

Water Security and Hydro-Political Complexity in Africa: Analyzing Environmental–Political Interactions in the Lake Chad Basin

الأمن المائي والتعقيد الهيدروسياسي في أفريقيا: دراسة التفاعلات البيئية والسياسية في حوض بحيرة تشاد

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Abstract :

This study addresses the issue of water security in the Lake Chad Basin as a representative model of the interaction between environmental, political, and security factors within the African hydro-political complex. The severe decline in the lake's resources—caused by climate change, human pressures, and mismanagement—has led to the escalation of local and regional conflicts and the rise of armed group activities. The study adopts a composite analytical approach that combines the Environmental–Political framework with the concept of the Hydro-Political Complex to examine the dynamics of water security in the region. It concludes that addressing the Lake Chad crisis requires reconstructing regional water governance and strengthening environmental–security integration as a pathway toward achieving stability and peace in the African Sahel region.

Keywords : Water Security; Hydro-Political Complex ;Lake Chad; Africa; Regional Cooperation.

ملخص:

تتناول هذه الدراسة إشكالية الأمن المائي في حوض بحيرة تشاد بوصفها نموذجاً معبراً عن تفاعل العوامل البيئية والسياسية والأمنية في المركب الهيدروسياسي الإفريقي. فالتراجع الحاد في موارد البحيرة، الناتج عن التغيرات المناخية والضغط البشري وسوء الإدارة، أدى إلى تصاعد النزاعات المحلية والإقليمية وتنامي أنشطة الجماعات المسلحة. تعتمد الدراسة منهجاً تحليلياً مركباً يجمع بين المقاربة البيئية–السياسية (Environmental–Political Approach) ومفهوم المركب الهيدروسياسي (Hydro-Political Complex) لفهم ديناميات الأمن المائي في المنطقة. وتخلص إلى أن معالجة أزمة بحيرة تشاد تتطلب إعادة بناء الحوكمة المائية الإقليمية وتعزيز التكامل البيئي–الأمني كمدخل لتحقيق الاستقرار والسلم في منطقة الساحل الإفريقي. الكلمات المفتاحية: الأمن المائي، بحيرة تشاد، المركب الهيدروسياسي، أفريقيا، الحوكمة المائية.

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Introduction:

Water constitutes one of the most fundamental structural components of both human and national security. Its significance transcends the natural dimension as a vital resource, functioning instead as a strategic determinant of power, development, and stability within and among states. As much as water embodies the condition of life and the continuity of ecosystems, it also represents a highly sensitive geopolitical resource, where environmental, economic, political, and security considerations intersect. With the escalation of global challenges such as climate change, the growing demographic pressure on natural resources, and the widening gap of water justice between the Global North and South, the concept of *water security* has emerged as a central theme in contemporary literature on human and regional security.

Recent experiences across various regions of the world—particularly in Africa—demonstrate that environmental degradation and water scarcity not only generate developmental crises but can also evolve into structural factors of armed conflict and institutional fragility. Lake Chad stands out as one of the most illustrative cases of this complex interplay between environmental, political, and security variables. Over the past few decades, it has transformed from a source of life and a pillar of economic integration among its riparian states into a hotspot of environmental, humanitarian, and security tensions—an embodiment of what can be described as the *African hydro-political complex*, where resource scarcity intersects with institutional weakness and the expansion of armed groups.

The Lake Chad Basin—home to more than thirty million people who depend on its resources for agriculture, pastoralism, and fishing—is currently experiencing a dramatic decline in water levels due to climate change, poor water management, demographic pressures, and unsustainable consumption patterns. However, the severity of the crisis lies not only in its environmental dimension but also in its political and social ramifications. The degradation of water resources has intensified internal tensions, fueled local conflicts, and facilitated the growing influence of armed organizations that have exploited the developmental and security vacuum as fertile ground for recruitment and expansion.

This study seeks to analyze the dynamics of water security in the Lake Chad Basin through an integrated approach that connects environmental, political, and security dimensions. It employs the framework of the hydro-political complex to interpret the cross-border interactions among riparian states. The central research question is as follows: How do environmental degradation, political fragility, and security instability contribute to reshaping the equations of water security in the Lake Chad Basin?

The study's main hypothesis posits that the degradation of water resources in the basin driven by climate change, human pressures, and poor governance acts as a multiplier of regional fragility and redefines the security landscape across the African Sahel. The research aims to deconstruct the mechanisms of this interaction by examining the interlinkages between water resources, institutional structures, and security threats, thereby providing a deeper understanding of water security as a strategic variable that transcends technical approaches and enters the broader space of human and geopolitical security.

Section I: Water Security and the Hydro-Political Complex in Africa

Water security has emerged as one of the most dynamic concepts in contemporary security and environmental studies, owing to its intersection with issues of sovereignty, development, and regional stability. Water-related challenges are no longer perceived merely as matters of resource availability or technical management; rather, they have become a central axis for understanding power relations and interstate dynamics particularly in regions that share common hydrological systems. In this context, the analysis of water security acquires a dual significance: on the one hand, it reflects a state's capacity to achieve self-sufficiency and guarantee citizens' fundamental rights; on the other, it serves as an indicator of the nature of regional relations and the degree of cooperation or tension among actors sharing transboundary resources.

