
INTERNATIONAL FRAMEWORKS AND NATIONAL POLICIES FOR BIODIVERSITY CONSERVATION AND FISHERIES MANAGEMENT: A COMPREHENSIVE REVIEW

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ABSTRACT

International and national conventions aimed at biodiversity conservation, emphasizing their frameworks, objectives, and implementation challenges. The Convention on Biological Diversity (CBD) is highlighted as a pivotal element of global biodiversity policy and other key international treaties are CITES, the Ramsar Convention, the Convention on Migratory Species, the International Convention for the Regulation of Whaling, and UNCLOS, illustrating their collective influence on species conservation and resource management. It further explores national legislation, such as India's Biological Diversity Act and the U.S. Endangered Species Act, alongside various regional fisheries management organizations and biodiversity authorities, fisheries-specific acts and the importance of institutional frameworks in promoting sustainable use, habitat protection, and equitable access to biological resources. Despite significant advancements, challenges such as habitat loss, overexploitation, inadequate funding, and climate change threaten biodiversity and fisheries sustainability. The review advocates for integrated, collaborative governance approaches address to emerging threats and promote biodiversity resilience.

Keywords: CBD, CITES, Ramsar Convention, CMS, ICRW, UNCLOS, National legislation, Biodiversity authorities

INTRODUCTION

International and national conventions focused on biodiversity conservation, emphasizing their frameworks, objectives, and implementation challenges. The Convention on Biological Diversity (CBD) serves as a cornerstone for global biodiversity policy, promoting sustainable development through ecosystem conservation, sustainable use of resources, and equitable benefit-sharing (CBD, 2010). The significant role of various protocols under the CBD, including the Cartagena Protocol on Biosafety and initiatives for addressing invasive species highlights the ongoing challenges in biodiversity loss despite international commitments, particularly in light of socio-economic pressures and inadequate resources (Jha et al., 2014).

The analysis extends to other vital treaties such as CITES, the Ramsar Convention, the Convention on Migratory Species (CMS), the International Convention for the Regulation of Whaling (ICRW), and the United Nations Convention on the Law of the Sea (UNCLOS), illustrating their collective impact on species conservation and sustainable resource management (UNEP, 1971; Ramsar Convention Secretariat, 2012; CMS, 1979; ICRW, 1946; UNCLOS, 1982). National legislation, including India's Biological Diversity Act and the U.S. Endangered Species Act, emphasizing their role in implementing international principles at local levels (Government of India, 2002; U.S. Fish and Wildlife Service, 1973). The interconnection between these conventions and national frameworks underscores the necessity for cooperative governance and integrated approaches to address the multifaceted challenges of biodiversity conservation and fisheries management, particularly in light of emerging threats such as climate change and habitat degradation (CBD, 2010; FAO, 2019; UNFCCC, 1992).

At the national level, countries implement Biodiversity Acts, which often establish Biodiversity Authorities or Boards to oversee conservation efforts. For instance, India's Biological Diversity Act of 2002 created the National Biodiversity Authority (NBA) and State Biodiversity Boards (SBBs) to facilitate the conservation and sustainable use of biological diversity (Cite SeerX, 2002). These legal frameworks are crucial for addressing biodiversity loss. They provide a structured approach to managing biodiversity, integrating environmental, economic, and social considerations. These frameworks include international conventions and national legislation that establish guidelines and responsibilities for biodiversity management.

INTERNATIONAL CONVENTIONS AND THEIR OBJECTIVES

- 1. Convention on Biological Diversity (CBD):** Adopted during the Earth Summit in Rio de Janeiro in 22/May/1992 and officially entered into force on December 29, 1993, and has since become a central framework for global biodiversity policy. The CBD is a key international treaty emerged from growing concerns over the rapid loss of biodiversity driven by human activities such as deforestation, pollution, climate change, and overexploitation of resources aimed at promoting sustainable development through biodiversity conservation and provides a framework for countries to develop national strategies for the conservation and sustainable use of biodiversity, including fisheries and aquatic habitats. The CBD is ratified by 196 countries, highlighting its global significance. The Convention also established subsidiary bodies, such as the Subsidiary Body on Scientific, Technical, and Technological Advice (SBSTTA). However, challenges persist. Global assessments, such as the 2019 Global Biodiversity Outlook, reveal that biodiversity loss continues at an alarming rate. Factors hindering progress include inadequate financial resources, insufficient political will, and socio-economic pressures (CBD, 2019). The CBD's most recent strategic plan, the 2011-2020 Strategic Plan and associated Aichi Biodiversity Targets, set ambitious goals for biodiversity conservation. The successor framework, the Post-2020 Global Biodiversity Framework, is under negotiation to address emerging challenges and restore biodiversity (CBD, 2021).

