
CLIMATE CHANGE AND FISHERIES GOVERNANCE UNDER INTERNATIONAL LAW: RECONSTRUCTING OCEAN GOVERNANCE IN THE ANTHROPOCENE ERA

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ABSTRACT

Climate change has now been identified as a major threat to the marine ecosystems and the fisheries governance worldwide. Effects like increasing sea temperatures, ocean acidification, loss of biodiversity, and fish stocks migration, have changed the traditional fisheries systems and the aftermath are the fisheries regulations helping to expose the structural weaknesses of the international legal structures. The present system of international fisheries governance, mostly under the United Nations Convention on the Law of the Sea (UNCLOS), was designed at the time when climate change was not at all recognized as a worldwide global ecological threat. Because of this, in most cases, the current legal mechanisms that we have are unable to respond properly to changing marine conditions and emerging fisheries conflicts.

This article discusses the effects of climate change on the fisheries governance under international law. It highlights the legal obstacles of existing communities, increased importance of regional fisheries organisations, and the role of recent court cases and advisory opinions in the development of climate-compatible ocean governance. The paper presents the view that international fisheries laws should no longer be based on territorial approaches only but rather they should be adaptable, ecosystem-based, and justice-oriented governance systems. Besides, it also points out that a sustainable fisheries governance in this century is heavily dependent on strong international cooperation, integration of scientific knowledge, climate justice, as well as the protection of vulnerable coastal communities.

Keywords: Climate Change - Fisheries Governance- UNCLOS- Marine Biodiversity-Climate Justice- Ocean Governance- International Environmental Law.

Introduction

Oceans have always been the backbone of the global economy, food security, ecosystem conservation and human survival. In particular, marine fisheries support huge numbers of people with their livelihoods as well as providing the main source of food for coastal communities in regions like Asia, Africa and the Pacific. Besides being one of the economic activities, fisheries in many developing countries represent a vital social and cultural institution. Still, the escalating climate crisis has drastically changed marine ecosystems and highlighted the insufficiency of the existing fisheries management mechanisms. Increased ocean temperatures, ocean acidification, coral bleaching, changing current systems, loss of biodiversity - all rendering fishing less sustainable, and at the same time, affecting the natural balance of marine life.¹ Many fish species have been observed migrating to cooler waters as ocean temperatures change, disrupting the usual fishing grounds and causing conflicts between states over the traditional sharing of fishing resources, scientific data indicate. Changes in climate have led to the change of fisheries governance from mainly a resource management aspect to an environmental security issue, a matter of geopolitical competition and global justice. Currently, fisheries agreements have been made on the idea that marine ecosystems will be only slightly changing and predictable geographically. Still, this idea is not reflecting the current ecological situation.

The main international legal instrument regulating the use of marine resources continues to be the United Nations Convention on the Law of the Sea (UNCLOS), agreed upon in 1982. Even though UNCLOS laid down a detailed legal structure for the oceans, it was made before climate change was seen as a major global issue.² So, some of its rules are still working from unchanging territorial assumptions which do not sufficiently cover climate-related ecological changes. Based on this paper, climate change has uncovered a deep crisis in modern fisheries governance under international law. The current legal structures are fragmented; enforcement mechanisms are, in most cases, weak, and present governance models do not sufficiently match rapidly changing ecological conditions. Besides, this paper contends that whatever future fisheries governance is, it should be ecosystem-based, climate-responsive, and justice-oriented to face the realities of ecological uncertainty.

¹ Intergovernmental Panel on Climate Change, *The Ocean and Cryosphere in a Changing Climate* 450–60 (2019).

² United Nations Convention on the Law of the Sea arts. 61–62, Dec. 10, 1982, 1833 U.N.T.S. 397.

Literature Review

Recent studies on climate change and fisheries governance highlight that existing international legal systems are not fit for purpose when it comes to addressing climate-driven changes in the ocean environment. For example, legal experts like Rosemary Rayfuse and Vito De Lucia point out that the groundwork for fisheries legislation was laid at a time when the marine world was considered relatively stable and its fluctuations, predictable.³ As a result, today's fisheries law is finding it hard to keep up with changing fish migration patterns and loss of biodiversity due to climate.