In Africa where environmental, political and economic factors are deeply intertwined the issue of water security assumes a multidimensional and complex character that transcends technical considerations to encompass the geopolitical stakes of sustainable development. Therefore, a theoretical framework that integrates the concept of water security with that of the hydro-political complex provides an appropriate analytical tool for understanding the nature of water-related interactions on the continent, and for explaining how water transforms from a source of life into a strategic determinant within the broader equation of regional security.

A) subtitle: The Concept and Theoretical Evolution of Water Security

The concept of water security is inherently multidimensional and complex, combining human needs with geopolitical imperatives. Water is no longer viewed merely as a natural resource, but as a fundamental determinant of political stability and sustainable development both within and among states. Since the 1990s, the notion of water security has evolved from a primarily technical approach, focused on resource management, to a more holistic perspective that situates water within the broader framework of human security, encompassing economic, environmental, and health dimensions.¹

Contemporary literature in international relations has redefined water security within the wider context of non-traditional security, framing it as the ability of individuals and states to ensure adequate quantities of acceptable-quality water for sustainable development, while minimizing associated risks.² In this sense, water becomes a structuring element in the relationship between state and society, as the efficiency of its distribution and governance reflects the capacity of institutions to respond to environmental and social pressures.³

Moreover, recent critical approaches have transcended the realist view that confines water issues to the logic of scarcity and conflict, emphasizing instead that water disputes are not an inevitable outcome of scarcity, but rather a manifestation of unequal political structures and weak governance systems.⁴ Consequently, water security should not be measured solely by the availability of resources, but by the degree of equity in distribution and the resilience of systems in sustaining water supplies amid climate change and demographic pressures.

B) subtitle: The Hydro-Political Complex as an Analytical Framework

The concept of the Hydro-Political Complex emerged in the early 2000s as an analytical tool for examining transboundary water relations, particularly within shared river basins.⁵ This concept refers to a network of states connected through shared water resources, where their domestic and

foreign policies become interlinked due to their mutual dependence on these resources. According to this framework, the nature of interstate relations within a basin whether cooperative or conflictual is determined by factors such as the degree of water scarcity, the strength of institutional structures, and the balance of power among riparian actors.⁶

According to Anthony Turton, the hydro-political complex constitutes “a regional system of interdependence in which water-related interactions transcend national boundaries and become a determinant of collective security.”⁷ Similarly, Zeitoun and Mirumachi argue that hydro-political interaction results from a blend of material dynamics (such as scarcity and hydrological flows) and political dynamics (including interests, control, and legitimacy).⁸

Recent scholarship demonstrates that understanding transboundary water relations can no longer rely solely on technical or hydrological perspectives; rather, it requires adopting a hydro-political approach that analyzes the interplay between environmental, political, institutional, and social factors within an interconnected regional context. Water has thus evolved into a strategic variable in regional power configurations and a key driver of both conflict and cooperation among riparian states.⁹

The hydro-political complex, developed by scholars such as Waterbury, Brauch, and Meissner, represents an extension of the Regional Security Complex Theory formulated by Barry Buzan and Ole Wæver within the Copenhagen School of Security Studies.¹⁰ It refers to an interdependent network of states sharing water resources, in which both water and political security are deeply intertwined—meaning that the security of one state is contingent upon that of its neighbors, depending on factors such as resource distribution, institutional fragility, and the level of cooperation.¹¹

This analytical framework emphasizes that transboundary water relations are not governed solely by physical scarcity but also by the quality of governance and the nature of legal and institutional arrangements among stakeholders. In Africa, for example, weak institutional capacity, poor environmental governance, and increasing demographic pressures amplify the risks of hydro-political tensions.¹² Nevertheless, empirical evidence shows that the establishment of river basin organizations can transform water from a source of conflict into an arena of regional integration, as illustrated by cooperative initiatives in the Niger and Senegal basins.¹³

The hydro-political complex framework holds particular significance in the African context, where most major river basins—such as the Nile, Niger, Congo, and Lake Chad exemplify what has been termed “complex hydropolitics.” These systems reveal the convergence of environmental, political, and socio-security challenges.¹⁴ Ensuring water security in such regions therefore requires integrated regional governance that harmonizes environmental, developmental, and security dimensions, grounded in the principles of equitable utilization and sustained cooperation.

