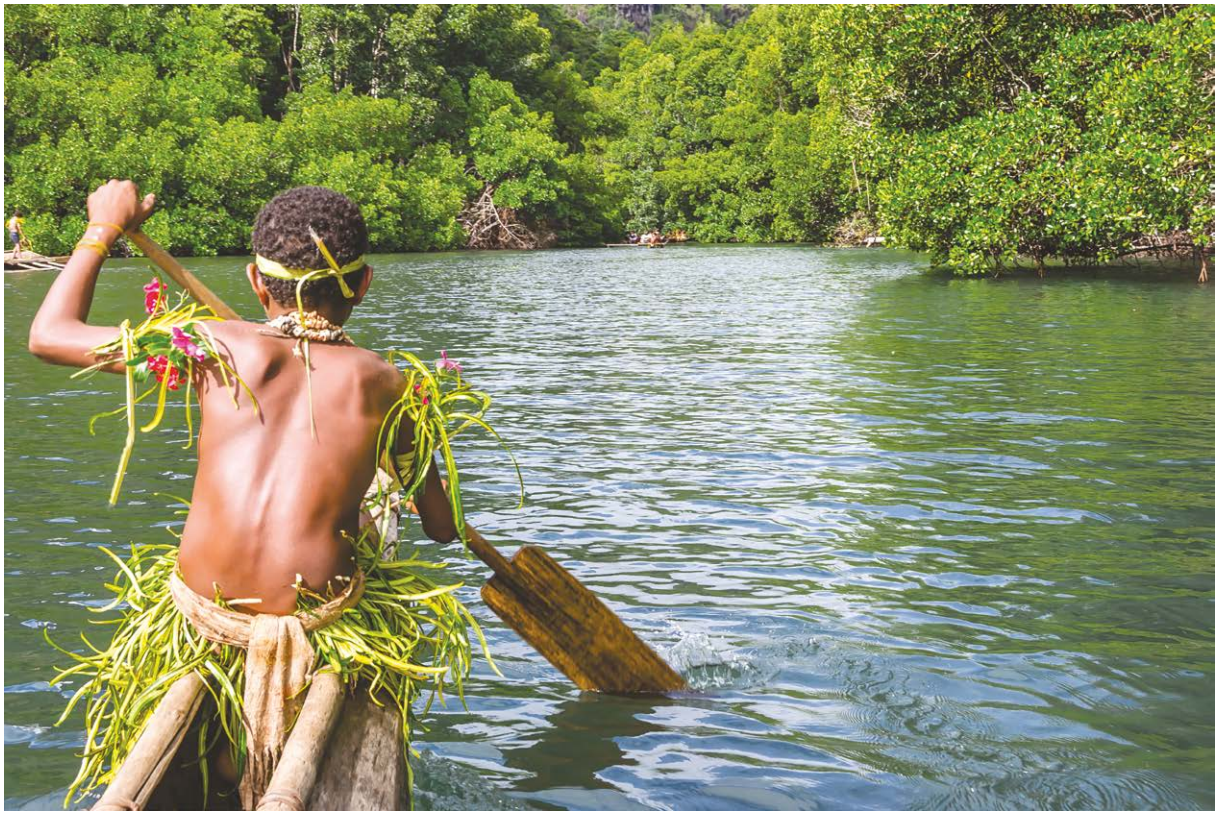
34 Boyle, A. (2007). The Environmental Jurisprudence of the International Tribunal for the Law of the Sea. *The International Journal of Marine and Coastal Law* 22(3): 369-381.

35 *Southern Bluefin Tuna Cases* (New Zealand v. Japan; Australia v. Japan) [1999] ITLOS Separate Opinion of Judge Treves.

36 Convention on Biological Diversity (Rio de Janeiro, 5 July 1992) Preamble.

37 *Gabcikovo-Nagymaros Project* (Hungary v. Slovakia) [1997] ICJ Rep 7. Para. 7.

38 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) (Helsinki, 17 March 1992) Article 2(5)(a).



earth, but this is not a reason to delay action to conserve mangroves as important carbon sinks.

2.1.3 The polluter pays principle

Mangrove ecosystems have significant value, in terms of carbon sequestration, disaster risk reduction, timber and non-timber products and other ecosystem services. The fact that these high value ecosystems are disappearing at an alarming rate suggests that either the activities resulting in destruction and degradation have a much higher value than the mangroves themselves, or the full cost of the damage is not being paid by the beneficiary of the activities. Shifting the cost of ecosystem harm to those creating the harm can create a substantial deterrent to drivers of mangrove degradation and loss.

National and international legal systems have adopted the polluter pays principle to address this misalignment of costs and incentives. The principle that the cost of pollution should be borne by the actor who caused it was adopted by the Organisation for Economic Co-operation and Development (OECD) in 1972 and elaborated in 1974.[39] It is referenced in the Rio Declaration and the UNECE Water Convention, as well as several Regional Seas Conventions.[40]

The polluter pays principle is connected to concepts of liability and responsibility for environmental harm (see Section 2.1.1). It can be invoked in the context of compensation and as a mechanism for covering the cost of restoration. It is also an important means to create incentives not to cause harm.

Pollution, alongside other anthropogenic factors causes substantial degradation to mangrove ecosystems. One of the significant factors of mangrove biodiversity loss is chemical pollution, particularly accumulation and bio-

39 Guiding Principles Concerning International Economic Aspects of Environmental Policies (OECD. Adopted 26 May 1972 C(72)128); The Implementation of the Polluter-Pays Principle (OECD. Adopted 14 November 1974 C(74)223).

40 The Rio Declaration on Environment and Development (Rio de Janeiro, 12 August 1992) Principle 16; Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) (Helsinki, 17 March 1992) Article 2(5)(b); Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) (Paris, 22 September 1992) Article 2(2)(b); Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki, 9 April 1992) Article 3, 4.

transformation of toxic metals.[41] Agricultural run-off and municipal and industrial waste from areas adjacent to the mangrove or farther upstream can find their way into mangrove ecosystems. The concept behind the polluter pays principle – of putting responsibility for damage on the actor responsible – can also apply to other types of activities that cause harm to mangroves.

2.1.4 Sustainable development and use

Sustainable development has emerged as a foundational concept in international environmental law. The 1987 report of the World Commission on Environment and Development (Brundtland Report) defines sustainable development as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs."[42] This builds on recognition in the Stockholm Declaration that:

> The natural resources of the earth, including the air, water, land, flora and fauna and especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate.[43]

Sustainable development is based on the understanding that long term economic and social development depends on appropriate management and conservation of environmental resources. According to the Brundtland report, the "conservation of living natural resources - plants, animals, and micro-organisms, and the non-living elements of the environment on which they depend - is crucial for development."[44] The Rio Declaration echoes this, stating: "In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it."[45]

The concept of sustainable development has been recognized in the Rio Declaration, the Convention on Biological Diversity and the UNECE Water Convention.[46] The World Heritage Committee has endorsed the integration of a sustainable development perspective into the processes of the World Heritage Convention.[47] Judge Weeramantry of the ICJ argued that the right to sustainable development, and the linked principle of intergenerational equity, have become part of international law.[48]

Agenda 21 provides guidance for achieving sustainable development across economic, social and environmental dimensions.[49] It encourages nations and corporate enterprises to "integrate environmental protection, degradation, and restoration costs in decision-making at the outset."[50] It recognizes mangroves as "among the most highly diverse, integrated and productive of the Earth's ecosystems" and calls on governments to:

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41 Dr Kawalekar, J. S. (2015). Impact of Anthropogenic Pollution on Mangrove Biodiversity: A Review. *International Journal of Multidisciplinary and Current Research*..

42 World Commission on Environment and Development. (1987). *Report of the World Commission on Environment and Development: Our common future*. Oxford University Press, Oxford, England. Overview §27.

43 Declaration of the United Nations Conference on the Human Environment (Stockholm, 16 June 1972) Principle 2.

44 World Commission on Environment and Development. (1987). *Report of the World Commission on Environment and Development: Our common future*. Oxford University Press, Oxford, England. Chapter 6§1.

45 The Rio Declaration on Environment and Development (Rio de Janeiro, 12 August 1992) Principle 4.

46 "The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations" The Rio Declaration on Environment and Development (Rio de Janeiro, 12 August 1992) Principle 3; Convention on Biological Diversity (Rio de Janeiro, 5 July 1992) Article 2; Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) (Helsinki, 17 March 1992) Article 2(5)(c).

47 Decisions adopted by the World Heritage Committee at its 39 Session (8 July 2015 WHC-15/39.COM/19). Decision 39.COM/5D.

48 *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgment of 20 December 1974 in the Nuclear Tests* (New Zealand v. France) [1995] ICJ Rep 288. Dissenting opinion of Judge Weeramantry (discussing a principle of intergenerational equity); *Gabcikovo-Nagymaros Project* (Hungary v. Slovakia) [1997] ICJ Rep 7. Separate opinion of vice-president Weeramantry (discussing the right to sustainable development). *See also, Minors Oposa v. Secretary of the Department of Environment and Natural Resources* (1994) 33 ILM. Pg. 169.

49 United Nations Conference on Environment and Development: Agenda 21 (Rio de Janeiro, 3rd-14th June 1992).

50 *Ibid.* Chapter 8.

> Take action where necessary for the conservation of biological diversity through the in situ conservation of ecosystems and natural habitats … In situ measures should include the reinforcement of terrestrial, marine and aquatic protected area systems and embrace, inter alia, vulnerable freshwater and other wetlands and coastal ecosystems, such as estuaries, coral reefs and mangroves.[51]

The SDGs adopted in 2015 do not explicitly reference mangroves, but mangroves will be key to realizing several of the goals themselves. Goal 14 includes a target to manage and protect marine and coastal ecosystems, including by strengthening resilience and taking action for restoration.[52] Goal 15 includes targets on conservation, restoration and sustainable use of forests and wetlands, halting deforestation, and reducing degradation of natural habitats.[53] Under Goal 13, States commit to integrating climate change measures into national policies, strategies and planning.[54] Targets on integrated water resource management and restoration of water-related ecosystems including forests and wetlands are also relevant for mangroves.[55] Mangroves will play a role in realizing targets on poverty, food security and reducing loss from disasters.[56]

2.1.5 The co-operation principle

In a separate opinion in the ICJ case on the *Legality of the Threat or Use of Nuclear Weapons,* Judge Weeramantry wrote:

> The principle [of good neighborliness] is one of the bases of modern international law, which has seen the demise of the principle that sovereign states could pursue their own interests in splendid isolation from each other. A world order in which every sovereign state depends on the same global environment generates a mutual interdependence which can only be implemented by co-operation and good neighborliness.[57]

The principle of co-operation derives from the UN Charter, as interpreted by a series of UN Declarations and Resolutions.[58] The Stockholm Declaration and the Rio Declaration recognized the need for cooperation in environmental matters.[59] The CBD obligates Parties to cooperate "as far as possible and as appropriate" for conservation and sustainable use of biological diversity "in respect of areas beyond national jurisdiction and on other matters of mutual interest."[60] The UN Watercourses Convention recognizes a general obligation for watercourse States to cooperate "on the basis of sovereign equality, territorial integrity, mutual benefit and good faith."[61] The ICJ affirmed the importance of cooperation in the context of international watercourses in the 1997 *Case Concerning the Gabcikovo Nagymaros Project*.[62] The Ramsar Convention imposes obligations of consultation and coordination in the case of a "wetland extending over the territories of more than one Contracting Party or where a water system is shared by Contracting Parties".[63]

51 *Ibid.* Para. 17.72; 15.5(g).

52 General Assembly resolution 70/1. Transforming our World: the 2030 Agenda for Sustainable Development (Sustainable Development Goals) A/RES/70/1 (25 September 2015). Section 14.2.

53 *Ibid.* Section 15.1, 15.2, 15.5.

54 *Ibid.* Section 13.2.

55 *Ibid.* Section 6.5.

56 *Ibid.* Goals 1, 2 and 11.

57 *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgment of 20 December 1974 in the Nuclear Tests* (New Zealand v. France) [1995] ICJ Rep 288. Dissenting opinion of Judge Weeramantry. Para. 47.

58 General Assembly resolution 2625 (XXV). Declaration on Principles of International Law concerning Friendly Relations and Co-operation among States in accordance with the Charter of the United Nations. A /RES/25/2625 (24 October 1970); General Assembly resolution 46/62. Development and strengthening of good-neighborliness between States. A/RES/46/62 (9 December 1991).

59 Declaration of the United Nations Conference on the Human Environment (Stockholm, 16 June 1972) Principle 24; The Rio Declaration on Environment and Development (Rio de Janeiro, 12 August 1992) Principle 7.

60 Convention on Biological Diversity (Rio de Janeiro, 5 July 1992) Article 5.

61 Convention on the Law of the Non-navigational Uses of International Watercourses (UN Watercourses Convention) (New York, 21 May 1997) Article 8.1.

62 *Gabcikovo-Nagymaros Project* (Hungary v. Slovakia) [1997] ICJ Rep 7.

63 The Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 2 February 1971) Article 5.

The principle of co-operation implies that States "immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States" and, "provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith."[64] It is closely related to the principle of responsibility for transboundary harm (see Section 2.1.1).

The cooperation principle clearly relates to measures to address transboundary harm, which can threaten mangrove ecosystems. It can also be invoked as a basis for international cooperation in efforts to address mangrove deforestation and degradation, including allocation of financial and technical resources. The cooperation principle is the basis of the principle of common but differentiated responsibility, which underlies much of the international climate change regime, including mechanisms for reduction of emissions from deforestation and forest degradation (REDD) and trading in carbon offsets (see Section 2.2.4).

2.1.6 Public access to information, public participation in decision-making and public access to justice in environmental matters

Good governance and rule of law have been recognized as necessary prerequisites for conservation across sectors. Three key components of good governance are:

- Access to information
- Public participation in decision-making processes
- Access to justice in environmental matters

The UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) lays out guidance for these three components.[65] Although regional in scope, the Aarhus Convention has been recognized as globally relevant.[66]

The principle of access to information in environmental matters requires that public authorities, in response to a request for environmental information, ensure the availability of information to the public as soon as possible. This right shall be guaranteed within the framework of national legislation.[67] National legislation should also establish systems for collection and dissemination of information related to environmental matters.[68]

The principle of public participation in decision-making processes requires that the public is well informed early in the process, and has time to "prepare and participate effectively during the environmental decision-making."[69] The principle includes obligations to provide "opportunities for public participation in the preparation of policies relating to the environment" and promote "effective public participation at an appropriate stage during the preparation by public authorities of executive regulations and other generally applicable legally binding rules that may have a significant effect on the environment."[70] This principle has grounding in Principle 10 of the Rio Declaration, which recognizes that "environmental issues are best handled with the participation of all concerned citizens, at the relevant level".[71]

The principle of public access to justice in environmental matters means that any person who considers that his or her rights to access to information, or to participate in decision-making process, have been violated has access

64 The Rio Declaration on Environment and Development (Rio de Janeiro, 12 August 1992) Principle 18 and 19.

65 Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus, 25 June 1998).

66 Morgera, E. (2011). Aarhus Convention / MOP-4: Ensuring Global Relevance? *Environmental Policy and Law* 41(4/5):194-205.

67 Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus, 25 June 1998) Article 4.

68 *Ibid*. Article 5.

69 *Ibid*. Article 6.

70 *Ibid*. Article 7; 8.

71 The Rio Declaration on Environment and Development (Rio de Janeiro, 12 August 1992) Principle 10.

to an independent and impartial review procedure such as through a court of law.[72] Such procedures should be "fair, equitable, timely and not prohibitively expensive" and shall provide appropriate remedies "including injunctive relief as appropriate."[73]

Access to information, public participation in decision-making and access to justice are also recognized in Sustainable Development Goal 16.[74]

The governance related principles described here are important tools for mangrove conservation. They can allow local communities and civil society to put pressure on government decisionmakers, improve transparency, and address problems of mismanagement and corruption.

2.1.7 The non-regression principle

Downgrading of environmental protections through degazettement of protected areas, opening of formerly protected ecosystems to development, and loosening of regulations on pollution and damaging activities threaten species and ecosystems around the world. These forms of regression can be responses to growing needs and demands and changing political climates, or to discovery of formerly unknown types of resources or sources of revenue. In some cases, destruction of ecosystems is seen as necessary to respond to pressures related to climate change such as food insecurity and threat of natural disasters; in the long term such responses will make the problem much worse. For example, in Colombia, hard structures used to reduce coastal erosion resulted in various adverse impacts, such as the intensification of erosion processes.[75]

At Rio+20 countries adopted the principle of non-regression which underlines the necessity for each country to not backtrack from their environmental commitments even though they are facing multiple crises.[76]

A step beyond the principle of non-regression is the principle of progression, according to which measures to conserve the environment shall be constantly improved in the light of the latest scientific and technological knowledge. This principle is implemented within the framework of the Paris Agreement, according to which Parties' efforts should represent a progression over time.[77]

Mangroves represent a key example of the importance of non-regression. Growing populations and globalization create demand for resources and land that drives mangrove deforestation and coastal development. At the same time, countries respond to rising sea levels through sea walls and other coastal infrastructure that may have adverse effects on mangrove ecosystems. This might result in releasing tons of carbon and making climate change worse.[78] For example, in Guyana, the construction of seawalls constrain mangroves behind them and limits the interaction between mangroves and mud-banks. This results as a lower wave dissipation and thus the erosion of the coast.[79] These effects have the potential to snowball unless they are halted through strong

72 Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus, 25 June 1998) Article 9.

73 *Ibid*. Article 9; 4.

74 General Assembly resolution 70/1. Transforming our World: the 2030 Agenda for Sustainable Development (Sustainable Development Goals) A/RES/70/1 (25 September 2015). Section 16.3 ("ensure equal access to justice for all"); 16.7 ("Ensure responsive, inclusive, participatory and representative decision-making at all levels"); 16.10 ("Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements").

75 Rangel-Buitrago, N., Williams, A.T. and Anfuso, G. (2018). Hard protection structures as a principal coastal erosion management strategy along the Caribbean coast of Colombia. A chronicle of pitfalls. *Ocean & Coastal Management*. 156: 58-75.

76 General Assembly resolution 66/288. The Future We Want. A/RES/66/288 (27 July 2012). Para. 20.

77 The Paris Agreement (Paris, 12 December 2015) Article 3: "The efforts of all Parties will represent a progression over time, while recognizing the need to support developing country Parties for the effective implementation of this Agreement".

78 Kauffman, J., Heider, C., Norfolk, J., and Payton, F. (2014). Carbon stocks of intact mangroves and carbon emissions arising from their conversion in the Dominican Republic. *Ecological Applications* 24(3):518-527.