Besides this, some of the researchers also draw attention to the disjointed approach to fisheries governance. Currently, international fisheries management is done through the less coordinated treaty systems, regional fisheries organizations, environmental agreements, and soft-law instruments that overlap.⁴ This disjointedness of the governance system results in a less than effective reaction to the ecological changes caused by the climate.

Adaptive governance and ecosystem-based fisheries management have been subjects of further research and discussion. Advocates for these methods contend that fisheries governance needs to be scientifically flexible and ecologically responsive rather than being only territorial and focused on extraction.⁵ In fact, these views acknowledge that marine ecosystems are constantly changing and, as a result, need governance systems that are able to adapt to uncertainty.

Examples of climate justice literature definitely play a role in fisheries governance discussion. Scholars point out that first world countries and vulnerable fishing communities are the ones who will experience a change in climate first even though they are the least contributors of global greenhouse gas emissions.⁶ That means, future fisheries governance should encompass environmental justice, social equity, and livelihood protection.

First, the research focus on climate-responsive fisheries governance has seen a large expansion in the scholarly literature. Yet, major questions remain as to how international law can

³ Rosemary Rayfuse, *International Law and Disappearing States: Maritime Zones and the Criteria for Statehood*, 41 *Env't Pol'y & L.* 281, 286–89 (2011); Vito De Lucia, *Competing Narratives and Complex Genealogies: The Ecosystem Approach in International Environmental Law*, 27 *J. Env't L.* 91, 95–101 (2015).

⁴ Erik J. Molenaar, *Current and Prospective Roles of the Arctic Council System within the Context of the Law of the Sea*, 27 *Int'l J. Marine & Coastal L.* 553, 560–65 (2012).

⁵ Food & Agriculture Organization of the United Nations, *The Ecosystem Approach to Fisheries* 14–25 (2003).

⁶ Sumudu Atapattu, *Climate Change, Human Rights, and Forced Migration: Implications for International Law*, 27 *Wis. Int'l L.J.* 607, 610–18 (2009).

adequately balance sovereign rights, ecological changes, and fair distribution of resources. This study aims to add value to discussions on these issues by analyzing in depth the changing connections between climate change and the international fisheries governance system.

Climate Change and the Transformation of Marine Fisheries

Climate change has massively disrupted marine ecological systems at a fundamental level. From the oceans uptake of Much large quantities of human-derived heat and carbon dioxide emissions, warming and acidification of the ocean is taking place.⁷ Such environmental alterations have an impact on the fish reproduction cycles, the migration patterns of fish, marine biodiversity, and the overall health of the ecosystem. One of the most striking effects of climate change is the shifting of fish stocks from one region to another. With the warming of the ocean, many fish species are moving towards cooler waters to find favourable environmental conditions.⁸ Due to this redistribution, traditional fishing systems are being thrown into disarray and there is an increase in the competition among coastal states for the access to the newly available marine resources. When fish stocks migrate, their migration brings about serious legal issues. Traditionally, fisheries agreements and quota systems were mainly based on the assumption that fish patterns would be relatively stable with the environment. Though, the redistribution of stocks from climate change not only puts in question fishery management systems but also leads to higher risks of conflicts related to fishing rights and conservation responsibilities. The state of ocean acidification poses an additional risk to marine life, In particular to creatures like corals and shellfish that play major roles in the marine environment for biodiversity. Also, coral reefs are known to be the main sites where various species of fish reproduce and get their food. So, destruction of those coral reefs would result in releasing less energy to the environment at large and its ability to support the fisheries production will be severely limited. Climate change will cause even more severe weather conditions like cyclones, heavy rains, and flooding combined with storm surges. Fishing communities living by the sea remain very vulnerable as their incomes depend largely on marine resources and coastal infrastructure. Besides, small-scale fishermen usually do not have sufficient financial means, support for technology, and institutional safeguards to ensure effective adaptation to environmental changes. The changing of marine ecosystems indicates that the fisheries governance system cannot be based anymore on fixed assumptions about ocean conditions.

