

MANGROVE ECOSYSTEMS AND SERVICES: LEGAL RECOGNITION AND PROTECTION IN INDO-PACIFIC ISLAND STATES

ERIKA TECHERA *

Mangroves are valuable and highly productive ecosystems providing multiple services, including coastal protection, fishery breeding, birthing and nursery grounds, carbon sequestration and water filtration. Although they are rarely the subject of tailored legal protection, there are some jurisdictions where the ecosystem services provided by mangroves are recognised in law and policy frameworks. This article focuses on Indo-Pacific island states to highlight the ways in which mangroves have been treated in law in these nations, and to make suggestions for how Indo-Pacific island states could enhance their conservation and management.

I INTRODUCTION

Mangrove areas are highly productive coastal ecosystems, existing in marine and river environments where freshwater and seawater mix.¹ Mangroves provide myriad goods and ecosystem services of importance to human communities — such as coastal protection,² wildlife habitats,³ carbon sinks⁴ and water purification⁵ — and they are also of cultural value in many parts of the world.⁶ Multiple activities and processes affect mangroves, including land-clearing and

* UWA Law School and UWA Oceans Institute, The University of Western Australia. This article draws upon research contracted by the Food and Agriculture Organization of the United Nations ('FAO') for a project entitled 'Law, Policy and Governance of Mangroves in Small Island Developing States'. The author acknowledges the work of Wygene Chong, Kim Friedman and FAO colleagues on that project.

¹ There are at least 54 species of mangroves, which are found throughout the world: Smithsonian, *Mangroves* <<https://ocean.si.edu/ocean-life/plants-algae/mangroves>>.

² Including the amelioration of coastal processes, soil stabilisation and erosion control.

³ Mangroves are critical habitats for many species, including breeding, spawning, hatching and nursery grounds for fish.

⁴ Mangroves sequester carbon, and are sometimes referred to as a 'blue carbon' resource.

⁵ Mangroves play a role in the filtration of water.

⁶ A Himes-Cornell, SO Grose and L Pendleton, 'Mangrove Ecosystem Service Values and Methodological Approaches to Valuation: Where Do We Stand?' (2018) (Oct) *Frontiers in Marine Science* 376.

coastal reclamation, pollution and eutrophication, and over-harvesting.⁷ Increasingly, scientific research is pointing to the impacts of these activities on mangroves, and the ecological cost of the continued declines.⁸

This article explores the integration of law and science, by focusing on whether the scientific value placed upon mangroves is matched by their legal recognition and protection. The purpose is to highlight the ways in which mangroves have been treated in law and to make suggestions for how states could enhance their approaches to ensure that these critical ecosystems are better protected, managed and, if necessary, restored. Law has a critical role to play, for example, in legally protecting mangroves from being harvested or harmed, conserving specific mangrove species and/or managing such species as part of a protected area. Law can mandate specific conservation efforts, including restoration and reforestation, and/or require the implementation of management plans focused on conservation and sustainable utilisation. More broadly, legal frameworks can embed consideration of ecosystem services in decision-making processes surrounding development approvals, requirements for environmental impact assessment and consideration of ecosystem-based management principles.

While mangroves are rarely subject to tailored international law or domestic legislation, they do often feature in habitat, forestry or fisheries laws, and sometimes in protected area management, biodiversity, coastal zone management or climate change regimes. The ways in which they are conserved, managed or restored reflects both the ecosystem services they provide and the particular priorities within each state. By exploring the diversity of legal mechanisms utilised, a suite of legal options can be identified, which will be of value to these and other states seeking to enhance mangrove protection, management and restoration.

⁷ In Mauritius, for example, threats to mangrove areas include 'habitat fragmentation and land use conversion ... due to growing demand for land for development in prime coastal areas': Republic of Mauritius, *National Biodiversity Strategy and Action Plan 2017–2025* (2017) 29. In Fiji, the threats include mangrove-cutting and coastal tourism development: Government of Fiji, *Fiji's Fifth National Report to Convention on Biological Diversity 2009–2014* (Report, 2014) 6 <<https://www.cbd.int/doc/world/fj/fj-nr-05-en.pdf>>. Mangrove encroachment can also be a problem, by over-shadowing or migration into saltmarsh or open intertidal flats: C Harty, 'Planning Strategies for Mangrove and Saltmarsh Changes in Southeast Australia' (2004) 32(4) *Coastal Management* 405.

⁸ See, eg, Linwood Pendleton et al, 'Estimating Global "Blue Carbon" Emissions from Conversion and Degradation of Vegetated Coastal Ecosystems' (2012) 7(9) *PLoS ONE* e43542; and Laura Carugati et al, 'Impact of Mangrove Forests Degradation on Biodiversity and Ecosystem Functioning' (2018) 8 *Scientific Reports* art 13298.

The focus of this research is Indo-Pacific island states.⁹ These nations are home to important mangrove species and areas, and a range of mangrove values and services is recognised.¹⁰ There are also examples of propagation programmes in the region, which demonstrate political will for their restoration.¹¹ Mangrove ecosystems are of critical importance to communities for food and livelihoods in these countries, and for coastal protection from extreme weather events associated with the changing climate, but simultaneously these areas will be affected by sea level rise and thermal stress.¹² From a legal perspective, the rationale for focusing on these Indo-Pacific states is to contribute to the limited legal literature about these nations, to examine the ways in which these countries have utilised relevant international laws to protect mangrove areas, and to explore the diverse and innovative domestic legislative interventions. By comparatively analysing these jurisdictions, a toolbox of legal options and approaches can be distilled, which may assist other states in legal capacity building to enhance protection, management and restoration of mangroves.

Although island states face many common challenges, they also have notable differences that complicate comparative analysis. Most Pacific states are legally pluralistic, combining a common law legal system with customary law and traditional land tenure rights.¹³ This adds a layer of complexity to the governance landscape in the Pacific region, and can provide a foundation for community-based mangrove governance.¹⁴ This article focuses upon formally recognised,

⁹ In the Pacific, the states considered here include the Federated States of Micronesia ('FSM'), Fiji, Kiribati, Marshall Islands, Palau, Papua New Guinea ('PNG'), Samoa, Solomon Islands, Timor Leste, Tonga and Vanuatu. In the Indian Ocean, they include Madagascar, Maldives, Mauritius and Seychelles.

¹⁰ It is estimated that in Fiji, for example, 38,000 hectares of mangrove remain, which is the third largest in the Pacific: Asian Development Bank, *Environment Assessment (Summary), Country Partnership Strategy: Fiji 2014–2018* (Report, 2014) <<https://www.adb.org/sites/default/files/linked-documents/cps-fij-2014-2018-ena.pdf>>. See also James Sloan, 'How Does the Law Protect Mangroves in Fiji?' [2017] *Ocean Law Bulletin* (13 February 2017) <<http://www.sas.com.fj/ocean-law-bulletins/how-does-the-law-protect-mangroves-in-fiji>>. In Mauritius, several species of mangrove have been identified, including *Bruguiera gymnorrhiza* and *Rhizophora mucronata*, and cover about 20 square kilometres: Chandani Appadoo, 'Status of Mangroves in Mauritius' (2003) 7(1) *Journal of Coastal Development* 1.

¹¹ A specific mangrove propagation programme was initiated in 1995, involving the planting of 220,000 seedlings, with an 80 per cent success rate; and as of 2009, mangrove cover had extended to 145 hectares: Ministry of Environment and Sustainable Development, Government of Mauritius, *Mauritius Environmental Outlook Report* (Report, 2011) 96.

¹² Ministry of Environment and Sustainable Development, Government of Mauritius, *Mauritius Environmental Outlook Report* (Report, 2011) 90 and 144.

¹³ Although most States in the Pacific have majority Indigenous populations, this is not the case in Fiji Islands, where approximately half the population is Indigenous and half is of Indian descent as a result of British indentured labour policies to support plantations.

¹⁴ For example, in Fiji, Vanuatu and the Solomon Islands: Mangrove Ecosystems for Climate Change Adaptation and Livelihoods, *Review of Policy and Legislation Relating to the Use and Management of Mangroves in Fiji* (Undated Report); Mangrove Ecosystems for Climate Change Adaptation and

state-based law, largely because the foreshore areas where mangroves are located fall below the high-water mark and therefore legally belong to the State.¹⁵ There is little formal recognition of customary law in the Indian Ocean island states, in comparison to the Pacific.¹⁶ Mauritius and Seychelles, for example, had no Indigenous peoples, although periods of slavery have resulted in a strong Creole culture today.¹⁷ In the Indian Ocean, both common law and civil systems are found, although Sharia's law also operates in states such as the Maldives and Comoros. Yet much can be learned from a comparative analysis of the laws, given the shared goal of improving mangrove governance.

This research has involved a desk-based analysis of the ways in which Indo-Pacific island states have utilised international law and domestic legislation to protect, manage and/or restore mangrove ecosystems. The methodology has drawbacks because laws as enacted may not be implemented, complied with or enforced. Further empirical research is, therefore, essential to assess the effectiveness of the laws. Nevertheless, this study is a first step to better understanding the various ways in which mangroves are treated in law, and it contributes to the limited literature on environmental law in Indo-Pacific island states.

The article commences by examining the global legal landscape relevant to mangroves, including both international law and global programmes, and the ways in which Indo-Pacific island countries have engaged at the global level. The next section explores regional developments in each of the Pacific and Indian Ocean areas, given there are no initiatives that span the Indo-Pacific region. This is followed by an analysis of the domestic laws that account for mangroves in Indo-Pacific island states. The article concludes by drawing out the various legal options and approaches to conserve, manage and restore mangroves, which are of value to these and other jurisdictions seeking to enhance legal recognition and protection of these critical ecosystems.