In sum, the concept of the hydro-political complex provides a vital theoretical lens for understanding water security in Africa. It highlights the intricate interdependence between natural resources and political structures, reframing the discourse on water from one centered on scarcity and conflict to one emphasizing shared management and collective responsibility. Through this perspective, the Lake Chad Basin can be understood not merely as an ecologically degraded zone but as a complex political–environmental system, in which water resources actively reshape relationships between states and local communities. When water governance is effective, shared

resources can become a stabilizing factor; in its absence, they risk becoming catalysts for regional tension.¹⁵

C) subtitle: Water Security in Africa: Between Structural Challenges and Geopolitical Stakes

Africa is among the world's most water-insecure regions, containing nearly 60 percent of the planet's transboundary river basins, while the continent's average per capita renewable freshwater availability does not exceed 5,000 cubic meters per year—a figure far below the global average. This structural vulnerability renders African water security contingent upon factors that often transcend national control, including climate change, desertification, and institutional fragility.

According to the World Bank's report *Water in Africa: Resilience and Inclusion* (2022), over 250 million Africans currently face severe water scarcity, a condition contributing to GDP losses of up to 6 percent annually in some countries.¹⁶ Similarly, the United Nations Environment Programme (UNEP) stresses that the failure to manage shared river basins effectively remains one of the most significant causes of modern environmental conflicts.¹⁷

The uniqueness of the African context lies in the interaction between material scarcity and institutional weakness, where environmental constraints intersect with political and ethnic identities, transforming water resources into instruments of domination or resistance. Consequently, water security in Africa transcends the technical dimension to become a geopolitical stake, reshaping the configuration of power and regional relations—a phenomenon particularly evident in the case of the Lake Chad Basin.

Section II: The Lake Chad Basin: Between Environmental Degradation and Hydro-Political Fragility

The Lake Chad Basin forms part of Africa's extensive sedimentary systems, geologically referred to as the Interior African Basin. Its origins date back to the Tertiary Period, when tectonic movements caused crustal subsidence, producing a closed inland depression. Over millions of years, sediment accumulation shaped a low-lying terrain conducive to surface water retention and groundwater recharge.¹⁸

A) subtitle: Geographical Location and Topographical Features

Situated in Central Africa, the Lake Chad Basin encompasses parts of four primary riparian states—Chad, Nigeria, Niger, and Cameroon—while extending peripherally into the Central African Republic, Sudan, Algeria, and Libya, which are hydrologically connected through subsurface aquifers.¹⁹ The basin covers approximately 2.5 million square kilometers, representing nearly 8 percent of the African continent, making it one of the world's largest endorheic (closed) basins.²⁰

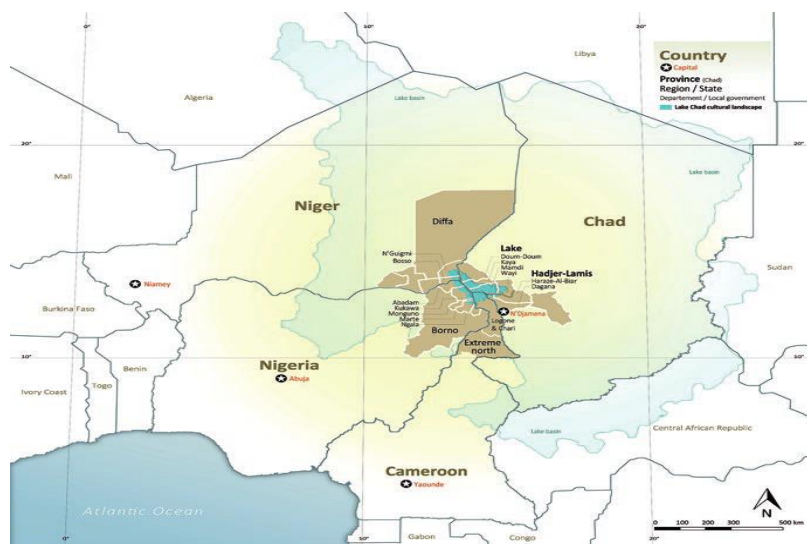
In the 1960s, Lake Chad covered more than 25,000 km², ranking as the sixth largest lake globally and the fourth largest in Africa; however, it has since shrunk by over 90 percent due to climatic variability and unsustainable resource management.²¹ The basin's geomorphology ranging from deserts and semi-arid plains to plateaus strongly influences water flow and hydrological distribution.²²

Today, the basin sustains over 30 million inhabitants dependent on agriculture, fishing, and pastoralism. With no maritime outlet, Lake Chad occupies a pivotal position between 12°–20° N

latitude and 13°00'–15°20' E longitude. Although Algeria, Libya, Sudan, and the Central African Republic are not riparian states, they remain indirectly linked through groundwater flows and climatic interdependencies.²³

Hydrologically, the basin functions as the drainage terminus of one of Africa's largest inland water systems in the central-western region. Its hydrological and traditional boundaries are divided into two distinct zones, as illustrated in Figure 4: Traditional and Hydrographic Boundaries of the Lake Chad Basin.²⁴

Figure 1: The Traditional and Hydrographic Basin of Lake Chad



UNESCO and Lake Chad Basin Commission (LCBC). *Lake Chad Cultural Landscape Nomination Dossier*. Paris: UNESCO World Heritage Centre, 2018, p. 18.