79 Anthonya, E. and Gratiot, N. (2012). Coastal engineering and large-scale mangrove destruction in Guyana, South America: Averting an environmental catastrophe in the making. *Ecological Engineering* 47: 268–273.

frameworks that protect mangrove ecosystems against reductions in protection.

2.2. International instruments relating to mangroves

Mangroves and their conservation and use fall within the scope of several international conventions. These conventions create binding obligations relating to mangrove conservation and sustainable use. They also create and promote frameworks and tools such as lists of sites that can cover mangroves, mechanisms for investment and financing of mangrove conservation, and bilateral and multilateral governance structures that can include mangroves within their scope. The following section describes key instruments and regimes that are applicable to mangroves.

2.2.1 Ramsar Convention on Wetlands of International Importance

The 1971 Convention on Wetlands of International Importance is a key international instrument for conservation of mangroves.[80] It imposes obligations on States Parties to promote "as far as possible the wise use of wetlands in their territory".[81] The wise use of wetlands is defined by the Contracting Parties as "their sustainable utilisation for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem."[82] The Ramsar Convention also establishes a List of Wetlands of International Importance. Each Contracting Party must designate at least one site to be included in the List, and Parties shall "formulate and implement their planning so as to promote the conservation of the wetlands included in the List" .[83] There are 268 mangrove sites on the List of Wetlands of International Importance, covering a total of 29,751,181 ha.[84] As of 2016, more than 10% of total Ramsar sites contain mangroves.[85] Of the 268 Ramsar sites protecting mangroves, 62 are situated in Mexico. It has the highest number of mangrove sites protected under the Convention, covering over 4,000,000 ha.[86] The first site was designated in 1996, with additional sites added only after 2003.

The Ramsar Convention requires parties to report regularly on implementation of their commitments, including those relating to mangroves.[87] Every three years at the Conference Of the Parties (COP), these commitments are reviewed, and measures are adopted to address loss of wetlands. Multiple resolutions concerning mangroves have been adopted. Resolution VIII.11 (2002) encourages States and particularly Asian countries to designate sites covering under represented and threatened ecosystems, such as mangroves. Resolution VII.32 promotes better management of mangroves through modification of politics and strategies affecting mangroves, protection measures, and cooperation. Resolution VIII.4 adopts the Principles and guidelines for incorporating wetland issues into Integrated Coastal Zone Management (ICZM), to ensure the conservation and wise use of wetlands.[88]

80 The Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 2 February 1971).

81 *Ibid.* Article 3.

82 Recommendation 3.3: Wise use of wetlands (adopted on 27 – 5 June 1987 [3 Ramsar Conference of the Contracting Parties]); Ramsar Convention Secretariat. (2013). *The Ramsar Convention Manual: a guide to the Convention on Wetlands (Ramsar, Iran, 1971), 6th ed.* Ramsar Convention Secretariat, Gland, Switzerland.

83 Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 2 February 1971) Article 3.

84 Webber, M., Calumpong, H., Ferreira, B., Granek, E., Green, S., Ruwa, R. and Soares, M. (2016). *Mangroves*. Oceans & Law of the Sea: United Nations (citing 278 Ramsar sites containing mangroves); Ramsar 2018. *Sites Information Service*. Retrieved from https://rsis.ramsar.org/fr/ris-search/mangroves?language=fr&pagetab=0 [Downloaded 6 August 2018].

85 Webber, M., Calumpong, H. Ferreira, B., Granek, E., Green, S., Ruwa, R. and Soares, M. (2016). *Mangroves*. Oceans & Law of the Sea: United Nations.

86 Ramsar 2018. *Sites Information Service*. Retrieved from https://rsis.ramsar.org/fr/ris-search/mangroves?language=fr&pagetab=0 [Downloaded 6 August 2018].

87 Ramsar Convention Secretariat. (2013). *The Ramsar Convention Manual: a guide to the Convention on Wetlands (Ramsar, Iran, 1971), 6th ed.* Ramsar Convention Secretariat, Gland, Switzerland.

88 Principles and guidelines for incorporating wetland issues into Integrated Coastal Zone Management (ICZM) (Adopted 18 – 26 November 2002 Ramsar Convention Resolution VIII.4).

2.2.2 World Heritage Convention

The World Heritage Convention promotes protection of sites of outstanding universal value. It establishes a list which contains both cultural and natural sites. Mangroves are present in 19 natural sites, most of which cover not only mangroves but a larger ecosystem.[89] The largest mangrove forest in the world, the Sundarbans forest in Bangladesh and India, is a World Heritage Site. A memorandum of understanding has been signed between the World Heritage Convention and the Ramsar Convention to avoid conflict where a site is protected by both conventions.[90]

There is evidence that inscription of a site on the list of World Heritage Sites can lead to positive action on the part of the concerned State. For example, the Atlantic Forest South-East Reserves in Brazil were classified in the World Heritage List in 1999. This permitted the extension of the protected areas network and implementation of financial incentives in the site.[91] In addition, inscription on the World Heritage List can help promote tourism, direct political attention, and raise revenue for support of a mangrove site.

Where a World Heritage Site is threatened by "serious and specific dangers" such as large-scale development projects, land use change, or natural disaster, it may be included on the List of World Heritage in Danger.[92] Inclusion on this list can help unlock financial resources or motivate a conservation response. The Belize Barrier Reef Reserve System provides an illustration. The Barrier Reef System was added to the World Heritage List in 1996 and transferred to the List of World Heritage in Danger in 2008 because of the "sale and lease of public lands for the purposes of development within the property leading to the destruction of

89 Webber, M., Calumpong, H. Ferreira, B., Granek, E., Green, S., Ruwa, R. and Soares, M. (2016). *Mangroves*. Oceans & Law of the Sea: United Nations (citing 26 World Heritage Sites containing mangroves).

90 Memorandum of Understanding between the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Bureau of the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar, 14 May 1999).

91 UNESCO (1999). *WHC Nomination Documentation - Atlantic Forest South-East Reserves*. Retrieved from https://whc.unesco.org/uploads/nominations/893rev.pdf [Accessed 11 August 2018].

92 Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO) (Paris, 16 November 1972) Article 11(4).

mangrove and marine ecosystems."[93] Following this decision, Belize put in place a mangrove-cutting moratorium and cancelled all new land transactions and land leases. It adopted revised regulations on protection of mangroves, including strict regulation of activities in "priority mangrove areas".[94] In 2018, the site was removed from the list of World Heritage in Danger, in part because of adoption of the new regulations which represent significant progress towards meeting the country's commitments on maintaining mangrove cover within the World Heritage Site.[95]

2.2.3 Convention on Biological Diversity

The Convention on Biological Diversity (CBD) does not explicitly refer to mangroves or wetlands, but many of its articles are relevant for mangrove conservation.[96] It requires Parties to integrate biodiversity considerations into sectoral and cross-sectoral plans, programmes and policies and national decision-making.[97] It provides for incentives for conservation and measures to avoid or minimize adverse impacts on biological diversity.[98] It requires Parties to establish a system of protected areas and restore degraded ecosystems.[99]

In 2010, the CBD COP adopted the Strategic Plan for Biodiversity 2011-2020, which includes the Aichi Biodiversity Targets. The Aichi Targets are specific, measurable goals to be achieved by 2020, across a range of sectors. Several of the targets are relevant to mangrove conservation.[100] Target 5 provides for halving of the rate of loss of all-natural habitats, including forests. Target 7 calls for sustainable management of areas under agriculture, aquaculture and forestry. Target 11 sets a goal of achieving coverage of 17% of terrestrial and inland water and 10% of coastal ecosystems for "equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures." Target 15 seeks restoration of at least 15% of degraded ecosystems to enhance resilience and the contribution of biodiversity to carbon stocks.[101]

The CBD and the Ramsar Convention signed a Memorandum of Cooperation in 1996, renewed in 2011. They have established several joint work plans since 1998, including the current fifth Joint Work Plan 2011-2020.[102] The current plan focuses on the achievement of the Aichi Biodiversity Targets.

The CBD has begun a consultative process to prepare a post-2020 Biodiversity Framework, while recognizing the need to continue working towards the achievement of the existing targets.[103] In addition to Parties, the Secretariats of the Ramsar Convention and the Convention on International Trade in Endangered Species (CITES), among others, have participated in the process of developing the Post-2020 Framework.[104]

93 State of conservation of World Heritage properties inscribed on the List of World Heritage in Danger - Belize Barrier Reef Reserve System (Belize) (N 764).

94 Forests (Protection of Mangroves) Regulations of 15 June 2018.

95 World Heritage Committee, Item 7A of the Provisional Agenda: State of conservation of the properties inscribed on the List of World Heritage in Danger. 42 Session, Manama, Bahrain (24 June – 4 July 2018 WHC/18/42.COM/7A.Add.).

96 Convention on Biological Diversity (Rio de Janeiro, 5 July 1992).

97 *Ibid.* Article 6(b); 10(a).

98 *Ibid.* Article 11; 10(b).

99 *Ibid.* Article 8.

100 Van Lavieren, H., Spalding, M., Alongi, D.M., Kainuma, M., Clüsener-Godt, M. and Adeel, Z. (2012). *Securing the future of mangroves.* UNU-INWEH, UNESCO-MAB with ISME, ITTO, FAO, UNEP-WCMC and TNC. Pg. 38.

101 The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets, Annex part IV (adopted on 29 October 2010 UNEP/CBD/COP/DEC/X/2).

102 CBD and Ramsar. (2012). *The Convention on Biological Diversity (CBD) and the Ramsar Convention on Wetlands (Ramsar) 5th Joint Work Plan (JWP) 2011-2020.*

103 Progress in the implementation of the Convention and the Strategic Plan for Biodiversity 2011-2020 and towards the achievement of the Aichi Biodiversity Targets (adopted on 12 December 2016 CBD/COP/DEC/XIII/1); CBD. *Preparations for the Post-2020 Biodiversity Framework.* Retrieved from https://www.cbd.int/post2020/

104 CBD. *Submissions from Parties, other Governments, relevant organizations and indigenous peoples and local communities on the preparations for the Post-2020 Biodiversity Framework.* Retrieved from https://www.cbd.int/post2020/submissions.shtml; Ramsar. *Follow-up to the Strategic Plan for Biodiversity beyond 2020.* Retrieved from https://www.ramsar.org/news/follow-up-to-the-strategic-plan-for-biodiversity-beyond-2020

2.2.4 Climate change frameworks

Mangroves are increasingly recognized as an important resource for addressing climate change in terms of both mitigation and adaptation. They provide significant carbon storage. They contain around 1,023 Mg of carbon per hectare, which is five times higher than tropical upland forests. Mangroves soils accounted for 49-98% of carbon storage.[105] Mangroves support climate change adaptation through key ecosystem services such as local climate regulation as well as livelihood and food security. They provide protection against storm surges, erosion and other climate related damage.[106] They enhance resilience of connected ecosystems.[107]

At the same time, climate change creates significant threats to mangroves, in the form of weather unpredictability, rising sea-levels, modification of ocean salinity, changes to the hydrological cycle, and other effects, many of which are not well understood.[108]

In recognition of these connections, mangroves feature in the Nationally Determined Contributions (NDCs) registered within the framework of the Paris Agreement.[109] NDCs provide high level goals and targets which should be implemented through programmes and initiatives at the national level, or through legal reform in some cases.

Some NDCs specifically mention mangroves. Mexico's NDC includes mangroves among its adaptation actions for 2020-2030: "Increase carbon capture and strengthen coastal protection with the implementation of a scheme of conservation and recovery of coastal and marine ecosystems such as coral reefs, mangroves, sea grass and dunes."[110]

Madagascar's NDC also refers to mangrove restoration defining a clear target. It considers the restoration of 35,000 hectares of primary forest areas and mangroves before 2020 and the restoration of 55,000 ha of forests and mangroves by 2030.[111]

India's NDC includes mangrove-related initiatives under both mitigation and adaptation strategies. It states that the Green India Mission and other initiatives will increase forest cover by 5 million hectares and improve the quality of forest cover by an additional 5 million hectares, resulting in additional carbon sequestration of approximately 100 million tons of CO2 annually, leading to an additional carbon sink of 2.5 to 3 billion tons of CO2 equivalent by 2030. The Green India Mission specifies that restoration of 0.2 million ha of mangroves and wetlands by 2020 will sequester 1.6 MtCo2 annually, a small but important component of the goal. The adaptation strategy included in India's NDC references the Mangroves for the Future initiative, coordinated by IUCN, as a means to protect coastal livelihoods.[112]

Other countries' NDCs include goals and targets that are relevant to mangrove conservation and restoration. Kenya's NDC includes a target of achieving "tree cover of at least 10% of the land area of Kenya" and a more general goal to "enhance the resilience of ecosystems to climate variability and change."[113]

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105 Donato, D., Kauffman, J., Murdiyarso, D., Kurnianto, S., Stidham, M., and Kanninen, M. (2011). Mangroves among the most carbon-rich forests in the tropics. *Nature geoscience* 4: 293–297.

106 Wilson, A., Meriwether, W. and Forsyth, C. (2018). Restoring near-shore marine ecosystems to enhance climate security for island ocean states: Aligning international processes and local practices. *Marine Policy* 93:284-294.

107 Miththapala, S. (2008). *Mangroves. Coastal Ecosystems Series Volume 2*. Ecosystems and Livelihoods Group, Asia. 1-28 + iii; Imbach. A. and Kent J. 2005. *Colombo, Sri Lanka: Ecosystems and Livelihoods Group Asia*. IUCN, Gland, Switzerland.

108 Feller, I., Friess, C., Krauss, D. and Lewis, A. (2017). The state of the world's mangroves in the 21st century under climate change. *Hydrobiologia* 803(1):1-12.

109 169 Parties have submitted their first NDCs (175 countries have ratified the Paris Agreement, 197 Parties to the UNFCCC). UNFCCC 2018. *NDC Registry*. Retrieved from http://www4.unfccc.int/ndcregistry/Pages/All.aspx [Accessed 6 August 2018].

110 Mexico's Intended Nationally Determined Contribution. UNFCCC; Failler, P., Pètre, E., Binet, T., and Maréchal, J.P. (2015). Valuation of marine and coastal ecosystem services as a tool for conservation: The case of Martinique in the Caribbean. *Ecosystem Services* 11:67-75.

111 Madagascar's intended nationally determined contribution. UNFCCC.

112 India's intended nationally determined contribution: working towards climate justice, 2.4 4) "*Another initiative to protect coastal livelihood is 'Mangroves for the Future (MFF)' coordinated by International Union for Conservation of Nature (IUCN) in India*". UNFCCC.

113 Kenya's intended nationally determined contribution. UNFCCC.

NDCs also include national emissions reduction commitments. To understand how mangrove conservation may contribute to achieving these commitments, it is important to understand how carbon accounting will be conducted. For example, Kenya's NDC admits that there is significant uncertainty in estimating emissions in the land use sector and recognizes the need for work to improve these estimates.[114]

The global climate regime has given rise to frameworks for reduction of emissions from deforestation and forest degradation (REDD).[115] The REDD+ mechanism was developed by Parties to the UNFCCC.[116] It allows for the development of results-based finance schemes to encourage financial value for the carbon stored in forests in order to encourage countries to reduce emissions from forested lands.[117] Countries can receive results-based payments for conserving and sustainably managing their forests.[118] Participating countries implement measuring, reporting and verification (MRV) to assess and demonstrate their forest carbon stocks.[119]

REDD+ mangrove restoration project has been undertaken in Colombia in 2013. The project has the objective to reduce 16,959,039 tCO2e for a period of 30 years.[120] If the project is duly implemented it would be the first REDD+ project on mangroves in the world.[121]

In Kenya, the project "Mikoko Pamuja" has the objectives to protect and restore mangrove ecosystems in Gazi Bay, southern Kenya. The project would provide $12,138 potential annual income from carbon credits and 2023 tCO2 benefit per annum.[122] However, this project is not under the REDD+ framework.[123]

2.2.5 International water conventions

Mangroves can exist where the river meets the sea. In deltas, estuaries or backwaters, mangroves are part of a freshwater ecosystem that they depend on for survival. Some of the most serious threats to mangroves relate to reduction in supply of freshwater or water pollution originating upstream.

In 1992, the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) was adopted in Helsinki to address transboundary impacts related to international watercourses. In 2013 it was opened for accession by any UN Member State.[124] The Convention requires Parties to take appropriate measures to ensure conservation and restoration of ecosystems, through reasonable and equitable use as well as ecologically sound and rational water management. It also states that Parties must address pollution in relation to transboundary waters.[125] It provides explicit guidance for States to "develop, adopt, implement and, as far as possible, render compatible relevant legal, administrative,

114 *Ibid.*

115 United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries.

116 The first decision of the UNFCCC Conference of the Parties concerning the reduction of emissions from deforestation and forest degradation was taken during its eleventh session in Montréal in 2005: decision 2/CP.13; Reducing emissions from deforestation in developing countries: approaches to stimulate action (adopted 14 – 15 December 2007 FCCC/CP/2007/6/Add.1)

117 Decision 2/CP.17. Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (adopted 15 December 2009 FCCC/AWGLCA/2009/L.7/Add.6) para 64.

118 Decision 9/CP.19. Work programme on results-based finance to progress the full implementation of the activities referred to in decision 1/CP.16, paragraph 70 (adopted 22 November 2013 FCCC/CP/2013/L.5).

119 Decision 14/CP.19. Modalities for measuring, reporting and verifying (adopted 22 November 2013 FCCC/CP/2013/10/Add.1).

120 Ecological Carbon Offsets Partners, LLC (ecoPartners), Offsetters, ClearSky Climate Solutions. (2014). Resumen, Proyecto REDD+ Bajo Calima y La Plata-Bahía Málaga (BCBM)

121 The REDD desk. *REDD+ Mangrove*. Retrieved from https://theredddesk.org/countries/initiatives/redd-mangrove

122 The REDD desk. *Mikoko Pamoja Mangrove restoration in Gazi Bay*. Retrieved from https://theredddesk.org/countries/initiatives/mikoko-pamoja-mangrove-restoration-gazi-bay; Iley, R. Elvers, C. (2017). *Building trust in forest carbon payments (REDD+): Learning from the world of financial accounting*. Working Paper. Climate and Development Knowledge Network (CDKN).