Livelihoods, *Review of Policy and Legislation Relating to the Use and Management of Mangroves in the Solomon Islands* (Undated Report); and *Mangrove Ecosystems for Climate Change Adaptation and Livelihoods, Review of Policy and Legislation Relating to the Use and Management of Mangrove Ecosystems in Vanuatu* (Undated Report).

¹⁵ Brian Rotich, Esther Mwangi and Steven Lawry, *Where Land Meets the Sea: A Global Review of the Governance and Tenure Dimensions of Coastal Mangrove Forests* (Center for International Forestry Research and United States Agency for International Development, 2016) viii.

¹⁶ Katrina Cuskelly, *Customs and Constitutions: State Recognition of Customary Law Around the World* (International Union for the Conservation of Nature and Natural Resources, 2011) 16. Madagascar recognises customary law, but other states do not.

¹⁷ Again, though, this is not uniform and Mauritius also has a large Indian population.

II INTERNATIONAL LAW, MANGROVES AND ISLAND STATES

Multiple international instruments, institutions and programs focus on mangrove conservation, management and restoration. The relevant binding instruments fall into three broad categories: first, habitat and area-based instruments such as the *Convention on Wetlands* ('Ramsar Convention')¹⁸ and the *Convention Concerning the Protection of the World Cultural and Natural Heritage* ('World Heritage Convention').¹⁹ Also relevant is the *International Convention for the Prevention of Pollution from Ships* ('MARPOL').²⁰ Secondly, there are biodiversity and species-based treaties, including the *Convention on Biological Diversity* ('CBD')²¹ and *Convention on International Trade in Endangered Species* ('CITES').²² Thirdly, there are the instruments recognising other values of mangroves, primarily related to climate change: the *United Nations Framework Convention on Climate Change*²³ and the *Paris Agreement*.²⁴ These international laws have been widely ratified by Indo-Pacific countries as highlighted below.

The Ramsar Convention was the first international instrument to focus specifically on habitats. It recognises the importance of wetlands, which include mangroves, as habitats for flora and fauna.²⁵ The Convention requires each state to designate at least one wetland area and, thereafter, to promote conservation and wise use of the wetland.²⁶ This Convention is less well-ratified than others in the Indo-Pacific;²⁷ nevertheless, it can catalyse the listing and protection of wetland areas, and an examination of the Ramsar List of Wetlands shows that this has occurred: Fiji's Qoliqoli Cokovata, Nooto-North Tarawa in Kiribati, Jaluit and Namdrik Atolls in the Marshall Islands, Aldabra Atoll and Port Launay Coastal

¹⁸ *Convention on Wetlands of International Importance especially as Waterfowl Habitat*, opened for signature 2 February 1971, 996 UNTS 246 (entered into force 21 December 1975) ('Ramsar Convention').

¹⁹ *Convention for the Protection of the World Cultural and Natural Heritage*, adopted 16 November 1972, 1037 UNTS 151 (entered into force 17 December 1975) ('World Heritage Convention').

²⁰ *International Convention for the Prevention of Pollution by Ships*, adopted 2 November 1973, 1340 UNTS 1841 (entered into force 2 October 1983). As modified by the Protocol of 1978, adopted 17 February 1978, 12 ILM 1319 (combined instrument entered into force on 2 October 1983).

²¹ *Convention on Biological Diversity*, adopted 5 June 1992, 1760 UNTS 79 (entered into force 29 December 1993).

²² *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, adopted 3 March 1973, 993 UNTS 243 (entered into force 1 July 1975) ('CITES').

²³ *United Nations Framework Convention on Climate Change*, adopted 9 May 1992, 1771 UNTS 107 (entered into force 21 March 1994).

²⁴ *Paris Agreement*, adopted 13 December 2015 (entered into force 4 November 2016) UNFCCC, COP Report No 21, Addendum, 21. UN Doc FCCC/CP/2015/10/Add.1.

²⁵ Wetlands are defined in the Ramsar Convention (n 18) art 1.

²⁶ *Ibid* arts 2 and 3.

²⁷ In the Pacific, Fiji, Palau, PNG, Samoa and Vanuatu have ratified, as have Mauritius and Seychelles in the Indian Ocean: Ramsar, *Contracting Parties to the Ramsar Convention* <https://www.ramsar.org/sites/default/files/documents/library/annotated_contracting_parties_list_e.pdf>.

Wetland in Seychelles, Zones Humides de Sahamalaza, Site Bioculturel d'Antrema, Iles Barren, Mangroves de Tsiribihina and Complexe des lacs Ambondro et Sirave in Madagascar, and Blue Bay Marine Park and Pointe d'Esny Wetland in Mauritius.²⁸ Furthermore, the Ramsar Convention Secretariat hosts one programme focused specifically on mangroves, although it does not relate to the Indo-Pacific Region.²⁹ States have implemented the Ramsar Convention in their national governance framework in different ways, including through area-based management laws, as explored further below.³⁰ For example, Mauritius has established a national Ramsar Committee 'comprising members from all relevant institutions involved with wetlands to assist the Ministry in implementing the provisions contained in the Ramsar Convention and to advise the Ministry on Wetland development issues'.³¹

The World Heritage Convention is another treaty that can be utilised to protect both natural mangrove sites and those areas with cultural values.³² The Convention is well accepted, with all Indo-Pacific island states having ratified it.³³ It encourages the identification, protection, preservation and presentation of natural and cultural heritage of 'outstanding universal value' to all peoples.³⁴ The World Heritage Marine Programme focuses on 50 flagship marine protected areas with outstanding universal value, several of which include mangroves.³⁵ The World Heritage list includes a number of Indo-Pacific sites with mangrove areas, including Nan Madol in the Federated States of Micronesia ('FSM'), Aldabra Atoll in Seychelles, and Tsingy de Bemaraha Strict Nature Reserve in Madagascar.³⁶ State parties are required to enact appropriate law for such sites,³⁷ which in most cases is through protected area management provisions (outlined further below). It is also clear that Indo-Pacific states continue to put forward relevant sites for listing. Fiji, for example, has three sites on the tentative list, including the

²⁸ Ramsar, *Ramsar Sites Information Service*: <<https://rsis.ramsar.org/>>.

²⁹ Ramsar, *Regional Initiative for the Conservation and Wise Use of Mangroves and Coral Reefs in the Americas*: <http://archive.ramsar.org/pdf/regional-initiatives/Americas/Americas_coral-reefs_mangroves.pdf>.

³⁰ See, eg, Evan Hamman and Vainuupo Jungblut, 'Wetlands of the Pacific: Towards Effective Law and Governance' in Margaretha Wewerinke-Singh and Evan Hamman (eds), *Environmental Law and Governance in the Pacific: Climate Change, Biodiversity and Communities* (Routledge/Earthscan, 2020) ch 9.

³¹ Government of Mauritius, *Wetland Unit* <<http://npcs.govmu.org/English/Documents/Wetland.pdf>>.

³² Natural and cultural heritage is defined in the World Heritage Convention (n 19) art 1.

³³ UNESCO World Heritage Convention, States Parties Ratification Status: <<https://whc.unesco.org/en/statesparties/>>.

³⁴ World Heritage Convention (n 19) arts 3–5.

³⁵ World Heritage Centre, World Heritage Marine Programme: <<https://whc.unesco.org/en/marine-programme/>>.

³⁶ UNESCO World Heritage Convention, World Heritage List: <<https://whc.unesco.org/en/list/>>.

³⁷ World Heritage Convention (n 19) art 5.

Sigatoka Sand Dunes with nearby mangroves. The listing of this area, therefore, would be likely to enhance protection.³⁸

A further relevant international instrument is MARPOL,³⁹ which provides for the designation of Particularly Sensitive Sea Areas ('PSSAs'), where special protection is warranted on the grounds of ecological, scientific or socio-economic criteria.⁴⁰ Mangroves are explicitly referred to in the Revised Guidelines on PSSAs with reference to ecological criteria.⁴¹ This mechanism has been used to protect an Indo-Pacific mangrove area: Jomard Entrance in Papua New Guinea, which features coral reefs and mangrove areas.⁴²

The CBD has an important role to play in protected area management, encouraging *in situ* conservation and requiring parties 'as far as possible and appropriate' to 'establish a system of protected areas' and 'regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use'.⁴³ Mangroves are specifically referred to in operational objectives under the Marine and Coastal Living Resources Programme, in the Programme of Work to operationalise the Jakarta Mandate.⁴⁴ The treaty has been widely endorsed, and all Indo-Pacific island countries are members.⁴⁵ As part of their obligations, states must submit national reports; and in these reports, many states have included actions in relation to mangroves.⁴⁶ Maldives is one of the few Indo-Pacific states to submit its Sixth National Report; it observes that mangrove areas are important ecosystems providing essential

³⁸ Sustainable Coastal Resources Management for Fiji: A Background Paper prepared for the Fiji National Workshop on Integrated Coastal Management (2002) <http://www.crc.uri.edu/download/Fiji_National_Paper.pdf>.

³⁹ The majority of Indo-Pacific island states have ratified the main treaty and at least one of the Annexes: IMO, Status of Conventions: <<http://www.imo.org/en/About/Conventions/StatusOfConventions/Pages/Default.aspx>>.

⁴⁰ IMO, Particularly Sensitive Sea Areas: <<http://www.imo.org/en/OurWork/Environment/PSSAs/Pages/Default.aspx>>.

