

## CLIMATE CHANGE & WATER CRISIS: CRITICAL ANALYSIS OF INTERNATIONAL WATER LAW

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### Abstract

Climate change poses an existential threat to global water security, avec increasing stresses on transboundary river basins. However, international water law remains limited in its effectiveness for equitable and sustainable water management under climate disruptions. This paper undertakes a critical analysis of international water law concerning climate justice, human rights and ethics of care. It focuses on examining if existing legal frameworks adequately address climate-induced water variability in transboundary contexts to ensure water access and prevent conflicts.

The analysis evaluates major principles like equitable utilization, no significant harm, cooperation and sharing of hydrological data. It reveals how principles emphasize state sovereignty over collective action, lacking climate and human rights perspectives. The paper argues for re-evaluating dominant anthropocentric, neoliberal paradigms in international water law which commodify water and marginalize care ethics. Integrating Indigenous water cosmologies emphasizing spiritual connections to water and local participatory governance can decolonize water law. Adopting a feminist lens to elevate justice and relationality can make water law more climate-responsive and equitable.

The paper concludes by proposing legal reforms informed by climate justice, decolonization and feminist ethics of care. This involves harmonizing human rights to water with sustainable development, enshrining collective ecological stewardship of transboundary basins and formal participation rights for women and Indigenous communities. Such care-centered reforms can build water law's resilience to climate disruptions and ability to equitably safeguard this precious resource.

**Keywords:** *International Water Law, Climate Change, Water Crisis, Climate Justice, Care Ethics*

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## Introduction

Water is the essence of life, and the growing climate crisis poses an unprecedented threat to global water security. As climate disruptions intensify the water stresses facing our interconnected world, international water law remains constrained in its ability to enable cooperative and ethical governance of transboundary freshwater resources. This paper argues that existing legal frameworks require fundamental reimagining using lenses of climate justice, decolonization and feminist ethics of care.

Rivers winding across national frontiers epitomize the reality that water links communities across borders. However, principles like absolute territorial sovereignty have dominated international water law, privileging state control over river basins while disregarding collective responsibility.<sup>1</sup> But climate change is reshaping hydrological flows, necessitating a paradigm shift.

This paper undertakes a critical analysis of international water law, examining its efficacy in addressing climate-induced variability in transboundary basins to uphold rights and peace. Core principles like equitable utilization, no significant harm, cooperation and information exchange are evaluated from perspectives of climate ethics, human rights and decolonization. The analysis reveals how existing frameworks emphasize national interests over collective action and ignore lived experiences of vulnerable communities.<sup>2</sup>

The paper advocates reforming water law using alternative frameworks like Indigenous water justice and feminist ethics of care to make it more climate-resilient and equitable. The introduction sets the context for this crucial examination by foregrounding the climate emergency's threat to water security and need for transformative legal paradigms centered on ecological stewardship, justice and care. Water scarcity due to climate change will generate water stress having effects across the globe.<sup>3</sup> Local access to water is affected by global hydrological cycle which will get disrupted due to climate change.<sup>4</sup> Water is not an unlimited

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<sup>1</sup> Rieu-Clarke, A. (2015). Regulation of the Mekong River system: Is the glass really half full? In *The Mekong-River, basin and people* (pp. 23-43). Springer, Cham.

<sup>2</sup> Cullet, P. (2018). Editorial: Regulation of Transboundary Water Issues: Perspectives from International Law. *International Community Law Review*, 20(3-4), 243–249.

<sup>3</sup> Dan Tarlock, *Four Challenges for International Water Law* 23(369) *TULANE ENVIRONMENTAL LAW JOURNAL* 377 (2010).

<sup>4</sup> Phillipe Cullet, *Water Law in a Globalised World: the Need for a New Conceptual Framework*, 23(2) *JOURNAL OF ENVIRONMENTAL LAW* 234 (2011).

resource but a limited one and scarcity with respect to it is going to increase in future. International Water Law is still unequipped and unprepared to deal with the water crisis and related humanitarian crisis that may arise in future.