⁷ Intergovernmental Panel on Climate Change, *supra* note 1, at 390–420.

⁸ Food & Agriculture Organization of the United Nations, *The State of World Fisheries and Aquaculture 2022* 54–60 (2022).

The law at the international level needs to evolve to cope with the biological uncertainty and the changing environmental circumstances. The main drawback of current fisheries governance is that the legal adaptation is left far behind the ecological transformation. To environmental damage, international law has a history of reacting only when there is substantial degradation. This type of governance, since it is reactive, is becoming insufficient as ecological disruption is not only rapid, but also transboundary and, in many cases, irreversible.

International Legal Framework Governing Fisheries

United Nations Convention on the Law of the Sea (UNCLOS)

The United Nations Convention on the Law of the Sea continues to be the chief legal instrument dealing with oceanic resources and the jurisdiction of maritime areas. UNCLOS lays down the legal principles for territorial waters, Exclusive Economic Zones (EEZs), continental shelves, and the regulation of the high seas.⁹ Articles 61 and 62 of UNCLOS grant coastal states sovereign rights to marine resources within their EEZs but also impose on them the duty to conserve and manage the living marine resources in an environmentally sound and sustainable manner.¹⁰ Besides that, the Convention calls for concerted actions in the fisheries sector of highly migratory fish stocks and stocks which straddle the borders of the EEZs. In fact, UNCLOS has been the milestone in international legislation on oceans by establishing a universal legal setup for marine areas. Having said that, UNCLOS is based on a rather static and state-centric perspective of ocean governance and the Convention was concluded at a time when climate change had not yet been considered as the main ecological issue. Because of this, there are only a few provisions in UNCLOS that deal with the impact of climate change like migration of fish stocks, altering of marine ecosystems or adaptive allocation of resources. The ongoing ecological changes are progressively undermining the traditional views on maritime jurisdiction and fisheries management. Fish stocks crossing different Exclusive Economic Zones (EEZs) give rise to legal ambiguities on who has access rights, conservation obligations, and how resources are to be shared. States may start to compete over fishery resources that were not previously part of their maritime areas. Also, the current legal systems are still not up to the task of dealing with such ecological changes. Also, enforcement problems still lessen the effectiveness of fisheries management, in particular in areas beyond national jurisdiction where

⁹ United Nations Convention on the Law of the Sea, *supra* note 2.

¹⁰ *Id.* arts. 61–62.

illegal, unreported, and unregulated (IUU) fishing is very common.¹¹ Lack of enforcement tools and non-uniform compliance by states greatly undermine the impact of international conservation commitments. Continuing dependence on territorially fixed governance structures uncovers a more profound conceptual error inherent in the law of the sea. Traditional maritime governance was based on the idea that boundaries would remain stable and ecosystems predictable. Climate change is undermining both of these assumptions at the same time.

Paris Agreement and Climate Governance

The Paris Agreement, which operates under the United Nations Setup Convention on Climate Change, is a major global initiative aimed at tackling climate change through emission reduction and adaptation strategies.¹² Even though the Agreement does not explicitly deal with fisheries governance, it has a strong impact on marine conservation and environmental sustainability. By mitigating greenhouse gas emissions, the measures taken also protect marine ecosystems by controlling ocean heating and reducing the loss of marine biodiversity. The adaptation measures supported by the Paris Agreement also promote the development of resilience capabilities in coastal communities susceptible to environmental changes. Even so, the Agreement has only a few hints about fisheries governance or changes in the marine environment resulting from climate change. It is a reflection of the disjointed international environmental governance system.

Convention on Biological Diversity (CBD)

The Convention on Biological Diversity is a key advocate for the protection and sustainable use of biodiversity, which also includes marine ecosystems.¹³ It underlines ecosystem-based management and pushes states to incorporate biodiversity conservation into their fisheries plans. One can say that the CBD has really helped the discussion on marine conservation; Though, there are still unaddressed issues of implementation due to insufficient enforcement mechanisms and varying capacities of states.