⁴¹ International Maritime Organisation, Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas, IMO Assembly Res A.982(24), 24th session, Agenda Item 11, IMO Doc A 24/Res.982 (1 December 2005).

⁴² Marine Environment Protection Committee, Designation of the Jomard Entrance as a Particularly Sensitive Sea Area, MEPC Res MEPC.283(70), IMO Doc MEPC 70/18/Add.1 (28 October 2016) annex 12. In addition, Australia and PNG proposed the Torres Strait as a PSSA: IMO, List of Special Areas under MARPOL and Particularly Sensitive Sea Areas, MEPC.1/Circ.778: <http://www.imo.org/blast/blastDataHelper.asp?data_id=30979&filename=778.pdf>.

⁴³ Convention on Biological Diversity, opened for signature 5 June 1992, 1760 UNTS 79 (entered into force 29 December 1993) art 8.

⁴⁴ Convention on Biological Diversity, Marine and Coastal Biological Diversity, Conference of the Parties to the Convention on Biological Diversity, 7th meeting, Agenda Item 18.2, UN Doc UNEP/CBD/COP/DEC/VII/5 (13 April 2004) 2, 14, 47.

⁴⁵ Convention on Biological Diversity ('CBD'), List of Parties: <<https://www.cbd.int/information/parties.shtml>>.

⁴⁶ CBD, National Reports: <<https://www.cbd.int/reports/>>.

services, notes the impacts of waste and pollution, and commits to establishing an inventory and protecting 20 per cent of wetlands and mangroves by 2025.⁴⁷ Mangroves also feature, for example, in Fiji's Fifth National Report, where it is noted that 'habitat destruction in the coastal areas for tourism development is a major threat to Fiji's biodiversity in the mangrove, estuaries, reef and foreshore ecosystems'.⁴⁸ Mangroves are also recognised for their ability to act as buffers against natural disasters.⁴⁹

CITES is focused on regulating or prohibiting international trade in threatened or endangered species. It creates a framework for the listing of species in one of three appendices, and could potentially regulate international trade in all species of flora and fauna.⁵⁰ Although some plants with a poor conservation status have been listed, no mangrove species are included.⁵¹

In relation to the marine environment, the *United Nations Convention on the Law of the Sea* ('UNCLOS') is the primary instrument that establishes key maritime zones, as well as rights and obligations in relation to ocean areas and resources.⁵² All Indo-Pacific island states have ratified it.⁵³ Mangroves are found in the coastal zone, which is either considered to be land (outside the scope of UNCLOS) or the territorial sea.⁵⁴ States have sovereignty over the territorial sea, and the right to exploit resources found there, subject to the obligation to protect and preserve the marine environment.⁵⁵ Part XII of UNCLOS sets out some relevant specific provisions, including the obligation to take measures 'necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life'.⁵⁶ This provides one of the only international obligations placed upon states to conserve species at risk within their own territory.

Beyond the binding international law referred to above, there are a number of soft law instruments that provide for the protection or sustainable use of

⁴⁷ Maldives, *Sixth National Report to the CBD 2014–2018*: <<https://chm.cbd.int/search/reporting-map?filter=nr6>>.

⁴⁸ Fiji, *Fifth National Report to CBD 2009–2014*: <<https://www.cbd.int/doc/world/fj/fj-nr-05-en.pdf>> 6–7.

⁴⁹ Ibid 10.

⁵⁰ CITES (n 22) arts I–V.

⁵¹ CITES, Species Plus: <<https://www.speciesplus.net/>>. Although some species are listed that depend upon mangroves, such as the Mangrove Black-Hawk, Mangrove Hummingbird and Mangrove Monitor: <https://www.speciesplus.net/#/taxon_concepts?taxonomy=cites_eu&taxon_concept_query=mangrove&geo_entities_ids=&geo_entity_scope=cites&page=1>.

⁵² *United Nations Convention on the Law of the Sea*, adopted 10 December 1982, 1833 UNTS 396 (entered into force 16 November 1994) ('UNCLOS').

⁵³ For state parties, see <https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXI-6&chapter=21&clang=_en>.

⁵⁴ UNCLOS (n 52) arts 2–5.

⁵⁵ Ibid arts 192 and 193.

⁵⁶ Ibid art 194(5).

mangrove environments. The Food and Agriculture Organization's *Code of Conduct for Responsible Fisheries* is the key document covering fisheries management, fishing operations, aquaculture development, integrated coastal zone management, trade and research. Objectives include the 'protection of living aquatic resources and their environments and coastal areas',⁵⁷ through, inter alia, conservation of ecosystems and protection and rehabilitation of 'critical fisheries habitats ... such as ... mangroves'.⁵⁸ In relation to forest conservation, there is only a soft law instrument: *Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests*.⁵⁹ Mangroves are not referred to explicitly, and no state obligations are created. Other relevant international instruments include the *International Tropical Timber Agreement*, which applies only to tropical timbers and focuses on trade, but does refer to conservation in the context of sustainable management.⁶⁰ The International Tropical Timber Organization ('ITTO')⁶¹ recognises the value of mangroves, particularly in terms of coastal protection and water quality, and also the threats to these species.⁶² A number of mangrove initiatives fall under the auspices of the ITTO,⁶³ including the development of a Global Mangrove Database and Information System ('GLOMIS').⁶⁴ Other non-binding global initiatives include the Forest Stewardship Council,⁶⁵ which is a voluntary forest product certification and labelling scheme, with principles

⁵⁷ Food and Agriculture Organization, *Code of Conduct on Responsible Fisheries* <<http://www.fao.org/3/v9878e/v9878e00.htm>> art 2.

⁵⁸ Ibid art 6.8.

⁵⁹ It recognises the role that forests play, and confirms States' rights to exploit forest resources but also calls for sustainable management. See 'Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests' in *Report of the United Nations Conference on Environment and Development*, UN GAOR, UN Doc A/CONF.151/26 (Vol. III) (14 August 1992) annex III.

⁶⁰ *International Tropical Timber Agreement*, opened for signature 26 January 1994, 1955 UNTS 81 (provisionally entered into force 1 January 1997). See also *International Tropical Timber Agreement*, opened for signature 27 January 2006, 2797 UNTS 75 (entered into force 7 December 2011).

⁶¹ Of the Indo-Pacific island countries, only Fiji and PNG are members: International Tropical Timber Organization ('ITTO'), *Members* <https://www.itto.int/about_itto/members/>.

⁶² ITTO, *Mangroves* <<http://www.itto.int/feature07>>.

⁶³ The ITTO hosted the International Conference on Sustainable Mangrove Ecosystems in 2017: <<https://www.itto.int/mangrove2017/>>. The outcome report includes an entire theme devoted to governance, monitoring and law enforcement: ITTO, *Report of International Conference on Sustainable Mangrove Ecosystems: Managing a Vital Resource for Achieving the Sustainable Development Goals and the Paris Agreement* (Report, 2017).

⁶⁴ Global Mangrove Database and Information System <<http://www.gloemis.com/>>.

⁶⁵ Forest Stewardship Council (Web Page) <<https://www.fsc.org/>>.

addressing ecosystem values. There is future potential for schemes such as this and the soft law instruments to form the basis of a legal treaty.⁶⁶

Mangrove conservation efforts could be assisted through the Reduction of Emissions from Deforestation and Forest Degradation ('REDD') programme under the auspices of the *United Nations Framework Convention on Climate Change* ('UNFCCC').⁶⁷ The idea of extending the REDD programme to mangroves and other wetlands was explored in a 2012 workshop.⁶⁸ Subsequently, the *Paris Agreement* was adopted, requiring states to set out their mitigation and adaptation efforts to addressing climate change through Nationally Determined Contributions ('NDCs').⁶⁹ A number of Indo-Pacific island states include wetlands in their mitigation strategies; other states focus on adaptation, in the context of conservation, coastal zone management and sustainable fisheries.⁷⁰ For example, Fiji, Kiribati, Marshall Islands, Madagascar, Mauritius and Seychelles all refer to mangroves in their NDCs.⁷¹ Each State has taken a different approach; for example, Fiji commits to strengthening town planning regulations to conserve existing mangrove areas and to plant mangroves as part of its coastal adaptation plans,⁷² and Kiribati includes mangrove conservation and management for mitigation.⁷³ It has also been recognised that mangroves can protect against natural disasters more broadly. Although there is no international legally binding instrument in this area, there are soft law instruments such as the United Nations Office for Disaster Risk Reduction's *Sendai Framework for Disaster Risk Reduction*.⁷⁴ Strengthening governance is a key aspect of the framework, including by mainstreaming and integrating disaster risk reduction in national laws.⁷⁵

⁶⁶ See, generally, Feja Lesniewska, *Laws for Forests* (International Institute for Environment and Development, 2005); Constance McDermott, Aran O'Carroll and Peter Wood, *International Forest Policy — The Instruments, Agreements and Processes that Shape It* (United Nations Department of Economic and Social Affairs, 2007).

⁶⁷ *United Nations Framework Convention on Climate Change*, opened for signature 9 May 1992, 1771 UNTS 107 (entered into force 21 March 1994).

⁶⁸ See 'REDD+ and Legal Regimes of Mangroves, Peatlands and Other Wetlands: ASEAN and the World' [2013] (1) *International Journal of Rural Law and Policy* <<http://epress.lib.uts.edu.au/journals/index.php/ijrlp/issue/view/271>>.

⁶⁹ *Paris Agreement* (n 24) arts 3 and 4.

⁷⁰ D Herr and E Landis, *Coastal Blue Carbon Ecosystems. Opportunities for Nationally Determined Contributions* (International Union for the Conservation of Nature and Natural Resources and The Nature Conservancy, 2016) 10.