The map illustrates a precise differentiation between the *traditional basin* and the *hydrographic basin* of Lake Chad, reflecting the complex hydrological and political structure of the region. The traditional basin (LCBC Conventional Basin), shown in dark brown, represents the administrative domain under the mandate of the Lake Chad Basin Commission (LCBC). It encompasses the riparian territories of Chad, Nigeria, Niger, and Cameroon, covering an area of approximately 967,000 km². This basin constitutes the legal and institutional framework governing regional cooperation in water management, agriculture, and desertification control.

In contrast, the hydrographic basin, depicted in transparent green, extends beyond the political boundaries of the traditional basin to include wider areas reaching into central Niger, northern Cameroon, southern Libya, and parts of Sudan, with an estimated surface area of about 2.4 million km². It comprises a network of primary tributaries feeding the lake, most notably the Chari River, which provides nearly 90% of the annual inflow, along with the Logone River from Cameroon and seasonal streams such as the Komadougou Yobe River along the Nigeria–Niger border.

The map thus reveals the distinction between institutional and ecological water boundaries: while the traditional basin follows an administrative–political logic, the hydrographic basin reflects the natural hydrological reality of water distribution. This divergence constitutes a fundamental factor behind the complexity of water governance and the heightened hydro-political risks in the

region. The overlap and misalignment between institutional and natural domains hinder the development of an integrated and sustainable water management system. Therefore, adopting a comprehensive basin-based approach that harmonizes environmental and legal dimensions is essential for mitigating tensions and achieving regional water security.

1. The Conventional Basin of Lake Chad

The conventional (primary) basin covers approximately 20% of the total area of the Lake Chad Basin, representing about 427,500 km². This area corresponds to the officially recognized jurisdiction under the Lake Chad Basin Commission (LCBC).

Table 1: Distribution of the Conventional Basin Area among LCBC Member States

Country	Basin Area (km ²)	Share of Basin Area (%)	Basin Area as % of National Territory
Cameroon	56,800	6%	12.12%
Niger	162,375	17%	12.70%
Nigeria	188,000	19%	22.15%
Chad	361,980	36%	28.42%
Central African Republic	197,800	22%	37.75%

Lake Chad Basin Commission (LCBC). *Water Resources and Sustainable Development Report in the Lake Chad Basin*. N'Djamena, Chad: LCBC, 2016, p. 12.

2. The Hydrographic Basin of Lake Chad

Table 2: Distribution of the Hydrographic Basin Area of Lake Chad among Riparian States

Country	National Area (km ²)	Basin Area (km ²)	% of Total Basin Area	% of Basin from National Territory	Mean Annual Rainfall (mm)
Nigeria	923,770	179,282	7.5%	19.4%	670
Niger	1,267,000	691,473	29.0%	54.6%	105
Algeria	2,381,740	93,451	3.9%	3.9%	20
Sudan	2,505,810	101,048	4.2%	4.0%	585
Central African Republic	622,980	219,410	9.2%	35.2%	1,215
Chad	1,284,000	1,046,196	43.9%	81.5%	400
Cameroon	475,440	50,775	2.1%	10.7%	1,010
Total	—	2,381,635	100%	—	415 (average)

A comparison between Tables (1) and (2) reveals a fundamental distinction between the *conventional* and the *hydrographic* basins of Lake Chad, reflecting the duality between institutional and natural perspectives in the governance of shared water resources. The conventional basin, covering approximately 427,500 km², represents the legal and administrative framework under which the Lake Chad Basin Commission (**LCBC**) operates. It encompasses five member states Chad, Nigeria, Niger, Cameroon, and the Central African Republic (which joined in 1999) and

constitutes the active basin area, where most development, anti-desertification, and water management initiatives are implemented.

By contrast, the hydrographic basin extends over a much larger area of about 2.38 million km², incorporating seven countries, including Algeria and Sudan, which are not directly riparian but remain hydrologically connected through subsurface aquifers and intermittent drainage systems. This broader hydrological scope highlights the complex, transboundary nature of the basin, which transcends political boundaries and underlines the basin's ecological interdependence at the regional level.

The significant gap between the administrative and the hydrological boundaries underscores the challenges of multi-level water governance in the Lake Chad region. On one hand, the LCBC provides a structured institutional mechanism for cooperation, yet it does not encompass all the states affected by the basin's hydrological system. On the other hand, the wide hydrological reach necessitates integrated management approaches that combine surface and groundwater systems while reconciling environmental, developmental, and security dimensions.

Therefore, achieving regional water security in the Lake Chad area requires broadening the scope of basin governance to include the entire hydrographic system and establishing mechanisms of coordination that transcend the current conventional framework. Such an approach would enable a more holistic and sustainable model of hydropolitical cooperation, better equipped to address the mounting challenges of climate change, demographic pressure, and ecosystem degradation.

The case of the Lake Chad Basin vividly illustrates the complex hydropolitical nature of Africa, where environmental, geopolitical, and institutional dimensions converge. Water, in this context, is not merely a natural resource but an active agent in reshaping regional power dynamics and defining patterns of cooperation and competition among states. Hence, Lake Chad can be viewed as a microcosm of the broader African Hydro-Political Complex, in which resource fragility intersects with weak governance and limited regional integration—making water security not solely an environmental issue but a strategic pillar in the architecture of regional security across the continent.