The Convention articulates three primary objectives:

- 1. Conservation of Biological Diversity:** To promote measures necessary for the conservation of biological diversity across all ecosystems, habitats, and species.
- 2. Sustainable Use of Components:** To ensure that the utilization of biological resources is sustainable, preventing overexploitation and habitat degradation.
- 3. Fair and Equitable Sharing of Benefits:** To recognize and promote fair distribution of benefits arising from the utilization of genetic resources, including traditional knowledge and innovations of indigenous peoples and local communities (UNEP, 1992).

The CBD's framework encompasses a range of targets, protocols, and program activities:

- **National Biodiversity Strategies and Action Plans (NBSAPs):** Parties commit to

developing and implementing integrated policies. Since its inception, the CBD has led to significant policy developments and national commitments to conserve biodiversity. Numerous countries have developed NBSAPs, established protected areas, and legislated against harmful practices (CBD, 2010).

- **Protected Areas:** Establishment and management of national parks, reserves, and other protected areas.
- **Access and Benefit-Sharing (ABS):** Regulates the use of genetic resources and associated traditional knowledge, ensuring community benefits (UNCBD, 2011).
- **Invasive Species Control:** Addressing threats from non-native species.
- **Cartagena Protocol on Biosafety:** This protocol, which is part of the CBD, addresses the safe transfer, handling, and use of living modified organisms (LMOs) resulting from modern biotechnology. It aims to protect biological diversity from potential risks posed by LMOs.

Implementation and Challenges

Implementation relies heavily on national governments, with efforts supported by international cooperation, NGOs, indigenous peoples, and local communities. The Global Biodiversity Outlook (GBO) reports monitor progress, revealing that most targets under the Aichi Biodiversity Targets, adopted in 2010 during the CBD's tenth Conference of the Parties (COP10), were not fully met by the 2020 deadline (CBD, 2020). Challenges include:

- Insufficient funding and political will.
- Loss of habitats and species.
- Unsustainable land-use practices.
- Inadequate integration of biodiversity considerations into economic policies.

Emerging threats like climate change and pandemics further exacerbate biodiversity loss, demanding adaptive and holistic strategies (Secretariat of the CBD, 2020).

Case Study: The Amazon Rainforest

The Amazon rainforest, home to an estimated 10% of the world's species, exemplifies both the conservation challenges and opportunities articulated by the CBD. Deforestation, driven by agriculture and logging, threatens this biodiversity hotspot. CBD initiatives advocate for sustainable land-use practices, Indigenous rights, and protected areas to balance ecological health with economic needs (Fearnside, 2019).

- 2. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES):** CITES regulates international trade in endangered species, including certain fish and aquatic species. Aims to ensure that international trade does not threaten the survival of species in the wild. Provides a framework for the sustainable management of fish stocks that are at risk. Adopted on March 3, 1973, and entering into force on July 1, 1975, CITES aims to regulate and monitor global trade, thereby conserving biodiversity and safeguarding species from overexploitation due to international commerce (CITES, 2024).

During the 1900s, increasing concern about the rapid decline of different species due to illegal and unstable trade inspired the need for an international legal framework. Many species, especially they, encountered appreciated, serious threats to their economic and aesthetic value - from ivory and rhino to foreign wood and medicinal plants. The main principle of CITES is that international cooperation and regulation are necessary for effective protection, especially given that many species are led to national boundaries before they reach consumers (Mace, 2014). The conference is run on a system of permits and certificates, which controls imports, exports and re-export of listed species (CITES, 2024). The decision-making authority rests on the parties' (COP) conference, from time to time to review the construction and enforcement measures of the species (Schneider and Tisdale, 2001). Recent efforts focus on capacity building, DNA analysis such as technological development and public awareness campaigns (Hawkley and Nilson, 2017).