123 The REDD desk. *Mikoko Pamoja Mangrove restoration in Gazi Bay*. Retrieved from https://theredddesk.org/countries/initiatives/mikoko-pamoja-mangrove-restoration-gazi-bay

124 Decision III/1. Reporting and review of implementation of the Protocol (adopted 28 November 2003, entered into force 6 February 2013 ECE/MP.EIA/23.Add.3); See also Decision VI/3. Adoption of the workplan (adopted 6 February 2013 ECE/MP.EIA/20/Add.3) clarifying the accession procedure. As of May 2018, only one non-ECE country has joined the Convention: Chad (accessed 22 February 2018).

125 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) (Helsinki, 17 March 1992) Article 2.

Table 1: Regional instruments relevant to mangroves

Instrument	Region (number of parties)	Description
The African Convention on The Conservation of Nature and Natural Resources (1968)	Africa (32 Parties)	Provides for the conservation and protection of forests.
Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region (1997, amended 2010)	Western Indian Ocean Region (10 parties)	Provides guidance for the protection of the marine and coastal environment, particularly on combating pollution.
Charte et Plan d'actions pour une gestion durable des mangroves dans l'espace Programme Régional de Conservation de la zone Marine et Côtière de l'Afrique de l'Ouest (2010)	West African Region (6 parties)	Contains specific and detailed action plans that each country will have to implement to address mangrove degradation.
The Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region (Abidjan Convention) (1984)	West and Central African Region (17 Parties)	Provides guidance for the protection of the marine and costal environment in the region, including on tackling pollution, reduction of coastal erosion and the creation of specially protected areas.
The Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, (Nouméa Convention) (1986)	South Pacific Region (12 Parties)	Provides a framework for the protection of the marine and coastal environment, including marine pollution, the protection of wild fauna and flora and the establishment of specially protected areas.
Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (1942)	Latin America, the Caribbean and the North America Region (19 Parties)	Aims to protect all species of flora and fauna and their habitats as well as other sites of high value, particularly through the establishment of protected areas.
The Convention for the Protection of the Marine Environment and Coastal Area of the South-East Pacific (1986).	South East Pacific Region (5 parties)	The Convention seeks to protect the marine environment and coastal zones of the South-East Pacific within the EEZ of its Parties.

economic, financial and technical measures" to ensure, *inter alia* licensing or permitting of waste-water discharge, wastewater treatment, measures for reduction of nutrient inputs, EIA and promotion of the ecosystems approach for sustainable water resource management.[126]

Between the adoption of the UNECE Convention and its amendment to allow global accession, the UN Convention on the Law of the Non-Navigational Uses of International Watercourses (UN Watercourses Convention) was adopted in 1997 in New York. The UN Watercourses Convention promotes equitable and reasonable utilization of international watercourses, taking into account ecological and hydrological factors as well as social and economic needs of watercourse States and local populations.[127] It also provides for regular exchange of data and information, cooperation in management, and notification procedures for planned measures that might affect shared watercourses.[128] The UN Watercourses Convention did not enter into force until 2014, 17 years after its adoption.

Both agreements promote cooperation at the river or basin level through bilateral or multilateral agreements, or joint mechanisms and commissions. However the UNECE Watercourses Convention creates a binding obligation to enter into such mechanisms, while the UN Water Convention does not.[129] There are

126 *Ibid.* Article 3.

127 *Ibid.* Article 5-6.

128 Convention on the Law of the Non-navigational Uses of International Watercourses (UN Watercourses Convention) (New York, 21 May 1997) Article 9, 11-19, 24.

129 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) (Helsinki, 17 March 1992) Article 2(6); Convention on the Law of the Non-navigational Uses of International Watercourses (UN Watercourses Convention) (New York, 21 May 1997) Article 8(2).

many examples of basin level cooperation around the world, dating back to the establishment of the Rhine and Danube Commissions in the 19th Century.[130] Global and basin-level water agreements can help create standards and promote cooperation along transboundary watercourses, which can have direct impacts for mangrove conservation, particularly where threats are transboundary in nature. The obligations contained in such agreements must be implemented through national sectoral legislation regulating water allocation and pollution, as well as planning, permitting and EIAs (see Sections 3.1.2.2 and 3.1.4.3).

2.2.6 Other conventions and instruments related to mangroves

Several other global instruments are relevant to mangrove conservation. The Convention on Migratory Species creates a framework for agreements among range states of migratory species, such as the Agreement on the Conservation of African and Eurasian Migratory Water birds; many of these species depend on mangrove ecosystems for essential habitat.[131] The CITES includes in its Appendices species living in mangrove ecosystems such as the mangrove hummingbird, the mangrove black hawk, and several species of reptile.[132] The United Nations Convention on the Law of the Sea calls on States to protect and preserve the marine environment in zones under their jurisdiction.[133] This may imply an obligation to conserve mangrove ecosystems and regulate activities that pose a threat to the marine environment.

In addition to global instruments, there are several regional instruments adopted under the UN Environment Programme that are relevant for mangrove conservation and sustainable use. Table 1 includes a non-comprehensive selection of such agreements.

There are also non-binding instruments that provide additional international guidance for sustainable use and conservation of mangroves. The International Society for Mangrove Ecosystems (ISME), an international non-profit and non-governmental scientific society, drafted the Charter for Mangroves at its first meeting in 1991.[134] The Charter for Mangroves complements the United Nations World Charter for Nature.[135] It provides specific guidance for the conservation of mangroves.

In 2003, the World Bank, ISME and the Centre for Tropical Ecosystems Research published a draft code of conduct for the management and sustainable use of mangrove ecosystems. The Code contains guidelines, principles and recommended practices that apply for the conservation and management of mangroves, helping relevant stakeholders to sustainably use this sensitive ecosystem. It details a number of best practices from fisheries and forestry to community issues and precautionary approach, and provides specific examples from a large range of countries. Article 3 stipulates that "States should ensure that effective policy, legal, institutional and administrative frameworks are developed at the local, national and transboundary levels, as appropriate, to support mangrove management". The other paragraphs of the article develop the necessity of clear responsibilities, appropriate zoning, concrete targets or goals and EIA.[136]

130 Caponera, D.A. (2007). *Principles of Water Law and Administration*. Brookfield: Rotterdam, Netherlands; Jekel, H. (2017). *Transboundary water cooperation into practice: example of the German experience*. [*PowerPoint slides*]. Retrieved from https://www.unece.org/fileadmin/DAM/env/documents/2017/WAT/12Dec_20-21_TunisWS/3.2_Germany_Jekel_German_experience_cooperation.pdf [Accessed 6 August 2018].

131 Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA Convention) (Bonn, 16 June 1995) Annex 1, 2; Van Lavieren, H., Spalding, M., Alongi, D.M., Kainuma, M., Clüsener-Godt, M. and Adeel, Z. (2012). *Securing the future of mangroves*. UNU-INWEH, UNESCO-MAB with ISME, ITTO, FAO, UNEP-WCMC and TNC. Pp. 38-39.

132 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Washington, 3 March 1979). Checklist of CITES Species, checklist.cites.org [Accessed 9 October 2018].

133 The United Nations Convention on the Law of the Sea (Montego Bay, 10 December 1982), Article 2 referring to Zones under States jurisdiction are internal waters, territorial sea, Article 56 (referring to the Exclusive Economic Zone).

134 The International Society for Mangrove Ecosystems (ISME). (1991). *Charter for Mangroves*. Bangkok.

135 General Assembly resolution 37/7. World Charter for Nature. A/RES/37/7 (28 October 1982).

136 Macintosh, D.J. and Ashton, E.C. (2003). *Draft code of conduct for sustainable management of mangrove forest ecosystems*.

The UNESCO Man and Biosphere Programme designates sites in the World Network of Biosphere Reserves – currently 88 of the 669 biosphere reserves include mangroves and 13% of the World Network is composed of mangroves.[137] On 17th December 2007, the General Assembly of the United Nations adopted a Resolution referring to a non-legally binding instrument that provides guidance for the sustainable management of all types of forests, which *de facto* includes mangrove forests.[138]

2.3. Mangroves and international law summary

Many principles and concepts of environmental international law are relevant for the conservation of mangrove ecosystems as well as various international conventions. Mangroves form part of forest, freshwater, wetland and marine ecosystems, and correspondingly implicate a range of international and regional instruments. Mangroves are an important international carbon sink and source of ecosystem services, and play a significant role in the international framework on the adaptation to and mitigation of climate change.

There is no comprehensive global binding framework focusing on mangrove conservation, but there is a range of applicable international tools and standards that can be used for mangrove conservation, if appropriately implemented in national law.

137 UNESCO, *Ecological Sciences for Sustainable Development - Mangroves*. Retrieved from http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/specific-ecosystems/mangroves/ [Accessed 12 August 2018].

138 General Assembly resolution 62/98. Non-legally binding instrument on all types of forests. A/RES/62/98 (17 December 2007).

3

MANGROVE CONSERVATION IN NATIONAL LEGAL FRAMEWORKS

Mangroves exist at the intersection of coast and ocean, freshwater and forest. They are used and threatened by vastly different activities and industries. They can be both nationally significant and essential to local communities. This complexity is reflected in the multitude of legal tools and frameworks that determine, affect or implicate mangrove conservation and sustainable use.

Increasingly, countries directly address mangroves in national policies and targets as well as specific legal provisions on mangroves. However, legal instruments from different sectors and areas of law provide important tools and frameworks for mangrove conservation. These include both mechanisms for regulating activities that affect mangrove ecosystems – whether they take place within or outside mangrove areas -- as well as basic institutional and procedural frameworks that structure and determine mangrove governance.

This chapter first provides an overview of different legal tools and options for mangrove conservation and sustainable use, including provisions on mangrove ecosystems as well as permitting and planning tools, market-based mechanisms, and tools from a range of sectors. The second section describes governance frameworks that are relevant for mangrove conservation, addressing issues of governance, land tenure and rights. The final section explores the reality of implementation of legal tools and frameworks, including a range of cross-cutting challenges.

3.1. Tools and options for mangrove conservation

There are many legal tools available for conservation of mangroves. Mangroves can be directly protected by the legislation, taken into consideration before and during the development of activities by planning, permitting instruments and environmental impact assessments. Activities can be restricted or banned in mangroves areas by declaring them as protected areas. Due to its belonging to different ecosystems, mangroves fit into different sectoral legislation, such as forest, marine and coastal law, water and wetlands, aquaculture and climate change. Mangroves produce ecosystem services and thus, several market-based mechanisms are an option for mangrove conservation.

These tools may be found in different types and levels of law and regulation, and they may overlap. They may incorporate and build on the international principles, standards and processes discussed above to different degrees. National, state or subnational and municipal level laws and institutions can be relevant. Legal frameworks can be created by legislation, referring to executive decree or regulation, or by judicial decision-making. Similar types of tools may be found in different instruments: regulation of forest uses may be embedded in a forest law in one country and a protected areas law in another, while environmental impact assessment requirements and procedures may be part of standalone regulations or sectoral frameworks. Different rules may apply in different parts of the country, based on geography, ecosystem, or jurisdiction.

3.1.1 Direct protection of mangroves

Most countries do not have a special "Mangrove Law", but there are several examples of specific legal provisions aimed at protecting mangrove ecosystems. This typically takes the form of assigning a protected status or classification to mangrove ecosystems, coupled with a ban on certain activities within the mangrove area.

In Costa Rica, mangroves are considered part of the National Natural Heritage.[139] As such, they cannot be privately owned, and are protected from almost any form of conversion, cutting or use of forest resources. Mangrove forests can only be used for three purposes--- research, education and ecotourism---and only with prior approval by the Ministry of Environment and Energy.[140]

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139 *Ley forestal* No. 7575 of 5 February 1996. Article 13, 14, 15.

140 *Ibid.* Note that use of the aquatic resources for sustainable fishing may also be allowed according to an approved management plan, under the Fishing and Aquaculture Law No. 8436 of 10 February 2005. Article 9, 13 (see Section 3.1.6.).

In Mexico, it is forbidden to remove, fill, transplant, cut or do any work that affects the hydrological flow of mangroves or connected ecosystems, according to the amended General Law of Wildlife.[141] This is elaborated through a norm which establishes specific provisions for the preservation, conservation, sustainable use and restoration of coastal wetlands in mangrove zones.[142] However, non-extractive activities may be allowed with prior authorization from the Secretariat for Environment and Natural Resources, Mexico's environment ministry.[143] This decision must follow an EIA.[144] In 2016, in Cancun, significant mangrove forests were destroyed to build a resort, with the authorization of the Secretariat. Legal proceedings contesting the decision are ongoing.[145]

Restrictions on activities in mangroves are necessary for their conservation and can be seen as a first positive step. However, such restrictions might create issues for implementation, especially where they lack public support or interfere with local livelihoods. In Costa Rica, communities dependent on mangrove resources for subsistence and livelihoods must deal with the restrictions on use created by the protections of mangroves. Many communities in Costa Rica traditionally relied on harvesting of piangua bivalves in mangroves. For example, in the national wetland of Terraba-Sierpe there are currently more than 200 families who depend on the extraction of Piangua.[146] The management plan of this wetland, which includes mangroves, was approved in 2013 and provides that the extraction of Piangua in virgin areas is not allowed.[147] Piangua's extraction is only allowed in semi-natural areas as long as it has scientific and technical justification. This provision restricted the use of this wetland from the local communities that are dependent on its resources. In 2015, the Executive Decree No. 39411 addressed this issue that concerns many wetlands, by providing for development of management plans to allow rational use of mangrove aquatic resources such as piangua by local communities that have traditionally exercised this activity.[148]

A similar situation is playing out in Madagascar, where cutting of mangroves is illegal.[149] The high demand for charcoal coupled with lack of alternative energy sources drives extensive illegal cutting in mangrove areas. In Madagascar, 90% of people depend on biomass as their main energy source, leading to significant conversion of mangroves for charcoal.[150] As commercial timber extraction has been illegal since 2000, patrols have been established to control illegal logging and charcoal production.[151] Some organizations such as Blue Ventures and partner NGOs are pushing for legalization of selective cutting and community-based sustainable management of mangrove forests.[152]

Absolute protection of mangrove ecosystems can also cause pressures to shift to other ecosystems. In Mexico, some reports assert that the legal framework protecting mangroves led to the

141 *Ley General de Vida Silvestre* of 3 July 2000 (amended on 19 January 2018) (translated into English under the title [General Law of Wildlife]). Article 60 TER.

142 *Norma Oficial Mexicana* NOM-022-SEMARNAT-2003

143 Secretaria de Medio Ambiente y Recursos Naturales (SEMANART)

144 *Ley General de Vida Silvestre* of 3 July 2000 (amended on 19 January 2018) (translated into English under the title [General Law of Wildlife]). Article 99.

145 Varillas, A. (27 August 2018). *Confronta a ciudadanos bloqueo de accesos a malecón de Tajamar*. Retrieved from http://www.eluniversal.com.mx/estados/confronta-ciudadanos-bloqueo-de-accesos-malecon-de-tajamar. [Accessed 19 September 2018].

146 Arroyo Mora, Daisy (2013). Humedal Nacional Térraba-Sierpe Nuevos pasos en nuestra acción social e investigación. *Crisol: Revista de Ciencia y Tecnología de la UCR*. No. 27.

147 *Decreto Ejecutivo* No. 37986 MINAE of 16 December 2013. *Resumen Ejecutivo del Plan de Manejo del Humedal Nacional Téraba-Sierpe.*

148 *Decreto Ejecutivo* No. 39411-MINAE-MAG of 2 September 2015 (translated into English under the title [Executive Decree]). Stating: "*Que es fundamental que se autoricen y regulen acciones de aprovechamiento racional de los recursos marinos de los humedales, como una medida tendiente tanto a evitar acciones no compatibles con el uso racional de las poblaciones naturales, como para mejorar las condiciones de vida de los miembros de las comunidades costeras, por medio de instrumentos técnicos como los planes de manejo.*"

149 *Arrêté interministériel* No. 32100/2014 of 24 October 2014 *portant interdiction d'exploitation de bois de mangroves au niveau du territoire national.*

150 Minten, B., Sander, K., and Stifel, D. (2012). Forest management and economic rents: Evidence from the charcoal trade in Madagascar. *Energy for Sustainable Development* 17(2):106-115.

151 Jones, T. (2013). Editorial: Shining a light on Madagascar's mangroves. *Madagascar Conservation & Development* 8(1):5; Jones, T. et al. (2016). Madagascar's Mangroves: Quantifying Nation-Wide and Ecosystem Specific Dynamics, and Detailed Contemporary Mapping of Distinct Ecosystems. *Remote Sensing* 8(2):4.

152 Interview with Jen Hacking from Blue Ventures Madagascar on 27 April 2017.

establishment of shrimp farms on saltmarshes.[153] In Madagascar, the prohibition of harvesting of mangroves for charcoal may drive charcoal harvesters to terrestrial forests to meet the demand.[154]

Where all activities in mangroves are prohibited, this can affect restoration efforts as well. In Thailand it is illegal to bring heavy machinery into mangroves, so restoring hydrological flows can require breaking dykes by hand.[155] In other countries, restoration can be a requirement under law connected to direct protection. In Haiti, a ministerial decree adopted in 2013 establishes a ban on construction, cutting and fishing in mangrove forests, and states that "mangroves shall be restored in the five years following the adoption of the decree."[156]

3.1.2 Planning and permitting

Where activities in or affecting mangroves are allowed, they should be regulated to ensure compatibility with sustainability of the mangrove ecosystem. This type of regulation can be achieved through a planning process and/or a system of permits that takes conservation considerations into account. Either system needs to be designed taking into account the principles of participation, access to information and access to justice (see Section 2.1.6). These principles are baselines for transparency and legitimacy, which are essential for fair and effective implementation of planning and permitting systems.

3.1.2.1. Sectoral and integrated planning

Planning is a fundamental tool for managing natural resources at different governance levels, and it is often sector-specific. Within a single country there can be processes for agricultural planning, land use planning, coastal zone planning, freshwater planning, and protected area and environmental planning. There may also be national or sub-national development plans or environmental plans that cut across sectors.

Planning processes can be coupled with an inventory of the ecosystem or resource, which serves as a baseline or foundation. In Kenya, the Environmental Management and Coordination Act (EMCA) requires development of an inventory of the coastal zone, which should contain, inter alia, "an inventory of the state of the coral reefs, mangroves and marshes" and preparation of an integrated national coastal zone management plan.[157]

Planning and authorization may be required under multiple sectoral laws. In Costa Rica mangroves are considered to be part of the public area of the maritime terrestrial zone, and are reserved for public projects approved by the Ministry of Public Works and Transport, the Costa Rican Institute of Tourism and the National Institute of Housing and Urbanism.[158] Under the Forestry Law, the use of forest resources in mangroves also requires prior approval by the Ministry of Environment and Energy, including an environmental impact assessment as appropriate.[159] Fishing activities are subject to a management plan approved by the Ministry of Environment and Energy and the Costa Rican institute for fisheries and aquaculture.[160]

153 Berlanga-Robles, C.A., Ruiz-Luna, A. and Hernández-Guzmán, R.. (2011). Impact of Shrimp Farming on Mangrove Forest and Other Coastal Wetlands: The Case of Mexico. *InTech* 17-28.