### **BACKGROUND & IMPORTANCE OF INTERNATIONAL WATER LAW**

Climate change and water crisis are two interrelated and pressing issues that have garnered global attention in recent years. Climate change refers to long-term alterations in temperature and weather patterns caused primarily by human activities such as burning fossil fuels, deforestation, and industrialization. These activities have resulted in increased levels of greenhouse gases in the atmosphere, leading to global warming and its subsequent impacts on the environment. One of the major consequences of climate change is the exacerbation of the water crisis, which is characterized by the scarcity, degradation, and poor quality of water resources. As global temperatures rise, precipitation patterns shift, resulting in more frequent droughts, floods, and extreme weather events. These changes directly affect the availability and accessibility of fresh water, posing significant challenges to human wellbeing and sustainable development. Therefore, understanding the background and dimensions of climate change and water crisis is crucial in formulating effective legal frameworks and policies to address these critical issues at the international level. The UN Framework Convention on Climate Change (UNFCCC) is a pivotal international agreement addressing climate change and its impacts. Adopted in 1992, it sets the overall framework for intergovernmental efforts to tackle climate change. The Paris Agreement, reached in 2015, builds on the UNFCCC and aims to strengthen the global response to climate change by limiting global temperature increase to well below 2 degrees Celsius above pre-industrial levels. Additionally, the Convention on Biological Diversity (CBD) was established in 1992 to promote sustainable development while conserving the world's biodiversity. These key international conventions and agreements play a vital role in addressing the complex challenges of climate change and water crisis. The United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses (UNWC) is a legal framework that aims to provide a comprehensive set of rules and principles governing the use and management of international watercourses. The convention recognizes the increasing

challenges posed by climate change to water resources and emphasizes the need for effective cooperation and coordination among states sharing watercourses. It emphasizes the principles of equitable and reasonable utilization, prevention of significant harm, and the duty to protect ecosystems. The UNWC contributes to the development of a consistent and harmonized legal regime that ensures the sustainable management and protection of international watercourses, thereby addressing the critical issue of water scarcity and the impacts of climate change.

International water law refers to the body of legal principles and rules that govern the allocation, management, and protection of transboundary water resources. It encompasses both surface water and groundwater and extends to natural and artificial water bodies shared between two or more countries. The scope of international water law is broad, covering issues such as water allocation, water quality, environmental conservation, navigable uses, and dispute resolution mechanisms. Its primary objective is to promote cooperative and sustainable management of shared water resources while respecting the sovereign rights of states. The framework for international water law consists of various treaties, conventions, and customary international law, providing a legal foundation for addressing the complex challenges posed by climate change and water scarcity.

International water law plays a vital role in addressing the challenges posed by climate change and the water crisis. Firstly, it provides a legal framework for the effective management and equitable allocation of transboundary water resources. This is crucial as climate change impacts are not confined to national borders and require collaborative efforts among states. Secondly, international water law promotes the sustainable use and conservation of water resources, emphasizing the principles of equity, cooperation, and environmental protection. By establishing clear rights and obligations, it enhances cooperation and reduces potential conflicts over water, ensuring its equitable distribution to all stakeholders. Furthermore, international water law facilitates the implementation of adaptation and mitigation measures, enabling states to effectively respond to the changing hydrological conditions caused by climate change. Overall, the significance of international water law cannot be overstated in addressing the complex challenges arising from climate change and the water crisis.

International law related to water exists in bilateral<sup>5</sup>, multilateral<sup>6</sup>, soft law form<sup>7</sup>, general principles of international law<sup>8</sup>, customary international law<sup>9</sup>, judicial decisions<sup>10</sup> etc. Prior to 20<sup>th</sup> Century Water law constituted of navigational rights. From 20<sup>th</sup> Century international law related to non-navigational uses of watercourses came forth.<sup>11</sup> Soft law instruments like Helsinki rules<sup>12</sup> arose. Helsinki rules was prevalent for a long time and then UN Convention on non-navigational uses of International Watercourses, 2014.<sup>13</sup> This Convention borrowed a lot from Helsinki rules. Helsinki rule had become customary international law because of the prevalent State Practice and hence even though The Watercourses Convention had not come into force but it still holds value in international law.<sup>14</sup> Helsinki rules, 1996 provided for equitable use of watercourses by countries. Major debate related to the Convention is with respect to equitable use vis-à-vis no harm principle. Water rights under as per such law should be equitable but should not harm the natural resources of other State. No harm thus acts as a limitation on sovereignty principle.<sup>15</sup> In 2006 Berlin rules were added to Helsinki rules to incorporate environmental protection and shared water management into it.<sup>16</sup>

The Watercourses Convention does not limit sovereignty of States to take unilateral action with respect to usage of water but Article 5 of the Watercourses Convention provides for States to use water resources in an equitable and reasonable manner respecting future rights to water of all riparian States.<sup>17</sup> If there is any significant harm to other States then those States can raise objection to such use. Hence, equitable and reasonable use is bound by significant harm caused

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<sup>5</sup> Indus Water Treaty (1960).