⁷¹ NDC Registry <<https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx>>.

⁷² Government of Fiji, *Fiji's Intended Nationally Determined Contribution* (Report, 2015) 8–9.

⁷³ Republic of Kiribati, *Intended Nationally Determined Contribution* (Report, 2015) 9.

⁷⁴ UN Office for Disaster Risk Reduction, *Sendai Framework for Disaster Risk Reduction 2015–2030* (Report, 2015) <<https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>>.

⁷⁵ *Ibid* Priority 2.

Beyond the international law instruments, key United Nations bodies have supported important mangrove programmes in the Indo-Pacific. For example, United Nations Environment (together with others) has co-developed the *World Mangrove Atlas* to provide a global distribution map, which benefits all nations, including those in the Indo-Pacific.⁷⁶ The United Nations Development Programme ('UNDP') oversaw an Adaptation Fund project, *20,000 Mangroves Strong*, which involved replanting mangroves in Mauritius for coastal protection and livelihoods.⁷⁷ Mauritian engagement at regional and global levels has also been of benefit in protecting critical areas. For example, the *Project for Capacity Development on Coastal Protection and Rehabilitation in the Republic of Mauritius* was supported by the Japan International Cooperation Agency ('JICA'), which identified impacts on coastal environments due to loss of mangroves and the need for conservation.⁷⁸ International non-governmental organisations ('NGOs') also have programmes of work relevant to mangroves, although few include law and governance aspects.⁷⁹ The International Union for Conservation of Nature ('IUCN'), together with the UNDP, leads the *Mangroves for the Future* ('MFF') programme, including work with the Maldives and Seychelles.⁸⁰ Relevant to this article, the programme is working to support legal protection of mangroves in the

⁷⁶ UN Environment and WCMC, *World Mangrove Atlas*: <<https://www.unep-wcmc.org/resources-and-data/world-mangrove-atlas-1997>>.

⁷⁷ United Nations Development Programme, '20,000 Mangroves Strong', *United Nations Development Programme Stories* (Web Page, 3 June 2014) <<https://stories.undp.org/20000-mangroves-strong>>.

⁷⁸ Ministry of Environment, Sustainable Development, Disaster and Beach Management of the Republic of Mauritius, *Project for Capacity Development on Coastal Protection and Rehabilitation in the Republic of Mauritius: Final Report* (Report, Japan International Cooperation Agency, 2015).

⁷⁹ For example, the International Society for Mangrove Ecosystems is the only global NGO that focuses purely on mangroves and has engaged in projects in Kiribati and Maldives <<http://www.mangrove.or.jp/english/subpage/index.html#pageLink-mokuteki>> and <<http://www.mangrove.or.jp/english/subpage/projects.html#pageLink-now>>. The *Mangrove Action Project* is a network that brings together scientists and NGOs to reverse mangrove degradation: <<http://mangroveactionproject.org>>. It has worked in Timor Leste. IUCN undertook the *Global Status Report on Mangroves: Working Group on Mangrove Ecosystems of the Commission on Ecology, United Nations Environment Programme and World Wildlife Fund, Global Status of Mangrove Ecosystems* (Report, International Union for the Conservation of Nature and Natural Resources, 1983). World Wide Fund for Nature ('WWF') works to conserve mangroves through its 'Oceans, Seas and Coasts' and focus on mangrove forests, with projects in various island states, such as Madagascar: <http://www.panda.org/about_our_earth/blue_planet/coasts/mangroves/>; Trevor G Jones et al, 'Madagascar's Mangroves: Quantifying Nation-Wide and Ecosystem Specific Dynamics, and Detailed Contemporary Mapping of Distinct Ecosystems' (2016) 8(2) *Remote Sensing* 106 <<http://www.mdpi.com/2072-4292/8/2/106/pdf>>. Similarly, The Nature Conservancy has a focus on 'Coasts and Communities', including mangroves, and partners with local NGOs: <<https://www.nature.org/ourinitiatives/urgentissues/oceans/coasts-and-communities/restoration-works-mangroves.xml>>.

⁸⁰ *Mangroves for the Future*: <<https://www.mangrovesforthefuture.org/>>.

Seychelles.⁸¹ The IUCN also hosts the *Pacific Mangrove Initiative* ('PMI'), which seeks to promote investment and action in sustainable mangrove futures, with policy and legislation being a key focus.⁸² These NGOs can play a powerful role in achieving positive outcomes on the ground, with some also working to overcome governance challenges.

III REGIONAL MANGROVE GOVERNANCE

Regional approaches allow states to coordinate and collaborate on shared vulnerabilities and concerns. Pacific Island states are members of a number of strong governmental and non-governmental regional organisations leading to the adoption of regional treaties in some areas.⁸³ The IUCN *Pacific Mangrove Initiative* works with the Secretariat of the Pacific Environment Programme, the UNDP and Fiji, Vanuatu, Papua New Guinea, Samoa, Solomon Islands and Tonga. In addition, the IUCN has completed a valuable global legal assessment of mangrove governance.⁸⁴ Relevantly, there are two specific regional projects. The first is the Mangrove Ecosystem for Sustainable Climate Change Adaptation and Livelihoods project ('MESCAL')⁸⁵ which involved Fiji, Samoa, Solomon Islands, Tonga and Vanuatu from 2009 to 2013.⁸⁶ The second was the Mangrove

⁸¹ Mangroves for the Future, *Mangroves for the Future: Investing in Coastal Ecosystems* <<https://www.mangrovesforthefuture.org/assets/Repository/Documents/2011-MFF-Brochure.pdf>> 5.

⁸² IUCN, *Pacific Mangroves Initiative* (Web Page) <<https://www.iucn.org/regions/oceania/our-work/deploying-nature-based-solutions/water-and-wetlands/completed-projects/pacific-mangroves-initiative>>. Key partners include the Secretariat of the Pacific Regional Environment Programme ('SPREP'), the United Nations Development Programme ('UNDP') and Fiji, Vanuatu, Papua New Guinea, Samoa, Solomon Islands and Tonga.

⁸³ Pacific Community ('SPC'), the Pacific Islands Forum Secretariat, the SPREP, and the Pacific Islands Applied Geoscience Commission.

⁸⁴ Lydia Slobodian et al, *Legal frameworks for Mangrove Governance, Conservation and Use: Assessment Summary* (IUCN and WWF Germany, 2018).

⁸⁵ IUCN, *MESCAL Project* <<https://www.iucn.org/regions/oceania/our-work/nature-based-solutions/water-and-wetlands/pacific-mangroves-initiative/mangrove-ecosystems-climate-change-adaptation-livelihoods-mescal-project>>.

⁸⁶ The project has resulted in five detailed reports: *Mangrove Ecosystems for Climate Change Adaptation and Livelihoods, Review of Policy and Legislation Relating to the Use and Management of Mangroves in Fiji* (Undated Report); *Mangrove Ecosystems for Climate Change Adaptation and Livelihoods, Review of Policy and Legislation Relating to the Use and Management of Mangrove Ecosystems in the Solomon Islands* (Undated Report); *Mangrove Ecosystems for Climate Change Adaptation and Livelihoods, Review of Policy and Legislation Relating to the Use and Management of Mangroves in Samoa* (Undated Report); *Mangrove Ecosystems for Climate Change Adaptation and Livelihoods, Review of Policy and Legislation Relating to the Use and Management of Mangroves in Tonga* (Undated Report); and *Mangrove Ecosystems for Climate Change Adaptation and Livelihoods, Review of Policy and Legislation Relating to the Use and Management of Mangrove Ecosystems in Vanuatu* (Undated Report).

Rehabilitation for Sustainably-Managed Forest project ('MARSH')⁸⁷ which was implemented in Papua New Guinea, Solomon Islands and Vanuatu, with policy and legislation as one of the five key focus areas. The Pacific region is well known for its adoption of regional treaties and model law frameworks.⁸⁸ Mangrove governance is not currently the subject of such interventions, but there is scope for regional approaches to be adopted in the future.

Regional organisations and initiatives are much less developed in the Indian Ocean. The oldest regional body is the Indian Ocean Commission, but it has a limited membership and a mandate focused on regional economic development.⁸⁹ The regional organisation with the broadest membership is the Indian Ocean Rim Association ('IORA'), which has 22 members, including island states and littoral nations. There are no pan-regional Indian Ocean mangrove initiatives, nor any relevant regional policy or treaties. However, the IORA Blue Carbon Hub has recently been established to protect and restore ecosystems, including mangroves.⁹⁰ There are many opportunities to enhance regional environmental law in the Indian Ocean, particularly in the context of the blue economy,⁹¹ and it remains to be seen whether IORA will take the lead in this space.⁹²

IV NATIONAL GOVERNANCE IN INDO-PACIFIC ISLAND STATES

In the majority of Indo-Pacific islands, the value of mangrove ecosystems is recognised, albeit in different ways. Sometimes the interventions have been driven by international environmental law obligations, and in other instances by bottom-up national interests. As noted above, in some cases mangroves are regulated as natural resources under fisheries or forestry laws. In all these cases, species-based and area-based tools are frequently utilised, and sometimes, these protections are connected with the ecosystem services that mangroves provide. Explored below are examples of jurisdictions where fisheries laws recognise that

⁸⁷ IUCN, *MARSH Project* <<https://www.iucn.org/regions/oceania/our-work/nature-based-solutions/water-and-wetlands/pacific-mangroves-initiative/mangrove-rehabilitation-sustainably-managed-healthy-forests-marsh-project>>.