154 Minten, B., Sander, K., and Stifel, D. (2012). Forest management and economic rents: Evidence from the charcoal trade in Madagascar. *Energy for Sustainable Development* 17(2):106-115.

155 The Thaiger. (24 May 2012). *Phuket lifestyle: Saving Thailand's mangroves*. Retrieved from https://thethaiger.com/thai-life/phuket-lifestyle-saving-thailands-mangroves [Accessed 6 August 2018].

156 *Arrêté Ministériel interdisant l'exploitation des mangroves* of 10 July 2013 (translated into English under the title [Ministerial decree])

157 The Environmental Management and Co-ordination Act (EMCA) (Chapter 387) of 6 January 2000. Section 55.

158 *Ley sobre la Zona Marítimo Terrestre* No. 6043 of 2 March 1977. Article 22.

159 *Ley forestal* No. 7575 of 5 February 1996 (translated into English under the title [Forestry Law]). Article 18.

160 Fishing and Aquaculture Law No. 8436 of 10 February 2005. Article 9, 13.

Where planning takes place in multiple sectors, integrated planning is a tool to mainstream conservation and biodiversity across sectoral plans. In India, the National Biodiversity Act provides for the Central Government to "integrate the conservation, promotion and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies."[161]

Cross-sectoral environmental plans can be developed for particular sites or ecosystems. The Kenyan EMCA provides for development of "an overall environmental management plan for a lake, river, wetland or coastal area, taking into account the relevant sectoral interest."[162] In India, the Wetlands (Conservation and Management) Rules adopted in 2017 state that the State or Union Wetlands Authority should "coordinate implementation of integrated management plans based on wise use principles through various line departments and other concerned agencies."[163]

Kenya established a National Environment Action Plan Committee to prepare regular national environment action plans submitted to the National Assembly for adoption. The plans should include an analysis of resources and current uses, recommendations for "appropriate legal and fiscal incentives", identification of potential threats, guidelines for integration of environmental standards into development planning, recommendations for policy and legislative approaches for mitigating impacts, and mapping of existing monuments and protected areas .[164]

Planning can take place at different levels of government. In India, District Planning Committees consolidate plans prepared by Panchayats and Municipalities into district development plans, while Metropolitan Planning Committees elaborate development plans for metropolitan areas; both district and metropolitan plans should consider matters of common interest between Panchayats and Municipalities such as coordinated spatial planning, sharing of water and other natural resources, and environmental conservation.[165]

Planning can be a means for involving local communities in management. The Indian National Conservation Strategy and Policy Statement on Environment and Development provides for "Micro-level planning to develop appropriate methodology and implementation of action plan by involving the people at the village level in social forestry programmes, land use planning, afforestation etc."[166]

The implementation of the legislation related to development and land use planning often does not prioritize conservation uses. High value competing land uses, such as oil palm, aquaculture, or charcoal may appear to be a better use of land resources, at least in the short term. Proponents of competing land uses may have political power over planning processes at the national or local levels. However, some countries have intentionally reversed this in their policies. Madagascar has made a priority in its National Development Plan to include natural capital assets into economic and social development planning processes.[167]

In some cases, balancing commercial use with conservation needs involves offsetting – a requirement that mangroves destroyed must be offset by mangroves planted elsewhere. In Vietnam, any harvested area of a protected forest must be replanted.[168] These replanting tools can help balance the damage done by necessary

161 The Biological Diversity Act, 2002 No. 18 of 2003 of 5 February 2003. Section36(3).

162 The Environmental Management and Co-ordination Act (EMCA) (Chapter 387) of 6 January 2000. Section 42(3).

163 Wetlands (Conservation and Management) Rules of 26 September 2017. Section 5(4)(l).

164 The Environmental Management and Co-ordination Act (EMCA) (Chapter 387) of 6 January 2000. Section 37.

165 The constitution of India of 26 November 1949. Article 243ZD.

166 National Conservation Strategy and Policy Statement on Environment and Development of 2 June 1992. Section 5.2.1.4.

167 Ministère de l'économie et de la planification. (2015). *Plan national de développement 2015-2019.* (translated into English under the title [National Development Plan])., Section 1.1.2.; IUCN and Blue Ventures. (2016). *National Blue Carbon Policy Assessment*. IUCN, Gland, Switzerland. Pg. 28.

168 Decision No. 178/2001/QD-TTg of 12 November 2001 on the benefits and obligations of households and individuals assigned, leased or contracted forests and forestry land; Beresnev, N. et al. (2016). *Mangrove-related policy and institutional frameworks in Pakistan, Thailand and Vietnam*. FAO and IUCN, Gland, Switzerland.

human use, but they can also provide a false sense that no harm has been caused. There is evidence that mature mangrove forests are better than replanted forests in terms of ecosystem services and biodiversity value, and it can take decades for a newly planted forest to catch up.[169] In 2009, around 62% of mangrove forests in Vietnam were recent monoculture plantation.[170] In it's Fifth National Report to the CBD, Vietnam recognized that planted forests have "a lower value in terms of biodiversity" compared to primary forests.[171]

3.1.2.2. Permitting and Environmental Impact Assessments

Many countries, including Costa Rica, Honduras, Malaysia and Sri Lanka, require authorization for activities within mangrove ecosystems, subject to an EIA.[172] Permitting and EIA requirements are often strengthened in protected areas (see Section 3.1.3).

Madagascar requires an environmental authorization or an environmental impact study for any public or private investment in activities which may harm the environment. In this context, an environmental authorization is required for any forest exploitation of more than 150 hectares.[173] It is also needed for any logging of more than 150 hectares.[174]

169 Gibson, L.P. et al. (2011). Primary forests are irreplaceable for sustaining tropical biodiversity. *Nature* 478(7369):378–381.

170 McNally R., McEwin A. and Holland T. (2010). *The Potential for Mangrove Carbon Projects in Vietnam*, SNV Vietnam Programme, Hanoi.

171 "Forest coverage is observed to be expanding, this is mainly due to an increase in planted forests, which has a lower value in terms of biodiversity, and in addition the area of natural forests with higher-level biodiversity values." - Ministry of natural resources and environment (2014). *Vietnam's Fifth National Report to the United Nations Convention on Biological Diversity, Reporting period 2009-2013.*

172 Howarth, W. et al. (2001). *Legislation governing shrimp aquaculture - legal issues, national experiences and options.* FAO, Rome, Italy.

173 *Décret* No. 99-954 of 15 December 1999 (modified by the *décret* No. 2004-167 of 3 February 2004) fixing the new provisions relating to the compatibility of investments with the environment. Annex II.

174 *Ibid.* Annex I.

In Mexico, the General Law of Ecological Balance and Environmental Protection provides for EIAs to establish conditions for activities that may impact ecological equilibrium or exceed established environmental limits or protections.[175] Environmental Impact Authorization is specifically required for activities in wetlands, mangroves, lagoons, rivers, lakes and estuaries connected to the sea, as well as developments that affect the coastal ecosystem and activities in protected areas.[176]

In Malaysia, EIAs are explicitly required for several activities related to mangroves, including:

> Land-based aquaculture projects accompanied by clearing of mangrove forest, peat swamp forest or fresh water swamp forest... Conversion of an area of mangrove forest ... for industrial, housing or agricultural use ... Clearing of mangrove forest, peat swamp forest or fresh water swamp forest on islands adjacent to any national marine park.[177]

In Kenya, permits and EIAs are the primary means for managing natural resources. The Environmental Management and Coordination Act states that the Minister shall provide for the conservation of mangrove and coral reef ecosystems, and creates requirements for EIAs and permits, but does not give specific guidance on conservation standards.[178] Permits are required for activities relating to rivers and wetlands, as well as mining activities and other listed activities. EIAs are prepared by registered experts, and conducted according to extensive regulations. The Kenyan Environmental Management and Coordination Act provides for a regular environmental audit of activities likely to have a significant effect on the environment, as well as regular reporting requirements for operators of projects for which an EIA report has been made. [179] In some cases, permitting requirements can create obstacles for restoration. In Costa Rica, permits are required for most activities in mangrove areas, including degraded areas. Obtaining the permits for restoration activities is a slow process that requires applications to multiple departments, which can cause long delays in restoration projects.[180]

3.1.3 Protected areas

Protected areas are among the oldest and most familiar forms of biodiversity management, and a common means to protect mangrove forests in many countries. The proportion of mangrove forests located within protected areas has been estimated from as little as 7% to as much as 36% of total mangroves worldwide.[181]

Protected areas have different names and definitions, and it is worth exploring what they mean and how they work. IUCN defines a protected area as:

> A clearly defined geographical space recognized, dedicated and managed, through legal and other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.[182]

Protected areas are not areas in which no activity or use is allowed. A protected area can be compatible with sustainable use where it does not undermine the conservation

175 *Ley General del Equilibrio Ecológico y la Protección al Ambiente* of 28 January 1988 (translated into English under the title [General Law of Ecological Balance and Environmental Protection]).

176 *Ibid.* Article 28.

177 The Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015 of 5 August 2015. First Schedule (4) referring to Section 3(1). *See also,*Shukor, A.H. (2004). *The use of mangroves in Malaysia, In: Promotion of mangrove-friendly shrimp aquaculture in Southeast Asia* (pp. 136-144). Tigbauan, Iloilo, Philippines: Aquaculture Department, Southeast Asian Fisheries Development Center.*;* Dudley N. (2008). *Guidelines for applying protected area management categories*. IUCN, Gland, Switzerland. 86pp. Pg. 136-144.

178 The Environmental Management and Co-ordination Act (EMCA) (Chapter 387) of 6 January 2000. Section 42.

179 *Ibid.* Section 68.

180 Interview with Luis Carlos Solis, OSA Conservation, Costa Rica, 6 October 2017; *Ley sobre la Zona Marítimo Terrestre* No. 6043 of 2 March 1977. Article 11, 4.

181 Webber, M., Calumpong, H. Ferreira, B., Granek, E., Green, S., Ruwa, R. and Soares, M. (2016). *Mangroves*. Oceans & Law of the Sea: United Nations (6.9%); Mark Spalding et al. (2014). Attaining Aichi Target 11: How well are marine ecosystem services covered by protected areas? Discussion Paper prepared for the World Parks Congress, Sydney (36%); Van Lavieren, H., Spalding, M., Alongi, D.M., Kainuma, M., Clüsener-Godt, M. and Adeel, Z. (2012). *Securing the future of mangroves*. UNU-INWEH, UNESCO-MAB with ISME, ITTO, FAO, UNEP-WCMC and TNC. (25%).

182 Dudley N. (2008). *Guidelines for applying protected area management categories*. IUCN, Gland, Switzerland. 86pp.

Table 2: IUCN protected area categories

Category	Description
Ia Strict nature reserve	Strictly protected for biodiversity and also possibly geological/ geomorphological features, where human visitation, use and impacts are controlled and limited to ensure protection of the conservation values
Ib Wilderness area	Usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, protected and managed to preserve their natural condition
II National park	Large natural or near-natural areas protecting large-scale ecological processes with characteristic species and ecosystems, which also have environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities
III Natural monument or feature	Areas set aside to protect a specific natural monument, which can be a landform, sea mount, marine cavern, geological feature such as a cave, or a living feature such as an ancient grove
IV Habitat/ species management area	Areas to protect particular species or habitats, where management reflects this priority. Many will need regular, active interventions to meet the needs of particular species or habitats, but this is not a requirement of the category
V Protected landscape/ seascape	Where the interaction of people and nature over time has produced a distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values
VI Protected area with sustainable use of natural resources	Areas which conserve ecosystems, together with associated cultural values and traditional natural resource management systems. Generally large, mainly in a natural condition, with a proportion under sustainable natural resource management and where low-level non-industrial natural resource use compatible with nature conservation is seen as one of the main aims

objectives of the area. IUCN has defined a set of categories of protected areas according to their primary management objectives (Table 2). The IUCN categories have been used by national governments as a basis for creating definitions in national legislation.[183] The names used for different types of protected areas vary widely across countries, but almost all countries recognize multiple types of protected area within their national protected area systems.

Not all protected areas are governed by the State. IUCN describes four types of protected areas governance, based on who has primary authority and control over decision-making in the protected area:[184]

- **Governance by government:** Describes national, provincial and locally owned or controlled protected areas;
- **Governance by indigenous peoples or local communities:** Describes indigenous and community conserved areas (ICCAs);
- **Governance by private entities**: Describes areas governed by an individual owner, non-profit organization, or for-profit organization for the primary purpose of conservation;
- **Shared governance**: Describes areas jointly governed by diverse rightsholders and stakeholders.

Mangroves may be included in different types of protected area, under different governance arrangements, depending on the protected areas law as well as frameworks for land, resource tenure and rights.

In most countries, protected areas are managed according to a management plan developed by the protected area authority or authorities, typically through a consultative process. The management plan lays out objectives for conservation as well as what activities should be allowed, permitted or prohibited in the protected

183 Lausche, B. (2011). *Guidelines for Protected Areas Legislation*. IUCN, Gland, Switzerland.

184 Borrini-Feyerabend, G., Dudley, N., Jaeger, T., Lassen, B., Broome, N.P., Phillips, A. and Sandwith, T. (2013). *Governance of Protected Areas: From understanding to action. Best Practice Protected Area Guidelines Series No. 20*. IUCN, Gland, Switzerland. at. xvi + 124pp.

area as a whole or in different zones. Mangroves may be subject to protection under multiple protected area categories in the same country. For example, In Vietnam, mangroves can be designated as a "National Park" or "species and habitat sanctuary".[185] Under the Indian Forest Act, mangroves can be classified as forest reserves or protected forests.[186] Under the Indian Wildlife Protection Act, mangroves could be designated as Wildlife Sanctuaries or National Parks.[187] The National Biodiversity Act provides for designation of Biodiversity Heritage Sites – while no mangrove sites are currently listed, there are news reports that mangrove forests in Kerala and Kochi are under consideration for recognition.[188] Each different type of protected area designation provides a different set of requirements and restrictions.[189]

In some countries, mangroves are protected areas by definition. In Costa Rica, wetlands, including mangroves, are defined as both an ecosystem and a management category of protected area.[190] Certain activities are restricted within such protected areas, subject to a specific management plan created for the site.

To be effective, protected areas should be committed for a long term, preferably in perpetuity. Degazettement of protected areas threatens their specific biodiversity value and undercuts the conservation system. National legislation can help avoid this by making it more difficult to remove protections. In Costa Rica, wetlands declared as protected areas may only be downgraded by a law, not by executive decree, and such downgrading must be justified by technical studies.[191] In India, alteration of the boundaries of a sanctuary or national park requires a resolution passed by the State legislature.[192]

3.1.4 Sectoral regulations

Mangroves are a type of forest; they are also a type of wetland. They are part of the marine and coastal environment, and they are part of freshwater systems. Where national legislation is organized by sector, this can create complexity in understanding and implementing law in the context of mangroves. Mangroves may be covered by laws from many different sectors. Such laws are often not designed with mangroves in mind and may be implemented with a focus on other ecosystems within their scope. Even where mangroves are covered by more legal instruments than other ecosystems, they may still fall through the gaps.

3.1.4.1. Forest law

Mangroves are often covered by forest legislation, and subject to legal protections, restrictions or frameworks applicable to other types of forests.

Forest law can create special types of forest. These may be a form of protected area if they meet the definition of protected area described above. However, they may not be defined for the primary purpose of conservation, or their protected status may be temporary, or they otherwise may not meet the definition of protected area.

For example, Vietnam classifies forests into three types:

- Special use forests (14% of mangrove forests), which are strictly protected and

185 Decree No. 57/2008/ND-CP of 2 May 2008 promulgating the regulation on management of Vietnam's marine reserves of national and international importance. Article 2.2.

186 The Indian Forest Act of 21 September 1927. Section 3, 26 (forest reserves); 29 (protected forests).

187 The Indian Wildlife (Protection) Act of 9 September 1972. Section 18 et seq.(wildlife sanctuaries); 35 (national parks).

188 Sham, M. (24 July 2017). *Ashramam first biodiversity heritage site*. Retrieved from https://www.deccanchronicle.com/nation/in-other-news/240717/ashramam-first-biodiversity-heritage-site.html [Accessed 6 August 2018]; Nandakumar, T. (3 August 2017). *State to get three new biodiversity heritage sites*. Retrieved from http://www.thehindu.com/news/national/kerala/state-to-get-three-new-biodiversity-heritage-sites/article19418899.ece [Accessed 6 August 2018].

189 DasGupta, R., Shaw, R. (2013). Changing perspectives of mangrove management in India: An analytical overview, *Ocean and Coastal Management*. vol. 80.

190 Sentencia No. 14288 de Sala Constitucional de la Corte Suprema de Justicia of 9 September 2009.

191 *Ley Orgánica del Ambiente* No. 7554 of 4 October 1995. Article 38.

192 The Indian Wildlife (Protection) Act No. 53 of 1972 of 9 September 1972. Section 26A, 35.

include national parks, nature conservation zones and landscape protection areas;

- Protection forests (55% of mangrove forests), which include both planted and natural forests and are intended for protection of watersheds and ecosystem services, and allow some regulated timber extraction; and

- Production forests (31% of mangrove forests), which include replanted forests and are intended for commercial use.[193]

In Kenya, a forest with "particular environmental, cultural, scientific, or other special significance" can be declared a nature reserve "for the purpose of preserving its biodiversity and natural amenities thereof."[194] Mangroves have had legal status as government reserve forests in Kenya since 1932.[195] In 1964, specific mangrove forests were listed in the gazette.[196] Within a nature reserve, no cutting, grazing, removal of forest produce, hunting or fishing is allowed. However, a forest community or traditional user may make an application for special use.[197]

India has similar provisions for reserve forests, constituted by the State Government, in which clearing is prohibited and the State can make rules for fishing and other use.[198] It can also decides to apply protections to all forests over which it has rights, termed protected forests.[199] The State Government may assign rights over a reserve forest to a village community. In such village forests, the State Government makes rules describing the conditions under which the community may use forest resources and the duties of the community to protect the forest.[200]

Forest legislation can also create protections for specific species of tree. For example, in Kenya, the President may declare any tree, species or family of tree protected in the whole country. Any person who cuts, damages or removes a protected tree commits an offence.[201] All 10 species of mangrove found in Kenya are currently listed as protected trees.[202]

In Madagascar, mangroves are considered forests.[203] As a result, they benefit from protection and sustainable forest management regimes.[204] Clearing and wildfires are considered to be a punishable offence.[205] Punishments range from a fine, to imprisonment or labor days to the Administration in charge of water and forests.[206]

3.1.4.2. Marine and coastal law

Many countries provide legal frameworks for integrated coastal zone management. The frameworks can cover surveying and assessment of coastal ecosystems, and integrated management planning involving multiple relevant agencies (see Section 3.1.2.1). National legislation can also create specific protections for coastal zones.