CITES aims to Ensure that international trade in specimens of wild animals and plants is legal, sustainable, and traceable and Conserve species by regulating and restricting trade based on their conservation status. Promote cooperation among governments, environmental organizations, industry, and local communities.

CITES has three Appendices, each representing different levels of protection:

- Appendix I: Contains species threatened with extinction that are banned from international trade except under exceptional circumstances, such as captive breeding.
- Appendix II: Includes species not necessarily threatened with extinction but may become so if trade is not regulated; trade requires permits.
- Appendix III: Covers species protected within a particular country that needs cooperation to prevent illegal trade.

3. The Ramsar Convention: The Ramsar Convention on Wetlands, officially known as a convention on the wetlands of international importance, is one of the oldest global treaties aimed at the purpose of environmental protection, especially as a waterfall. On February 2, 1971, the Iranian city of Ramsar was adopted, the conference came into force on December 21, 1975. It emphasizes the importance of the wetlands - an important ecosystem that provides many ecological, economic and cultural benefits and promotes permanent governance to ensure their conservation for future generations.

The Ramsar Convention appeared during the early environmental movement when the international community recognized immediate need to protect the wetland ecosystems. In the 1960s and early 1970s, the decline in wetlands increased due to drainage for agriculture, urban development and pollution. Convention was inspired by the belief that the wetlands cover about 6% of the Earth's surface and migratory fasses and other biodiversity (Barbier et al., 2011).

The primary goal of the Ramsar Convention is the conservation and sensible use of wetlands through country wide action and global cooperation, as articulated in Article 3.1 of the treaty. The Convention emphasizes the importance of sustainable use, ensuring that the ecological character of wetlands is maintained over time (Ramsar Secretariat, 2016). Countries decide to figuring out and defensive wetlands which are ecologically sizeable and global Importance (Ramsar Sites) and Ensuring that the ecological features of wetlands are maintained whilst taking into consideration sustainable utilization and Facilitating cross-border management, mainly for transboundary wetlands, migratory species, and shared water assets.

Each contracting country establishes a National Wetland Committee answerable for enforcing the Convention's provisions. Countries nominate wetlands as Ramsar Sites, a technique regarding clinical tests of ecological significance. As of 2023, over 2, four hundred websites

covering approximately 255 million hectares have been certain globally (Ramsar Secretariat, 2023).

4. The Convention on Migratory Species (CMS): Convention on Migratory Species (CMS), also known as the Bonn Convention, is a pivotal international treaty dedicated to the conservation and sustainable use of migratory animals and their habitats. Established in 1979 under the auspices of the United Nations Environment Programme (UNEP), the CMS aims to address the challenges faced by species that traverse international borders, ensuring coordinated and effective conservation efforts globally. The CMS was adopted on December 23, 1979, in Bonn, Germany, and entered into force on November 1, 1983. Its creation was motivated by increasing concern over the declining populations of migratory species due to habitat loss, hunting, pollution, and other anthropogenic pressures (Rabinowitz et al., 1986). Recognizing that migratory species require international cooperation, the CMS was designed to facilitate collaborative conservation measures across countries and regions. The Convention operates on principles of mutual cooperation, scientifically informed decision-making, and respect for the sovereignty of Parties (CMS, 2020).

CMS covers a broad array of migratory species, including birds, mammals, reptiles, fish, and invertebrates. The Convention has adopted specific agreements, known as Memoranda of Understanding (MoUs), to address particular taxa or regional issues. For example, the MoU concerning the Conservation of Bats in Africa and Eurasia and the MoU concerning the Conservation of Marine Turtles and Their Habitats are notable initiatives under the CMS framework.