<sup>6</sup> Convention on the Law of the Non-navigational Uses of International Watercourses (1997).

<sup>7</sup> S Salman, *The Helsinki Rules, the UN Watercourses Convention and the Berlin Rules: Perspectives on International Water Law* 23(4) WATER RESOURCES REGULATION (2007).

<sup>8</sup> NEIL CRAIK, *THE INTERNATIONAL LAW OF ENVIRONMENTAL IMPACT ASSESSMENT* (2008).

<sup>9</sup> *Id.*

<sup>10</sup> Case Relating to the Territorial Jurisdiction of the International Commission of the River Order (1929) Series A no 23- Series C NO 17-11.

<sup>11</sup> Peter Beaumont, *The 1997 UN Convention On The Law Of Non-Navigational Uses Of International Watercourses: Its Strengths And Weaknesses From A Water Management Perspective And The Need For New Workable Guidelines*, 16(4) INTERNATIONAL JOURNAL OF WATER RESOURCES DEVELOPMENT (2010).

<sup>12</sup> *Supra* note 5.

<sup>13</sup> *Id.* at 628.

<sup>14</sup> *Id.* at 631, 632.

<sup>15</sup> *Id.* at 8.

<sup>16</sup> *Supra* note 10 at 635-638.

<sup>17</sup> Dan Tarlock, *Four Challenges for International Water Law* 23(369) TULANE ENVIRONMENTAL LAW JOURNAL 376 (2010).

to the water right or natural resources of other State.<sup>18</sup> Further, there is duty to cooperate as part of general international environmental law by conducting Environmental Impact Assessment and by providing notification and doing consultation.<sup>19</sup> All these principles limit the absolute and unlimited use of water by any State under the garb of sovereignty. Such unlimited riparian right is called Harmon Doctrine or absolute sovereignty principle has become obsolete now.<sup>20</sup>

### **CRITICAL ANALYSIS OF INTERNAITONAL WATER LAW**

International Water Law plays a crucial role in addressing climate change and the water crisis. The significance of this law lies in its ability to provide a framework for cooperation and dispute resolution among states sharing transboundary water resources. International water law is based on the principle of equitable and reasonable utilization, emphasizing the need for sustainable water management. Furthermore, this legal framework has evolved to incorporate climate change concerns, recognizing the impact it has on water availability and the need for adaptive measures. However, challenges remain in implementing and enforcing international water law, requiring continuous efforts for effective management of water resources in the face of climate change. It can be seen that even in current state of affairs when unfolding of effects of climate change is at its initial phase, the international water law has developed to address the water conflicts and equitable water sharing issues in order to lay down laws and principles to address conflict. The analysis of international water law and Water laws reflect the multiple conflicts existing across the world due to water. Equitable sharing rights are created to provide water rights in the background of conflict. So, conflict is general due to unilateral action or geopolitical reason or power politics, etc. when it comes to sharing of water internationally. Efforts for progressive development of water law have been made to bring order, compromise and cooperation to the conflicting water related situation at international level. This indicates a red signal for the world as in future water scarcity and water stress is going to multiply due to adverse effect of climate change. This indicates towards water crisis and therefore humanitarian crisis in future which could aggravate non-cooperation amongst States and hence increase conflicts. It is said that

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<sup>18</sup> Dan Tarlock, *Four Challenges for International Water Law* 23(369) TULANE ENVIRONMENTAL LAW JOURNAL 377 (2010).

<sup>19</sup> NEIL CRAIK, THE INTERNATIONAL LAW OF ENVIRONMENTAL IMPACT ASSESSMENT (2008).