In Madagascar, the decree on integrated management of coastal and marine areas states that "in the coastal and marine area, environmental concerns must be systematically integrated into all other policies, including agriculture, forestry, energy, industry, tourism, fisheries, aquaculture, transport, human

193 Law on Forest Protection and Development No. 29/2004/QH11 of 3 December 2004. Article 4.

194 The Forests Act (Chapter 385) of 18 November 2005. Section 32(1).

195 Proclamation No. 44 of 30 April 1932.

196 Legal Notice No. 174/64 of 20 May 1964.

197 The Forests Act (Chapter 385) of 18 November 2005. Section 33.

198 The Indian Forest Act of 21 September 1927. Section 3, 26.

199 *Ibid.* Section 29.

200 *Ibid.* Section 28.

201 The Forests Act (Chapter 385) of 18 November 2005. Section 34.

202 Proclamation No. 44 of 30 April 1932; Legal Notice No. 174/64 of 20 May 1964; Kairo, J.G. and Dahdough-Guebas, F. (2004). *Conservation Status of Mangrove Resources in Kenya, Review on Mangrove Conservation and Biodiversity*. Laboratory of General Botany and Nature Management (Draft), Mombasa, Kenya.

203 *Loi* No. 97.017 of 8 August 1997 *portant révision de la législation forestière*. Article 2 – « *Sont assimilés aux forêts : (...) les mangroves, les bois sacrés, les raphières (cœur de palmiers Ravinala).* »

204 *Décret* No. 98-782 of 16 September 1998 *relatif au régime de l'exploitation forestière.*

205 *Ordonnance* No. 60-127 of 3 October 1960 *fixant le régime des défrichements et des feux de végétation.*

206 *Ordonnance* No. 60-128 of 3 October 1960 *fixant la procédure applicable à la répression des infractions à la législation forestière, de la chasse, de la pêche et de la protection de la nature.*

settlements development, other works and water management." It also states that plans and development plans should specify the limits of the coastal zone and the conditions for the allocation and use of land and sea areas.[207]

The Kenyan EMCA creates an offence for polluting the coastal zone, and provides for development of regulations to prevent pollution of the marine environment.[208] Under Costa Rican Maritime Terrestrial Zone Law, all mangroves, even those located far from the coast, are considered part of the Maritime Terrestrial Zone and therefore reserved for public use.[209] In India, mangroves fall within the Coastal Regulation Zone, in which land reclamation, discharge of untreated waste, mining, and setting up of new industries are largely prohibited. Mangroves are specifically classified under Category I (CRZ-I) in which new construction is prohibited except in accordance with specific exceptions, such as construction of public utilities for traditional inhabitants of the Sundarban Biosphere reserve area.[210]

Marine and fisheries legislation can also prove relevant for mangroves, through regulation of fishing activities allowed within mangrove areas, as well as restrictions on aquaculture (see Section 3.1.4.4). The Mexican General Law of Sustainable Fisheries and Aquaculture provides principles for formulation of the National Policy on Sustainable Fisheries and Aquaculture, including the restoration of coastal and aquatic ecosystems and ensuring that exploitation of fishery and aquaculture resources is compatible with their natural capacity for recovery.[211]

3.1.4.3. Water and wetlands law

Water and wetlands related legislation is relevant for mangroves on two fronts: 1) mangroves are often considered a type of wetland, and subject to the same rules and protections; and 2) activities relating to freshwater sources upstream from mangroves can cause significant damage to mangrove ecosystems, through pollution or interference with hydrological flows.

In Kenya, mangroves are considered wetlands under the definition provided in the Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation adopted in 2009. The Regulation provides that "Wetland resources shall be utilized in a sustainable manner compatible with the continued presence of wetlands and their hydrological, ecological, social and economic functions and services."[212] Many activities in or affecting rivers, lakes and wetlands require a permit given after an EIA. These include building, altering or demolishing any structure, depositing any substance "likely to have adverse environmental effects", or draining or redirecting any river, lake or wetland. Such activities may be allowed following government approval.[213]

In Costa Rica, mangroves fall within the legal concept of wetland.[214] This legal concept of wetland has been reinforced by a series of resolutions from the Constitutional Chamber of the Supreme Court of Justice determining that all wetlands are public interest and legally protected.[215]

Water law can help protect mangroves from pollution. The Indian Water (Prevention and Control of Pollution) Act of 1974 provides for regulation of water pollution according to

207 *Décret* No. 2010-137 of 23 March 2010 *portant réglementation de la gestion intégrée des zones côtières et marines de Madagascar*. Article 11.

208 The Environmental Management and Co-ordination Act (EMCA) (Chapter 387) of 6 January 2000. Section 55.

209 *Ley sobre la Zona Marítimo Terrestre y su Reglamento* of 16 December 1977 (translated into English under the title [Maritime Terrestrial Zone Law]). Article 11.

210 Coastal Regulation Zone Notification of 6 January 2011. Section 7(i)(A)(a), 8(I).

211 *Ley general de pesca y acuacultura sustentables* of 24 July 2007 (translated into English under the title [General Law of Sustainable Fisheries and Aquaculture]). Article 17.

212 Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation, 2009 of 2009. Section 5(1)(a).

213 The Environmental Management and Co-ordination Act (EMCA) (Chapter 387) of 6 January 2000. Section 42(1).

214 *Ley orgánica del ambiente* of 4 October 1995. Article 40, 41.

215 Sentencia No. 14288 de Sala Constitucional de la Corte Suprema de Justicia of 9 September 2009; Sentencia No. 00938 de Sala Constitucional de la Corte Suprema de Justicia of 2 February 2001.

standards determined by the State Board.[216] In Mexico, the National Waters Law addresses the preservation of wetlands affected by national water flow regimes.[217] In Kenya, a permit is required for "discharge of a pollutant into any water resource" or depositing any substance "likely to have adverse environmental effects" into a river, lake or wetland, or draining or redirecting any river, lake or wetland.[218]

3.1.4.4. Aquaculture

Aquaculture is one of the most serious and widely recognized threats to mangrove conservation. Many countries have responded with legal provisions regulating or prohibiting aquaculture activities that threaten mangrove ecosystems.

The Fisheries Code of the Philippines states: "It shall be unlawful for any person to convert mangroves into fishponds or for any other purpose."[219] Illegal conversion of mangroves is punishable by 6-12 years imprisonment or a fine of 80,000 pesos, and orders for restoration.[220] The Fisheries Law of Ecuador prohibits the destruction or alteration of mangroves during the exercise of fishing activities.[221] Applicants for authorization to set up aquaculture facilities must provide certification that the project area does not include mangroves.[222]

In 1996, the Supreme Court of India held that "The agricultural lands, salt pan lands, mangroves, wet lands, forest lands, land for village common purpose and the land meant for public purposes shall not be used/converted for construction of shrimp culture ponds."[223] This was echoed in the Indian Coastal Aquaculture Authority Rules of 2005 which listed prevention of such conversion as one of the functions of the Coastal Aquaculture Authority.[224] Certain Indian States, such as Tamil Nadu, have also adopted explicit bans on shrimp aquaculture in mangrove areas.[225]

Some countries regulate aquaculture in mangrove areas, but stop short of a full ban. In Madagascar, the installation of an aquaculture facility must not entail the destruction of more than 10% of the mangroves in the area of right of way of the exploitation.[226] In Costa Rica, construction of canals in mangrove areas, though otherwise prohibited, is allowed in the case of aquaculture projects that have a technical justification and were authorized prior to the enactment of Forestry Law No. 7575.[227] Vietnam has issued a number of laws, regulations and polices on land tenure, allocation of the space, rights of use and the production benefit sharing that should apply to the farmers who have shrimp based livelihoods.[228] For example, in Ca Mau a popular shrimp farming system allocates a household 3-10 hectares, of which 50 to 70% must be reserved for mangroves, 10% may be used for housing and 20 to 40% may be used for aquaculture ponds.

Today, many fishponds are abandoned, creating opportunities for restoration. In the Philippines, the Fisheries Code specifies that abandoned, undeveloped or unutilized fishponds should be

216 The Indian Water (Prevention and Control of Pollution) Act of 23 March 1974. Section 17(1).

217 *Ley de Aguas Nacionales* of 1 December 1992 (translated into English under the title [National Waters Law]). Article 86 Bis 1.

218 The Water Act of 13 September 2016. Section 36; The Environmental Management and Co-ordination Act (EMCA) (Chapter 387) of 6 January 2000. Section 42(1).

219 The Philippine Fisheries Code of 1998 of 25 February 1998. Section 94.

220 *Ibid.*; Howarth, W. et al. (2001). *Legislation governing shrimp aquaculture - legal issues, national experiences and options*. FAO, Rome, Italy; Ramos, G.E. and Osorio, R.L.E. (2013). REDD+ in the Philippines: legal status and conservation of mangrove forests in the Philippines. *International Journal of Rural Law and Policy* 1:1-12.

221 *Ley de Pesca y Desarrollo Pesquero (Codificación 2005-007)* of 26 April 2005 (translated into English under the title [The Fisheries Law]). Article 44.

222 *Decreto* No. 1391 of 15 October 2008.

223 *S. Jagannath v. Union of India & Ors* [1996] INSC 1592 (11 December 1996).

224 Notification No. G.S.R 740(E) of 22 December 2005 enacting the Coastal Aquaculture Authority Rules. Section 5.

225 The Tamil Nadu Aquaculture (Regulation) Act, 1995 of 10 April 1995; Howarth, W. et al. (2001). *Legislation governing shrimp aquaculture - legal issues, national experiences and options*. FAO, Rome, Italy.

226 *Loi* No. 2015-053 of 16 December 2015 *portant Code de la pêche et de l'aquaculture*..Article 112.

227 *Decreto Ejecutivo* No. 23247-MIRENEM of 18 May 1994. Article 4; *Ley forestal* No. 7575 of 5 February 1996.

228 Ha, T.T.P., Van Dijk, H., and Visser, L. (2014). Impacts of changes in mangrove forest management practices on forest accessibility and livelihood: A case study in mangrove-shrimp farming system in Ca Mau Province, Mekong Delta, Vietnam. *Land Use Policy* 36:89-101.

immediately restored to their original mangrove state.[229] In some countries, there can be legal obstacles to restoration of abandoned fishponds, relating to questions of ownership and tenure as well as restrictions on activities in mangrove areas.

Given the continued high profit potential of shrimp farming, even where strong legal regulation of conversion of mangroves for aquaculture exists, it may not be well enforced.[230] In Ecuador, despite the clear prohibition on aquaculture in mangrove areas, there were reports that licenses were still issued for shrimp farms in protected areas in the 1990s.[231]

In Xuan Thuy National Park, Vietnam, land conversion to aquaculture is one of the common violations of environmental regulations, driven by high local population density and limited alternative livelihood possibilities.[232] In Vietnam, aquaculture has high potential returns but also high risk, and is seen as one of the drivers of socio-economic inequality. There is evidence that local political elites facilitate aquaculture operations by their relatives and well-connected households and suspend regulations and penalties for unsustainable activities.[233] Nonetheless it is seen as an opportunity for sustainable development and alleviation of poverty if it can be managed sustainably.[234]

229 The Philippine Fisheries Code of 1998 of 25 February 1998. Section 94.

230 Veuthey, S. and Gerber, J.F. (2012). Accumulation by dispossession in coastal Ecuador: Shrimp farming, local resistance and the gender structure of mobilizations. (Report). *Global Environmental Change* 22(3):616.

231 Southgate, D. (1992). *Shrimp Mariculture Development In Ecuador: Some Resource Policy Issues*. Environmental and Natural Resources Policy Training Project. Department of Agricultural Economics: Ohio State University.

232 Katoomba XVII. *REDD and mangrove forests in Vietnam: Legal issues*. Hanoi, Vietnam.

233 Slayde Hawkins, et al. (2010). *Roots in the Water: Legal Frameworks for Mangrove PES in Vietnam*. Katoomba Group's Legal Initiative Country Study Series. Forest Trends: Washington, D.

234 Orchard, S.E., Stringer, L.C. and Quinn, C.H. (2015). Environmental Entitlements: Institutional Influence on Mangrove Social-Ecological Systems in Northern Vietnam. *Resources* 20(4)903-938.

3.1.4.5. Climate change

Climate change is highly relevant for mangrove conservation, and vice versa (see Section 2.2.4). Most countries do not have a specific climate change law, but address climate change through a range of legal instruments.

Mexico is a notable exception. The General Law for Climate Change explicitly mentions mangroves as a priority ecosystem for conservation.[235] It stipulates that the government should take action to strengthen resilience of mangroves and other ecosystems, through restoration of ecological integrity and connectivity.[236] It calls for promotion of policies to reduce emissions and improve carbon sequestration in the forest sector, and strengthen sustainable management and restoration of mangroves, among other forest and wetland ecosystems.[237]

Other countries address mangroves in the context of carbon sequestration. Many countries include mangroves in their nationally determined commitments under the Paris Agreement framework (Section 2.2.4).

Several countries consider mangroves in adaptation plans. Madagascar's National Climate Change Adaptation Action Plan recognizes that coastal areas such as mangroves are vulnerable to sea level rise leading to coastal erosion and salt water intrusion, which will in turn reduce the ability of these ecosystems to sequester carbon.[238] The plan provides for improved management of mangroves as part of its adaptation strategy.[239]

The Strategy and Action Plan for the adaptation of the Costa Rican biodiversity sector to climate change also acknowledges that climate change

235 *Ley General de Cambio Climatico* of 6 June 2012 (translated into English under the title [General Law for Climate Change]). Article 26.

236 *Ibid.* Article 30.

237 *Ibid.* Article 34.

238 Ministère de l'environnement, des eaux et forêts. (2006). *Programme d'action national d'adaptation au changement climatique*, Madagascar 2006 (translated into English under the title [Madagascar's National Climate Change Adaptation Action Plan]). Chapter II.3.

239 *Ibid.*

Table 3: Forms of payments for ecosystem services.

	Private payer	Public payer
Private provider	Private resource user pays community or individual for conservation of resource. Example: private beverage company pays private landowners to take measures that protect the watershed. Legal tools: private contract; offsetting.	Government pays community or individual for conservation of resource. Example: government fund pays community for conserving forest. Legal tools: public-private contract; public fund; subsidy; tax break; easement; PES legislation.
Public provider	Private resource user pays government agency or body for use of resource. Example: private tourism industry pays fee to support national park. Legal tools: tax, concession, offsetting, PES legislation.	Government entity pays a different government entity for ecosystem services.* Example: State owned hydropower plant pays state land management enterprise for conservation of watershed. Legal tools: PES legislation

* Note that this form of PES is atypical. In almost all cases, PES schemes are aimed to create incentives for private conservation and/or capture revenue from private sources to fund conservation. However, in countries such as Vietnam where state-owned enterprises can benefit from natural resources, and state-managed boards can receive payments for ecosystem services, this type of PES system could occur.

will reduce carbon sequestration in mangrove ecosystems.[240] Carbon offsetting schemes relating to mangroves are discussed in section 3.1.5.3.

3.1.5 Market-based mechanisms and incentives

Mangrove ecosystems produce various resources and services useful for nature and human-beings. These resources and services can be sustainably monetized to support the conservation of mangroves, through payments for ecosystem services, product certification, carbon offsetting and REDD+ and fiscal incentives and disincentives.

3.1.5.1. Payments for ecosystem services

Payment for Ecosystem Services (PES) is a mechanism whereby users of benefits provided by healthy ecosystems make payments which are used to help maintain the ecosystems. These payments are often used to compensate landowners or rightsholders for conserving the ecosystem and not converting it to an unsustainable use. Payments for ecosystem services can take different forms, depending on who is paying whom, and how the payments are structured. They can involve private contracts between companies and individuals, or public systems established by legislation under which government pays individuals or communities for conservation measures, or private beneficiaries of ecosystem services pay taxes or fees to support conservation (Table 3).[241]

In Vietnam, a PES system was established in 2008 under the Biodiversity Law, which states that "organizations and individuals using environmental services related to biodiversity shall pay charges to service providers".[242] The subsequent decree on Policy for Payments for Forest Ecosystem Services (PFES) lists four environmental services eligible for inclusion in the system:

1. watershed protection, including soil protection, reduction of erosion and sedimentation of reservoirs, rivers and streams, and regulation and maintenance of water sources for production and living activities of the society;

240 IDB, MINAE, SINAC and DDC. (2015). *Strategy and action plan for the adaptation of the Costa Rican biodiversity sector to climate change (2015-2025)*. San Jose, Costa Rica. Pg. 3.

241 Greiber, T. (ed). (2009). *Payments for Ecosystem Services. Legal and Institutional Frameworks*. IUCN, Gland, Switzerland. xvi + 296 pp; Emerton, L., Bishop, J. and Thomas, L. (2006). *Sustainable Financing of Protected Areas: A global review of challenges and options*. IUCN, Gland, Switzerland and Cambridge, UK. x + 97pp.

242 Biodiversity Law of 13 November 2008. Article 74.

2. protection of the natural landscape and conservation of biodiversity of forest ecosystems for tourism;

3. forest carbon sequestration and retention, reduction of emissions of greenhouse gases through measures for preventing forest degradation and loss, and for forest sustainable development;

4. provision of spawning grounds, sources of feeds and natural seeds, and use of water from forest for aquaculture.[243]

Any of these ecosystem services could potentially be provided by mangroves (figure 3). Under the system, agreements are made between investors, government and the service provider for payments from the ecosystem beneficiary. Given the complicated system for allocation of forest property rights in Vietnam, it is not always clear who is entitled to receive the payments. Forest Management Boards, who hold over 50% of mangroves in Vietnam, are obligated to retain only 10% of PES revenue received and allocate the remaining 90% to local communities.[244] However, there are questions of transparency and accountability in distribution of benefits and potential problems of capture by local elites. To date there are no operational PFES systems related to mangrove forests in Vietnam.[245]

Payments for ecosystem services are determined by legal frameworks for mangrove rights and ownership (See Section 3.2.3). Where mangroves are not subject to private ownership, PES may not apply. For example, Costa Rica has a well-developed PES framework for forest ecosystem services owned by private landowners, but mangroves are public domain and cannot be individually owned. Nonetheless, there is continued interest in finding an alternative market-based measure that could incentivize mangrove conservation in Costa Rica.[246]

PES systems operate by creating value for ecosystem services that is used to compensate owners for maintaining those services and incentivize conservation rather than unsustainable use. For example, the Mexican General Law of Sustainable Forestry Development provides that forests land owners who conserved or improved the environmental services, as a result of sustainable forest management, will receive the economic benefits derived from such services.[247] Problems arise where competing uses promise a higher payment than available through PES. Mangroves typically provide value through multiple different services, such as shoreline protection, fish production and climate change mitigation. These services may be enjoyed by different users. Payments from any single user group may not be enough to offset the opportunity costs of a competing land use. In these cases, PES will not be effective unless there is a way to compensate for multiple ecosystem services, or otherwise ensure that payments for conservation are higher than returns available for destructive uses.