The Convention emphasizes the importance of habitat protection, reducing threats such as illegal hunting, and mitigating habitat degradation, especially in migratory corridors, breeding and stopover sites, and wintering grounds. CMS collaborates with regional agreements and partner organizations such as the International Union for Conservation of Nature (IUCN), BirdLife International, and the Ramsar Convention (López-Hoffman et al., 2017).

The primary objectives of the CMS include:

- Ensuring the conservation of migratory species throughout their ranges.
- Promoting cooperation among States for sustainable management.

- Addressing threats to migratory species and their habitats.
- Facilitating research, monitoring, and assessment of species populations.

5. The International Convention for the Regulation of Whaling (ICRW): The International Convention for the Regulation of Whaling (ICRW), established in 1946, represents a landmark international treaty dedicated to the conservation and sustainable management of whale populations worldwide. Recognizing the commercial and ecological importance of whales, the ICRW was conceived to prevent overexploitation of whale stocks and to promote the conservation of these magnificent marine mammals through international cooperation. The convention laid the foundation for modern whale conservation efforts and led to the creation of the International Whaling Commission (IWC), the primary governing body responsible for implementing the Convention (IWC, 1946).

The ICRW established the International Whaling Commission (IWC) as its governing body, tasked with overseeing whale conservation and management. The IWC's functions include setting catch limits, issuing permits, conducting scientific research assessments, and implementing conservation measures. The IWC operates through biennial meetings where member countries negotiate policies and regulations. Notably, the ICRW recognizes the importance of scientific research and permits whaling for scientific purposes, a contentious aspect that has led to debates over actual conservation goals (Reeves et al., 2013).

Over time, the IWC has adopted various measures, including the establishment of a List of Whaling Countries, catch quotas, and conservation resolutions. In 1982, the IWC adopted the historic Moratorium on Commercial Whaling, which took effect in 1986, aiming to halt commercial whaling and allow whale populations to recover (Ponting, 2012).

In the early 20th century, whale populations faced unprecedented declines due to intensive hunting driven by the commercial demand for whale oil, meat, and other products. The lack of international regulation led to unregulated hunting, threatening the survival of many species. The devastation of whale stocks prompted scientific and conservation communities to advocate for international treaties aimed at regulating whaling activities. This culminated in the adoption of the ICRW in 1946 at the International Conference on the Regulation of Whaling held in Washington, D.C. (Laherrère, 1996). The Convention emphasizes the importance of scientific research, sustainable management practices, and cooperation among member nations to

achieve conservation goals (ICRW, 1946). Japan has continued commercial whaling under scientific research permits, leading to widespread criticism and allegations of exploiting loopholes (Reeves & Mitchell, 2008).

The primary objectives of the ICRW are:

- To provide effective international regulation of whaling to ensure the proper conservation of whale stocks.
- To establish a framework for cooperation among nations engaged in whaling and whale research.
- To promote the conservation and rational use of whale resources for economic and scientific purposes.
- To protect whale populations from overexploitation by establishing quotas and monitoring efforts.

6. United Nations Convention on the Law of the Sea (UNCLOS): Established in 1982, entering into force in 1994, UNCLOS is pivotal in defining territorial waters, exclusive economic zones, continental shelves, seabed rights, and maritime boundaries, thereby regulating a wide array of maritime activities globally (UN, 1982). UNCLOS governs the rights and responsibilities of nations in their use of the world's oceans, including the conservation of marine biodiversity. Addresses the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction. Promotes cooperation among states in managing shared fish stocks and protecting marine ecosystems. The concept of regulating oceanic affairs has roots dating back centuries; however, the modern framework began with efforts to address increasing maritime commerce, resource exploitation, and environmental concerns. The 20th century saw multiple treaties, but fragmented jurisdictions prompted the UN to initiate a comprehensive development process. This culminated in the adoption of UNCLOS at the Third UN Conference on the Law of the Sea held in Montego Bay, Jamaica, culminating in a treaty that codifies customary international law and introduces new legal principles (Tanaka, 2015). The Convention is based on key principles like freedom of navigation, equitable use of maritime resources, cooperation among states, and the responsibility to protect the marine environment (UNCLOS, 1982). Navigation and Maritime Conduct ensures the freedom of navigation and