Figure (2): Distribution of Water Tributaries in the Lake Chad Basin



Julien Bouchez et al., “Hydrological Modeling of the Lake Chad Basin: Present Situation and Future Scenarios,” *Hydrology and Earth System Sciences Discussions* 22, no. 4 (2021): p.126

Map No. (1) is among the most significant illustrative maps that delineate the hydrographic structure of the Lake Chad Basin. It highlights the sub-basins and main tributaries feeding the lake, as well as the extensive regional interconnectedness that characterizes this hydrological system. The map shows that the basin spans across eight African countries to varying degrees Chad, Nigeria, Niger, Cameroon, Sudan, the Central African Republic, Algeria, and Libya making it one of the most complex basins in the continent from a geo-hydrological perspective.

The outer boundaries of the basin are clearly marked in red, representing the full hydrographic extent of the system, while the blue lines trace the network of rivers and tributaries that flow into the lake. The Chari River, originating from the south and flowing through Chad and Cameroon, is the principal source of freshwater for Lake Chad, contributing approximately 90% of its annual inflow. The map also identifies the Logone River, the main branch of the Chari, and the Komadougou–Yobe River, which forms the natural border between Nigeria and Niger on the western side of the basin.

In addition, the map depicts several seasonal sub-basins, such as the Yaérés floodplains in northern Cameroon, Lake Fitri, and the Salamat region within Chad these represent internal hydrological extensions that are directly influenced by the fluctuation of Lake Chad’s water levels. The northern areas of the basin, particularly in Niger and Libya, exhibit high hydrological fragility, reflecting a marked ecological asymmetry in water availability between the northern and southern zones of the basin.

From a hydropolitical standpoint, this map carries substantial analytical significance. It reveals the intricate spatial overlap between the natural boundaries of rivers and lakes and the political borders of states, thereby illustrating how water resource management in the Lake Chad Basin inherently transcends national sovereignty. The interweaving of river tributaries and zones of political influence lies at the core of the Hydro-Political Complex framework, which explains how water security concerns are deeply intertwined with regional security dynamics. Consequently, understanding the spatial distribution of tributaries and drainage systems, as illustrated in this map, constitutes a crucial step in analyzing the patterns of conflict and cooperation within the basin.

B) subtitle: Hydrological Background of the Lake Chad Basin

The Lake Chad Basin represents one of the largest and most ecologically significant inland drainage systems in Africa. It covers an area estimated at 2.5 million square kilometers, shared primarily among Chad, Nigeria, Niger, and Cameroon, in addition to non-riparian countries influenced by the basin’s hydrological system such as the Central African Republic and Sudan.²⁵

Geomorphologically, the basin consists of two main zones: a humid southern basin, which receives the majority of inflows through the Chari and Logone Rivers, and a semi-arid northern basin, which relies heavily on groundwater reserves and seasonal runoff.²⁶ The Chari River and its tributaries account for over 90% of the lake’s total inflow, rendering the system highly dependent on a single hydrological source—a factor that constitutes a structural vulnerability within the basin.²⁷

During the 1960s, Lake Chad covered an area of approximately 25,000 km², ranking as the fourth-largest lake in Africa at the time. However, it has since shrunk by over 90% during the past five decades, reaching less than 1,500 km² in some periods.²⁸ This dramatic contraction results from a combination of interrelated factors, including shifts in rainfall patterns, rising temperatures, unsustainable resource exploitation, and unregulated agricultural expansion along the lake's shores.²⁹

Hydrological data from the United Nations Environment Programme (UNEP) indicate that the annual precipitation in the basin area has declined from around 320 mm in the 1970s to 210 mm over the past two decades, while surface water flows have decreased by approximately 75% compared to pre-drought levels in the same period.³⁰ This hydrological decline has been accompanied by severe biodiversity loss, with numerous fish and crop species disappearing species that once sustained local livelihoods.³¹

These hydrological transformations are not merely environmental in nature; they represent a structural shift in the region's socio-economic dynamics. The diminishing water levels have reconfigured local economies, weakened the interdependence of traditional communities, and created new patterns of vulnerability and instability across the basin.