In Madagascar, a National Steering Committee is responsible for the implementation of the "Global Partnership for the Accounting of Assets and the Valuation of Ecosystem Services" which was instituted in 2012 by the decree No. 9260/2012.[248] The Committee is in charge of the implementation of the “Global Partnership for the Accounting of Assets and the Valuation of Ecosystem Services". The objective of the Partnership is to take the natural capital and the environmental services into consideration when

243 Decree No. 99/2010/ND-CP of 24 September 2010 on the policy on payment for forest environment services. Article 4.

244 *Ibid.;* Beresnev, N. et al. (2016). *Mangrove-related policy and institutional frameworks in Pakistan, Thailand and Vietnam*. FAO and IUCN, Gland, Switzerland. p. 35-37; Mohammed, E.Y. (2013). *Economic Incentives for Marine and Coastal Conservation: Prospects, Challenges and Policy Implication*. Routledge: Abingdon, United Kingdom; Hawkins, S. et al. (2010). *Roots in the Water: Legal Frameworks for Mangrove PES in Vietnam. Katoomba Group's Legal Initiative Country Study Series*. Forest Trends Washington, DC.

245 Hawkins, S. et al. (2010). *Roots in the Water: Legal Frameworks for Mangrove PES in Vietnam. Katoomba Group's Legal Initiative Country Study Series*. Forest Trends Washington, DC.

246 BIOMARCC, SINAC and GIZ. (2014). *Payments for ecosystem services of mangroves: A case study of the Savegre Delta, Costa Rica*. BIOMARCC-SINAC-GIZ, San José-Costa Rica. The project studied the possibility to implement PES in a buffer zone in the surroundings of mangroves, which could be financed through voluntary payments to a trust fund.

247 *Ley General de Desarrollo Forestal Sustentable* of 5 June 2018 (translated into English under the title [General Law of Sustainable Forestry Development]). Article 134 bis.

248 *Arrêté* No. 9260/2012 of 14th May 2012 *portant constitution d'un Comité National de Pilotage (CNP) chargé de la mise en œuvre du "Partenariat Mondial pour la comptabilisation du Patrimoine et la Valorisation des Services d'Ecosystème (WAVES)"* (translated into English under the title [decree]). Article 1.

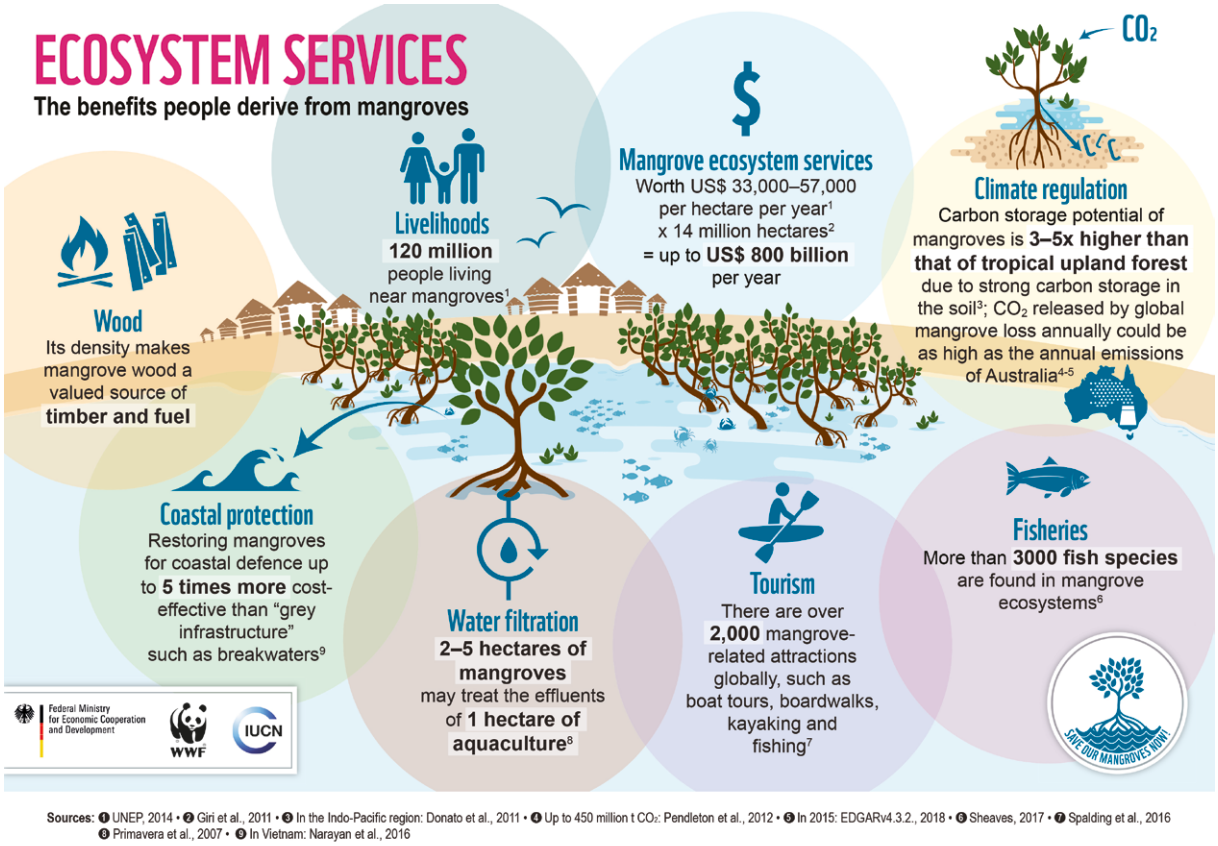

Figure 3: Ecosystem services provided by mangroves

making economic and financial decisions. In other terms, it provides to consider the economic and financial value of nature.

Madagascar Order No. 29 211/2017 provides for transfer of management of fisheries resources and aquatic ecosystems to fishermen consortiums to establish locally managed fishing areas. They may use part or all of their area for projects generating payments for ecosystem services. The PES can range from carbon sequestration to the exercise of ecotourism activities. Fishermen would receive payments from private entities, such as the tourists through eco-touristic activities or carbon-credits buyers through the activities to improve carbon sequestration. In this context, the manager of the locally managed fishing area must carry out systematic reforestation of mangroves.[249] The area can be managed by the fishermen consortium or through a collaboration with a nongovernmental organization.[250]

3.1.5.2. Product certification

Productive uses of mangrove ecosystems are not necessarily incompatible with sustainability. Promoting sustainable productive use can be an effective means of protecting mangroves, where the sustainable use is economically competitive with alternative unsustainable uses.

One way to encourage sustainable use is through certification schemes which allow producers to charge a premium for products that meet a certain standard. The IUCN initiative Mangroves for the Future is working with Fair Trade and other partners to test models for certification in Vietnam, Bangladesh, and other countries.[251]

249 *Arrêté* No. 29211/2017 of 2017 *fixant les modalités de transfert de gestion des ressources halieutiques et écosystèmes aquatiques*. Article 8.

250 *Ibid*. Article 9.

251 IUCN 2018. *Mangroves for the Future*. Retrieved from https://www.iucn.org/regions/asia/our-work/regional-projects/mangroves-future-mff [Accessed 20 July 2018].

In Madagascar, WWF and a group of shrimp farmers and fishermen designed an eco-labelling system.[252] It provides that to qualify for certification, shrimp farmers must remove no more than 10% of mangroves in the project area.[253]

In Ca Mau Province, Vietnam, an IUCN project put a certification process in place to address conversion of mangroves to shrimp ponds. Through the public project Markets and Mangroves, shrimp farmers received trainings on sustainable aquaculture to meet Naturland organic certification standards.[254] To be certified, shrimp operations needed at least 50% of mangrove coverage.[255]

Where product certification programs are implemented by civil society or private organizations, as in these examples, legal structures create essential enabling frameworks that allow for sustainable use and promote transparency. Where aquaculture activities and other productive uses are illegal, product certification programs will not be viable. In other cases, legal instruments themselves can create standards for certification of sustainable products.

3.1.5.3. Carbon offsetting and REDD+

Mangroves represent significant carbon storage. Multiple initiatives have looked at ways to monetize this carbon potential through REDD+ initiatives and selling carbon on the voluntary market. Such initiatives depend on legal enabling conditions that are absent in many countries, including legal definition of ownership of mangrove areas and their ecosystem services, legal definition of carbon property rights, and standards for valuation of carbon. Lack of legal clarity and good governance in carbon markets drives away potential investors and can put conservation at risk.

In Mexico, the General Law of Sustainable Forestry Development defines ecosystem services to include carbon capture and climate regulation, and includes ecosystem services as a type of forest resource.[256] The Vietnam Decree on Policy for PFES also lists "forest carbon sequestration" as an environmental service eligible for inclusion in the PES system.[257] These provisions allow carbon storage to be included in PES frameworks. However, they do not clearly define who has rights to carbon credits and how they can be sold.

Valuation of carbon can also create challenges. Where rules for calculating value are complicated, the cost of compliance can be higher than the return available from sale of

252 GAPCM - Groupement des Aquaculteurs et Pêcheurs de Crevettes de Madagascar.

253 UNEP. (2009). *Evaluation intégrée des politiques liées au commerce et les implications en termes de diversite* biologique dans le secteur agricole à Madagascar - La *durabilite´* de l'aquaculture de crevette et les enjeux lies à la *biodiversite´*. UNEP, Madagascar.

254 Naturland is a farmer's association, visit <www.naturland.de>.

255 REDD+. (2015). *Implementation Agreement between the Forest Management Board and the UN-REDD Provincial Programme Management Unit of Ca Mau.* REDD+, Asia Pacific; Wylie, L., Sutton-Grier, A.E. and Moore, A. (2016). Keys to successful blue carbon projects: Lessons learned from global case studies. *Marine Policy* 65:80; Friess, D. A., Thompson, B.S., Brown, B., Amir, A.A., Cameron C., Koldewey, H.J., Sasmito S.D. and Sidik, F. (2016). Policy challenges and approaches for the conservation of mangrove forests in Southeast Asia. *Conservation Biology* 30(5):933-949; Pham, T.T., Bennet, K., Vu, T.P., Brunner J., Le, N.D. and Nguyen, D.T. (2013). *Payments for forest environmental services Vietnam: From policy to practice.* CIFOR: Bogor, Indonesia.

256 *Ley General de Desarrollo Forestal Sustentable* of 5 June 2018 (translated into English under the title [General Law of Sustainable Forestry Development]). Article 7(LXII).

257 Decree No. 99/2010/ND-CP of 24 September 2010 on the policy on payment for forest environment services. Article 3.1, 4, 7.

carbon credits.[258] Where different methods of accounting are used in different circumstances, it can undermine the certainty and legitimacy of the market. In other cases, where the price of carbon or the payments available from REDD+ projects are too low, they can fail to act as an incentive. According to one expert, in Madagascar, payments from REDD projects may be significantly lower than the revenue to be gained from illegal exploitation of mangrove to produce charcoal. Payments as an incentive may also fail because they are made to communities managing the mangroves while outside actors are often responsible for illegally harvesting mangrove timber for exploitation.[259]

There may be legal problems with application of carbon offsetting systems to mangrove forests. In Madagascar, the definition of forests for the purposes of the Clean Development Mechanism provides a minimum tree height of 5m.[260] This excludes many mangroves.[261] Also, in Madagascar's intended nationally determined contribution, the terms of "mangroves" and "forests" are used distinctly.[262] However, the forest definition in the domestic law includes mangroves as they are "assimilated" to forests.[263]

3.1.5.4. Fiscal incentives and disincentives

National legal systems can establish incentives for private action that promotes conservation of mangroves, as well as disincentives for harmful activities. Kenyan law allows for fiscal incentives to promote environmentally friendly practices such as tax rebates for industries that invest in equipment for pollution control or water conservation.[264]

The purpose of fiscal incentives and disincentives is to change behavior and decision-making to support conservation and sustainability. India has made this explicit in its National Environment Policy, which calls for development of standardized environmental accounting practices to encourage environmental responsibility in investment decision-making. It promotes incorporation of costs associated with degradation and depletion of natural resources into decisions of economic actors "to reverse the tendency to treat these resources as 'free goods' and to pass the costs of degradation to other sections of society, or to future generations of the country."[265] This reflects the polluter pays principle (see Section 2.1.3).

3.2. Enabling frameworks for mangrove conservation

Mangrove conservation depends not only on specific legal tools for protection and management, but also on basic legal frameworks and norms that create the structures and context within which governments, managers, users, rightsholders and other actors operate. The legal context determines what rights are available and how they can be exercised, how decisions are made and how decision-makers can be held accountable.

In response to the question, "what are the biggest challenges for mangrove conservation?" surveyed experts highlighted problems in coordination of institutions and governance, followed by lack of community involvement, subsistence needs, and land tenure issues (Figure). These issues are closely linked to governance frameworks and basic rights.

This section will explore constitutional rights, institutional structures, land and resource tenure systems, good governance elements and

258 Chapman, S., Wilder, M. and Millar, I. (2014). Defining the Legal Elements of Benefit Sharing in the Context of REDD. *Carbon & Climate Law Review* 8(4): 270-281; Interview with Nikolai Beresnev, 24 April 2017.

259 Interview with Jen Hacking, Blue Ventures Madagascar, 27 April 2017.

260 Report of the technical assessment of the proposed forest reference emission level of Madagascar submitted in 2017 (12 December 2017 FCCC/TAR/2017/MDG).

261 IUCN and Blue Ventures (2016). National Blue Carbon Policy Assessment. Madagascar. IUCN, Blue Ventures. 28pp.

262 Madagascar's intended nationally determined contribution. UNFCCC.

263 *Loi* No. 97-017 of 8th August 1997 *portant révision de la législation forestière*. Article 2.

264 The Environmental Management and Co-ordination Act (EMCA) (Chapter 387) of 6 January 2000. Section 57.

265 National Environment Policy 2006 of 18 May 2006. §5.1.3(vi).

What are the biggest challenges for mangrove conservation in your country?

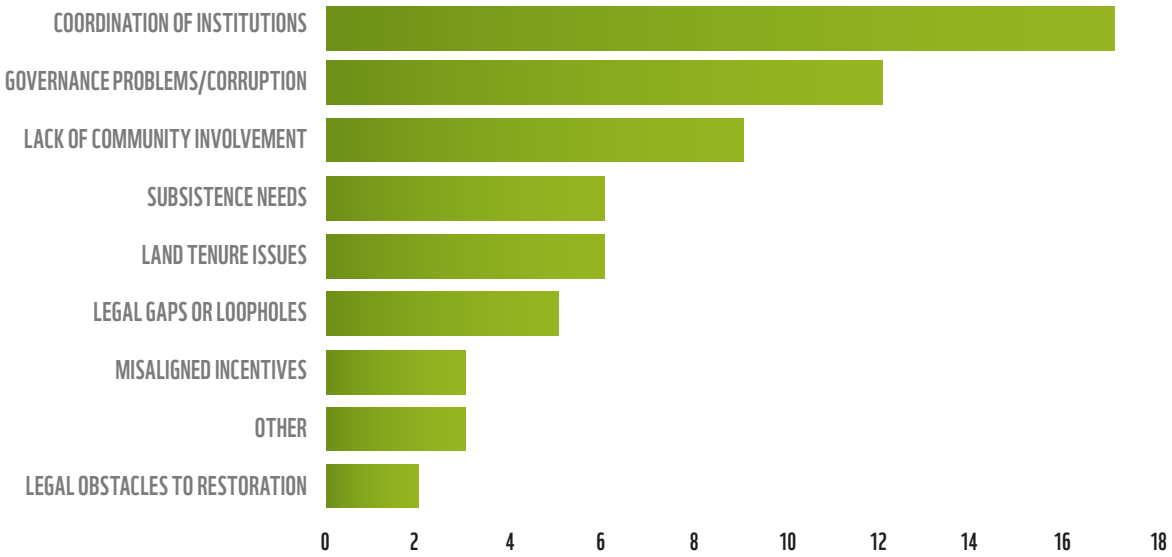

Figure 4: Survey responses on challenges for mangrove conservation

problems, and involvement of local communities in management and governance of mangroves.

3.2.1 Constitution

Most of the world's constitutions incorporate provisions related to environmental rights and responsibilities.[266] While it is still uncommon to see explicit mention of mangroves in constitutions, these constitutional rights can create a fundamental framework for conservation that can be invoked to protect mangroves. In many cases, constitutions create both a right and a duty. The right creates a legally protected interest that citizens can use to require government action for protection of ecosystems. The duty creates an obligation on citizens to protect the environment which can be used to require action by private actors.[267]

The right to a healthy environment is found in the constitutions of Mexico, Kenya and Costa Rica. In Kenya, this includes the right to "have the environment protected for the benefit of present and future generations".[268] It specifies that the State shall "ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources...", "work to achieve and maintain a tree cover of at least 10 per cent of the land area of Kenya" and "eliminate processes and activities that are likely to endanger the environment."[269] It goes on to specify tools to promote these aims, including public participation, EIAs, and environmental audit and monitoring.[270] It puts an obligation on every person "to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources." Finally, it creates a procedure for enforcing environmental rights and grants standing to any person to bring a case in court to ask for an order to prevent or stop any environmentally harmful act.[271]

266 As of 2012, 147 countries include direct or indirect references to environmental rights in their constitutions. Boyd, David R. (2012). *The Environmental Rights Revolution: A Global Study of Constitutions, Human Rights, and the Environment*, Vancouver, UBC Press. Pg. 47.

267 Not all constitutions are the same. For example, Article 50 of the Constitution of Costa Rica creates a duty to protect the environment on the part of the State only. The obligation of Citizens to protect the environment is not constitutional; it comes from the *Ley orgánica del ambiente* of 4 October 1995. Article 2(a).