overflight, subject to the rights of coastal states and resource Management Provides mechanisms for equitable sharing, especially regarding the management of fish stocks and seabed mineral resources. (UNCLOS, Articles 87, 90). States have a duty to prevent, reduce, and control pollution of the marine environment (UNCLOS, Part XII). Establishes procedures for resolving conflicts, including arbitration and the International Tribunal for the Law of the Sea (ITLOS) (UNCLOS, Part XV). While UNCLOS has been ratified by over 160 countries, some major maritime nations, including the United States, have not ratified it but generally follow its principles as customary law. Challenges include disputes over maritime boundaries, Environmental Degradation, Climate Change, Seabed Mining. (Kapoor et al., 2018).

UNCLOS aims to:

- Define the legal status of different maritime zones and rights therein.
- Promote the peaceful use of oceans and resolve disputes.
- Ensure the conservation and sustainable use of marine resources.
- Protect and preserve the marine environment.
- Facilitate maritime navigation, scientific research, and maritime commerce.

UNCLOS delineates several maritime zones, each with specific rights and responsibilities:

- **Territorial Sea:** Extends up to 12 nautical miles from a coastal state's baseline. The state has sovereignty, including exclusive rights to resource exploitation (UNCLOS, Article 2).
- **Contiguous Zone:** Extends up to 24 nautical miles, where states can enforce customs, immigration, and pollution laws.
- **Exclusive Economic Zone (EEZ):** Extends up to 200 nautical miles, granting coastal states sovereign rights for exploring, exploiting, and managing natural resources (UNCLOS, Articles 55-58).
- **Continental Shelf:** The submerged prolongation of a land territory, over which a coastal state has rights to explore and exploit its natural resources, beyond the EEZ if

applicable.

- **High Seas:** Areas beyond national jurisdiction, open to all states for navigation, fishing, and scientific research under freedom principles.

UNCLOS established several institutions:

- **International Seabed Authority (ISA):** Oversees mineral-related activities in the International Seabed Area beyond national jurisdictions.
- **Commission on the Limits of the Continental Shelf:** Assists coastal states in establishing outer limits of their continental shelves.
- **International Tribunal for the Law of the Sea (ITLOS):** adjudicates disputes arising under UNCLOS.
- **Conference of the Parties (COP):** Reviews implementation and adopts amendments (UNCLOS, Part XV).

NATIONAL LEGISLATION AND ESTABLISHMENTS

Fish biodiversity forms a critical component of global aquatic ecosystems, supporting ecological balance, food security, and livelihoods. However, overfishing, habitat degradation, pollution, and climate change have led to alarming declines in fish populations and diversity (FAO, 2020; Dudgeon et al., 2006). To counter this, various countries and international bodies have enacted legal frameworks specifically aimed at conserving aquatic biodiversity, especially fish species. Many countries have enacted national biodiversity legislation to implement the principles of the CBD at the local level. These acts typically establish national authorities or boards responsible for overseeing biodiversity conservation efforts (CBD, 2010; Government of India, 2002).

- **India: Biological Diversity Act, 2002:** India's Biological Diversity Act was enacted in line with the CBD to preserve the country's vast biological resources, including aquatic life. The Act establishes the National Biodiversity Authority (NBA) and mandates prior approval for access to biological resources, especially for commercial use. "No person shall obtain any biological resource for research or commercial

utilization without prior approval from the NBA” (Biological Diversity Act, 2002, Section 3). It also promotes documentation through People’s Biodiversity Registers (PBRs), which often include local fish species knowledge.

- **United States: Endangered Species Act (ESA), 1973:** The ESA provides protection for species at risk of extinction, including freshwater and marine fishes such as salmon, sturgeon, and pupfish. Critical habitats are identified, and recovery plans are mandated. “The purposes...are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved” (ESA, 1973, Section 2).
- **European Union: EU Habitats Directive (92/43/EEC):** The EU’s Habitats Directive ensures conservation of natural habitats and wild fauna, including aquatic species. It created the Natura 2000 network of protected areas and is key in conserving European freshwater biodiversity.