⁸⁸ See, eg, *Niue Treaty on Cooperation in Fisheries Surveillance and Law Enforcement in the South Pacific Region*, opened for signature 9 July 1992, [1993] ATS 31 (entered into force 20 May 1993); and SPC, *Policy Brief: Harmonisation of Biosecurity Laws in the Pacific* (2010), <https://cgspace.cgiar.org/bitstream/handle/10568/52217/Policy_brief_Harmonisation_of_biosecurity_laws_in_the_Pacific.pdf?sequence=1&isAllowed=y>.

⁸⁹ Indian Ocean Commission <<https://www.commissionoceanindien.org/>>.

⁹⁰ CSIRO, *IORA Blue Carbon Hub*: <<https://research.csiro.au/iora-blue-carbon-hub/>>.

⁹¹ The blue economy involves the sustainable development of the ocean space to achieve economic, developmental and socio-cultural benefits, commonly including fisheries, shipping, energy and tourism sectors. See, eg, Government of Seychelles, *Seychelles' Blue Economy Strategic Policy Framework and Roadmap: Charting the Future (2018-2030)* (2017): <<https://seymsp.com/wp-content/uploads/2018/05/CommonwealthSecretariat-12pp-RoadMap-Brochure.pdf>>.

⁹² Erika Techera, 'Achieving Blue Economy Goals: The Need for Improved Legal Frameworks Across the Indian Ocean' (2019) 1(2) *Seychelles Research Journal* 5.

mangroves provide breeding, spawning or nursery grounds, and others where they are conserved and restored as valuable biodiversity, sometimes in standalone protected area or threatened species laws. Given that land reclamation and development are key threats to mangroves, land use planning laws are also relevant in some nations, and mangroves are sometimes included in climate change policy because they can protect against coastal erosion and also provide carbon sequestration (blue carbon) services. The sections that follow adopt this thematic approach in analysing the domestic legislation.

A Natural Resources Law and Species-Based Legislation

There are two main forms of species-based natural resource legislation that are of relevance to mangroves: fisheries and forestry. This classification of mangroves as ‘resources’ tends to focus on regulating their utilisation and does not adequately take account of the multiple ecosystem services they provide. Nonetheless, it is clear that these types of laws can provide regulatory and management frameworks for mangroves, can acknowledge them as habitats for fish and as forestry resources, and, more broadly, can recognise the ecosystem services they provide. Many Acts provide for the designation of aquatic or forest reserves, as well as powers to protect individual species of plants or fish that are threatened or endangered.

In terms of fisheries statutes, domestic legislation sits across a spectrum from basic regulation to comprehensive legal frameworks. The Fijian *Fisheries Act 1942*, for example, allows for the designation of protected areas and seasonal restrictions for conservation, protection and maintenance of fish stocks. Papua New Guinea’s *Fisheries Management Act 1998* is an example of more integrated fisheries regulation that ‘promote[s] the management and sustainable development of fisheries’. Section 25 of that Act provides a comprehensive list of objectives and principles, including ecosystem-based approaches. The FSM *Marine Resources Act 2002* is an example of contemporary legislation that seeks to regulate living marine resources more comprehensively. Fishery laws in the Indian Ocean generally provide a similar system of administration as their Pacific counterparts.⁹³ The Seychelles *Fisheries Act 2014* demonstrates a sophisticated, integrated approach to fisheries management, with a guiding object being an ecosystem approach based on international standards. In the Maldives, s 10 of the *Fisheries Law (Law No 5/87)* relevantly provides for the protection of species,

⁹³ *Loi no 2015-053 portant Code de la Pêche et de l’Aquaculture (Madagascar)*; *Fisheries Law of the Maldives 1987 (Maldives)*; *Fisheries and Marine Resources Act 2007 (Mauritius)*; *Fisheries Act 2014 (Seychelles)*.

although it is unclear whether mangroves could be protected. In Mauritius, mangroves receive focused attention through the fishery reserves provisions under the *Fishing and Marine Resources Act 2007*.⁹⁴ The Act includes specific reference to mangroves in the offences regime, stating that '[n]o person shall ... except with the written approval of the Permanent Secretary, cut, take or remove [or] damage ... a mangrove plant'.⁹⁵ In addition, s 69(1) prevents the discharge of poisonous substances into a wetland. It is notable that this mangrove protection is in a fisheries Act, and highlights that mangroves are recognised as critically important to fisheries resources in Mauritius. The only other country with similar specificity is Madagascar, where art 84 of the *Loi no 2015-053 portant Code de la Pêche et de l'Aquaculture* provides that '[a]nyone who cuts, collects, transports or sells mangrove wood without authorization is liable to a fine of \$10,000 to \$20,000 per hectare of mangrove destroyed and/or imprisonment for six (6) to twelve (12) months'. As noted below, this approach recognises one ecosystem service related to fish and marine species, but can lead to gaps and overlaps where mangroves are located at the land–water interface.

Forestry Acts are less common across the Indo-Pacific, perhaps because many of the countries are low-lying islands and/or have little forest cover. Nonetheless, for those states with high islands, forested areas and industries, such legislation is in place.⁹⁶ Papua New Guinea's *Forestry Act 1991* is comprehensive, providing for the declaration of national forests (area-based protection), protected trees (species-based protection), administrative authorities, forest management plans, forest development plans, a licence and permit system and enforcement. Samoa has taken a similar integrated approach in its *Forestry Management Act 2011*.⁹⁷ Mauritius and Seychelles have basic conservation legislation for forests,⁹⁸ as opposed to legislation that administers a forestry industry. These laws provide species-based protection for listed trees and area-based protection through forest reserves. Under the Seychelles *Breadfruit and Other Trees (Protection) Act 1917*, one species of mangrove is identified: *Heritiera littoralis*. No mangroves are listed under the Mauritius *Forests and Reserves Act 41 of 1983*.

⁹⁴ See, eg, *Proclamation to Declare the Lafayette Fishing Reserve as a Marine Protected Area and to Designate It as a Fishing Reserve* (No 26 of 2000) <<http://extwprlegs1.fao.org/docs/pdf/mat160783.pdf>>, and *Proclamation to Declare the Trou d'Eau Douce Reserve as a Marine Protected Area and to Designate It as a Fishing Reserve* (No 27 of 2000) <<http://extwprlegs1.fao.org/docs/pdf/mat160791.pdf>>.

⁹⁵ *Fishing and Marine Resources Act 2007* (Mauritius) s 69(2).

⁹⁶ *Forest Decree 1992* (Fiji); *Forestry Act 1991* (PNG); *Forestry Management Act 2011* (Samoa); *Forests Act 1999* (Solomon Islands); *Forests Act 1961* (Tonga); *Forestry Act 2001* (Vanuatu).

⁹⁷ *Forestry Management Act 2011* (Samoa) pt III.

⁹⁸ *Forests and Reserves Act 1983* (Mauritius); *Forest Reserve Act 1955* (Seychelles); *Breadfruit and Other Trees (Protection) Act 1917* (Seychelles).

Forestry laws continue to develop, with Fiji, for example, preparing a new *Forest Bill 2016*, although it has not yet been enacted.⁹⁹ This law would require the classification of forests to include ‘protection forests’ specifically defined as able to include mangrove forests.¹⁰⁰ While there is no Pacific law that specifically targets mangrove forests, other species have received such attention. For example, the *Tongan Sandalwood Regulations 2016* provide species protection for a specific forestry resource under the *Forests Act 1961*. Mangroves could benefit from similar specific regulations, particularly where they are identified as a species at risk due to pre-existing degradation, harvesting for local use, pollution and cumulative impacts from adjacent coastal development.

B *Protected Area Laws*

Standalone area-based or protected area legislation exists throughout the Indo-Pacific, although not in all jurisdictions.¹⁰¹ A simple example is the *Samoa National Parks and Reserves Act 1974*, which provides for the establishment of national parks and reserves, their conservation and preservation, and subsidiary acts to carry out the law.

The location of mangroves in the coastal zone also has the potential to create areas that are protected under different Acts. For example, the *National Parks Act 1954* of the Solomon Islands provides land-based protection, while s 19 of the *Fisheries Management Act 2015* allows the designation of a marine protected area. If mangroves were designated under both Acts, this could result in a perverse situation where differing rules would apply on land and in water in the coastal zone. This highlights the importance of having one coordinating agency or authority. The Fijian National Trust, established under the *National Trust for Fiji Act 2000*, is an example of an entity in a position to exercise this role.

Some mangrove areas are specifically protected under area-based laws. For example, Timor Leste includes in its *Regulation No 2000/19 on Protected Places* a provision declaring that wetlands and mangrove areas are protected in East Timor and prohibits pollution, draining, destruction, cutting, damaging or removing mangroves. In Seychelles, mangroves are protected by the *Port Launay Marine*

⁹⁹ *Forest Bill 2016* (Fiji) <<http://www.parliament.gov.fj/wp-content/uploads/2017/03/Bill-No-13-Forest.pdf>>.

¹⁰⁰ *Ibid* cl 13(1).

¹⁰¹ See, eg, *Palau National Marine Sanctuary Act 2015* (Palau); *National Parks and Reserves Act 1974* (Samoa); *Protected Areas Act 2010* (Solomon Islands); *National Parks Act 1954* (Solomon Islands); *Parks and Reserves Act 1977* (Tonga); *National Parks Act 1993* (Vanuatu); *Loi No 2015-005 portant Refonte du Code de Gestion des Aires Protégées* (Madagascar); *Environmental Protection and Preservation Act 1993* (Maldives); *Native Terrestrial Biodiversity and National Parks Act 2015* (Mauritius); *National Parks and Nature Conservancy Act 1969* (Seychelles).