Section III: Causes of Lake Chad's Shrinkage

Lake Chad has long been one of the most vital hydrological bodies in the Sahel region, serving historically as a lifeline for human settlement, agricultural productivity, and regional stability. Today, however, it stands among Africa's most ecologically fragile systems, having lost more than 90% of its surface area compared to its extent in the 1960s, when it spanned approximately 25,000 km².³²

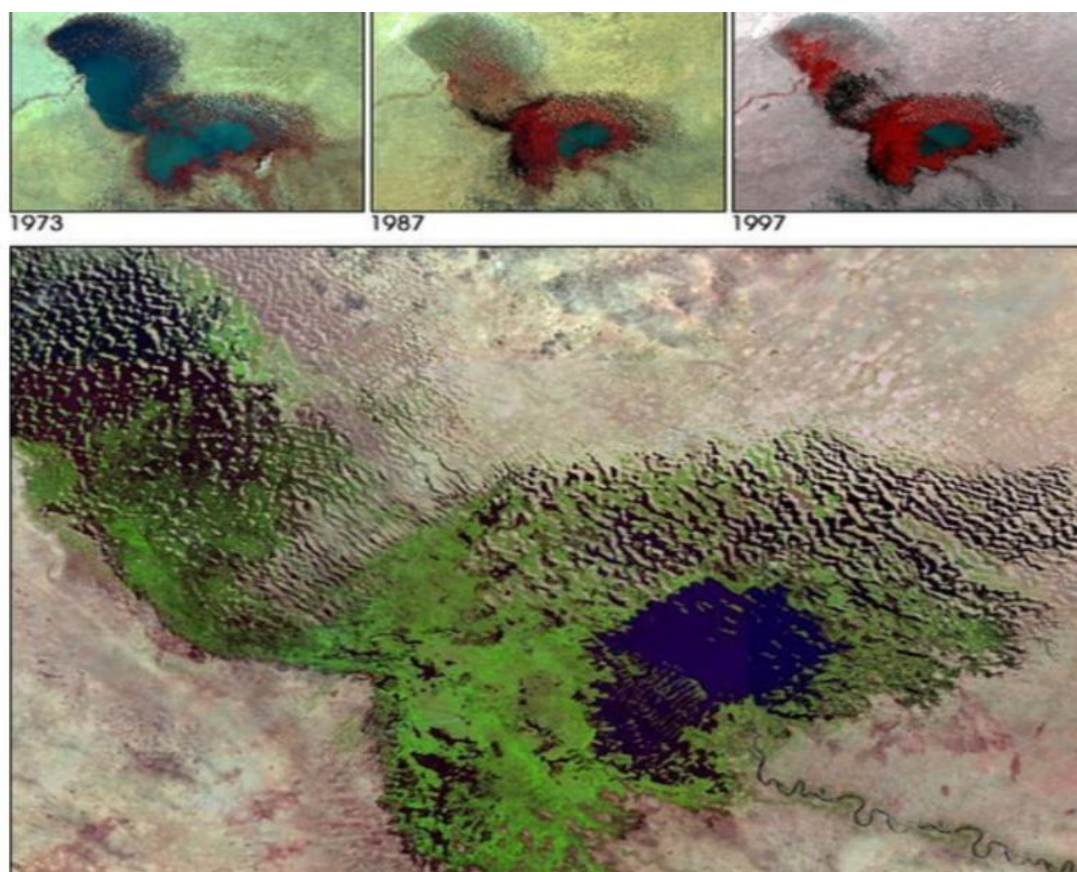
Geological evidence suggests that, thousands of years ago, the lake covered nearly 400,000 km², forming what is known as "Mega-Chad", a prehistoric super-lake that once dominated the central African landscape. This long-term variability underscores the dynamic nature of the basin's ecosystem and its sensitivity to climatic oscillations.³³

Table 3. Historical Evolution of Lake Chad Surface Area (Estimated)

Period / Year	Estimated Lake Area (km ²)	Remarks
Before Christ to Medieval Period	Over 400,000	Known as " Mega-Chad " – the largest inland lake in Africa
1960–1963	~25,000	Highest recorded level in modern history
1970–1985	~15,000–10,000	Beginning of major shrinkage due to Sahel drought
2000	<2,000	More than 90% decline compared to the 1960s
2020	~1,500	Continued shrinkage under increasing human and climatic pressures
2030 (Projected)	<500 or complete desiccation	Warnings from international organizations (FAO, UNEP, LCBC)

Lake Chad Basin Commission (LCBC), *State of the Lake Chad Basin Report*, N'Djamena: LCBC Secretariat, 2020, p. 61;

Figure 3: The Recession of Lake Chad's Waters from 1973 to 2001



This significant contraction of the lake cannot be understood without considering the interconnected set of factors driving it—chiefly climatic changes on one hand, and unsustainable human practices on the other. These interrelated dynamics have produced a series of overlapping environmental, social, and political consequences that now threaten the stability of the entire region.

Figure (6) illustrates the progressive retreat of Lake Chad's waters between 1973 and 2001, highlighting the alarming pace of shrinkage that, according to recent projections, could lead to the lake's complete disappearance within the next five years if current trends persist. The average annual rainfall in the basin has dropped from 320 mm to 210 mm, primarily due to reduced inflows from the Chari and Logone Rivers, which are the lake's main tributaries.