<sup>20</sup> *Supra* note 10 at 627.

future water crisis could even lead to possibility of world war in future which seems forthcoming due to already conflictual nature of States, geopolitics with respect to water, looming water scarcity in future.<sup>21</sup> At domestic level there are doctrines like Public Trust Doctrine on the government to cater to the interest of common citizen's or vulnerable groups' access to water but at international level there is no such doctrine and riparianism is still prevalent among countries limited by equitable and reasonable use. Riparianism relates water rights to land rights and is exclusionary in nature. So, riparianism, unilateral action and sovereignty could become a justification for States to maintain the status of conflict in situations of water crisis in Future. International law is better at corrective than distributive justice. It is better equipped to remedy past harms than to prevent future conflicts. The international community is not prepared legally or politically to deal with extreme disruptive water crises that may emerge in future.

Looming water scarcity of future demands action of cooperation and understanding amongst nations. Such cooperation is required as the need for water sharing is going to increase manifold in future. Further unsustainable water consumption across the world for production of goods like coffee, textiles, etc. which are water intensive sectors, would aggravate the water crisis situation specifically in developing countries. Production of textiles, agriculture, coffee or products which consume a lot of water is done in developing or least developed countries to exploit the availability of water, cheap labour and easy laws with respect to environmental protection. It provides the developing countries with jobs and economic growth which is environmentally unsustainable. The concept of virtual water clearly reflects such exploitation by developed world of the developing countries in exploiting their water resources.<sup>22</sup> International law does not attribute any liability or duty on developed world to change their consumption pattern and divert towards sustainable consumption. There is no international law to ensure the water rights of such vulnerable nations and their citizens.

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<sup>21</sup> Saeed Kamali Dehghan, *Water wars: early warning tools uses climate data to predict conflict hotspots*, The Guardian, Jan. 1, 2021; The Third World War Will be About Water, [https://www.carnegiecouncil.org/publications/archive/policy\\_innovations/innovations/00308](https://www.carnegiecouncil.org/publications/archive/policy_innovations/innovations/00308) (last visited Aug. 1, 2021).

<sup>22</sup> Temporal variation in export and import of virtual water through popular crop and livestock products by India, <https://www.sciencedirect.com/science/article/abs/pii/S2352801X18301358?via%3Dihub> (last visited Aug 1. 2021).

The arid and semi-arid regions would lose sources of water due to increasing heat, temperature and climate change by 2050. Arid regions could also face severe flooding.<sup>23</sup> Climate crisis in future directly affects the hydrological assumptions such as water allocation, usage, water pollution control, aquatic ecosystem conservation is based. A complete revaluation of such hydrological assumptions is needed and the impacts of it needs to be understood so as to devise a response plan for future and shape international cooperation and water law in that direction.<sup>24</sup>

The countries around the world are reluctant to compromise on their sovereignty for advanced cooperation among all nations for water sharing and access, etc. for adaptation.<sup>25</sup> Countries have inertia to continue in the existing legal system because under the current system ensures them right to fixed and firm share of international waters by arbitration, adjudication or treaty and this is a great legal achievement for nations. While adaptation regime would require flexibility to make real time water allocation by changing conditions which require high level of cooperation among nations.<sup>26</sup>

### **CLIMATE CHANGE AND WATER CRISIS**

Another critical issue in international water law in the context of climate change is the principle of equity. Climate change impacts are not evenly distributed across the globe, and certain regions are more vulnerable to water scarcity than others. The principle of equity entails that the burden of addressing climate change and water crisis should be shared fairly among states, taking into account their historical responsibilities for greenhouse gas emissions and their capacity to adapt to climate change impacts. This principle acknowledges the need for differentiated responsibilities and contributions in addressing the water crisis and climate change, ensuring that the most vulnerable states receive the necessary support to build resilience and adapt to the changing water availability.

The impact of climate change on global water resources is multifaceted and poses several challenges that must be addressed urgently. One of the most significant effects is the alteration of precipitation patterns, resulting in increased instances of droughts and floods on a global scale.

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<sup>23</sup> V Tzatzaki, et al., *International Water Law and Climate Disruption Adaptation* in The UNCEC Convention on the protection and Use of Transboundary Watercourses and International Lakes (2015).

<sup>24</sup> *Supra* note 15 at 892.

<sup>25</sup> *Supra* note 15 at 384.

<sup>26</sup> *Supra* note 15 at 384.



These extreme weather events, coupled with rising temperatures, can have devastating consequences for water availability and quality. Furthermore, the melting of glaciers and icecaps due to global warming contributes to sea-level rise, threatening coastal areas and freshwater sources located in these regions. Effective international water laws and robust management strategies are vital to mitigate the adverse effects of climate change on global water resources and ensure sustainable water management for future generations.