National Park Regulations 1981, which are made under the *National Parks and Nature Conservancy Act 1969*. Yet in Mauritius, as noted above, mangroves benefit from fishery reserves under the *Fishing and Marine Resources Act 2007*. This again creates the potential for confusion among multiple laws. It is possible that the coastlines of these marine reserves could be protected by nature reserves under the *Forests and Reserves Act 1983*. The *Mauritian Native Terrestrial Biodiversity and National Parks Act 2015* provides for the declaration of national parks or special reserves on state-owned land, as well as private conservation areas on private land. The Ile d'Ambre site, for example, contains mangroves areas and is listed as an open reserve.¹⁰² The Act deals somewhat with the issue of overlapping legislation by creating an authority with the potential to coordinate protected areas made under different legislation.

C *Planning and Environment Laws*

Basic Pacific environment and planning laws often have limited pollution protection mandates, such as litter and environmental levies.¹⁰³ However, later instruments tend to be more sophisticated and comprehensive. For example, s 2 of the *Vanuatu Pollution Control Act 2013* incorporates the precautionary principle, which facilitates broader environmental protection. There are also several examples of detailed environmental management legislation in the Pacific.¹⁰⁴ In the *FSM Environmental Protection Act 1980* a principles-based approach, including sustainable development, is used to guide government decision-making. The *Environmental Impact Assessment Regulations 1996* provide more detailed instruction on the content of these assessments. Fiji has the most specific provisions in this regard, requiring that any development that could 'alter ... mangrove areas', 'harm or destroy designated or proposed protected areas including ... mangrove conservation areas', or 'destroy or damage ... mangrove swamp' require the approval of the Environmental Impact Assessment Administrator.¹⁰⁵

¹⁰² *Native Terrestrial Biodiversity and National Parks Act 2015* (Mauritius), sch 1, pt II.

¹⁰³ *Environmental Levy Act 2015* (Fiji); *Litter Promulgation 2008* (FSM); *Solid Waste Management Regulations 1996* (Palau); *Environment Contaminants Act 1978* (PNG); *Waste Management Act 2010* (Samoa); *Waste Management Act 2005* (Tonga); *Garbage Act 1970* (Tonga); *Pollution Control Act 2013* (Vanuatu).

¹⁰⁴ *Environmental Management Act 2005* (Fiji); *Environmental Quality Protection Act* (Palau); *Environment Act 2000* (PNG); *Environmental Planning Act 1978* (PNG); *Land, Surveys and Environment Act 1989* (Samoa); *Environment Act 1998* (Solomon Islands); *Environment Management Act 2010* (Tonga); *Environmental Management and Conservation Act 2002* (Vanuatu).

¹⁰⁵ *Environment Management Act 2005* (Fiji) sch 2, pt 1(j), (n) and (o), respectively. See also *Environmental Management (EIA Process) Regulations 2007*.

All Indian Ocean island states have environmental management laws.¹⁰⁶ The Mauritian *Environmental Protection Act 2002* includes sustainable development as a core principle,¹⁰⁷ which aligns with its related *Planning and Development Act 2004*.¹⁰⁸ The Act provides for prospective planning and approvals to ensure that environmental resources and areas do not become degraded. The requirements include balancing economic development and environmental conservation, exemplifying sustainable development, and going beyond a simplistic approach to refer to ‘society’, ‘people’ and ‘culture’. The Act, therefore, provides a foundation for decision-making that could take into account all the natural and cultural ecosystem values of mangroves. As in the Pacific, mangroves should benefit from such decision-making processes associated with approval of nearby development projects. This is advanced environmental management legislation, and provides a potential example for other countries to follow.

D *Biodiversity and Conservation Law*

Every Indo-Pacific island country has a national biodiversity and strategy action plan provided for under the CBD framework,¹⁰⁹ with the general content not differing significantly. Mangroves feature in all of these plans, and extensive references appear in some.¹¹⁰ While these National Biodiversity Strategies and Action Plans have been driven by ratification of the CBD, other catalysts exist for legislation. For example, the *Native Terrestrial Biodiversity and National Parks Act 2015* of Mauritius is an instance of an Act using the term ‘biodiversity’ in a purely environmental conservation context and not pursuant to the CBD. There are no

¹⁰⁶ *Décret No 99-954 modifié par le Décret No 2004-167 relatif à la Mise en Compatibilité des Investissements avec l'Environnement* (Madagascar); *Environmental Protection and Preservation Act 1993* (Maldives); *Environmental Protection Act 2002* (Mauritius); *Planning and Development Act 2004* (Mauritius); *Environmental Protection Act 1994* (Seychelles).

¹⁰⁷ *Environmental Protection Act 2002* (Mauritius) preamble.

¹⁰⁸ *Planning and Development Act 2004* (Mauritius) s 3(a)(iv).

¹⁰⁹ Government of Fiji, *Biodiversity Strategy and Action Plan* (2003); Government of the Federated States of Micronesia, *National Biodiversity Strategy and Action Plan* (2002); Republic of Palau, *National Biodiversity Strategy and Action Plan* (2005); Government of Papua New Guinea, *National Biodiversity Strategy and Action Plan* (2007); Ministry of Natural Resources and Environment of Samoa, *National Biodiversity Strategy and Action Plan 2015-2020* (undated); Ministry of Environment, Climate Change, Disaster Management and Meteorology of the Solomon Islands, *National Biodiversity Strategic Action Plan 2016-2020* (2016); Department of Environment of the Kingdom of Tonga, *National Biodiversity Strategy and Action Plan* (2006); Environment Unit of the Government of Vanuatu, *National Biodiversity Strategy and Action Plan Project* (1999); Ministry of Environment and Energy of Maldives, *National Biodiversity Strategy and Action Plan* (2015); Government of the Seychelles, *National Biodiversity Strategy and Action Plan 2015-2020* (2014); Government of Mauritius, *National Biodiversity Strategy and Action Plan* (2017).

¹¹⁰ The Palau plan refers to mangroves 70 times: Republic of Palau, *National Biodiversity Strategy and Action Plan* (2005) <<https://www.sprep.org/att/IRC/eCOPIES/Countries/Palau/53.pdf>>

Pacific island countries that have passed a biodiversity statute, but it is common for biodiversity to be addressed via a number of different laws. For example, the Samoan biodiversity policy identifies the Samoan Constitution, environmental Acts, forest and reserves Acts, the fishery Act and wildlife and biosecurity Acts as relevant to the conservation and utilisation of biodiversity.¹¹¹ Relevantly, mangroves do benefit from a variety of conservation laws. For example, in Tonga the *Birds and Fish Preservation Act 1988* specifically prohibits a person from cutting, damaging, removing or destroying any mangrove within a protected area,¹¹² and the whole of the lagoon in Tongatapu is a protected area under that law, including mangrove and foreshore areas.¹¹³

E *Climate Change Laws*

Although the majority of Indo-Pacific island states have climate change policies, rarely has this translated into legislation. Nevertheless, many of the policy documents and strategic planning instruments do refer to mangroves. In Fiji, for example, the National Climate Change Policy reinforces commitments to conserve mangroves as carbon sinks and for resilience to extreme weather events due to climate change, and also recognises that ‘conservation and sustainable management of mangroves will protect a large carbon sink and reservoir, while providing physical foreshore protection, marine breeding grounds, and healthy coral reef systems’.¹¹⁴ The Green Growth Framework also refers to the planting of mangroves as an adaptation initiative to protect against sea level rise,¹¹⁵ as well as damage caused by unsustainable exploitation of artisanal fisheries through mangrove harvesting.¹¹⁶

All of the Indo-Pacific countries explored here have signed the Paris Agreement, and this has required the preparation of NDC documents. These documents are insightful, as references to mangroves often highlight key values of national importance. For example, in Fiji’s NDC: ‘The planting of mangroves, construction of seawalls and the relocation of communities to higher grounds are part of ongoing adaptation initiatives.’¹¹⁷ Actions include strengthening the role of local governments in building resilience’, including by reviewing ‘the town

¹¹¹ Ministry of Natural Resources and Environment of Samoa, *National Biodiversity Strategy and Action Plan 2015–2020* (undated) 28–9.

¹¹² *Birds and Fish Preservation Act 1988* (Tonga) s 7(iii).

¹¹³ *Ibid* sch 3.

¹¹⁴ Government of Fiji, *National Climate Change Policy* (2012) 8.

¹¹⁵ *Ibid* 33.

¹¹⁶ *Ibid* 48.

¹¹⁷ Government of Fiji, *Fiji’s Intended Nationally Determined Contribution* (Report, 2015) 8.

plan regulations to facilitate the enforcement of zoning and buffer zones for ... mangrove areas'.¹¹⁸

Mauritius is one of the few Indo-Pacific nations that has introduced a Climate Change Bill.¹¹⁹ While such legislation is not essential, its importance is elevated where climate change is not a consideration under broader environmental instruments. Fiji, for example, has not yet enacted legislation implementing adaptation commitments, and the *Environment Management Act 2005* does not mention climate change.

F *Integrated Governance*

The references to, and dependence upon, multiple pieces of legislation illuminates the dearth of integrated coastal zone management ('ICZM') approaches in legislation. There are no specific ICZM statutes among the Indo-Pacific island countries. However, provisions for the making of ICZM plans do exist in the environmental protections legislation in Mauritius and Seychelles.¹²⁰ Under s 51(3) of the *Mauritian Environmental Protection Act 2002*, these plans 'shall be used for coastal zone planning, management and development', although it seems that the primary goal is still 'the preservation and conservation of the environment of the zone' per s 51(2)(a).¹²¹ In the Pacific, some policies have sought to address multiple issues in an integrated way, but these have not translated into legislation, nor do they focus specifically on mangroves.¹²² There are, however, some issue-specific holistic policies, such as the *Tonga Climate Change policy*¹²³ and the *Vanuatu National Sustainable Development Plan*, but again

¹¹⁸ Ibid 9.

