

Climate Change and Water Resources in the Context of International Law

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Introduction

Climate change is one of the most pressing global challenges of our time. Its impact on water resources is profound and has already led to significant ecological, economic, and political tensions.^١ The increase in extreme weather events, such as droughts, floods, and glacier melt, has particularly affected transboundary water resources.^٢ At the same time, existing international legal frameworks are being tested by the dynamic challenges posed by climate change.^٣ This paper analyzes the impact of climate change on water resources, examines transboundary conflicts, and critically evaluates the role of international law in addressing these issues.^٤

١. Climate Change and Its Impact on Water Resources

١.١ Changes in Hydrological Patterns

Climate change alters the global water cycle in various ways:

- **Increased Evaporation:** Rising temperatures lead to higher evaporation rates, reducing soil moisture.^٥
- **Changing Rainfall Patterns:** Wet regions experience more intense rainfall, while arid areas face increasing droughts.^٦
- **Melting Glaciers:** Glaciers in regions like the Himalayas and the Alps are rapidly melting, threatening long-term freshwater supplies.^٧

١,٢ Impact on Water Quality

- **Saltwater Intrusion:** Rising sea levels increase groundwater salinization in coastal areas, especially in regions like Bangladesh and the Maldives.^{٨٨}
- **Water Contamination:** Flooding leads to the contamination of drinking water sources with chemical and biological pollutants.^{٨٩}

١,٣ Regional Differences

- **Africa:** According to the IPCC, a quarter of Africa's population will face water stress by ٢٠٢٥.^{٩٠}
- **Asia:** The retreat of Himalayan glaciers threatens river systems like the Ganges and Brahmaputra, which sustain millions of people.^{٩١}
- **Europe:** While Southern Europe struggles with more frequent droughts, Northern Europe experiences intensified rainfall.^{٩٢}

٢. International Legal Principles for Water Management

٢,١ Equitable and Reasonable Utilization

The principle of equitable and reasonable utilization demands a balanced distribution of water resources, considering the interests of all affected states.^{٩٣} It was first codified in the **Helsinki Rules (١٩٦٦)** and later in the **UN Watercourses Convention (١٩٩٧)**.^{٩٤}

٢,٢ Prevention of Significant Harm

Article ٧ of the UN Watercourses Convention obliges states to avoid measures that cause significant harm to other riparian states.^{٩٥}

٢,٣ Cooperation and Information Sharing

Article ٨ of the convention emphasizes cooperation between states through the exchange of hydrological data and the joint planning of water use projects.^{٩٦}

٢,٤ The Human Right to Water

The **UN General Assembly Resolution ٦٤/٢٩٢ (٢٠١٠)** recognizes access to clean water and sanitation as a fundamental human right.^{٩٧}

٣. Challenges for International Law

٣.١ Climatic Uncertainties

The unpredictable effects of climate change complicate the application of existing international legal frameworks, which are often based on stable hydrological conditions.^{١٨}

٣.٢ Transboundary Conflicts

٣.٢.١ The Nile Conflict

The Nile, at ٦,٦٥٠ kilometers long, is the world's longest river. The conflict over its use primarily involves Egypt, Sudan, and Ethiopia.^{١٩}

- **Background:**

Colonial agreements in ١٩٢٩ and ١٩٥٩ allocated most of the Nile's waters to Egypt and Sudan. Ethiopia, which supplies about ٨٥% of the Nile's waters, was excluded from these agreements.^{٢٠}

- **The GERD Dam:**

The Grand Ethiopian Renaissance Dam (GERD), initiated in ٢٠١١, has escalated the conflict. Ethiopia views GERD as essential for its development, while Egypt sees it as a threat to its water supply.^{٢١}

- **Relevance of International Law:**

The UN Watercourses Convention emphasizes equitable use and harm prevention, but a binding agreement has yet to be reached.^{٢٢}

٣.٢.٢ The Indus Waters Treaty

The Indus Waters Treaty (١٩٦٠) governs the use of the Indus River basin between India and Pakistan.^{٢٣}

- **Treaty Provisions:**

The treaty divides the rivers into western (allocated to Pakistan) and

eastern (allocated to India) groups. India may use western rivers only under limited conditions.^{٢٤}

- **Climatic Strains:**

Glacier melt and altered monsoon cycles threaten the treaty's stability. Political tensions, such as the Kashmir dispute, further exacerbate the situation.^{٢٥}

٣,٢,٣ Iraq-Turkey Conflict

The Tigris and Euphrates Rivers are vital for Iraq but originate in Turkey.^{٢٦}

- **Turkish Infrastructure Projects:**

The construction of dams, such as the Atatürk and Ilisu dams, has significantly reduced water availability in Iraq.^{٢٧}

- **Political Tensions:**

Iraq accuses Turkey of using water as a geopolitical tool. Negotiations remain challenging.^{٢٨}

٤. Approaches to Addressing Legal Challenges

٤,١ Adapting Existing Agreements

- **Flexibility:** International agreements must account for climatic uncertainties.^{٢٩}
- **Mandatory Climate Adaptation Strategies:** Droughts and altered river flows must be better regulated.^{٣٠}

٤,٢ Promoting Sustainable Technologies

- **Water Recycling and Desalination:** Technological innovations can alleviate water scarcity.^{٣١}
- **Preservation of Wetlands:** Natural water storage systems should be protected.^{٣٢}

٥. Examples of Conflict Resolution

٥,١ Positive Examples

- **Danube Commission:** A model of successful transboundary cooperation in Europe.^{٣٣}

٥,٢ Challenges

- **Aral Sea Crisis:** The failure of international cooperation led to one of the ٢٠th century's largest ecological disasters.^{٣٤}

٦. Conclusion

Climate change significantly exacerbates the challenges of managing transboundary water resources. While international law provides principles such as equitable utilization and harm prevention, it must become more flexible and adaptive.^{٣٥} Only through technological innovation, international cooperation, and legally binding agreements can conflicts be sustainably resolved.^{٣٦}

Extended Bibliography

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