This hydrological regression has had profound repercussions for the riparian states, leading to severe deterioration in living standards and economic hardship among local communities that depend on the lake's ecosystem for agriculture, fishing, and livestock grazing.³⁴

A) subtitle: Natural and Environmental Causes

Climatic factors represent one of the central determinants of the Lake Chad crisis. Climate change has shortened the duration of the rainy season and increased evaporation rates, thereby intensifying drought and desertification. Recent climate models indicate that the average temperature in the basin has risen by 1.5°C over the past three decades, with projections suggesting an increase of more than 2°C by 2050.³⁵

Human pressures have further exacerbated the crisis, as the region has experienced a rapid population growth rate of approximately 3% per year, leading to increased demand for water for agriculture, livestock, and domestic consumption.³⁶ This has resulted in the overexploitation of groundwater and rising pollution levels due to excessive use of fertilizers and pesticides, weakening the lake's natural regeneration capacity.

B) subtitle: Political and Institutional Factors

The fragility of water governance in the Lake Chad Basin is reflected in the limited effectiveness of the Lake Chad Basin Commission (LCBC), established in 1964 to coordinate cooperation among riparian states. Despite its symbolic importance, the Commission suffers **from** chronic financial and institutional weaknesses, which constrain its ability to implement projects or enforce collective commitments.³⁷

Moreover, the divergence of national priorities—with Nigeria focusing on counterterrorism while Chad emphasizes irrigated agriculture—has prevented the development of a unified basin management strategy.³⁸

In addition, the spread of armed groups, notably Boko Haram and the Islamic State in West Africa (ISWA), has exacerbated the crisis by exploiting state fragility and underdevelopment to expand their influence. The lake's periphery has thus become a zone of intersection between water and military security, where terrorist organizations capitalize on environmental displacement and economic deterioration to recruit youth populations, leveraging narratives of marginalization and loss of livelihoods.³⁹

C) subtitle: Geopolitical Dimension and Water Project Conflicts

Another critical aspect is the ongoing controversy over the proposed water transfer project from the Ubangi River to Lake Chad, which Chad and Nigeria regard as a strategic initiative to save the lake, whereas the Congo and Central African Republic view it as a threat to their environmental sovereignty.⁴⁰ This divergence reflects the political dimension of water conflict, where the project is employed as a negotiation instrument within the regional hydro-political complex. To date, all initiatives have failed to achieve consensus on the project's economic and environmental feasibility, primarily due to mutual distrust and regional competition.⁴¹

Section IV: Integrated Analysis: Interaction of Environmental, Political, and Security Factors in the Lake Chad Basin

The study of the Lake Chad Basin reveals that the water security crisis cannot be explained solely through the environmental dimension. Rather, it reflects a complex hydro-political assemblage shaped by interdependent structural factors that combine natural scarcity, weak governance, and human insecurity.

Environmental degradation in Lake Chad has transcended its ecological dimension to become a central factor in the intensification of social and security fragility. Agricultural and pastoral communities that have lost their livelihoods due to the lake's shrinkage have become increasingly involved in recurring disputes over land and water, resulting in hundreds of deaths and thousands of displacements each year.⁴²

The World Bank estimates that over 2.5 million people have been displaced from the lake's surrounding areas since 2000 due to drought and armed violence.⁴³ These waves of displacement have placed additional pressure on urban centers and led to the disintegration of traditional social structures that once ensured equitable resource distribution. Meanwhile, the lake has become a contested space between government forces and armed groups, hindering the implementation of any long-term developmental or environmental strategies.⁴⁴

Under these dynamics, it can be argued that water security in Lake Chad has evolved beyond a sectoral issue to become a mirror of regional security as a whole. The continued degradation of resources, in the absence of effective cooperative management, threatens to deepen humanitarian crises and expand instability across the Sahel and West Africa. Hence, the crisis can be analyzed across three interrelated levels: the environmental, the political, and the regional.

A) subtitle: Environmental Level – Climate Change as a Multiplier of Fragility

Climatic data indicate that the decline in the lake's levels is not merely a cyclical phenomenon linked to rainfall fluctuations but represents a structural environmental transformation driven by long-term climate change. Continuous temperature rises have increased evaporation rates, while erratic rainfall has reduced wetland areas, transforming vast territories into arid lands.⁴⁵

This ecological degradation has cumulative repercussions on human security, reducing arable land and fish production, thereby worsening food poverty and increasing migration and displacement.⁴⁶ Recent studies confirm that climate change does not directly cause conflict, but rather redistributes resources and risks in ways that deepen social divisions and weaken state capacity to maintain territorial control.

B) subtitle: Political Level – State Fragility and Weak Water Governance

The Lake Chad case illustrates the institutional fragility undermining the management of shared resources. Weak coordination among riparian states and divergent national priorities limit the effectiveness of collective initiatives. For instance, Nigeria prioritizes counterterrorism, while Chad views the lake as an economic lifeline, and Niger focuses on domestic agriculture and pastoralism.

This divergence produces what can be termed an “institutional fragmentation of water security”, in which resource management shifts from a collective to a nationalized framework. In the absence of binding cooperation mechanisms, the Lake Chad Basin Commission (LCBC) has lost much of its coordinating capacity, functioning more as a consultative body than as an executive authority.