268 The Constitution of Kenya of 6 May 2010. Article 42.

269 *Ibid.* Article 69.

270 *Ibid.*

271 *Ibid.* Article 70.

While it does not provide a constitutional right to a healthy environment, the Constitution of India provides that the State "shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country" and that every citizen has the duty "to protect and improve the natural environment including forests, lakes, rivers and wildlife ...".[272]

3.2.2 Institutional structure

As mangroves can fall under a range of sectoral legal regimes, they can be covered by a range of different institutions, including agencies responsible for forests, fisheries, coastal areas, environment, agriculture, aquaculture, land use, protected areas, biodiversity, and development.

In some countries, an institution is specially authorized to regulate a certain activity that threatens mangroves. In India, the Coastal Aquaculture Authority (CAA) was established "for regulating the activities connected with coastal aquaculture in the coastal areas..."[273] One of the functions of the CAA is to "ensure that the agricultural lands, salt pan lands, mangroves, wetlands, forest lands [...] and national parks and sanctuaries shall not be converted for construction of coastal aquaculture farms so as to protect the livelihood of coastal community"[274]

There can be multiple overlapping authorities involved in mangrove governance. In Vietnam, the Ministry of Agriculture and Rural Development (MARD) has jurisdiction over the trees in mangrove forests, while the Ministry of Environment and Natural Resources (MONRE) has jurisdiction over the land itself. MARD has responsibility for managing the mangrove forests, while MONRE manages biodiversity in the forests. MARD regulates aquaculture and fisheries, while MONRE regulates geology, mining and water.[275] Where this is the case, legal regimes may not be well coordinated.

Some countries have created institutional coordination mechanisms to address these problems. In 1999, Kenya established the National Environment Council to, *inter alia*, "promote co-operation among public departments, local authorities, the private sector, Non-Governmental Organizations and such other organizations engaged in environmental protection programmes."[276]

In Madagascar, Mangroves fall under the mandate of three different ministries: the Ministry of Environment, Ecology and Forests, the Ministry of Fisheries and Marine Resources and the Ministry of Land Development. There are mechanisms for cross-agency coordination, such as the National Committee for Integrated Coastal Zone Management responsible for coordinating sustainable development in coastal and marine areas, the National Office for Climate Change Coordination, created to coordinate and implement climate change action, and the Inter-Ministerial Environment Committee, which aims to ensure that policies and strategies adopted within each ministry include an environmental or sustainability dimension. In 2015, a National Commission on the Integrated Management of Mangroves was created to ensure, under the authority of the Ministry of the Environment and the Ministry of Fishing, the sustainable management of mangrove areas and to review and evaluate all aspects of mangrove management.[277]

Mangrove governance often involves multiple levels of governance, from national to subnational and local. In India, there is a division of competence between the Central Government and State Governments on a multitude of issues related to mangrove conservation. Under the Biological Diversity Act, 2002, the Central Government is responsible

272 The constitution of India of 26 November 1949. Article 48A; 51A.

273 Coastal Aquaculture Authority Act, 2005 of 23rd June 2005. Preamble.

274 Notification No. G.S.R 740(E) of 22 December 2005 enacting the Coastal Aquaculture Authority Rules. Section 5.

275 The Law on Water Resources of 21 June 2012; the Land Law of 29 November 2013; or the Law on Forestry of 11 November 2017.

276 The Environmental Management and Co-ordination Act (EMCA) (Chapter 387) of 6 January 2000. Section 5(c).

277 *Décret* No. 2015-629 of 7 April 2015. Article 1.

for developing national strategies, plans and programmes for conservation and sustainable use of biological diversity.[278] The Central Government may direct State Governments to take ameliorative measures where it has reason to believe biological resources are being threatened and should offer the State Government "any technical and other assistance that is possible to be provided or needed".[279] Both the National Biodiversity Authority and State Biodiversity Boards should consult Biodiversity Management Committees - established by local bodies - in taking any decisions relating to use of biological resources within the Committee's jurisdiction.[280]

Indian States also have significant authority over Forest Resources, including the authority to reserve forests, but may not order use of forests for non-forest purposes without approval of the Central Government.[281] A user agency that seeks to use forest land for non-forest purposes must make a proposal to the nodal officer of the State Government. After review, the State Government will send the proposal to the Central Government, which will seek advice from a Committee on applicable environmental protections, proposed use, alternatives, offsetting and mitigation of environmental impact, after which the Central Government will approve or reject the proposal.[282]

Decentralization to the local level is a widely used governance tool that can support legitimacy and appropriate and equitable management.. However, in the case of mangroves, decentralization without consideration of capacity and the political and social situation can be a problem. In Vietnam, local authorities typically come from the same communities as other users, and may have their own interests, or promote the interests of their relatives and

278 The Biological Diversity Act, 2002 of 5 February 2003. Section 36(1).

279 *Ibid*. Section 36(2).

280 *Ibid*. Section 41.

281 The Indian Forest Act of 21 September 1927. Section 3.

282 Notification No. G.S.R.23(E) of 10 January 2003 enacting the Forest Conservation Rules. Section 6-8.

networks.[283] In theory, the local government needs permission of the central government to authorize conversion of mangroves, but in practice the central government does not exercise the necessary oversight to ensure sustainability.[284] In the Philippines, municipal governments have fisheries management responsibilities offered by the Bureau of Fisheries and Aquatic Resources but suffer from "limited capacity and support for planning, regulation and enforcement".[285]

3.2.3 Land and resource tenure and rights

Tenure describes the ways in which rights to land or other resources can be gained and held. Ownership, lease, public allocation and customary rights can all be considered types of tenure. In some countries, tenure rights may be held collectively or communally. Tenure rules may come from different legal regimes, including statutory and customary or religious law, and in these cases there are often conflicts.

Tenure is one of the most complicated aspects of natural resource management, and it can be even more complicated in the context of mangroves. In many countries, such as Costa Rica, mangroves are considered part of the coastal areas, which are public and not subject to private ownership. In other countries, mangroves are considered a type of forest, and around 86% of forests in the world are publicly owned.[286] Local communities often have special rights relating to mangroves based on customary law or traditional use.

In Kenya, the Land Act specifies that public lands containing mangroves cannot be allocated.[287] Mangroves cannot be owned because they are considered nature reserves. However, private landowners neighboring wetlands do have a duty "to prevent the degradation or destruction of the wetland" and to "maintain the ecological and other functions of the wetland."[288]

In Vietnam, all forest land is the property of the Vietnamese people represented by the State. The State grants short and long-term leases for sustainable use of the forest, depending on the classification of forest. Half of all mangroves are allocated to State Forest Management Boards.

In Ecuador, mangroves are considered public, and there is a legal framework for allocating concessions through agreements between the Ministry of the Environment and local communities. Communities gain usufruct rights over the mangroves, but must comply with the protective measures of the agreement. Serious non-compliance with the concession agreement and logging of mangroves are grounds for termination of community rights. Cutting, harvesting, altering or destroying mangrove forests is punishable by a fine.[289] However, concessions are granted to a small number of mangrove users, leading to conflicts between communities.[290]

It is important to distinguish between the problems of uncertainty and illegality in the land tenure regime. Illegal encroachment into mangroves is often a problem exacerbated by lack of enforcement of land use rules together with high demand for certain products, or lack of

283 Orchard, S.E., Stringer, L.C. and Quinn, C.H. (2015). Environmental Entitlements: Institutional Influence on Mangrove Social-Ecological Systems in Northern Vietnam. *Resources* 20(4)903-938.

284 According to Article 6(2)(b) of the Forestry Law, the State exercises the right to decide on forest assignment, lease and recovery and permit the change of forest use purposes; Baumgartner, U. and Nguyen, T. (2017). Organic certification for shrimp value chains in Ca Mau, Vietnam: a means for improvement or an end in itself? *Environment, Development and Sustainability* 19(3): 987-1002.

285 Thompson, B.S., Primavera, J.H. and Friess, D.A. (2017). Governance and implementation challenges for mangrove forest Payments for Ecosystem Services (PES): Empirical evidence from the Philippines. *Elsevier Journal* 23:146-155.

286 Siry, J.P. et al. (2009). *Global Forest Ownership: Implications for Forest Production, Management, and Protection*. World Forestry Congress. Buenos Aires, Argentina; For example, in Brazil, 90% of forests are publicly owned, 100% in China, and 72.9% in Australia.

287 Land Act of 27 April 2012. Article 12.

288 Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation of 2009. Section 14.

289 Gravez, V., Bensted-Smith, R., Heylings, P. and Gregoire-Wright, T. (2013). *Governance Systems for Marine Protected Areas in Ecuador » in Global Challenges in Integrated Coastal Zone Management*. Wiley-Blackwell: New Jersey, United States; IUCN and CI Ecuador. (2016). *Mapping of relevant policies and regulations for coastal carbon ecosystem management in 5 countries: From climate change to forestry and coastal marine resource management* – Ecuador.

290 López-Angarita, J., Roberts, C.M., Tilley, A., Hawkins, J.P. and Cooke, R.J. (2016). Mangroves and people: Lessons from a history of use and abuse in four Latin American countries. *Forest Ecology and Management* 368:151-162.

livelihood alternatives. However, in some cases the problem is not that the rules are not followed, but that the rules are not clearly defined. Unclear land tenure is a common and serious obstacle to mangrove conservation, restoration and sustainable use. Of the experts surveyed, 55% said it was true that in their country more than one person or group might think they have rights to a particular area of mangrove forest, while 75% said it was true that people use mangrove forests when they do not have legally recognized rights (see Section 1.4 for a description of survey methodology). Clear land tenure is essential for community involvement in conservation. Uncertain land tenure can disincentivize investment in conservation or block mangrove restoration.

In Thailand, numerous shrimp farming operations established in the aquaculture boom of the 1990s and 2000s are now abandoned. These operations were often partially situated on legal concessions and partially illegal encroachments into mangroves. In order to begin restoring these abandoned farms, it is necessary to identify the legal owner. Where this is not possible, as is often the case, restoration is difficult.[291]

Land tenure uncertainty is also a problem in Vietnam, where the complicated tenure system is not well understood. The government owns all forest land, but may allocate it to different state or private entities under a complex system of rules depending on the legal classification of the forest land under multiple conflicting laws. In practice, mangrove use is dominated by informal tenure arrangements, where forest land is distributed based on family and political connections.[292]

Land tenure regimes can create perverse incentives that act against mangrove conservation. In Ghana, under traditional law, the tenure of land where the mangroves grow is mostly controlled by communities and individuals. This has resulted in over exploitation and degradation of the mangroves. The community leaders lack the power, resource and logistics to enforce rules and regulations.[293]

3.2.4 Governance: transparency, accountability, participation and rule of law

Mangrove governance, like all governance, depends on certain standards of transparency, accountability, participation and rule of law to be effective, adequate and fair. (See Section 2.1.6).

One of the most fundamental tools available to civil society and the public to ensure government accountability in the environmental sector is access to information. The internationally recognized right of access to information gives citizens the right to access public information on, e.g. permits or concessions granted, activities approved, EIAs filed, and other documents or processes related to management of the natural environment.

In Kenya, the right of access to information is embedded in the constitution and elaborated by the Access to Information Act of 2016. It provides that "every citizen has the right of access to information held by -- (a) the State; and (b) another person where that information is required for the exercise or protection of any right or fundamental freedom."[294] Since environmental protection is recognized as a right in the Kenyan constitution, this provision should mean that any citizen has the right to important environmental information held by any private entity or corporation, including information on activities, plans or environmental impacts related to mangrove ecosystems.

291 Norman, A. (2004). Shrimp farming and mangrove loss in Thailand. *Journal of Economic Literature* 43(3):958.

292 Ha, T.T.T., Van Dijk, H. and Bush, S.R. (2012). Mangrove conservation or shrimp farmer's livelihood? The devolution of forest management and benefit sharing in the Mekong Delta, Vietnam. *Ocean and Coastal Management* 69:185-193; Dressler, W.H., To, P.X. and Mahanty, S. (2013). How Biodiversity Conservation Policy Accelerates Agrarian Differentiation: The Account of an Upland Village in Vietnam. *Conservation and Society* 11(2):130-143.

293 Asante, W., Acheampong, E., Boateng, K. and Adda, J. (2017). The implications of land tenure and ownership regimes on sustainable mangrove management and conservation in two Ramsar sites in Ghana. *Forest Policy and Economics* 85:65-75. Pg. 65.

294 Access to Information Act of 31 August 2016. Article 35.

The Mexican Constitution also recognizes the right to access to information and the right to public participation in the whole country.[295] In Madagascar, the right to information is provided by the Constitution, while the right to environmental information and participation are provided by law in the Environmental Charter.[296]

3.2.5 Community rights and co-management

Communities can significantly contribute to planning and management of mangroves, based on their unique knowledge of the ecosystem and its use. Where communities are a driver of mangrove loss, their incentives can be adjusted by empowering them to participate in the benefits of conservation. Even where they are not themselves drivers of damage, they can serve as important monitors of illegal activity. However, in order to effectively support mangrove conservation, communities need clear legal rights and status. Almost all experts interviewed for this assessment reported that community involvement and support is essential for effective mangrove conservation. Survey respondents mentioned community involvement more than any other topic in response to the question "What is the most effective approach to ensure restoration and conservation of mangroves in your country?" (see Section 1.4 for a description of survey methodology).

The rights of local communities can be specially protected by law. Kenya recognizes customary rights to forest resources under the Forests Act, which states, "Nothing in this Act shall be deemed to prevent any member of a forest community from using, subject to such conditions as may be prescribed, such forest produce as it has been the custom of that community to take from such forest otherwise than for the purpose of sale."[297]

Legislation can provide for co-management agreements between government and local communities, giving communities rights relating to management and use as well as obligations for conservation. Madagascar has a system for community management of forests, including mangroves. Under the law for locally secured management of renewable natural resources, management authority over forest resources can be transferred to local communities. This law recognizes Dina, or collective agreements that reflect customary rules governing management of natural resources.[298] However there can be different interpretations of Dina, and in some cases different social codes can conflict.[299]

For these systems, it is important to consider community capacity. A community may excel at the conservation aspects of management, but need support in administration and bureaucracy. A low literacy rate and complicated reporting requirements make it difficult for communities to meet administrative requirements on their own. According to experts interviewed, NGOs frequently provide assistance, without which community management would not be possible.[300] Even if the communities themselves were able to meet the administrative requirements for a REDD+ project, the cost of establishing a project through to auditing and verification makes it next to impossible for communities to do this on their own.[301]

3.2.6 Dispute resolution and access to justice

A final key component of effective mangrove governance is access to justice and dispute resolution. Dispute resolution processes and institutions are an essential mechanism for realizing access to justice, while access to justice

295 Constitution of Mexico of 5 February 1917. Article 6; 4, 26.

296 *Constitution de la IVe République* of 11 December 2010. Article 11; *Loi* No. 2015-003 of 19 February 2015 *portant Charte de l'Environnement Malagasy actualisée*. Article 7 (right to environmental information),14 (right to participation).

297 The Forests Act (Chapter 385) of 18 November 2005. Section 22.

298 *Loi* No. 96-025 of 30 September 1996 *relative à la gestion locale des ressources naturelles renouvelables* (translated into English under the title [law for locally secured management of renewable natural resources]). Article 49-53.

299 IUCN and Blue Ventures. (2016). *National Blue Carbon Policy Assessment*. IUCN, Gland, Switzerland.

300 Interview with Dannick Randriamanantena, WWF Madagascar, 26 September 2017.

301 Interview with Jen Hacking, Blue Ventures Madagascar, 27 April 2017.

is a foundational principle for designing dispute resolution frameworks. In practice, clear pathways for addressing claims and resolving disagreements are necessary for functional mangrove conservation systems.

In the context of mangroves, claims and disputes can arise in a number of ways. A user may bring a grievance if a permit or authorization to conduct an activity in mangroves is denied. Conversely, affected communities and conservation advocates may seek to block a permit that has been granted or otherwise seek stronger protection or better management of mangroves. In other cases, there may be disputes over land ownership or other resource rights.

A growing number of countries have a special tribunal for adjudicating environmental cases. These are meant to provide special focus and trained adjudicators in environmental cases, so that they are not lost among other cases which may be seen as higher priority.[302] The National Environment Tribunal in Kenya may consider appeals relating to environmental issues as well as refusals to grant licenses or permits.[303] In India, a similar role is played by the National Green Tribunal.[304] In Costa Rica, the Environmental Administrative Tribunal has jurisdiction over complaints for violation of national environmental legislation, and power to impose sanctions for destruction of mangroves.[305]

In 2015, Madagascar took a step in the direction of specialized environmental adjudication through a law providing for the creation of a special Court to judge infringements relating to illegal trade in ebony and rosewood.[306] While the scope of the law does not cover mangroves, it creates a precedent that could be followed in other environmental contexts.

3.3. Implementation and effectiveness

There is often a gap between law on paper and law in reality. Many experts have reported that despite well-designed laws, mangrove degradation continues. In Costa Rica, despite a strong legal framework, the country has lost over 10,000 hectares of mangrove since the 1990s.[307] In Vietnam, total mangrove area has reportedly expanded, but the health and connectivity of mangrove ecosystems has declined. Outside of national parks, most primary mangrove forests have vanished, and the majority of Vietnam's mangroves are highly fragmented replanted forests with the average patch size of 100 ha.[308]

This can occur because of some of the problems discussed in the previous section, such as corruption or institutional conflicts. However, it can also relate to problems of livelihood necessity, political will, lack of financial resources, or perceived illegitimacy of legal frameworks. This section summarizes the results of analyses, interviews, surveys and field visits undertaken in Costa Rica, Vietnam and Madagascar to understand how laws are implemented and perceived in practice, and to what extent they are effective.[309]

302 Pring G. and Pring C. (2016). *Environmental Courts and Tribunals: A Guide for Policy Makers*. UNEP, Nairobi, Kenya.

303 See for example, *Funzi Island Development Limited & 2 others v County Council of Kwale & 2 others* [2014] eKLR

304 *National Green Tribunal*. Retrieved from http://www.greentribunal.gov.in/ [Accessed 8 August 2018].

305 *Ley Orgánica del Ambiente* No. 7554 of 4 October 1995. Article 111.

306 *Loi organique* No. 2015-056 of 3 February 2016 *portant création de la chaine spéciale de lutte contre le trafic de bois de rose et/ou de bois d'ébène et répression des infractions relatives aux bois de rose et/ou bois d'ébène* (translated into English under the title [law relating to the rosewood and ebony trafficking]).