1. **Rising temperatures and changing precipitation patterns** As climate change continues to unfold, rising temperatures and changing precipitation patterns pose significant challenges to the availability and quality of water resources globally. The increase in global temperatures has led to the melting of glaciers and polar ice caps, contributing to rising sea levels and altering the hydrological cycle. This, in turn, affects precipitation patterns, leading to more frequent and intense droughts, as well as extreme rainfall events. These changes disrupt the balance of water supply and demand, affecting both human communities and ecosystems. Adapting to these new conditions requires effective management strategies and cooperation at the international level to ensure equitable access to water resources in an era of climate uncertainty.
2. **Melting glaciers and reduced water availability** Melting glaciers due to climate change have significant implications for water availability and the potential for a water crisis. Glaciers act as natural reservoirs of freshwater, storing vast amounts of water that melt gradually over time, providing a reliable supply to downstream areas. However, as these glaciers melt at an accelerated rate, the availability of water becomes increasingly uncertain. Reduced water availability can have widespread consequences, such as affecting agriculture, human health, and the environment. Therefore, it is crucial to address the issue of melting glaciers and its impact on water resources, while also implementing sustainable water management strategies to mitigate the potential water crisis.
3. **Increased frequency and intensity of droughts and floods** One of the significant consequences of climate change is the increased frequency and intensity of droughts and floods. As global temperatures rise, evaporation rates also increase, leading to more frequent and severe droughts. These prolonged dry periods have devastating effects on

agriculture, water supply, and the overall economy, particularly in regions heavily reliant on rainfall. In contrast, climate change also contributes to more intense rainfall events, resulting in frequent and severe floods. Such extreme weather events lead to the loss of lives, displacement of communities, destruction of infrastructure, and contamination of water sources, further aggravating the water crisis. Addressing these issues requires robust international water law frameworks that recognize the impacts of climate change and provide mechanisms to adapt and mitigate its effects.

The consequences of the water crisis are far-reaching and devastating. The lack of access to clean and safe water not only affects the basic human needs such as drinking, cooking, and sanitation, but it also hampers economic development and exacerbates poverty. Furthermore, water scarcity leads to conflicts over water resources, as countries and communities compete for limited supplies. The environmental impact of the water crisis is also significant, as ecosystems are disrupted and biodiversity is threatened. To mitigate these consequences, international water law must be strengthened and implemented effectively, emphasizing the principles of equity, sustainability, and cooperation. Only through international cooperation and collective action can we hope to address the water crisis and ensure a sustainable future for all.

Climate change poses a significant threat to public health and sanitation. As temperatures rise, the frequency and intensity of extreme weather events, such as floods and droughts, are increasing. These events can disrupt water supplies and sanitation systems, leading to an increased risk of waterborne diseases and the spread of infectious illnesses. Additionally, rising temperatures can also affect the quality of drinking water, as warmer temperatures can facilitate the growth of harmful bacteria and algae in water sources. Moreover, climate change can exacerbate existing water scarcity issues, further compromising public health and sanitation efforts. Therefore, addressing climate change is crucial in ensuring the availability of safe and clean water for public health and sanitation purposes.

Another important aspect of climate change is its impact on food and agricultural insecurity. As global temperatures rise, various regions around the world experience changes in precipitation patterns and extreme weather events such as droughts and floods. These changes can lead to reduced crop yields, increased pest and disease outbreaks, and threats to livestock and fisheries. Additionally, climate change can also affect the availability and quality of water resources for

irrigation, further exacerbating food and agricultural insecurity. In order to address these challenges, international water law should consider incorporating climate change adaptation strategies and promoting sustainable agriculture practices to ensure food security for future generations.

One aspect of the water crisis that requires urgent attention is its socioeconomic impacts on vulnerable populations. The depletion and contamination of water sources have severe consequences for impoverished communities, exacerbating existing socio-economic inequalities. Access to clean water and sanitation services is essential for human well-being, public health, and economic development. However, marginalized groups often bear the brunt of water scarcity, leading to food insecurity, diminished livelihoods, and increased poverty levels. Moreover, women and children in these populations are disproportionately affected as they bear the responsibility of fetching water over long distances, limiting their educational and economic opportunities. Consequently, addressing the socioeconomic impacts of the water crisis is crucial to improve the lives of vulnerable communities and achieve sustainable development. In conclusion, the critical analysis of international water law reveals its glaring inadequacies in addressing the complex challenges posed by climate change and the global water crisis. The existing legal framework fails to recognize the urgent need for a holistic approach that integrates both environmental sustainability and socio-economic development. Furthermore, the absence of any binding enforcement mechanisms undermines the effectiveness of international water law. Consequently, there is a pressing need for reforms that promote cooperation, equity, and adaptive management in the face of changing climate conditions and increasing water scarcity. Without comprehensive reform, the existing legal framework will continue to be inadequate in its response to the challenges posed by climate change and the water crisis.