Specialized Fishery Acts

- **India: Indian Fisheries Act, 1897:** Although dated, this Act gives states authority to regulate inland fisheries and prevent illegal fishing. States have adapted it into more modern regulations, like the Tamil Nadu Marine Fishing Regulation Act, 1983.
- **Marine Fishing Regulation Acts (State-wise in India):** Each coastal state in India has enacted a Marine Fishing Regulation Act (MFRA) that governs mesh sizes, closed seasons, and gear restrictions to protect breeding fish populations and juveniles.
- **Fisheries Act of Canada (R.S.C., 1985):** This act manages Canada’s fish habitats and enforces prohibitions against pollution and destruction of fish habitats. “No person shall carry on any work, undertaking or activity that results in serious harm to fish” (Fisheries Act, 1985, Section 35).

BIODIVERSITY BOARDS OR AUTHORITIES

Biodiversity Boards or Authorities play a pivotal role in the conservation, management, and sustainable utilization of biological resources, including fisheries. These statutory bodies are established to oversee policies, regulations, and actions aimed at preserving biodiversity while

ensuring the sustainable exploitation of biological resources, particularly aquatic ecosystems and fisheries.

Role and Functions of Biodiversity Authorities in Fisheries

- **Conservation and Regulation:** Biodiversity Authorities are mandated to frame policies that conserve aquatic biodiversity and regulate fishing activities to prevent overexploitation. They develop guidelines for sustainable fishing practices, establishing limits on catch sizes, fishing seasons, and gear types to minimize ecological impacts (CBD, 2010).
- **Environmental Impact Assessment:** All developmental projects affecting aquatic environments require prior environmental clearance, which is overseen by these authorities. They evaluate proposed projects' impact on biodiversity and fisheries, ensuring that development does not harm aquatic ecosystems (MoEFCC, 2019).
- **Habitat Protection and Restoration:** Protection of critical habitats such as mangroves, estuaries, and breeding grounds is fundamental for sustainable fisheries. Authorities develop strategies for habitat preservation and restoration to support fish populations and biodiversity (FAO, 2019).
- **Monitoring and Research:** Biodiversity authorities promote research and monitoring of fish stocks, biodiversity status, and ecosystem health to inform policy decisions. They facilitate data collection, scientific assessments, and the implementation of conservation programs (ICUN, 2019).

Examples of Biodiversity Authorities in Fisheries

- **National Biodiversity Authority (India):** In India, the National Biodiversity Authority (NBA) was constituted under the Biological Diversity Act, 2002. NBA oversees the conservation of biological resources, including fisheries, and regulates access and benefit-sharing of biodiversity (Government of India, 2002).
- **Convention on Biological Diversity (CBD):** Internationally, the CBD provides a comprehensive framework for biodiversity conservation, including protocols relevant

to fisheries management, emphasizing sustainable use and equitable sharing of benefits (CBD, 2010).

- **Regional Fisheries Management Organizations (RFMOs): Organizations** such as the Indian Ocean Tuna Commission (IOTC) and South East Atlantic Fisheries Organization (SEAFO) coordinate conservation efforts across nations, implementing biodiversity-friendly policies (FAO, 2019).

CONCLUSION

The complex web of legal and institutional acts governing biodiversity presents a significant framework for the conservation and sustainable management of biological resources at both international and national levels. The implementation of biodiversity conventions and specific Biodiversity Acts underscores the commitment of nations to uphold ecological integrity, promote research, and safeguard ecosystems. Furthermore, the establishment of authoritative boards and regulatory bodies facilitates the enforcement of these laws, ensuring accountability and fostering collaboration among stakeholders. As biodiversity loss continues to pose a critical threat to global ecosystems, ongoing evaluation and adaptation of these legal regimes are essential. By aligning policy frameworks with contemporary scientific insights and socio-economic considerations, we can enhance the effectiveness of biodiversity governance, ultimately contributing to the resilience of our planet's natural heritage. Thus, a comprehensive approach that integrates legal mandates with active participation from communities and organizations is imperative to achieving lasting impacts in biodiversity conservation.

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Certainly! Here's an overview paragraph on international and national conventions focused on biodiversity conservation, with proper citation:

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