307 FAO Forestry Economics and Policy Division. (2007). *The world's mangroves 1980-2005. A thematic study prepared in the framework of the global forest resources assessment 2005*. FAO Forestry Paper No. 153. FAO. Rome, Italy. Pg. 31; Ministerio de Ambiente y Energía, Comisión Nacional para la Gestión de la Biodiversidad, Sistema Nacional de Áreas de Conservación. (2016). Estrategia Nacional de Biodiversidad 2016-2025, Costa Rica. FMAM-PNUD, Fundación de Parques Nacionales-Asociación Costa Rica por Siempre, San José, Costa Rica. Pg. 17.

308 Hawkins, S. et al. (2010). *Roots in the Water: Legal Frameworks for Mangrove PES in Vietnam. Katoomba Group's Legal Initiative Country Study Series*. Forest Trends Washington, DC.

309 Methodology of these assessments is described in Section 1.4. Much of the information included in this section is based on formal or informal interviews and discussions. The identity of sources is not included unless they explicitly agreed to be cited.

Main problems in implementation of mangrove-related laws?

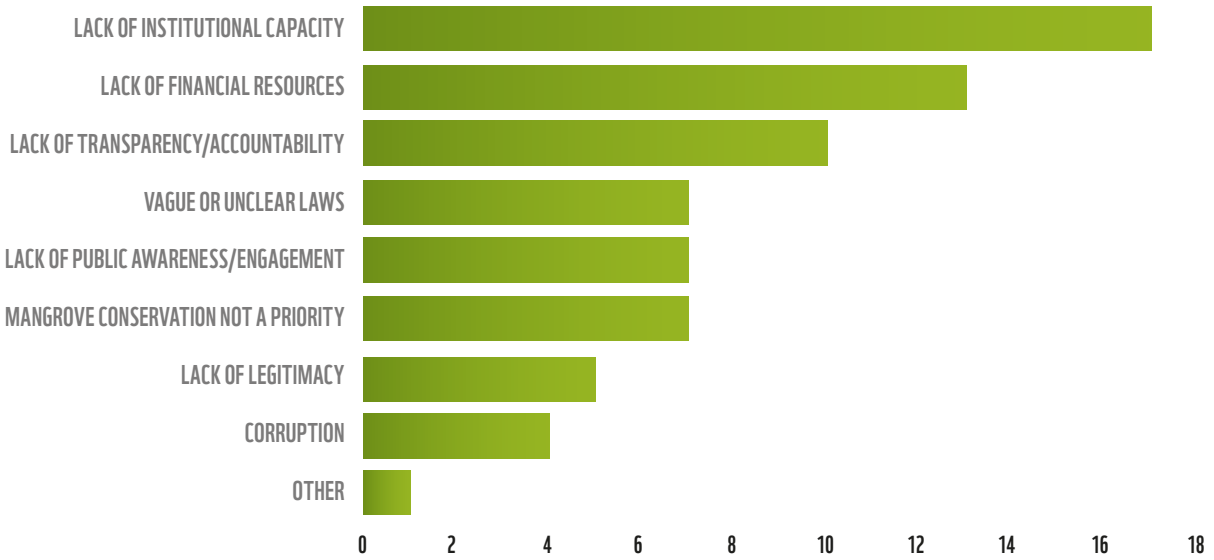

Figure 5: Survey responses to question on problems in implementation

3.3.1 Lack of institutional capacity and financial resources

Most experts surveyed identified the main problems in implementation of mangrove-related laws as lack of institutional capacity and financial resources, as well as problems of transparency and accountability (Figure 5). Almost all experts agreed that national institutions were not effective or only sometimes effective.[310]

In Costa Rica, a report presented by the Comptroller General of the Republic identified a series of weaknesses in mangrove conservation and governance, including weaknesses in management plans, lack of information in the institutional GIS system, and weak enforcement. These problems led to serious mangrove degradation, even within protected areas. For example, the Caño Negro wetland lost substantial mangrove and wetland area to pasture expansion after it was declared a National Wildlife Refuge in 1984, due to lack of financial and human resources for effective management. The report included binding recommendations for improvements.[311] Pursuant to the recommendations, the National System of Conservation Areas embarked on a project to conduct a national assessment of ecosystem services in Ramsar sites, update information in the national cadaster and land registry and the national inventory of wetlands, and develop a new National Wetlands Policy.[312] It is not yet possible to determine the effectiveness of these actions in improving governance of mangroves.

In many countries, the government relies heavily on NGOs and donors to support mangrove conservation and restoration because it lacks the necessary resources itself. In Chira Island, in the Gulf of Nicoya, Costa Rica, technical support from Conservation International has allowed women from the local community to receive micro-entrepreneurship training and engage in eco-tourism activities, building mangrove nurseries and mangrove clean-up initiatives.[313]

310 The responses to the multiple choice question "How effective are the national institutions responsible for mangrove management in your country" were as follows: "Nonfunctional" (0); "Operational but not effective" (8); "Sometimes effective" (11) and "Effective" (1). See Section 1.4 for a description of survey methodology.

311 Comptroller General of the Republic of Costa Rica. Report No. DFOE-AE- IF-13-2011 of 30 November 2011.

312 Camacho, A., Herrera, J., Vargas, P., Jiménez, R., Veas, N., Acuña, F. and Quirós, M. (2017). Estado de los humedales: nuevos desafíos para su gestión. Costa Rica: Informe estado de la Nación en Desarrollo Humano Sostenible; Ministerio de Ambiente y Energía, Sistema Nacional de Áreas de Conservación. (2017). Política Nacional de Humedales 2017-2030, Costa Rica. PNUD, San José, Costa Rica.

313 Blue Solutions. (2015). *Blue solutions from Latin America and the Wider Caribbean*.

In Madagascar, law provides for community management of forest resources, but in practice NGOs provide extensive support for communities in setting up these arrangements and meeting reporting requirements (see Section 3.2.5).

3.3.2 Enforcement challenges

Degradation and biodiversity loss in mangroves continue even where unsustainable activities are prohibited, such as strictly protected areas. This points to enforcement challenges, which may be caused by lack of institutional capacity discussed above, or may be symptomatic of other problems.

Logging is a serious threat in the Bombetoka Bay Protected Area in Madagascar. This is driven by a combination of high demand for cropland and charcoal and delays in instituting the management decree in the area. Madagascar is also reportedly affected by systemic corruption, which has an impact on mangroves sustainable use. Transferring resources management to local communities as provided in the law for locally secured management of renewable natural resources may help counter these governance issues.[314]

Xuan Thuy National Park, a Ramsar site in Vietnam, is threatened by frequent violation of environmental laws and regulations in both the core and buffer zones including tree cutting, shellfish collection, cattle grazing, and illegal conversion to aquaculture.[315] To some extent, this non-compliance may be attributed to lack of awareness of legal requirements on the part of users, lack of capacity on the part of local authorities, and low penalties. High population density and lack of alternative livelihoods are also significant factors. Finally, local officials may be reluctant to enforce conservation restrictions against poor resource users within their own communities.[316]

Local political and economic realities can undermine national legal frameworks. In Vietnam, social networks and patronage systems at the local level shape allocation of capital, land and forest resources. Households with bureaucratic backgrounds and strong political connections benefited most from the expansion of aquaculture, leading to a conflict of interest, where local elites who make decisions relating to mangrove conservation are the very families who benefit most from destructive activities.[317]

In some countries, mangrove advocates face physical danger from illegal users. Threats of violence as well as killing of forest patrols, community members, and mangrove defenders have been reported by several experts. In Costa Rica, mangroves are reportedly used by narcotics traffickers to hide and transport drugs, creating serious danger for local communities.[318]

3.3.3 Social, cultural and economic contexts

In understanding legal effectiveness, it is important to consider social contexts and the needs and alternatives of users. Users

314 L'Express. (9 May 2018). *Madagascar: replanter la mangrove pour améliorer le quotidien des pêcheurs*. Retrieved from https://www.lexpress.fr/actualites/1/actualite/madagascar-replanter-la-mangrove-pour-ameliorer-le-quotidien-des-pecheurs_2007291.html [Accessed 6 August 2018].

315 Hawkins, S. et al. (2010). *Roots in the Water: Legal Frameworks for Mangrove PES in Vietnam. Katoomba Group's Legal Initiative Country Study Series*. Forest Trends Washington, DC.; Zink, E. (2013). Hot Science, High Water: Assembling Nature, Society and Environmental Policy in Contemporary Vietnam. Copenhagen: NiasPress.

316 Hawkins, S. et al. (2010). *Roots in the Water: Legal Frameworks for Mangrove PES in Vietnam. Katoomba Group's Legal Initiative Country Study Series*. Forest Trends Washington, DC; Orchard, S.E., Stringer L.C. and Quinn, C.H. (2015). Environmental Entitlements: Institutional Influence on Mangrove Social-Ecological Systems in Northern Vietnam. *Resources* 20(4)903-938; Koh, D. (2004). Urban government: ward-level administration in Hanoi. In: Kerkvliet, B.J.T. and Marr, D.G. (eds) *Beyond Hanoi: local government in Vietnam*.. Institute of Southeast Asian Studies, Singapore, pp. 197–228.

317 Hawkins, S. et al. (2010). *Roots in the Water: Legal Frameworks for Mangrove PES in Vietnam. Katoomba Group's Legal Initiative Country Study Series*. Forest Trends Washington, DC; Orchard, S.E., Stringer, L.C. and Quinn, C.H. (2015). Impact of Aquaculture on Social Networks in the Mangrove Systems of Northern Vietnam. *Ocean and Coastal Management* 114, 1-10; Van Hue, L. and Scott, S. (2008). Coastal Livelihood Transitions: Socio-economic Consequences of Changing Mangrove Forest Management and Land Allocation in a Commune of Central Vietnam. *Geographical Research* 46(1):62 – 73.

318 Solano, H.C. (21 June 2017). *Estudio sobre penetración del narco en zonas protegidas detecta vulnerabilidad en Osa*. Retrieved from https://www.nacion.com/sucesos/seguridad/estudio-sobre-penetracion-del-narco-en-zonas-protegidas-detecta-vulnerabilidad-en-osa/37ZXPSWLYBB7FPWZL35OBRHQV4/story/; La Nacion. (16 July 2012). *Narcos usan manglar de parque nacional para esconder droga*. Retrieved from https://www.nacion.com/sucesos/narcos-usan-manglar-de-parque-nacional-para-esconder-droga/2LVW4G4PFBFCDDUCFXEG7LREUM/story/

may understand that activities are illegal or unsustainable, but continue because of lack of alternatives. This can relate to overlapping tenure regimes, where customary use of a resource conflicts with statutory restrictions (see Section 3.2.3). In other cases, high levels of demand or potential short term gain can drive unsustainable and illegal activities.

Tourism, urban development, and agricultural expansion can receive higher governmental priority than mangroves, resulting in degradation. In Costa Rica, several experts interviewed reported that pineapple, sugar cane and rice plantations, livestock farming, urbanization, and large tourism projects were granted concessions that increased pressure on mangrove areas. In the Térraba-Sierpe National Wetland Ramsar Site in Costa Rica, over 1000 ha of wetland were replaced by livestock farming, rice and African palm between 2008 and 2016.[319] Costa Rican civil society and government representatives highlighted a difficult conflict between the short term returns sought by investors and long term ecosystem value lost to degradation. However, they also discussed certain activities such as sport fishing and eco-tourism that depend on ecosystem services provided by mangroves, and may support their conservation financially and politically.

In Vietnam, local communities may encroach on protected areas because they have no choice and no other options for livelihoods and subsistence. In Madagascar, local communities who live in the region where mangroves are located may be dependent on the resources provided by mangroves ecosystems, which are degraded by users coming in from outside the area. Demand for charcoal continues to fuel unsustainable use.[320]

Engagement with communities is essential to effective mangrove governance, but frameworks for engagement are often ineffective. In Madagascar, the National Committee for the Integrated Coastal Zone Management has a mandate to involve local communities through regional committees, but the membership of regional committees is not necessarily representative of local communities, and may not hold or defend their interests. Community based organizations working in the country claim that instead of top-down participation strategies, mangrove conservation strategies should take advantage of customary law. Transfer of management to communities and application of Dina, customary norms elaborated through a participative process, is considered to be one of the most effective approaches to mangrove governance.[321]

319 Camacho, A., Herrera, J., Vargas, P., Jiménez, R., Veas, N., Acuña, F. and Quirós, M. (2017). Estado de los humedales: nuevos desafíos para su gestión. Costa Rica: Informe estado de la Nación en Desarrollo Humano Sostenible. Pg. 8.

320 IUCN and Blue Ventures (2016). National Blue Carbon Policy Assessment. Madagascar. IUCN, Blue Ventures. 28 pp.

321 L'Express. (9 May 2018). *Madagascar: replanter la mangrove pour améliorer le quotidien des pêcheurs*. Retrieved from https://www.lexpress.fr/actualites/1/actualite/madagascar-replanter-la-mangrove-pour-ameliorer-le-quotidien-des-pecheurs_2007291.html [Accessed 6 August 2018].

4

LESSONS AND CONCLUSIONS

Mangroves are valuable ecosystems. They are covered by conservation principles and frameworks at the international and national levels, and the subject of significant international interest. However, they continue to be depleted at a rapid rate. Addressing this depletion requires consideration of social, economic, ecological and political factors in designing and implementing legal frameworks and tools. The approach must be tailored to the national and ecosystem context, and informed by understanding of the main threats to mangroves as well as the needs, interests and capacities of stakeholders and users. Effective implementation of legal tools will require enabling conditions that support fair and transparent decision-making and enforcement. Legal certainty will be crucial.

Legal measures to conserve mangroves should be designed to respond to key threats, which may vary depending on circumstances. Where threats come from local communities, they may be appropriately addressed through community-based management structures. Where threats come from outside, communities may not be in a position to best respond, and may need support in enforcement and implementation of effective legal instruments. In other cases, threats may come from different sectors or geographically distant sources. They may be transboundary. The most appropriate response may involve not only the proximate cause of deforestation, but an underlying driver such as international demand for unsustainably sourced products. Legal tools should consider connected ecosystems and markets. A significant threat to mangroves will be climate change, which can only be addressed through global action.

Destruction of mangroves can be evaluated through a cost-benefit analysis. Where there is a high value to be gained and the costs are relatively low, unsustainable use may continue. In these cases, decreasing the benefit of unsustainable use—e.g. through reducing demand–while increasing the costs—e.g. through imposing costs on users including through regulation and legal penalties—may reduce such use. Market mechanisms can be used to align incentives, but it is important to get the valuation right. Where mangroves are worth more as charcoal than as standing forests, degradation will be hard to avoid, even if it is made illegal.

One explanation of why mangroves are being destroyed despite their high value is that those who benefit from mangrove degradation do not bear the full costs. Local communities may be affected by mangrove degradation that is caused by foreign users. Benefits may accrue to a small number of users—operators of unsustainable activities—while costs are distributed among many. Certain costs, such as loss of carbon sinks, are distributed across the entire global community. Where this is the case, legal interventions can adjust the market, through direct regulation or incentive-based measures.

Legal frameworks should be designed with implementation in mind. There are many examples of laws that exist on paper but are not well implemented in practice. Lack of capacity is a common barrier to implementation. Community based management mechanisms should consider capacity of the communities involved, and take advantage of their strengths while not imposing burdens they are unable to handle, such as unfamiliar reporting requirements. Institutional capacity should shape the design of government processes. Where institutional capacity is low, such processes can be streamlined and simplified to facilitate implementation. In all cases, capacity building can be foreseen and provided for in legal instruments, but it should not be taken for granted that such capacity exists.

Lack of coordination across sectors and levels of governance is a particular challenge in implementation of mangrove related legal protection. Addressing this requires harmonization of legal rules – ensuring that different sectoral laws do not create conflicting rights or obligations. A second necessity is harmonization of processes such as planning and permitting, through integrated planning or measures for coordinating planning across sectors. Third is coordination of institutions, in both law and practice. Law can create mechanisms and channels to support or require institutional coordination. However,

coordination needs to be institutionalized in practice – government actors need to communicate across sectoral silos as a matter of standard procedure.

Social and economic conditions will shape implementation of mangrove related legislation. Legal measures should take into account potential issues of compliance. Where compliance is impossible – as where mangrove users depend on the resource for their livelihoods – a legal rule will be seen as illegitimate or unfair. This can be the case where an absolute ban on mangrove use does not take into account the practices and needs of local users. In other cases, where non-compliance is motivated by greed, absolute prohibition on activities may be an appropriate and effective way to facilitate strong enforcement and minimize opportunities for disguising illegal use.

Legal frameworks need to establish appropriate enabling conditions for conservation and sustainable use. Good governance can be promoted through legal measures that support participation, access to information and access to justice. Corruption is a difficult problem, but there are legal tools that can help. One measure to combat corruption is allocating decision-making authority to the appropriate level: in some cases this is the community level, but in others it is a higher level to avoid local corruption. Degazettement of protected areas and regression of conservation protections is a significant problem that can be related to governance problems; requiring degazettement decisions to be made at the highest level or through a cross-branch or public process can be a response to this problem. Governance problems in permitting can be addressed in part through reducing discretion of decision-makers. The need for flexibility in mangrove management needs to be balanced against a need to contain potential governance problems and will depend on the situation of the country. Transparency is one of the most important tools to support good governance. Legal requirements for sharing information around permitting, planning and other management decisions can create a basis for civil society to act as watchdogs against corruption.

Restoration also requires appropriate enabling conditions. Unclear tenure can block restoration or delay it for years. Regulations designed to protect mangroves, such as permitting requirements and restrictions on certain activities in mangrove ecosystems can create unintended obstacles to restoration.

Some legal measures are easier to enforce than others. The more complicated a legal tool or structure, the more it may be subject to corruption or misuse. Ambiguous laws or overlapping can lead to confusion or create loopholes for intentional misuse. Clear laws and legal certainty may be the most important characteristics of a functional legal system for mangrove conservation and sustainable use.

Mangrove conservation requires clear and well-designed legal frameworks, but these are not the only requirements. In some cases, the problem is not legal but economic or social. While legal enabling frameworks are essential, legal intervention may not be the most effective approach to mangrove conservation in all circumstances. The improvement of institutional capacities might also be necessary to fulfill the mandate assigned by the legal system. International and national law, principles and regulation are one component among many that come together to protect the world's mangroves.

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Increasing the effectiveness of investments in mangrove conservation has been explored in our sister publication produced under the same project. For detailed information and further reading see: Flint, R., D. Herr, F. Vorhies and J. R. Smith 2018. *Increasing success and effectiveness of mangrove conservation investments: A guide for project developers, donors and investors*. IUCN, Geneva, Switzerland, and WWF Germany, Berlin, Germany. (106) pp.


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