¹¹ Food & Agriculture Organization of the United Nations, *Illegal, Unreported and Unregulated Fishing* (2020).

¹² Paris Agreement art. 2, Dec. 12, 2015, T.I.A.S. No. 16-1104.

¹³ Convention on Biological Diversity arts. 1, 6, June 5, 1992, 1760 U.N.T.S. 79.

Fragmentation in International Fisheries Governance

Among the main drawbacks of the present fisheries governance is the institutional fragmentation. Different treaties, regional organizations, and environmental agreements are regulating various aspects of marine governance without effective coordination. Such a fragmented setup makes international actions against climate-induced ecological disruption less effective. Fisheries governance (which in fact is closely interconnected with climate governance) often run independently of it. At the same time, biodiversity conservation setups might become independent from fisheries management systems. Coastal developing states, in particular, are facing major challenges as they usually do not have the required technological, financial, and scientific capacity to develop fisheries regulation and conduct environmental monitoring effectively.

Regional fisheries organisations have tried to fill the governance voids with joint management initiatives. Organisations like the Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO) and the Indian Ocean Tuna Commission support scientific collaboration, fisheries monitoring, data sharing, and the implementation of sustainable management strategies.¹⁴ In fact, the Bay of Bengal region is a case in point of how climate change can expose different jurisdictions to different vulnerabilities. Coastal communities in India, Bangladesh, and Sri Lanka are experiencing a decrease in fish stocks, stronger cyclones, and environmental damage due to ocean warming. Fishermen from India who work in the Palk Bay region are also frequently involved in disputes over maritime boundaries and fishing rights with Sri Lanka.¹⁵ Climate change should escalate such conflicts since marine resources will be even scarcer. India's Blue Economy policies altogether and the SAGAR (Security and Growth for All in the Region) policy system clearly show a deepening awareness among the policymakers that marine governance, economic development, and maritime security are three sides of the same coin.¹⁶ Still, existing Indian fisheries regulation is still shackled by various structural issues such as overfishing, lack of monitoring capacity, and patchy enforcement of conservation measures. Although regional collaboration has been made, a large number of fisheries organizations are still suffering from lack of enforcement powers, shortage of funds,

¹⁴ Agreement for the Establishment of the Bay of Bengal Programme Inter-Governmental Organisation, Jan. 23, 2003.

¹⁵ V. Suryanarayan, *Conflict over Fisheries in the Palk Bay Region*, 48 Econ. & Pol. Wkly. 12, 13–16 (2013).

¹⁶ Gurpreet S. Khurana, *India's SAGAR Initiative: Expanding Regional Maritime Cooperation*, Nat'l Maritime Found. Issue Brief (2019).

and political disputes among members. The disjointed set-up of present-day fisheries governance is nothing but a symptom of a bigger institutional issue in the field of international environmental law: ecological emergencies are global and interrelated, whereas legal interventions are still compartmentalized and geographically separated.

Climate Justice and the Human Dimension of Fisheries Governance

Climate change severely impacts vulnerable coastal communities who are least responsible for environmental destruction. Small-scale fishers, indigenous peoples, and island nations in the developing world are among the ones who economically and socially suffer the most from the reduced availability of fish and changes in the natural environment. In recent times, climate justice has been a vital concept in fisheries governance debate. It advocates for the equitable sharing of environmental burdens and highlights how climate change affects different groups of people, with the most vulnerable being hardest hit.

Fisheries governance traditionally mainly targeted resource allocation and sovereign rights. As a result, it overlooked human vulnerability and social inequality. Even so, fisheries governance is inseparable from issues of food security, livelihood protection, and human dignity. Besides, climate change leads to general worries about intergenerational equity and environmental responsibility. Overharvesting of marine materials jeopardizes the chances of seniors to get hold of healthy oceanic ecosystems and sustainable fisheries.