Analyses by the UNDP (2022) indicate that weak water governance remains a major barrier to development efforts in the basin. Administrative corruption and inequitable resource distribution have aggravated spatial inequalities, undermining local trust in state institutions.⁴

C) subtitle: Security Level – The Nexus Between Environmental Degradation and Armed Violence

The Lake Chad region is today one of the most affected areas in Africa by “complex security”, where water security intersects with military security. The depletion of natural resources has intensified competition among local communities over land and water, fueling tribal disputes and sectarian tensions.⁴⁷

Armed groups exploit this context to recruit marginalized populations, particularly unemployed youth in drought-affected areas, through narratives of grievance and exclusion.⁸⁴⁸ Consequently, water loss has evolved beyond an environmental hazard into a political and military mobilization tool, reshaping territorial control and power relations across the region.

Moreover, the absence of sustainable development deepens local dependence on humanitarian aid, leaving communities hostage to international assistance rather than fostering autonomous resilience. Thus, water security becomes entangled in global structures of dominance over Southern resources—echoing the logic of contemporary environmental colonialism.⁴⁹

Conclusion

The Lake Chad crisis reveals that water security can no longer be understood as an isolated environmental concern, but as a strategic concept encompassing the interactions between nature, politics, and society. The loss of water resources in the region not only triggers environmental degradation but also reshapes power relations and exposes the limitations of development models based on unilateral resource exploitation.

Achieving water security in the Lake Chad Basin requires a comprehensive regional approach built upon cooperative water governance that transcends political borders and integrates environmental, developmental, and security considerations. This also demands a redefinition of the LCBC’s role, empowering it as a genuine coordinating and planning body while enhancing local community participation in resource management.

At the international level, there is a need for a more equitable climate finance framework, in which African basins are not treated as marginal spaces, but as frontlines in the global struggle against climate change. In this sense, the future of regional security in the Sahel is fundamentally tied to water security in Lake Chad. Any political or developmental stability project in the region will remain fragile unless it addresses the root of the crisis: water as both a right and a pillar of existence.

Findings

1. The multidimensional nature of water security: The Lake Chad Basin crisis is not purely environmental but results from a complex interaction between climate, politics, and governance.
2. From scarcity to fragility: Water scarcity alone does not cause conflict; institutional weakness and inequitable distribution play a decisive role.
3. Transboundary water security: The basin's water security has become a regional issue that cannot be addressed within narrow national frameworks.
4. Institutional erosion: The lack of transparency in resource management has eroded state legitimacy, paving the way for non-state actors to expand their influence.
5. Climate change as a structural factor: Climate dynamics influence security, economy, and migration, serving as a multiplier of regional fragility.

Recommendations

- 1. Strengthening Cooperative Water Governance :** The Lake Chad Basin Commission (LCBC) should be transformed from a consultative body into a **regional executive authority** with binding powers over the management of shared water resources. This requires institutional reform, sustainable financial mechanisms among member states and development partners, and the establishment of a transparent monitoring framework to ensure equitable water distribution and resource accountability.
- 2. Integrating Water Security into Regional :** Security Policies Riparian states should treat water security as an integral component of regional security, embedded within the broader framework of *human security*. Water policies must therefore be aligned with national strategies for counterterrorism, climate adaptation, and rural development.
- 3. Investing in Green Infrastructure and Sustainable Technologies :** Investment in rainwater harvesting systems, smart irrigation, and solar-powered groundwater extraction offers practical solutions to reduce hydrological pressure on Lake Chad. Adopting *Nature-Based Solutions (NbS)*, as recommended by the *World Bank (2022)* and *FAO (2023)*, can balance resource exploitation with natural regeneration and long-term resilience.
- 4. Developing a Shared Regional Hydrological Database :** A Digital Hydrological Observatory should be established among the eight countries affected by the basin, utilizing **GIS** and remote sensing technologies to monitor water, soil, and climate variations in real time.
- 5. Empowering Local Communities and Civil Society :** A participatory governance approach is essential for sustainable water management. Farmers, herders, fishers, and women must be included as active agents in decision-making processes. Decentralized governance improves compliance and reduces resource-based conflicts.
- 6. Redirecting International Climate Finance Toward Justice-Based Approaches :** Climate finance must shift from short-term humanitarian aid to productive and sustainable investment targeting communities directly affected by lake shrinkage. International institutions should adopt a *Water Justice Financing* framework to ensure fair access to resources from the *Green Climate Fund*.
- 7. Building an Alternative Regional Development Model :** A “**Lake Chad Vision 2050**” should be designed as a comprehensive development blueprint grounded in regional integration and the green economy. This vision would promote sustainable agriculture, eco-friendly fisheries, and environmental tourism — transforming the basin from a zone of crisis into a space of cooperation and shared prosperity.

Achieving water security in the Lake Chad Basin requires a multi-level alliance linking state actors, regional organizations, and international institutions. Such an approach must redefine water as both a strategic resource and a universal human right. Integrating scientific knowledge with political will is essential to bring about a structural transformation in resource governance that ensures justice, sustainability, and stability at the heart of Africa.

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