¹¹⁹ UNDP, *A Climate Promise: Mauritius' Response to Climate Change* (Report, 2020) <https://www.mu.undp.org/content/mauritius_and_seychelles/en/home/news-centre/news/a-climate-promise---mauritius-response-to-climate-change-.html>.

¹²⁰ An integrated coastal zone management framework and study, which includes mangroves, was reported in Mauritius's *Fifth National Report to the CBD: Mauritius, Fifth National Report to the Convention on Biological Diversity* (Report, 2015): <<https://www.cbd.int/doc/world/mu/mu-nr-05-en.pdf>> 76.

¹²¹ The *Environmental Protection Act 1994* of the Seychelles makes similar provision in s 11.

¹²² For example, the Green Growth Framework for Fiji. Key thematic areas include climate change resilience, waste management, sustainable resources, social development, food security, energy security, sustainable transportation, and technology and innovation. See also Solomon Islands Government, *National Development Strategy 2016–2035* (2016), and Government of Samoa, *Strategy for the Development of Samoa 2016/17–2019/20* (2016) 14.

¹²³ Department of Climate Change, Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications, *Tonga Climate Change Policy: A Resilient Tonga by 2035* (2016). See also Government of Tonga, *Tonga Strategic Development Framework 2015–2025* (2015).

these do not address mangroves.¹²⁴ In the Indian Ocean, ICZM can be seen through initiatives such as the *Arusha Resolution on Integrated Coastal Zone Management in Eastern Africa including Island States* in 1993,¹²⁵ the 1996 *Seychelles Second Policy Conference on Integrated Coastal Zone Management in Eastern African and Island States*, and the 1998 *Maputo Declaration from the Pan-African Conference on Sustainable Integrated Coastal Management*.¹²⁶ It is not clear that these developments have had any effect on mangroves. The Maldivian *Seventh National Development Plan* is one of the only examples of an integrated policy,¹²⁷ but it makes no reference to mangroves.

More broadly, it is argued that integrated governance is critical to the holistic conservation and management of mangroves. Where laws create a patchwork of protection that differs slightly from instrument to instrument, confusion, gaps and challenges can arise. This fragmentation is not necessarily a problem if coordination exists between government entities administering the laws, and if policies and guidelines explain why certain areas are classified under one Act but not another. Institutional fragmentation is also evident in all jurisdictions. In Fiji, for example, multiple agencies have responsibility for mangroves. The Ministry of Lands and Mineral Resources manages state-owned land, including the foreshore and intertidal zones; the Ministry of Forests declares forest reserves and licences extraction of timber; the Ministry of Local Government, Housing, Environment, Infrastructure and Transport implements the *Environment Management Act 2005* and decides on coastal development proposals; and the Ministry of Fisheries administers the *Fisheries Act 1942*. In addition, other key bodies include the National Environment Council, Fiji National Biodiversity Strategy and Action Plan Steering Committee, Protected Areas Committee, Integrated Coastal Management Committee, and Mangrove Management Committee.¹²⁸ Similarly, in Mauritius, the Ministry of Social Security, National Solidarity and Environment and Sustainable Development is the focal ministry for international commitments, and includes the Environment Department, with Divisions such as Integrated Coastal Zone Management, Climate Change, Environmental Law and Prosecution, Pollution Prevention and Control,

¹²⁴ Department of Strategic Policy, Planning and Aid Coordination of the Republic of Vanuatu, *Vanuatu 2030: The People's Plan* (2016).

¹²⁵ Mauritius, Mozambique, Madagascar, the Seychelles, Tanzania and, later, Kenya were signatories of the Arusha Resolution. See L Celliers et al, 'Pathways of Integrated Coastal Management from National Policy to Local Implementation: Enabling Climate Change Adaption' (2013) 39(C) *Marine Policy* 72, 73.

¹²⁶ *Ibid.*

¹²⁷ Government of Maldives, *Seventh National Development Plan 2006–2010: Creating New Opportunities* (2007).

¹²⁸ Mangrove Ecosystems for Climate Change Adaptation and Livelihoods, *Review of Policy and Legislation Relating to the Use and Management of Mangroves in Fiji* (Undated Report) iv.

Sustainable Development and Environmental Assessment.¹²⁹ Other relevant Ministries include the Ministry of Agro Industry and Food Security, and the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping.¹³⁰ At one level, the *Native Terrestrial Biodiversity and National Parks Act 2015* deals with the issue of overlapping legislation by creating a Council with representation across key Ministries. The legislation does not, however, give the Council overarching authority covering all legislation under which a protected area might be declared.¹³¹ In the absence of integrated legislation, or one overarching agency being given responsibility for mangrove governance, ways and means must be found to harmonise powers for efficient and effective administration.

V ADVANCING MANGROVE LAWS IN THE INDO-PACIFIC

The above analysis demonstrates that the legal treatment of mangroves in Indo-Pacific island states varies from limited legal consideration that provides linear protection, to more comprehensive governance. It is clear that mangroves are rarely governed specifically or holistically as species or ecosystems, but most states have some laws and policies addressing different issues or uses. Mangroves are, or could be, considered under existing protected area or national parks legislation, as well as through fisheries and forestry regulations that provide for the declaration of reserves. Mauritius provides a good example of a fisheries approach, with Palau and Timor Leste favouring a protected area mechanism. Similarly, wildlife, biodiversity or threatened flora laws could be used to protect mangroves on a species basis, as Seychelles have done in listing a mangrove under its tree laws. The advantage of such approaches is that specific ecosystem services could be identified, providing an opportunity for both mangrove protection and public awareness raising. Clearly, land use planning laws have a critical role to play in preventing developmental impacts, but by themselves they cannot ensure the health of mangroves. In some circumstances, it may be appropriate for particular legal frameworks to respond to acute pressures on mangrove resources, but they do not provide a holistic governance framework, and indeed perverse outcomes could result where mangroves are protected under one statute but are impacted upon by activities in unrelated or weakly regulated areas. Greater integration would ensure that multiple values and cumulative impacts are also addressed.

¹²⁹ See <<http://environment.govmu.org/English/AboutUs/Pages/Mission-and-Vision-Statement.aspx>>.

¹³⁰ See <<http://oceanconomy.govmu.org/English/Pages/default.aspx>>.

¹³¹ *Native Terrestrial Biodiversity and National Parks Act 2015* (Mauritius) s 5.

As with legislation, few states have developed focused mangrove policies, but there are examples of mangroves receiving targeted attention. Mauritius provides a useful case study in this respect. The country has a number of policies that provide general recognition of the value of mangroves and that action must be taken to conserve and manage them.¹³² The *Advances in Cross-Sectoral Mainstreaming of Biodiversity in Mauritius* report, for example, identifies 169 hectares of mangrove wetlands as environmentally sensitive areas intended to be the focus of a project to mainstream biodiversity into the management of the coastal zone.¹³³ The *Ecosystem-Based Adaptation Strategies for a Resilient Mauritian Protected Area Network* report notes the importance of mangroves for freshwater resources as key habitats for many species, including fish, and for shoreline protection; the impacts of clearing mangroves are also acknowledged.¹³⁴ The need for ecosystem-based adaptation is emphasised in Mauritius, including restoring mangroves for coastal and lagoon protection.¹³⁵ This is particularly important, as climate change has been recognised as impacting on mangrove areas in terms of sea level rise, acidification, extreme weather events, invasive species and anthropogenic pressures.¹³⁶

From a legal perspective, Mauritius has acknowledged that weak governance is an issue.¹³⁷ To date, the Indian Ocean states have not benefited from the same level of legal analysis as their Pacific counterparts. In Fiji, as well as Solomon Islands, Vanuatu, Tonga and Samoa, the MESCAL project has mapped the mangrove law and policy landscape.¹³⁸ The reports resulting from this project provide critically important information on mangrove governance, and the mapping exercise undertaken is a necessary first step to improving the law. In Fiji, recommendations were made for reform, and the project led to a new draft

¹³² See, eg, Government of Mauritius, *National Forestry Policy* (2006), and the more recent Government of Mauritius, *Strategic Plan (2016–2020) for the Food Crop, Livestock and Forestry Sectors* (2016).

¹³³ Government of Mauritius, Ministry of Agro-Industry and Food Security, *Advances in Cross-Sectoral Mainstreaming of Biodiversity in Mauritius* (Study Document, 2017) 39.

¹³⁴ Government of Mauritius, Ministry of Agro-Industry and Food Security, *Ecosystem-Based Adaptation Strategies for a Resilient Mauritian Protected Area Network* (Report, 2017) 9.

¹³⁵ Government of Mauritius, *National Biodiversity Strategy and Action Plan 2017–2025* (2017) vi.

¹³⁶ *Ibid* 4.

¹³⁷ *Ibid* 34 and 108.