Because of this, there is a need for future fisheries governance to incorporate human rights, social protection and fair adaptation against the impacts of climate change at the international level. It is impossible to achieve sustainable governance if a legal system that safeguards fisheries resources is at the same time ignoring fishing communities. Conservation of nature and social equity should be harmonized and not opposites.

Judicial Developments and Fisheries Disputes

Marine conservation is now seen as a serious international issue thanks to key court rulings. These decisions show how states must work together to manage fish stocks fairly and sustainably. The UK-Iceland Fisheries Jurisdiction Case before the ICJ set major precedents on shared ocean management.¹⁷ The ruling helped define responsibilities in fishing zones and

¹⁷ Fisheries Jurisdiction (U.K. v. Ice.), Judgment, 1974 I.C.J. 3 (July 25).

resource use. States agreed that fair sharing and environmental protection are part of international duty. This case laid groundwork for future decisions linking climate changes with fishery rules.

In a similar way, the South China Sea Arbitration case between the Philippines and China focused on environmental measures under UNCLOS and pointed out the state duties in giving effect to the conservation and protection of the deteriorating marine environments through the prevention of illegal fishing activities.¹⁸ The arbitral tribunal condemned the major environmental damage of the coral reef system and stressed the obligations of marine environment protection. The rulings of the International Tribunal for the Law of the Sea (ITLOS) have also served to strengthen the notion of cooperation, environmental due diligence, and marine conservation. Though, present judicial mechanisms still find it difficult to tackle the issue of climate-related migration of fish stocks and overall ecological change. It is quite obvious that future maritime conflicts will be related to climate-induced fisheries redistribution and issues of environmental responsibility. Rising fishing disputes show that climate change is becoming more than just an environmental issue. It's turning into a matter of geopolitical stability, resource security, and even the legitimacy of international law.

Contemporary Conflicts, Recent Case Studies, and Emerging Advisory Opinions

Climate change has exacerbated maritime disputes over fisheries governance, marine conservation, and resource sharing. The movement of fish stocks and the reduction in fishery yields have changed the nature of fisheries conflicts; they are now geopolitical and environmental. Arguably, one of the most striking examples is the South China Sea area known for its abundant fisheries resources. Climate change, combined with overfishing and environmental damage, has led to more tensions among coastal countries such as China, Philippines, and Vietnam.

Global warming has led to a rise in tensions in the Arctic. The melting ice and warmer oceans have changed fish migration patterns and opened up new areas for exploitation of marine resources, causing Arctic States to vie more for fisheries access and maritime jurisdiction. Same here, the Bay of Bengal area is experiencing great environmental difficulties like ocean warming, loss of biodiversity, cyclones, and decreased fish production. People living along the

¹⁸ South China Sea Arbitration (Phil. v. China), PCA Case No. 2013-19, Award (Perm. Ct. Arb. July 12, 2016).

coasts of India, Bangladesh, and Sri Lanka are becoming more and more exposed to the consequences of the marine environment's disruption.

One of the most significant recent developments is the 2024 Advisory Opinion by the International Tribunal for the Law of the Sea (ITLOS) on climate change and the protection of the marine environment.¹⁹ The Tribunal has identified greenhouse gas emissions as a type of marine pollution under UNCLOS and declared that states have legal duties to prevent, minimize, and control such pollution. The advisory opinion has really stepped up international environmental law by highlighting the importance of states' due diligence obligations, the role of scientific cooperation, the application of precautionary principles, and the protection of the marine environment. Beyond that, the Tribunal has even raised the possibility that merely implementing the Paris Agreement might not be enough to fulfill the wider obligations under UNCLOS.

Considering climate change is the most direct way of changing marine biodiversity and fish migration, the recognition of GHGs as a kind of marine pollution is extremely effective in fisheries governance. This helps increase the legal support for future new claims and litigation for climate-related fisheries and the environment. Climate-related advisory proceedings before the International Court of Justice, which are still ongoing, might have the power to further guide the evolution of international environmental law and the liability of states for climate change.²⁰ At the same time, island states that are vulnerable are raising their voices to call for stronger mechanisms of accountability of the major greenhouse gas-emitting countries. These changes are a part of a bigger picture of a transformation that is happening within international law. Environmental protection is in fact no longer just a side issue when it comes to maritime governance; it is on its way to becoming one of the main organizing principles of this area.