### **CASE STUDIES**

Several case studies illustrate the complex relationship between climate change and water scarcity, providing critical insights into the effectiveness of international water law. For instance, the ongoing crisis in the Middle East, particularly in the arid region of the Levant, underscores the immediate threat climate change poses to water security. The depletion of the Jordan River, shared by Israel, Jordan, and Palestine, amplifies tensions and highlights the urgent need for transboundary cooperation. Similarly, in Sub-Saharan Africa, countries like Ethiopia, Sudan, and

Egypt are grappling with the impacts of changing rainfall patterns on the Nile River Basin, necessitating close collaboration to mitigate conflict and ensure equitable water allocation. These real-world scenarios underscore the need for robust international legal frameworks to address the multifaceted challenges posed by climate change and water scarcity.

**Amazon Basin: Transboundary water management challenges** Moreover, the Amazon Basin poses its own unique challenges in transboundary water management. The vastness of the basin covers nine countries, resulting in multiple jurisdictions with differing water management policies and practices. This fragmentation can hinder effective cooperation and coordination among the nations. Additionally, the Amazon Basin faces the impacts of climate change, including increased droughts and extreme rainfall events. These changes in precipitation patterns further complicate water management efforts, as they lead to uncertain water availability and increased potential for flooding. Consequently, addressing the transboundary water management challenges in the Amazon Basin requires not only cooperation among the various countries but also adaptation strategies that account for the uncertainties brought about by climate change.

**B. Aral Sea: Lessons from a man-made environmental disaster** The case of the Aral Sea is a prime example of a man-made environmental disaster and serves as a crucial lesson in understanding the consequences of reckless water management policies. Once the fourth-largest lake in the world, the Aral Sea has shrunk by nearly 90% since the 1960s due to the diversion of its two main tributaries for irrigation purposes. The resulting environmental degradation has been catastrophic, with fishing communities displaced, an increase in respiratory illnesses due to toxic dust storms, and the loss of biodiversity. This serves as a poignant reminder of the potential long-term consequences of unsustainable water practices and the urgent need for effective water management policies.

## **SUGGESTIONS FOR CHANGE IN INTERNATIONAL WATER LAW**

To address the challenges and complexities posed by climate change and water crisis, several recommendations can be made to enhance the effectiveness of international water law. Firstly, there is a need for improved coordination and collaboration among nations to develop comprehensive legal frameworks that encompass all aspects of water management. This can be achieved through the establishment of a global water governance body that oversees the

implementation and enforcement of international water law. Additionally, it is crucial to promote the principle of integrated water resources management, which emphasizes the holistic and sustainable approach to water management. This can be achieved by promoting interdisciplinary research and knowledge sharing among nations. Moreover, the inclusion of mechanisms for dispute resolution and transboundary water cooperation should be emphasized to ensure peaceful and equitable solutions to water-related conflicts. Lastly, there should be an increased focus on capacity-building initiatives to enhance the technical and institutional capabilities of countries in managing their water resources effectively. By implementing these recommendations, international water law can become more responsive, adaptable, and effective in addressing the challenges posed by climate change and water crisis.

- 1) Creation of joint institutional mechanism. Under which an supranational authority would be created. States are generally reluctant in creation of such authorities due to threat to sovereignty. But severe water scarcity situation due climate change could not be addressed through the current notions of sovereignty and rather requires effective cooperation and interdependence. There is a consensus among nations about it. Power need to be vested in such authorities with respect to. Jurisdiction of all hydrographic basin and all freshwater resources in the basin, coordinate with all riparian, gather data and mitigation on effects of climate change. They should be given flexibility in decision making as per the changing predictions of water availability or scarcity. Further, such mechanism should be financed adequately so as to deliver its mandate.<sup>27</sup>
- 2) Needs over rights have to be given priority in international context as well. Rights based approach is dependent on riparian rights of States while need based approach analyzes how the water is allocated and what is the minimum requirement of each State based on discussion.<sup>28</sup>
- 3) Market trading mechanisms could also be used amongst nations and domestically in the form of water quota, water entitlement or water pricing. Such a mechanism for carbon emissions trading amongst developed countries were provided under the Kyoto Protocol and similar mechanism for water trading could be developed for capping overall usage. Developing, least developed and vulnerable countries should be assisted technologically, financially, etc. in developing efficient usage of water. Mechanisms similar to Carbon Border Adjustment