¹³⁸ Mangrove Ecosystems for Climate Change Adaptation and Livelihoods, *Review of Policy and Legislation Relating to the Use and Management of Mangroves in Fiji* (Undated Report); Mangrove Ecosystems for Climate Change Adaptation and Livelihoods, *Review of Policy and Legislation Relating to the Use and Management of Mangroves in the Solomon Islands* (Undated Report); Mangrove Ecosystems for Climate Change Adaptation and Livelihoods, *Review of Policy and Legislation Relating to the Use and Management of Mangrove Ecosystems in Vanuatu* (Undated Report); Mangrove Ecosystems for Climate Change Adaptation and Livelihoods, *Review of Policy and Legislation Relating to the Use and Management of Mangrove Ecosystems in Tonga* (Undated Report); and Mangrove Ecosystems for Climate Change Adaptation and Livelihoods, *Review of Policy and Legislation Relating to the Use and Management of Mangrove Ecosystems in Samoa* (Undated Report).

Mangrove Management Plan. For any state wishing to advance mangrove governance, a focused strategy or action plan is essential to provide tailored protection, management and restoration measures. The *Mangrove Management Plan* acknowledges failings of the past and seeks to learn lessons from them.¹³⁹ The Plan is comprehensive, recognising high impact areas and activities, fishing, fuelwood and reclamation issues, and emphasising the use of environmental impact assessment processes and zonal plans to address development pressure.¹⁴⁰ This emphasis is appropriate given the specific reference to mangroves in the *Fijian Environmental Management (EIA Process) Regulations 2007*, discussed above, and demonstrates sound use of existing legislative mechanisms.¹⁴¹

In order to advance mangrove governance, states should adopt policies that specifically refer to mangroves. As a first step this could involve mangroves being considered in existing fisheries, forestry, wildlife and biodiversity policies. These policies would take into account the ecosystem services provided by mangroves as nursery grounds, timber resources, cultural assets and threatened or endangered species status. Increasingly, and in part driven by the *Paris Agreement*, the coastal protection and blue carbon role that mangroves play may be captured under NDCs. The next step in policy development would involve a targeted mangrove policy that takes into account all the ecosystem services they provide, their conservation and sustainable use (both natural and cultural) and research, education and capacity-building needs. A mangrove policy or plan, such as that in Fiji, would be a solid foundation to move forward, but in order to genuinely advance mangrove conservation, management and restoration, a tailored piece of legislation would be optimal. Madagascar is one of the few jurisdictions with such a law — a quasi-legal *décret* that establishes an entity specifically to deal with the management of mangrove habitats.¹⁴² Yet there are examples of species-based laws to draw upon, such as the Tongan Sandalwood Regulations. These are not, however, comprehensive and tend to focus on single issues, such as extraction or conservation. A tailored mangrove law could address all of the ecosystem goods and services that mangroves provide (including the

¹³⁹ National Mangrove Management Committee, *Mangrove Management Plan for Fiji* (2013) 9–11 (*'Mangrove Management Plan for Fiji'*). Although theoretically all mangroves in Fiji were declared to be forest reserve in 1933, this did not prevent mangrove loss: Working Group on Mangrove Ecosystems of the Commission on Ecology, United Nations Environment Programme and World Wildlife Fund, *Global Status of Mangrove Ecosystems* (International Union for the Conservation of Nature and Natural Resources, 1983) 66.

¹⁴⁰ *Mangrove Management Plan for Fiji* (n 142) 3–5.

¹⁴¹ Although, it has been noted that the Environmental Impact Assessment process does not appear to have had any positive impact on mangroves or ensured environmental outcomes to date: *Mangrove Management Plan for Fiji* (n 142) 16.

¹⁴² *Décret No 2015-629 portant Création d'une Commission Nationale de Gestion Intégrée des Mangroves* (Madagascar).

forest resources, fish habitat, coastal protection and blue carbon roles), protect individual species and areas at risk, provide for the conservation and management of existing mangroves and their restoration where needed, ensure that activities with impacts on mangroves are considered in planning and development decisions, and acknowledge cultural values and uses. Such an approach would be comprehensive, but may be unrealistic in the context of the Indo-Pacific states. In the absence of such a Mangrove Act, there is a need to enhance existing laws to provide better integrated governance, as noted above. This could be achieved by, for example, granting power to one overarching institution to administer laws related to mangroves, and/or harmonising rules across various pieces of legislation. While possible in theory, integrated governance has proved challenging to achieve in many contexts.¹⁴³

Two further approaches that could be taken are highlighted below. First, a wetlands law could be adopted recognising mangrove habitats and ecosystem services.¹⁴⁴ This approach squarely favours environmental considerations, but could also incorporate socio-cultural values of wetlands. Jamaica, for example, developed a Mangrove and Coastal Wetlands Protection Draft Policy and Regulation that sought to take this approach and may provide useful insights.¹⁴⁵ Secondly, advances could be made through climate legislation. All states appear likely to advance climate laws, driven in part by *Paris Agreement* commitments, and also as mitigation and adaptation become critical. Therefore, this may be one fruitful avenue for development of mangrove-related laws. Although such an approach would favour the ecosystem services mangroves provide, in terms of coastal protection and carbon sequestration, species and area-based measures could also be included. Mauritius has drafted both a Climate Change Bill and a Wetlands Bill.¹⁴⁶ However, Mauritius has also developed draft legislation that seeks to provide more holistic governance through a dedicated statute focused on ecologically sensitive areas.¹⁴⁷ This draft law takes a combined area-based and ecosystem services approach, and it is one of the few laws in the region that incorporates payments for ecosystem services, although it remains in draft form.¹⁴⁸ This example highlights the diversity of legal options and developments

¹⁴³ UNEP, *Integrated Governance: A New Model of Governance for Sustainability* (2014) <https://www.unepfi.org/fileadmin/documents/UNEPFI_IntegratedGovernance.pdf>.

¹⁴⁴ See Hamman and Jungblut (n 30). See also the analysis of wetlands governance in Joanna C Ellison, 'Wetlands of the Pacific Island Region' (2009) 17(3) *Wetlands Ecology Management* 169.

¹⁴⁵ Natural Resource Conservation Authority and USAid, *Mangrove and Coastal Wetlands Protection Draft Policy and Regulation* (1997) <https://www.nepa.gov.jm/symposia_03/policies/mangrove&wetlandsprotectionpolicy.pdf>.

¹⁴⁶ See Republic of Mauritius, 'Wetlands Bill in Preparation, Announces Agro Minister' (February 6, 2020) <<http://www.govmu.org/English/News/Pages/Wetland-Bill-in-preparation,-announces-Agro-Minister.aspx>>.

¹⁴⁷ See the draft bill for the *Environmentally Sensitive Areas Conservation and Management Act* (2009).

¹⁴⁸ *Ibid*, pt V.

evident in the Indo-Pacific region, and demonstrates the value of continued research across the Indo-Pacific.

VI CONCLUDING REMARKS

Mangroves play critical environmental, social and economic roles in Indo-Pacific island countries, and this is reflected in their legal treatment. Several states have drawn attention to, and conserved, mangrove areas using international law. However, as with all international law, its effectiveness will depend largely upon domestic implementation, compliance and enforcement efforts. The recent disastrous oil spill in Mauritius, directly impacting on the protected Pointe D'Esny Ramsar mangrove wetlands, draws sharply into focus the need for vigilant and responsive governance, even where the highest levels of legal protection are in place.¹⁴⁹ This highlights the importance of domestic legal frameworks, which vary greatly between jurisdictions, as noted above. These differences reflect both the range of ecosystem services that mangroves provide and the priorities of the various states. No Indo-Pacific state currently has a holistic, comprehensive and cohesive framework for mangroves that recognises their multiple values and ecosystem services. Mangroves are complex ecosystems providing multiple services, and are found at the land-water interface. This context highlights the need for tailored governance frameworks, yet it does not appear that any Indo-Pacific island nation is developing draft mangrove law. Nevertheless, the Fijian *Mangrove Management Plan*, and the draft Mauritian wetland and climate change Bills, point to positive future legislative developments.

Further legal research is clearly needed to improve mangrove governance in the Indo-Pacific. In the Pacific, states not covered by the MESCAL project would benefit from law and policy analyses. For example, Palau and the FSM both have significant mangrove areas and complex governance frameworks requiring further analysis, and Timor Leste is another valuable jurisdiction to explore in terms of mangroves governance. As noted above, this article has focused on formal governance through state-based laws and institutions, yet customary law and traditional institutions can play an important role in mangrove stewardship. Greater understanding of informal governance mechanisms is essential, as well as how they may enhance mangrove conservation and management.¹⁵⁰ Further

¹⁴⁹ Adam Moolna, 'Mauritius is Reeling from a Spreading Oil Spill — and People are Angry with How the Government has Handled It', *The Conversation* (12 August 2020) <<https://theconversation.com/mauritius-is-reeling-from-a-spreading-oil-spill-and-people-are-angry-with-how-the-government-has-handled-it-144288>>.

¹⁵⁰ Several useful examples exist of ways in which to strengthen community-based governance. In Vanuatu, for example, the *Environment Protection and Conservation Act 2002* allows for the formal declaration, and legal recognition, of community conserved areas. See Erika J Techera, 'Protected Area Management in Vanuatu' (2005) 2(2) *Macquarie Journal of International and Comparative Environmental Law* 107.

research is also needed to better understand subsistence and artisanal uses of mangroves more broadly. Finally, detailed empirical research is vital to assess the effectiveness of the laws explored above, including their implementation, compliance and enforcement.

This article has explored and analysed the legal efforts that Indo-Pacific island countries have made to conserve, manage and restore mangroves. Although specific legal mechanisms are not automatically transferable to other jurisdictions, collating the legal options and approaches can help to build legal capacity in other island nations. In circumstances where resources are limited, but there is some impetus to conserve and manage mangroves, the analysis can assist states to strengthen their laws and improve mangrove governance. This article makes a small contribution to the literature in this field, and a further step forward in the legal protection of mangroves in the Indo-Pacific region.