Toward Adaptive and Ecosystem-Based Fisheries Governance

The reality of climate change is forcing us to change our ways of fishing governance completely at the international level. Existing governance systems based on territorial boundaries are less and less relevant due to the changing nature of marine ecosystems. Adaptive governance is a method that is more open to changes and based on the latest scientific

¹⁹ Request for an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International Law, Advisory Opinion, Case No. 31, ITLOS (May 21, 2024).

²⁰ Request for an Advisory Opinion on the Obligations of States in Respect of Climate Change, Order of Apr. 9, 2024, I.C.J.

knowledge in managing fisheries. This type of governance focuses on the capacity of an ecosystem to sustain itself, ongoing monitoring, sharing scientific information, and making decisions based on a precautionary principle. Marine ecosystem management is aimed at ensuring that marine life, fishing activities, and the environment are all sustained. Fishery governance that is in line with future needs cannot be based on the exclusive use of the resource as it must include marine conservation measures as a whole.

Climate-responsive fisheries governance should consist of:

- Ecosystem-based conservation
- Flexible quota systems
- Transboundary cooperation
- Scientific adaptability
- Precautionary obligations and
- Stronger enforcement mechanisms.

Technological innovation can also matter a lot in enhancing fisheries governance - use of satellite monitoring, digital surveillance systems, and climate forecasting technologies. Above all, governance reforms need to strike a balance between environmental sustainability and social justice as well as protection of vulnerable communities. One of the main issues for future international laws is figuring out if they can be changed fast enough to prevent ecological disasters that can't be undone. If political indecision delays changes in governing systems, these changes might eventually become impossible due to an ecological breakdown.

Policy Recommendations for Future Ocean Governance

The increasing deterioration of water ecosystems is a serious concern and it calls for many changes, mainly at the level of global fisheries rules and institutions. To begin with, climate-related changes should be a core feature of international fisheries treaties and the management tools should be quite adaptive to fishery resource changes. In addition, there is a need to increase the mandate of regional fisheries agencies to effectively carry out their work through regular access to funding, additional scientific expertise, and new technologies. Also,

international regulations should encourage ecosystem-based management approaches instead of simply focusing on a species or a specific resource. Also, the principle of climate justice should be integrated into the core fisheries governance. Communities that depend on fishery resources for their livelihoods and are most affected by changes in climate need financial, technological, and institutional support. Another point is that the marine sector will be properly managed only if climate change, biodiversity, and fisheries laws are coordinated at a higher level. Lastly, enhanced marine scientific work and global collaboration are the main guides in the direction of climate-adaptive fisheries management.

Conclusion

Climate change has revealed some fundamental structural deficiencies in the governance of international fisheries by the modern world. Ocean heating, the loss of marine species, acidification, and changes in fish distribution challenge the old assumptions on which legal structures were built. While the Law of the Sea continues to be the main pillar of global marine governance, its somewhat unchanging and country-focused structure is not suitable for coming to terms with rapidly changing nature. A system of governance that is divided, enforcement in place which is weak, and inadequacy of measures for adaptation to the changing environment are amongst the factors that continue to lead to the poor management of fisheries. International fisheries governance will be shaped by the extent to which legal systems can be developed that are adaptive, ecosystem-based, climate-responsive, and able to accommodate ecological uncertainty and environmental change. Nowadays, managing fish populations isn't just about national control or making money. Instead, it ties into larger goals like protecting nature, addressing climate fairness, saving ocean life, while sharing duty across nations. When global rules lag behind rapid environmental shifts, fishery management may drift further from the actual conditions it aims to oversee. So effective ocean stewardship demands updated laws along with a deeper shift in how people view their place within sea environments.