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<sup>27</sup> Gabriel Eckstein, *Water Scarcity, Conflict, and Security in a Climate Change World: Challenges and Opportunities International Law and Policy*, 27 Wis. Int'l L.J. 443-448 (2009).

<sup>28</sup> *Id.* at 454.

Mechanism, which levies tariffs on products based on carbon emissions, could be developed for putting tariff on products which has consumed a lot of water.<sup>29</sup>

4) There is a need to have more integrated approach towards regulation of water rather than regulating it in fragmented and sectoral approach. More considerations such as water scarcity, changing hydrological cycle, environmental considerations, human rights also needs to be taken into account for formulating an integrated regulation of water at international level. Water availability cannot be bound by the principle of sovereignty as it is not determined at the national level.<sup>30</sup> Water availability is largely dependent on rainfall which is going to be altered due to changing dynamics as a result of climate change. Water needs to be seen as a global problem.<sup>31</sup>

5) Principles such as duty to cooperate, polluter pays, sustainable development (sustainable use of water by industries, Public Trust Doctrine, Water Impact Assessment need to used more internationally for equitable distribution of water resources across world.

## **CONCLUSION**

In conclusion, it is evident that climate change has exacerbated the water crisis, making it imperative for governments, international organizations, and civil society to prioritize water management and strengthen international cooperation. Effective and comprehensive water management strategies must be implemented at both the national and international levels to ensure sustainable access to clean water for present and future generations. Furthermore, it is crucial for governments and international organizations to work collaboratively towards the development of robust international water laws and agreements, with a focus on equitable water allocation, transboundary cooperation, and climate change adaptation. To achieve these goals, all stakeholders must be actively engaged and committed to addressing the water crisis, recognizing it as a global challenge that requires collective action. International water law is currently anchored in principles of riparian sovereignty and equitable utilization that emerged in a pre-climate crisis era. However, the worsening disruptions to Earth's hydrological cycle driven by

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<sup>29</sup> *Id.* at 454.

<sup>30</sup> *Supra* note 2 at 234.

<sup>31</sup> *Supra* note 2.

climate change reveal the inadequacies of existing legal paradigms for dealing with intensifying water stresses, conflicts and inequities.

The climate emergency fundamentally changes the basic hydrological assumptions that water treaties were premised on regarding predictable river flows and recharge patterns. By 2050, climate impacts are projected to significantly alter global and regional water budgets through increased incidents of drought, flooding, salinization and groundwater depletion.<sup>32</sup> This will exacerbate competition over transboundary waters, especially in water-scarce regions like Africa and the Middle East. International water law in its current form lacks the ethical frameworks, cooperation mechanisms and adaptive capacity needed to avert dangerous water conflicts and uphold community rights in this climate-altered world.

Fundamentally reforming international water law by integrating principles of climate justice, human rights, decolonization and care ethics can enable cooperative governance of shared waters. Moving beyond dated notions of absolute state sovereignty towards shared responsibility and stewardship of interconnected basins is vital.<sup>33</sup> Participatory frameworks giving voice to women and indigenous communities in water treaties can make law more equitable and responsive to social vulnerabilities. Integrating flexibility, solidarity and ecological integrity into law through a care-centered approach is indispensable for inter-generational justice. As the climate crisis renders historical water allocation accords obsolete, reinventing international water law along ethical lines becomes imperative to govern waters sustainably and peacefully.

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<sup>32</sup> IPCC (2022). Climate Change 2022 Impacts, Adaptation and Vulnerability Report. <https://www.ipcc.ch/report/ar6/wg2/>

<sup>33</sup> Rieu-Clarke, A. (2022). Bits and pieces or systemic change? Developing international law to improve transboundary water governance. *The International Journal of Human Rights*, 1-16.